VDOT Planning

US 1 Corridor Study

AUGUST 2021

FINAL REPORT

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INTRODUCTION

This report compiles the results of the US 1 Corridor Study and includes:

- Findings from the study, which examined existing and future conditions for the US 1 (Route 1, Jefferson Davis Highway) between the proposed Commonwealth Commuter Lot to Arcadia Road in Spotsylvania County.
- Recommendations for intersection and corridor-wide improvements.
- Next steps for implementing the recommendations.

This effort is a product of collaboration between the Virginia Department of Transportation (VDOT), Spotsylvania County, and the Fredericksburg Area Metropolitan Planning Organization (FAMPO) [hereby referred to as the Stakeholder Group or Stakeholders]. This Stakeholder Group engaged the community at each stage of the study. Community input helped inform the vision for Route 1 as a corridor that supports the development and provides safe and comfortable travel for all uses and users of the roadway.

The roadmap from vision to reality is long and complex. VDOT is ready and able to champion the effort but will need the support of community leaders, transportation and planning organizations, and community members.

To see how you can help, please read on and visit:

https://www.virginiadot.org/projects/fredericksburg/route-1-corridor-planning-study,-spotsylvania-county.asp

THANK YOU

- to all the US 1 Stakeholders, community
- champions, and citizens for your
- participation in and support of the US 1
- Corridor Study! Your contributions will help
- transform US 1 (Route 1) into an even more
- transformative and accessible corridor.

STUDY BACKGROUND

The US 1 Corridor Study was conducted to identify and advance solutions that foster safe and comfortable travel for all roadway users. The study's goal was to arrive at a shared vision for the US 1 (Route 1, Jefferson Davis Highway) corridor and to better define how the corridor can evolve as development changes the street's character and travel demand along with it. The study focused on identifying the issues, opportunities, and mobility and access needs that must be met to support robust and successful multimodal travel along the corridor.

The completed study provided a clear understanding of:

- Multimodal travel needs in the corridor;
- The range of potential solutions and potential benefits and impacts of those solutions; and
- A preferred set of alternatives that are implementable and supported by VDOT and its partner agencies.

Study Location and Timeline

An approximately eight-mile section of Route 1 was evaluated for the study. The section extended from Commonwealth Drive to the Carolina County Line in Spotsylvania County, as shown in **Figure 1**. As a Corridor of Statewide Significance (CoSS) and part of the National Highway System (NHS), this corridor plays an important role in incident management along the I-95 corridor.

QUESTIONS THIS SECTION ANSWERS:

- Why did VDOT conduct the US 1 Corridor Study?
- Where did the study occur?
- Which regional partners supported VDOT during the study?

Through coordination with the Stakeholder Group, the following 12 intersections along the study corridor were identified for evaluation:

- Route 1/Commonwealth Commuter Lot Entrance
- Route 1/Route 749 (Old Telegraph Road)
- Route 1/Lad Land Drive
- Route 1/Route 608 (Massaponax Church Road)
- Route 1/Route 607 (Guinea Station Road)
- Route 1/River Run Parkway/Massaponax High School Driveway
- Route 1/Route 632 (Hickory Ridge Road)
- Route 1/Route 632 (North Roxbury Mill Road)
- Route 1/North Point Drive/Larkinchew Road
- Route 1/South Roxbury Mill Road
- Route 1/Morris Road/Mudd Tavern Road
- Route 1/Route 603 (Arcadia Road)

VDOT conducted the study between June 2019 and August 2021 (see the schedule in **Figure 2**). The project was organized into five overlapping phases, with each phase encompassing various tasks, which are detailed in this report.

A Regional Opportunity

VDOT, Spotsylvania County, and FAMPO have advanced several transportation initiatives through Virginia's SMART SCALE funding program over the past three years, including the proposed Commuter Lot at Commonwealth Drive and the widening of Mudd Tavern Road (Route 606). Both projects fall along the study corridor. The Route 1 corridor study presents another important opportunity for VDOT's partners to address regional mobility challenges and connect existing SMART SCALE projects.

VDOT convened a Stakeholder Group to represent local partners and serve as a sounding board for each step of the study. The Stakeholder Group members represented Virginia Department of Transportation (VDOT), Spotsylvania County, and the Fredericksburg Area Metropolitan Planning Organization (FAMPO). The Stakeholder Group guided the study and helped identify and evaluate alternatives that would best serve the communities living along Route 1 and the greater region.

The Route 1 corridor study presents an opportunity to address regional mobility challenges and connect existing SMART SCALE projects.

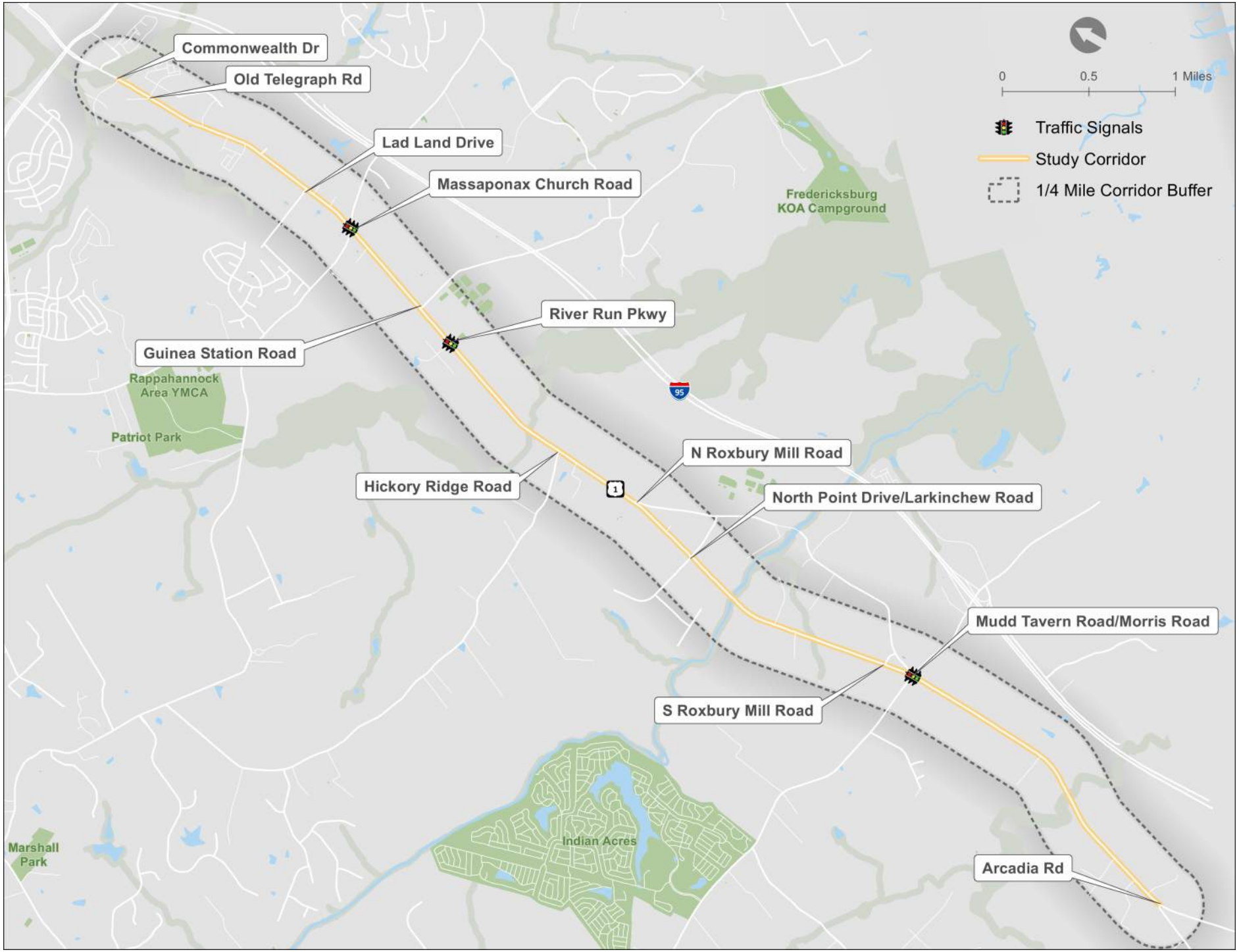
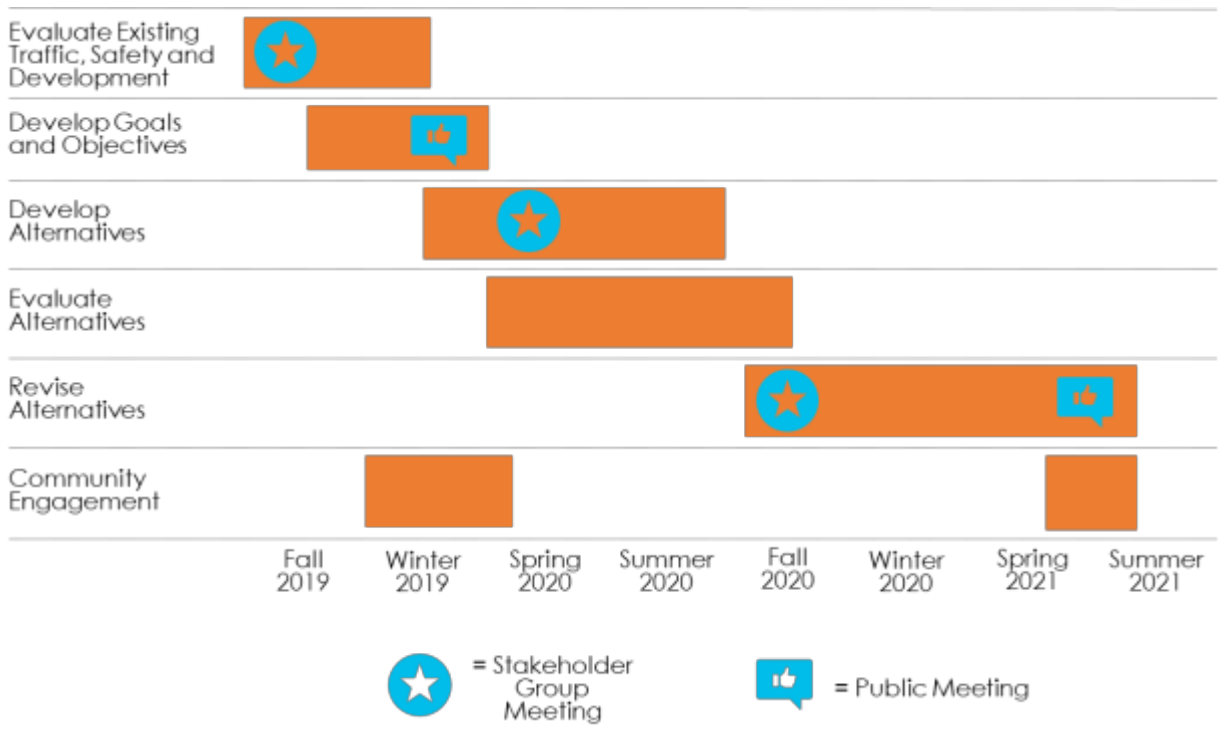


Figure 1. Study Area Map

Figure 2 Study Schedule



KEY TAKEAWAYS FROM THIS SECTION:

- The study's purpose is to develop a shared vision for the corridor and transportation solution to help Route 1 adapt to new developments.
- The study covered Route 1 between the proposed Commonwealth Commuter Lot and Arcadia Road in Spotsylvania County.
- Stakeholders from VDOT, Spotsylvania County, and the FAMPO participated.

THE PUBLIC ENGAGEMENT PROCESS

VDOT established early and continuous engagement through the public involvement process. The process engaged a diverse group of community members through a variety of channels and opportunities.

Stakeholder Group Meetings

The study team met with the Stakeholder Group four times at key study milestones. The Stakeholder Group helped establish the study's vision, goals, and objectives; helped identify alternatives; and provided feedback during the alternatives analysis process. Members of the Stakeholder Group helped develop the final set of alternatives for the study. The Stakeholder Group meetings helped VDOT gather helpful feedback and provided an additional line of communication between the study team, communities along Route 1, and local leadership bodies.

Public Outreach

The study team gathered input and feedback from the public at virtual community meetings at two key phases of the study. The first set of meetings were held to evaluate the study's draft vision, goals, and objectives. The second meeting gathered community feedback on the study alternatives.

QUESTIONS THIS SECTION ANSWERS:

- How did VDOT engage local and regional decision-making entities in the study?
- How did VDOT engage community members in the study?

PHASE 1 GOALS AND PRIORITIES MEETINGS

The study team virtually engaged the public to review and assess the study planning process, vision, goals, objectives. Additionally, issues and opportunities identified through existing conditions data collection and analysis were discussed. The study used both a study website and a goals and priorities survey to collect information. The survey sought public feedback on the study goals and objectives and input on multimodal issues and opportunities on Route 1. Over 415 people participated in the survey, with thirty-two percent of participants living along Route 1. The results were used to finalize the study's vision, goals, and objectives and inform the initial study alternatives. The goals and priorities survey was open for the last two weeks of May 2020 (May 17th to June 2nd).

Figure 3 Phase 1 Virtual Public Engagement

PHASE 2 ALTERNATIVES MEETING

The study team conducted an online public meeting with community members in June 2021 to present and solicit feedback on the alternatives being considered. Twenty people participated in the live meeting.

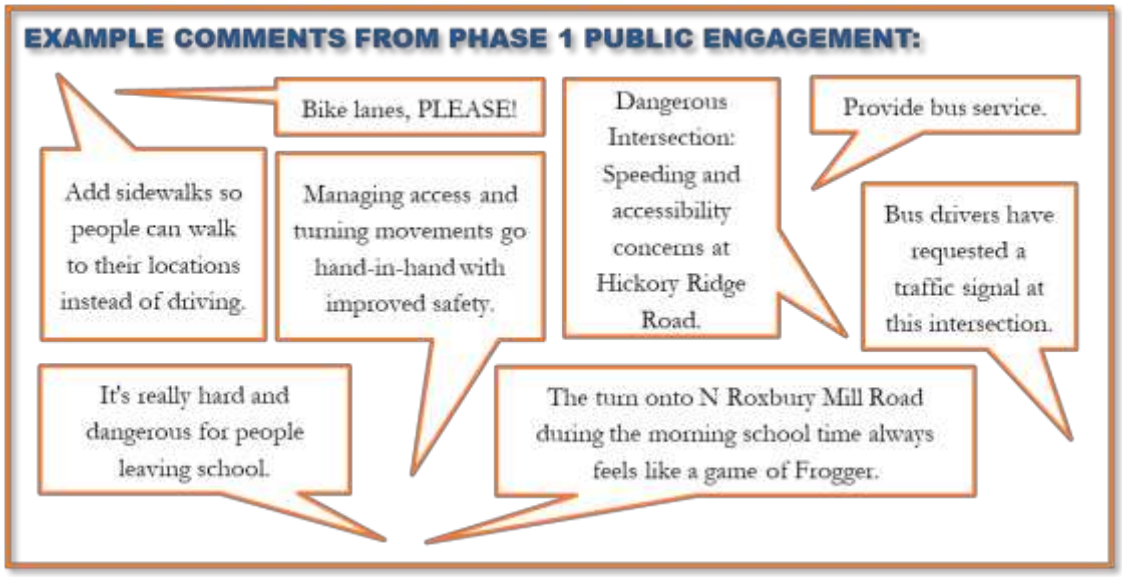
This meeting was supplemented with a survey to gather feedback on the design concepts described in the next section. The study team collected nine responses to this survey. For each of the concepts presented, the public was able to describe what they liked about it and any concerns. In cases where multiple options were provided for an intersection, the public was able to indicate which concept they preferred.

KEY TAKEAWAYS FROM THIS SECTION:

- VDOT convened a Stakeholder Group composed of local and regional agency representatives to serve as a sounding board during every stage of the study.
- VDOT held virtual community meetings and hosted interactive online surveys to gather community input on study goals, priorities, and alternatives.

Figure 4 Phase 2 Public Engagement

Figure 5 Example Comments from Phase 1 Public Engagement



WHY ROUTE 1 AND WHY NOW?

The study team reviewed existing conditions on Route 1 to understand land uses, multimodal travel patterns, and safety trends. The review highlighted possible future improvement opportunities on the corridor. *See Appendix A for the full details of the existing and future no-build conditions analysis.*

QUESTIONS THIS SECTION ANSWERS:

- What are the land use and transportation challenges facing Route 1 today?
- What opportunities exist to address the challenges facing Route 1?

Corridor Opportunities & Challenges

As a key regional connector and site of future developments, Route 1 has unique opportunities but also faces distinctive challenges. These include:

- Isolated stretches of sidewalk are present along Route 1 near recent redevelopments but do not connect residences with commercial or retail areas. In addition, there are no transit options or bicycle facilities present of the study corridor, as shown in **Figure 6**. The Phase 1 Public Engagement revealed that only 1% of survey participants currently walk and/or bike on Route 1, but 73% of respondents expressed that they would be interested in walking along Route 1 if pedestrian improvements were implemented along this study corridor (see **Figure 7**).
- Route 1 plays an important role in incident management along I-95 as it serves as an alternative north-south route. The public expressed a need for Route 1 to continue to operate well even with traffic that may be rerouted from I-95.
- The top four transportation challenges survey participants observed along the study corridor included traffic congestion, location and quality of sidewalks, speeding, and access to driveways. These results are shown in **Figure 8** below.
- As shown in **Figure 9**, rear-end crashes (153 total) and angle crashes (118 total) make up over 70% of crashes. Five of the six head-on crashes resulted in an injury. Head-on crashes have a higher proportion of injuries exhibited than in the total reported crashes for the study corridor (34% of study corridor crashes resulted in injury or fatality). 41 percent of corridor crashes over the past five years of available data occurred at intersections, as shown in **Figure 10**. This suggests that Route 1 could benefit from improvements at both the intersection and corridor-wide levels.
- The character and feel of Route 1 vary throughout the approximately eight-mile study corridor, primarily due to changes in zoning and adjacent land uses within the various sections. Each of these sections has different demands, but the corridor requires connectivity between them.

- As shown in **Figure 11**, three of the twelve study intersections currently operate at Level of Service (LOS) E or LOS F in the weekday a.m. or p.m. peak hours. These intersections are:
    - Route 1/Lad Land Drive (LOS F in p.m. peak),
    - Route 1/Guinea Station Road (LOS F in a.m. and p.m. peak hours), and
    - Route 1/North Roxbury Mill Road (LOS E in the a.m. peak hour).
- Route 1 is expected to experience significant increases of traffic through regional growth and in-process developments. This additional growth is expected to cause deterioration in the LOS at eight of the study intersections. By 2030, it is expected that nine of the twelve intersections will operate at LOS E or LOS F in the weekday a.m. or p.m. peak hours (shown in **Figure 12**).

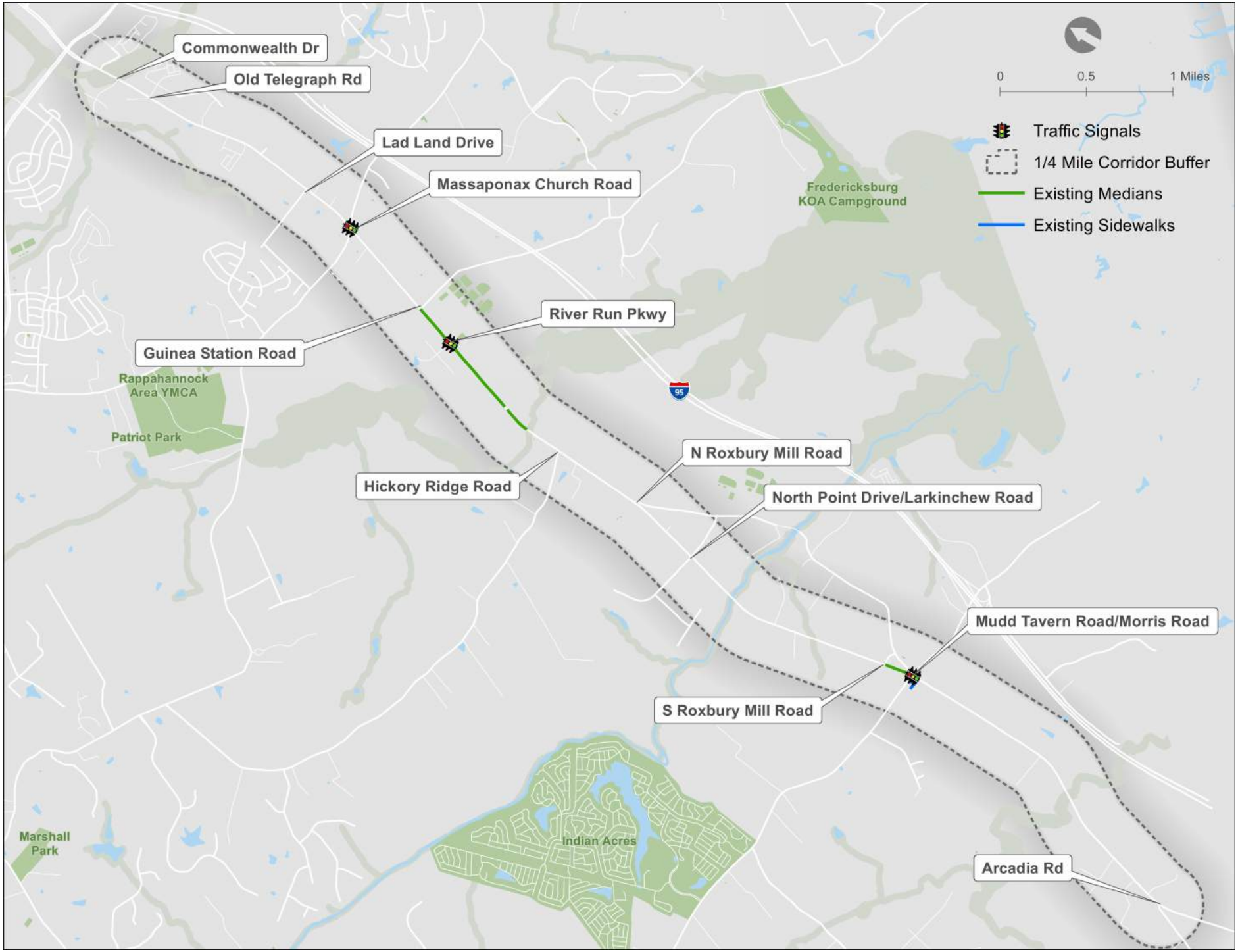


Figure 6. Existing Multimodal Facilities

Figure 7 How Survey Respondents Travel Along Route 1

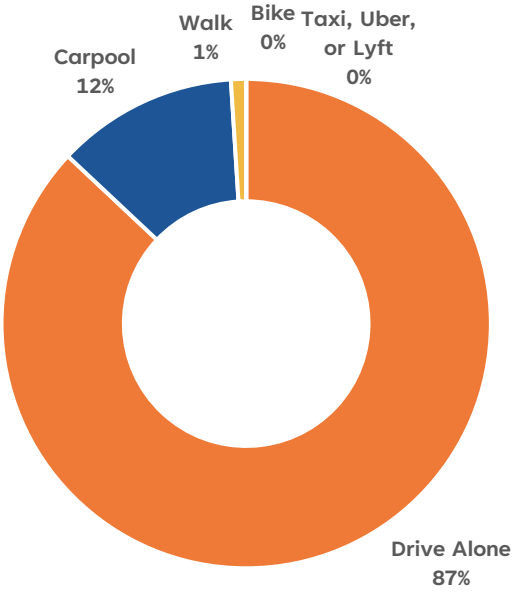


Figure 8 "What transportation problems have you observed along the study corridor?"

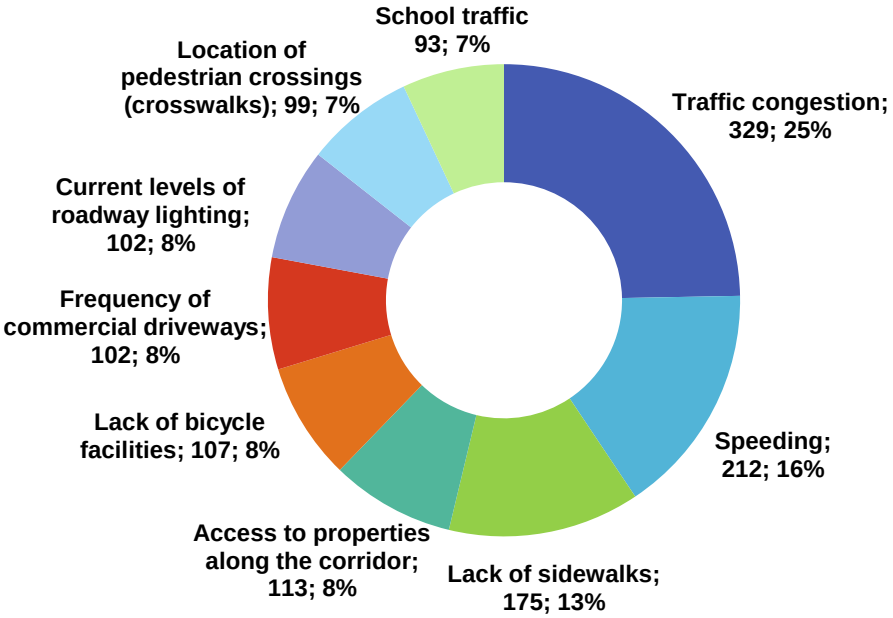
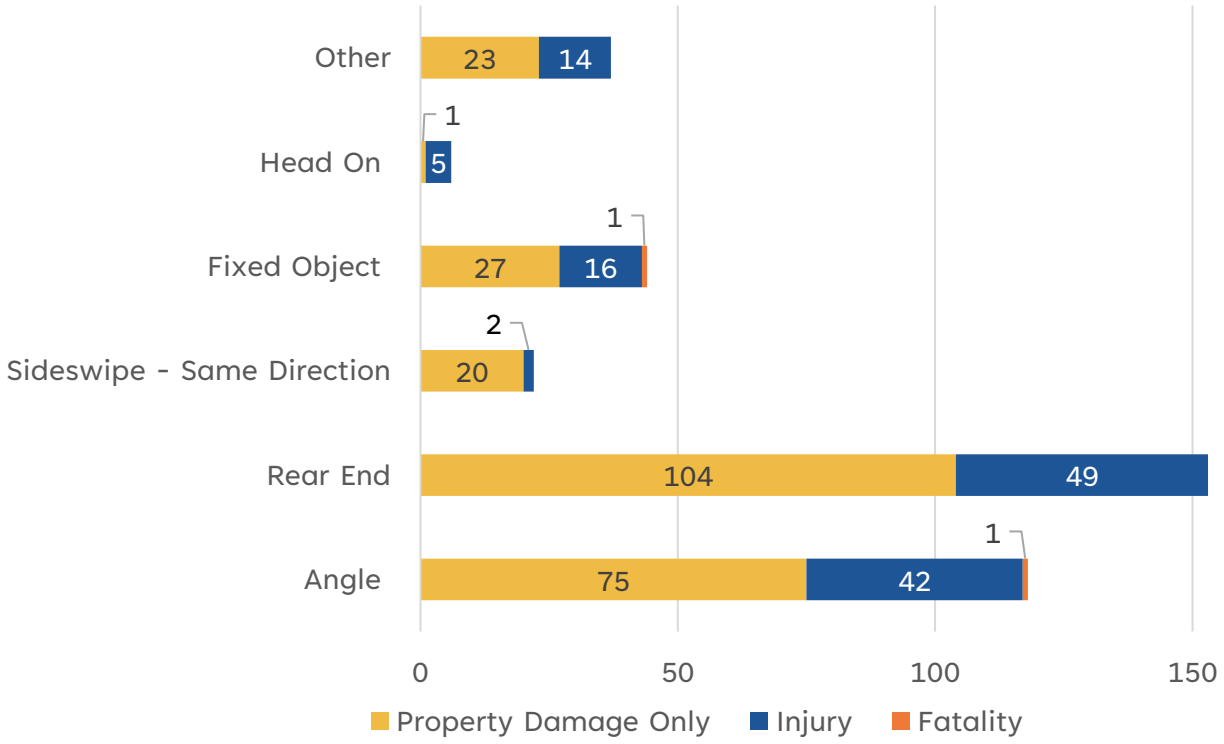


Figure 9 Reported Crashes by Collision Type and Severity, January 2014-December 2018.



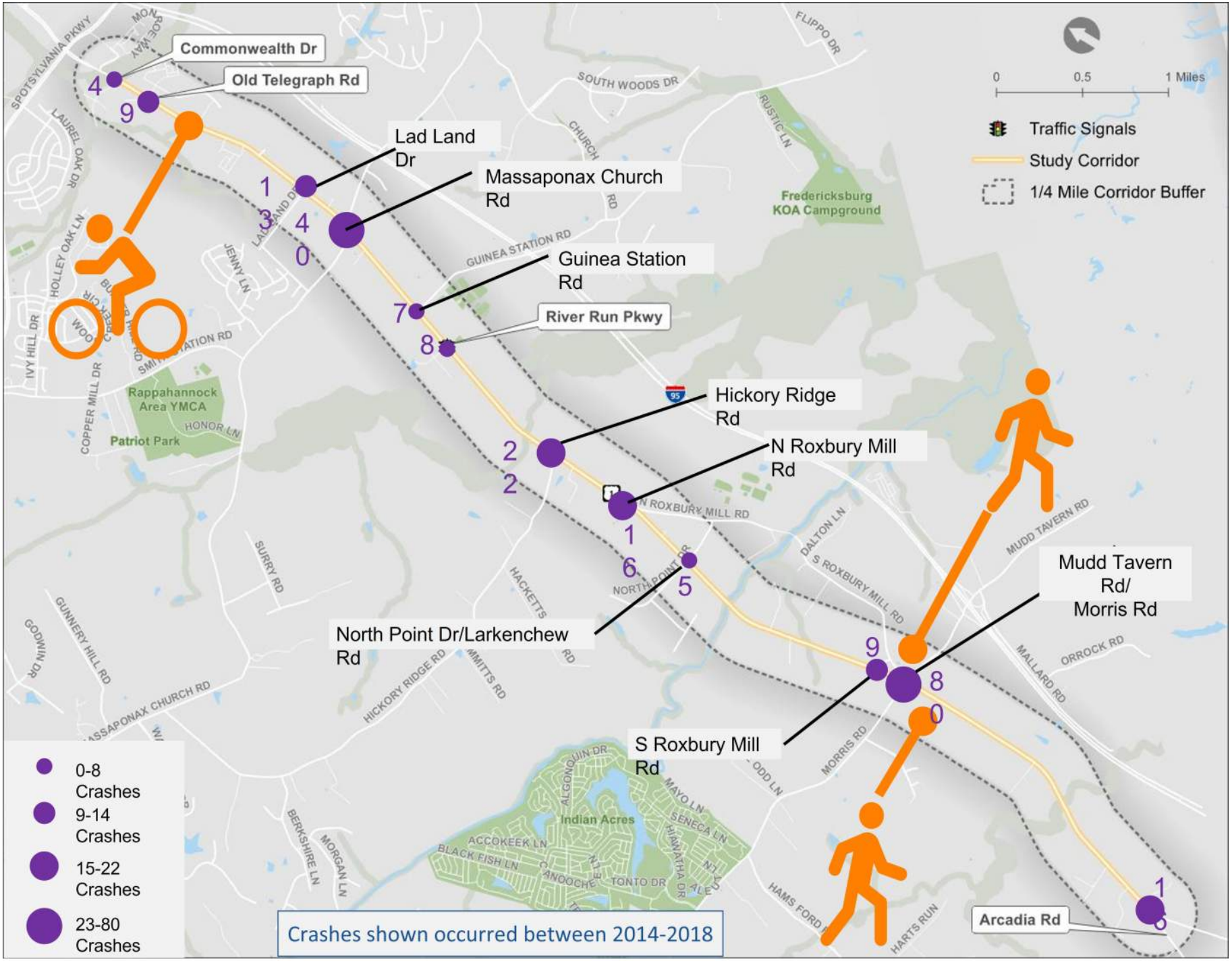


Figure 10. Route 1 Crash Analysis

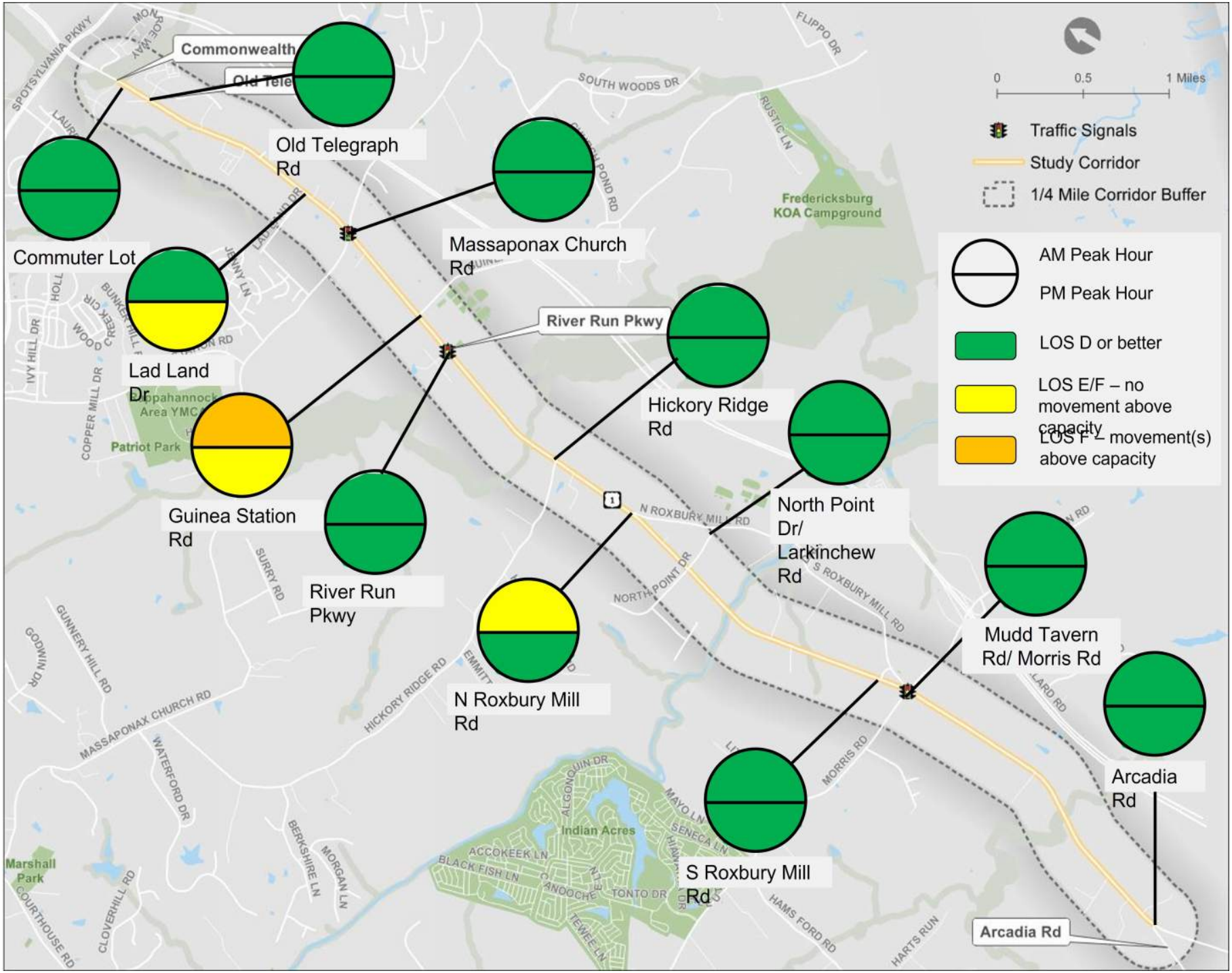


Figure 11. Existing Traffic Operational Conditions

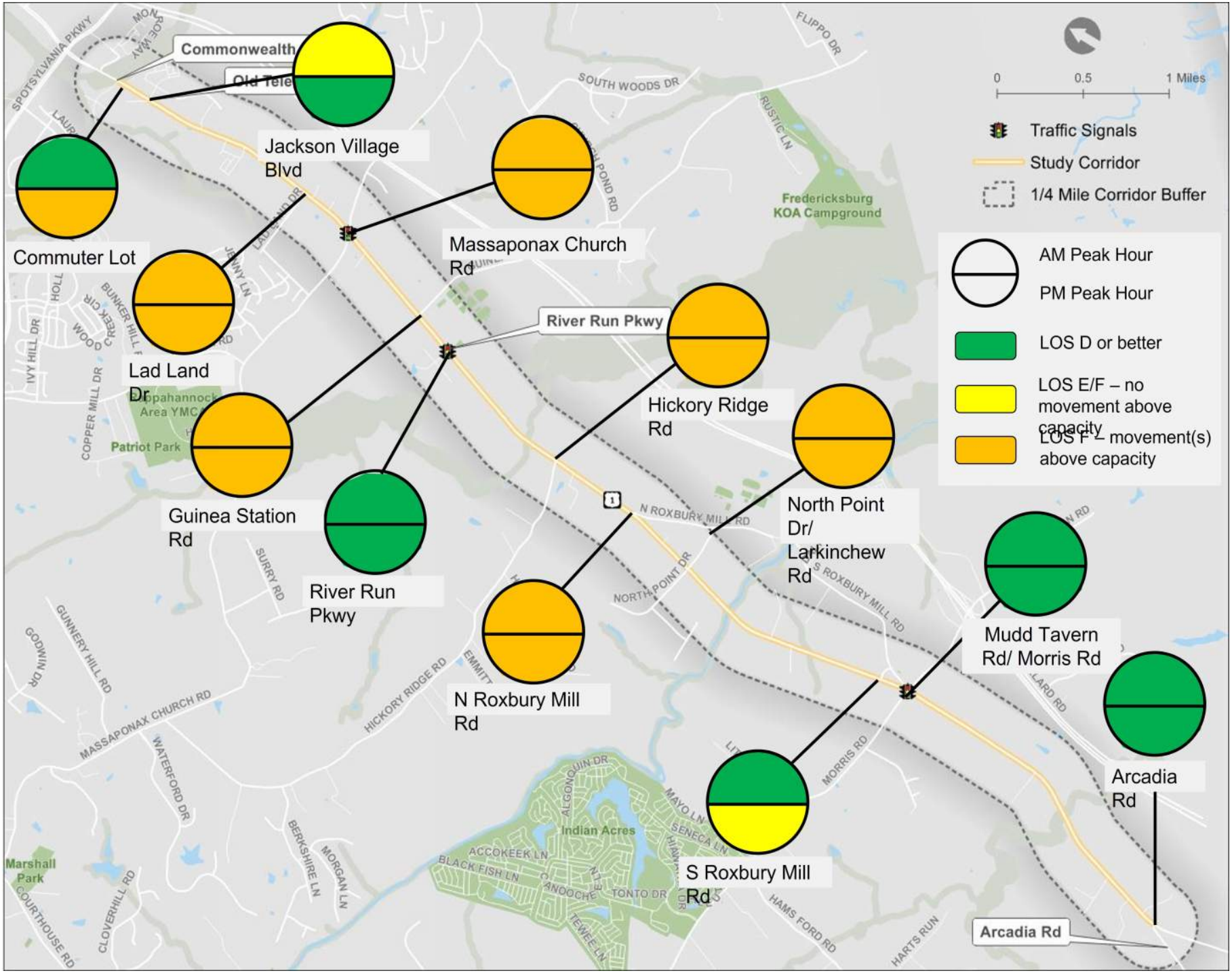


Figure 12. Year 2030 No-Build Traffic Conditions

HOW DO WE EVALUATE ALTERNATIVES?

The study team developed goals, objectives, and screening criteria aligned with VDOT, the Stakeholder Group, and public visions for Route 1. These became the basis for evaluating alternatives and determining if they respond to the needs and opportunities along the corridor.

Goals and Objectives

The study team and Stakeholder Group developed a project vision, goals, and objectives based on the issues and opportunities identified through the existing conditions analysis. These goals and objectives formed the framework for measuring the effectiveness of potential multimodal alternatives. **Figure 13** presents the project goals developed from feedback from the public with the Stakeholder Group.

Screening Criteria & Alternatives Analysis

Screening criteria were developed during the alternatives evaluation process and tied to each project's goals and objectives. The alternatives analysis was based on the screening criteria, planning-level estimates of probable cost, and community feedback (see **Figure 14**).

The objective of the alternatives evaluation and refinement tasks was to compare the alternatives and provide decision-makers with the information they would need to select the best solutions to advance. Each of the alternatives was evaluated using metrics related to the project's goals and objectives.

QUESTIONS THIS SECTION ANSWERS:

- How did VDOT develop the study vision, goals, and objectives?
- How did the study goals and objectives inform the alternatives comparison process?

KEY TAKEAWAYS FROM THIS SECTION:

- VDOT developed the study vision, goals, and objectives using findings from the existing conditions analysis, Stakeholder Group, and community feedback.
- Screening criteria related to each study goal and its objectives were used to inform the alternatives analysis process.

VDOT JUNCTION SCREENING TOOL (VJUST)

The VDOT Junction Screening Tool (VJuST) was used to evaluate alternatives intersection configurations at each of the study locations along the Route 1 Corridor. VJuST helped in the decision-making process by identifying intersection configurations that could reduce congestion and improve safety. The tool considers 29 different intersection configuration types, including nine interchange types. These configuration types are ranked on congestion, pedestrian accommodations, and safety.

VDOT's Innovative Intersections and Interchanges database provides more information about each of the innovative intersection configurations evaluated by the study team.

It is important to note that not all configuration types were considered for each intersection. Reasons for a configuration type not being considered as a feasible improvement included:

- Intersection Configuration: Several improvements depend on the number of approaches, i.e., a bowtie configuration is only feasible for a four-legged intersection.
- Topography/Context: The safety benefits of several of these innovative intersection configurations diminishes when implemented during rolling or hilly terrain (i.e., there may be sight distance issues for a median U-turn in rolling terrain.)
- Financial/Right-of-Way Acquisition constraints: Several improvement types would require a high cost that would prevent the Stakeholder Group from implementing these configurations. An example of this would be a center turn overpass. This configuration would require extensive construction and right-of-way costs.

SIGNAL WARRANTS

For each of the existing unsignalized study intersections' projected 2030 traffic volumes, the study team evaluated the volume-based signal timing warrants described in the *Manual on Uniform Traffic Control Devices (MUTCD)*. These include the eight-hour vehicular volume, four-hour vehicular volume, and peak hour volume warrants. By evaluating these warrants, the study team considered a signal as a potential intersection improvement and signalized versions of the innovative intersection configurations. If the volume-based signal warrants were not met, additional justification would be required to warrant the installation of a signal along Route 1.

OPERATIONAL ANALYSES

Alternatives showing promise for meeting the study goals after the initial screening were evaluated further in the appropriate traffic analysis software, as specified in VDOT's *Traffic Operations and Safety Analysis Manual (TOSAM)*. For the at-grade study intersections, these primarily consisted of Synchro and SIDRA analyses. Operational metrics evaluated include, but are not limited to:

- Intersection and/or individual movement levels of service (LOS)
- 95th percentile queues
- Intersection and/or individual movement control delays
- Experienced travel time (ETT)
- Volume-to-capacity ratio (v/c)

COST ESTIMATES

The study team developed a planning-level estimate of probable cost for each alternative in which a concept was developed. This probable cost includes:

- Survey
- Traffic Control
- Excavation
- Construction Materials
- Engineering Support
- Right-of-Way Acquisition
- 30% Project Contingency

For intersections in which a roundabout was considered as an alternative, the study team utilized the VDOT Intersection Cost Comparison tool. This tool compares the cost of a roundabout to a traditional intersection type

such as a stop-controlled or signalized intersection. Costs related to safety, operations, and maintenance were included in these calculations.

PUBLIC FEEDBACK

The team solicited community feedback on each of the alternatives during Phase 2 Public Engagement. Members of the public were able to ask questions and provide feedback during a virtual session. In addition, a survey was provided for the public to rank and provide feedback on each alternative. For each option, the public was asked:

- What do you like about this option?
- What concerns do you have about this option?

In cases where multiple alternatives were presented for the same intersection, the public was able to indicate which option they preferred and why.

Figure 13 Vision and Goals

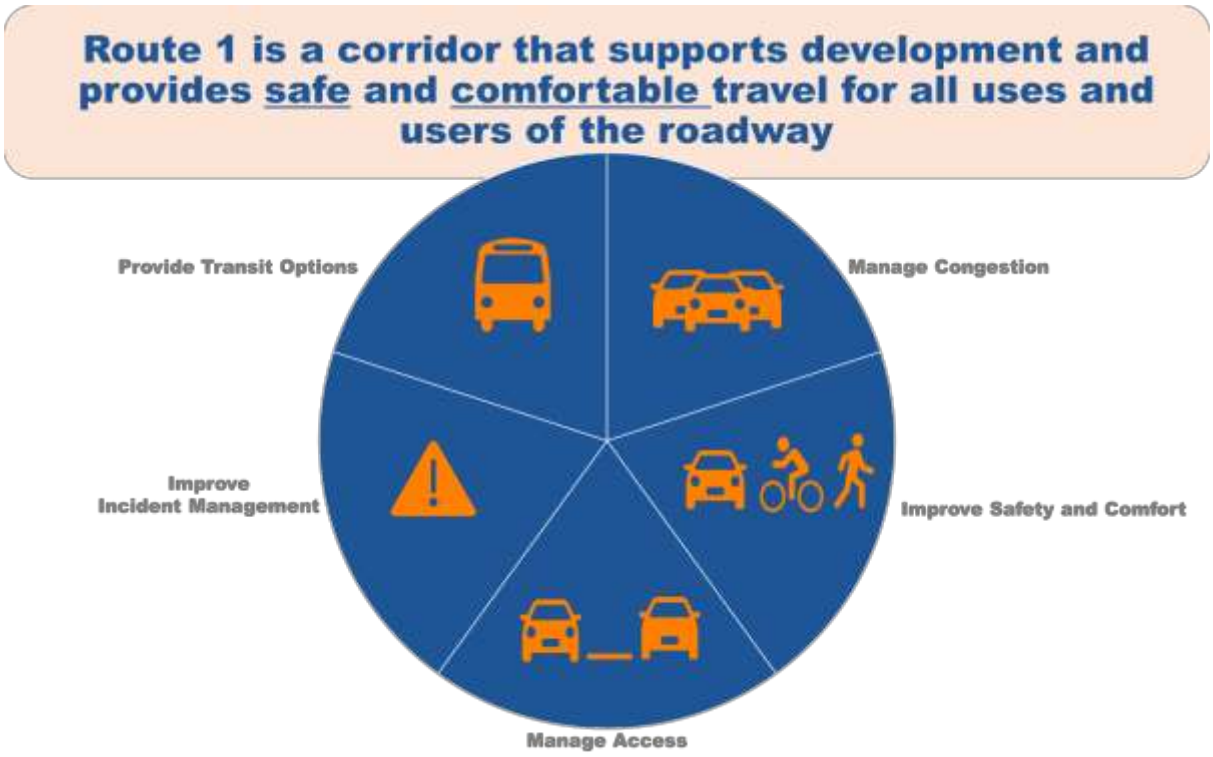
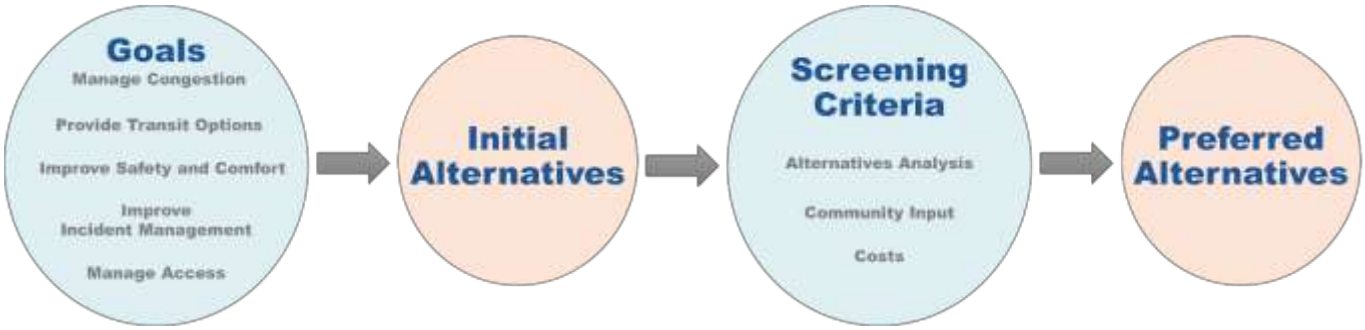


Figure 14 Alternatives Evaluation Process



WHAT ARE THE ALTERNATIVES?

This section describes the outcomes of the alternative development process. VDOT and the study team aimed to develop feasible alternatives that would be supported by the Stakeholder Group and meet the study's goals and objectives.

QUESTIONS THIS SECTION ANSWERS:

- How did VDOT develop the alternatives for Route 1?
- What are the alternatives for Route 1? How would each study alternative advance the study goals?
- How did the community feel about each study alternative?
- How much would each study alternative cost?

Transportation Solutions for Route 1

The study team developed intersection-specific alternatives at each of the unsignalized and signalized locations along the study corridor. The study team also identified network alternatives that could increase safety and multimodal options along Route 1.

MULTIMODAL FACILITIES

Looking at the existing corridor, Route 1 is characterized by an inconsistent bicycle and pedestrian facilities network. Existing pedestrian facilities include a few short stretches of sidewalk near signalized intersections. However, none of these sections have signalized pedestrian crossings or crosswalks. Currently, there is a funded plan to add pedestrian crossings at Mudd Tavern Road and Morris Road as a part of the existing widening project.

After reviewing Route 1's crash history, its existing and future operations, and feedback from the public and Stakeholder Group, the study team is proposing several corridor-wide multimodal treatments. First, a shared use path is proposed along the east side of Route 1, except for a small portion on the west side by the future Commonwealth Commuter Lot. In general, the shared use path will follow existing utility easements and power lines.

An additional goal of this study is to explore options to expand transit along Route 1. While no transit routes operate along the corridor, the study proposes transit stops at several locations based on projected land uses and densities for future consideration. These include the new commuter lot and additional stations near Lad Land Drive, Massaponax Church Road, River Run Parkway, and Mudd Tavern Road. The study team encourages the local entities to conduct a future study on evaluating the ridership and service needed at these proposed locations.

These proposed multimodal facilities are shown in **Figure 15**, below.

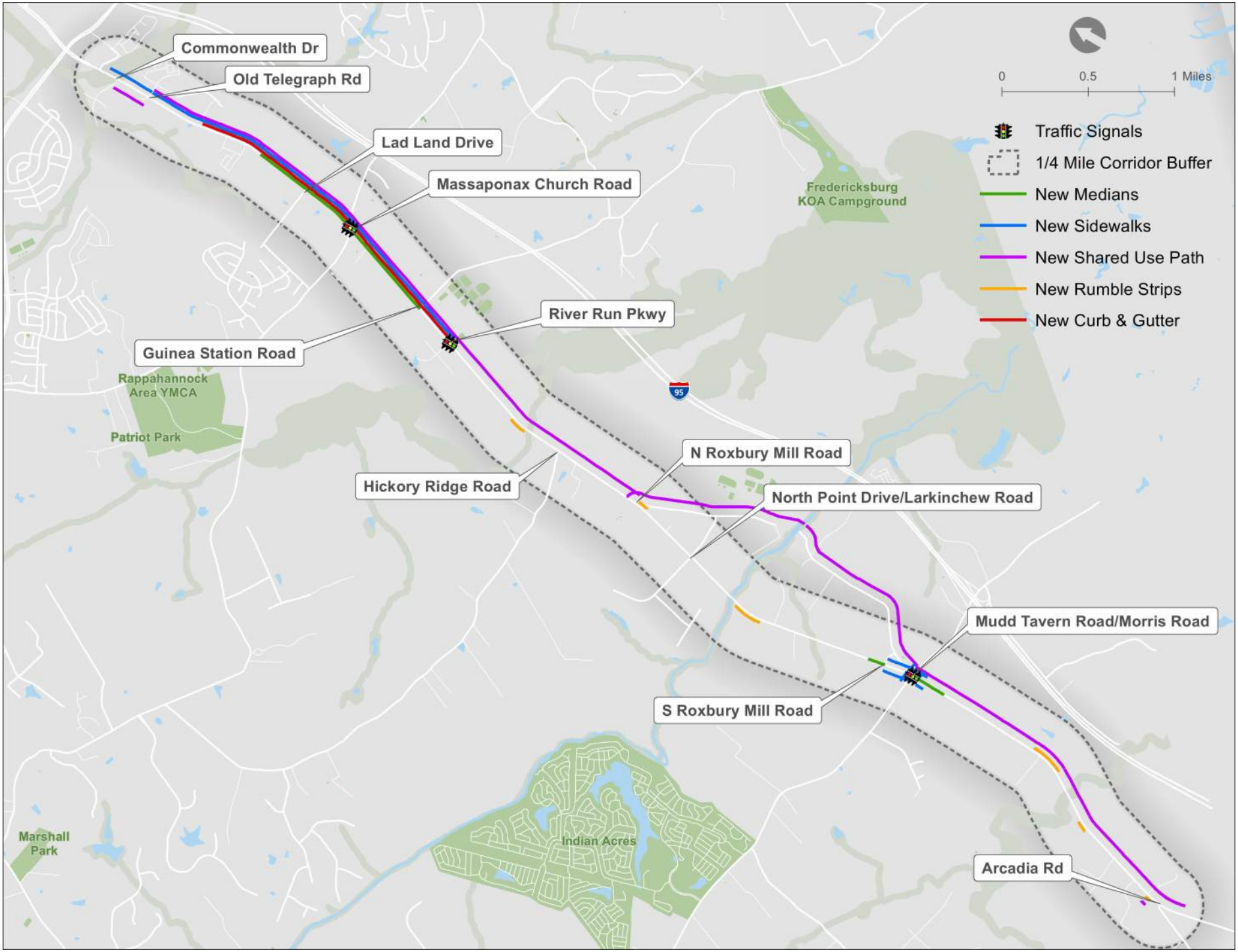


Figure 15. Proposed Multimodal Facilities

ACCESS MANAGEMENT

Through discussions with the Stakeholder Group and feedback from the public, improvements in access management along Route 1 are key to the corridor's growth. The study is proposing three strategies to help.

The first strategy is the installation of medians. Striped or raised medians could be used to encourage drivers to complete left turns at defined locations.

The second strategy would be the installation of inter-parcel connections. The study team encourages local authorities to work with developers to implement these connections to help limit traffic entering on Route 1, particularly for short-distance trips.

The final strategy to consider is the installation of curb and gutter along Route 1. Because the public expressed interest in defining the roadway edge and driveways, curb and gutter would help achieve this. The study team encourages local authorities to consider this installation during planned resurfacing projects.

INTELLIGENT TRANSPORTATION SYSTEMS (ITS) AND INCIDENT MANAGEMENT TOOLS

Two key technologies are proposed to improve the user experience along Route 1.

The first of which is Automated Traffic Signal Performance Measures (ATSPM). This technology can be added to the existing and proposed signals along Route 1 to continuously collect and analyze signal timing data. The benefit of this is that traffic signals can be managed more proactively. Local jurisdictions can receive comprehensive data that will allow them to allocate future resources more effectively and identify high-priority locations.

The second of which is travel time variable message boards. By implementing this technology at key locations, such as approaching the Mudd Tavern Road intersection, drivers can be alerted of anticipated delays and ongoing incidents, including those along I-95. This will allow drivers to make informed route choices.

These ideas were presented during the second public meeting. In general, there was little feedback regarding the use of ATSPM. However, there was concern expressed in travel time variable message boards being maintained full-time on Route 1.

Commonwealth Commuter Lot Entrance & Route 749 (Old Telegraph Road)

NO-BUILD CONDITIONS

Given their proximity to each other and the potential interaction between any recommended improvements, the intersections of the future Route 1/Commonwealth Commuter Lot entrance and Route 1/Old Telegraph Road were evaluated together. These two intersections are the anticipated locations of two key developments along the Route 1 corridor.

The Commonwealth Commuter Lot is expected to be constructed just south of Commonwealth Drive. This lot is anticipated to serve as an important location for carpooling and transit access. A new right-in/right-out entrance is planned on Route 1 between Commonwealth Drive and Old Telegraph Road.

The second is the approved Jackson Village development, which will establish a new connection over I-95 via the construction of Jackson Village Parkway. In this plan, Old Telegraph Road will be disconnected from Route 1, and the new Route 1/Jackson Village Parkway intersection will become signalized.

Operations

If no additional improvements were to be made, vehicles exiting the Commuter Lot are anticipated to experience high delays due to heavy southbound volumes expected on Route 1. This results in forecast LOS C and LOS F conditions at the Commonwealth Commuter Lot entrance during the weekday a.m. and weekday p.m. peak hours, respectively, in 2030.

The planned signal at Jackson Village Parkway is forecast to operate at LOS C during both weekday peak hours. However, queues in the southbound left-turn lane along Route 1 are projected to spill back into mainline traffic under the current design plans. This projected increase in queueing (relative to previous studies) may result from more aggressive growth projections assumed in this study between existing conditions and the 2030 design year.

Safety Performance

The study team also evaluated the crash history at the nearby Commonwealth Drive and Old Telegraph Road. Four crashes occurred at Commonwealth Drive, two of which were fixed-object (off-road) events. The proposed right-in/right-out entrance to the Commonwealth Commuter Lot may result in a modest increase in rear-end and sideswipe crashes. This is expected due to introducing new conflict points by providing a new access point along this section of Route 1.

The Old Telegraph Road intersection experienced nine crashes during the five-year study period. Six of these nine crashes were rear-ends. One bicycle-related crash also occurred at this intersection. Of the nine crashes at this location, one resulted in a severe (Level A) injury, and four were visible (Level B) injury. This resulted in an Equivalent Property Damage Only (EPDO) score that was among the highest on the corridor.

Sightlines are anticipated to improve at Old Telegraph Road as the realignment of this roadway to create Jackson Village Parkway will create a less-skewed approach. However, the addition of a traffic signal may increase the potential for rear-end crashes.

"There is a real need for a barrier that separates the north and south lanes." -anonymous.

ALTERNATIVES ANALYSIS

Potential improvements to the planned configurations at the Commonwealth Commuter Lot entrance and the future Jackson Village Parkway were evaluated to alleviate the forecast delay and safety performance constraints at the intersection. Both the future Commonwealth Lot entrance and the proposed Jackson Village Parkway met all volume-based traffic signal warrants. Therefore, both signalized and unsignalized improvements were included in the evaluation shows the results of the VJuST analysis of the intersections under forecast 2030 conditions. From this analysis, the study team determined many of the innovative intersection control forms would not yield sufficient operational benefits to justify the associated costs with construction and maintenance.

The potential for the primary access of the Commuter Lot being directly located on Commonwealth Drive was also explored. To implement this idea, the study team initially reviewed the operations of Commonwealth Drive if this intersection continued to operate as two-way stop control. As shown in **Table 2**, this scenario is expected to operate as LOS F in 2030. A conventional traffic signal was considered at Commonwealth Drive with and without a new dedicated right turn lane. These options would likely decrease the number of vehicles attempting to exit the Commuter Lot via the proposed right-in/right-out access by adding more capacity to eastbound movements from Commonwealth Drive. This, in return, would reduce the delays projected at the right-in/right-out entrance. However, substantial operational or safety benefits from these potential improvements was not found.

Similarly, a signalized Continuous Green-T intersection was forecast to operate at LOS F during the weekday p.m. peak hour. An unsignalized Continuous Green-T was not evaluated further, as it would offer less capacity improvements to eastbound vehicles exiting the Commuter Lot than the signalized continuous green-T option.

Appendix B contains the Synchro operational worksheets for alternatives evaluated in greater detail.

While not explicitly evaluated in VJuST, more moderate modifications to the no-build control forms at the two study intersections were also analyzed. The extension of the southbound left-turn lane was evaluated to mitigate the forecast queue spillback in the southbound left-turn lane at the Route 1/Jackson Village Parkway intersection. Capacity to the right-in/right-out Commuter Lot entrance can be increased by providing a southbound acceleration lane out of the Commuter Lot. The proposed spacing between the Commuter Lot entrance and Jackson Village Parkway would require the southbound acceleration lane to extend downstream of the planned signal. Both improvements can be accommodated by the developers during construction. **Table 2** summarizes the anticipated LOS of these improvements under 2030 conditions.

Table 1 VJuST Results - Commonwealth Commuter Lot Entrance and Jackson Village Parkway

Commonwealth Commuter Lot Entrance				
Type	**Direction**	**Weighted Total Conflict Points**	**AM Peak V/C**	**PM Peak V/C**
Conventional	-	48	0.74	1.07
Continuous Green-T	-	12*	0.73	1.07
Median U-Turn	-	20	0.74	1.07
Partial Median U-Turn	-	28	0.74	1.07
Restricted Crossing U-Turn	-	20	0.73	1.07
Roundabout	-	8	1.69	2.38
Jackson Village Parkway				
Conventional	-	48	0.84	1.19
Continuous Green-T	-	12*	0.84	1.19
Median U-Turn	-	20	0.84	1.43
Partial Displaced Left Turn	-	44	0.78	1.07
Partial Median U-Turn	-	28	0.83	1.24
Restricted Crossing U-Turn	-	20	0.84	1.12
Roundabout	-	8	1.92	3.10

Table 2 Level of Service of Potential Improvements - Commonwealth Drive Commuter Lot

Operational Improvement(s)	AM	PM
Existing	B, C [2]	C, C [2]
2030 No-Build	C, E [2]	F, D [2]
All Commuter Lot Trips Routed to Existing Commonwealth Drive	F [1]	F [1]
Signal at Commonwealth Drive	B [1]	F [1]
Signal at Commonwealth Drive with Additional Turn Lanes	B [1]	F [1]
Signalized Continuous Green Tee	B [1]	F [1]
Southbound Acceleration Lane; Increase Southbound Left Storage	A, C [2]	A, C [2]

[1] Operations for Commonwealth Drive intersection

[2] Operations for future Jackson Village Parkway

RECOMMENDED ROADWAY IMPROVEMENTS

The study team developed modifications of the preliminary designs proposed for the Commonwealth Commuter Lot and Jackson Village Parkway. As shown in **Figure 16**, the proposed modifications include:

- An acceleration lane out of the planned commuter lot should be added to reduce the expected delays for those exiting the facility. The acceleration lane could be extended through the proposed signalized Jackson Village Parkway intersection and be terminated as a lane drop south of this signal. This would also allow for vehicles to reach Route 1's design speed before merging into traffic.
- The planned southbound left-turn lane in the preliminary plans for Jackson Village Parkway should be extended to prevent anticipated queueing from spilling back into southbound mainline traffic on Route 1.

Appendix C contains a full-sized plan sheet of the recommended improvements. The proposed concept is anticipated to reduce delay for those exiting the commuter lot, reduce the potential for crashes, reduce the anticipated severity of crashes, and prevent queueing issues at the signal. However, this concept is expected to impact the right-of-way north of the Jackson Village Parkway signal.

Table 3 summarizes the alternatives analysis results, planning-level estimates of probable cost, and community feedback for Commonwealth Drive and Jackson Village Parkway options. **Appendix D** contains a more detailed breakdown of the cost estimates.

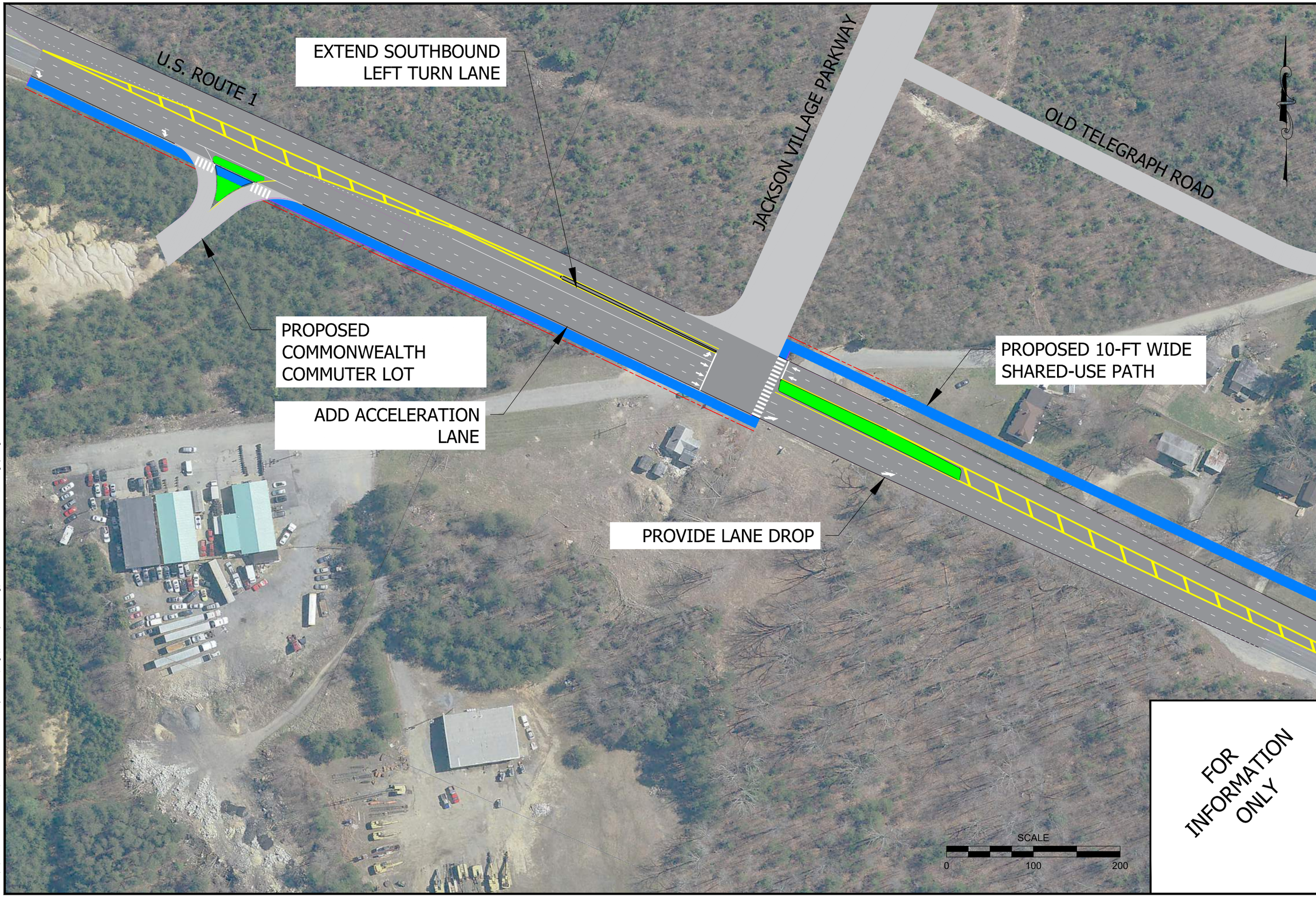
These concepts were presented to the public during the second virtual meeting. The public provided two scores of "5" indicating that these concepts were "most preferred."

Several low-cost improvements could be added to Route 1 in the short term. Because two of the four crashes at Commonwealth Drive resulted from deer, providing deer crossing signs may raise driver awareness. There may be additional benefit in adding "bus stopping" warning signs as school buses are present along this stretch of Route 1.

Future consideration should also be given to providing access to the Commonwealth Drive Commuter Lot via Filter Lane. This would create a fourth leg to the proposed Route 1/Jackson Village Parkway intersection. As the existing land uses along Filter Lane are not anticipated to be redeveloped by the design year, this option was not evaluated operationally as a part of this study. The costs for land acquisition were deemed too high by the Stakeholder Group, but the extension of Filter Lane can be discussed at such time the properties south of the Commuter Lot redevelop.

Table 3 Evaluation of Alternatives - Commonwealth Commuter Lot Entrance & Jackson Village Parkway

	Improve Safety and Comfort	Manage Congestion	Improve Incident Management	Manage Access	Provide Transit Options	Order of Magnitude of Costs
No-Build	★★	★★	★★★	★★	★★	N/A
Southbound Commuter Lot Acceleration Lane & Southbound Left-Turn Lane Extension	★★★	★★★	★★★	★★★	★★★	$2,000,000



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KITTELSON & ASSOCIATES
11480 COMMERCE PARK DRIVE, SUITE 450
RESTON, VA 20191
P 703.885.9970

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Submission Date: 08/13/2021

Drawn:	Designed:	Checked:
JCC	JCC	KJH

PROJECT NO.
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Route 1 Corridor Study: Spotsylvania County

Commonwealth Commuter Lot & Jackson Village Parkway

FIGURE NO.
16

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Lad Land Drive

NO-BUILD CONDITIONS

The Route 1/Lad Land Drive intersection is influenced by the recent development along Gateway Boulevard, just south of this intersection. The development, which currently comprises the Lifepoint Church and college, is set to expand further with an approved business park in the coming years. In addition, this intersection is just south of substantial future developments, including Heritage Woods, Palmers Creek, and Jackson Village.

Operations

If no changes are made to this unsignalized intersection, vehicles attempting to exit Lad Land Drive during the weekday peak hours are anticipated to experience high delays in 2030. LOS E and LOS F conditions are anticipated in the weekday a.m. and weekday p.m. peak hours, respectively, by 2030. Despite significant growth in this area, this intersection is not anticipated to meet volume-based signal warrants for peak-hour, four-hour or eight-hour volumes. Additionally, this intersection is impacted by a high number of turning heavy vehicles as the fourth leg of this intersection provides access to Central Transport, a trucking company.

Safety Performance

In addition to the inconvenience to drivers, the high delays anticipated at this intersection could lead to drivers forcing their way into smaller gaps in mainline traffic to get out, which may lead to a potential increase in angle crashes at the intersection. This intersection experienced 13 crashes during the five years of crash data analyzed. Of these, ten were angle crashes, and three were rear-ends. The 13 crashes at this intersection resulted in one severe (Level A) crash and four visible (Level B) injury crashes. This resulted in an Equivalent Property Damage Only (EPDO) score among the highest on the corridor.

ALTERNATIVES ANALYSIS

While projected volumes under 2030 conditions are not forecast to meet the volume-based traffic signal warrants, both signalized and unsignalized alternatives were evaluated at the intersection based on feedback received during public outreach. **Table 4** illustrates the initial screening for alternatives conducted in VJuST. Several at-grade intersection control forms, such as a partial displaced left-turn, showed promise under the planning-level capacity analysis in VJuST. However, they were ruled out due to the existing context of the intersection, and adjacent land uses.

Additionally, the operational impacts of a conventional signal, unsignalized RCUT, and signalized Continuous Green-T were explored at this intersection using Synchro. Although the results of all three configurations showed operational improvements (as shown in **Table 5**), the Stakeholder Group expressed preferences towards unsignalized improvements. The Stakeholder Group also wanted to ensure that the additional traffic to or from Gateway Boulevard would be adequately served. One idea supplied was a “dog bone” or “peanut” roundabout that could provide direct access to both Lad Land Drive and Gateway Boulevard.

Table 5 shows the forecast operations of each of the alternatives analyzed in greater detail after the initial screening.

Table 4 VJuST Results – Lad Land Drive/Central Transport Entrance

Lad Land Drive/Central Transport Entrance				
Type	Direction	Weighted Total Conflict Points	AM Peak V/C	PM Peak V/C
Conventional	-	48	0.54	0.77
Bowtie	-	24	1.02	1.50
Full Displaced Left Turn	-	40	0.53	0.77
Median U-Turn	-	20	0.54	0.78
Partial Displaced Left Turn	-	44	0.53	0.77
Partial Median U-Turn	-	28	0.54	0.77
Quadrant Roadway	N-W	40	0.54	0.77
	N-E	40	0.56	0.79
	S-E	40	0.54	0.77
	S-W	40	0.54	0.77
Restricted Crossing U-Turn	-	20	0.54	0.78
Roundabout	-	8	1.13	1.77

Table 5 Level of Service of Potential Improvements – Lad Land Drive/Central Transport Entrance

Operational Improvement(s)	AM	PM
Existing	C	F
2030 No-Build	F	F
Conventional Signal	A	B
Unsignalized RCUT	C	C
Signalized Continuous Green-T	A	A

RECOMMENDED ROADWAY IMPROVEMENTS

After reviewing the preliminary analysis, the study team identified two alternatives that meet multiple study goals at Lad Land Drive – an unsignalized Restricted Crossing U-Turn (RCUT) intersection (**Figure 17**) and a "peanut" roundabout (**Figure 18**). Each of these are discussed below. **Appendix C** also contains full-sized plan sheets of the recommended improvement options.

An unsignalized RCUT intersection restricts left-turn movements out of Lad Land Drive by installing a median along Route 1. To make a left-turn out of Lad Land Drive, drivers would make a right-turn on Route 1 and proceed to a downstream U-turn location.

Creating this two-stage maneuver for left-turns not only reduces the delays experienced but reduces the likelihood of crashes by reducing the number of conflict points at each turn location. However, widening Route 1 to accommodate the necessary medians would require some right-of-way along the existing property frontage.

Another option to improve delays and anticipated safety performance at Lad Land Drive would be developing a "peanut" or dog-bone roundabout. This enlarged roundabout would extend down to Gateway Boulevard to help maintain full access to the large church, college, and planned business park. In addition, the roundabout would naturally manage vehicle speeds on Route 1 in this area, which was identified by community members as a key area of speeding today.

This option is anticipated to have greater reductions in delay to minor street movements relative to the RCUT. It does, however, come with slightly greater impacts to properties directly adjacent to the main intersection. Access to the Selective Auto Sales business could be provided with a driveway between the two nodes to maintain access.

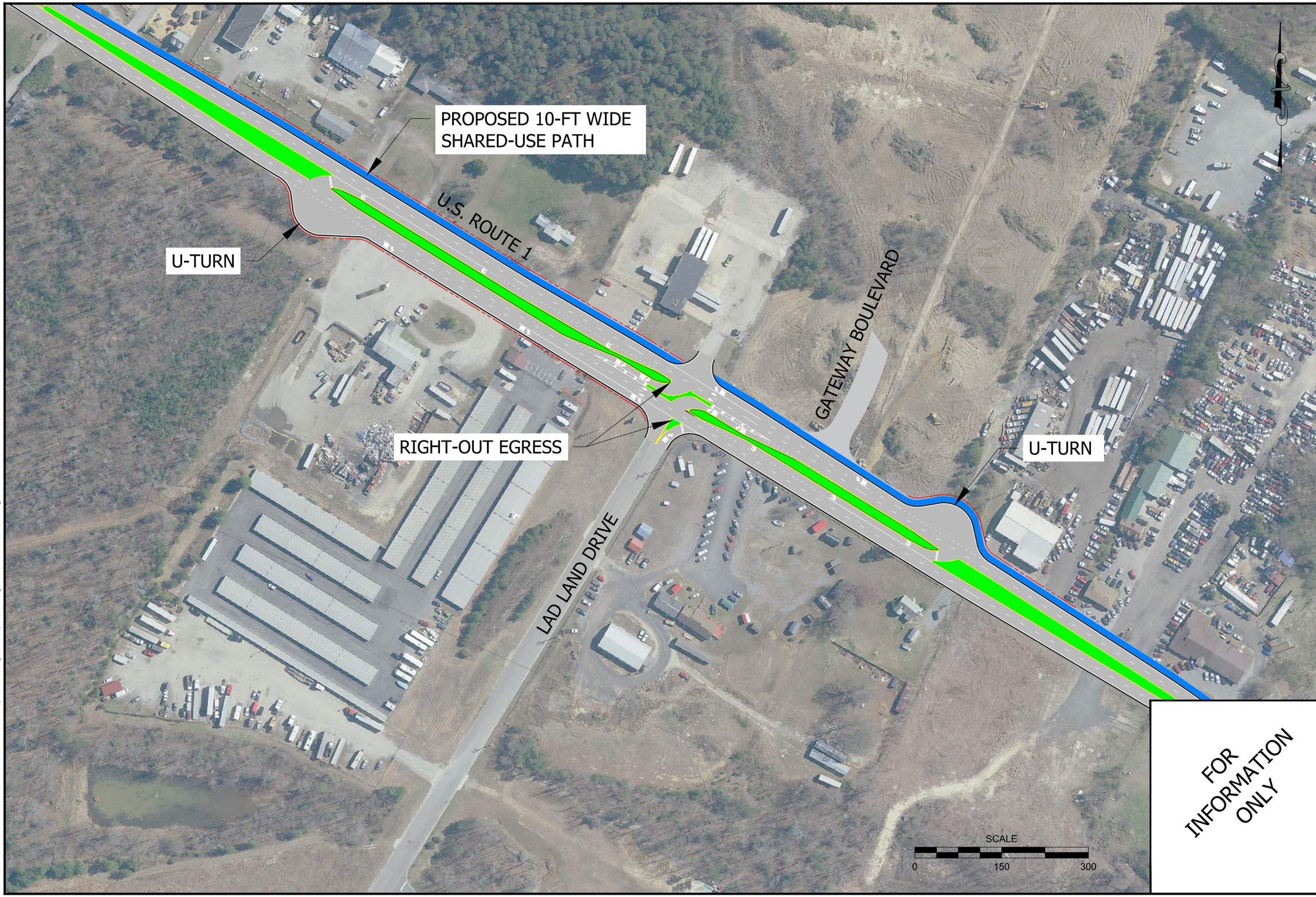
These concepts were then presented to the public during the second virtual meeting. Several members of the public voiced their interest in the "peanut" roundabout but also suggested that a conventional signal be installed at this intersection. However, the study team determined that the anticipated traffic volumes at Lad Land Drive do not meet any of the volume-based signal warrants.

Table 6 summarizes the alternatives analysis results and planning-level estimates of probable cost for the options at Lad Land Drive. **Appendix D** contains a more detailed breakdown of the cost estimates.

In addition to the proposed roadway configuration, the study team also suggests that roadway resurfacing programs could install curbs and improve access management to/from driveways. These treatments were considered as several members of the public expressed interest in defining roadway edges and business accesses. In addition, the study team encourages the local jurisdictions to work with new developers and businesses to determine the appropriate access when constructing new driveways.

Table 6 Evaluation of Alternatives - Lad Land Drive/Central Transport Entrance

	Improve Safety and Comfort	Manage Congestion	Improve Incident Management	Manage Access	Provide Transit Options	Order of Magnitude of Costs
No-Build	★	★	★	★	★	N/A
Unsignalized RCUT	★★★	★★★	★★★	★★★	★	$6,600,000
"Peanut" Roundabout	★★★★	★★★★	★★★	★★★	★	$6,078,000



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KITTELSON & ASSOCIATES
11480 COMMERCE PARK DRIVE, SUITE 450
RESTON, VA 20191
P 703.835.6970

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Route 1 Corridor Study: Spotsylvania County

Lad Land Drive Option #1 - RCUT

FIGURE NO.
17

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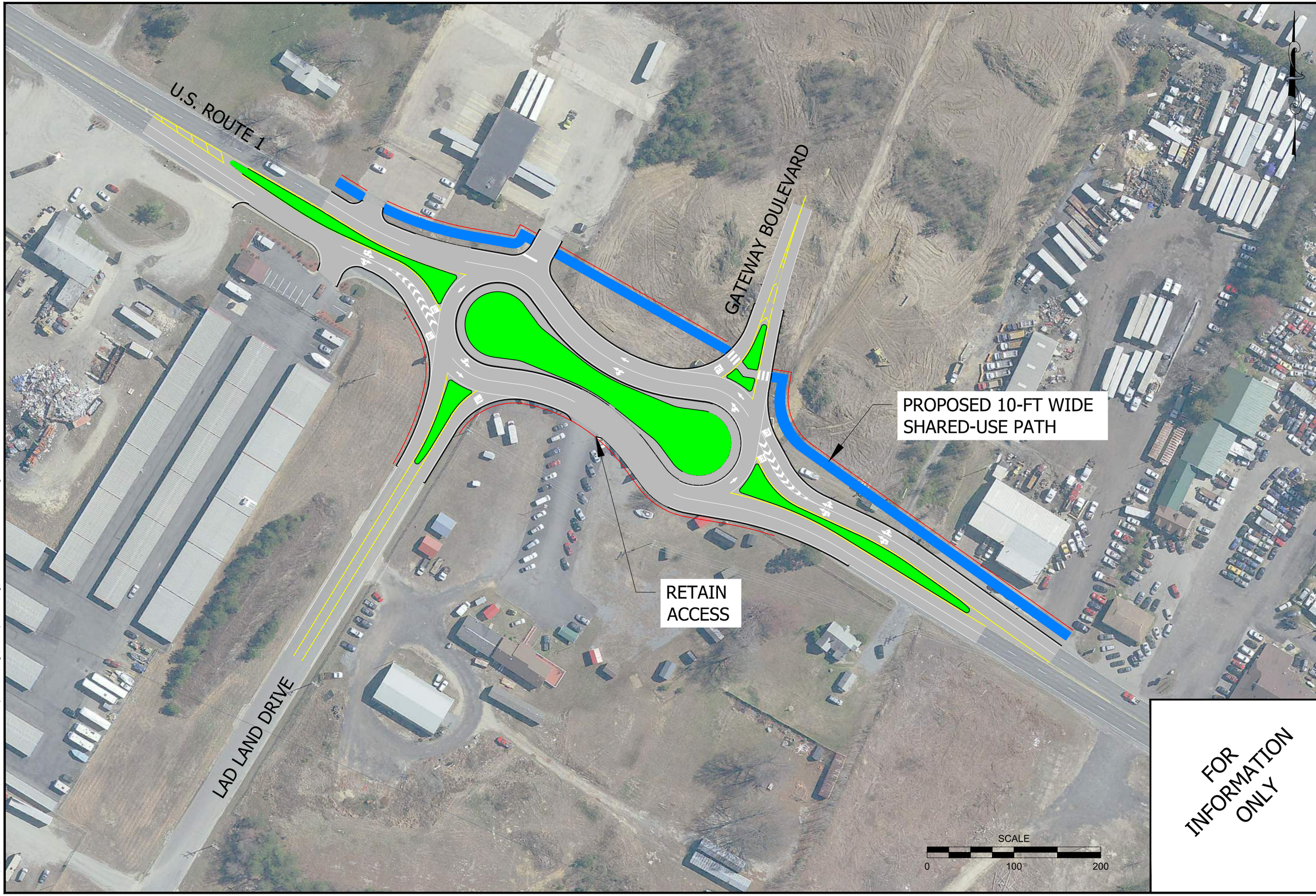

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KITTELSON & ASSOCIATES
11480 COMMERCE PARK DRIVE, SUITE 450
RESTON, VA 20191
P 703.835.6970

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Route 1 Corridor Study: Spotsylvania County

Lad Land Drive Option #2 - Peanut Roundabout

FIGURE NO. 18

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Route 608 (Massaponax Church Road)

NO-BUILD CONDITIONS

Route 1's intersection with Massaponax Church Road falls at the center of existing commercial and light industrial businesses. It is also near many of the major residential developments anticipated along the Route 1 corridor. The intersection itself is constrained with gas stations located in the northeast and southwest quadrants and a historic church located in the northwest quadrant. According to the feedback received in the first public meeting, there are concerns about multiple driveways being present close to the signalized intersection.

OPERATIONS

If no changes are made to the signalized intersection of Route 1 and Massaponax Church Road, demand for left-turning maneuvers from Massaponax Church Road will exceed capacity. This will result in high delay times and long queues at the signal. It is anticipated that this intersection will operate at a LOS F in both the weekday a.m. and p.m. peak hours in 2030.

SAFETY PERFORMANCE

This intersection was among those on the study corridor that experienced the highest frequency of crashes and highest EPDO score. During the five years of data analyzed, 40 crashes occurred at Massaponax Church Road. 20 of these 40 crashes were rear-ends, and 17 were angle crashes. Of the 40 crashes, this intersection experienced one severe (Level A) injury crash, eleven visible (Level B) injury crashes, and one non-visible (Level C) injury crash.

"A LOT of people traveling southbound make a dangerous U-turn across traffic to go into the gas station. The triangular turn restriction sign on the east side doesn't help. There should be a median here or something restricting southbound traffic from entering here." - *anonymous.*

ALTERNATIVES ANALYSIS

The study team evaluated potential improvements to the Massaponax Church Road intersection using VJuST, as shown in **Table 7**. Although this analysis showed some moderate operational improvements by converting the conventional signal to a more innovated control form, find sufficient benefits to justify the associated costs of impacting the historic church and gas stations. In addition, the skewed approaches from Massaponax Church Road would likely result in challenging construction and high right-of-way costs. **Appendix B** contains the Synchro operational worksheets for alternatives evaluated in greater detail.

Instead, the study team explored opportunities to upgrade the existing signal. The first option was to optimize the signal timing. However, this improvement did not yield improvements in the expected LOS, as shown in

Table 8. The second option was to provide exclusive left turn lanes on Massaponax Church Road. The westbound left turn lane could be added in the existing striped median. The eastbound left turn lane could be added within the existing pavement as there is a wide shoulder.

A concept for this second option was developed after discussions with the project's study team. This concept was then presented during the second virtual public meeting. The public provided two scores of "5" choosing these concepts were "most preferred."

RECOMMENDED ROADWAY IMPROVEMENTS

After input from the public and Stakeholder Group, the study team is recommending the improvements shown in **Figure 19**. These modifications include:

- To improve delays at the intersection, the addition of left-turn lanes on Massaponax Church Road would help separate minor street left-turns from the through movements.
- Adjustments to the signal phasing would also reduce the potential for crashes involving minor street left-turns.
- The addition of signalized pedestrian crossings and a pedestrian refuge island in the northeast quadrant will help connect the planned trail running along the length of Route 1.

Appendix C contains a full-sized plan sheet of these recommended improvements.

In addition, the study team encourages the local jurisdictions to work with new developers and businesses to determine the appropriate access when constructing new driveways. This strategy should be extended throughout the entire Route 1 corridor.

Table 9 summarizes the alternatives analysis results and planning-level estimates of probable cost for this alternative at Massaponax Church Road. **Appendix D** contains a more detailed breakdown of the cost estimates.

Table 7 VJuST Results - Massaponax Church Road

Route 608 (Massaponax Church Road)				
Type	Direction	Weighted Total Conflict Points	AM Peak V/C	PM Peak V/C
Conventional	48	N/A	1.17	1.06
Bowtie	24	EB-WB	1.64	1.53
Full Displaced Left Turn	40	N/A	0.80	0.81
Partial Displaced Left Turn	44	NB-SB	0.97	0.89
Restricted Crossing U-Turn	20	NB-SB	1.27	1.14
Roundabout	8	N/A	5.28	4.75

Table 8 Level of Service of Potential Improvements – Massaponax Church Road

Operational Improvement(s)	AM	PM
Existing	D	D
2030 No-Build	F	F
Signal Timing Optimization	F	F
Eastbound & Westbound Left-Turn Lanes + Permissive/Protective Left Turns	E	E

Table 9 Evaluation of Alternatives - Massaponax Church Road

	Improve Safety and Comfort	Manage Congestion	Improve Incident Management	Manage Access	Provide Transit Options	Order of Magnitude of Costs
No-Build	★	★	★	★	★	N/A
Adding Minor Street Left-Turn Lanes and Pedestrian Improvements	★★★	★★★	★★★	★★★	★★	$500,000

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KITTELSON & ASSOCIATES
11480 COMMERCE PARK DRIVE, SUITE 450
RESTON, VA 20191
P 703.835.6970

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Route 1 Corridor Study: Spotsylvania County

Massaponax Church Road Left-Turn Lanes

FIGURE NO.
19

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Guinea Station Road & River Run Parkway

NO-BUILD CONDITIONS

One of the key intersections identified in both the existing conditions and future 2030 operational analyses was at Route 1 and Guinea Station Road. Guinea Station Road serves as a key access point for parents and students at Massaponax Church High School. In addition, it is the only means of accessing the northern parking lot.

It is important to note that Spotsylvania County is planning a future extension of Guinea Station Road up to Massaponax Church Road and Smith Station Road. This connection can be shown in the County's Comprehensive Plan and Thoroughfare Plan. The Guinea Station Road extension is expected to give drivers route choices to avoid some travel on Route 1. This change will also convert the Guinea Station Road intersection with a route to a four-way intersection.

River Run Parkway serves as the official entrance to the Massaponax High School and the only access point to the school's southern parking lot. The Ni Village development is also anticipated to add a substantial number of trips to the eastbound approach of the signal.

OPERATIONS

Feedback from the public and Stakeholder Group shows that attempting to pull out of Guinea Station Road during the weekday rush hours proves difficult due to heavy volumes on Route 1. With the additional traffic expected by year 2030, it is anticipated that the Guinea Station Road intersection will operate at a LOS F in both the weekday a.m. and p.m. peak hours. In addition, this intersection met the volume-based signal warrants for its anticipated eight-hour, four-hour, and peak hour volumes.

"It would be helpful to have a traffic signal here, specifically for after-school hours. It's really hard and dangerous for people leaving school." - *anonymous.*

The intersection of River Run Parkway on Route 1 was recently updated by extending turn lanes, updating signal timing, and providing additional signal head infrastructure. Although these countermeasures were primarily installed to address safety concerns at this intersection, they also support effective operations at this location. These improvements are expected to maintain a LOS B during both the weekday a.m. and p.m. peak hours in 2030.

SAFETY

The study evaluated the crash history at the Guinea Station Road and River Run Parkway intersections. The Guinea Station Road intersection experienced seven crashes from 2014 to 2018. Three of these crashes were angle events and two were rear-ends. Two of the seven crashes at this intersection were visible (Level B) injuries.

The River Run Parkway intersection also experienced eight crashes during the five years of data experienced, six of which were rear-ends. Three of the eight crashes at this intersection were visible (Level B) injury. Some of these crashes occurred prior to the intersection's reconstruction and therefore is expected that this intersection has less risk than previously.

ALTERNATIVES ANALYSIS

Given the proximity between Guinea Station Road and River Run Parkway, the study team and Stakeholder Group sought to find improvements for each that worked together as a coordinated system. The alternatives at these intersections also needed to be flexible to accommodate the planned extension of Guinea Station Road. Several options were initially evaluated using VJuST to address the anticipated conditions at Guinea Station Road and River Run Parkway with and without the Guinea Station Road extension.

As shown in **Table 10**, several innovative intersection configurations could provide operational improvements to the Guinea Station Road intersection. After reviewing the intersection's context, a signal, signalized Continuous Green-T, signalized 3-legged RCUT, and an unsignalized RCUT were evaluated using Synchro. Additionally, a roundabout was also evaluated using SIDRA. An unsignalized RCUT and signalized Continuous Green-T are not expected to yield sufficient operational improvements (shown in **Table 11**). The Stakeholder Group also expressed concern if the signalized Continuous Green-T would fit the context and project's need to accommodate the future Guinea Station Road extension.

The study team determined that the River Run Parkway's operations would be sufficient in the year 2030 after the previous roadway improvements. These results can be found in **Appendix B.**

These options were presented during the second public meeting. The public received the County's proposed extension of Guinea Station Road to Smith Station Road well. However, the public was divided in their preferences for a roundabout or signal at the Guinea Station Road. In general, the public was interested in a simple solution to support the safe movement of high school drivers as well as large trucks.

RECOMMENDED ROADWAY IMPROVEMENTS

Through discussions with the Stakeholder Group and feedback from the public, the study team is proposing three options that could be constructed in the near-term, short term, and long-term.

The first option can be done in the near term (i.e., in the next few years). School-related traffic on Guinea Station Road could access Route 1 via the existing signal at River Run Parkway by simply connecting the northern school parking lot to the southern lots. This low-cost improvement would address many of the operational and safety concerns experienced at Guinea Station Road today.

In conjunction with the new internal school connection, operations at Guinea Station Road can be further improved by developing a multi-lane roundabout.

Secondly, roundabouts effectively manage vehicular speeds, allowing intersections to operate more efficiently than traditional stop or signal-controlled intersections. However, a roundabout at Guinea Station Road would require right-of-way acquisition and higher initial construction costs.

A roundabout at this location could be expanded for the future extension of Guinea Station Road. This can be completed by simply adding a fourth leg to the three-legged roundabout. No additional widening or construction would be required Route 1 to accommodate the new eastbound approach.

The third option, suggested in the first round of community outreach, is a traditional traffic signal. In the short term, prior to the extension of

Guinea Station Road, the three-legged signal would provide regular gaps for vehicles on Guinea Station Road to access Route 1. In addition, this signal can be closely coordinated with the adjacent signal at River Run Parkway to help maintain throughput along Route 1.

When Guinea Station Road is extended to Massaponax Church Road in the future, the traditional signal can be modified into a quadrant roadway. Under this configuration, left-turns from Guinea Station Road are restricted and directed to a new extension of River Run Parkway. Westbound left-turns from Guinea Station Road would drive straight through the intersection at Route 1. An extension of River Run Parkway would be used to access the existing signal at Route 1 and River Run Parkway. Eastbound left-turns, shown in the red arrows, would turn right onto the River Run Parkway extension (prior to ever reaching Route 1) and complete their left-turn maneuver at the existing signal at River Run Parkway. By shifting left-turns from Guinea Station, the new proposed signal can operate more efficiently.

Appendix C provides full-sized plan sheets of these recommended improvements. **Table 12** summarizes the anticipated operations of the long-term improvements.

Table 13 summarizes the alternatives analysis results and planning-level estimates of probable cost at Guinea Station Road and River Run Parkway. **Appendix D** also contains a more detailed breakdown of the cost estimates. While the traditional traffic signal has a lower initial cost than a roundabout, the roundabout has fewer crashes and less delay. The life cycle benefit/cost ratio of installing a roundabout is 5.0, as shown in **Table 14**. This suggests that a roundabout is the preferred option.

In addition, there are several low-cost options that can be added to these intersections before major roadway projects are funded. These include:

- Visibility improvements for existing signals and signs, including reflective backing.
- A red-light camera to discourage red-light running.
- Advance traffic signal warning signs.

Table 10 Guinea Station Road and River Run Parkway VJuST Results

Route 607 (Guinea Station Road)				
Type	**Direction**	**Weighted Total Conflict Points**	**AM Peak V/C**	**PM Peak V/C**
Conventional	-	48	0.74	0.90
Bowtie	-	24	0.84	0.81
Full Displaced Left Turn	-	40	0.73	0.81
Median U-Turn	-	20	1.10	0.99
Partial Displaced Left Turn	-	44	0.74	0.81
Partial Median U-Turn	-	28	0.93	0.88
Quadrant Roadway	N-W	40	0.89	0.84
	N-E	40	0.87	0.98
	S-E	40	0.93	0.90
	S-W	40	0.95	0.84
Restricted Crossing U-Turn	-	20	0.86	0.91
Roundabout	-	8	2.01	2.12

River Run Parkway/Massaponax High School				
Type	**Direction**	**Weighted Total Conflict Points**	**AM Peak V/C**	**PM Peak V/C**
Conventional	-	48	0.70	1.05
Bowtie	-	24	0.87	1.02
Full Displaced Left Turn	-	40	0.65	0.90
Median U-Turn	-	20	0.80	1.17
Partial Displaced Left Turn	-	44	0.65	0.90
Partial Median U-Turn	-	28	0.82	0.98
Quadrant Roadway	N-W	40	0.74	0.88
	N-E	40	0.87	1.18
	S-E	40	0.78	0.96
	S-W	40	0.82	0.89
Restricted Crossing U-Turn	-	20	0.76	0.92
Roundabout	-	8	1.83	2.91

Table 11 Level of Service of Potential Improvements – Prior to Extension of Guineas Station Road - Guinea Station Road / River Run Parkway

Guinea Station Road		
Operational Improvement(s)	**AM**	**PM**
Existing	F	F
2030 No-Build	F	F
Adding Internal School Connection Between Parking Lots	F	F
Roundabout	B	C
Conventional Signal	B	B
Signalized Continuous Green-T	E	E
Unsignalized RCUT without Internal School Connection	F	F
Unsignalized RCUT with Internal School Connection	E	E
Signalized RCUT	B	C
River Run Parkway		
Operational Improvement(s)	**AM**	**PM**
Existing	B	D
2030 No-Build	B	B
Adding Internal School Connection Between Parking Lots	C	D
Signal Timing Updates	B	B

Table 12 Level of Service of Potential Improvements – After Extension of Guineas Station Road - Guinea Station Road

Guinea Station Road		
Optional Improvements	**AM**	**PM**
Roundabout (4-legged)		
Quadrant Roadway	C, C [1]	C, D [1]

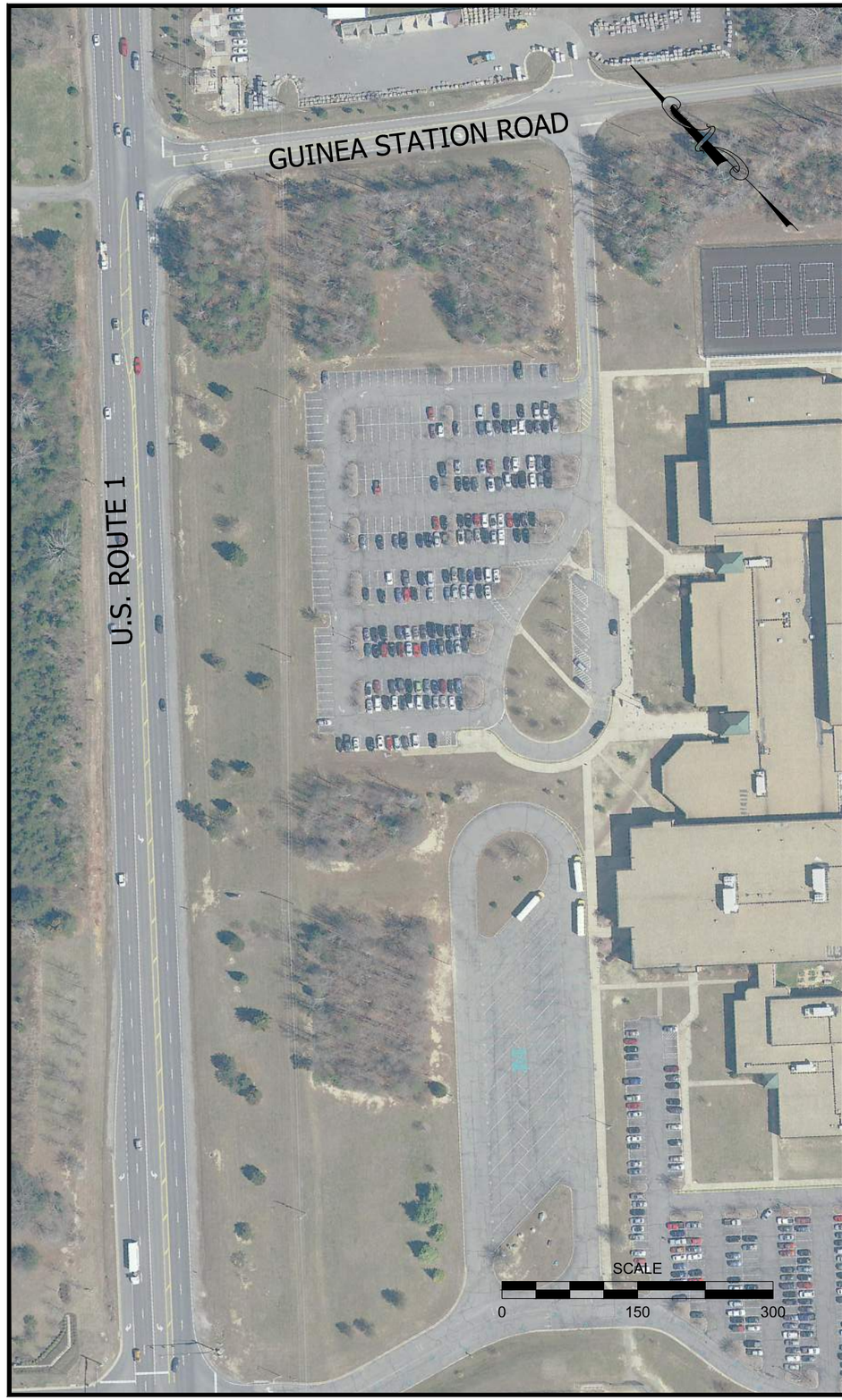
[1]LOS at River Run Parkway

Table 13 Evaluation of Alternatives – Guinea Station Road / River Run Parkway

	Improve Safety and Comfort	Manage Congestion	Improve Incident Management	Manage Access	Provide Transit Options	Order of Magnitude of Costs
No-Build	★	★	★	★	★	N/A
High School Connection	★	★★	★	★★	★	$216,000
Roundabout	★★★★	★★★★	★★★★	★★★	★	$4,300,000
Traffic Signal	★★★	★★★	★★★	★★★	★	$760,000

Table 14 Life Cycle Benefit/Cost Ratio

Life Cycle Benefit/Cost Ratio	
Safety Benefit of a Roundabout	-
Delay Reduction Benefit of a Roundabout	$13,290,277
Total Benefits	$13,290,277
Added Operations & Maintenance Costs of a Roundabout	($59,495)
Added Capital Costs of a Roundabout	$2,692,969
Total Costs	$2,633,474
Life Cycle Benefit/Cost Ratio	5.0



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RESTON, VA 20191
P 703.835.6970

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PROJECT NO.
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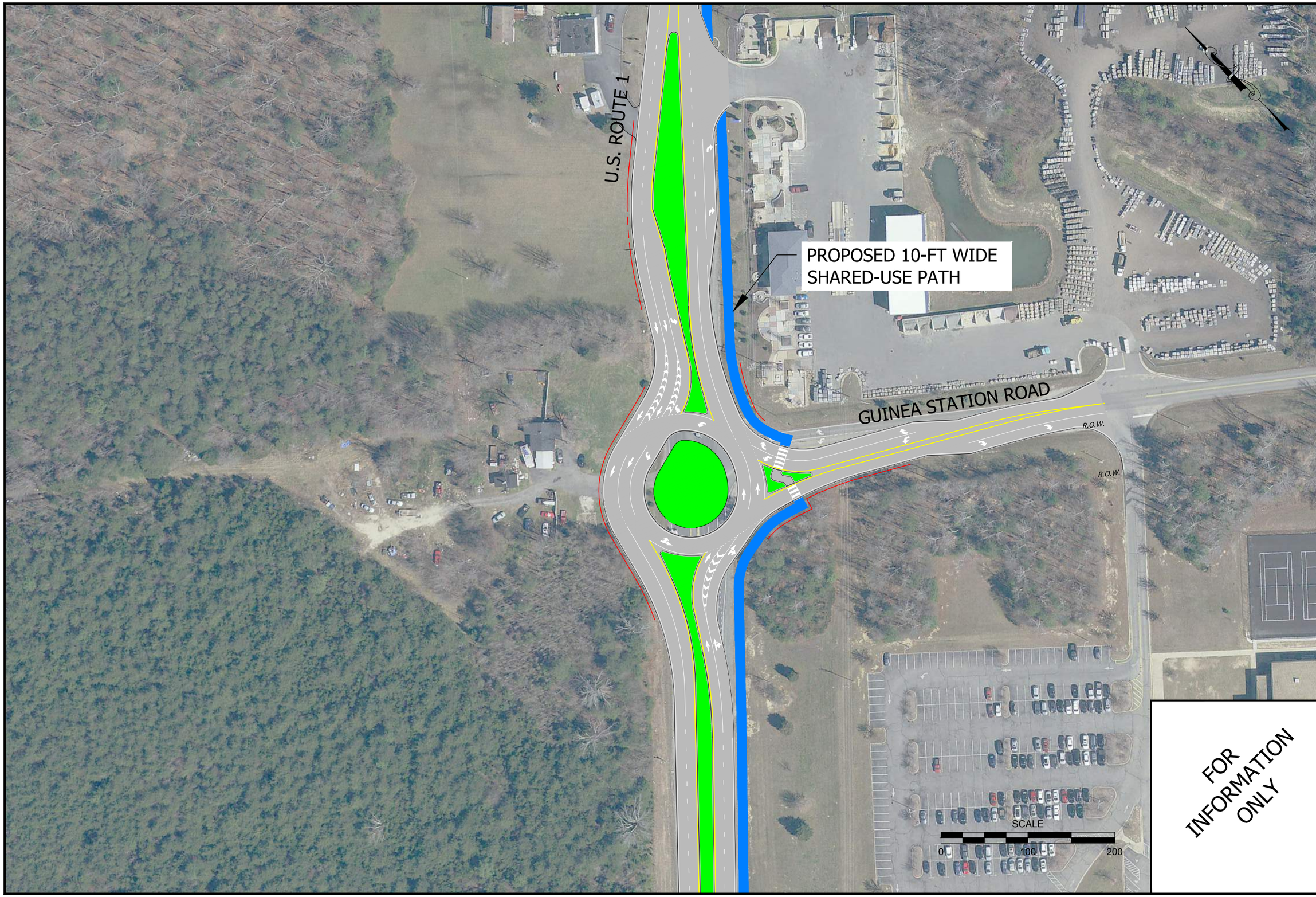
Route 1 Corridor Study: Spotsylvania County

Massaponax High School Internal Connection

FIGURE NO.
20



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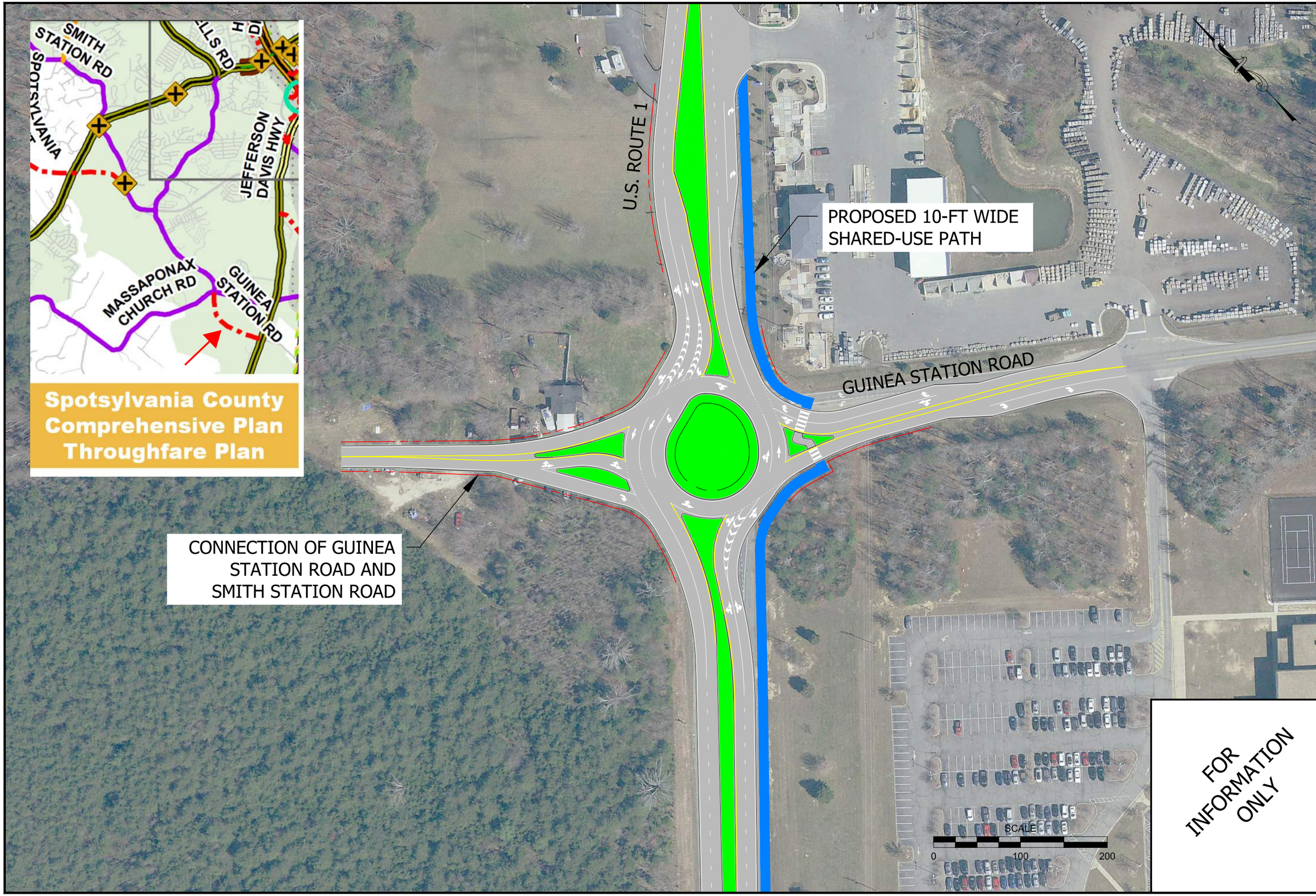
Route 1 Corridor Study: Spotsylvania County

Guinea Station Road Roundabout - Phase 1

FIGURE NO.
21



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Route 1 Corridor Study: Spotsylvania County

Guinea Station Road Roundabout - Phase 2

FIGURE NO.
22

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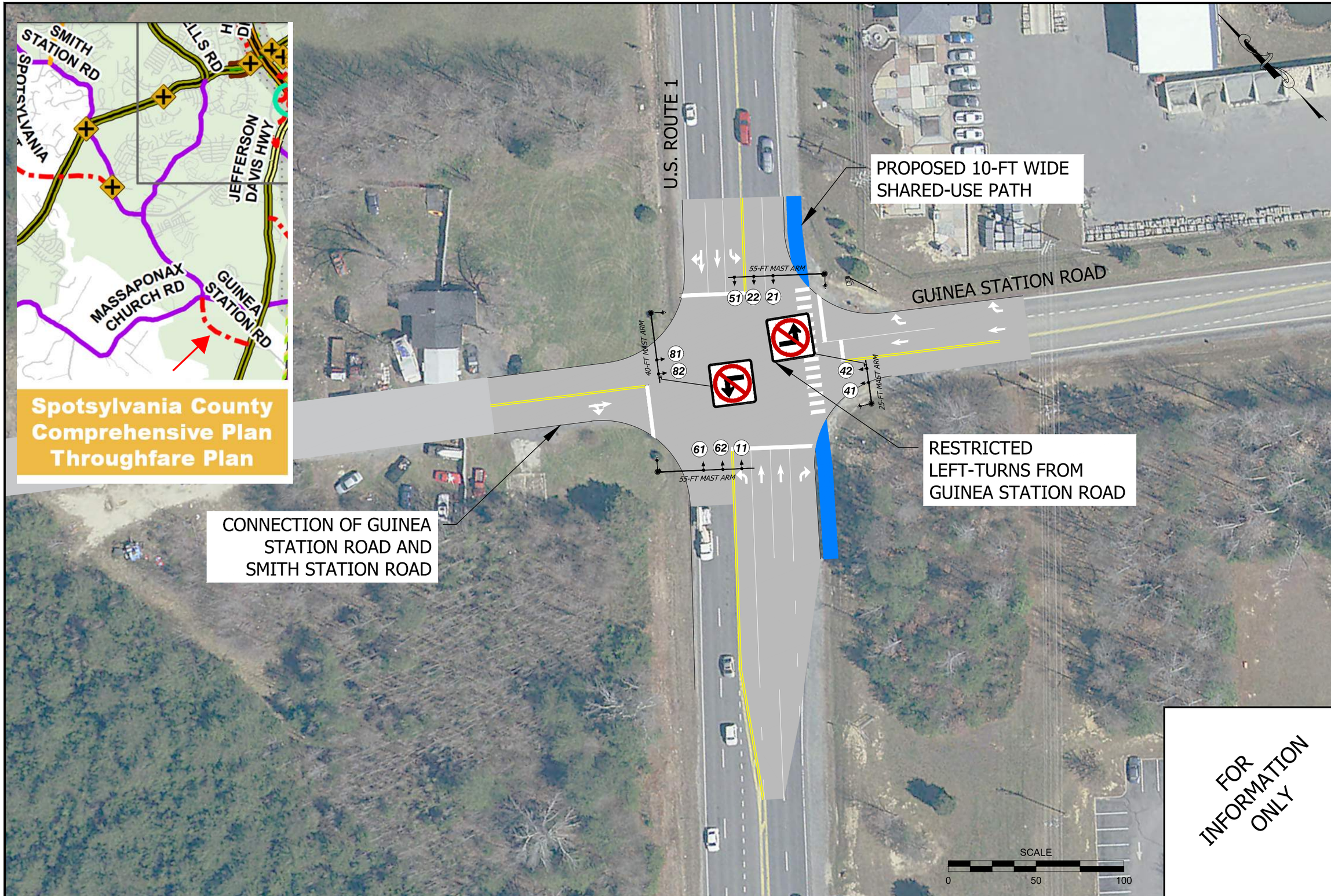
Route 1 Corridor Study: Spotsylvania County

Guinea Station Road 3-Legged - Signal

FIGURE NO.
23



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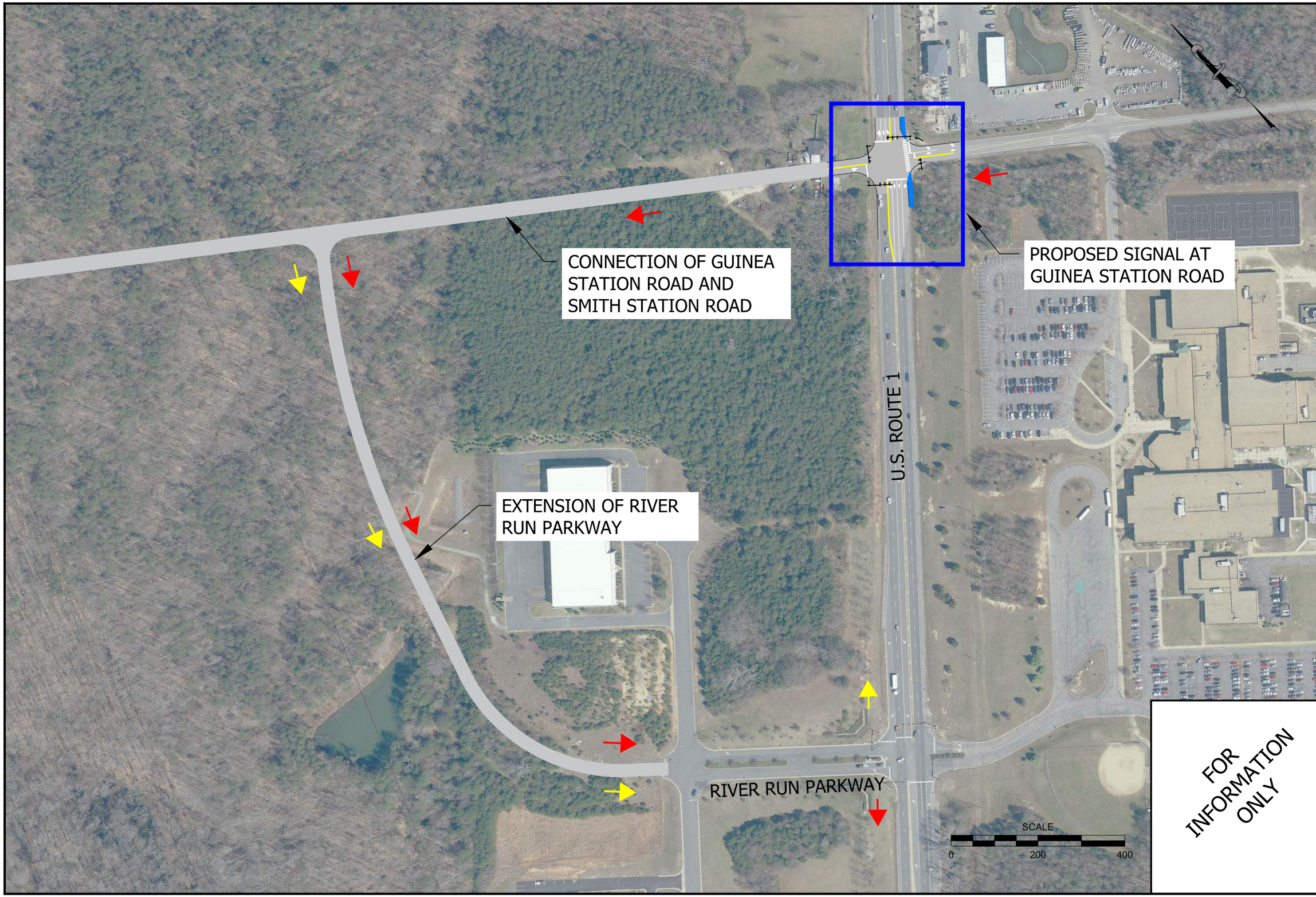
Route 1 Corridor Study: Spotsylvania County

Guinea Station Road Quadrant - Signal

FIGURE NO. 24



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Route 1 Corridor Study: Spotsylvania County

Guinea Station Road Quadrant Configuration

FIGURE NO. 25

Route 632 (Hickory Ridge Road)

NO-BUILD CONDITIONS

The intersection of Route 1at Hickory Ridge Road is located along a section of Route 1 that has rolling hills and a dense mix of trees and brush adjacent to the edge of pavement. This intersection was previously widened between 2015 and 2017. During this period, the additional turn lanes provided access onto Hickory Ridge Road. The existing southbound right turn lane was extended, and an exclusive northbound left turn lane was added. A striped median was provided on the northern leg. The approach on Hickory Ridge Road was also widened to accommodate an exclusive right turn lane.

OPERATIONS

If no additional improvements were to be made by 2030, this intersection is anticipated to be above capacity (LOS F) in the a.m. and p.m. peak hours. Large volumes of through traffic along Route 1 are anticipated to make turning onto and off Hickory Ridge Road challenging.

SAFETY PERFORMANCE

In addition, this intersection was among the study intersections that experienced the highest number of crashes, with 22 occurring during the five years of data evaluated. 12 of the 22 crashes were rear-end events, while the remaining crashes were angle, sideswipe, or fixed object crashes. This intersection was also the site of the only fatal crash that resulted from an angle crash. In addition, this intersection experienced four severe (Level A) injury and seven visible (Level B) injury crashes.

"Dangerous Intersection: Speeding and accessibility concerns at Hickory Ridge Road." - *anonymous.*

ALTERNATIVES ANALYSIS

The study team evaluated potential improvements to the Massaponax Church Road intersection using VJuST, as shown in **Table 15**. In addition, the team determined that the anticipated traffic conditions in 2030 are expected to only meet the signal warrant based on its peak hour volumes.

One option to address these challenges is an unsignalized RCUT. An RCUT here would restrict left-turn movements out of Hickory Ridge and adjacent driveways by installing a median. To make a left turn movement, drivers need to take a right and complete a U-turn downstream. As previously described, RCUTs reduce travel delays and the likelihood of crashes. However, it will require some minor out-of-direction travel and right-of-way acquisition to accommodate the median.

A second option to consider at Hickory Ridge Road is a roundabout. This option is expected to have better overall operations despite some minor added delay to mainline traffic on Route 1. Movements from Hickory Ridge are expected to be more efficient and safer as conflict points are reduced. Like the RCUT option, right-of-way would be required while accesses to the existing properties are maintained.

As shown in **Table 16**, signalized Continuous Green-T and a conventional signal at this location were also explored. The Stakeholder Group expressed that they would prefer no additional signals along Route 1. The primary motivations for avoiding new signals along this

corridor are from annual maintenance costs and this roadway serves as an alternative to I-95.

Appendix B contains the Synchro operational worksheets for these evaluated alternatives in greater detail.

These alternatives were presented during the second public meeting. The public was divided on what they perceived the best option to be. Some believed a roundabout was the preferred option, while others voiced concern about placing roundabouts on Route 1, especially on the study corridor. There appeared to be less support for an RCUT at this location because of perceived safety issues related to completing U-turns as northbound vehicles tend to speed in this area. One participant suggested that a traffic signal be added to this location.

RECOMMENDED ROADWAY IMPROVEMENTS

As a result of the alternatives analysis and feedback from the public and Stakeholder Group, the unsignalized RCUT and roundabout are recommended for implementation. Both intersection configurations would require some right-of-way acquisition and introduce additional delay to the minor approaches. However, both configurations promote safer and more efficient left turns onto Hickory Ridge Road. Relative to the RCUT, the roundabout alternative is anticipated to result in a lower Experienced Travel Time, which accounts for the out-of-direction travel and delays at multiple modes experienced under the RCUT alternative.

Appendix C contains a full-sized plan sheet of the recommended improvements.

Table 18 summarizes the alternatives analysis results and planning-level estimates of probable cost for the options at Hickory Ridge Road. **Appendix D** contains a more detailed breakdown of the cost estimates.

In the near-term, the study team also encourages the Stakeholder Group to further evaluate the removal or delineation of fixed objects at and near the intersection. Five of the 22 crashes were the result of fixed-object crashes.

Table 15 Hickory Ridge Road VJuST Results

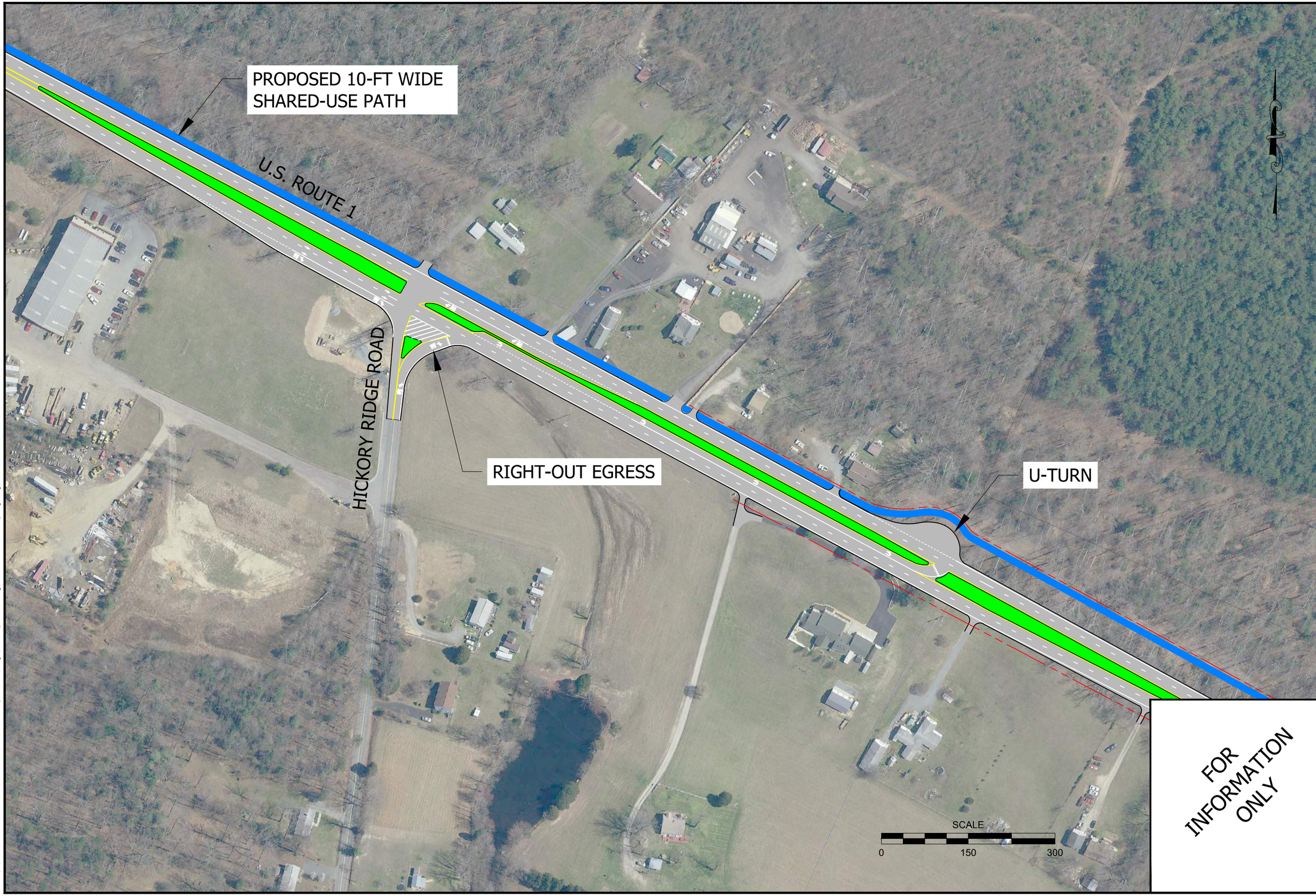
Route 632 (Hickory Ridge Road)				
Type	Direction	Weighted Total Conflict Points	AM Peak V/C	PM Peak V/C
Conventional	-	48	0.41	0.57
Bowtie	-	24	0.40	0.55
Continuous Green-T	-	12*	0.41	0.57
Median U-Turn	-	20	0.48	0.58
Partial Displaced Left Turn	-	44	0.39	0.55
Partial Median U-Turn	-	28	0.42	0.57
Quadrant Roadway	N-W	40	0.42	0.57
	N-E	40	0.42	0.55
	S-E	40	0.41	0.55
	S-W	40	0.41	0.57
Restricted Crossing U-Turn	-	20	0.42	0.58
Roundabout	-	8	0.92	1.30

Table 16 Level of Service of Potential Improvements - Hickory Ridge Road

Operational Improvement(s)	AM	PM
Existing	C	C
2030 No-Build	F	F
Conventional Signal	A	A
Roundabout	A	A
Signalized Continuous Green-T	B	B
Unsignalized RCUT: 3-Legged	B	C

Table 17 Evaluation of Alternatives - Hickory Ridge Road

	Improve Safety and Comfort	Manage Congestion	Improve Incident Management	Manage Access	Provide Transit Options	Order of Magnitude of Costs
No-Build	★	★	★	★	★	N/A
RCUT	★★★	★★★★	★★★	★★	★	$7,200,000
Roundabout	★★★★	★★★★	★★	★★★	★	$1,000,000



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KITTELSON & ASSOCIATES
11480 COMMERCE PARK DRIVE, SUITE 450
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P 703.885.9970

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Route 1 Corridor Study: Spotsylvania County

Hickory Ridge Road Option #1 - RCUT

FIGURE NO. 26

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RESTON, VA 20191
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Route 1 Corridor Study: Spotsylvania County

Hickory Ridge Road Option #2 - Roundabout

FIGURE NO.
27

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North Roxbury Mill Road

NO-BUILD CONDITIONS

The North Roxbury Mill Road intersection with Route 1 experiences both operational and safety challenges due to its skewed approach to Route 1. During public engagement, many drivers noted that they do not feel safe turning into or out of North Roxbury Mill Road due to low visibility and a lack of turn lanes. This intersection is also located close to the River of Life Church entrance. The public and Stakeholder Group members described that traffic will back up as vehicles try to enter the church.

OPERATIONS

In addition, this intersection is expected to operate at LOS E in the weekday a.m. peak hour and LOS F in the weekday p.m. peak hour. Because much of the new developments' traffic is anticipated to travel through this intersection to exit the corridor at Mudd Tavern Road/Morris Road it is anticipated the intersection will approach capacity.

SAFETY PERFORMANCE

This intersection experienced 16 crashes during the five years of data evaluation. Of these 16 crashes, 11 were rear-end events, and four were angle events. Only one visible (Level B) injury and one non-visible (Level C) injury crash occurred at this intersection.

"Bus drivers have requested a traffic signal at this intersection during peak morning and afternoon times for safer exits from school." - *anonymous.*

ALTERNATIVES ANALYSIS

Potential improvements to the North Roxbury Mill Road intersection were evaluated using VJuST, as shown in **Table 18**. The study team initially considered both three-legged and four-legged versions of an RCUT. The four-legged version used the River of Life Church as the fourth leg.

The study team also considered a roundabout at this location. This would require either realignment of the existing North Roxbury Mill Road or the reconstruction of the church access. Although this configuration was operationally sufficient in terms of the LOS (shown in

Table 19), the study team and Stakeholder Group determined a roundabout would not suit the context of this intersection.

The analyses determined that these innovative configurations would not yield sufficient benefits to justify the associated costs with construction, maintenance, and coordination with the church. Detailed Synchro operational worksheets for these configurations can be found in **Appendix B.** As a result, the study team looked at ways to additional options to improve this intersection.

One low-cost option would be to simply close North Roxbury Mill Road off from Route 1. Drivers currently using this intersection would be diverted down to Larkinchew Road, which has better visibility and turn-lanes.

If maintaining access North Roxbury Mill Road is a priority, the intersection could be restricted to right-in/right-out. Egress from North Roxbury Mill Road would be accommodated via an acceleration lane. This would prevent drivers from having to turn nearly 180 degrees to see incoming northbound vehicles on Route 1. Under

this scenario, southbound left-turns onto North Roxbury Mill Road are prohibited and are directed to use Larkinchew Road.

The third option, which is a slight variation on Option 2, widens Route 1 to provide a left-turn lane into the existing church on the west side of Route 1. Feedback received from the community illustrated there are existing issues with turns in and out of the church. This option could be achieved with coordination and financial contribution from the church.

RECOMMENDED ROADWAY IMPROVEMENTS

After input from the public and Stakeholder Group, the study team recommends the turn lane improvements shown in Figure 28 to Figure 30. These modifications include:

- Close access from North Roxbury Mill Road
- Restrict North Roxbury Mill Road to right-in/right-out
- Restrict North Roxbury Mill Road to right-in/right-out with dedicated turn lanes for the church.

These alternatives were presented at the second public meeting. Full-sized plan sheets for these recommended improvements can be found in **Appendix** C. Feedback and the public's preferences were split among the alternatives but primarily favored the "close access" and "restrict access with turn lanes" options. However, there was some concern related to removing access for houses that are located along North Roxbury Mill Road.

Table 20 summarizes the alternatives analysis results and planning-level estimates of probable cost for these options at North Roxbury Mill Road. A detailed breakdown of the cost estimates can be found in **Appendix D.**

Table 18 North Roxbury Mill Road VJuST Results

Route 632 (North Roxbury Mill Road)				
Type	**Direction**	**Weighted Total Conflict Points**	**AM Peak V/C**	**PM Peak V/C**
Conventional	-	48	0.46	0.57
Bowtie	-	24	0.45	0.60
Full Displaced Left Turn	-	40	0.46	0.50
Median U-Turn	-	20	0.48	0.61
Partial Displaced Left Turn	-	44	0.46	0.5
Partial Median U-Turn	-	28	0.48	0.61
Quadrant Roadway	N-W	40	0.45	0.60
	N-E	40	0.51	0.60
	S-E	40	0.46	0.61
	S-W	40	0.45	0.61
Restricted Crossing U-Turn	-	20	0.46	0.51
Roundabout	-	8	0.95	1.19

Table 19 Level of Service of Potential Improvements - North Roxbury Mill Road

Operational Improvement(s)	AM	PM
Existing	E	D
2030 No-Build	F	F
Add Southbound Left-Turn	F	F
Unsignalized RCUT (including Church Driveway)	F	D
Roundabout	B	B
Right-Out Only with Acceleration Lane	A	A

Table 20 Evaluation of Alternatives at North Roxbury Mill Road

	Improve Safety and Comfort	Manage Congestion	Improve Incident Management	Manage Access	Provide Transit Options	Order of Magnitude of Costs
No-Build	★	★	★	★	★	N/A
Close Access	★★	★	★★	★	★	$0
Restrict Access	★★	★★	★★	★★	★	$830,000
Restrict Access with NB Left-Turn Lane	★★	★★	★★	★★★	★	$1,700,000

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P 703.885.8970

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Route 1 Corridor Study: Spotsylvania County

N Roxbury Mill Road Option #1 - Close Access

FIGURE NO. 28

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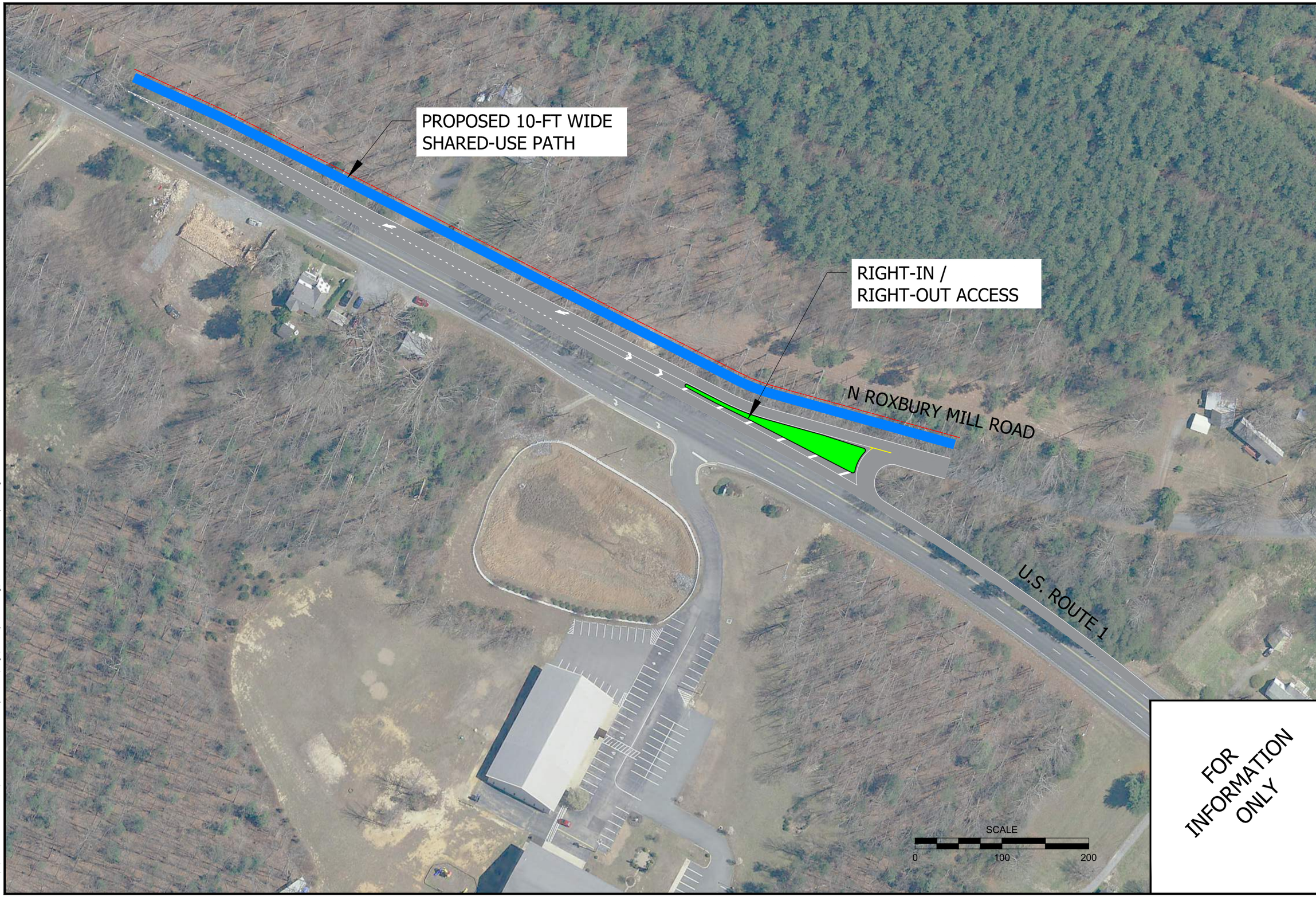

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N Roxbury Mill Road Option #2 - Right-in/Right-out

FIGURE NO.
29

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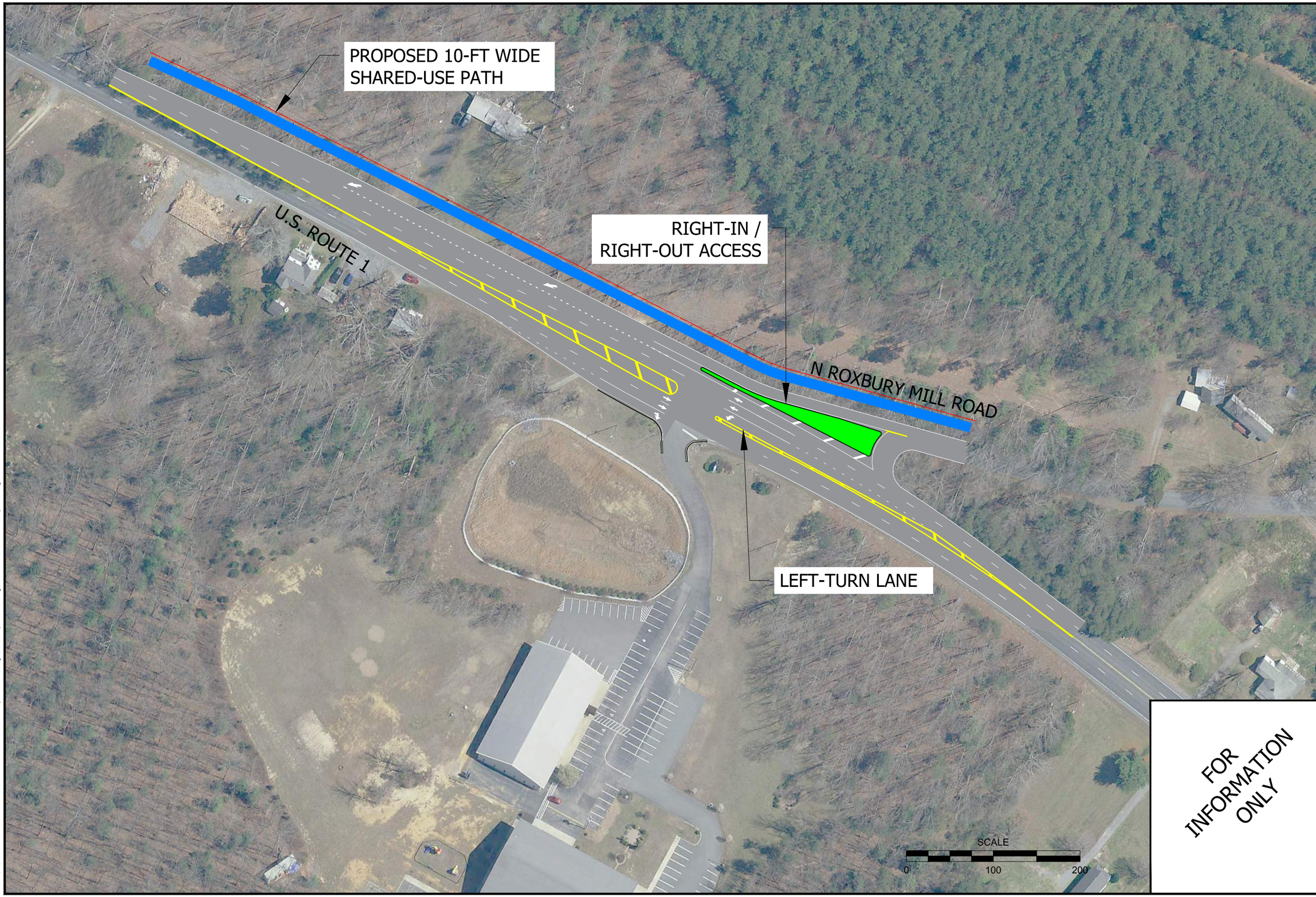

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N Roxbury Mill Road #3 - Right-out with Left Turn Lane

FIGURE NO.
30

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North Pointe Drive & Larkinchew Road

NO-BUILD CONDITIONS

North Point Drive and Larkinchew Road intersection is an important connection for the local community along Route 1. This location provides access to an elementary, middle, and high school to the east of this intersection.

OPERATIONS

By 2030, this intersection is anticipated to be nearing or above capacity in the morning (LOS E) and evening peak hours (LOS F). The operations at this intersection are expected to deteriorate at this location because much of the new developments' traffic is anticipated to travel through this intersection to exit the corridor at Mudd Tavern Road/Morris Road.

SAFETY PERFORMANCE

This intersection experienced five crashes in the five years of data evaluated. Three of these five crashes were fixed object-off road events. Only one of the five crashes that occurred at this intersection resulted in a visible (LOS B) injury.

"Bus drivers have requested a traffic signal at this intersection during peak morning and afternoon times for safer exits from school." - *anonymous.*

ALTERNATIVES ANALYSIS

Potential improvements to the North Pointe Drive and Larkinchew Road intersection were evaluated using VJuST, as shown in **Table 21**. As a result of this analysis and discussions with the Stakeholder Group, the study team explored several options at this intersection. Feedback at the first public meeting was there is interest in a signal at this location. The benefits of a signal here would be that it allows vehicles, including school buses, to enter Route 1. However, signals tend to have safety concerns related to angle and rear-end crashes. Therefore, high operational delays are still expected with a signal at this intersection. In addition, a signal is only expected to be warranted during the peak hours in the year 2030.

A roundabout was also evaluated. A roundabout would decrease the number of conflict points and therefore reduce the expected number of crashes. As previously mentioned, roundabouts help manage vehicular speeds to allow efficient movements through intersections. A challenge of a roundabout at this location is the higher construction cost. However, this cost is expected to be offset through lower annual costs.

The study team also considered the addition of a westbound left turn lane at this intersection. As shown **Table 22**, this configuration results in limited operational improvements in terms of LOS. **Appendix B** contains the Synchro operational worksheets for alternatives evaluated in greater detail.

RECOMMENDED ROADWAY IMPROVEMENTS

After discussions with the Stakeholder Group and feedback from the public, it is recommended that both a roundabout and traffic signal be considered as the improvement for the North Point Drive/Larkinchew Road intersection. Both improvements are anticipated to create safer, more efficient movements, especially for the minor approaches. **Appendix C** contains a full-sized plan sheet of the recommended improvements.

Table 23 is provided to summarize the alternatives analysis results and planning-level estimates of probable cost for the options at North Point Drive/Larkinchew Road. While the traditional traffic signal has a lower initial cost than a roundabout, the roundabout has fewer crashes and less delay. The life cycle benefit/cost ratio of installing a roundabout is 0.3, as shown in **Table 24.** This suggests that a traffic signal is the preferred option. **Appendix D** contains a more detailed breakdown of the cost estimates.

These options were also presented during the second public meeting. Again, the public appeared to be divided in their preferences for a roundabout and a signal. However, the public seemed receptive to the bus drivers' interest in a signal at this location.

Table 21 North Point Drive/Larkinchew Road VJuST Results

North Point Drive/Larkinchew Road				
Type	Direction	Weighted Total Conflict Points	AM Peak V/C	PM Peak V/C
Conventional	-	48	0.40	0.53
Bowtie	-	24	0.40	0.53
Full Displaced Left Turn	-	40	0.40	0.52
Median U-Turn	-	20	0.44	0.59
Partial Displaced Left Turn	-	44	0.40	0.53
Partial Median U-Turn	-	28	0.43	0.55
Quadrant Roadway	N-W	40	0.40	0.55
	N-E	40	0.44	0.53
	S-E	40	0.40	0.53
	S-W	40	0.40	0.55
Restricted Crossing U-Turn	-	20	0.40	0.56
Roundabout	-	8	0.96	1.26

Table 22 Level of Service of Potential Improvements - North Pointe Drive/Larkinchew Road

Operational Improvement(s)	AM	PM
Existing	C	D
2030 No-Build	E	F
Add Westbound Left-Turn Lane	E	F
Conventional Signal	A	B
Roundabout	A	A

Table 23 Evaluation of Alternatives at North Point Drive/Larkinchew Road

	Improve Safety and Comfort	Manage Congestion	Improve Incident Management	Manage Access	Provide Transit Options	Order of Magnitude of Costs
No-Build	★	★★	★★	★★	★	N/A
Traffic Signal	★★★	★★★	★★★	★★★	★	$670,000
Roundabout	★★★★	★★★★	★★★	★★★	★	$2,100,000

Table 24 Roundabout Life Cycle Benefit/Cost Ratios and Total Discounted Costs (2030-2055)

Total Discounted Life Cycle Costs (2030-2055)	
Safety Benefit of a Roundabout	-
Delay Reduction Benefit of a Roundabout	$301,926
Total Benefits	$301,926
Added Operations & Maintenance Costs of a Roundabout	($72,555)
Added Capital Costs of a Roundabout	$1,124,681
Total Costs	$1,052,126
Life Cycle Benefit/Cost Ratio	0.3

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11480 COMMERCE PARK DRIVE, SUITE 450
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Route 1 Corridor Study: Spotsylvania County

North Pointe Drive/ Option #1 - Signal

FIGURE NO. 31

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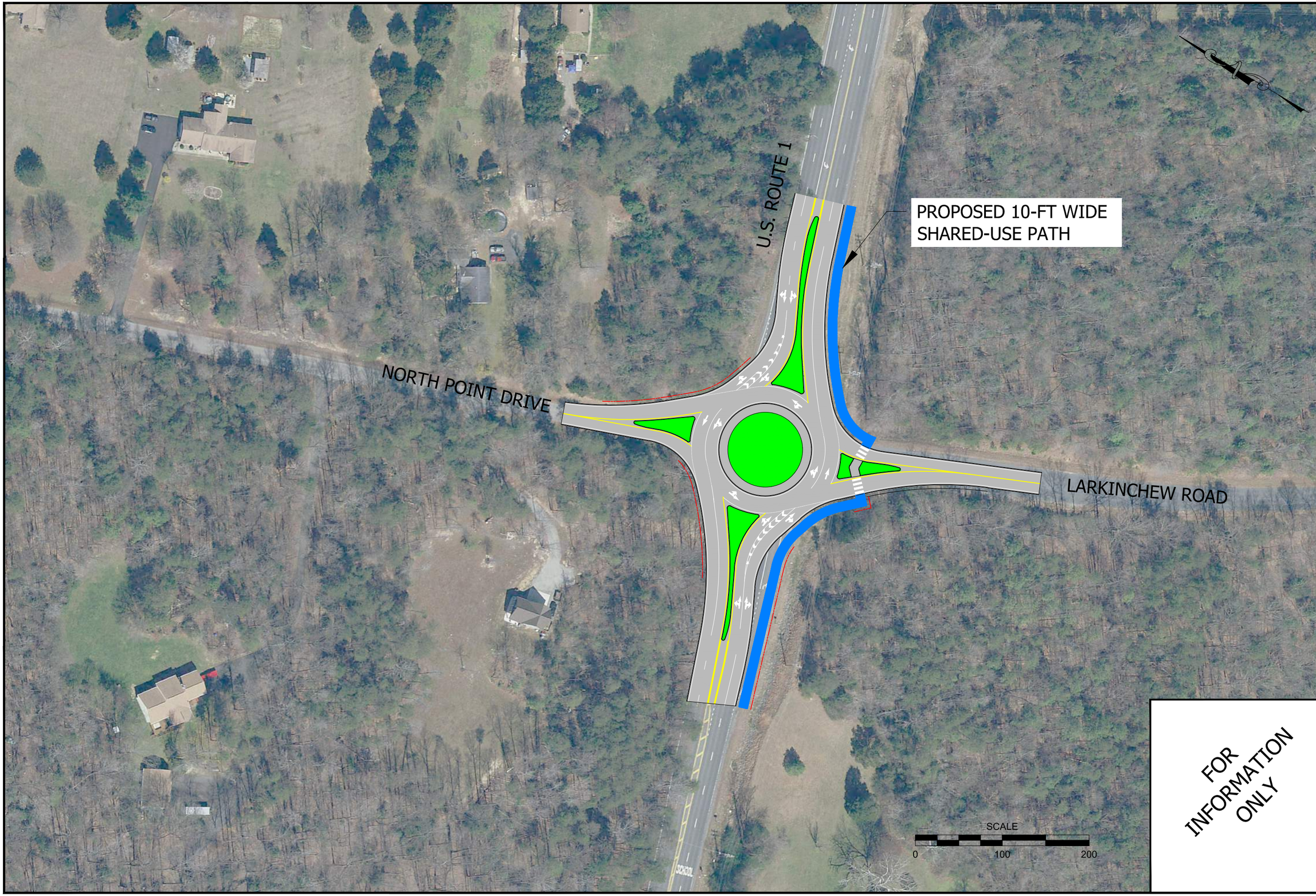

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North Pointe Drive Option #2 - Roundabout

FIGURE NO.
32

South Roxbury Mill Road & Mudd Tavern Road/Morris Road

NO-BUILD CONDITIONS

The area near South Roxbury Mill Road and Mudd Tavern Road is programmed to see several improvements come online prior to 2030. First, Mudd Tavern Road and Morris Road are being widened with turn lanes and pedestrian infrastructure at the signal. A new connector road is also being constructed to the east of Route 1 to provide alternative means of accessing Mudd Tavern Road and Route 1 from South Roxbury Mill Road.

OPERATIONS

Even with these proposed improvements, South Roxbury Mill Road is forecast to operate near capacity (LOS E) in the p.m. peak hour as vehicles attempting to access Route 1 are anticipated to experience high delays. This intersection is expected to operate as a LOS B in the a.m. peak hour. The improvements planned for Mudd Tavern Road/Morris Road are anticipated to yield LOS D operations in the a.m. and p.m. peak hours.

SAFETY PERFORMANCE

The study team evaluated the crash history at these two intersections. The South Roxbury Mill Road intersection experienced nine crashes in the study period, including one pedestrian-related crash. Of the nine crashes, two were visible (Level B) injury, and the remaining seven were property-damage-only.

There were 80 crashes at the Mudd Tavern Road/Morris Road intersection, including 40 angle, 23 rear-end, and one pedestrian-related crashes. Of the 80 crashes at this location, five were severe (Level A) injury, eighteen were visible (Level B) injury, and seven were non-visible (Level C) injury crashes. The number of these injury crashes resulted in this intersection being among those on the corridor with the highest equivalent property damage only (EPDO) scores. It is anticipated that much of the improvements planned for this area will address many of these safety-related issues.

"A right turn lane needs to be added to Mudd Tavern Road. The alignment of Morris Road and Mudd Tavern Road needs to be at a 90° angle. A delegated right turn lane should be added to Morris Road."- *anonymous.*

ALTERNATIVES ANALYSIS

As shown in **Table 25**, the study team used VJuST to evaluate innovative improvements at these two intersections. Although many of these innovative configurations were shown to have yielded operational improvements, the study team identified a few low-cost modifications to enhance the planned improvements for this area.

Several options were considered at South Roxbury Mill Road. These include adding a dedicated westbound right-turn lane, creating a parallel/frontage road for land uses in the northwest quadrant of the intersection to access Morris Road (rather than direct access to Route 1), and implementing an unsignalized RCUT. As shown in

Table 26, a dedicated westbound right turn lane or creating a frontage road are not anticipated to improve operations at South Roxbury Mill Road due to continued delays on the westbound approach. Although the unsignalized RCUT is shown to yield operational improvements, the study team and Stakeholder Group had concerns about the proximity of an RCUT at this location and Mudd Tavern Road/Morris Road.

The study team also explored how the proposed plans at Mudd Tavern Road/Morris Road could be expanded to further improve operations at this intersection. As shown in **Table 26**, the dual southbound left turn lanes with and without dual eastbound left turn lanes were evaluated in Synchro. The operational worksheets for each of these alternatives can be found in **Appendix B**.

RECOMMENDED ROADWAY IMPROVEMENTS

Through feedback from the public and Stakeholder Group, a combination of treatments was considered to further improve the proposed Mudd Tavern Road/Morris Road plans.

The first treatment involves converting South Roxbury Mill Road to right-out egress only, which will improve the anticipated over-capacity operations. Drivers on South Roxbury Mill Road looking to travel south on Route 1 can still do so via the planned connector road and the signal at Mudd Tavern Road.

The proposed plan could also be modified by extending the southbound left-turn lane within the existing median at the traffic signal. This would help prevent queue spillback into the through lanes on Route 1.

In this portion of the study area, the shared-use path, which had been diverted to run along South Roxbury Mill Road, could be tied back to Route 1 at the signal. These are shown in **Figure 33**. **Appendix C** contains a full-sized plan sheet of the recommended improvements.

The public appears to be generally supportive of the improvements shown during the second public meeting. However, some members of the public may need additional information to understand the recommended improvements. In addition, one member of the public suggested that this intersection should be considered as an additional park-and-ride location.

Table 27 summarizes the alternatives analysis results and planning-level estimates of probable cost for South Roxbury Mill Road and Mudd Tavern Road/Morris Road options. **Appendix D** contains a more detailed breakdown of the cost estimates.

Table 25 South RoxburyMill Road & Mudd Tavern Road/Morris Road VJuST Results

South Roxbury Mill Road				
Type	**Direction**	**Weighted Total Conflict Points**	**AM Peak V/C**	**PM Peak V/C**
Conventional	-	48	0.37	0.52
Continuous Green-T	-	12*	0.37	0.49
Full Displaced Left Turn	-	40	0.37	0.50
Median U-Turn	-	20	0.38	0.53
Partial Displaced Left Turn	-	44	0.37	0.51
Partial Median U-Turn	-	28	0.37	0.52
Quadrant Roadway	N-W	40	0.37	0.51
	N-E	40	0.39	0.52
	S-E	40	0.37	0.51
	S-W	40	0.37	0.52
Restricted Crossing U-Turn	-	20	0.38	0.52
Roundabout	-	8	0.84	1.19
Morris Road/Mudd Tavern Road				
Type	**Direction**	**Weighted Total Conflict Points**	**AM Peak V/C**	**PM Peak V/C**
Conventional	-	48	0.81	0.80
Bowtie	-	24	1.37	1.54
Full Displaced Left Turn	-	40	0.62	0.65
Median U-Turn	-	20	1.10	1.29
Partial Displaced Left Turn	-	44	0.62	0.69
Partial Median U-Turn	-	28	1.14	1.00
Quadrant Roadway	N-W	40	0.60	0.82
	N-E	40	1.09	1.30
	S-E	40	0.86	0.89
	S-W	40	0.62	0.89
Restricted Crossing U-Turn	-	20	1.13	1.29
Roundabout	-	8	2.44	2.51

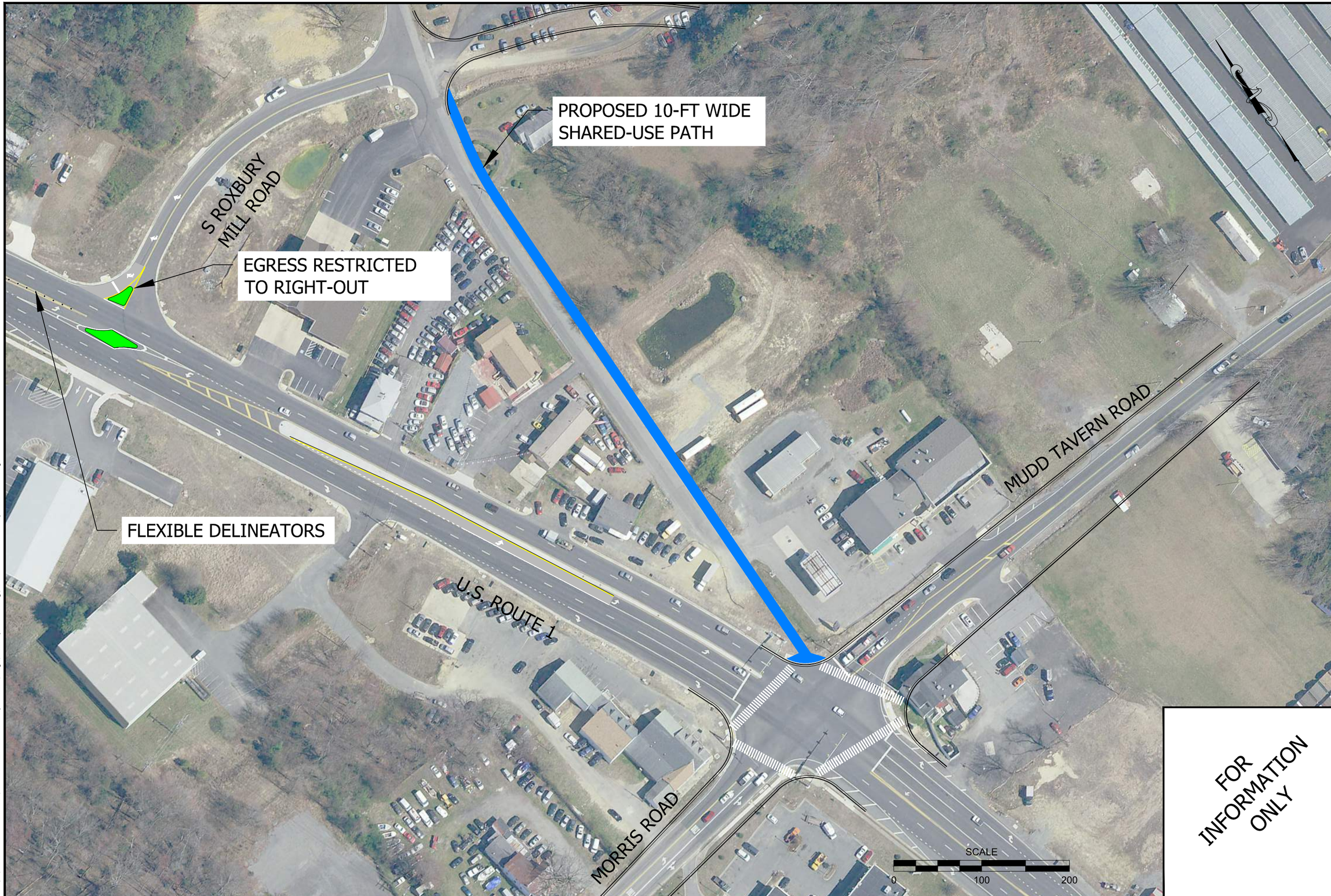
Table 26 Level of Service of Potential Improvements - South Roxbury Mill Road & Mudd Tavern Road/Morris Road

South Roxbury Mill Road		
Operational Improvement(s)	**AM**	**PM**
Existing	B	C
2030 No-Build	C	F
Add Westbound Right-Turn Lane	C	F
Unsignalized RCUT	B	B
Parallel Road in the NW Quadrant to Morris Road	D, D [1]	F, D [1]
Morris Road/Mudd Tavern Road		
Operational Improvement(s)	**AM**	**PM**
Existing	D	D
2030 No-Build	D	D
Dual Southbound Left Turn Lanes	D	D
Dual Eastbound and Southbound Left Turn Lanes	D	D

[1]LOS for signal at Morris Road/Mudd Tavern Road with rerouted volumes from NW quadrant onto Morris Road

Table 27 Evaluation of Alternatives at South Roxbury Mill Road and Mudd Tavern Road/Morris Road

	Improve Safety and Comfort	Manage Congestion	Improve Incident Management	Manage Access	Provide Transit Options	Order of Magnitude of Costs
No-Build	★	★★	★★★	★★	★	N/A
Plan Improvements	★★★	★★★	★★★	★★★	★★★★★	$522,000



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KITTELSON & ASSOCIATES
11480 COMMERCE PARK DRIVE, SUITE 450
RESTON, VA 20191
P 703.835.6970

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Submission Date: 08/13/2021

Drawn:	Designed:	Checked:
AJB	AJB	KJH

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Route 1 Corridor Study: Spotsylvania County

S. Roxbury Mill Rd & Mudd Tavern Rd Improvements

FIGURE NO.
33

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Route 603 (Arcadia Road)

NO-BUILD CONDITIONS

Through discussions with our Stakeholder Group and feedback from the first public meeting, safety and speeding are the primary concerns at this intersection. The concerns at this intersection are magnified by the skewed approach on Arcadia Road and the curved roadway of Route 1. This combination leads to drivers having difficulty gauging gaps when completing turning movements.

OPERATIONS

It is anticipated that most of the traffic growth along the Route 1 in this area is expected to exit the corridor at the Mudd Tavern Road/Morris Road intersection. The Route 1 intersection at Arcadia Road is expected to experience traffic growth at a slower rate. With this slower background traffic growth, Arcadia Road is anticipated to operate at a LOS C in the a.m. and p.m. peak hour.

SAFETY PERFORMANCE

As previously described, the Stakeholder Group expressed concerns related to the safety of the Arcadia Road intersection. Arcadia Road experienced 16 crashes during the five years of evaluated crash data, 10 of which were angle crashes. This intersection also had 4 fixed-object off-road crashes. The 16 crashes at Arcadia Road consisted of seven visible (Level B) injury and nine property damage only (PDO) crashes.

"There should be speed management at Arcadia Road - most drivers ignore posted 45 mph speed limit and traffic backups" - ***anonymous.***

ALTERNATIVES ANALYSIS

The study team evaluated potential improvements to the Arcadia Road intersection using VJuST, as shown in **Table 28**. Of these potential improvements, an unsignalized RCUT at this location was initially considered. Although this configuration yielded some operations improvements in terms of LOS (shown in **Table 29**), this configuration's benefits do not appear to justify costs. In addition, the right-of-way and existing roadway configurations are anticipated to create challenges during construction.

To address the safety concerns at this location, the study team considered two options. The first of which is to restrict Arcadia Road to right-in/right-out movements. Drivers that previously used this intersection to turn left could do so at Marye Road, which anticipated to operate below capacity even with the additional, rerouted traffic. This option is expected to reduce the number of severe angle crashes. However, it would require out-of-direction travel for some exiting Arcadia Road.

The second option is to realign Arcadia Road by extending Plantation Estates Way. The benefit of this option is that it would create a more perpendicular approach which would create safer turning movements by improving visibility. However, this option is anticipated to be more expensive as right-of-way will need to be purchased. Coordination with the subdivision to the west will also need to be considered as this is a primary origin of many of the users.

Appendix B contains the Synchro operational worksheets for alternatives evaluated in greater detail.

RECOMMENDED ROADWAY IMPROVEMENTS

After reviewing the alternatives analysis and feedback from the public and Stakeholder Group, the study team recommends both the restricted access and Plantation Estates Way extension options be considered for implementation. Both options would provide a more perpendicular approach and, therefore safer environment at Arcadia Road. Full-size plan sheets of these recommended improvements are located in **Appendix C.**

These options were presented at the second public meeting. In general, the public was strongly against closing the existing Arcadia Road intersection. As a result, realigning Arcadia Road appeared to be the preferred option.

Several members of the public suggested that a signal be installed at Arcadia Road. Although a signal is warranted due to the anticipated eight-hour, four-hour, and peak-hour volumes, the Stakeholder Group expressed concerns about both the safety and operational performance of installing a traffic signal at this location.

Table 30 summarizes the alternatives analysis results and planning-level estimates of probable cost for these options at Arcadia Road. A more detailed breakdown of the cost estimates can be found in **Appendix D**.

In addition to the proposed roadway configurations, the study team also suggests that landscaping be maintained, especially at this intersection, to maintain sight distances.

Table 28 Arcadia Road VJuST Results

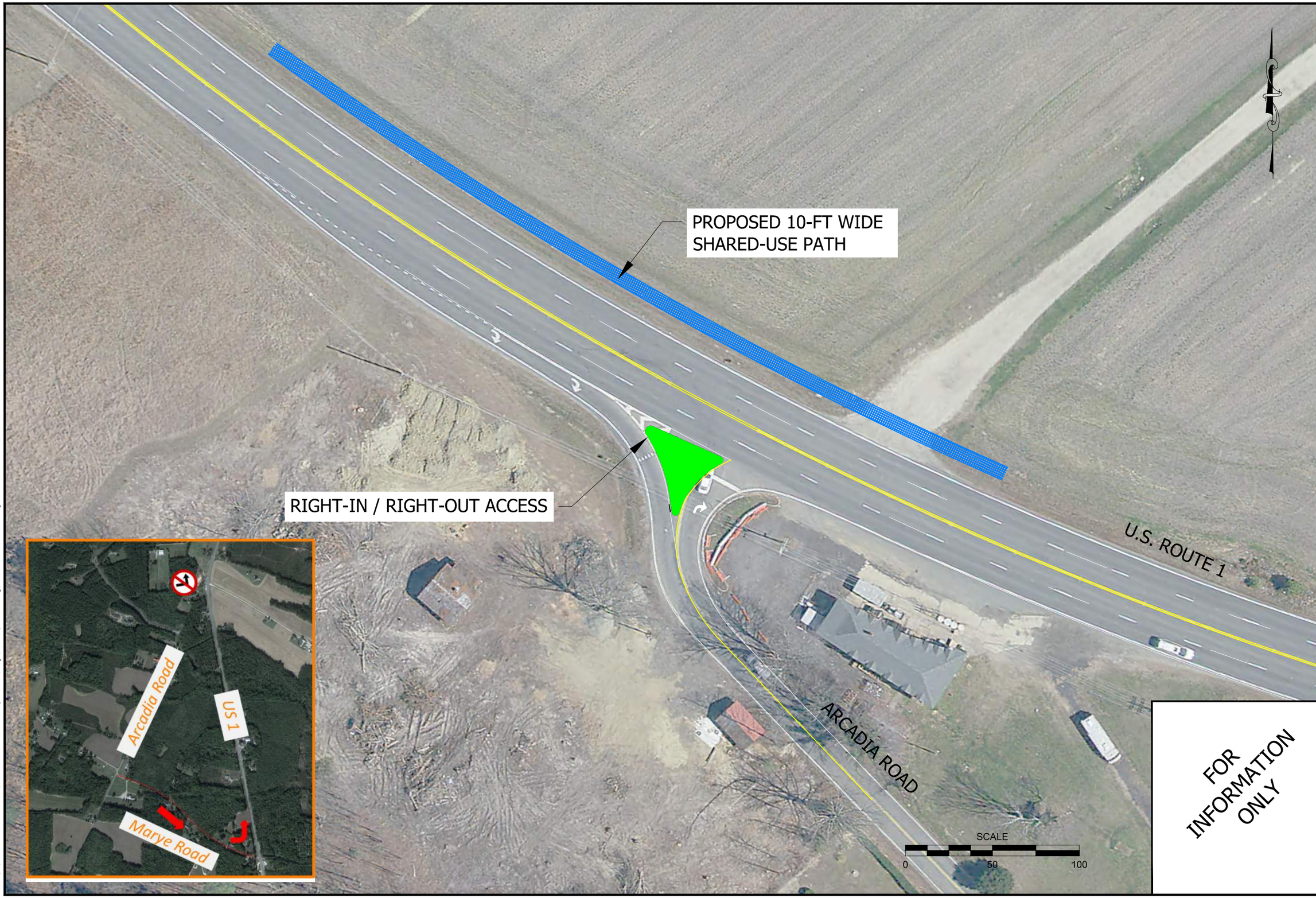
Route 603 (Arcadia Road)				
Type	Direction	Weighted Total Conflict Points	AM Peak V/C	PM Peak V/C
Conventional	-	48	0.33	0.27
Continuous Green-T	-	12*	0.25	0.27
Median U-Turn	-	20	0.45	0.35
Partial Displaced Left Turn	-	44	0.33	0.34
Partial Median U-Turn	-	28	0.33	0.28
Quadrant Roadway	N-W	40	0.33	0.27
	N-E	40	0.36	0.38
	S-E	40	0.36	0.28
	S-W	40	0.33	0.27
Restricted Crossing U-Turn	-	20	0.37	0.35
Roundabout	-	8	0.43	0.65

Table 29 Level of Service of Potential Improvements - Arcadia Road

Operational Improvement(s)	AM	PM
Existing	B	C
2030 No-Build	C	C
Unsignalized RCUT	B	B
Right-In/Right-Out Access	B	B

Table 30 Evaluation of Alternatives at Arcadia Road

	Improve Safety and Comfort	Manage Congestion	Improve Incident Management	Manage Access	Provide Transit Options	Order of Magnitude of Costs
No-Build	★	★	-	★	-	N/A
Restrict Access	★★	★	-	★	-	$670,000
Realignment	★★★	★★	-	★★	-	$2,803,000



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11480 COMMERCE PARK DRIVE, SUITE 450
RESTON, VA 20191
P 703.835.6970

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Route 1 Corridor Study: Spotsylvania County

Arcadia Road
Option # 1 - Right-Turn Only

FIGURE NO.
34

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KITTELSON & ASSOCIATES
11480 COMMERCE PARK DRIVE, SUITE 450
RESTON, VA 20191
P 703.835.6970

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Route 1 Corridor Study: Spotsylvania County

Arcadia Road Option #2 - Realignment

FIGURE NO. 35

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PRIORITY RECOMMENDATIONS

This study concluded with a package of recommendations that can be advanced with varying implementation timeframes. Although all alternatives presented to the public are viable, the study team proposes that some intersections are prioritized. The team rated these intersections by their potential for operational and safety improvements. Ratings described in the VDOT's Smart Scale application were used as a guide to this process.

Figure 36 shows each location by priority.

PRIORITY 0

Locations identified as "priority 0" are those that have already been through the SMART SCALE process. Each of these has existing plans that could be modified to further improve the anticipated operations and safety conditions along this section of Route 1.

The project at the Commonwealth Commuter Lot and future Jackson Village Parkway was identified by the study team as an opportunity to further improve the anticipated operations at these intersections. By prioritizing this project, the study expects that the improvements at this location could be constructed simultaneously as the planned Commuter Lot and Jackson Village Parkway projects. This will likely decrease construction and engineering costs.

The study also identified the plan improvements at South Roxbury Mill Road and Mudd Tavern Road/Morris Road to improve the existing plans. The motivation for this prioritization is that these improvements should be constructed simultaneously as the Mudd Tavern Road improvements to decrease construction and engineering costs. These improvements are also anticipated to maximize the impact of that project.

PRIORITY 1

The internal high-school connection at Massaponax High School was identified as "priority 1." This project can be completed immediately to improve the operations along Route 1 and improve the internal circulation at the school. This improvement would not need to go through the SMART SCALE process as it can be completed by private funding. However, the Stakeholder Group will need to work closely with the school system to support this construction.

PRIORITY 2

The locations identified as "priority 2" are opportunities to address both safety and operational concerns. Both the Lad Land Drive and Massaponax Church Road intersections were among those that experienced the highest number of crashes during the five years of data studied. In addition, both intersections are anticipated to operate at LOS F in 2030 due to the effects of planned large developments in their proximity. By prioritizing these locations, the overall corridor conditions are expected to improve.

The study team also identified the proposed concept at Guinea Station Road as "Priority 2" as the concern was expressed by both the Stakeholder Group and the public about this intersection. If the roundabout or the signal was constructed at this location, then safer and more efficient movements for users, including the local high school students and staff are anticipated.

PRIORITY 3

Three locations were identified as "Priority 3" as they all focus on both operational and safety-related issues but tend to require additional

coordination. The Hickory Ridge Road and North Roxbury Mill Road intersections would both experience improved safety and operational performance with the proposed improvements. However, the public did not express a strong preference on their preferred option at these locations. The study team encourages the local authorities to continue conversations with the Stakeholder Group, particularly focused on the minor-street approaches at these intersections, to develop a recommendation that achieves the desired safety and operational performance targets.

PRIORITY 4

The locations identified as the lowest priority, or "Priority 4," are Arcadia Road and North Point Drive/Larkinchew Road. Both intersections are anticipated below capacity with their current configuration through year 2030. The alternatives provided at these locations were primarily driven out of safety concerns. The study team encourages the local authorities to work with developers, particularly near Arcadia Road, to have these installed during the construction of each development.

The improvements at River Run Parkway are identified as "Priority 4" as the public expressed interest in implementing the Guinea Station Road extension to Smith Station Road. This extension will significantly impact River Run Parkway and provide an opportunity to develop a quadrant roadway to improve the anticipated operations at this location.

Figure 36 Priority Recommendations

IMPLEMENTING RECOMMENDATIONS ON ROUTE 1

The US 1 Corridor Study concluded with an evaluation of potential funding approaches and next steps.

Funding Sources

VDOT and the US 1 Corridor Study Stakeholder Group can pursue a variety of funding sources to realize the recommendations identified by this study.

SMART SCALE FUNDING

VDOT's SMART SCALE program scores and allocates funding to projects submitted by regional and local entities. FAMPO and Spotsylvania County can work with VDOT to select and submit projects for SMART SCALE funding. Projects that improve the Corridors of Statewide Significance enhance the Regional Transportation Network, compliment an Urban Development Area, and address safety concerns are a top priority for funding.

TRANSPORTATION ALTERNATIVES FUNDING

VDOT administers Federal Transportation Alternatives (TA) funding for non-motorized transportation projects. FAMPO and Spotsylvania County can submit projects for TA funding.

QUESTIONS THIS SECTION ANSWERS:

- What funding sources can be used to advance the study recommendations?
- Which agency partners will be involved in advancing each study recommendation?

KEY TAKEAWAYS FROM THIS SECTION:

- A mix of state and local funding sources can be used to fund the study recommendations.
- Agency partners who will be involved in submitting funding applications for study recommendations include VDOT, FAMPO, and Spotsylvania County.
- Agency partners who can incorporate study recommendations into their funding programs and budgets include FAMPO and Spotsylvania County.

LOCAL FUNDING APPROACHES

Regional and local agencies can incorporate study recommendations into their funding programs and budgets. FAMPO's Transportation Improvement Program and Spotsylvania County's Capital Improvement Program are local funding programs that could incorporate study recommendations.

Spotsylvania County and FAMPO can also work with private developers to incorporate some study recommendations into new development projects along Route 1.

BE A CHAMPION FOR ROUTE 1!

The Route 1 Corridor serves an important role in Spotsylvania County and its surrounding area. Major growth along this corridor is expected through several residential developments.

Through the US 1 Corridor Study recommendations, VDOT and its partners can advance the study's goals and achieve a safer, more livable, and complete street for Route 1's residents and workers.

Moving from vision to reality can be challenging. As community leaders, transportation professionals, or citizens of Spotsylvania County, we can all take steps to make these projects happen.

HOW YOU CAN HELP

- Executives/community leaders
  - Secure funds for preliminary engineering.
  - Support ongoing recommendations.
  - Contribute to short term recommendations.
- Agency staff
  - Incorporate study recommendations into your work.
  - Engage the community as you begin refining, designing, and implementing the short- and long-term recommendations.

QUESTION THIS SECTION ANSWERS:

- What specific actions can community leaders, agency staff, and citizens take to advance the recommendations of the US 1 Corridor Study?

KEY TAKEAWAYS FROM THIS SECTION:

- Realizing the recommendations of the US 1 Corridor Study will require support from all members of the Route 1 Community, including community leaders, transportation professionals, and citizens.
- You can share the information in this section with others to explain how the US 1 Corridor Study recommendations meet its vision and goals.

- Citizens
  - Tell your elected officials that you want Route 1 to become a complete street.
  - Follow VDOT at http://www.virginiadot.org/Route1Spotsylvania for updates.

WHAT CAN THE ROUTE 1 CORRIDOR STUDY RECOMMENDATIONS ACHIEVE?

Improve access management along the corridor by looking at consolidating access points or restrict particular movements

Improve safety

Improve efficiency by studying traffic operations at the 12 intersections and look at innovative intersection strategies or other upgrades

Improve the ability of the Route 1 corridor to serve as an alternate route to I-95

Appendix A.

Existing & No-Build Conditions Report

VDOT Planning

US1 Corridor Study

MAY 2020

TECH MEMO

EXISTING AND FUTURE NO-BUILD CONDITIONS

VDOT Planning

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1.0 INTRODUCTION

Kittelson and Associates, Inc. prepared this report to document the existing and future operational performance and safety of an eight-mile section of Jefferson Davis Highway (US 1). This section extends from Commonwealth Drive to the Carolina County Line in Spotsylvania County, as shown in . As a Corridor of Statewide Significance (CoSS) and part of the National Highway System (NHS), this corridor plays an important role in incident management along the I-95 corridor.

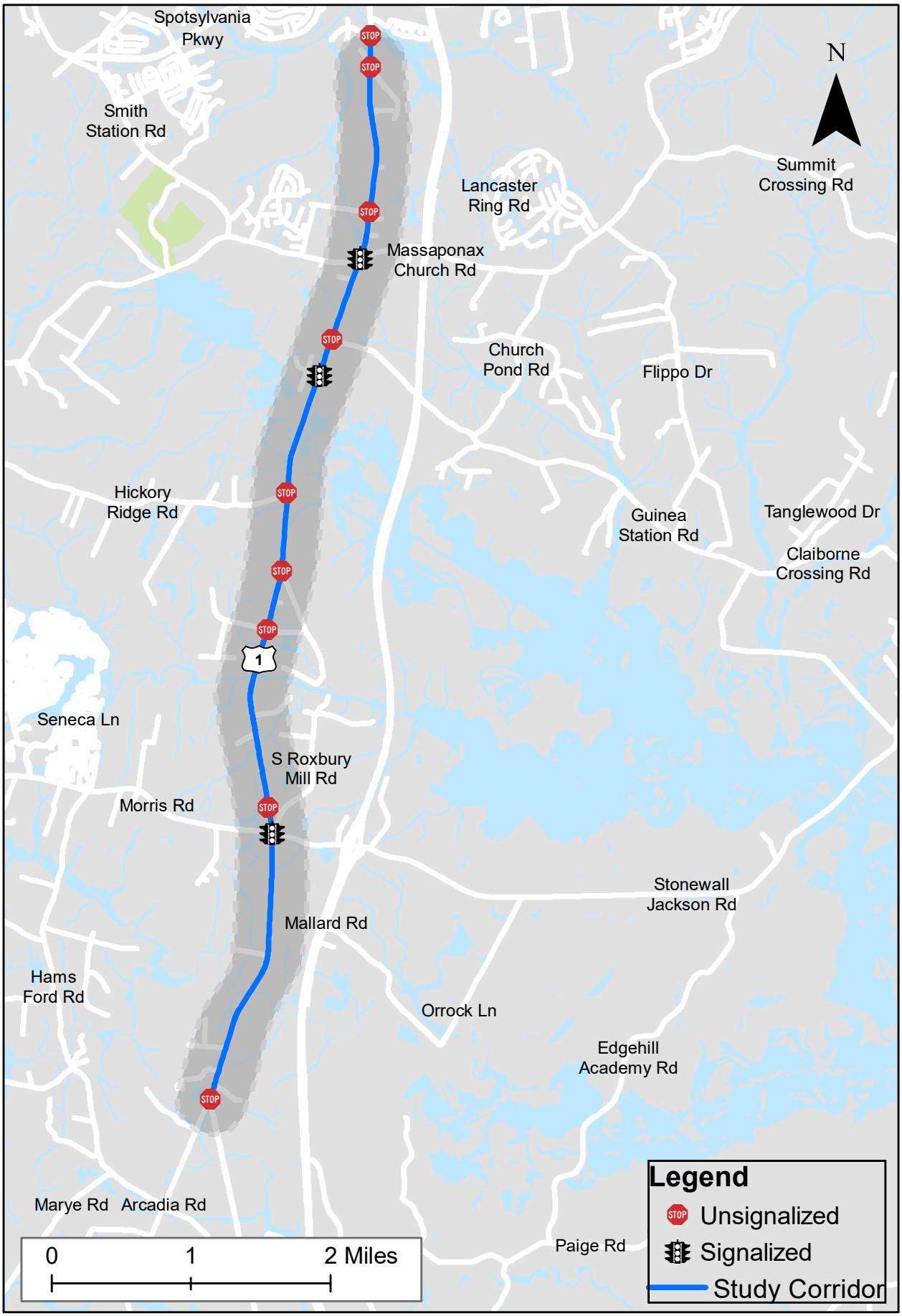
The general topography for the study site can best be described as level to rolling-hill type terrain. Zoning across the corridor includes the following classes:

- Agricultural
- Commercial
- Commercial Highway
- Industrial
- Mixed Use
- Planned Development Commercial
- Rural (Reference 1)

The study intersections, time periods for analysis, and scope of this project were selected through discussions with a stakeholder group comprised of representatives from VDOT, Spotsylvania County, and the Fredericksburg Area Metropolitan Planning Organization (FAMPO) [hereby referred to as the Stakeholder Group].

The following analyses have been conducted:

- Traffic
    - Year 2019 existing land use and transportation system conditions along the study corridor;
    - Forecast year 2030 no-build traffic conditions during the weekday a.m. and weekday p.m. peak periods including in-process/approved developments and regional growth;
- Safety
    - Study corridor crash patterns and trends;
    - Network screening and systemic findings;
    - Priority locations; and,
- Conclusions and recommendations.



KITTELSON & ASSOCIATES

Figure 1: Study Extents - US 1 Corridor Study (Spotsylvania County)

2.0 TRAFFIC

This section summarizes the approach and findings for the operational analysis evaluating the existing (2019) and year 2030 no-build traffic conditions. A discussion of the existing transportation infrastructure is also provided.

2.1 Existing Conditions

The existing conditions analysis identifies the site conditions and current operational and geometric characteristics of the roadways within the study area. These conditions will be compared with year 2030 no-build traffic conditions in the following section.

IN THIS SECTION>>

- Data and approach used for the study corridor analysis
- Key insights into study corridor existing operations

Through coordination with the Stakeholder Group, the following 12 study intersections along the US 1 Corridor were identified:

- US 1/Commonwealth Drive
- US 1/Route 749 (Old Telegraph Road)
- US 1/Lad Land Drive
- US 1/Route 608 (Massaponax Church Road)
- US 1/Route 607 (Guinea Station Road)
- US 1/River Run Parkway/Massaponax High School Driveway
- US 1/Route 632 (Hickory Ridge Road)
- US 1/Route 632 (North Roxbury Mill Road)

KEY TERMS>>

- **Delay analysis –** Identifying the additional time experienced by drivers at intersections that results from the presence of traffic control and conflicting traffic.
- **Level of service analysis –** Evaluating the quality of traffic service associated with the traffic conditions.
- **Volume-to-capacity ratio analysis –** Assessing the ability of an intersection to accommodate the demand given the roadway conditions.

- US 1/North Point Drive/Larkinchew Road
- US 1/South Roxbury Mill Road
- US 1/Morris Road/Mudd Tavern Road
- US 1/Route 603 (Arcadia Road)

At that time, additional information was collected regarding site conditions, adjacent land uses, existing traffic operations, and transportation facilities in the study area.

2.1.1 Transportation Facilities

Table 1 summarizes the primary transportation facilities in the site vicinity. Figure 2 shows the existing lane configurations and traffic control devices at the study intersections. While no on-street parking was observed along the corridor, parked vehicles were observed within a few feet of the traveled way along business frontages at several locations along the corridor. Current access management conditions are discussed further in Section 2.1.4.

2.1.2 Pedestrian and Bicycle Facilities

Field observations and traffic counts taken in the site vicinity revealed low levels of pedestrian and bicycle activity along the entire corridor. Isolated stretches of sidewalk are present along US 1 near Orchard Bridge Drive and a single quadrant of the US 1/Morris Road/Mudd Tavern Road intersection. These sidewalks are likely the result of recent redevelopment; however, they do not connect to any other pedestrian infrastructure. No pedestrian crossing infrastructure (e.g., crosswalks, pedestrian signals) are present at any of the study intersections. No protected bicycle infrastructure is present along the corridor.

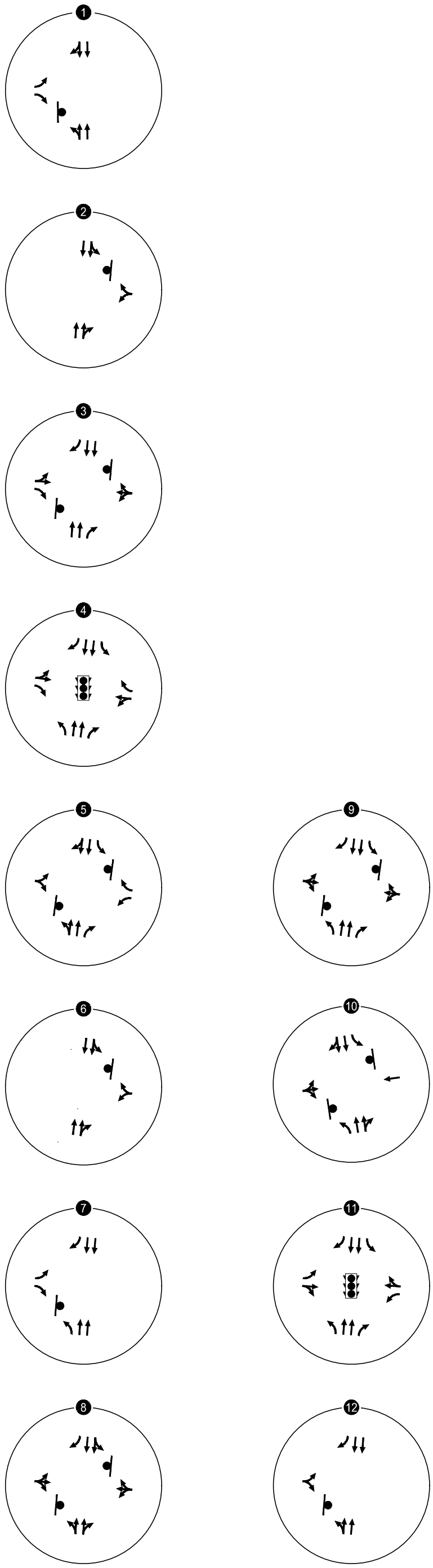
2.1.3 Transit Facilities

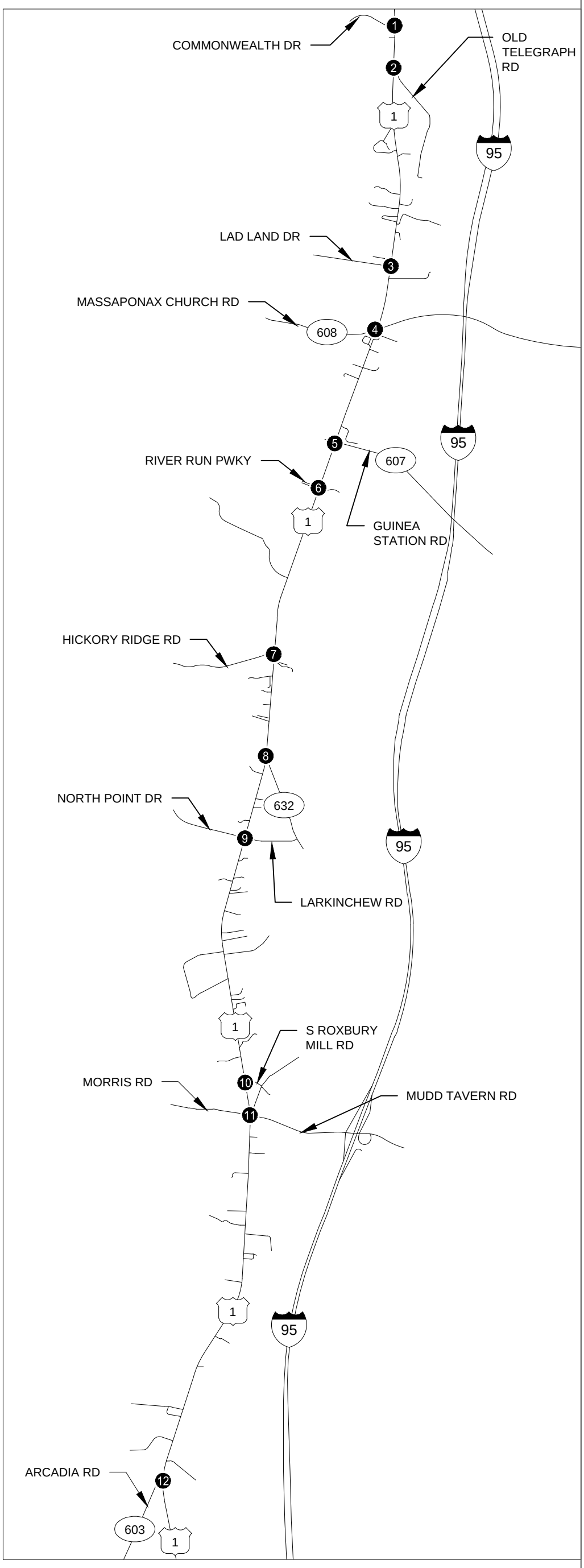
Currently, there are no existing transit facilities along the US 1 corridor. With the construction of the Spotsylvania County Commonwealth Drive Commuter Lot, transit services are expected in the future.

Table 1 Existing Transportation Facilities and Roadway Designations

Roadway	Classification[1]	Number of Lanes	Speed Limit (MPH)	Median
US 1 (Jefferson Davis Highway)	Other Principal Arterial	4	45/55	Limited[2]
Commonwealth Drive	Local	2	25	No
Route 749 (Old Telegraph Road)	Local	2	25	No
Lad Land Drive	Local	2	45	No
Route 608 (Massaponax Church Road)	Major Collector	2	45	No
Route 607 (Guinea Station Road)	Local	2	40	No
River Run Parkway/Massaponax High School Driveway	Local	2	25	No
Route 632 (Hickory Ridge Road)	Local	2	45	No
Route 632 (North Roxbury Mill Road)	Minor Collector	2	30	No
North Point Drive/Larkinchew Road	Local	2	30	No
South Roxbury Mill Road	Minor Collector	2	35	No
Morris Road/Mudd Tavern Road	Minor Arterial	2	35	No
Route 603 (Arcadia Road)	Major Collector	2	45	No

[1]Classifications based on VDOT's 2014 Functional Classification Map.
[2]Approximately 0.6 miles of median along US 1 south of River Run Parkway.





Existing Lane Configurations and Traffic Control Devices Spotsylvania County, VA

Figure 2

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2.1.4 Access Management

The character and feel of US 1 vary throughout the approximately eight-mile study corridor, primarily due to changes in zoning and adjacent land uses within the various sections. The study corridor can generally be divided between the following sections:

- Commonwealth Drive to Lad Land Drive
- Lad Land Drive to Guinea Station Road
- Guinea Station Road to Morris Road/Mudd Tavern Road
- Morris Road/Mudd Tavern Road to Arcadia Road

Figure 7 shows each of these sections, which are discussed subsequently.

2.1.4.1 Commonwealth Drive to Lad Land Drive

The section between Commonwealth Drive and Lad Land Drive consists of limited sight distances with dense trees along the roadway and non-perpendicular approaches. The vertical condition of this segment has a rolling hill terrain – adding to motorists' difficulty to gauge other drivers' behaviors. This is shown in Figure 3 at the intersection of US 1 and Old Telegraph Road. At this intersection, trees are adjacent to the roadway and there's a high degree of skew on the approach. In general, the rolling terrain on this section introduces additional challenges for the motorists along this corridor.

This segment is also the location of many of the new developments across this corridor. As a result, there has been construction and changing driver behavior, particularly between the intersections of US 1/Orchard Ridge Drive and US 1/Ondura Drive. With these new and changing conditions, motorists are adjusting their expectations of the transportation environment along this corridor.

Figure 3 Conditions at Commonwealth Drive

2.1.4.2 Lad Land Drive to Guinea Station Road

This section of US 1 features several commercial and light industrial businesses directly adjacent to the roadway. Access to these businesses are frequent and often not well defined. shows an example of a driveway to a business north of Massaponax Church Road with several dozen vehicles parked directly adjacent to the traveled way. For motorists traveling along US 1, it can often be difficult to determine which vehicles may be exiting the commercial parking lot.

Figure 4 Commercial Driveway with Vehicles Parked Directly Adjacent to Traveled Way

With the exception of a few key intersections, turn lanes are not present at any of the commercial

driveways. While sight distances are not typically an issue at many of the commercial driveways given the relatively flat and straight alignment of US 1, attempting a left-turning maneuver out of a driveway may be uncomfortable for many motorists due to the four-lane undivided nature of US 1.

2.1.4.3 Guinea Station Road to Morris Road/Mudd Tavern Road

The segment of US 1 between Guinea Station Road to Morris Road/Mudd Tavern Road serves as the primary connection between US 1 and I-95. Because of the large traffic demand to/from I-95, queues build at Morris Road/Mudd Tavern Road. Between the endpoints of this segment, the travel way returns to rolling hills with a dense mix of trees and brush adjacent to the pavement. This along with several minor approaches having short turn lanes and skewed approaches, motorists experience limited sight distances along this segment, as shown in Figure 5.

Figure 5 Conditions at Guinea Station Road

An important intersection along this segment is the intersection of US 1 and River Run Parkway/Massaponax High School Driveway. This is the only other signalized intersection along the segment and the school produces increased/focused traffic demands outside of the traditional a.m. and p.m. peak commuter hours. The traffic operational analyses at this intersection shows that large queues form as students arrive and depart school, resulting in poor operations.

2.1.4.4 Morris Road/Mudd Tavern Road to Arcadia Road

The segment between Morris Road/Mudd Tavern Road is most identified by the US 1 corridor transitioning into a residential area with driveways as well as a higher speed limit of 55 MPH. The combination of driveways and higher speeds proves to be a challenge for drivers as they are interested in traversing the corridor without stopping. Unexpected stops with driveways and postal deliveries can increase the potential for crashes along this segment.

Both operational and safety concerns were expressed by the Stakeholders related to limited sight distances and a skewed approach at the intersection at US 1 and Arcadia Road. These conditions lead to motorists having difficulty selecting gaps in the traffic flow to enter US 1. This, as shown in Figure 6, results in both operational and safety issues.

Figure 6 Conditions at Arcadia Road

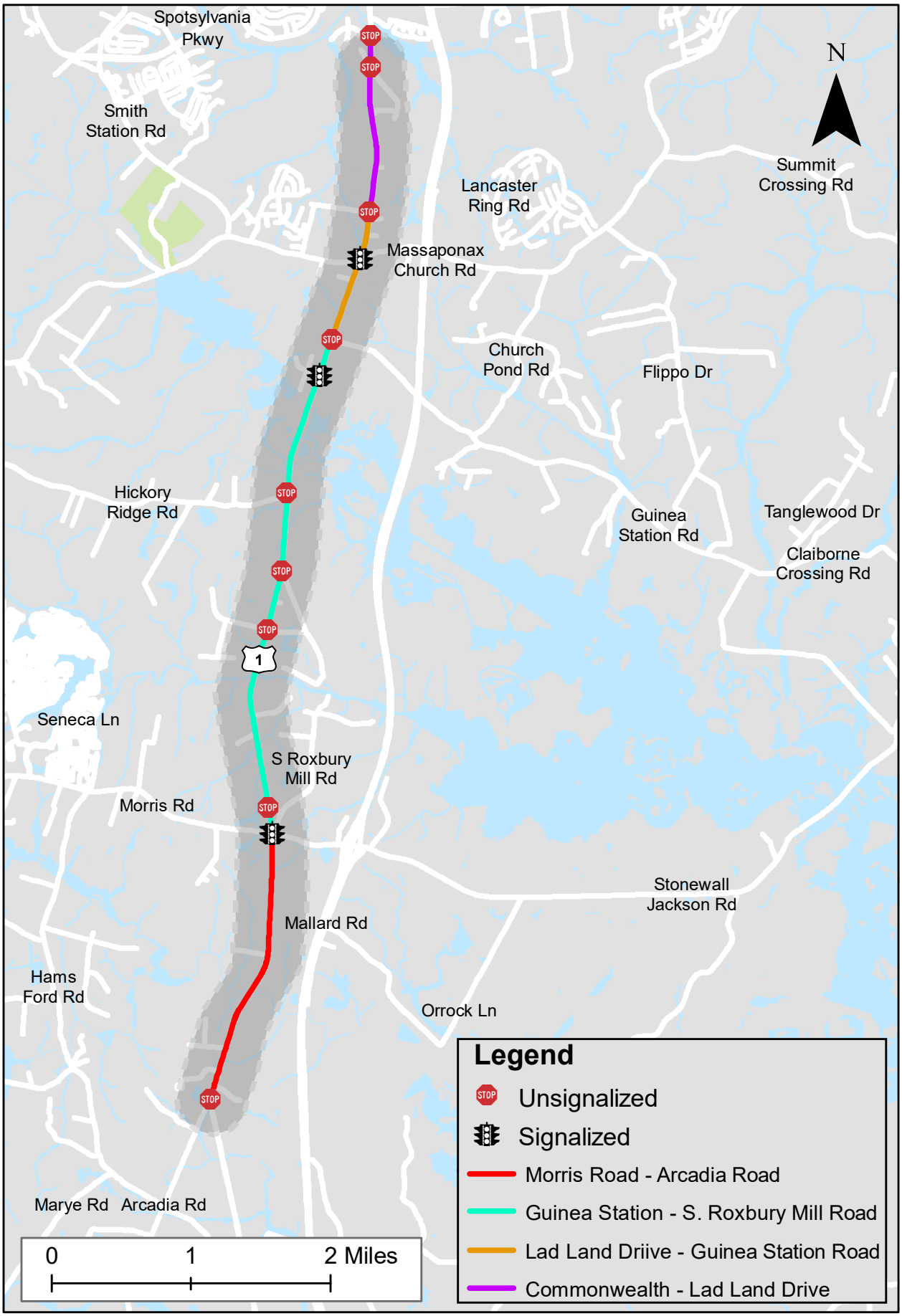

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Figure 7:Sections with Similar Characteristics along the US 1 Study Corridor

2.1.5 Existing Traffic Operations and Peak Hour Operations

Turning-movement counts were obtained in May 2019 at all study intersections. The counts were conducted on a typical weekday morning (6:00 a.m. – 9:00 a.m.) and weekday evening (4:00 p.m. – 7:00 p.m.) during peak time periods when school was in session. Appendix A contains all turning movement count data sheets. Using this data, operational analyses were performed at all 12 study intersections.

2.1.5.1 Current Levels of Service and Volume-To-Capacity Ratios

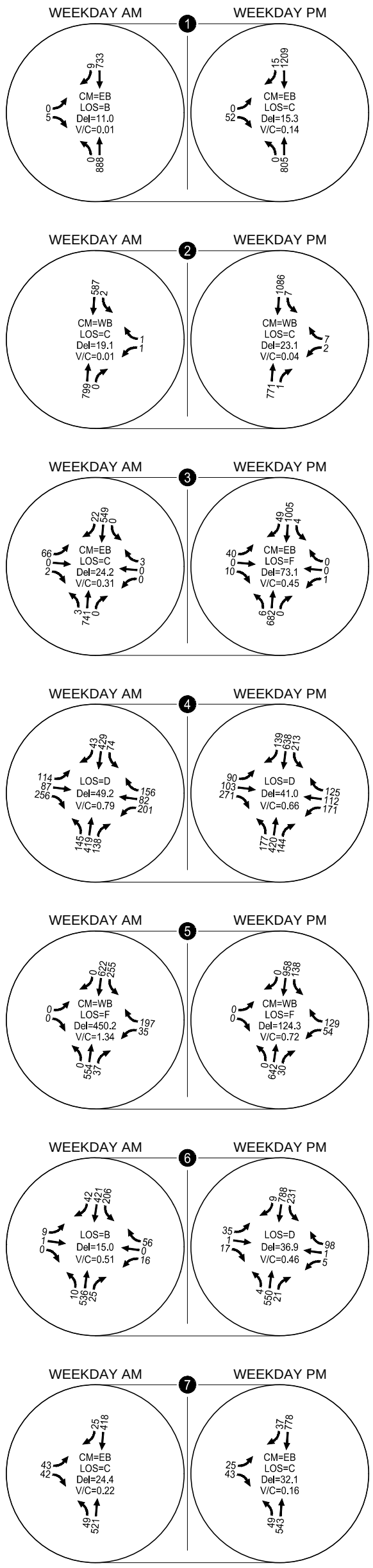
All level of service (LOS) analyses described in this report were performed in accordance with the procedures stated in the Traffic Operations and Safety Analysis Manual – version 2.0 (TOSAM) and report HCM 2010 outputs (Reference 2). A description of level of service and the criteria by which they are determined is presented in Appendix B.

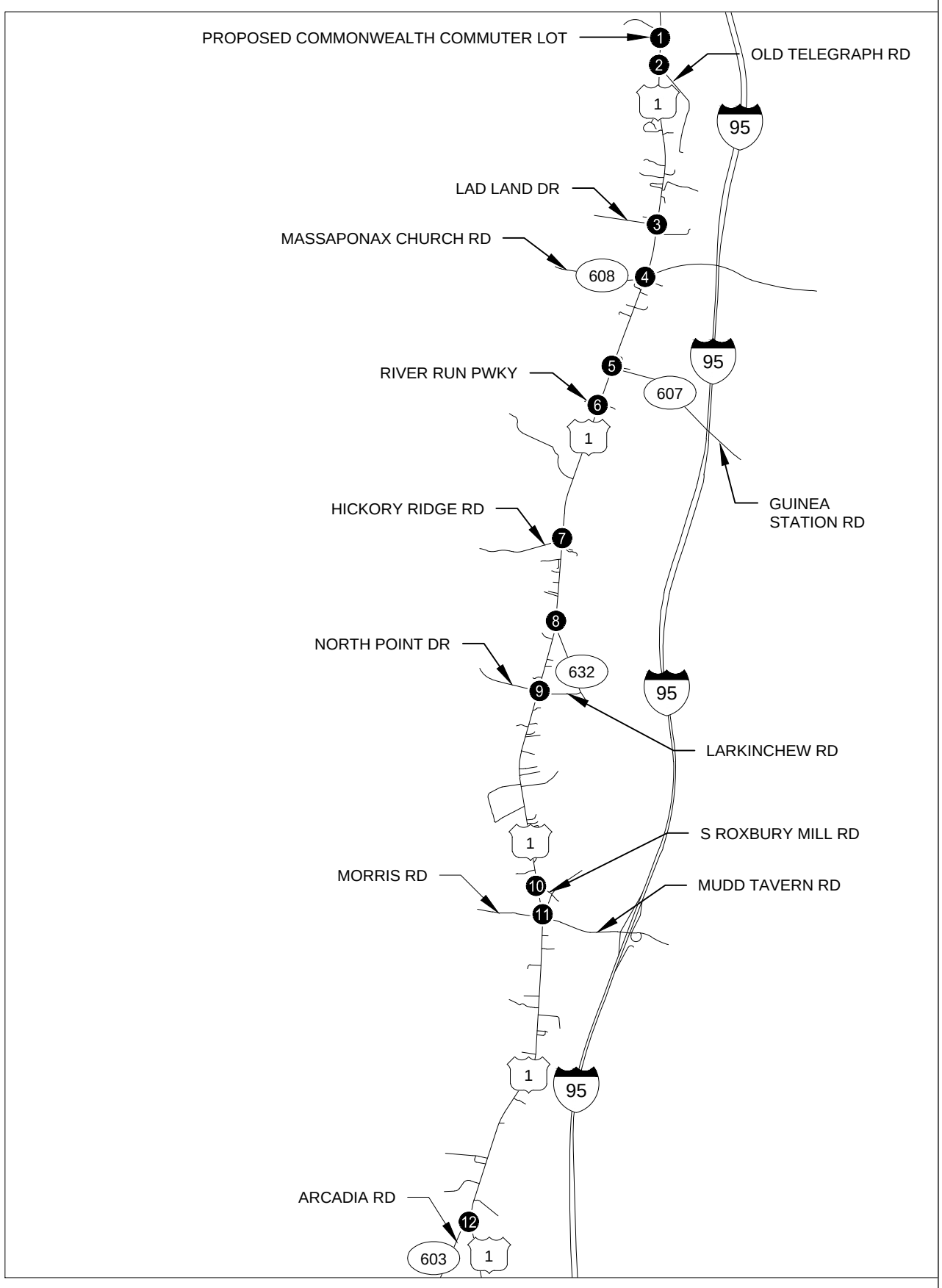
This analysis is based on the system hourly peak during each of the study periods to evaluate of all intersection levels-of-service. The weekday a.m. and weekday p.m. peak hours were found to occur from 6:45 a.m. to 7:45 a.m. and 4:00 p.m. to 5:00 p.m., respectively. Traffic operations were evaluated using Synchro 10 in accordance with VDOT's Traffic Operations and Safety Analysis Manual v1.0 (Reference 2).

Figure 8 shows the overall intersection operational results of the existing traffic operations analysis for the weekday a.m. and weekday p.m. peak hours. Figure 9 shows the lane group LOS. Table C.1 in Appendix C summarizes the Synchro 10 peak hour levels of service, 95th percentile back of queue, and delay for each lane group by intersection. Appendix C also contains the existing conditions level of service worksheets.

As shown in the figures and Table C.1, study intersections currently operate at LOS D or better except for the following intersections:

- US 1/Lad Land Drive (LOS F in p.m. peak)
- US 1/Guinea Station Road (LOS F in a.m. and p.m. peaks)
- US 1/North Roxbury Mill Road (LOS E in the a.m. peak).





CM = CRITICAL MOVEMENT (UNSIGNALIZED)
LOS = CRITICAL MOVEMENT LEVEL OF SERVICE (SIGNALIZED)/CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALIZED)
Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED)/CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO

Existing Traffic Conditions
Weekday AM and PM Peak Hours
Spotsylvania County, VA

Figure 8

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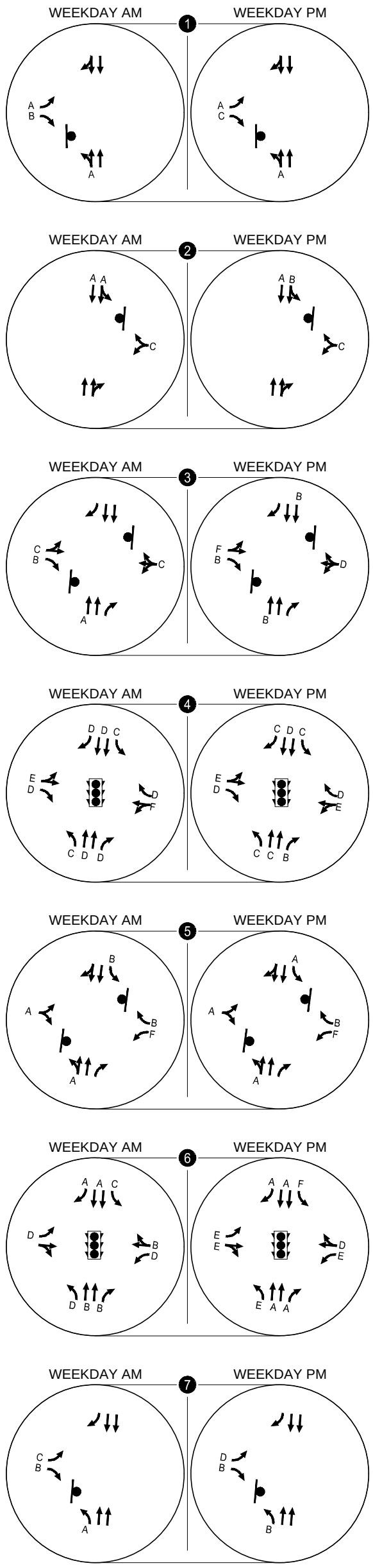

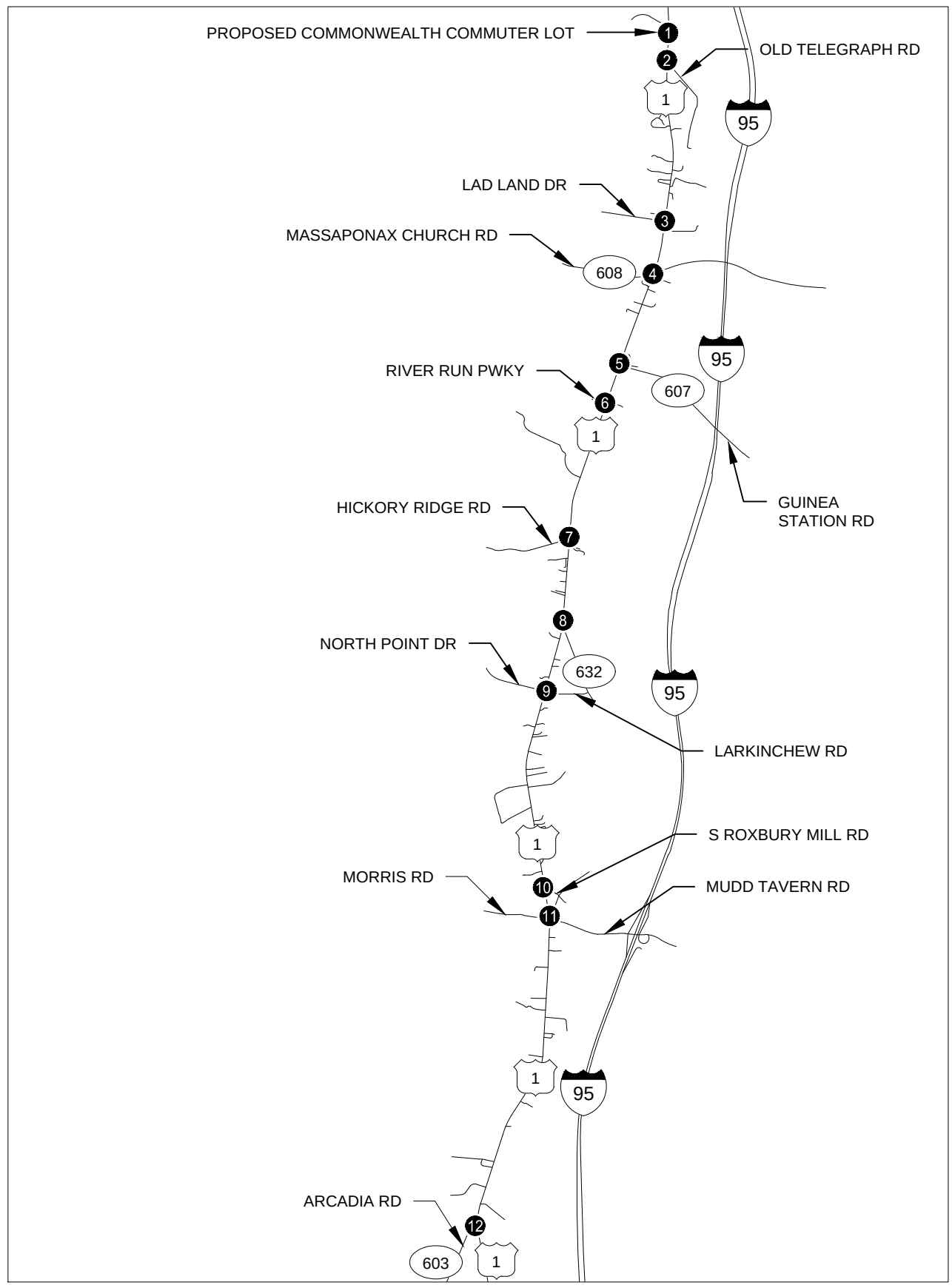

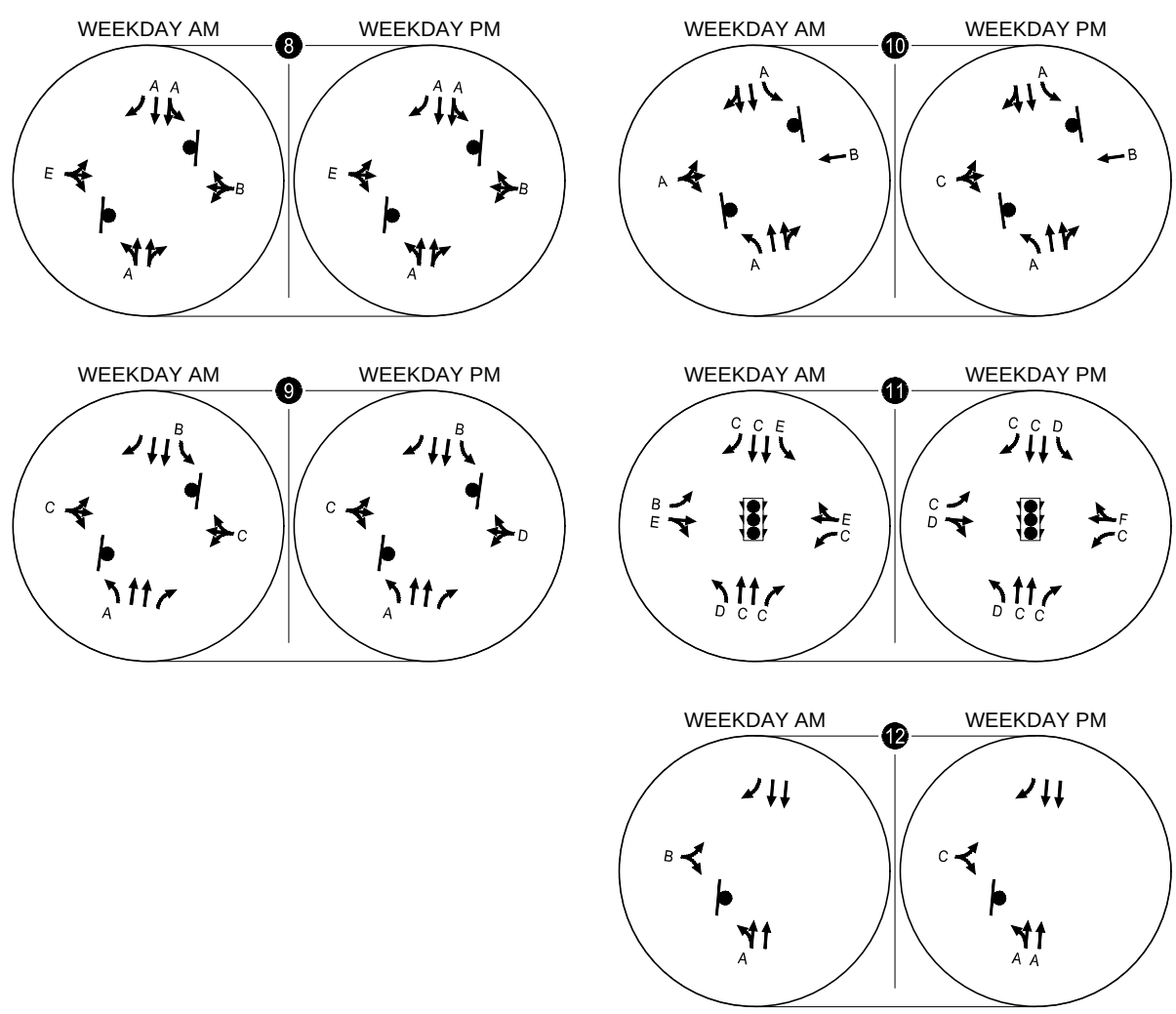

Existing Lane Group Level of Service
Weekday AM and PM Peak Hours
Spotsylvania County, VA

Figure
9

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2.2 Year 2030 No-Build Conditions

In the future year 2030 no-build analysis, traffic operations with in-process/approved developments are analyzed for the purposes of establishing a baseline against which to measure the impacts of any proposed improvements along the corridor. The initial background growth in traffic volumes can be attributed to regional growth in the area. In-process/approved developments also contribute to the growth within the study area. These two components of growth are discussed below.

2.2.1 Regional Growth

The following annual growth rates for traffic along US 1 were identified by VDOT staff to account for near-term regional traffic growth:

- Spotsylvania Parkway to Massaponax Church Road: 2.0%
- Massaponax Church Road to Morris Road/Mudd Tavern Road: 2.5%
- Morris Road/Mudd Tavern Road to the Caroline County Line: 2.5%

These growth rates were applied annually to forecast year 2030 no-build traffic volumes.

2.2.2 In-Process Developments

Through coordination with the Stakeholder Group, the total future traffic conditions included the following list of in-process developments assumed to be complete/operational by the year 2030:

- Spotsylvania County Commonwealth Drive Commuter Lot: Park & Ride lot with approximately 700 spaces near Commonwealth Drive.

IN THIS SECTION>>

- Data and approach used for the operational study corridor analysis
- Key insights into study corridor operational patterns and trends
- Study the results of regional growth and in-process developments.

- Jackson Village Development: Development with 298,000 square feet of office and commercial space and 2,270 residential units. The entrances of this development are between Old Telegraph Road and Ondura Drive.
- Palmers Creek Apartments (Phase 1): Development with 40,000 square feet of retail space and 400 apartments, located 4,500 feet north of Massaponax Church Road.
- Alexander's Crossing Development: Development with 1,558,600 square feet of commercial/industrial/civic use space, a 110-room hotel and 2,607 residential units. The entrance to this development is off of Massaponax Church Road east of I-95.
- Heritage Woods Development: This development consists of 1,072 residential units that are a mix of single-family detached homes, townhouses, and apartments. This development's entrances are on US 1, north of Lad Land Drive, and on Massaponax Church Road.

2.2.3 Planned Transportation Improvements

As results of the in-process developments, there are several roadway improvements that are expected on this corridor. The first of which the widening of the US 1 cross-section adjacent to the proposed Palmer's Creek development to

accommodate turn-lanes into the site and adjacent land uses (in association with Phase 1 of the Palmer's Creek Apartments development). This would include a 560' acceleration lane between intersection at Old Telegraph Road and new signal at the US 1/Pick-A-Parts intersection. This improvement is not modelled in this operational analysis as the US 1/Pick-A-Parts intersection was not identified as a study intersection.

The second transportation improvement planned for this corridor is the signalization of the US 1/Old Telegraph Road intersection. In addition, the westbound Old Telegraph Road is expected to be realigned to create a more perpendicular approach (in association with the Jackson Village development). At this intersection, the lane configuration will be modified to include dual left turn lanes and dual westbound left turn lanes. On the east side of the Jackson Village development, a bridge connection over I-95 is expected. This bridge connection is not modelled in this operation analysis as it is outside the study area. This change can be seen in Figure 10 and Figure 11.

In addition, improvements from VDOT's "Route 606 Widening Project" to the Morris Road/Mudd Tavern Road were included in this analysis. As a result of this project, the westbound Mudd Tavern Road approach will be widened to include dual left turn lanes, an exclusive through lane and a exclude right turn lane. The eastbound Morris Road approach's lane configuration will also be widened to include an additional through lane. These changes to intersection's lane configuration can be seen in Figure 11.

2.2.4 Future Year 2030 No-Build Traffic Conditions

The future year 2030 no-build analysis forecasts how the transportation system in the study area will operate with the full build out of the proposed developments along the corridor.

Trips generated from approved or in-process developments are shown in Figure 12. These volumes were added to background growth to arrive at the 2030 no-build traffic volumes shown in Figure 13. Figure 14 shows the lane group LOS for the weekday a.m. and weekday p.m. peak hours. Table D.1 in Appendix D summarizes the Synchro 10 peak hour levels of service, 95th percentile back of queue, and delay for each lane group by intersection. Appendix D also contains the year 2030 no-build traffic conditions operational worksheets.

The additional traffic on the network is expected to enter the US 1 Corridor at Old Telegraph Road and Massaponax Church Road. The additional northbound traffic is assumed to travel north through the network to Spotsylvania Parkway or I-95 and the new southbound traffic is anticipated to exit the US 1 Corridor at Mudd Tavern Road to reach I-95. As shown in the figures and Table D.1, the following changes occurred at each intersection.

US 1 and Commonwealth Drive

At the intersection of US 1 and Commonwealth Drive, traffic conditions deteriorated from B to C in the a.m. peak and C to F in the p.m. peak from traffic generated at the new commuter lot and proposed developments. The majority of this traffic is along US 1, resulting in added difficulty for motorists to exit Commonwealth Drive.

US 1 and Old Telegraph Road

The intersection of US 1 and Old Telegraph Road is planned to replace the existing two-way stop with a traffic signal. At this intersection, traffic conditions deteriorated from C to E in the a.m.

peak and C to D in the p.m. peak. In the a.m. peak the northbound through movement is expected to operate at LOS F and in the p.m. peak the southbound left movement is expected to operate at LOS F. The new traffic control allows for the new developments to be served at this location.

US 1 and Lad Land Drive

The current operational conditions at Lad Land Drive and US 1 are expected to get worse between 2019 and 2030. Although this intersection currently operates as a LOS C in the a.m. and a LOS F in the p.m., it is expected to operate as a LOS F in the a.m. and continue to be a LOS F in the p.m. in the future. Because this intersection is located by several of the new and existing developments along this corridor, it is expected to serve a much higher demand along US 1. This inhibits motorists on the minor streets to find gaps in the traffic.

US 1 and Massaponax Church Road

The intersection of Massaponax Church Road and US 1 is likely to deteriorate from a LOS D to a LOS F in both the a.m. and p.m. peaks because of the proposed developments along US 1. Entrances to multiple of these new developments are located on both US 1 and Massaponax Church Road.

US 1 between Massaponax Church Road and Morris Road/Mudd Tavern Road

South of Massaponax Church Road, changes in the level of services are mostly attributed to the background growth of the area and traffic generated from the new developments moving to or from I-95 at Mudd Tavern Road/Morris Road. This results in the following occurrences along the corridor:

- US 1/Guinea Station Road: LOS F continues in both the a.m. and p.m. peaks in both analyses.
- US 1/River Run Parkway/Massaponax High School Driveway: Additional traffic on US 1 makes it difficult for turning vehicles and as a result traffic operations are expected to worsen from LOS B to LOS C in the a.m. peak. The p.m. peak continues as a LOS D.
- US 1/Hickory Ridge Road: The additional traffic results in the LOS to worsen from LOS C to LOS F in the a.m. peak and from LOS D to LOS F in the p.m. peak.
- US 1/North Roxbury Mill Road: LOS declines from LOS E and LOS D to LOS F in the a.m. and p.m. peaks, respectively.
- US 1/North Point Drive/Larkinchew Road: Traffic conditions change from LOS C and D to LOS F in the a.m. and p.m. peaks, respectively.
- US 1/South Roxbury Mill Road: LOS declines from LOS B to LOS C in the a.m. peak and from LOS C to LOS F in the p.m. peak.

US 1 and Morris Road/Mudd Tavern Road

With the planned improvements from the "Route 606 Widening" project, the intersection of US 1 and Morris Road/Mudd Tavern Road is expected to continue to operate as a LOS D in both the a.m. and p.m. peaks. Trips generated from the new developments are likely to enter or exit the corridor at this location as it connects with I-95. The growth is especially likely on the southbound left turn and the westbound right turn.

US 1 and Arcadia Road

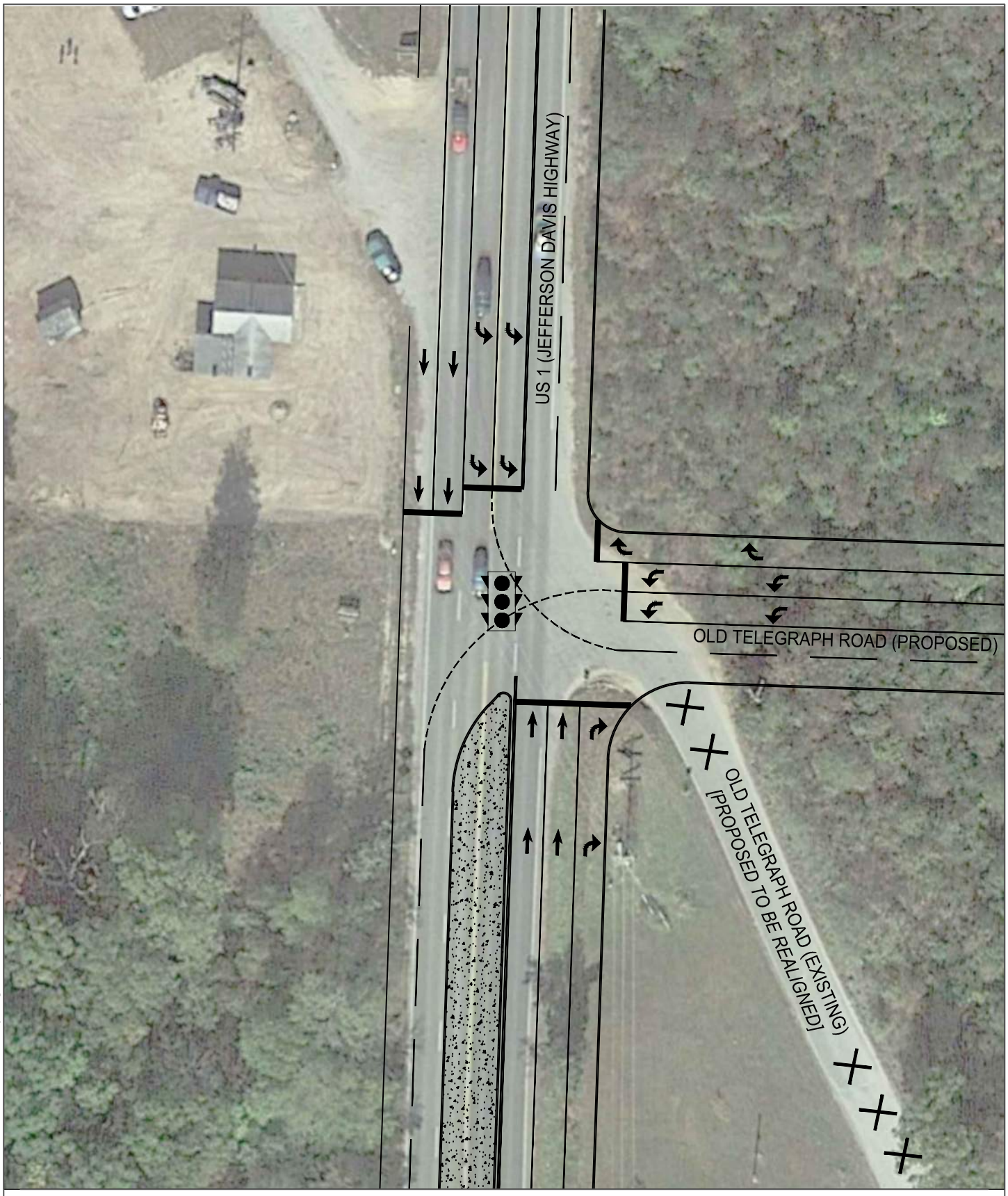
Changes at the intersection of Arcadia Road and US 1 will likely result from the background growth of the area. This is expected to change the LOS

from B to C in the a.m. peak and continue as a LOS C in the p.m. peak.

Summary

In summary, the study intersections that are expected to experience LOS E or F with the additional traffic demands include:

- US 1/Commonwealth Drive (LOS F in the p.m. peak)
- US 1/Old Telegraph Road (LOS E in the a.m. peak)
- US 1/Lad Land Drive (LOS F in the a.m. peak and p.m. peaks)
- US 1/Massaponax Church Road (LOS F in the a.m. and p.m. peaks)
- US 1/Guinea Station Road (LOS F in the a.m. and p.m. peaks)
- US 1/Hickory Ridge Road (LOS F in the a.m. and p.m. peaks)
- US 1/North Roxbury Mill Road (LOS F in the a.m. and p.m. peaks)
- US 1/North Point Drive/Larkinchew Road (LOS F in the a.m. and p.m. peaks)
- US 1/South Roxbury Mill Road (LOS F in the p.m. peak).



Scale: 1" = 50'

50 25 0 50

Improvements at Old Telegraph Road
Spotsylvania County, Virginia

Figure
10

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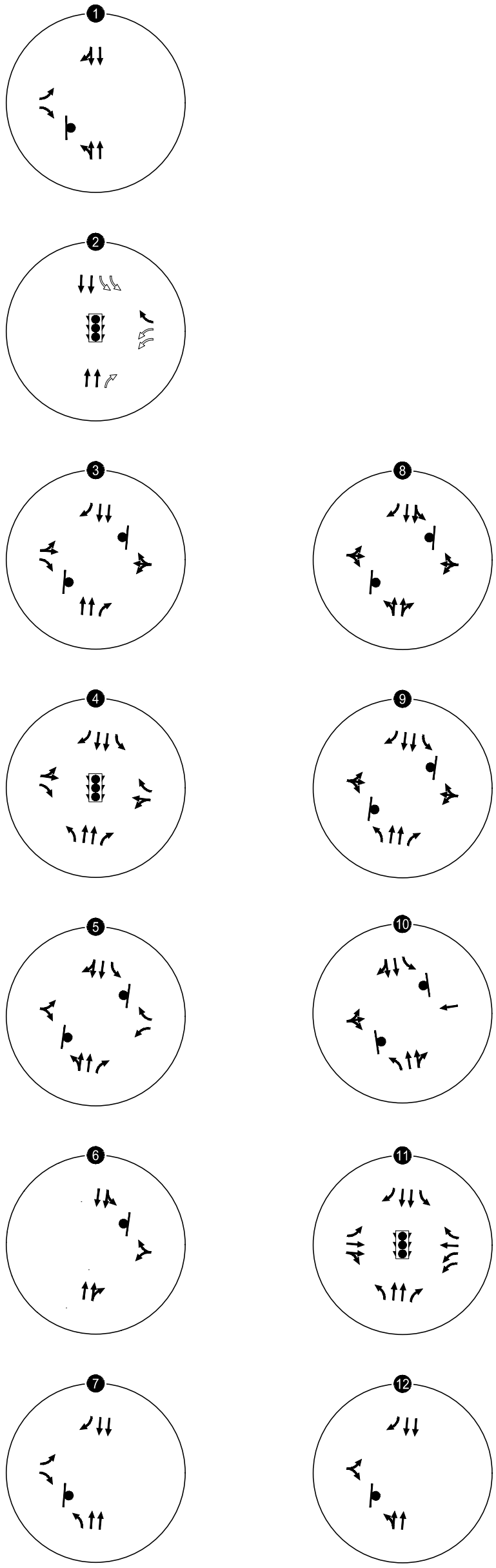

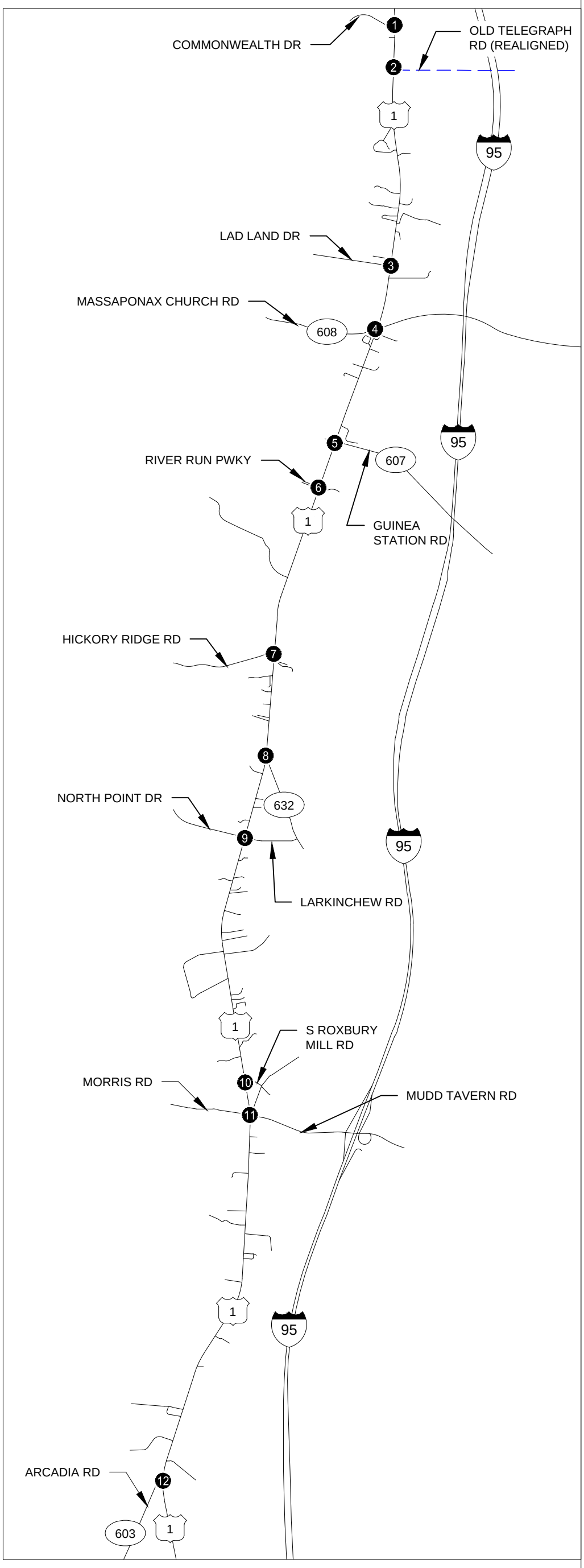

= ASSUMED LANE CONFIGURATION
= FUTURE REALIGNMENT OF OLD TELEGRAPH ROAD

Year 2030 No-Build Lane Configurations and Traffic Control Devices Spotsylvania County, VA

Figure 11

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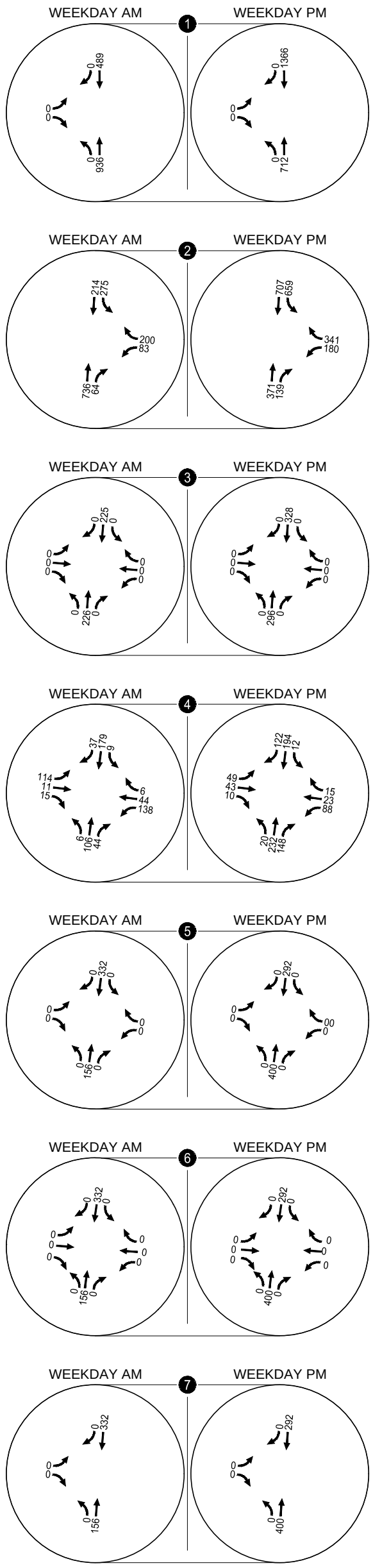

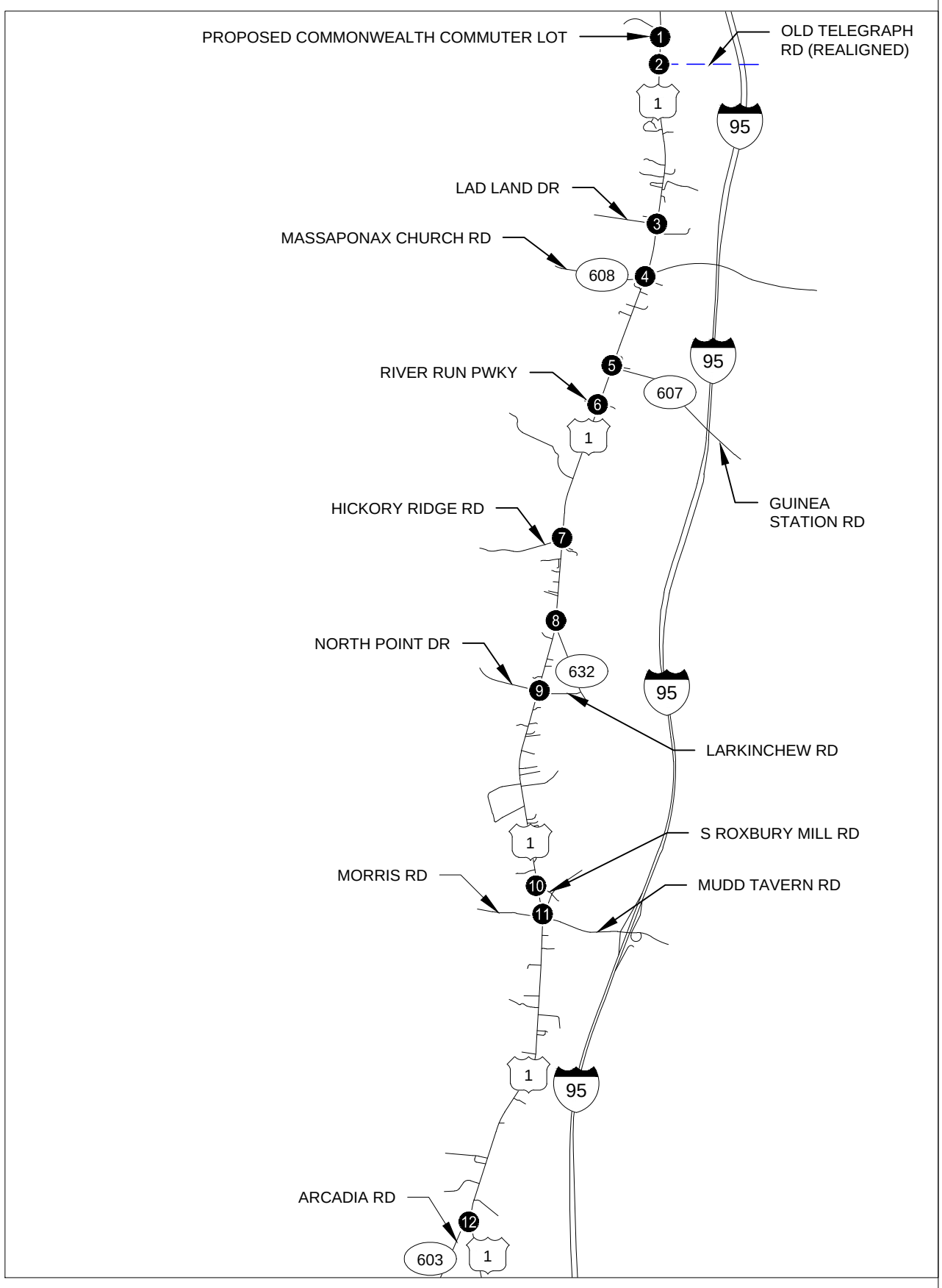

In-Process Development Generated Trips
Weekday AM and PM Peak Hours
Spotsylvania County, VA

Figure 12

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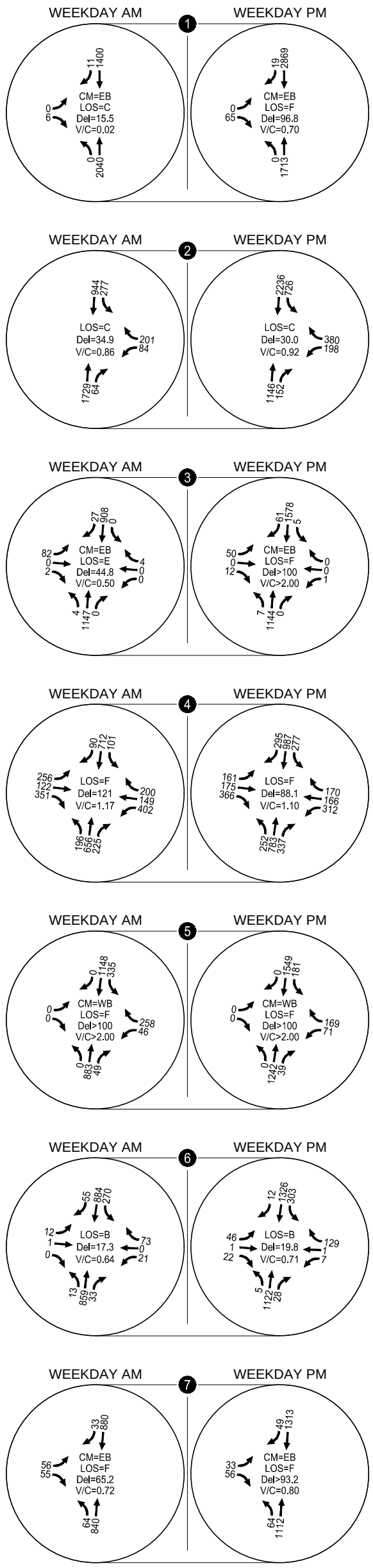

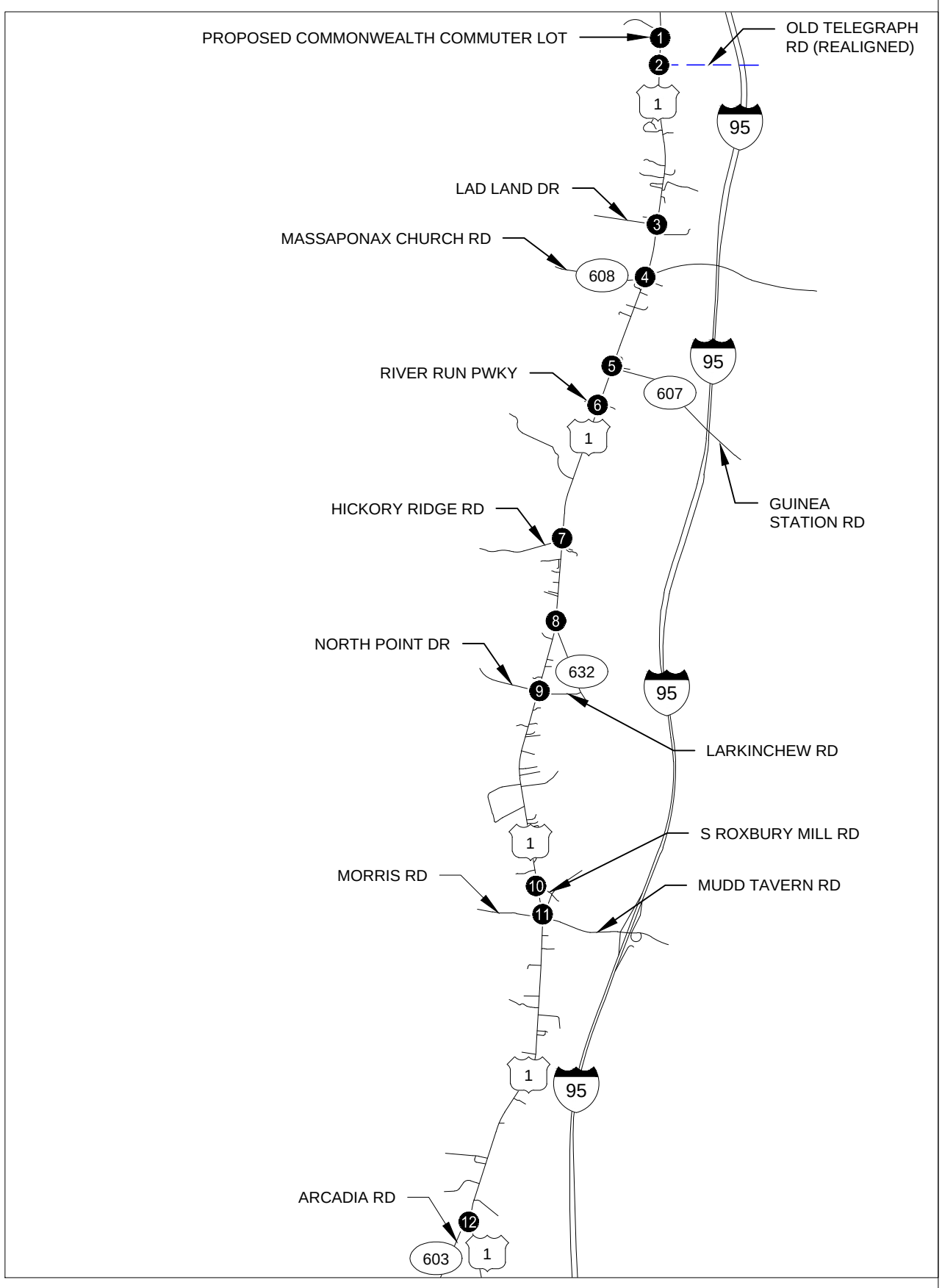

CM = CRITICAL MOVEMENT (UNSIGNALIZED)
LOS = CRITICAL MOVEMENT LEVEL OF SERVICE (SIGNALIZED)/CRITICAL MOVEMENT LEVEL OF SERVICE (UNSIGNALIZED)
Del = INTERSECTION AVERAGE CONTROL DELAY (SIGNALIZED)/CRITICAL MOVEMENT CONTROL DELAY (UNSIGNALIZED)
V/C = CRITICAL VOLUME-TO-CAPACITY RATIO

Year 2030 No-Build Traffic Conditions
Weekday AM and PM Peak Hours
Spotsylvania County, VA

Figure 13

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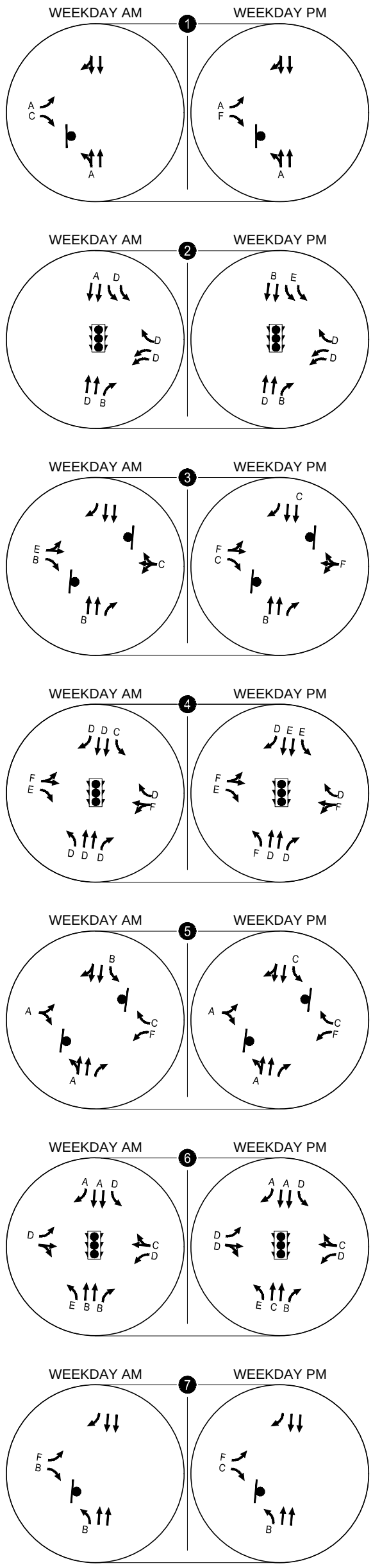

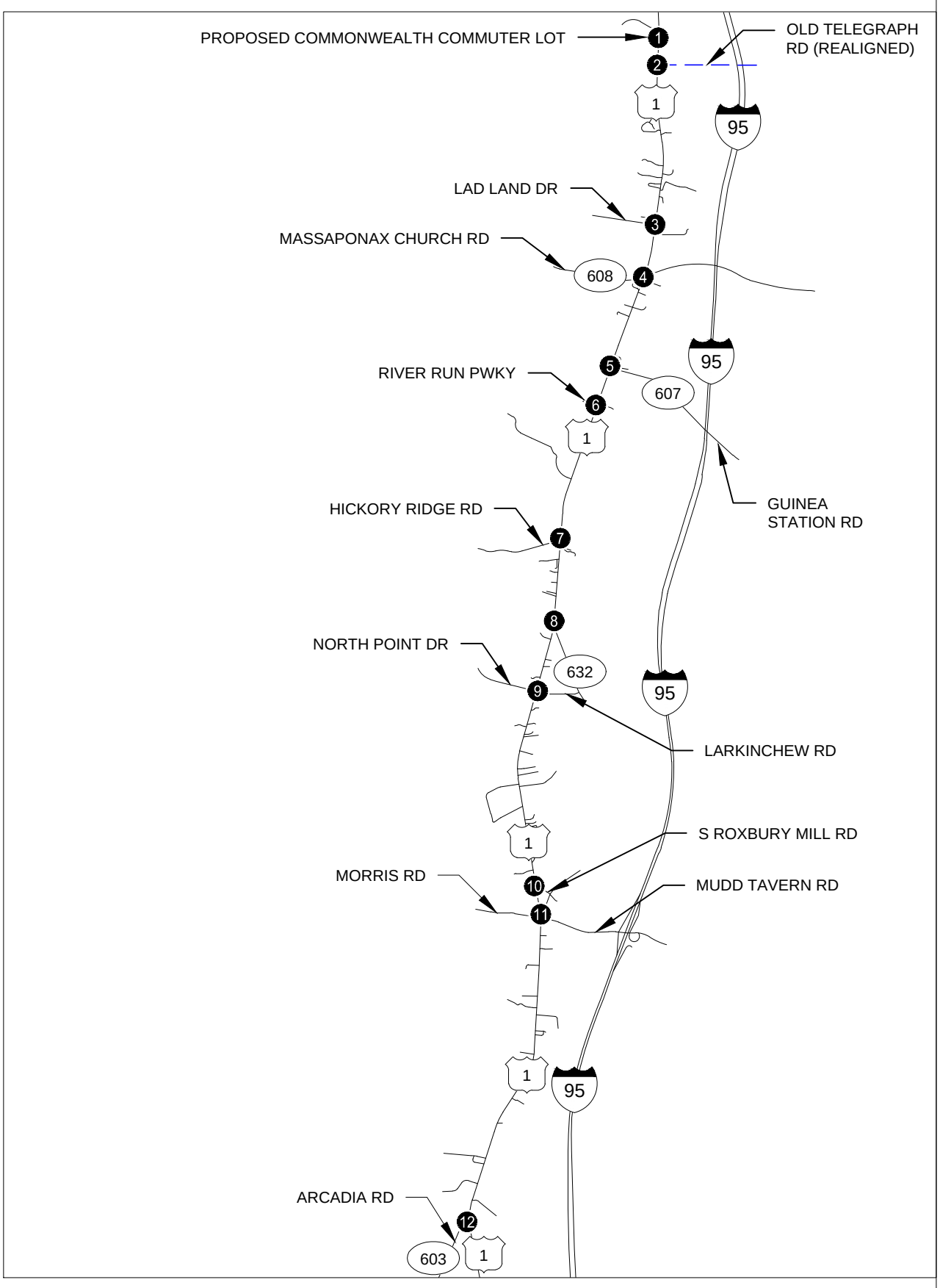

Year 2030 No-Build Lane Group Level of Service
Weekday AM and PM Peak Hours
Spotsylvania County, VA

Figure 14

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3.0 SAFETY

This section summarizes the approach and findings for a crash analysis conducted on the corridor. The material below discusses study corridor crash patterns and trends; network screening; and systemic safety evaluation. The analysis focuses on the study corridor only (US 1 between the proposed commuter lot north of Commonwealth Drive and Arcadia Drive). Maps that detail the location, type and severity of the crashes that occurred along this corridor between 2014 and 2018 can be found in Appendix E.

KEY TERMS>>

- **Network Screening –**Evaluating the entire street network to identify high-crash locations based on number of crashes, severity of crashes, and traffic volume.
- **Systemic analysis –** Identifying risk factors associated with high-crash locations and prioritizing locations based on risk factors and crash history.

3.1 Key Findings

- Crash Patterns and Trends
    - Over 40% of the reported crashes were rear-end collisions. Approximately 70% of these collisions were property-damage-only.
    - Injuries and fatalities accounted for 34% of reported crashes.
- The following crash types exhibited higher proportions of fatal and/or injury crashes than other reported crash types:
    - Pedestrian and bicyclist crashes and non-collision crashes (100% resulting in injury)
    - Head-on crashes (83% resulting in fatality or injury)
    - Two fatal crash occurred on this corridor as the result of an angle collision and a fixed object – off road crash.
- Network Screening and Systemic Findings
    - The roadway network was screened using: (1) the Equivalent Property Damage Only (EPDO) safety performance measure; and (2) a risk-based analysis to determine roadway characteristics potentially associated with higher crash risk.
    - The EPDO performance measure identifies locations that have exhibited a combined greater severity and frequency of crashes than other locations. It gives more weight to locations at which more severe crashes have occurred.
- The following intersections were identified as priority locations:
    - US 1 and Old Telegraph Road
    - US 1 and Lad Land Drive
    - US 1 and Massaponax Church Road
    - US 1 and Hickory Ridge Road
    - US 1 and Morris Road/Mudd Tavern Road

3.2 Study Corridor Crash Patterns and Trends

The following presents study corridor crash trends and patterns. Findings from this section will be used to determine countermeasures and multimodal transportation solutions that could be effective along the study corridor in future phases of the study.

IN THIS SECTION>>

- Data and approach used for the study corridor analysis
- Key insights into study corridor crash patterns and trends
- Study corridor crash patterns compared to VDOT's Fredericksburg District

Data and Approach

The study team obtained and analyzed the most recent five (5) years of complete crash data available for the US 1 Corridor and surrounding area from VDOT's database. The crash data used was from January 1, 2014 to December 31, 2018; there were 380 reported crashes in this period. The location data allowed the study team to geocode the crashes and map them in GIS software.

Findings

The study team considered crash patterns and trends in the corridor data by evaluating the following:

- Crash severity,
- Crash type,
- Lighting,
- Speed,
- Weather and roadway condition, and
- Year.

In the five years of data analyzed, approximately one percent of reported crashes involved pedestrians (2 crashes) or bicyclists (2 crashes). The rest of the reported crashes involved motor vehicles or motor vehicles and other objects (see Figure 16). Rear-end and angle were the top two crash types. The study team will use these findings to help identify and prioritize safety treatments.

Severity

Figure 15 summarizes the reported crashes by severity. Injury crashes are organized by severe injuries, other visible injuries, and injuries involving a complaint of pain but no visible injury.

- 250 of the 380 crashes recorded resulted in property damage only. This accounted for 65% of the total crashes.
- Two crashes (<1% of total crashes) resulted in a fatality, and twenty-five crashes (7% of total crashes) resulted in severe injury.

Figure 15 Crash Severity, January 2014 – December 2018.

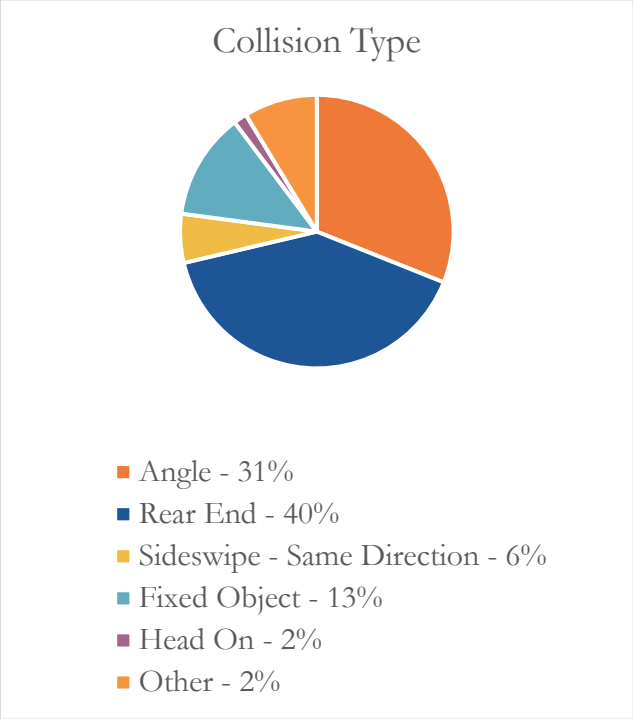
CRASH SEVERITY	CRASH COUNT
Fatal	2 (<1%)
Injury (Severe)	25 (7%)
Injury (Other Visible)	93 (24%)
Injury (Complaint of Pain)	10 (3%)
Property Damage Only (PDO)	25 (66%)

Source: Virginia Department of Transportation, Kittelson 2019.

Crash Type

Figure 16 identifies the crash types of the reported crashes.

Figure 16 Vehicle Crash Types, January 2013 – December 2018.

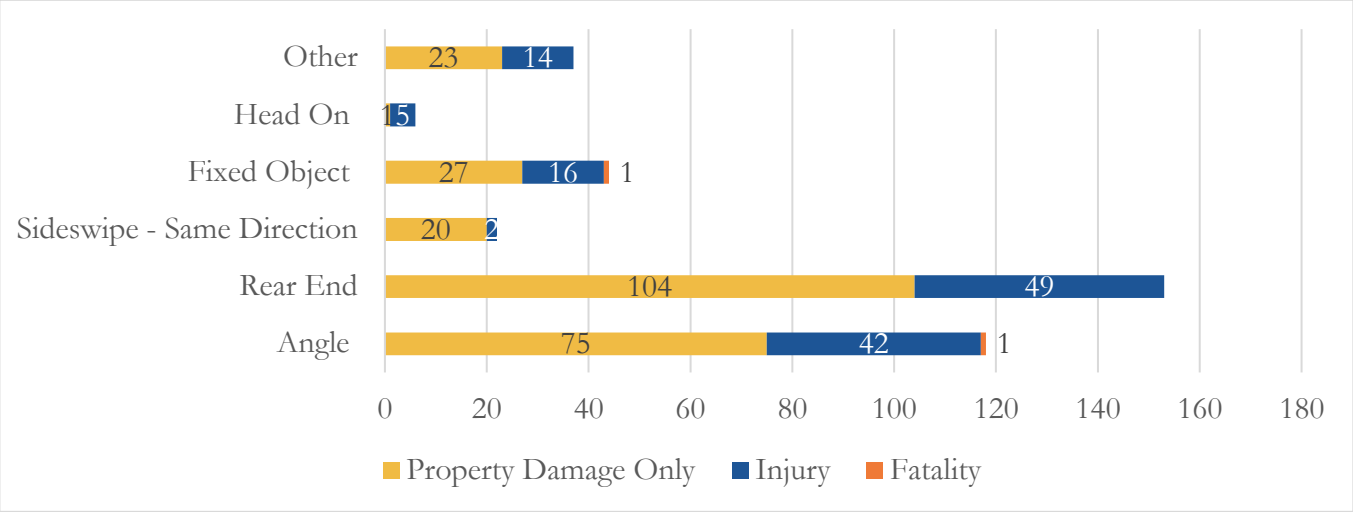


* The "Other" category includes Deer (15), Pedestrian (2), Backed Into (2), Sideswipe – Opposite Direction (3), Fixed Object in Road (4), Non-Collision (3), and crash types that were categorized as "Other" (6) in the data.
Source: Virginia Department of Transportation, Kittelson 2019.

- Rear end (40%) and angle (31%) crashes represent the largest proportions of crash types.
- Rear end (153 total crashes) and angle (118 total crashes) make up over 70% of all crashes.
- The two fatalities that occurred on this corridor had crash types of angle and fixed object – off road.

Figure 17 summarizes reported crashes by crash type and severity.

Figure 17 Reported Crashes by Crash Type and Severity, January 2014-December 2018.



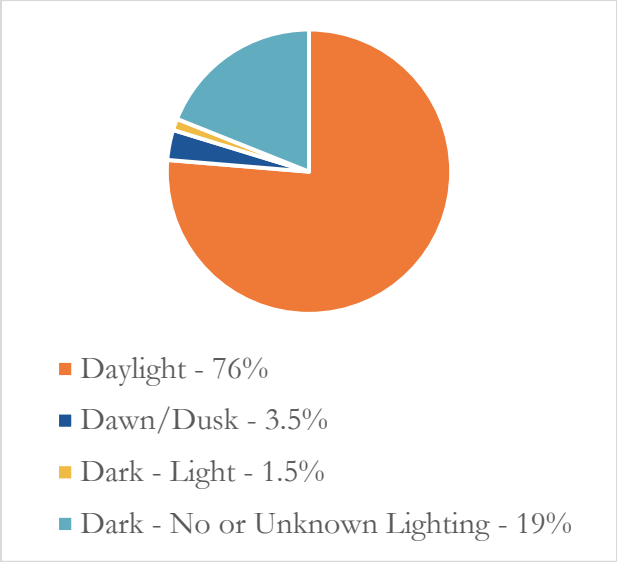
* "Other" includes Deer (15), Pedestrian (2), Backed Into (2), Sideswipe – Opposite Direction (3), Fixed Object in Road (4), Non-Collision (3), and crash types that were categorized as "Other" (6) in the data.
Source: Virginia Department of Transportation, Kittelson 2019.

- Of the 153 rear-end crashes, 32% resulted in injury and the other 68% resulted in property-damage only.
- 36% of the total angle crashes resulted in injury. Less than 1% of the angle crashes resulted in a fatality and 64% resulted in property-damage only.
- Of the 6 total head-on crashes, 83% (5 crashes) resulted in an injury. This is a higher proportion of injuries than exhibited in the total reported crashes for the study corridor (34% of study corridor crashes resulted in injury or fatality).

Lighting

Figure 18 displays the study corridor crash count by reported lighting condition.

Figure 18 Percent of Reported Crashes by Lighting, January 2014 – December 2018.



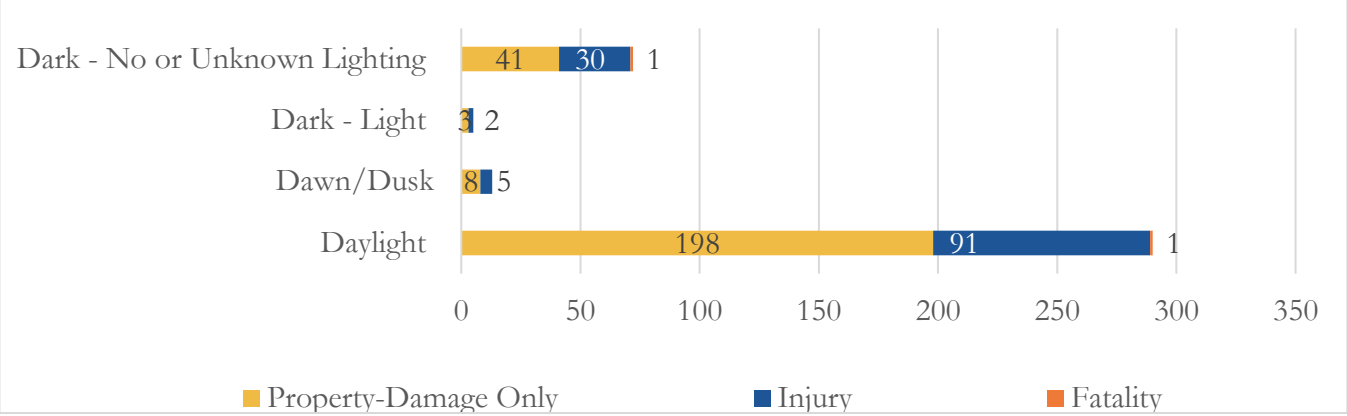
Source: Virginia Department of Transportation, Kittelson 2019.

- The majority of crashes (76%) occurred under daylight conditions.
- Of the 77 crashes that occurred in dark conditions, 93.5% of those occurred in unlit or unknown lighting conditions.

Figure 19 summarizes reported crashes by lighting condition and severity.

- Injury crashes that occurred under dawn or dusk conditions (38%) were slightly overrepresented compared to all crashes (34%).
- Of the 77 crashes that occurred in dark conditions, 41% (32 crashes) resulted in an injury. This is a higher proportion of injuries than exhibited in the total reported crashes (34%).
- The two fatalities that occurred on this corridor had lighting conditions of daylight (1 crash) and dark – unlit road (1 crash).

Figure 19 Reported Crashes by Lighting Condition and Severity, January 2014-December 2018.



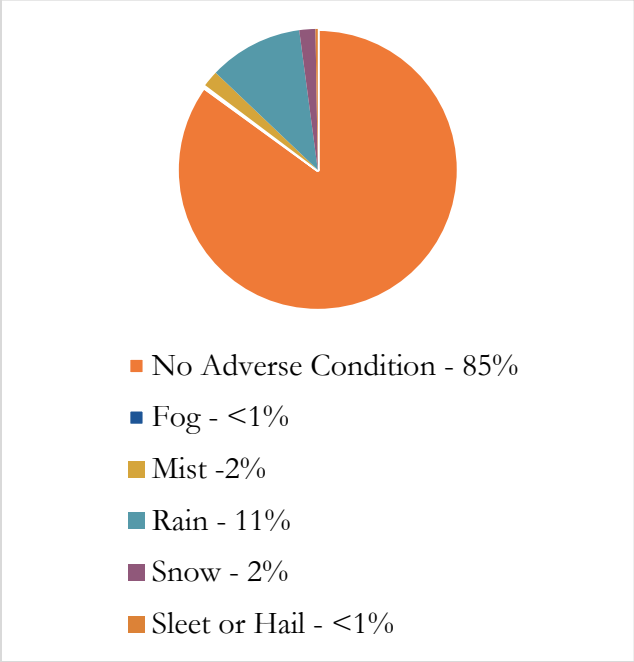
Source: Virginia Department of Transportation, Kittelson 2019.

Weather and Roadway Conditions

Figure 20 displays the study corridor crash count by reported weather condition.

- The majority of crashes (85%) occurred under no adverse or dry conditions.
- Rain accounted for 41 of the total crashes (11%).

Figure 20 Crashes by Reported Weather Condition, January 2014 – December 2019.

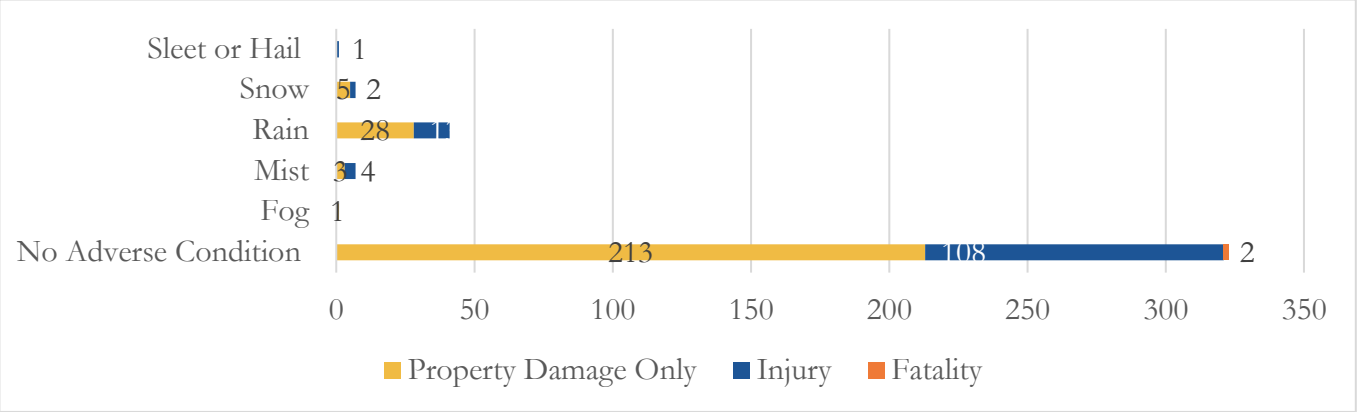


Source: Virginia Department of Transportation, Kittelson 2019.

Figure 21 summarizes reported crashes by lighting condition and severity.

- Injury crashes that occurred under snowy conditions (28%) were slightly underrepresented compared to all crashes (34%).
- Of the 7 crashes that occurred in misty conditions, 57% (4 crashes) resulted in an injury. The only crash that occurred with sleet or hail involved an injury.
- Both fatal crashes occurred under no adverse weather condition.

Figure 21 Reported Crashes by Weather Condition and Severity, January 2014-December 2018.

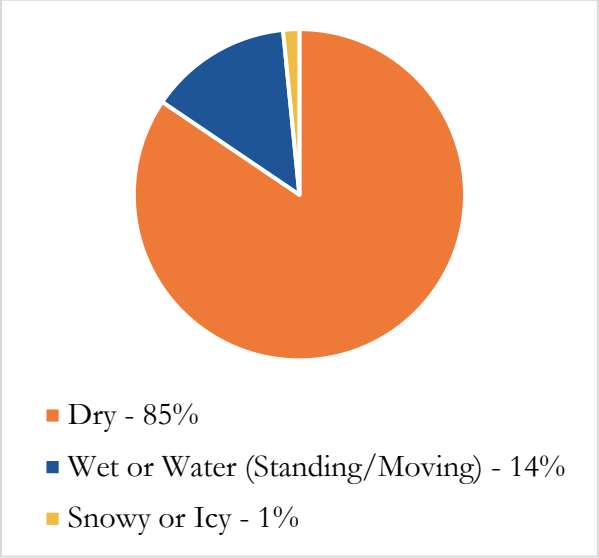


Source: Virginia Department of Transportation, Kittelson 2019.

Figure 22 displays the study corridor crash count by the reported roadway condition as an alternative way to describe the weather condition present at the time of the crash.

- The majority of crashes (84%) occurred while the roadway condition was reported to be dry.
- Snowy, icy or wet roadway conditions accounted for 15% of the total crashes on this corridor.

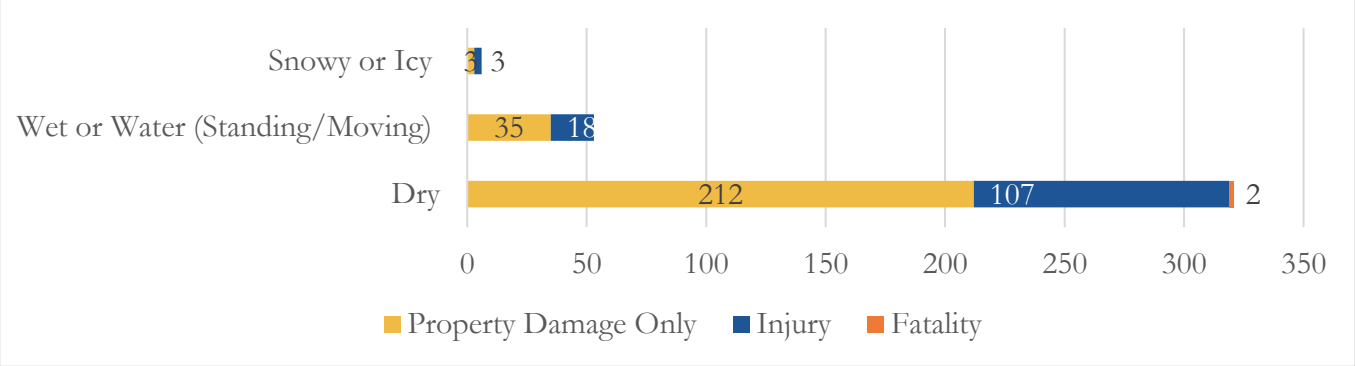
Figure 22 Crashes by Roadway Condition, January 2014 - December 2018



Source: Virginia Department of Transportation, Kittelson 2019.

Figure 23 summarizes the roadway condition and severity of crashes by year.

Figure 23 Reported Crashes by Roadway Condition and Severity, January 2014-December 2018.



Source: Virginia Department of Transportation, Kittelson 2019.

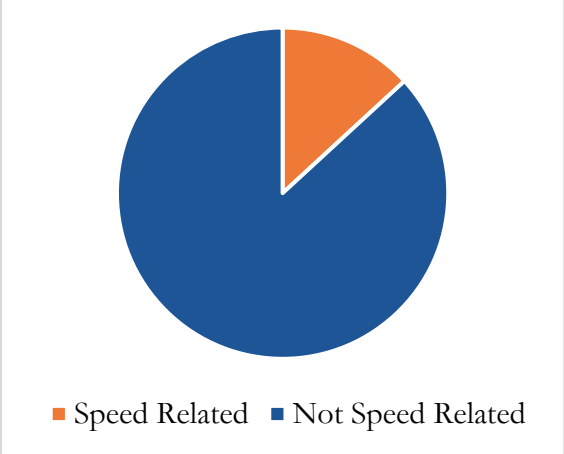
- Of the 6 crashes that occurred with snowy or icy roadway conditions, 50% (3 crashes) resulted in an injury.
- Both fatal crashes occurred while the roadway was considered to be dry.

Speed

Figure 24 summarizes the crashes by speeding condition and Figure 25 displays the speeding condition by severity of crashes.

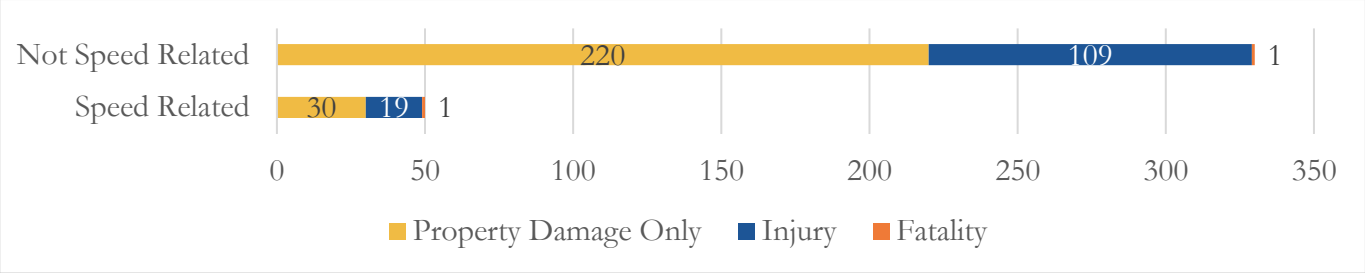
- The majority of crashes occurred when speed was not a favor (330 total crashes).
- Of the 50 crashes with speeding, 38% (19 crashes) resulted in an injury. This is a slightly higher proportion of injuries than exhibited in the total reported crashes for the study corridor (34% of study corridor crashes resulted in injury).
- One fatal crash occurred with speeding and the other fatal crash occurred without speeding.

Figure 24 Crashes by Speed Condition, January 2014 - December 2018



Source: Virginia Department of Transportation, Kittelson 2019.

Figure 25 Reported Crashes by Speed Condition and Severity, January 2014-December 2018.



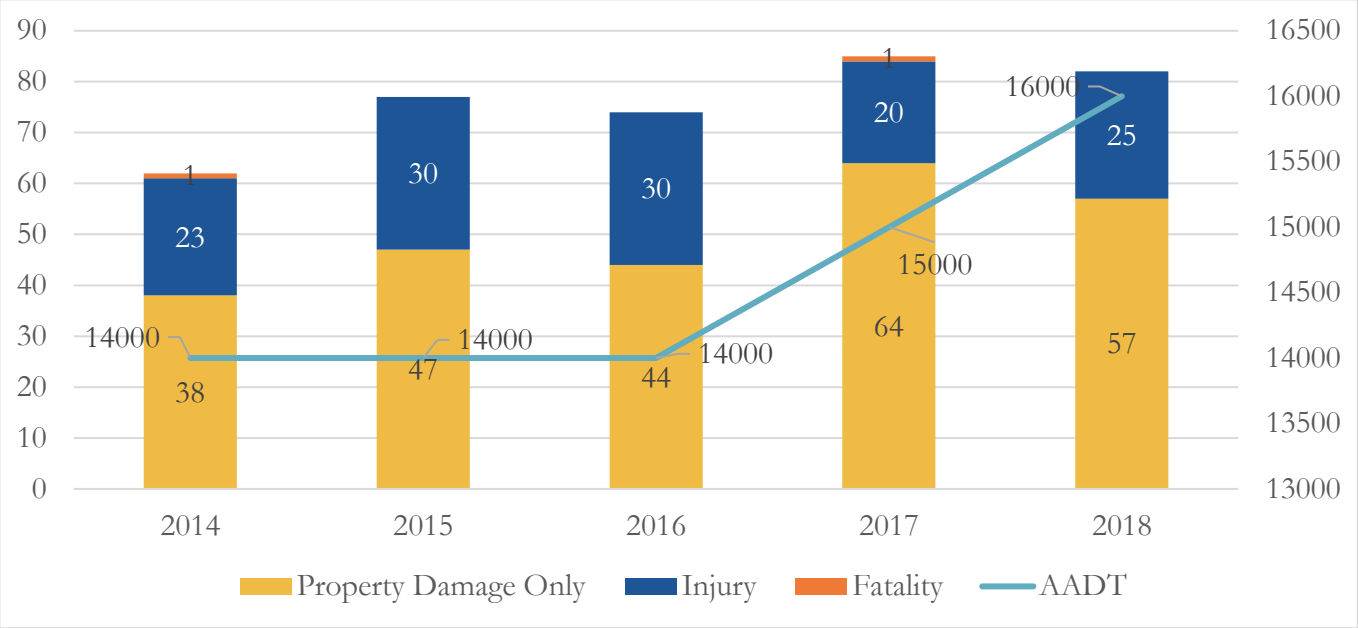
Source: Virginia Department of Transportation, Kittelson 2019.

Crash Year

Figure 26 summarizes the crash count and severity of crashes by year.

- 2017 had the highest count of crashes (85 total crashes).
- The number of annual crashes has generally increased since 2014, consistent with observed growth in average annual daily traffic (AADT).
- The fatal crashes occurred in 2013 and 2017.

Figure 26 Crashes by Year, January 2014 – December 2018



Source: Virginia Department of Transportation, Kittelson 2019.

Districtwide Ranking

Using the latest *Highway Safety Manual* (HSM) methods, VDOT conducts a roadway network screening process to identify intersections and segments with Potential for Safety Improvement (PSI) or Target Safety Needs (TSN). The comparison allows cities and counties to identify local "hot-spots" relative to peers. A number 1 in ranking is the worst performer relative to other peers in the group. All locations with a PSI greater than zero have a potential for safety improvement and a TSN indicates that a location has been considered a PSI for 3 to 5 years. This section presents relevant PSI and TSN rankings for VDOT's Fredericksburg District between 2013 and 2017.

In this study corridor, the two segments are highlighted in the Fredericksburg District list of locations with both Potential for Safety Improvements and Target Safety Needs (TSN) are:

- US 1 from Old Telegraph Road to Ondura Drive (District Rank: 105)
- US 1 from Massaponax Church Road to 200' North of Guinea Station Road (District Rank: 69).

One intersection along the study corridor that is highlighted as an intersection with Potential for Safety Improvement (PSI) and Target Safety Needs (TSN) is the intersection of US 1 and Hickory Ridge Road (District Rank: 42).

3.3 Network Screening and Systemic Findings

This section describes the network screening and systemic evaluation of the study corridor roadway network. First, the data and approach used to screen the study corridor roadway network and identify potential systemic risk factors are described.

Data and Approach

High-priority safety intersections were identified using the Equivalent Property Damage Only (EPDO) network screening performance measure from the HSM. We performed the EPDO screening calculation for all intersections along the study corridor. The EPDO performance measure is described below.

Equivalent Property Damage Only

The EPDO performance measure assigns weighting factors to crashes by severity relative to property damage only (PDO) crashes. The weighting factors used for the network screening are based on the crash costs by severity used for Caltrans' Highway Safety Improvement Program Benefit Calculator Tool. The crash costs vary based on the location type: signalized intersection, unsignalized intersection, or roadway. The weights for each crash severity by location type are shown in Figure 27.

Figure 27 Crash Weights by Severity and Location Type

CRASH LOCATION TYPE	SIGNALIZED INTERSECTION	UNSIGNALIZED INTERSECTION
Fatal	126	200
Injury (Severe)	126	200
Injury (Other Visible)	10.86	10.86
Injury (Complaint of Pain)	6.13	6.13
Property Damage Only (PDO)	1	1

Source: Caltrans, Highway Safety Improvement Program Benefit Calculator Tool, 2016.

The weights generally reflect an order of magnitude difference between the societal costs of fatal and severe injury collisions versus non-severe injury collisions. The weighting factors intentionally weigh fatal and severe injuries equally to recognize that the difference between a severe injury crash versus a fatal crash is often more of a function of the individuals involved – therefore, both represent locations where VDOT may want to prioritize improvements. The crash weights vary by location type due to the relative costs associated with the crash severity at those location types. Hence, fatal or severe crashes at an unsignalized intersection locations result in more persons injured or more severely injured in a fatal or severe injury crash and as a result have a higher average cost than at a signalized intersection.

We first coded reported crashes by severity. Crashes within 250 feet of an intersection were then spatially joined and summarized in ArcGIS to develop the total number of crashes by severity at each intersection. Where intersections were less than 500 feet from each other, crashes were assigned to the nearest intersection. Crashes occurring more than 250 feet from an intersection were excluded from the intersection analysis.

The EPDO score for intersections was calculated by multiplying each crash severity total by its associated weight (by intersection type) and summing the results, using the following formula:

*EPDO Score = Fatal weight * # of fatal crashes + severe injury weight * # of severe injury crashes + other visible injury weight * # of other visible injury crashes + complaint of pain injury weight * # of complaint of pain injury weight crashes + PDO crashes*

The EPDO score was then annualized by dividing the score by the number of years (five) of crash data used in the analysis.

Findings

Following the calculation of the network screening performance measures, priority intersections were identified using the annualized EPDO scores. As shown in Table 2, the EPDO scores ranged from zero (no crashes occurring during the five-year time frame analyzed) to 217.2 for intersections.

Table 2 Intersections by EPDO and Annualized EPDO, January 2014 – December 2018

INTERSECTION	EPDO	ANNUALIZED EPDO
Commonwealth Drive	4	0.8
Old Telegraph Road	247.4	49.5
Lad Land Drive	251.4	50.3
Massaponax Church Road	278.6	55.7
Route 607: Guinea Station Road	26.7	5.3
River Run Parkway	37.6	7.5
Hickory Ridge Road	1086.0	217.2
North Point Drive/Larkinchew Road	14.9	3.0
S Roxbury Mill Road	28.7	5.7
Morris Road/Mudd Tavern Road	918.4	183.7
Arcadia Road	85.0	17.0

3.4 Priority Locations

Priority Locations

Candidate priority locations were drawn from the corridor's intersections identified in the network safety analysis and finalized based on discussions with the County. The following five intersections were selected as the top five priority locations because they experienced the majority of crashes along the study corridor, shown in Figure 28.

Figure 28 Draft Priority Intersections

PRIORITY CORRIDOR	TOTAL CRASH COUNT
Old Telegraph Road	9
Lad Land Drive	13
Massaponax Church Road	40
Hickory Ridge Road	22
Morris Road/Mudd Tavern Road	80

Location-Specific Analysis Approach

To help inform the selection of the focus sites, the corridor wide crash pattern and trends analysis were refined to focus on the individual priority intersections. This approach allows for a more

nuanced understanding of how each priority intersection's safety performance varies across the study area. This refined understanding of the individual crash patterns and trends for each location will assist in developing a crash profile for the site that can be used to select appropriate safety treatments to improve safety performance.

This extraction process resulted in a focused crash data set of 164 priority intersection-related crashes. These 164 crashes account for 43% of all reported crashes in the study area. Of these 164 crashes, 13 were fatal or severe injury crashes, accounting for 48% of all reported fatal and severe injury crashes in the County. More detailed summaries of key crash characteristics are discussed below.

Location-Specific Findings

This section discusses crash trends along the priority intersections, highlighting notable differences between patterns in a specific intersection and the countywide patterns previously discussed. The analysis includes the following considerations:

- Crash severity
- Crash type
- Crash contributing factor

Crash Severity by Intersection

Figure 29 summarizes reported crashes by draft priority intersection and severity. PDO crashes were the most common crash type by all five priority intersections followed by moderate injury and then minor injury crashes. Each identified priority intersection had at least four moderate injury crashes and at least one serve injury crash. The intersection at Old Telegraph Road had the fewest crashes (8 total crashes), but over half of these had moderate of severe crashes (5 crashes). The Morris Road/Mudd Tavern Road intersection had the most crashes (80 total crashes) with 38% of these crashes resulting in at least a minor injury.

Figure 29 Crashes by Priority Intersection and Severity, January 2014 to December 2018

PRIORITY CORRIDOR	FATALITY	SEVERE INJURY	MODERATE INJURY	MINOR INJURY	PDO
Old Telegraph Road	0	1	4	0	4
Lad Land Drive	0	1	4	0	8
Massaponax Church Road	0	1	11	1	27
Hickory Ridge Road	1	4	7	0	10
Morris Road/Mudd Tavern Road	0	5	18	7	50

Source: Kittelson, 2019

- Old Telegraph Road: Above corridor average for severe injuries moderate injuries.
- Lad Land Drive: Above corridor average for severe injuries moderate injuries.
- Massaponax Church Road: Above corridor average for moderate injuries and property damage only crashes.
- Hickory Ridge Road: Above corridor average for fatalities, severe injuries and moderate injuries.
- Morris Road/Mudd Tavern Road: Above corridor average for minor injuries.

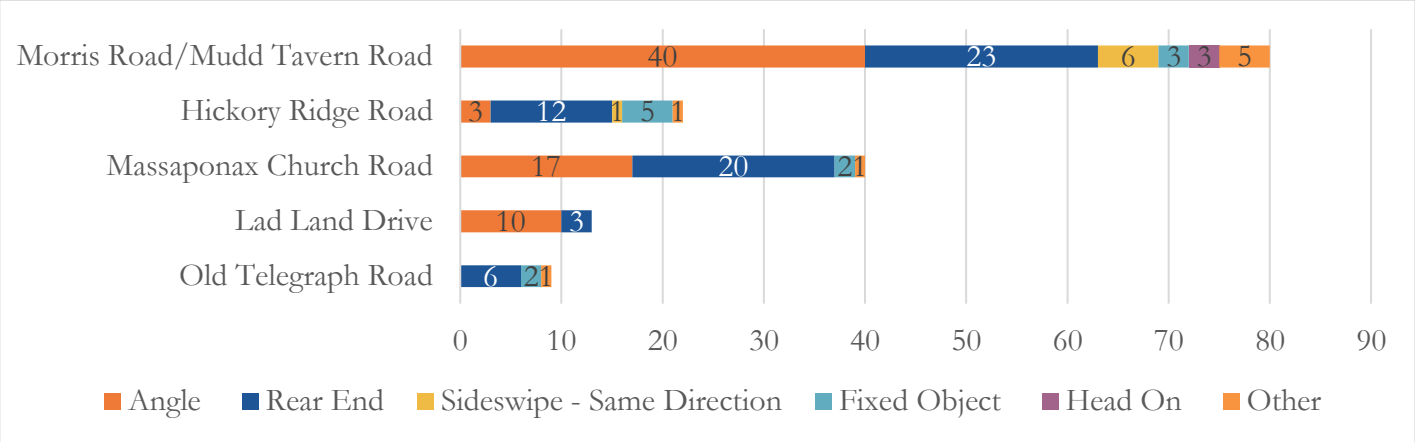
Crash Type by Intersection

As already discussed, the most common crash types study areawide are the following:

- PDO: 66% of total and
- Injury (Visible): 24% of total

Figure 30 summarizes crash types on each of the priority intersections. Rear end crashes are the most common crash types for each intersection except for the Lad Land Drive and Morris Road/Mudd Tavern Road where angle crashes were more.

Figure 30 Crash Type by Intersection, January 2014 to December 2018



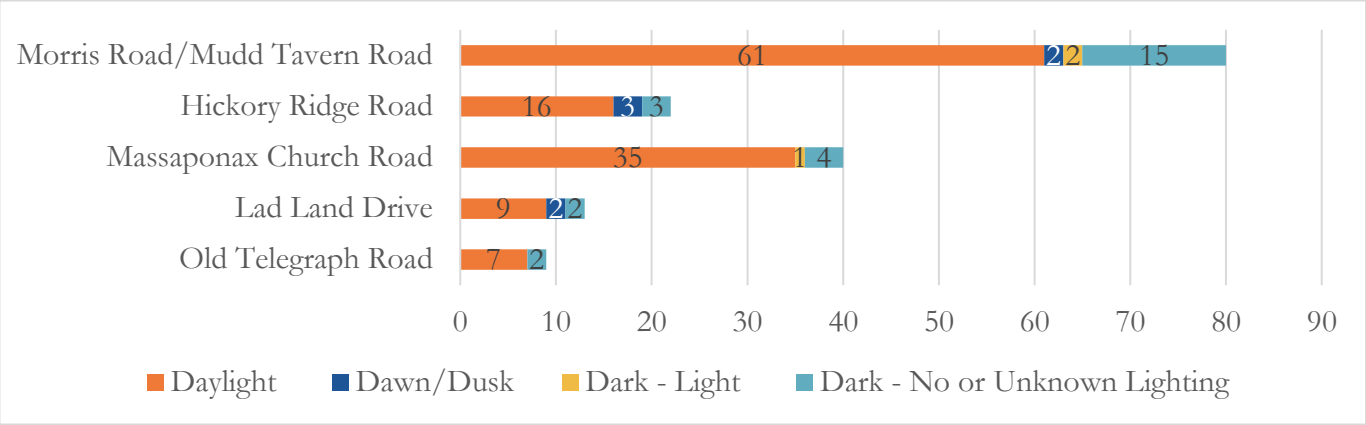
Source: Kittelson, 2019

- Old Telegraph Road: Above corridor average for rear end, fixed object, and other crashes.
- Lad Land Drive: Above corridor average for angle crashes.
- Massaponax Church Road: Above corridor average for angle and rear end crashes.
- Hickory Ridge Road: Above corridor average for rear end and fixed object crashes.
- Morris Road/Mudd Tavern Road: Above corridor average for angle, sideswipe – same direction, and head on crashes.

Lighting Conditions at Intersection Crash

Figure 31 summarizes crash types on each of the priority intersections regarding lighting conditions. Crashes during the daytime are the most common crash type for all five priority intersections.

Figure 31 Reported Crashes by Lighting Condition, January 2014 to December 2018



Source: Kittelson, 2019

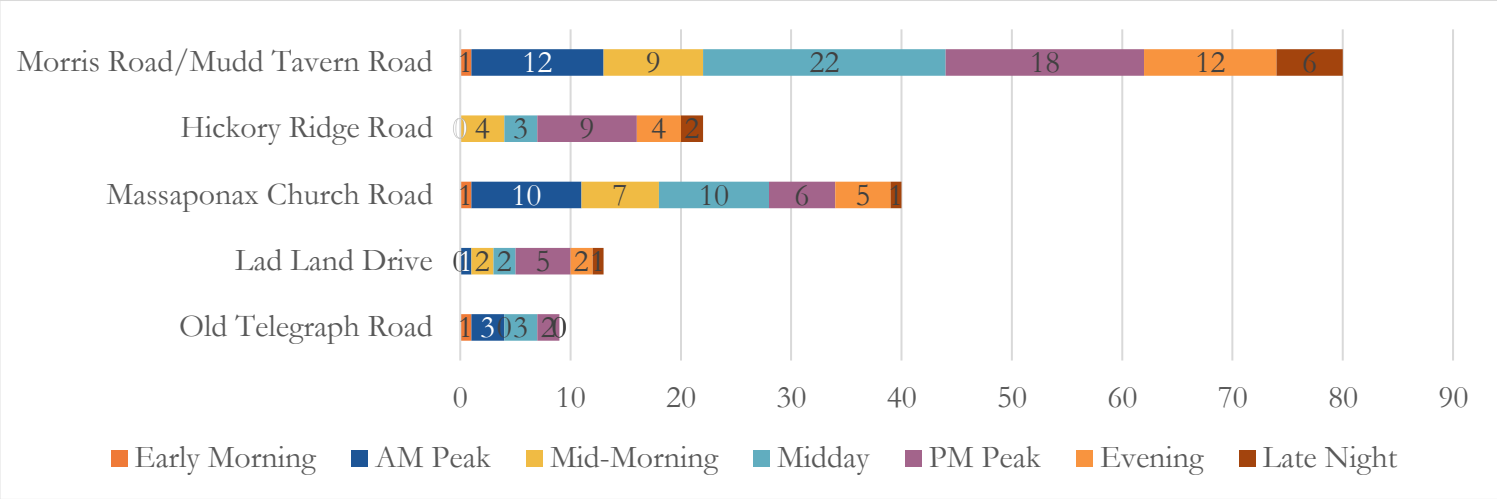
- Old Telegraph Road: Above corridor average for daylight and dark – no or unknown lighting crashes.
- Lad Land Drive: Above corridor average for dawn/dusk crashes.

- Massaponax Church Road: Above corridor average for daylight and dark-lighted roadway crashes.
- Hickory Ridge Road: Above corridor average for dawn/dusk crashes.
- Morris Road/Mudd Tavern Road: Above corridor average for dark-lighted roadway crashes.

Time of Day at Intersection Crash

Figure 32 summarizes crash types on each of the priority intersections regarding time of day. Crashes during the p.m. Peak are the most common crash type for all five priority intersections.

Figure 32 Reported Crashes by Time of Day, January 2014 to December 2018



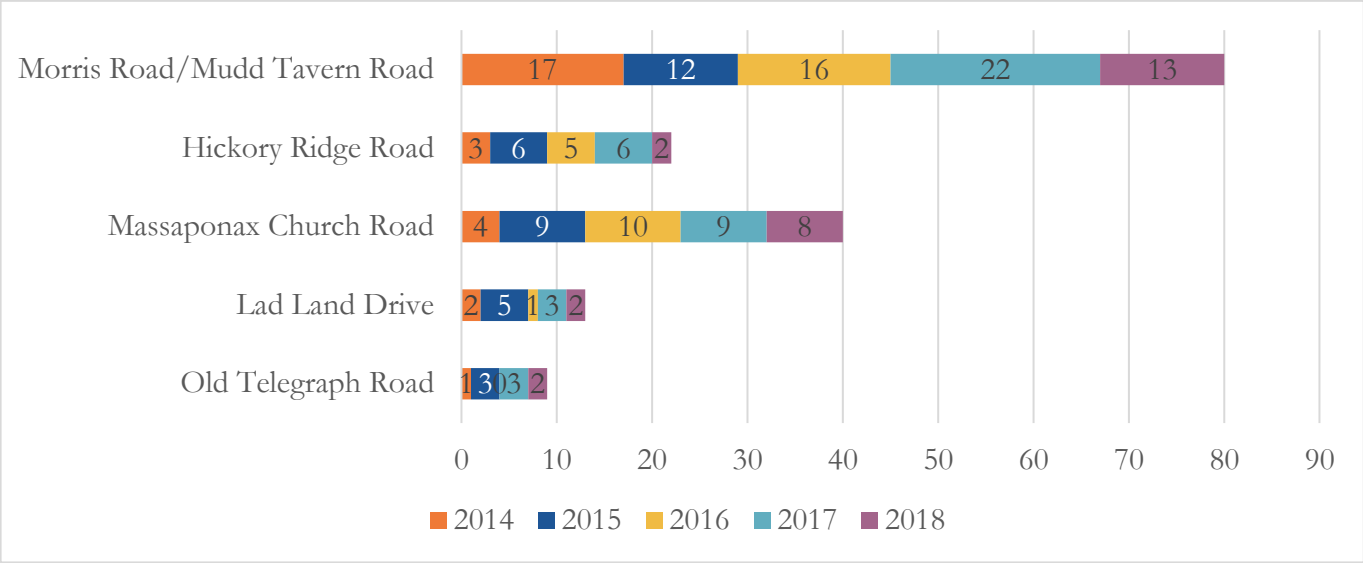
Source: Kittelson, 2019

- Old Telegraph Road: Above corridor average for early morning, a.m. peak, and midday crashes.
- Lad Land Drive: Above corridor average for mid-morning, p.m. peak, and evening crashes.
- Massaponax Church Road: Above corridor average for early morning, a.m. peak, mid-morning, midday, and evening crashes.
- Hickory Ridge Road: Above corridor average for mid-morning, p.m. peak, evening, and late-night crashes.
- Morris Road/Mudd Tavern Road: Above corridor average for midday and evening crashes.

Reported Year of Intersection Crash

Figure 33 summarizes crash types on each of the priority intersections regarding reported year.

Figure 33 Reported Crashes by Year, January 2014 to December 2018



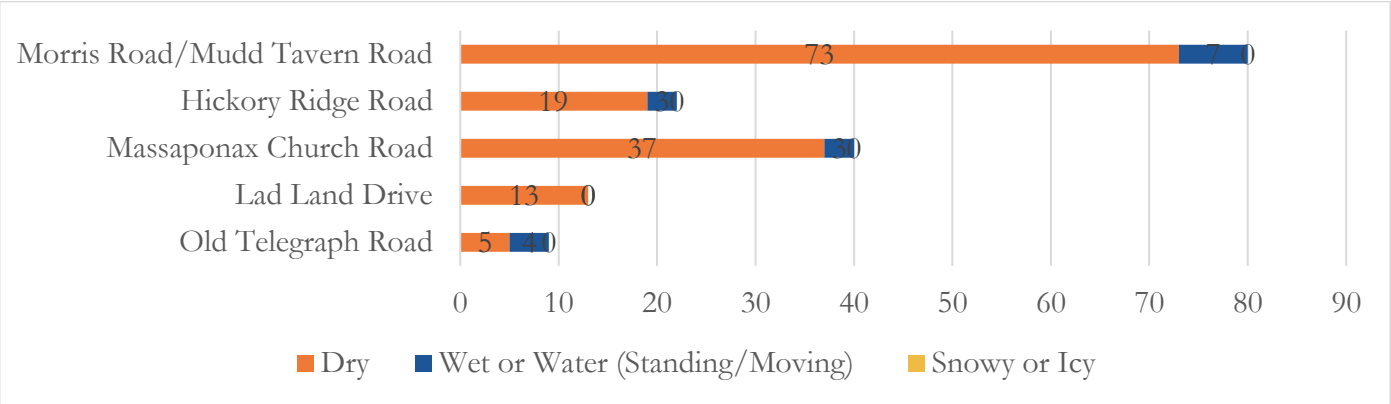
Source: Kittelson, 2019

- Old Telegraph Road: Above corridor average for crashes in 2015, 2017, and 2018.
- Lad Land Drive: Above corridor average for crashes in 2015 and 2017.
- Massaponax Church Road: Above corridor average for crashes in 2015, 2016, and 2017.
- Hickory Ridge Road: Above corridor average for crashes in 2015, 2016, and 2017.
- Morris Road/Mudd Tavern Road: Above corridor average for crashes in 2014, 2016, and 2017.

Roadway Surface Condition at Intersection Crash

Figure 34 summarizes crash types on each of the priority intersections regarding roadway surface conditions. Most of the priority intersection crashes occurred on dry roadway surfaces.

Figure 34 Reported Crashes by Roadway Surface Condition, January 2014 to December 2018



Source: Kittelson, 2019

- Old Telegraph Road: Above corridor average for wet roadway crashes.
- Lad Land Drive: Above corridor average for dry roadway crashes.
- Massaponax Church Road: Above corridor average for dry roadway crashes.
- Hickory Ridge Road: Above corridor average for dry roadway crashes.
- Morris Road/Mudd Tavern Road: Above corridor average for dry roadway crashes.

Summary

- The five priority intersections were selected as the top five priority locations because they experienced this highest annualized EPDO score across the 12 intersections evaluated along this corridor.
- PDO crashes were the most common crash type by all five priority intersections followed by moderate injury and then severe injury crashes.
- Rear end crashes are the most common crash type for the intersections at Old Telegraph Road, Massaponax Church Road, and Hickory Ridge Road. At Lad Land Drive and Morris Road/Mudd Tavern Road, the most common crash type is angle.
- Crashes during the daytime are the most common crash type for all five priority intersections.
- Crashes during the p.m. Peak are the most common crash type for the Lad Land Drive and Hickory Ridge Road intersections. Crashes during the midday time period are the most common during the Morris Road/Mudd Tavern Road intersection. At the Old Telegraph Road and Massaponax Church Road intersections, midday and a.m. peaks have the highest frequency of crashes.
- Most of the priority intersection crashes occurred on dry roadway surfaces.

4.0 CONCLUSION AND NEXT STEPS

Based on the analysis of existing and future year 2030 no-build operations and existing safety, strategies and alternatives will be identified to address operational, safety, and access management deficiencies. Improvements/strategies to preserve US 1 as an alternative corridor to I-95 will also be identified. All study intersections will be evaluated for potential improvements, including innovative intersection control strategies. After an initial screening of potential alternatives, up to two (2) improvements will be evaluated further for each intersection through development of conceptual designs and more detailed operational analysis.

An access management plan, including a typical cross-section(s), will be developed for the entire study corridor to plan for future growth. Specific emphasis will be placed on the following segments with existing or planned higher density land uses:

- From the northern limit of the study corridor through Guinea Station Road
- From the first commercial entrance north of Thornburg through the last commercial entrance south of Thornburg

Preliminary recommendations will be developed in annotated graphical format and circulated to the stakeholder group for subsequent discussions. Where feasible, improvements/strategies will be broken into smaller, phase-able improvements with individual summary pages.

5.0 REFERENCES

1. Spotsylvania County Interactive Web Based GIS. https://gis.spotsylvania.va.us/spotsylvania/#/mwlh
2. Virginia Department of Transportation. Traffic Operations and Safety Analysis Manual. February 2020.
3. Virginia Department of Transportation. Road Design Manual. July 2019.

6.0 APPENDICES

Appendix A: Traffic Counts

Peggy Malone & Associates

904-992-8072

File Name : 1-Route 1 and Route 749 AM
Site Code :
Start Date : 5/16/2019
Page No : 1

Groups Printed- Car

	Rt 1 Southbound				Old Telegraph Rd Westbound				Rt 1 Northbound					
Start Time	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Int. Total**
06:00 AM	32	0	0	32	0	0	0	0	0	114	0	0	114	146
06:15 AM	52	0	0	52	0	0	0	0	0	123	0	0	123	175
06:30 AM	54	0	0	54	0	0	1	1	0	155	0	0	155	210
06:45 AM	86	0	0	86	0	0	0	0	0	156	0	0	156	242
Total	224	0	0	224	0	0	1	1	0	548	0	0	548	773
07:00 AM	164	1	0	165	1	0	0	1	0	143	0	0	143	309
07:15 AM	180	1	0	181	0	1	0	1	0	190	0	0	190	372
07:30 AM	113	0	0	113	0	0	0	0	0	238	0	0	238	351
07:45 AM	124	2	0	126	0	0	0	0	1	158	0	0	159	285
Total	581	4	0	585	1	1	0	2	1	729	0	0	730	1317
08:00 AM	100	0	0	100	0	0	0	0	0	139	0	0	139	239
08:15 AM	110	1	0	111	0	0	0	0	0	168	0	0	168	279
08:30 AM	102	1	0	103	2	0	0	2	2	176	0	0	178	283
08:45 AM	99	1	0	100	0	0	0	0	0	219	0	0	219	319
Total	411	3	0	414	2	0	0	2	2	702	0	0	704	1120
Grand Total	1216	7	0	1223	3	1	1	5	3	1979	0	0	1982	3210
Apprch %	99.4	0.6	0		60	20	20		0.2	99.8	0	0		
Total %	37.9	0.2	0	38.1	0.1	0	0	0.2	0.1	61.7	0	0	61.7	

	Rt 1 Southbound			Old Telegraph Rd Westbound			Rt 1 Northbound				
Start Time	**Thru**	**Left**	**App. Total**	**Right**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Int. Total**
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1											
Peak Hour for Entire Intersection Begins at 07:00 AM											
07:00 AM	164	1	165	**1**	0	**1**	0	143	0	143	309
07:15 AM	**180**	1	**181**	0	**1**	1	0	190	0	190	**372**
07:30 AM	113	0	113	0	0	0	0	**238**	0	**238**	351
07:45 AM	124	**2**	126	0	0	0	**1**	158	0	159	285
Total Volume	581	4	585	1	1	2	1	729	0	730	1317
% App. Total	99.3	0.7		50	50		0.1	99.9	0		
PHF	.807	.500	.808	.250	.250	.500	.250	.766	.000	.767	.885

Peggy Malone & Associates

904-992-8072

File Name : 1-Route 1 and Route 749 AM
Site Code :
Start Date : 5/16/2019
Page No : 1

Groups Printed- Truck

	Rt 1 Southbound				Old Telegraph Rd Westbound				Rt 1 Northbound					
Start Time	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Int. Total**
06:00 AM	4	0	0	4	0	0	0	0	0	6	0	0	6	10
06:15 AM	2	0	0	2	0	0	0	0	0	14	0	0	14	16
06:30 AM	3	0	0	3	0	0	0	0	0	16	0	0	16	19
06:45 AM	4	0	0	4	0	0	0	0	0	15	0	0	15	19
Total	13	0	0	13	0	0	0	0	0	51	0	0	51	64
07:00 AM	17	0	0	17	0	0	0	0	0	17	0	0	17	34
07:15 AM	12	0	0	12	0	0	0	0	0	22	0	0	22	34
07:30 AM	11	0	0	11	0	0	0	0	0	18	0	0	18	29
07:45 AM	7	0	0	7	0	0	0	0	0	14	0	0	14	21
Total	47	0	0	47	0	0	0	0	0	71	0	0	71	118
08:00 AM	7	0	0	7	0	0	0	0	0	21	0	0	21	28
08:15 AM	17	0	0	17	0	0	0	0	0	16	0	0	16	33
08:30 AM	19	0	0	19	0	0	0	0	0	10	0	0	10	29
08:45 AM	11	0	0	11	0	0	0	0	0	14	0	0	14	25
Total	54	0	0	54	0	0	0	0	0	61	0	0	61	115
Grand Total	114	0	0	114	0	0	0	0	0	183	0	0	183	297
Apprch %	100	0	0		0	0	0		0	100	0	0		
Total %	38.4	0	0	38.4	0	0	0	0	0	61.6	0	0	61.6	

	Rt 1 Southbound			Old Telegraph Rd Westbound			Rt 1 Northbound				
Start Time	**Thru**	**Left**	**App. Total**	**Right**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Int. Total**
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1											
Peak Hour for Entire Intersection Begins at 07:00 AM											
07:00 AM	**17**	0	**17**	0	0	0	0	17	0	17	**34**
07:15 AM	12	0	12	0	0	0	0	**22**	0	**22**	34
07:30 AM	11	0	11	0	0	0	0	18	0	18	29
07:45 AM	7	0	7	0	0	0	0	14	0	14	21
Total Volume	47	0	47	0	0	0	0	71	0	71	118
% App. Total	100	0		0	0		0	100	0		
PHF	.691	.000	.691	.000	.000	.000	.000	.807	.000	.807	.868

Peggy Malone & Associates

904-992-8072

File Name : 1-Route 1 and Route 749 AM
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	Rt 1 Southbound				Old Telegraph Rd Westbound				Rt 1 Northbound					
Start Time	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Int. Total**
06:00 AM	36	0	0	36	0	0	0	0	0	120	0	0	120	156
06:15 AM	54	0	0	54	0	0	0	0	0	137	0	0	137	191
06:30 AM	57	0	0	57	0	0	1	1	0	171	0	0	171	229
06:45 AM	90	0	0	90	0	0	0	0	0	171	0	0	171	261
Total	237	0	0	237	0	0	1	1	0	599	0	0	599	837
07:00 AM	181	1	0	182	1	0	0	1	0	160	0	0	160	343
07:15 AM	192	1	0	193	0	1	0	1	0	212	0	0	212	406
07:30 AM	124	0	0	124	0	0	0	0	0	256	0	0	256	380
07:45 AM	131	2	0	133	0	0	0	0	1	172	0	0	173	306
Total	628	4	0	632	1	1	0	2	1	800	0	0	801	1435
08:00 AM	107	0	0	107	0	0	0	0	0	160	0	0	160	267
08:15 AM	127	1	0	128	0	0	0	0	0	184	0	0	184	312
08:30 AM	121	1	0	122	2	0	0	2	2	186	0	0	188	312
08:45 AM	110	1	0	111	0	0	0	0	0	233	0	0	233	344
Total	465	3	0	468	2	0	0	2	2	763	0	0	765	1235
Grand Total	1330	7	0	1337	3	1	1	5	3	2162	0	0	2165	3507
Apprch %	99.5	0.5	0		60	20	20		0.1	99.9	0	0		
Total %	37.9	0.2	0	38.1	0.1	0	0	0.1	0.1	61.6	0	0	61.7	

	Rt 1 Southbound			Old Telegraph Rd Westbound			Rt 1 Northbound				
Start Time	**Thru**	**Left**	**App. Total**	**Right**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Int. Total**
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1											
Peak Hour for Entire Intersection Begins at 07:00 AM											
07:00 AM	181	1	182	**1**	0	**1**	0	160	0	160	343
07:15 AM	**192**	1	**193**	0	**1**	1	0	212	0	212	**406**
07:30 AM	124	0	124	0	0	0	0	**256**	0	**256**	380
07:45 AM	131	**2**	133	0	0	0	**1**	172	0	173	306
Total Volume	628	4	632	1	1	2	1	800	0	801	1435
% App. Total	99.4	0.6		50	50		0.1	99.9	0		
PHF	.818	.500	.819	.250	.250	.500	.250	.781	.000	.782	.884

Peggy Malone & Associates

904-992-8072

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Groups Printed- Car

	Rt 1 Southbound				Old Telegraph Rd Westbound				Rt 1 Northbound					
Start Time	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Int. Total**
04:00 PM	266	2	0	268	1	0	0	1	1	208	0	0	209	478
04:15 PM	248	0	0	248	1	1	0	2	0	181	0	0	181	431
04:30 PM	258	0	0	258	0	0	0	0	0	184	0	0	184	442
04:45 PM	263	1	0	264	0	0	0	0	0	171	0	0	171	435
Total	1035	3	0	1038	2	1	0	3	1	744	0	0	745	1786
05:00 PM	229	1	0	230	0	0	0	0	0	215	0	0	215	445
05:15 PM	257	0	0	257	2	0	0	2	2	237	0	0	239	498
05:30 PM	255	0	0	255	1	0	0	1	0	173	1	0	174	430
05:45 PM	270	0	0	270	0	0	0	0	0	183	0	0	183	453
Total	1011	1	0	1012	3	0	0	3	2	808	1	0	811	1826
06:00 PM	241	0	0	241	0	0	0	0	0	164	0	0	164	405
06:15 PM	193	0	0	193	0	0	0	0	0	152	0	0	152	345
06:30 PM	233	0	0	233	1	0	0	1	0	170	0	0	170	404
06:45 PM	193	0	0	193	0	0	0	0	0	122	0	0	122	315
Total	860	0	0	860	1	0	0	1	0	608	0	0	608	1469
Grand Total	2906	4	0	2910	6	1	0	7	3	2160	1	0	2164	5081
Apprch %	99.9	0.1	0		85.7	14.3	0		0.1	99.8	0	0		
Total %	57.2	0.1	0	57.3	0.1	0	0	0.1	0.1	42.5	0	0	42.6	

	Rt 1 Southbound			Old Telegraph Rd Westbound			Rt 1 Northbound				
Start Time	**Thru**	**Left**	**App. Total**	**Right**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Int. Total**
Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1											
Peak Hour for Entire Intersection Begins at 05:00 PM											
05:00 PM	229	**1**	230	0	0	0	0	215	0	215	445
05:15 PM	257	0	257	**2**	0	**2**	**2**	**237**	0	**239**	**498**
05:30 PM	255	0	255	1	0	1	0	173	**1**	174	430
05:45 PM	**270**	0	**270**	0	0	0	0	183	0	183	453
Total Volume	1011	1	1012	3	0	3	2	808	1	811	1826
% App. Total	99.9	0.1		100	0		0.2	99.6	0.1		
PHF	.936	.250	.937	.375	.000	.375	.250	.852	.250	.848	.917

Peggy Malone & Associates

904-992-8072

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Groups Printed- Truck

	Rt 1 Southbound				Old Telegraph Rd Westbound				Rt 1 Northbound					
Start Time	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Int. Total**
04:00 PM	14	0	0	14	3	1	0	4	0	10	0	0	10	28
04:15 PM	12	0	0	12	1	0	0	1	0	9	0	0	9	22
04:30 PM	10	1	0	11	1	0	0	1	0	4	0	0	4	16
04:45 PM	15	3	0	18	0	0	0	0	0	4	0	0	4	22
Total	51	4	0	55	5	1	0	6	0	27	0	0	27	88
05:00 PM	15	0	0	15	0	2	0	2	0	3	0	0	3	20
05:15 PM	10	0	0	10	0	0	0	0	0	4	0	0	4	14
05:30 PM	7	0	0	7	0	0	0	0	0	4	0	0	4	11
05:45 PM	3	0	0	3	0	0	0	0	0	1	0	0	1	4
Total	35	0	0	35	0	2	0	2	0	12	0	0	12	49
06:00 PM	3	0	0	3	0	0	0	0	0	0	0	0	0	3
06:15 PM	4	0	0	4	0	0	0	0	0	2	0	0	2	6
06:30 PM	3	0	0	3	0	0	0	0	0	1	0	0	1	4
06:45 PM	8	0	0	8	0	0	0	0	0	3	0	0	3	11
Total	18	0	0	18	0	0	0	0	0	6	0	0	6	24
Grand Total	104	4	0	108	5	3	0	8	0	45	0	0	45	161
Apprch %	96.3	3.7	0		62.5	37.5	0		0	100	0	0		
Total %	64.6	2.5	0	67.1	3.1	1.9	0	5	0	28	0	0	28	

	Rt 1 Southbound			Old Telegraph Rd Westbound			Rt 1 Northbound				
Start Time	**Thru**	**Left**	**App. Total**	**Right**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Int. 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	**3**	**1**	**4**	0	**10**	0	**10**	**28**
04:15 PM	12	0	12	1	0	1	0	9	0	9	22
04:30 PM	10	1	11	1	0	1	0	4	0	4	16
04:45 PM	**15**	**3**	**18**	0	0	0	0	4	0	4	22
Total Volume	51	4	55	5	1	6	0	27	0	27	88
% App. Total	92.7	7.3		83.3	16.7		0	100	0		
PHF	.850	.333	.764	.417	.250	.375	.000	.675	.000	.675	.786

Peggy Malone & Associates

904-992-8072

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Groups Printed- Combined

	Rt 1 Southbound				Old Telegraph Rd Westbound				Rt 1 Northbound					
Start Time	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Int. Total**
04:00 PM	280	2	0	282	4	1	0	5	1	218	0	0	219	506
04:15 PM	260	0	0	260	2	1	0	3	0	190	0	0	190	453
04:30 PM	268	1	0	269	1	0	0	1	0	188	0	0	188	458
04:45 PM	278	4	0	282	0	0	0	0	0	175	0	0	175	457
Total	1086	7	0	1093	7	2	0	9	1	771	0	0	772	1874
05:00 PM	244	1	0	245	0	2	0	2	0	218	0	0	218	465
05:15 PM	267	0	0	267	2	0	0	2	2	241	0	0	243	512
05:30 PM	262	0	0	262	1	0	0	1	0	177	1	0	178	441
05:45 PM	273	0	0	273	0	0	0	0	0	184	0	0	184	457
Total	1046	1	0	1047	3	2	0	5	2	820	1	0	823	1875
06:00 PM	244	0	0	244	0	0	0	0	0	164	0	0	164	408
06:15 PM	197	0	0	197	0	0	0	0	0	154	0	0	154	351
06:30 PM	236	0	0	236	1	0	0	1	0	171	0	0	171	408
06:45 PM	201	0	0	201	0	0	0	0	0	125	0	0	125	326
Total	878	0	0	878	1	0	0	1	0	614	0	0	614	1493
Grand Total	3010	8	0	3018	11	4	0	15	3	2205	1	0	2209	5242
Apprch %	99.7	0.3	0		73.3	26.7	0		0.1	99.8	0	0		
Total %	57.4	0.2	0	57.6	0.2	0.1	0	0.3	0.1	42.1	0	0	42.1	

	Rt 1 Southbound			Old Telegraph Rd Westbound			Rt 1 Northbound				
Start Time	**Thru**	**Left**	**App. Total**	**Right**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Int. 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	268	1	269	1	0	1	0	188	0	188	458
04:45 PM	**278**	**4**	**282**	0	0	0	0	175	0	175	457
05:00 PM	244	1	245	0	**2**	**2**	0	218	0	218	465
05:15 PM	267	0	267	**2**	0	2	**2**	**241**	0	**243**	**512**
Total Volume	1057	6	1063	3	2	5	2	822	0	824	1892
% App. Total	99.4	0.6		60	40		0.2	99.8	0		
PHF	.951	.375	.942	.375	.250	.625	.250	.853	.000	.848	.924

Peggy Malone & Associates

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Groups Printed- Car

	Rt 1 Southbound					Central Transport Westbound					Rt 1 Northbound					Lad Land Dr Eastbound					
Start Time	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Int. Total**
06:00 AM	1	33	0	1	35	0	0	0	0	0	0	95	0	0	95	0	0	8	0	8	138
06:15 AM	4	39	0	0	43	0	0	0	0	0	0	108	0	0	108	0	0	12	0	12	163
06:30 AM	1	50	0	0	51	0	0	0	0	0	0	129	2	0	131	0	0	10	0	10	192
06:45 AM	4	76	0	0	80	0	0	0	0	0	0	142	0	0	142	0	0	18	0	18	240
Total	10	198	0	1	209	0	0	0	0	0	0	474	2	0	476	0	0	48	0	48	733
07:00 AM	5	144	0	0	149	0	0	0	0	0	0	126	2	0	128	1	0	9	0	10	287
07:15 AM	9	178	0	0	187	0	0	0	0	0	0	200	1	0	201	1	0	18	0	19	407
07:30 AM	3	101	0	0	104	0	0	0	0	0	0	207	0	0	207	0	0	20	0	20	331
07:45 AM	14	90	0	0	104	0	0	0	0	0	0	134	5	0	139	0	0	7	0	7	250
Total	31	513	0	0	544	0	0	0	0	0	0	667	8	0	675	2	0	54	0	56	1275
08:00 AM	17	79	0	0	96	0	1	0	0	1	0	142	1	0	143	1	0	11	0	12	252
08:15 AM	10	80	0	0	90	0	0	0	0	0	0	152	0	0	152	1	0	9	0	10	252
08:30 AM	10	69	0	0	79	0	0	0	0	0	0	211	0	0	211	0	0	8	0	8	298
08:45 AM	10	79	0	0	89	0	0	0	0	0	0	186	0	0	186	0	0	9	0	9	284
Total	47	307	0	0	354	0	1	0	0	1	0	691	1	0	692	2	0	37	0	39	1086
Grand Total	88	1018	0	1	1107	0	1	0	0	1	0	1832	11	0	1843	4	0	139	0	143	3094
Apprch %	7.9	92	0	0.1		0	100	0	0		0	99.4	0.6	0		2.8	0	97.2	0		
Total %	2.8	32.9	0	0	35.8	0	0	0	0	0	0	59.2	0.4	0	59.6	0.1	0	4.5	0	4.6	

	Rt 1 Southbound				Central Transport Westbound				Rt 1 Northbound				Lad Land Dr Eastbound				
Start Time	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Int. Total**
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	5	144	0	149	0	0	0	0	0	126	2	128	**1**	0	9	10	287
07:15 AM	9	**178**	0	**187**	0	0	0	0	0	200	1	201	1	0	18	19	**407**
07:30 AM	3	101	0	104	0	0	0	0	0	**207**	0	**207**	0	0	**20**	**20**	331
07:45 AM	**14**	90	0	104	0	0	0	0	0	134	**5**	139	0	0	7	7	250
Total Volume	31	513	0	544	0	0	0	0	0	667	8	675	2	0	54	56	1275
% App. Total	5.7	94.3	0		0	0	0		0	98.8	1.2		3.6	0	96.4		
PHF	.554	.721	.000	.727	.000	.000	.000	.000	.000	.806	.400	.815	.500	.000	.675	.700	.783

Peggy Malone & Associates

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Groups Printed- Truck

	Rt 1 Southbound					Central Transport Westbound					Rt 1 Northbound					Lad Land Dr Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
06:00 AM	0	5	0	0	5	0	0	0	0	0	0	8	0	0	8	1	0	0	0	1	14
06:15 AM	0	2	0	0	2	0	0	0	0	0	0	13	0	0	13	0	0	1	0	1	16
06:30 AM	0	2	0	0	2	0	0	1	0	1	0	13	0	0	13	0	0	0	0	0	16
06:45 AM	1	4	0	0	5	0	0	0	0	0	0	16	0	0	16	0	0	0	0	0	21
Total	1	13	0	0	14	0	0	1	0	1	0	50	0	0	50	1	0	1	0	2	67
07:00 AM	0	19	0	0	19	1	0	0	0	1	0	16	0	0	16	0	0	0	0	0	36
07:15 AM	0	15	0	0	15	0	0	0	0	0	0	22	0	0	22	0	0	1	0	1	38
07:30 AM	0	12	0	0	12	2	0	0	0	2	0	12	0	0	12	0	0	0	0	0	26
07:45 AM	0	10	0	0	10	2	0	1	0	3	0	12	0	0	12	1	0	0	0	1	26
Total	0	56	0	0	56	5	0	1	0	6	0	62	0	0	62	1	0	1	0	2	126
08:00 AM	0	5	0	0	5	0	0	0	0	0	0	14	0	0	14	0	0	0	0	0	19
08:15 AM	0	19	0	0	19	0	0	0	0	0	0	14	0	0	14	0	0	0	0	0	33
08:30 AM	0	18	0	0	18	0	0	0	0	0	0	13	0	0	13	0	0	0	0	0	31
08:45 AM	0	14	0	0	14	0	0	0	0	0	0	14	0	0	14	0	0	0	0	0	28
Total	0	56	0	0	56	0	0	0	0	0	0	55	0	0	55	0	0	0	0	0	111
Grand Total	1	125	0	0	126	5	0	2	0	7	0	167	0	0	167	2	0	2	0	4	304
Apprch %	0.8	99.2	0	0		71.4	0	28.6	0		0	100	0	0		50	0	50	0		
Total %	0.3	41.1	0	0	41.4	1.6	0	0.7	0	2.3	0	54.9	0	0	54.9	0.7	0	0.7	0	1.3	

	Rt 1 Southbound				Central Transport Westbound				Rt 1 Northbound				Lad Land Dr Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	**19**	0	**19**	1	0	0	1	0	16	0	16	0	0	0	0	36
07:15 AM	0	15	0	15	0	0	0	0	0	**22**	0	**22**	0	0	**1**	**1**	**38**
07:30 AM	0	12	0	12	**2**	0	0	2	0	12	0	12	0	0	0	0	26
07:45 AM	0	10	0	10	2	0	**1**	**3**	0	12	0	12	**1**	0	0	1	26
Total Volume	0	56	0	56	5	0	1	6	0	62	0	62	1	0	1	2	126
% App. Total	0	100	0		83.3	0	16.7		0	100	0		50	0	50		
PHF	.000	.737	.000	.737	.625	.000	.250	.500	.000	.705	.000	.705	.250	.000	.250	.500	.829

Peggy Malone & Associates

904-992-8072

File Name : 2-Route 1 and Lad Land Dr AM
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Groups Printed- Combined

	Rt 1 Southbound					Central Transport Westbound					Rt 1 Northbound					Lad Land Dr Eastbound					
Start Time	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Int. Total**
06:00 AM	1	38	0	1	40	0	0	0	0	0	0	103	0	0	103	1	0	8	0	9	152
06:15 AM	4	41	0	0	45	0	0	0	0	0	0	121	0	0	121	0	0	13	0	13	179
06:30 AM	1	52	0	0	53	0	0	1	0	1	0	142	2	0	144	0	0	10	0	10	208
06:45 AM	5	80	0	0	85	0	0	0	0	0	0	158	0	0	158	0	0	18	0	18	261
Total	11	211	0	1	223	0	0	1	0	1	0	524	2	0	526	1	0	49	0	50	800
07:00 AM	5	163	0	0	168	1	0	0	0	1	0	142	2	0	144	1	0	9	0	10	323
07:15 AM	9	193	0	0	202	0	0	0	0	0	0	222	1	0	223	1	0	19	0	20	445
07:30 AM	3	113	0	0	116	2	0	0	0	2	0	219	0	0	219	0	0	20	0	20	357
07:45 AM	14	100	0	0	114	2	0	1	0	3	0	146	5	0	151	1	0	7	0	8	276
Total	31	569	0	0	600	5	0	1	0	6	0	729	8	0	737	3	0	55	0	58	1401
08:00 AM	17	84	0	0	101	0	1	0	0	1	0	156	1	0	157	1	0	11	0	12	271
08:15 AM	10	99	0	0	109	0	0	0	0	0	0	166	0	0	166	1	0	9	0	10	285
08:30 AM	10	87	0	0	97	0	0	0	0	0	0	224	0	0	224	0	0	8	0	8	329
08:45 AM	10	93	0	0	103	0	0	0	0	0	0	200	0	0	200	0	0	9	0	9	312
Total	47	363	0	0	410	0	1	0	0	1	0	746	1	0	747	2	0	37	0	39	1197
Grand Total	89	1143	0	1	1233	5	1	2	0	8	0	1999	11	0	2010	6	0	141	0	147	3398
Apprch %	7.2	92.7	0	0.1		62.5	12.5	25	0		0	99.5	0.5	0		4.1	0	95.9	0		
Total %	2.6	33.6	0	0	36.3	0.1	0	0.1	0	0.2	0	58.8	0.3	0	59.2	0.2	0	4.1	0	4.3	

	Rt 1 Southbound				Central Transport Westbound				Rt 1 Northbound				Lad Land Dr Eastbound				
Start Time	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Int. Total**
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	5	163	0	168	1	0	0	1	0	142	2	144	**1**	0	9	10	323
07:15 AM	9	**193**	0	**202**	0	0	0	0	0	**222**	1	**223**	1	0	19	**20**	**445**
07:30 AM	3	113	0	116	**2**	0	0	2	0	219	0	219	0	0	**20**	20	357
07:45 AM	**14**	100	0	114	2	0	**1**	**3**	0	146	**5**	151	1	0	7	8	276
Total Volume	31	569	0	600	5	0	1	6	0	729	8	737	3	0	55	58	1401
% App. Total	5.2	94.8	0		83.3	0	16.7		0	98.9	1.1		5.2	0	94.8		
PHF	.554	.737	.000	.743	.625	.000	.250	.500	.000	.821	.400	.826	.750	.000	.688	.725	.787

Peggy Malone & Associates

904-992-8072

File Name : 2-Route 1 and Lad Land Dr PM
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Groups Printed- Car

	Rt 1 Southbound					Central Transport Westbound					Rt 1 Northbound					Lad Land Dr Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	9	253	1	0	263	0	0	0	1	1	0	177	1	0	178	1	0	13	1	15	457
04:15 PM	10	238	0	0	248	0	0	1	0	1	0	150	3	0	153	2	0	9	0	11	413
04:30 PM	17	225	0	0	242	0	0	0	0	0	0	172	1	0	173	3	0	7	0	10	425
04:45 PM	11	243	1	0	255	0	0	0	0	0	0	159	0	0	159	3	0	9	0	12	426
Total	47	959	2	0	1008	0	0	1	1	2	0	658	5	0	663	9	0	38	1	48	1721
05:00 PM	16	243	0	0	259	0	0	0	0	0	0	163	1	0	164	3	0	15	0	18	441
05:15 PM	8	230	0	0	238	0	0	0	0	0	0	203	2	0	205	2	0	17	0	19	462
05:30 PM	14	240	0	0	254	0	0	0	0	0	0	161	1	0	162	2	0	5	0	7	423
05:45 PM	18	263	0	0	281	0	0	0	0	0	0	179	2	0	181	3	0	8	0	11	473
Total	56	976	0	0	1032	0	0	0	0	0	0	706	6	0	712	10	0	45	0	55	1799
06:00 PM	17	219	0	0	236	0	0	0	0	0	0	142	1	0	143	0	0	6	0	6	385
06:15 PM	13	176	0	0	189	0	0	0	0	0	0	131	0	0	131	1	0	5	1	7	327
06:30 PM	15	206	0	0	221	0	0	0	0	0	0	151	0	0	151	1	0	5	0	6	378
06:45 PM	16	159	0	0	175	0	0	0	0	0	0	108	0	0	108	0	0	7	0	7	290
Total	61	760	0	0	821	0	0	0	0	0	0	532	1	0	533	2	0	23	1	26	1380
Grand Total	164	2695	2	0	2861	0	0	1	1	2	0	1896	12	0	1908	21	0	106	2	129	4900
Apprch %	5.7	94.2	0.1	0		0	0	50	50		0	99.4	0.6	0		16.3	0	82.2	1.6		
Total %	3.3	55	0	0	58.4	0	0	0	0	0	0	38.7	0.2	0	38.9	0.4	0	2.2	0	2.6	

	Rt 1 Southbound				Central Transport Westbound				Rt 1 Northbound				Lad Land Dr Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	16	243	0	259	0	0	0	0	0	163	1	164	**3**	0	15	18	441
05:15 PM	8	230	0	238	0	0	0	0	0	**203**	**2**	**205**	2	0	**17**	**19**	462
05:30 PM	14	240	0	254	0	0	0	0	0	161	1	162	2	0	5	7	423
05:45 PM	**18**	**263**	0	**281**	0	0	0	0	0	179	2	181	3	0	8	11	**473**
Total Volume	56	976	0	1032	0	0	0	0	0	706	6	712	10	0	45	55	1799
% App. Total	5.4	94.6	0		0	0	0		0	99.2	0.8		18.2	0	81.8		
PHF	.778	.928	.000	.918	.000	.000	.000	.000	.000	.869	.750	.868	.833	.000	.662	.724	.951

Peggy Malone & Associates

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Groups Printed- Truck

	Rt 1 Southbound					Central Transport Westbound					Rt 1 Northbound					Lad Land Dr Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	0	11	1	0	12	0	0	0	0	0	0	8	0	0	8	0	0	1	0	1	21
04:15 PM	0	14	0	0	14	0	0	0	0	0	0	8	1	0	9	1	0	1	0	2	25
04:30 PM	1	8	0	0	9	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	12
04:45 PM	1	13	1	0	15	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	20
Total	2	46	2	0	50	0	0	0	0	0	0	24	1	0	25	1	0	2	0	3	78
05:00 PM	0	14	0	0	14	0	0	0	0	0	0	3	0	0	3	1	0	0	0	1	18
05:15 PM	0	14	0	0	14	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	18
05:30 PM	1	6	1	0	8	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	12
05:45 PM	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2
Total	1	35	1	0	37	0	0	0	0	0	0	12	0	0	12	1	0	0	0	1	50
06:00 PM	0	2	1	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
06:15 PM	0	2	1	0	3	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	5
06:30 PM	0	2	0	0	2	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	3
06:45 PM	0	3	0	0	3	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	6
Total	0	9	2	0	11	0	0	0	0	0	0	6	0	0	6	0	0	0	0	0	17
Grand Total	3	90	5	0	98	0	0	0	0	0	0	42	1	0	43	2	0	2	0	4	145
Apprch %	3.1	91.8	5.1	0		0	0	0	0		0	97.7	2.3	0		50	0	50	0		
Total %	2.1	62.1	3.4	0	67.6	0	0	0	0	0	0	29	0.7	0	29.7	1.4	0	1.4	0	2.8	

	Rt 1 Southbound				Central Transport Westbound				Rt 1 Northbound				Lad Land Dr Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. 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	11	**1**	12	0	0	0	0	0	**8**	0	8	0	0	**1**	1	21
04:15 PM	0	**14**	0	14	0	0	0	0	0	8	**1**	**9**	**1**	0	1	**2**	**25**
04:30 PM	**1**	8	0	9	0	0	0	0	0	3	0	3	0	0	0	0	12
04:45 PM	1	13	1	**15**	0	0	0	0	0	5	0	5	0	0	0	0	20
Total Volume	2	46	2	50	0	0	0	0	0	24	1	25	1	0	2	3	78
% App. Total	4	92	4		0	0	0		0	96	4		33.3	0	66.7		
PHF	.500	.821	.500	.833	.000	.000	.000	.000	.000	.750	.250	.694	.250	.000	.500	.375	.780

Peggy Malone & Associates

904-992-8072

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Groups Printed- Combined

	Rt 1 Southbound					Central Transport Westbound					Rt 1 Northbound					Lad Land Dr Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	9	264	2	0	275	0	0	0	1	1	0	185	1	0	186	1	0	14	1	16	478
04:15 PM	10	252	0	0	262	0	0	1	0	1	0	158	4	0	162	3	0	10	0	13	438
04:30 PM	18	233	0	0	251	0	0	0	0	0	0	175	1	0	176	3	0	7	0	10	437
04:45 PM	12	256	2	0	270	0	0	0	0	0	0	164	0	0	164	3	0	9	0	12	446
Total	49	1005	4	0	1058	0	0	1	1	2	0	682	6	0	688	10	0	40	1	51	1799
05:00 PM	16	257	0	0	273	0	0	0	0	0	0	166	1	0	167	4	0	15	0	19	459
05:15 PM	8	244	0	0	252	0	0	0	0	0	0	207	2	0	209	2	0	17	0	19	480
05:30 PM	15	246	1	0	262	0	0	0	0	0	0	165	1	0	166	2	0	5	0	7	435
05:45 PM	18	264	0	0	282	0	0	0	0	0	0	180	2	0	182	3	0	8	0	11	475
Total	57	1011	1	0	1069	0	0	0	0	0	0	718	6	0	724	11	0	45	0	56	1849
06:00 PM	17	221	1	0	239	0	0	0	0	0	0	142	1	0	143	0	0	6	0	6	388
06:15 PM	13	178	1	0	192	0	0	0	0	0	0	133	0	0	133	1	0	5	1	7	332
06:30 PM	15	208	0	0	223	0	0	0	0	0	0	152	0	0	152	1	0	5	0	6	381
06:45 PM	16	162	0	0	178	0	0	0	0	0	0	111	0	0	111	0	0	7	0	7	296
Total	61	769	2	0	832	0	0	0	0	0	0	538	1	0	539	2	0	23	1	26	1397
Grand Total	167	2785	7	0	2959	0	0	1	1	2	0	1938	13	0	1951	23	0	108	2	133	5045
Apprch %	5.6	94.1	0.2	0		0	0	50	50		0	99.3	0.7	0		17.3	0	81.2	1.5		
Total %	3.3	55.2	0.1	0	58.7	0	0	0	0	0	0	38.4	0.3	0	38.7	0.5	0	2.1	0	2.6	

	Rt 1 Southbound				Central Transport Westbound				Rt 1 Northbound				Lad Land Dr Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	16	257	0	273	0	0	0	0	0	166	1	167	**4**	0	15	**19**	459
05:15 PM	8	244	0	252	0	0	0	0	0	**207**	**2**	**209**	2	0	**17**	19	**480**
05:30 PM	15	246	**1**	262	0	0	0	0	0	165	1	166	2	0	5	7	435
05:45 PM	**18**	**264**	0	**282**	0	0	0	0	0	180	2	182	3	0	8	11	475
Total Volume	57	1011	1	1069	0	0	0	0	0	718	6	724	11	0	45	56	1849
% App. Total	5.3	94.6	0.1		0	0	0		0	99.2	0.8		19.6	0	80.4		
PHF	.792	.957	.250	.948	.000	.000	.000	.000	.000	.867	.750	.866	.688	.000	.662	.737	.963

Peggy Malone & Associates

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Groups Printed- Car

	Rt 1 Southbound					Massaponax Church Rd Westbound					Rt 1 Northbound					Massaponax Church Rd Eastbound					
Start Time	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Int. Total**
06:00 AM	3	15	13	0	31	28	14	12	0	54	12	40	12	0	64	26	13	24	0	63	212
06:15 AM	4	24	12	0	40	23	12	20	0	55	20	70	11	0	101	30	14	21	0	65	261
06:30 AM	8	28	12	0	48	34	7	20	0	61	14	78	24	0	116	27	13	17	0	57	282
06:45 AM	6	54	13	0	73	39	11	21	0	71	14	69	30	0	113	36	14	30	0	80	337
Total	21	121	50	0	192	124	44	73	0	241	60	257	77	0	394	119	54	92	0	265	1092
07:00 AM	12	88	13	0	113	22	19	54	0	95	27	73	23	0	123	75	18	23	0	116	447
07:15 AM	12	175	19	0	206	28	18	51	0	97	28	117	26	0	171	74	23	30	0	127	601
07:30 AM	10	74	18	0	102	43	21	44	0	108	45	128	41	0	214	46	21	23	0	90	514
07:45 AM	11	53	25	0	89	28	22	26	0	76	39	81	41	0	161	36	35	19	0	90	416
Total	45	390	75	0	510	121	80	175	0	376	139	399	131	0	669	231	97	95	0	423	1978
08:00 AM	11	51	17	0	79	33	15	13	0	61	24	75	26	0	125	31	15	19	0	65	330
08:15 AM	12	52	12	0	76	38	21	24	0	83	16	95	23	0	134	29	17	17	0	63	356
08:30 AM	12	54	13	0	79	44	15	20	0	79	28	132	23	0	183	29	23	29	0	81	422
08:45 AM	11	51	21	0	83	28	18	31	0	77	28	124	27	0	179	35	17	26	0	78	417
Total	46	208	63	0	317	143	69	88	0	300	96	426	99	0	621	124	72	91	0	287	1525
Grand Total	112	719	188	0	1019	388	193	336	0	917	295	1082	307	0	1684	474	223	278	0	975	4595
Apprch %	11	70.6	18.4	0		42.3	21	36.6	0		17.5	64.3	18.2	0		48.6	22.9	28.5	0		
Total %	2.4	15.6	4.1	0	22.2	8.4	4.2	7.3	0	20	6.4	23.5	6.7	0	36.6	10.3	4.9	6.1	0	21.2	

	Rt 1 Southbound				Massaponax Church Rd Westbound				Rt 1 Northbound				Massaponax Church Rd Eastbound				
Start Time	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Int. Total**
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	**12**	88	13	113	22	19	**54**	95	27	73	23	123	**75**	18	23	116	447
07:15 AM	12	**175**	19	**206**	28	18	51	97	28	117	26	171	74	23	**30**	**127**	**601**
07:30 AM	10	74	18	102	**43**	21	44	**108**	**45**	**128**	**41**	**214**	46	21	23	90	514
07:45 AM	11	53	**25**	89	28	**22**	26	76	39	81	41	161	36	**35**	19	90	416
Total Volume	45	390	75	510	121	80	175	376	139	399	131	669	231	97	95	423	1978
% App. Total	8.8	76.5	14.7		32.2	21.3	46.5		20.8	59.6	19.6		54.6	22.9	22.5		
PHF	.938	.557	.750	.619	.703	.909	.810	.870	.772	.779	.799	.782	.770	.693	.792	.833	.823

Peggy Malone & Associates

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Groups Printed- Truck

	Rt 1 Southbound					Massaponax Church Rd Westbound					Rt 1 Northbound					Massaponax Church Rd Eastbound					
Start Time	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Int. Total**
06:00 AM	1	5	2	0	8	0	5	1	0	6	3	6	4	0	13	0	0	0	0	0	27
06:15 AM	0	1	1	0	2	2	1	1	0	4	6	8	7	0	21	1	0	2	0	3	30
06:30 AM	0	2	0	0	2	6	1	0	0	7	5	7	17	0	29	0	3	1	0	4	42
06:45 AM	1	4	0	0	5	5	2	3	0	10	3	5	7	0	15	3	3	4	0	10	40
Total	2	12	3	0	17	13	9	5	0	27	17	26	35	0	78	4	6	7	0	17	139
07:00 AM	0	16	2	0	18	7	2	14	0	23	8	7	2	0	17	10	2	2	0	14	72
07:15 AM	1	9	6	0	16	5	7	11	0	23	10	16	9	0	35	10	2	1	0	13	87
07:30 AM	1	9	3	0	13	7	2	3	0	12	3	4	7	0	14	2	4	1	0	7	46
07:45 AM	4	3	3	0	10	3	2	1	0	6	12	8	11	0	31	6	5	2	0	13	60
Total	6	37	14	0	57	22	13	29	0	64	33	35	29	0	97	28	13	6	0	47	265
08:00 AM	1	3	1	0	5	4	2	3	0	9	3	4	1	0	8	2	4	4	0	10	32
08:15 AM	4	10	6	0	20	3	2	6	0	11	0	8	3	0	11	3	2	3	0	8	50
08:30 AM	2	12	3	0	17	7	0	14	0	21	5	12	3	0	20	17	2	1	0	20	78
08:45 AM	2	4	9	0	15	5	3	6	0	14	0	9	3	0	12	12	5	1	0	18	59
Total	9	29	19	0	57	19	7	29	0	55	8	33	10	0	51	34	13	9	0	56	219
Grand Total	17	78	36	0	131	54	29	63	0	146	58	94	74	0	226	66	32	22	0	120	623
Apprch %	13	59.5	27.5	0		37	19.9	43.2	0		25.7	41.6	32.7	0		55	26.7	18.3	0		
Total %	2.7	12.5	5.8	0	21	8.7	4.7	10.1	0	23.4	9.3	15.1	11.9	0	36.3	10.6	5.1	3.5	0	19.3	

	Rt 1 Southbound				Massaponax Church Rd Westbound				Rt 1 Northbound				Massaponax Church Rd Eastbound				
Start Time	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Int. Total**
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	**16**	2	**18**	**7**	2	**14**	**23**	8	7	2	17	**10**	2	**2**	**14**	72
07:15 AM	1	9	**6**	16	5	**7**	11	23	10	**16**	9	**35**	10	2	1	13	**87**
07:30 AM	1	9	3	13	7	2	3	12	3	4	7	14	2	4	1	7	46
07:45 AM	**4**	3	3	10	3	2	1	6	**12**	8	**11**	31	6	**5**	2	13	60
Total Volume	6	37	14	57	22	13	29	64	33	35	29	97	28	13	6	47	265
% App. Total	10.5	64.9	24.6		34.4	20.3	45.3		34	36.1	29.9		59.6	27.7	12.8		
PHF	.375	.578	.583	.792	.786	.464	.518	.696	.688	.547	.659	.693	.700	.650	.750	.839	.761

Peggy Malone & Associates

904-992-8072

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Groups Printed- Combined

	Rt 1 Southbound					Massaponax Church Rd Westbound					Rt 1 Northbound					Massaponax Church Rd Eastbound					
Start Time	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Int. Total**
06:00 AM	4	20	15	0	39	28	19	13	0	60	15	46	16	0	77	26	13	24	0	63	239
06:15 AM	4	25	13	0	42	25	13	21	0	59	26	78	18	0	122	31	14	23	0	68	291
06:30 AM	8	30	12	0	50	40	8	20	0	68	19	85	41	0	145	27	16	18	0	61	324
06:45 AM	7	58	13	0	78	44	13	24	0	81	17	74	37	0	128	39	17	34	0	90	377
Total	23	133	53	0	209	137	53	78	0	268	77	283	112	0	472	123	60	99	0	282	1231
07:00 AM	12	104	15	0	131	29	21	68	0	118	35	80	25	0	140	85	20	25	0	130	519
07:15 AM	13	184	25	0	222	33	25	62	0	120	38	133	35	0	206	84	25	31	0	140	688
07:30 AM	11	83	21	0	115	50	23	47	0	120	48	132	48	0	228	48	25	24	0	97	560
07:45 AM	15	56	28	0	99	31	24	27	0	82	51	89	52	0	192	42	40	21	0	103	476
Total	51	427	89	0	567	143	93	204	0	440	172	434	160	0	766	259	110	101	0	470	2243
08:00 AM	12	54	18	0	84	37	17	16	0	70	27	79	27	0	133	33	19	23	0	75	362
08:15 AM	16	62	18	0	96	41	23	30	0	94	16	103	26	0	145	32	19	20	0	71	406
08:30 AM	14	66	16	0	96	51	15	34	0	100	33	144	26	0	203	46	25	30	0	101	500
08:45 AM	13	55	30	0	98	33	21	37	0	91	28	133	30	0	191	47	22	27	0	96	476
Total	55	237	82	0	374	162	76	117	0	355	104	459	109	0	672	158	85	100	0	343	1744
Grand Total	129	797	224	0	1150	442	222	399	0	1063	353	1176	381	0	1910	540	255	300	0	1095	5218
Apprch %	11.2	69.3	19.5	0		41.6	20.9	37.5	0		18.5	61.6	19.9	0		49.3	23.3	27.4	0		
Total %	2.5	15.3	4.3	0	22	8.5	4.3	7.6	0	20.4	6.8	22.5	7.3	0	36.6	10.3	4.9	5.7	0	21	

	Rt 1 Southbound				Massaponax Church Rd Westbound				Rt 1 Northbound				Massaponax Church Rd Eastbound				
Start Time	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Int. Total**
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	12	104	15	131	29	21	**68**	118	35	80	25	140	**85**	20	25	130	519
07:15 AM	13	**184**	25	**222**	33	**25**	62	**120**	38	**133**	35	206	84	25	**31**	**140**	**688**
07:30 AM	11	83	21	115	**50**	23	47	120	48	132	48	**228**	48	25	24	97	560
07:45 AM	**15**	56	**28**	99	31	24	27	82	**51**	89	**52**	192	42	**40**	21	103	476
Total Volume	51	427	89	567	143	93	204	440	172	434	160	766	259	110	101	470	2243
% App. Total	9	75.3	15.7		32.5	21.1	46.4		22.5	56.7	20.9		55.1	23.4	21.5		
PHF	.850	.580	.795	.639	.715	.930	.750	.917	.843	.816	.769	.840	.762	.688	.815	.839	.815

Peggy Malone & Associates

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Groups Printed- Car

	Rt 1 Southbound					Massaponax Church Rd Westbound					Rt 1 Northbound					Massaponax Church Rd Eastbound					
Start Time	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Int. Total**
04:00 PM	27	165	57	0	249	36	27	37	0	100	36	102	40	0	178	85	24	16	0	125	652
04:15 PM	41	159	48	0	248	29	22	50	0	101	30	98	48	0	176	47	21	24	0	92	617
04:30 PM	30	146	42	0	218	26	28	29	0	83	34	93	35	0	162	62	24	29	0	115	578
04:45 PM	36	146	58	0	240	26	31	36	0	93	35	118	51	0	204	48	24	19	0	91	628
Total	134	616	205	0	955	117	108	152	0	377	135	411	174	0	720	242	93	88	0	423	2475
05:00 PM	41	132	64	0	237	37	39	43	0	119	29	107	54	0	190	29	28	21	0	78	624
05:15 PM	31	139	51	0	221	32	45	57	0	134	37	124	51	0	212	43	29	18	0	90	657
05:30 PM	36	138	57	0	231	25	46	47	0	118	30	105	52	0	187	46	25	18	0	89	625
05:45 PM	39	151	50	0	240	34	24	58	0	116	29	115	53	0	197	38	26	32	0	96	649
Total	147	560	222	0	929	128	154	205	0	487	125	451	210	0	786	156	108	89	0	353	2555
06:00 PM	32	141	56	0	229	33	37	78	0	148	23	78	53	0	154	35	15	21	0	71	602
06:15 PM	24	106	49	0	179	20	18	43	0	81	27	85	43	0	155	30	24	16	0	70	485
06:30 PM	29	132	48	0	209	21	20	49	0	90	15	113	46	0	174	33	14	19	0	66	539
06:45 PM	25	97	41	0	163	21	16	37	0	74	13	68	38	0	119	21	13	8	0	42	398
Total	110	476	194	0	780	95	91	207	0	393	78	344	180	0	602	119	66	64	0	249	2024
Grand Total	391	1652	621	0	2664	340	353	564	0	1257	338	1206	564	0	2108	517	267	241	0	1025	7054
Apprch %	14.7	62	23.3	0		27	28.1	44.9	0		16	57.2	26.8	0		50.4	26	23.5	0		
Total %	5.5	23.4	8.8	0	37.8	4.8	5	8	0	17.8	4.8	17.1	8	0	29.9	7.3	3.8	3.4	0	14.5	

	Rt 1 Southbound				Massaponax Church Rd Westbound				Rt 1 Northbound				Massaponax Church Rd Eastbound				
Start Time	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Int. Total**
Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	**41**	132	**64**	237	**37**	39	43	119	29	107	**54**	190	29	28	21	78	624
05:15 PM	31	139	51	221	32	45	57	**134**	**37**	**124**	51	**212**	43	**29**	18	90	**657**
05:30 PM	36	138	57	231	25	**46**	47	118	30	105	52	187	**46**	25	18	89	625
05:45 PM	39	**151**	50	**240**	34	24	**58**	116	29	115	53	197	38	26	**32**	**96**	649
Total Volume	147	560	222	929	128	154	205	487	125	451	210	786	156	108	89	353	2555
% App. Total	15.8	60.3	23.9		26.3	31.6	42.1		15.9	57.4	26.7		44.2	30.6	25.2		
PHF	.896	.927	.867	.968	.865	.837	.884	.909	.845	.909	.972	.927	.848	.931	.695	.919	.972

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Groups Printed- Truck

	Rt 1 Southbound					Massaponax Church Rd Westbound					Rt 1 Northbound					Massaponax Church Rd Eastbound					
Start Time	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Int. Total**
04:00 PM	1	5	2	0	8	5	1	6	0	12	0	3	1	0	4	14	3	1	0	18	42
04:15 PM	1	8	2	0	11	0	1	7	0	8	2	4	1	0	7	10	1	1	0	12	38
04:30 PM	2	3	0	0	5	1	0	4	0	5	7	1	0	0	8	2	3	0	0	5	23
04:45 PM	1	6	4	0	11	2	2	2	0	6	0	1	1	0	2	3	3	0	0	6	25
Total	5	22	8	0	35	8	4	19	0	31	9	9	3	0	21	29	10	2	0	41	128
05:00 PM	1	8	6	0	15	1	2	0	0	3	1	3	2	0	6	3	1	0	0	4	28
05:15 PM	2	6	3	0	11	0	1	1	0	2	3	4	2	0	9	0	0	0	0	0	22
05:30 PM	1	2	4	0	7	0	1	0	0	1	2	4	1	0	7	0	2	0	0	2	17
05:45 PM	1	0	2	0	3	1	1	3	0	5	0	0	1	0	1	1	0	0	0	1	10
Total	5	16	15	0	36	2	5	4	0	11	6	11	6	0	23	4	3	0	0	7	77
06:00 PM	0	3	0	0	3	0	0	0	0	0	1	0	1	0	2	0	1	0	0	1	6
06:15 PM	0	1	0	0	1	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	3
06:30 PM	0	4	1	0	5	0	0	1	0	1	1	2	1	0	4	1	0	0	0	1	11
06:45 PM	2	3	0	0	5	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	6
Total	2	11	1	0	14	0	0	1	0	1	2	4	2	0	8	2	1	0	0	3	26
Grand Total	12	49	24	0	85	10	9	24	0	43	17	24	11	0	52	35	14	2	0	51	231
Apprch %	14.1	57.6	28.2	0		23.3	20.9	55.8	0		32.7	46.2	21.2	0		68.6	27.5	3.9	0		
Total %	5.2	21.2	10.4	0	36.8	4.3	3.9	10.4	0	18.6	7.4	10.4	4.8	0	22.5	15.2	6.1	0.9	0	22.1	

	Rt 1 Southbound				Massaponax Church Rd Westbound				Rt 1 Northbound				Massaponax Church Rd Eastbound				
Start Time	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Int. 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	1	5	2	8	**5**	1	6	**12**	0	3	**1**	4	**14**	**3**	**1**	**18**	**42**
04:15 PM	1	**8**	2	**11**	0	1	**7**	8	2	**4**	1	7	10	1	1	12	38
04:30 PM	**2**	3	0	5	1	0	4	5	**7**	1	0	**8**	2	3	0	5	23
04:45 PM	1	6	**4**	11	2	**2**	2	6	0	1	1	2	3	3	0	6	25
Total Volume	5	22	8	35	8	4	19	31	9	9	3	21	29	10	2	41	128
% App. Total	14.3	62.9	22.9		25.8	12.9	61.3		42.9	42.9	14.3		70.7	24.4	4.9		
PHF	.625	.688	.500	.795	.400	.500	.679	.646	.321	.563	.750	.656	.518	.833	.500	.569	.762

Peggy Malone & Associates

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File Name : 3-Route 1 and Route 608 PM
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Groups Printed- Combined

	Rt 1 Southbound					Massaponax Church Rd Westbound					Rt 1 Northbound					Massaponax Church Rd Eastbound					
Start Time	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Int. Total**
04:00 PM	28	170	59	0	257	41	28	43	0	112	36	105	41	0	182	99	27	17	0	143	694
04:15 PM	42	167	50	0	259	29	23	57	0	109	32	102	49	0	183	57	22	25	0	104	655
04:30 PM	32	149	42	0	223	27	28	33	0	88	41	94	35	0	170	64	27	29	0	120	601
04:45 PM	37	152	62	0	251	28	33	38	0	99	35	119	52	0	206	51	27	19	0	97	653
Total	139	638	213	0	990	125	112	171	0	408	144	420	177	0	741	271	103	90	0	464	2603
05:00 PM	42	140	70	0	252	38	41	43	0	122	30	110	56	0	196	32	29	21	0	82	652
05:15 PM	33	145	54	0	232	32	46	58	0	136	40	128	53	0	221	43	29	18	0	90	679
05:30 PM	37	140	61	0	238	25	47	47	0	119	32	109	53	0	194	46	27	18	0	91	642
05:45 PM	40	151	52	0	243	35	25	61	0	121	29	115	54	0	198	39	26	32	0	97	659
Total	152	576	237	0	965	130	159	209	0	498	131	462	216	0	809	160	111	89	0	360	2632
06:00 PM	32	144	56	0	232	33	37	78	0	148	24	78	54	0	156	35	16	21	0	72	608
06:15 PM	24	107	49	0	180	20	18	43	0	81	27	87	43	0	157	30	24	16	0	70	488
06:30 PM	29	136	49	0	214	21	20	50	0	91	16	115	47	0	178	34	14	19	0	67	550
06:45 PM	27	100	41	0	168	21	16	37	0	74	13	68	38	0	119	22	13	8	0	43	404
Total	112	487	195	0	794	95	91	208	0	394	80	348	182	0	610	121	67	64	0	252	2050
Grand Total	403	1701	645	0	2749	350	362	588	0	1300	355	1230	575	0	2160	552	281	243	0	1076	7285
Apprch %	14.7	61.9	23.5	0		26.9	27.8	45.2	0		16.4	56.9	26.6	0		51.3	26.1	22.6	0		
Total %	5.5	23.3	8.9	0	37.7	4.8	5	8.1	0	17.8	4.9	16.9	7.9	0	29.6	7.6	3.9	3.3	0	14.8	

	Rt 1 Southbound				Massaponax Church Rd Westbound				Rt 1 Northbound				Massaponax Church Rd Eastbound				
Start Time	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Int. Total**
Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	**42**	140	**70**	**252**	**38**	41	43	122	30	110	**56**	196	32	**29**	21	82	652
05:15 PM	33	145	54	232	32	46	58	**136**	**40**	**128**	53	**221**	43	29	18	90	**679**
05:30 PM	37	140	61	238	25	**47**	47	119	32	109	53	194	**46**	27	18	91	642
05:45 PM	40	**151**	52	243	35	25	**61**	121	29	115	54	198	39	26	**32**	**97**	659
Total Volume	152	576	237	965	130	159	209	498	131	462	216	809	160	111	89	360	2632
% App. Total	15.8	59.7	24.6		26.1	31.9	42		16.2	57.1	26.7		44.4	30.8	24.7		
PHF	.905	.954	.846	.957	.855	.846	.857	.915	.819	.902	.964	.915	.870	.957	.695	.928	.969

Peggy Malone & Associates

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File Name : 4-Route 1 and Route 607 AM
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Groups Printed- Car

	Rt 1 Southbound					Rt 607 Westbound					Rt 1 Northbound					Driveway Eastbound					
Start Time	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Int. Total**
06:00 AM	0	53	4	0	57	11	0	0	0	11	2	67	0	0	69	0	0	0	0	0	137
06:15 AM	0	56	11	0	67	14	0	0	0	14	0	82	0	0	82	0	0	0	0	0	163
06:30 AM	0	65	9	0	74	13	0	1	0	14	2	98	0	0	100	0	0	0	0	0	188
06:45 AM	0	84	30	0	114	13	0	5	0	18	13	120	0	0	133	0	0	0	0	0	265
Total	0	258	54	0	312	51	0	6	0	57	17	367	0	0	384	0	0	0	0	0	753
07:00 AM	0	133	77	0	210	26	0	5	0	31	10	90	0	0	100	0	0	0	0	0	341
07:15 AM	0	170	114	0	284	91	0	9	0	100	8	114	0	0	122	0	0	0	0	0	506
07:30 AM	0	139	33	0	172	66	0	13	0	79	5	153	0	0	158	0	0	0	0	0	409
07:45 AM	0	118	15	0	133	26	0	7	0	33	9	129	0	0	138	0	0	0	0	0	304
Total	0	560	239	0	799	209	0	34	0	243	32	486	0	0	518	0	0	0	0	0	1560
08:00 AM	0	73	9	0	82	16	0	1	0	17	2	107	0	0	109	0	0	0	0	0	208
08:15 AM	0	93	11	0	104	20	0	2	0	22	1	108	0	0	109	0	0	0	0	0	235
08:30 AM	0	86	14	0	100	22	0	1	0	23	3	168	0	0	171	0	0	0	0	0	294
08:45 AM	1	109	11	0	121	24	0	2	0	26	5	140	0	0	145	0	0	0	0	0	292
Total	1	361	45	0	407	82	0	6	0	88	11	523	0	0	534	0	0	0	0	0	1029
Grand Total	1	1179	338	0	1518	342	0	46	0	388	60	1376	0	0	1436	0	0	0	0	0	3342
Apprch %	0.1	77.7	22.3	0		88.1	0	11.9	0		4.2	95.8	0	0		0	0	0	0		
Total %	0	35.3	10.1	0	45.4	10.2	0	1.4	0	11.6	1.8	41.2	0	0	43	0	0	0	0	0	

	Rt 1 Southbound				Rt 607 Westbound				Rt 1 Northbound				Driveway Eastbound				
Start Time	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Int. Total**
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	133	77	210	26	0	5	31	**10**	90	0	100	0	0	0	0	341
07:15 AM	0	**170**	**114**	**284**	**91**	0	9	**100**	8	114	0	122	0	0	0	0	**506**
07:30 AM	0	139	33	172	66	0	**13**	79	5	**153**	0	**158**	0	0	0	0	409
07:45 AM	0	118	15	133	26	0	7	33	9	129	0	138	0	0	0	0	304
Total Volume	0	560	239	799	209	0	34	243	32	486	0	518	0	0	0	0	1560
% App. Total	0	70.1	29.9		86	0	14		6.2	93.8	0		0	0	0		
PHF	.000	.824	.524	.703	.574	.000	.654	.608	.800	.794	.000	.820	.000	.000	.000	.000	.771

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Groups Printed- Truck

	Rt 1 Southbound					Rt 607 Westbound					Rt 1 Northbound					Driveway Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
06:00 AM	0	7	0	0	7	0	0	0	0	0	1	16	0	0	17	0	0	0	0	0	24
06:15 AM	0	4	0	0	4	0	0	0	0	0	1	20	0	0	21	0	0	0	0	0	25
06:30 AM	0	2	0	0	2	0	0	0	0	0	0	27	0	0	27	0	0	0	0	0	29
06:45 AM	0	11	0	0	11	0	0	0	0	0	1	15	0	0	16	0	0	0	0	0	27
Total	0	24	0	0	24	0	0	0	0	0	3	78	0	0	81	0	0	0	0	0	105
07:00 AM	0	38	0	0	38	0	0	2	0	2	0	18	0	0	18	0	0	0	0	0	58
07:15 AM	0	32	1	0	33	0	0	1	0	1	0	31	0	0	31	0	0	0	0	0	65
07:30 AM	0	15	0	0	15	1	0	0	0	1	0	13	0	0	13	0	0	0	0	0	29
07:45 AM	0	9	1	0	10	0	0	0	0	0	0	32	0	0	32	0	0	0	0	0	42
Total	0	94	2	0	96	1	0	3	0	4	0	94	0	0	94	0	0	0	0	0	194
08:00 AM	0	6	1	0	7	1	0	1	0	2	0	7	0	0	7	0	0	0	0	0	16
08:15 AM	0	17	0	0	17	1	0	1	0	2	0	12	0	0	12	0	0	0	0	0	31
08:30 AM	0	43	0	0	43	0	0	1	0	1	0	24	0	0	24	0	0	0	0	0	68
08:45 AM	0	24	0	0	24	0	0	0	0	0	0	9	0	0	9	0	0	0	0	0	33
Total	0	90	1	0	91	2	0	3	0	5	0	52	0	0	52	0	0	0	0	0	148
Grand Total	0	208	3	0	211	3	0	6	0	9	3	224	0	0	227	0	0	0	0	0	447
Apprch %	0	98.6	1.4	0		33.3	0	66.7	0		1.3	98.7	0	0		0	0	0	0		
Total %	0	46.5	0.7	0	47.2	0.7	0	1.3	0	2	0.7	50.1	0	0	50.8	0	0	0	0	0	

	Rt 1 Southbound				Rt 607 Westbound				Rt 1 Northbound				Driveway Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	**38**	0	**38**	0	0	**2**	**2**	0	18	0	18	0	0	0	0	58
07:15 AM	0	32	**1**	33	0	0	1	1	0	31	0	31	0	0	0	0	**65**
07:30 AM	0	15	0	15	**1**	0	0	1	0	13	0	13	0	0	0	0	29
07:45 AM	0	9	1	10	0	0	0	0	0	**32**	0	**32**	0	0	0	0	42
Total Volume	0	94	2	96	1	0	3	4	0	94	0	94	0	0	0	0	194
% App. Total	0	97.9	2.1		25	0	75		0	100	0		0	0	0		
PHF	.000	.618	.500	.632	.250	.000	.375	.500	.000	.734	.000	.734	.000	.000	.000	.000	.746

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	Rt 1 Southbound					Rt 607 Westbound					Rt 1 Northbound					Driveway Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
06:00 AM	0	60	4	0	64	11	0	0	0	11	3	83	0	0	86	0	0	0	0	0	161
06:15 AM	0	60	11	0	71	14	0	0	0	14	1	102	0	0	103	0	0	0	0	0	188
06:30 AM	0	67	9	0	76	13	0	1	0	14	2	125	0	0	127	0	0	0	0	0	217
06:45 AM	0	95	30	0	125	13	0	5	0	18	14	135	0	0	149	0	0	0	0	0	292
Total	0	282	54	0	336	51	0	6	0	57	20	445	0	0	465	0	0	0	0	0	858
07:00 AM	0	171	77	0	248	26	0	7	0	33	10	108	0	0	118	0	0	0	0	0	399
07:15 AM	0	202	115	0	317	91	0	10	0	101	8	145	0	0	153	0	0	0	0	0	571
07:30 AM	0	154	33	0	187	67	0	13	0	80	5	166	0	0	171	0	0	0	0	0	438
07:45 AM	0	127	16	0	143	26	0	7	0	33	9	161	0	0	170	0	0	0	0	0	346
Total	0	654	241	0	895	210	0	37	0	247	32	580	0	0	612	0	0	0	0	0	1754
08:00 AM	0	79	10	0	89	17	0	2	0	19	2	114	0	0	116	0	0	0	0	0	224
08:15 AM	0	110	11	0	121	21	0	3	0	24	1	120	0	0	121	0	0	0	0	0	266
08:30 AM	0	129	14	0	143	22	0	2	0	24	3	192	0	0	195	0	0	0	0	0	362
08:45 AM	1	133	11	0	145	24	0	2	0	26	5	149	0	0	154	0	0	0	0	0	325
Total	1	451	46	0	498	84	0	9	0	93	11	575	0	0	586	0	0	0	0	0	1177
Grand Total	1	1387	341	0	1729	345	0	52	0	397	63	1600	0	0	1663	0	0	0	0	0	3789
Apprch %	0.1	80.2	19.7	0		86.9	0	13.1	0		3.8	96.2	0	0		0	0	0	0		
Total %	0	36.6	9	0	45.6	9.1	0	1.4	0	10.5	1.7	42.2	0	0	43.9	0	0	0	0	0	

	Rt 1 Southbound				Rt 607 Westbound				Rt 1 Northbound				Driveway Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	171	77	248	26	0	7	33	**10**	108	0	118	0	0	0	0	399
07:15 AM	0	**202**	**115**	**317**	**91**	0	10	**101**	8	145	0	153	0	0	0	0	**571**
07:30 AM	0	154	33	187	67	0	**13**	80	5	**166**	0	**171**	0	0	0	0	438
07:45 AM	0	127	16	143	26	0	7	33	9	161	0	170	0	0	0	0	346
Total Volume	0	654	241	895	210	0	37	247	32	580	0	612	0	0	0	0	1754
% App. Total	0	73.1	26.9		85	0	15		5.2	94.8	0		0	0	0		
PHF	.000	.809	.524	.706	.577	.000	.712	.611	.800	.873	.000	.895	.000	.000	.000	.000	.768

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	Rt 1 Southbound					Rt 607 Westbound					Rt 1 Northbound					Driveway Eastbound					
Start Time	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Int. Total**
04:00 PM	0	226	30	0	256	49	0	19	0	68	10	149	0	0	159	0	0	0	1	1	484
04:15 PM	0	226	40	0	266	29	0	20	0	49	8	147	0	0	155	0	0	0	0	0	470
04:30 PM	0	235	31	0	266	32	0	9	0	41	6	157	0	0	163	0	0	0	0	0	470
04:45 PM	0	199	36	0	235	17	0	6	0	23	6	167	0	0	173	0	0	0	0	0	431
Total	0	886	137	0	1023	127	0	54	0	181	30	620	0	0	650	0	0	0	1	1	1855
05:00 PM	1	180	33	0	214	17	0	1	0	18	7	175	0	0	182	1	0	0	0	1	415
05:15 PM	0	207	41	0	248	35	0	10	0	45	9	182	0	0	191	0	0	0	0	0	484
05:30 PM	0	195	51	0	246	39	0	8	0	47	12	149	0	0	161	0	0	0	0	0	454
05:45 PM	0	213	41	0	254	22	1	9	0	32	18	175	0	0	193	0	0	0	0	0	479
Total	1	795	166	0	962	113	1	28	0	142	46	681	0	0	727	1	0	0	0	1	1832
06:00 PM	0	229	27	0	256	18	0	8	0	26	22	133	0	0	155	0	1	0	0	1	438
06:15 PM	0	162	36	0	198	17	0	3	0	20	8	147	0	0	155	0	0	0	0	0	373
06:30 PM	0	152	54	0	206	14	0	3	0	17	9	137	0	0	146	0	4	0	0	4	373
06:45 PM	0	139	40	0	179	30	0	3	0	33	6	100	0	0	106	0	0	0	0	0	318
Total	0	682	157	0	839	79	0	17	0	96	45	517	0	0	562	0	5	0	0	5	1502
Grand Total	1	2363	460	0	2824	319	1	99	0	419	121	1818	0	0	1939	1	5	0	1	7	5189
Apprch %	0	83.7	16.3	0		76.1	0.2	23.6	0		6.2	93.8	0	0		14.3	71.4	0	14.3		
Total %	0	45.5	8.9	0	54.4	6.1	0	1.9	0	8.1	2.3	35	0	0	37.4	0	0.1	0	0	0.1	

	Rt 1 Southbound				Rt 607 Westbound				Rt 1 Northbound				Driveway Eastbound				
Start Time	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Int. Total**
Peak Hour Analysis From 04:00 PM to 06:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:15 PM																	
05:15 PM	0	207	41	248	35	0	**10**	45	9	**182**	0	191	0	0	0	0	**484**
05:30 PM	0	195	**51**	246	**39**	0	8	**47**	12	149	0	161	0	0	0	0	454
05:45 PM	0	213	41	254	22	**1**	9	32	18	175	0	**193**	0	0	0	0	479
06:00 PM	0	**229**	27	**256**	18	0	8	26	**22**	133	0	155	0	**1**	0	**1**	438
Total Volume	0	844	160	1004	114	1	35	150	61	639	0	700	0	1	0	1	1855
% App. Total	0	84.1	15.9		76	0.7	23.3		8.7	91.3	0		0	100	0		
PHF	.000	.921	.784	.980	.731	.250	.875	.798	.693	.878	.000	.907	.000	.250	.000	.250	.958

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Groups Printed- Truck

	Rt 1 Southbound					Rt 607 Westbound					Rt 1 Northbound					Driveway Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	0	25	0	0	25	0	0	0	0	0	0	6	0	0	6	0	0	0	0	0	31
04:15 PM	0	25	0	0	25	1	0	0	0	1	0	8	0	0	8	0	0	0	0	0	34
04:30 PM	0	7	0	0	7	1	0	0	0	1	0	6	0	0	6	0	0	0	0	0	14
04:45 PM	0	15	1	0	16	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	18
Total	0	72	1	0	73	2	0	0	0	2	0	22	0	0	22	0	0	0	0	0	97
05:00 PM	0	10	0	0	10	0	0	0	0	0	0	8	0	0	8	0	0	0	0	0	18
05:15 PM	0	6	0	0	6	0	0	0	0	0	1	8	0	0	9	0	0	0	0	0	15
05:30 PM	0	1	0	0	1	0	0	0	0	0	0	6	0	0	6	0	0	0	0	0	7
05:45 PM	0	2	1	0	3	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	4
Total	0	19	1	0	20	0	0	0	0	0	1	23	0	0	24	0	0	0	0	0	44
06:00 PM	0	2	0	0	2	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	3
06:15 PM	0	1	0	0	1	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	3
06:30 PM	0	4	0	0	4	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	8
06:45 PM	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2
Total	0	8	0	0	8	0	0	0	0	0	0	8	0	0	8	0	0	0	0	0	16
Grand Total	0	99	2	0	101	2	0	0	0	2	1	53	0	0	54	0	0	0	0	0	157
Apprch %	0	98	2	0		100	0	0	0		1.9	98.1	0	0		0	0	0	0		
Total %	0	63.1	1.3	0	64.3	1.3	0	0	0	1.3	0.6	33.8	0	0	34.4	0	0	0	0	0	

	Rt 1 Southbound				Rt 607 Westbound				Rt 1 Northbound				Driveway Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. 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	**25**	0	**25**	0	0	0	0	0	6	0	6	0	0	0	0	31
04:15 PM	0	25	0	25	**1**	0	0	**1**	0	**8**	0	**8**	0	0	0	0	**34**
04:30 PM	0	7	0	7	1	0	0	1	0	6	0	6	0	0	0	0	14
04:45 PM	0	15	**1**	16	0	0	0	0	0	2	0	2	0	0	0	0	18
Total Volume	0	72	1	73	2	0	0	2	0	22	0	22	0	0	0	0	97
% App. Total	0	98.6	1.4		100	0	0		0	100	0		0	0	0		
PHF	.000	.720	.250	.730	.500	.000	.000	.500	.000	.688	.000	.688	.000	.000	.000	.000	.713

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Groups Printed- Combined

	Rt 1 Southbound					Rt 607 Westbound					Rt 1 Northbound					Driveway Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	0	251	30	0	281	49	0	19	0	68	10	155	0	0	165	0	0	0	1	1	515
04:15 PM	0	251	40	0	291	30	0	20	0	50	8	155	0	0	163	0	0	0	0	0	504
04:30 PM	0	242	31	0	273	33	0	9	0	42	6	163	0	0	169	0	0	0	0	0	484
04:45 PM	0	214	37	0	251	17	0	6	0	23	6	169	0	0	175	0	0	0	0	0	449
Total	0	958	138	0	1096	129	0	54	0	183	30	642	0	0	672	0	0	0	1	1	1952
05:00 PM	1	190	33	0	224	17	0	1	0	18	7	183	0	0	190	1	0	0	0	1	433
05:15 PM	0	213	41	0	254	35	0	10	0	45	10	190	0	0	200	0	0	0	0	0	499
05:30 PM	0	196	51	0	247	39	0	8	0	47	12	155	0	0	167	0	0	0	0	0	461
05:45 PM	0	215	42	0	257	22	1	9	0	32	18	176	0	0	194	0	0	0	0	0	483
Total	1	814	167	0	982	113	1	28	0	142	47	704	0	0	751	1	0	0	0	1	1876
06:00 PM	0	231	27	0	258	18	0	8	0	26	22	134	0	0	156	0	1	0	0	1	441
06:15 PM	0	163	36	0	199	17	0	3	0	20	8	149	0	0	157	0	0	0	0	0	376
06:30 PM	0	156	54	0	210	14	0	3	0	17	9	141	0	0	150	0	4	0	0	4	381
06:45 PM	0	140	40	0	180	30	0	3	0	33	6	101	0	0	107	0	0	0	0	0	320
Total	0	690	157	0	847	79	0	17	0	96	45	525	0	0	570	0	5	0	0	5	1518
Grand Total	1	2462	462	0	2925	321	1	99	0	421	122	1871	0	0	1993	1	5	0	1	7	5346
Apprch %	0	84.2	15.8	0		76.2	0.2	23.5	0		6.1	93.9	0	0		14.3	71.4	0	14.3		
Total %	0	46.1	8.6	0	54.7	6	0	1.9	0	7.9	2.3	35	0	0	37.3	0	0.1	0	0	0.1	

	Rt 1 Southbound				Rt 607 Westbound				Rt 1 Northbound				Driveway Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. 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	**251**	30	281	**49**	0	19	**68**	**10**	155	0	165	0	0	0	0	**514**
04:15 PM	0	251	**40**	**291**	30	0	**20**	50	8	155	0	163	0	0	0	0	504
04:30 PM	0	242	31	273	33	0	9	42	6	163	0	169	0	0	0	0	484
04:45 PM	0	214	37	251	17	0	6	23	6	**169**	0	**175**	0	0	0	0	449
Total Volume	0	958	138	1096	129	0	54	183	30	642	0	672	0	0	0	0	1951
% App. Total	0	87.4	12.6		70.5	0	29.5		4.5	95.5	0		0	0	0		
PHF	.000	.954	.863	.942	.658	.000	.675	.673	.750	.950	.000	.960	.000	.000	.000	.000	.949

Peggy Malone & Associates

904-992-8072

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Groups Printed- Car

	Rt 1 Southbound					High School Westbound					Rt 1 Northbound					River Run Pkwy Eastbound					
Start Time	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Int. Total**
06:00 AM	2	49	2	0	53	1	0	0	0	1	0	68	0	0	68	0	0	0	0	0	122
06:15 AM	1	53	2	0	56	0	0	0	0	0	0	87	0	0	87	0	0	0	0	0	143
06:30 AM	2	62	1	0	65	0	0	0	0	0	1	106	0	0	107	0	0	0	0	0	172
06:45 AM	4	66	11	0	81	0	0	0	0	0	1	136	0	0	137	0	0	1	0	1	219
Total	9	230	16	0	255	1	0	0	0	1	2	397	0	0	399	0	0	1	0	1	656
07:00 AM	13	82	52	0	147	3	0	4	0	7	11	92	4	0	107	0	1	4	0	5	266
07:15 AM	12	85	91	0	188	9	0	2	0	11	5	116	1	0	122	0	0	0	0	0	321
07:30 AM	11	133	11	0	155	11	0	2	0	13	4	147	4	0	155	0	0	0	0	0	323
07:45 AM	11	109	5	0	125	1	0	1	0	2	1	135	4	0	140	0	1	1	0	2	269
Total	47	409	159	0	615	24	0	9	0	33	21	490	13	0	524	0	2	5	0	7	1179
08:00 AM	8	66	3	0	77	4	0	1	0	5	2	99	1	0	102	1	0	2	0	3	187
08:15 AM	11	79	4	0	94	3	0	2	0	5	1	109	3	0	113	1	0	1	0	2	214
08:30 AM	6	76	5	0	87	2	0	0	0	2	0	179	2	0	181	3	0	1	0	4	274
08:45 AM	5	92	13	0	110	2	1	0	0	3	0	132	0	0	132	2	0	4	0	6	251
Total	30	313	25	0	368	11	1	3	0	15	3	519	6	0	528	7	0	8	0	15	926
Grand Total	86	952	200	0	1238	36	1	12	0	49	26	1406	19	0	1451	7	2	14	0	23	2761
Apprch %	6.9	76.9	16.2	0		73.5	2	24.5	0		1.8	96.9	1.3	0		30.4	8.7	60.9	0		
Total %	3.1	34.5	7.2	0	44.8	1.3	0	0.4	0	1.8	0.9	50.9	0.7	0	52.6	0.3	0.1	0.5	0	0.8	

	Rt 1 Southbound				High School Westbound				Rt 1 Northbound				River Run Pkwy Eastbound				
Start Time	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Int. Total**
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	**13**	82	52	147	3	0	**4**	7	**11**	92	**4**	107	0	**1**	**4**	**5**	266
07:15 AM	12	85	**91**	**188**	9	0	2	11	5	116	1	122	0	0	0	0	321
07:30 AM	11	**133**	11	155	**11**	0	2	**13**	4	**147**	4	**155**	0	0	0	0	**323**
07:45 AM	11	109	5	125	1	0	1	2	1	135	4	140	0	1	1	2	269
Total Volume	47	409	159	615	24	0	9	33	21	490	13	524	0	2	5	7	1179
% App. Total	7.6	66.5	25.9		72.7	0	27.3		4	93.5	2.5		0	28.6	71.4		
PHF	.904	.769	.437	.818	.545	.000	.563	.635	.477	.833	.813	.845	.000	.500	.313	.350	.913

Peggy Malone & Associates

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Groups Printed- Truck

	Rt 1 Southbound					High School Westbound					Rt 1 Northbound					River Run Pkwy Eastbound					
Start Time	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Int. Total**
06:00 AM	0	7	0	0	7	0	0	0	0	0	0	16	0	0	16	0	0	1	0	1	24
06:15 AM	0	4	0	0	4	0	0	0	0	0	0	23	0	0	23	0	0	0	0	0	27
06:30 AM	0	3	0	0	3	0	0	0	0	0	0	29	0	0	29	0	0	0	0	0	32
06:45 AM	1	5	4	0	10	0	0	0	0	0	1	14	0	0	15	0	0	0	0	0	25
Total	1	19	4	0	24	0	0	0	0	0	1	82	0	0	83	0	0	1	0	1	108
07:00 AM	0	15	25	0	40	8	0	1	0	9	2	13	0	0	15	0	0	0	0	0	64
07:15 AM	0	21	12	0	33	23	0	5	0	28	0	7	1	0	8	0	0	3	0	3	72
07:30 AM	1	14	0	0	15	2	0	2	0	4	1	11	0	0	12	0	0	1	0	1	32
07:45 AM	0	9	0	0	9	4	0	0	0	4	0	28	1	0	29	0	0	1	0	1	43
Total	1	59	37	0	97	37	0	8	0	45	3	59	2	0	64	0	0	5	0	5	211
08:00 AM	1	6	0	0	7	1	0	0	0	1	0	3	1	0	4	0	0	2	0	2	14
08:15 AM	1	17	0	0	18	1	0	0	0	1	0	8	0	0	8	0	0	2	0	2	29
08:30 AM	0	42	0	0	42	0	0	0	0	0	0	20	0	0	20	0	0	0	0	0	62
08:45 AM	0	24	1	0	25	0	0	0	0	0	1	7	0	0	8	0	0	0	0	0	33
Total	2	89	1	0	92	2	0	0	0	2	1	38	1	0	40	0	0	4	0	4	138
Grand Total	4	167	42	0	213	39	0	8	0	47	5	179	3	0	187	0	0	10	0	10	457
Apprch %	1.9	78.4	19.7	0		83	0	17	0		2.7	95.7	1.6	0		0	0	100	0		
Total %	0.9	36.5	9.2	0	46.6	8.5	0	1.8	0	10.3	1.1	39.2	0.7	0	40.9	0	0	2.2	0	2.2	

	Rt 1 Southbound				High School Westbound				Rt 1 Northbound				River Run Pkwy Eastbound				
Start Time	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Int. Total**
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	15	**25**	**40**	8	0	1	9	**2**	13	0	15	0	0	0	0	64
07:15 AM	0	**21**	12	33	**23**	0	**5**	**28**	0	7	**1**	8	0	0	**3**	**3**	**72**
07:30 AM	**1**	14	0	15	2	0	2	4	1	11	0	12	0	0	1	1	32
07:45 AM	0	9	0	9	4	0	0	4	0	**28**	1	**29**	0	0	1	1	43
Total Volume	1	59	37	97	37	0	8	45	3	59	2	64	0	0	5	5	211
% App. Total	1	60.8	38.1		82.2	0	17.8		4.7	92.2	3.1		0	0	100		
PHF	.250	.702	.370	.606	.402	.000	.400	.402	.375	.527	.500	.552	.000	.000	.417	.417	.733

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Groups Printed- Combined

	Rt 1 Southbound					High School Westbound					Rt 1 Northbound					River Run Pkwy Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
06:00 AM	2	56	2	0	60	1	0	0	0	1	0	84	0	0	84	0	0	1	0	1	146
06:15 AM	1	57	2	0	60	0	0	0	0	0	0	110	0	0	110	0	0	0	0	0	170
06:30 AM	2	65	1	0	68	0	0	0	0	0	1	135	0	0	136	0	0	0	0	0	204
06:45 AM	5	71	15	0	91	0	0	0	0	0	2	150	0	0	152	0	0	1	0	1	244
Total	10	249	20	0	279	1	0	0	0	1	3	479	0	0	482	0	0	2	0	2	764
07:00 AM	13	97	77	0	187	11	0	5	0	16	13	105	4	0	122	0	1	4	0	5	330
07:15 AM	12	106	103	0	221	32	0	7	0	39	5	123	2	0	130	0	0	3	0	3	393
07:30 AM	12	147	11	0	170	13	0	4	0	17	5	158	4	0	167	0	0	1	0	1	355
07:45 AM	11	118	5	0	134	5	0	1	0	6	1	163	5	0	169	0	1	2	0	3	312
Total	48	468	196	0	712	61	0	17	0	78	24	549	15	0	588	0	2	10	0	12	1390
08:00 AM	9	72	3	0	84	5	0	1	0	6	2	102	2	0	106	1	0	4	0	5	201
08:15 AM	12	96	4	0	112	4	0	2	0	6	1	117	3	0	121	1	0	3	0	4	243
08:30 AM	6	118	5	0	129	2	0	0	0	2	0	199	2	0	201	3	0	1	0	4	336
08:45 AM	5	116	14	0	135	2	1	0	0	3	1	139	0	0	140	2	0	4	0	6	284
Total	32	402	26	0	460	13	1	3	0	17	4	557	7	0	568	7	0	12	0	19	1064
Grand Total	90	1119	242	0	1451	75	1	20	0	96	31	1585	22	0	1638	7	2	24	0	33	3218
Apprch %	6.2	77.1	16.7	0		78.1	1	20.8	0		1.9	96.8	1.3	0		21.2	6.1	72.7	0		
Total %	2.8	34.8	7.5	0	45.1	2.3	0	0.6	0	3	1	49.3	0.7	0	50.9	0.2	0.1	0.7	0	1	

	Rt 1 Southbound				High School Westbound				Rt 1 Northbound				River Run Pkwy Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	**13**	97	77	187	11	0	5	16	**13**	105	4	122	0	**1**	**4**	**5**	330
07:15 AM	12	106	**103**	**221**	**32**	0	**7**	**39**	5	123	2	130	0	0	3	3	**393**
07:30 AM	12	**147**	11	170	13	0	4	17	5	158	4	167	0	0	1	1	355
07:45 AM	11	118	5	134	5	0	1	6	1	**163**	**5**	**169**	0	1	2	3	312
Total Volume	48	468	196	712	61	0	17	78	24	549	15	588	0	2	10	12	1390
% App. Total	6.7	65.7	27.5		78.2	0	21.8		4.1	93.4	2.6		0	16.7	83.3		
PHF	.923	.796	.476	.805	.477	.000	.607	.500	.462	.842	.750	.870	.000	.500	.625	.600	.884

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	Rt 1 Southbound					High School Westbound					Rt 1 Northbound					River Run Pkwy Eastbound					
Start Time	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Int. Total**
04:00 PM	3	157	93	0	253	35	0	2	0	37	8	117	1	0	126	3	1	13	0	17	433
04:15 PM	5	188	62	0	255	31	0	1	0	32	5	118	1	0	124	5	0	6	0	11	422
04:30 PM	1	208	36	0	245	10	1	0	0	11	4	136	1	0	141	6	0	8	0	14	411
04:45 PM	0	166	34	0	200	20	0	1	0	21	4	154	0	0	158	3	0	8	0	11	390
Total	9	719	225	0	953	96	1	4	0	101	21	525	3	0	549	17	1	35	0	53	1656
05:00 PM	1	168	17	0	186	17	0	3	0	20	4	146	0	0	150	3	0	6	0	9	365
05:15 PM	0	192	27	0	219	21	0	3	0	24	4	155	0	0	159	2	0	2	0	4	406
05:30 PM	1	179	26	0	206	39	0	2	0	41	7	112	0	0	119	2	0	7	0	9	375
05:45 PM	0	145	74	0	219	64	0	6	0	70	5	125	2	0	132	1	0	3	0	4	425
Total	2	684	144	0	830	141	0	14	0	155	20	538	2	0	560	8	0	18	0	26	1571
06:00 PM	3	171	71	0	245	62	0	4	0	66	4	87	1	0	92	1	0	0	0	1	404
06:15 PM	2	143	14	0	159	52	0	2	0	54	7	106	1	0	114	1	0	3	0	4	331
06:30 PM	0	129	34	0	163	33	0	1	0	34	6	117	0	0	123	1	0	2	0	3	323
06:45 PM	0	113	24	0	137	22	0	7	0	29	2	87	0	0	89	0	0	1	0	1	256
Total	5	556	143	0	704	169	0	14	0	183	19	397	2	0	418	3	0	6	0	9	1314
Grand Total	16	1959	512	0	2487	406	1	32	0	439	60	1460	7	0	1527	28	1	59	0	88	4541
Apprch %	0.6	78.8	20.6	0		92.5	0.2	7.3	0		3.9	95.6	0.5	0		31.8	1.1	67	0		
Total %	0.4	43.1	11.3	0	54.8	8.9	0	0.7	0	9.7	1.3	32.2	0.2	0	33.6	0.6	0	1.3	0	1.9	

	Rt 1 Southbound				High School Westbound				Rt 1 Northbound				River Run Pkwy Eastbound				
Start Time	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Int. 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	3	157	**93**	253	**35**	0	**2**	**37**	**8**	117	**1**	126	3	**1**	**13**	**17**	**433**
04:15 PM	**5**	188	62	**255**	31	0	1	32	5	118	1	124	5	0	6	11	422
04:30 PM	1	**208**	36	245	10	**1**	0	11	4	136	1	141	**6**	0	8	14	411
04:45 PM	0	166	34	200	20	0	1	21	4	**154**	0	**158**	3	0	8	11	390
Total Volume	9	719	225	953	96	1	4	101	21	525	3	549	17	1	35	53	1656
% App. Total	0.9	75.4	23.6		95	1	4		3.8	95.6	0.5		32.1	1.9	66		
PHF	.450	.864	.605	.934	.686	.250	.500	.682	.656	.852	.750	.869	.708	.250	.673	.779	.956

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Groups Printed- Truck

	Rt 1 Southbound					High School Westbound					Rt 1 Northbound					River Run Pkwy Eastbound					
Start Time	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Int. Total**
04:00 PM	0	23	2	0	25	0	0	0	0	0	0	9	0	0	9	0	0	0	0	0	34
04:15 PM	0	26	1	0	27	1	0	1	0	2	0	7	1	0	8	0	0	0	0	0	37
04:30 PM	0	6	1	0	7	0	0	0	0	0	0	7	0	0	7	0	0	0	0	0	14
04:45 PM	0	14	2	0	16	1	0	0	0	1	0	2	0	0	2	0	0	0	0	0	19
Total	0	69	6	0	75	2	0	1	0	3	0	25	1	0	26	0	0	0	0	0	104
05:00 PM	0	9	1	0	10	0	0	0	0	0	0	7	0	0	7	0	0	0	0	0	17
05:15 PM	0	5	2	0	7	0	0	0	0	0	1	8	0	0	9	0	0	0	0	0	16
05:30 PM	0	2	0	0	2	0	0	1	0	1	0	5	0	0	5	0	0	0	0	0	8
05:45 PM	0	2	0	0	2	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	3
Total	0	18	3	0	21	0	0	1	0	1	1	21	0	0	22	0	0	0	0	0	44
06:00 PM	0	2	0	0	2	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	3
06:15 PM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	2
06:30 PM	1	3	0	0	4	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	8
06:45 PM	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2
Total	1	6	0	0	7	0	0	0	0	0	0	8	0	0	8	0	0	0	0	0	15
Grand Total	1	93	9	0	103	2	0	2	0	4	1	54	1	0	56	0	0	0	0	0	163
Apprch %	1	90.3	8.7	0		50	0	50	0		1.8	96.4	1.8	0		0	0	0	0		
Total %	0.6	57.1	5.5	0	63.2	1.2	0	1.2	0	2.5	0.6	33.1	0.6	0	34.4	0	0	0	0	0	

	Rt 1 Southbound				High School Westbound				Rt 1 Northbound				River Run Pkwy Eastbound				
Start Time	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Int. 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	23	**2**	25	0	0	0	0	0	**9**	0	**9**	0	0	0	0	34
04:15 PM	0	**26**	1	**27**	**1**	0	**1**	**2**	0	7	**1**	8	0	0	0	0	**37**
04:30 PM	0	6	1	7	0	0	0	0	0	7	0	7	0	0	0	0	14
04:45 PM	0	14	2	16	1	0	0	1	0	2	0	2	0	0	0	0	19
Total Volume	0	69	6	75	2	0	1	3	0	25	1	26	0	0	0	0	104
% App. Total	0	92	8		66.7	0	33.3		0	96.2	3.8		0	0	0		
PHF	.000	.663	.750	.694	.500	.000	.250	.375	.000	.694	.250	.722	.000	.000	.000	.000	.703

Peggy Malone & Associates

904-992-8072

File Name : 5-Route 1 and River Run Pkwy PM
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Groups Printed- Combined

	Rt 1 Southbound					High School Westbound					Rt 1 Northbound					River Run Pkwy Eastbound					
Start Time	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Int. Total**
04:00 PM	3	180	95	0	278	35	0	2	0	37	8	126	1	0	135	3	1	13	0	17	467
04:15 PM	5	214	63	0	282	32	0	2	0	34	5	125	2	0	132	5	0	6	0	11	459
04:30 PM	1	214	37	0	252	10	1	0	0	11	4	143	1	0	148	6	0	8	0	14	425
04:45 PM	0	180	36	0	216	21	0	1	0	22	4	156	0	0	160	3	0	8	0	11	409
Total	9	788	231	0	1028	98	1	5	0	104	21	550	4	0	575	17	1	35	0	53	1760
05:00 PM	1	177	18	0	196	17	0	3	0	20	4	153	0	0	157	3	0	6	0	9	382
05:15 PM	0	197	29	0	226	21	0	3	0	24	5	163	0	0	168	2	0	2	0	4	422
05:30 PM	1	181	26	0	208	39	0	3	0	42	7	117	0	0	124	2	0	7	0	9	383
05:45 PM	0	147	74	0	221	64	0	6	0	70	5	126	2	0	133	1	0	3	0	4	428
Total	2	702	147	0	851	141	0	15	0	156	21	559	2	0	582	8	0	18	0	26	1615
06:00 PM	3	173	71	0	247	62	0	4	0	66	4	88	1	0	93	1	0	0	0	1	407
06:15 PM	2	143	14	0	159	52	0	2	0	54	7	108	1	0	116	1	0	3	0	4	333
06:30 PM	1	132	34	0	167	33	0	1	0	34	6	121	0	0	127	1	0	2	0	3	331
06:45 PM	0	114	24	0	138	22	0	7	0	29	2	88	0	0	90	0	0	1	0	1	258
Total	6	562	143	0	711	169	0	14	0	183	19	405	2	0	426	3	0	6	0	9	1329
Grand Total	17	2052	521	0	2590	408	1	34	0	443	61	1514	8	0	1583	28	1	59	0	88	4704
Apprch %	0.7	79.2	20.1	0		92.1	0.2	7.7	0		3.9	95.6	0.5	0		31.8	1.1	67	0		
Total %	0.4	43.6	11.1	0	55.1	8.7	0	0.7	0	9.4	1.3	32.2	0.2	0	33.7	0.6	0	1.3	0	1.9	

	Rt 1 Southbound				High School Westbound				Rt 1 Northbound				River Run Pkwy Eastbound				
Start Time	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Int. 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	3	180	**95**	278	**35**	0	**2**	**37**	**8**	126	1	135	3	**1**	**13**	**17**	**467**
04:15 PM	**5**	**214**	63	**282**	32	0	2	34	5	125	**2**	132	5	0	6	11	459
04:30 PM	1	214	37	252	10	**1**	0	11	4	143	1	148	**6**	0	8	14	425
04:45 PM	0	180	36	216	21	0	1	22	4	**156**	0	**160**	3	0	8	11	409
Total Volume	9	788	231	1028	98	1	5	104	21	550	4	575	17	1	35	53	1760
% App. Total	0.9	76.7	22.5		94.2	1	4.8		3.7	95.7	0.7		32.1	1.9	66		
PHF	.450	.921	.608	.911	.700	.250	.625	.703	.656	.881	.500	.898	.708	.250	.673	.779	.942

Peggy Malone & Associates

904-992-8072

File Name : 6-Route 1 and Route 749 AM
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Groups Printed- Car

	Rt 1 Southbound				Rt 1 Northbound				Hickory Ridge Rd Eastbound				
Start Time	**Right**	**Thru**	**Peds**	**App. Total**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Left**	**Peds**	**App. Total**	**Int. Total**
06:00 AM	0	44	0	44	62	3	0	65	14	4	0	18	127
06:15 AM	1	53	0	54	91	2	0	93	6	3	0	9	156
06:30 AM	0	59	0	59	96	7	0	103	4	8	0	12	174
06:45 AM	5	65	0	70	118	13	0	131	7	5	0	12	213
Total	6	221	0	227	367	25	0	392	31	20	0	51	670
07:00 AM	7	74	0	81	107	6	0	113	11	12	0	23	217
07:15 AM	4	82	0	86	109	14	0	123	8	14	0	22	231
07:30 AM	2	139	0	141	147	11	0	158	12	7	0	19	318
07:45 AM	0	104	0	104	137	7	0	144	13	8	0	21	269
Total	13	399	0	412	500	38	0	538	44	41	0	85	1035
08:00 AM	1	68	0	69	91	10	0	101	11	3	0	14	184
08:15 AM	1	71	0	72	112	10	0	122	14	4	0	18	212
08:30 AM	1	78	0	79	169	9	0	178	16	4	0	20	277
08:45 AM	2	79	0	81	128	6	0	134	10	6	0	16	231
Total	5	296	0	301	500	35	0	535	51	17	0	68	904
Grand Total	24	916	0	940	1367	98	0	1465	126	78	0	204	2609
Apprch %	2.6	97.4	0		93.3	6.7	0		61.8	38.2	0		
Total %	0.9	35.1	0	36	52.4	3.8	0	56.2	4.8	3	0	7.8	

	Rt 1 Southbound			Rt 1 Northbound			Hickory Ridge Rd Eastbound			
Start Time	**Right**	**Thru**	**App. Total**	**Thru**	**Left**	**App. Total**	**Right**	**Left**	**App. Total**	**Int. Total**
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:00 AM										
07:00 AM	**7**	74	81	107	6	113	11	12	**23**	217
07:15 AM	4	82	86	109	**14**	123	8	**14**	22	231
07:30 AM	2	**139**	**141**	**147**	11	**158**	12	7	19	**318**
07:45 AM	0	104	104	137	7	144	**13**	8	21	269
Total Volume	13	399	412	500	38	538	44	41	85	1035
% App. Total	3.2	96.8		92.9	7.1		51.8	48.2		
PHF	.464	.718	.730	.850	.679	.851	.846	.732	.924	.814

Peggy Malone & Associates

904-992-8072

File Name : 6-Route 1 and Route 749 AM
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Groups Printed- Truck

	Rt 1 Southbound				Rt 1 Northbound				Hickory Ridge Rd Eastbound				
Start Time	**Right**	**Thru**	**Peds**	**App. Total**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Left**	**Peds**	**App. Total**	**Int. Total**
06:00 AM	0	8	0	8	15	2	0	17	0	0	0	0	25
06:15 AM	0	4	0	4	21	0	0	21	0	0	0	0	25
06:30 AM	0	4	0	4	28	0	0	28	0	0	0	0	32
06:45 AM	1	4	0	5	15	1	0	16	0	1	0	1	22
Total	1	20	0	21	79	3	0	82	0	1	0	1	104
07:00 AM	3	14	0	17	7	0	0	7	2	4	0	6	30
07:15 AM	1	22	0	23	8	3	0	11	2	0	0	2	36
07:30 AM	2	18	0	20	10	1	0	11	0	0	0	0	31
07:45 AM	1	9	0	10	25	0	0	25	0	3	0	3	38
Total	7	63	0	70	50	4	0	54	4	7	0	11	135
08:00 AM	0	5	0	5	5	1	0	6	1	0	0	1	12
08:15 AM	1	15	0	16	7	2	0	9	1	1	0	2	27
08:30 AM	5	40	0	45	23	0	0	23	3	2	0	5	73
08:45 AM	0	24	0	24	10	2	0	12	3	2	0	5	41
Total	6	84	0	90	45	5	0	50	8	5	0	13	153
Grand Total	14	167	0	181	174	12	0	186	12	13	0	25	392
Apprch %	7.7	92.3	0		93.5	6.5	0		48	52	0		
Total %	3.6	42.6	0	46.2	44.4	3.1	0	47.4	3.1	3.3	0	6.4	

	Rt 1 Southbound			Rt 1 Northbound			Hickory Ridge Rd Eastbound			
Start Time	**Right**	**Thru**	**App. Total**	**Thru**	**Left**	**App. Total**	**Right**	**Left**	**App. Total**	**Int. Total**
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 08:00 AM										
08:00 AM	0	5	5	5	1	6	1	0	1	12
08:15 AM	1	15	16	7	**2**	9	1	1	2	27
08:30 AM	**5**	**40**	**45**	**23**	0	**23**	**3**	**2**	**5**	**73**
08:45 AM	0	24	24	10	2	12	3	2	5	41
Total Volume	6	84	90	45	5	50	8	5	13	153
% App. Total	6.7	93.3		90	10		61.5	38.5		
PHF	.300	.525	.500	.489	.625	.543	.667	.625	.650	.524

Peggy Malone & Associates

904-992-8072

File Name : 6-Route 1 and Route 749 AM
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Groups Printed- Combined

	Rt 1 Southbound				Rt 1 Northbound				Hickory Ridge Rd Eastbound				
Start Time	**Right**	**Thru**	**Peds**	**App. Total**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Left**	**Peds**	**App. Total**	**Int. Total**
06:00 AM	0	52	0	52	77	5	0	82	14	4	0	18	152
06:15 AM	1	57	0	58	112	2	0	114	6	3	0	9	181
06:30 AM	0	63	0	63	124	7	0	131	4	8	0	12	206
06:45 AM	6	69	0	75	133	14	0	147	7	6	0	13	235
Total	7	241	0	248	446	28	0	474	31	21	0	52	774
07:00 AM	10	88	0	98	114	6	0	120	13	16	0	29	247
07:15 AM	5	104	0	109	117	17	0	134	10	14	0	24	267
07:30 AM	4	157	0	161	157	12	0	169	12	7	0	19	349
07:45 AM	1	113	0	114	162	7	0	169	13	11	0	24	307
Total	20	462	0	482	550	42	0	592	48	48	0	96	1170
08:00 AM	1	73	0	74	96	11	0	107	12	3	0	15	196
08:15 AM	2	86	0	88	119	12	0	131	15	5	0	20	239
08:30 AM	6	118	0	124	192	9	0	201	19	6	0	25	350
08:45 AM	2	103	0	105	138	8	0	146	13	8	0	21	272
Total	11	380	0	391	545	40	0	585	59	22	0	81	1057
Grand Total	38	1083	0	1121	1541	110	0	1651	138	91	0	229	3001
Apprch %	3.4	96.6	0		93.3	6.7	0		60.3	39.7	0		
Total %	1.3	36.1	0	37.4	51.3	3.7	0	55	4.6	3	0	7.6	

	Rt 1 Southbound			Rt 1 Northbound			Hickory Ridge Rd Eastbound			
Start Time	**Right**	**Thru**	**App. Total**	**Thru**	**Left**	**App. Total**	**Right**	**Left**	**App. Total**	**Int. Total**
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:00 AM										
07:00 AM	**10**	88	98	114	6	120	**13**	**16**	**29**	247
07:15 AM	5	104	109	117	**17**	134	10	14	24	267
07:30 AM	4	**157**	**161**	157	12	**169**	12	7	19	**349**
07:45 AM	1	113	114	**162**	7	169	13	11	24	307
Total Volume	20	462	482	550	42	592	48	48	96	1170
% App. Total	4.1	95.9		92.9	7.1		50	50		
PHF	.500	.736	.748	.849	.618	.876	.923	.750	.828	.838

Peggy Malone & Associates

904-992-8072

File Name : 6-Route 1 and Route 749 PM
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Groups Printed- Car

	Rt 1 Southbound				Rt 1 Northbound				Hickory Ridge Rd Eastbound				
Start Time	**Right**	**Thru**	**Peds**	**App. Total**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Left**	**Peds**	**App. Total**	**Int. Total**
04:00 PM	6	168	0	174	122	12	0	134	4	2	0	6	314
04:15 PM	7	182	0	189	117	13	0	130	11	3	0	14	333
04:30 PM	11	189	0	200	139	11	0	150	14	5	0	19	369
04:45 PM	9	174	0	183	145	8	0	153	11	11	0	22	358
Total	33	713	0	746	523	44	0	567	40	21	0	61	1374
05:00 PM	16	159	0	175	162	11	0	173	8	4	0	12	360
05:15 PM	12	180	0	192	153	8	0	161	8	7	0	15	368
05:30 PM	12	180	0	192	115	11	0	126	8	7	0	15	333
05:45 PM	10	141	0	151	132	15	0	147	15	5	0	20	318
Total	50	660	0	710	562	45	0	607	39	23	0	62	1379
06:00 PM	11	175	0	186	88	13	0	101	14	4	0	18	305
06:15 PM	8	137	0	145	114	13	0	127	5	3	0	8	280
06:30 PM	5	128	0	133	110	9	0	119	10	3	0	13	265
06:45 PM	10	106	0	116	86	8	0	94	4	6	0	10	220
Total	34	546	0	580	398	43	0	441	33	16	0	49	1070
Grand Total	117	1919	0	2036	1483	132	0	1615	112	60	0	172	3823
Apprch %	5.7	94.3	0		91.8	8.2	0		65.1	34.9	0		
Total %	3.1	50.2	0	53.3	38.8	3.5	0	42.2	2.9	1.6	0	4.5	

	Rt 1 Southbound			Rt 1 Northbound			Hickory Ridge Rd Eastbound			
Start Time	**Right**	**Thru**	**App. Total**	**Thru**	**Left**	**App. Total**	**Right**	**Left**	**App. Total**	**Int. 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	11	**189**	**200**	139	**11**	150	**14**	5	19	**369**
04:45 PM	9	174	183	145	8	153	11	**11**	**22**	358
05:00 PM	**16**	159	175	**162**	11	**173**	8	4	12	360
05:15 PM	12	180	192	153	8	161	8	7	15	368
Total Volume	48	702	750	599	38	637	41	27	68	1455
% App. Total	6.4	93.6		94	6		60.3	39.7		
PHF	.750	.929	.938	.924	.864	.921	.732	.614	.773	.986

Peggy Malone & Associates

904-992-8072

File Name : 6-Route 1 and Route 749 PM
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Groups Printed- Truck

	Rt 1 Southbound				Rt 1 Northbound				Hickory Ridge Rd Eastbound				
Start Time	**Right**	**Thru**	**Peds**	**App. Total**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Left**	**Peds**	**App. Total**	**Int. Total**
04:00 PM	1	20	0	21	5	3	0	8	1	3	0	4	33
04:15 PM	1	29	0	30	7	0	0	7	0	0	0	0	37
04:30 PM	0	5	0	5	7	2	0	9	0	1	0	1	15
04:45 PM	2	11	0	13	1	0	0	1	2	0	0	2	16
Total	4	65	0	69	20	5	0	25	3	4	0	7	101
05:00 PM	3	7	0	10	8	0	0	8	2	0	0	2	20
05:15 PM	1	4	0	5	9	0	0	9	0	2	0	2	16
05:30 PM	0	3	0	3	2	0	0	2	0	0	0	0	5
05:45 PM	0	2	0	2	1	0	0	1	0	0	0	0	3
Total	4	16	0	20	20	0	0	20	2	2	0	4	44
06:00 PM	0	0	0	0	1	0	0	1	0	0	0	0	1
06:15 PM	0	0	0	0	2	0	0	2	0	0	0	0	2
06:30 PM	0	3	0	3	4	0	0	4	0	0	0	0	7
06:45 PM	0	1	0	1	1	0	0	1	0	0	0	0	2
Total	0	4	0	4	8	0	0	8	0	0	0	0	12
Grand Total	8	85	0	93	48	5	0	53	5	6	0	11	157
Apprch %	8.6	91.4	0		90.6	9.4	0		45.5	54.5	0		
Total %	5.1	54.1	0	59.2	30.6	3.2	0	33.8	3.2	3.8	0	7	

	Rt 1 Southbound			Rt 1 Northbound			Hickory Ridge Rd Eastbound			
Start Time	**Right**	**Thru**	**App. Total**	**Thru**	**Left**	**App. Total**	**Right**	**Left**	**App. Total**	**Int. 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	1	20	21	5	**3**	8	1	**3**	**4**	33
04:15 PM	1	**29**	**30**	**7**	0	7	0	0	0	**37**
04:30 PM	0	5	5	7	2	**9**	0	1	1	15
04:45 PM	**2**	11	13	1	0	1	**2**	0	2	16
Total Volume	4	65	69	20	5	25	3	4	7	101
% App. Total	5.8	94.2		80	20		42.9	57.1		
PHF	.500	.560	.575	.714	.417	.694	.375	.333	.438	.682

Peggy Malone & Associates

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File Name : 6-Route 1 and Route 749 PM
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Groups Printed- Combined

	Rt 1 Southbound				Rt 1 Northbound				Hickory Ridge Rd Eastbound				
Start Time	**Right**	**Thru**	**Peds**	**App. Total**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Left**	**Peds**	**App. Total**	**Int. Total**
04:00 PM	7	188	0	195	127	15	0	142	5	5	0	10	347
04:15 PM	8	211	0	219	124	13	0	137	11	3	0	14	370
04:30 PM	11	194	0	205	146	13	0	159	14	6	0	20	384
04:45 PM	11	185	0	196	146	8	0	154	13	11	0	24	374
Total	37	778	0	815	543	49	0	592	43	25	0	68	1475
05:00 PM	19	166	0	185	170	11	0	181	10	4	0	14	380
05:15 PM	13	184	0	197	162	8	0	170	8	9	0	17	384
05:30 PM	12	183	0	195	117	11	0	128	8	7	0	15	338
05:45 PM	10	143	0	153	133	15	0	148	15	5	0	20	321
Total	54	676	0	730	582	45	0	627	41	25	0	66	1423
06:00 PM	11	175	0	186	89	13	0	102	14	4	0	18	306
06:15 PM	8	137	0	145	116	13	0	129	5	3	0	8	282
06:30 PM	5	131	0	136	114	9	0	123	10	3	0	13	272
06:45 PM	10	107	0	117	87	8	0	95	4	6	0	10	222
Total	34	550	0	584	406	43	0	449	33	16	0	49	1082
Grand Total	125	2004	0	2129	1531	137	0	1668	117	66	0	183	3980
Apprch %	5.9	94.1	0		91.8	8.2	0		63.9	36.1	0		
Total %	3.1	50.4	0	53.5	38.5	3.4	0	41.9	2.9	1.7	0	4.6	

	Rt 1 Southbound			Rt 1 Northbound			Hickory Ridge Rd Eastbound			
Start Time	**Right**	**Thru**	**App. Total**	**Thru**	**Left**	**App. Total**	**Right**	**Left**	**App. Total**	**Int. 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	11	**194**	**205**	146	**13**	159	**14**	6	20	**384**
04:45 PM	11	185	196	146	8	154	13	**11**	**24**	374
05:00 PM	**19**	166	185	**170**	11	**181**	10	4	14	380
05:15 PM	13	184	197	162	8	170	8	9	17	384
Total Volume	54	729	783	624	40	664	45	30	75	1522
% App. Total	6.9	93.1		94	6		60	40		
PHF	.711	.939	.955	.918	.769	.917	.804	.682	.781	.991

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	Rt 1 Southbound					Rt 632 Westbound					Rt 1 Northbound					Church Dvwy Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
06:00 AM	0	46	14	0	60	4	0	0	0	4	0	57	0	0	57	0	0	0	0	0	121
06:15 AM	0	51	9	0	60	0	0	0	0	0	0	89	0	0	89	0	0	0	0	0	149
06:30 AM	0	54	6	0	60	0	0	0	0	0	0	103	0	0	103	0	0	0	0	0	163
06:45 AM	0	69	12	0	81	2	0	0	0	2	0	125	0	0	125	0	1	0	0	1	209
Total	0	220	41	0	261	6	0	0	0	6	0	374	0	0	374	0	1	0	0	1	642
07:00 AM	0	60	22	0	82	3	0	0	0	3	0	115	0	0	115	0	0	0	0	0	200
07:15 AM	0	57	38	0	95	11	0	0	0	11	0	109	0	0	109	0	0	0	0	0	215
07:30 AM	0	84	59	0	143	35	0	0	0	35	0	124	0	0	124	0	0	0	0	0	302
07:45 AM	0	65	54	0	119	38	0	1	0	39	0	100	0	0	100	0	0	0	0	0	258
Total	0	266	173	0	439	87	0	1	0	88	0	448	0	0	448	0	0	0	0	0	975
08:00 AM	0	60	29	0	89	10	0	0	0	10	0	91	0	0	91	0	0	0	0	0	190
08:15 AM	0	52	34	0	86	5	0	0	0	5	0	113	0	0	113	0	0	0	0	0	204
08:30 AM	3	72	31	0	106	55	0	1	0	56	0	133	0	0	133	0	0	0	0	0	295
08:45 AM	1	65	22	0	88	22	0	0	0	22	0	99	1	0	100	0	0	1	0	1	211
Total	4	249	116	0	369	92	0	1	0	93	0	436	1	0	437	0	0	1	0	1	900
Grand Total	4	735	330	0	1069	185	0	2	0	187	0	1258	1	0	1259	0	1	1	0	2	2517
Apprch %	0.4	68.8	30.9	0		98.9	0	1.1	0		0	99.9	0.1	0		0	50	50	0		
Total %	0.2	29.2	13.1	0	42.5	7.4	0	0.1	0	7.4	0	50	0	0	50	0	0	0	0	0.1	

	Rt 1 Southbound				Rt 632 Westbound				Rt 1 Northbound				Church Dvwy Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	60	22	82	3	0	0	3	0	115	0	115	0	0	0	0	200
07:15 AM	0	57	38	95	11	0	0	11	0	109	0	109	0	0	0	0	215
07:30 AM	0	**84**	**59**	**143**	35	0	0	35	0	**124**	0	**124**	0	0	0	0	**302**
07:45 AM	0	65	54	119	**38**	0	**1**	**39**	0	100	0	100	0	0	0	0	258
Total Volume	0	266	173	439	87	0	1	88	0	448	0	448	0	0	0	0	975
% App. Total	0	60.6	39.4		98.9	0	1.1		0	100	0		0	0	0		
PHF	.000	.792	.733	.767	.572	.000	.250	.564	.000	.903	.000	.903	.000	.000	.000	.000	.807

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	Rt 1 Southbound					Rt 632 Westbound					Rt 1 Northbound					Church Dvwy Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
06:00 AM	0	6	0	0	6	1	0	0	0	1	0	13	0	0	13	0	0	0	0	0	20
06:15 AM	0	3	0	0	3	0	0	0	0	0	0	25	0	0	25	0	0	0	0	0	28
06:30 AM	0	3	0	0	3	0	0	0	0	0	0	26	0	0	26	0	0	0	0	0	29
06:45 AM	0	4	0	0	4	0	0	0	0	0	0	16	0	0	16	0	0	0	0	0	20
Total	0	16	0	0	16	1	0	0	0	1	0	80	0	0	80	0	0	0	0	0	97
07:00 AM	0	16	0	0	16	0	0	0	0	0	0	7	0	0	7	0	0	0	0	0	23
07:15 AM	0	24	0	0	24	0	0	0	0	0	0	9	0	0	9	0	0	0	0	0	33
07:30 AM	0	18	0	0	18	0	0	0	0	0	0	16	0	0	16	0	0	0	0	0	34
07:45 AM	0	10	0	0	10	0	0	0	0	0	0	19	0	0	19	0	0	0	0	0	29
Total	0	68	0	0	68	0	0	0	0	0	0	51	0	0	51	0	0	0	0	0	119
08:00 AM	0	6	0	0	6	0	0	0	0	0	0	6	0	0	6	0	0	0	0	0	12
08:15 AM	0	16	0	0	16	0	0	0	0	0	0	8	0	0	8	0	0	0	0	0	24
08:30 AM	0	39	4	0	43	3	0	0	0	3	0	16	0	0	16	0	0	0	0	0	62
08:45 AM	0	28	2	0	30	0	0	0	0	0	0	13	0	0	13	0	0	0	0	0	43
Total	0	89	6	0	95	3	0	0	0	3	0	43	0	0	43	0	0	0	0	0	141
Grand Total	0	173	6	0	179	4	0	0	0	4	0	174	0	0	174	0	0	0	0	0	357
Apprch %	0	96.6	3.4	0		100	0	0	0		0	100	0	0		0	0	0	0		
Total %	0	48.5	1.7	0	50.1	1.1	0	0	0	1.1	0	48.7	0	0	48.7	0	0	0	0	0	

	Rt 1 Southbound				Rt 632 Westbound				Rt 1 Northbound				Church Dvwy Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	0	6	0	6	0	0	0	0	0	6	0	6	0	0	0	0	12
08:15 AM	0	16	0	16	0	0	0	0	0	8	0	8	0	0	0	0	24
08:30 AM	0	**39**	**4**	**43**	**3**	0	0	**3**	0	**16**	0	**16**	0	0	0	0	**62**
08:45 AM	0	28	2	30	0	0	0	0	0	13	0	13	0	0	0	0	43
Total Volume	0	89	6	95	3	0	0	3	0	43	0	43	0	0	0	0	141
% App. Total	0	93.7	6.3		100	0	0		0	100	0		0	0	0		
PHF	.000	.571	.375	.552	.250	.000	.000	.250	.000	.672	.000	.672	.000	.000	.000	.000	.569

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	Rt 1 Southbound					Rt 632 Westbound					Rt 1 Northbound					Church Dvwy Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
06:00 AM	0	52	14	0	66	5	0	0	0	5	0	70	0	0	70	0	0	0	0	0	141
06:15 AM	0	54	9	0	63	0	0	0	0	0	0	114	0	0	114	0	0	0	0	0	177
06:30 AM	0	57	6	0	63	0	0	0	0	0	0	129	0	0	129	0	0	0	0	0	192
06:45 AM	0	73	12	0	85	2	0	0	0	2	0	141	0	0	141	0	1	0	0	1	229
Total	0	236	41	0	277	7	0	0	0	7	0	454	0	0	454	0	1	0	0	1	739
07:00 AM	0	76	22	0	98	3	0	0	0	3	0	122	0	0	122	0	0	0	0	0	223
07:15 AM	0	81	38	0	119	11	0	0	0	11	0	118	0	0	118	0	0	0	0	0	248
07:30 AM	0	102	59	0	161	35	0	0	0	35	0	140	0	0	140	0	0	0	0	0	336
07:45 AM	0	75	54	0	129	38	0	1	0	39	0	119	0	0	119	0	0	0	0	0	287
Total	0	334	173	0	507	87	0	1	0	88	0	499	0	0	499	0	0	0	0	0	1094
08:00 AM	0	66	29	0	95	10	0	0	0	10	0	97	0	0	97	0	0	0	0	0	202
08:15 AM	0	68	34	0	102	5	0	0	0	5	0	121	0	0	121	0	0	0	0	0	228
08:30 AM	3	111	35	0	149	58	0	1	0	59	0	149	0	0	149	0	0	0	0	0	357
08:45 AM	1	93	24	0	118	22	0	0	0	22	0	112	1	0	113	0	0	1	0	1	254
Total	4	338	122	0	464	95	0	1	0	96	0	479	1	0	480	0	0	1	0	1	1041
Grand Total	4	908	336	0	1248	189	0	2	0	191	0	1432	1	0	1433	0	1	1	0	2	2874
Apprch %	0.3	72.8	26.9	0		99	0	1	0		0	99.9	0.1	0		0	50	50	0		
Total %	0.1	31.6	11.7	0	43.4	6.6	0	0.1	0	6.6	0	49.8	0	0	49.9	0	0	0	0	0.1	

	Rt 1 Southbound				Rt 632 Westbound				Rt 1 Northbound				Church Dvwy Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	76	22	98	3	0	0	3	0	122	0	122	0	0	0	0	223
07:15 AM	0	81	38	119	11	0	0	11	0	118	0	118	0	0	0	0	248
07:30 AM	0	**102**	**59**	**161**	35	0	0	35	0	**140**	0	**140**	0	0	0	0	**336**
07:45 AM	0	75	54	129	**38**	0	**1**	**39**	0	119	0	119	0	0	0	0	287
Total Volume	0	334	173	507	87	0	1	88	0	499	0	499	0	0	0	0	1094
% App. Total	0	65.9	34.1		98.9	0	1.1		0	100	0		0	0	0		
PHF	.000	.819	.733	.787	.572	.000	.250	.564	.000	.891	.000	.891	.000	.000	.000	.000	.814

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Groups Printed- Car

	Rt 1 Southbound					Rt 632 Westbound					Rt 1 Northbound					Church Dvwy Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	0	169	6	0	175	22	0	0	0	22	0	104	0	0	104	1	0	2	0	3	304
04:15 PM	0	174	15	0	189	24	0	0	0	24	0	106	0	0	106	0	0	1	0	1	320
04:30 PM	0	198	7	0	205	30	0	0	0	30	0	117	0	0	117	0	0	0	0	0	352
04:45 PM	0	178	5	0	183	21	0	0	0	21	0	143	0	0	143	0	0	1	2	3	350
Total	0	719	33	0	752	97	0	0	0	97	0	470	0	0	470	1	0	4	2	7	1326
05:00 PM	0	162	9	0	171	21	1	0	0	22	1	146	0	0	147	0	0	1	0	1	341
05:15 PM	1	176	5	0	182	14	0	0	0	14	0	142	0	0	142	0	0	0	0	0	338
05:30 PM	0	175	14	0	189	3	0	0	0	3	0	128	0	0	128	0	0	0	0	0	320
05:45 PM	2	146	10	0	158	1	0	0	0	1	0	137	0	0	137	2	1	2	0	5	301
Total	3	659	38	0	700	39	1	0	0	40	1	553	0	0	554	2	1	3	0	6	1300
06:00 PM	2	174	4	0	180	9	0	0	0	9	0	89	0	0	89	1	0	0	0	1	279
06:15 PM	2	145	2	0	149	14	0	0	0	14	1	115	0	0	116	0	0	0	0	0	279
06:30 PM	1	136	4	0	141	26	0	0	0	26	0	95	0	0	95	0	0	0	0	0	262
06:45 PM	3	105	3	0	111	10	0	0	0	10	0	79	0	0	79	0	0	1	0	1	201
Total	8	560	13	0	581	59	0	0	0	59	1	378	0	0	379	1	0	1	0	2	1021
Grand Total	11	1938	84	0	2033	195	1	0	0	196	2	1401	0	0	1403	4	1	8	2	15	3647
Apprch %	0.5	95.3	4.1	0		99.5	0.5	0	0		0.1	99.9	0	0		26.7	6.7	53.3	13.3		
Total %	0.3	53.1	2.3	0	55.7	5.3	0	0	0	5.4	0.1	38.4	0	0	38.5	0.1	0	0.2	0.1	0.4	

	Rt 1 Southbound				Rt 632 Westbound				Rt 1 Northbound				Church Dvwy Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. 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	**198**	7	**205**	**30**	0	0	**30**	0	117	0	117	0	0	0	0	**352**
04:45 PM	0	178	5	183	21	0	0	21	0	143	0	143	0	0	**1**	**1**	348
05:00 PM	0	162	**9**	171	21	**1**	0	22	**1**	**146**	0	**147**	0	0	1	1	341
05:15 PM	**1**	176	5	182	14	0	0	14	0	142	0	142	0	0	0	0	338
Total Volume	1	714	26	741	86	1	0	87	1	548	0	549	0	0	2	2	1379
% App. Total	0.1	96.4	3.5		98.9	1.1	0		0.2	99.8	0		0	0	100		
PHF	.250	.902	.722	.904	.717	.250	.000	.725	.250	.938	.000	.934	.000	.000	.500	.500	.979

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Groups Printed- Truck

	Rt 1 Southbound					Rt 632 Westbound					Rt 1 Northbound					Church Dvwy Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	0	19	0	0	19	0	0	0	0	0	0	9	0	0	9	0	0	0	0	0	28
04:15 PM	0	29	0	0	29	1	0	0	0	1	0	6	0	0	6	0	0	0	0	0	36
04:30 PM	0	7	0	0	7	0	0	0	0	0	0	8	0	0	8	0	0	0	0	0	15
04:45 PM	0	12	0	0	12	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	14
Total	0	67	0	0	67	1	0	0	0	1	0	25	0	0	25	0	0	0	0	0	93
05:00 PM	0	9	0	0	9	0	0	0	0	0	0	8	0	0	8	0	0	0	0	0	17
05:15 PM	0	4	0	0	4	0	0	0	0	0	0	9	0	0	9	0	0	0	0	0	13
05:30 PM	0	5	0	0	5	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	7
05:45 PM	0	2	0	0	2	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	3
Total	0	20	0	0	20	0	0	0	0	0	0	20	0	0	20	0	0	0	0	0	40
06:00 PM	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2
06:15 PM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	2
06:30 PM	0	2	0	0	2	1	0	0	0	1	0	3	0	0	3	0	0	0	0	0	6
06:45 PM	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2
Total	0	4	0	0	4	1	0	0	0	1	0	7	0	0	7	0	0	0	0	0	12
Grand Total	0	91	0	0	91	2	0	0	0	2	0	52	0	0	52	0	0	0	0	0	145
Apprch %	0	100	0	0		100	0	0	0		0	100	0	0		0	0	0	0		
Total %	0	62.8	0	0	62.8	1.4	0	0	0	1.4	0	35.9	0	0	35.9	0	0	0	0	0	

	Rt 1 Southbound				Rt 632 Westbound				Rt 1 Northbound				Church Dvwy Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. 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	19	0	19	0	0	0	0	0	**9**	0	**9**	0	0	0	0	28
04:15 PM	0	**29**	0	**29**	**1**	0	0	**1**	0	6	0	6	0	0	0	0	**36**
04:30 PM	0	7	0	7	0	0	0	0	0	8	0	8	0	0	0	0	15
04:45 PM	0	12	0	12	0	0	0	0	0	2	0	2	0	0	0	0	14
Total Volume	0	67	0	67	1	0	0	1	0	25	0	25	0	0	0	0	93
% App. Total	0	100	0		100	0	0		0	100	0		0	0	0		
PHF	.000	.578	.000	.578	.250	.000	.000	.250	.000	.694	.000	.694	.000	.000	.000	.000	.646

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	Rt 1 Southbound					Rt 632 Westbound					Rt 1 Northbound					Church Dvwy Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	0	188	6	0	194	22	0	0	0	22	0	113	0	0	113	1	0	2	0	3	332
04:15 PM	0	203	15	0	218	25	0	0	0	25	0	112	0	0	112	0	0	1	0	1	356
04:30 PM	0	205	7	0	212	30	0	0	0	30	0	125	0	0	125	0	0	0	0	0	367
04:45 PM	0	190	5	0	195	21	0	0	0	21	0	145	0	0	145	0	0	1	2	3	364
Total	0	786	33	0	819	98	0	0	0	98	0	495	0	0	495	1	0	4	2	7	1419
05:00 PM	0	171	9	0	180	21	1	0	0	22	1	154	0	0	155	0	0	1	0	1	358
05:15 PM	1	180	5	0	186	14	0	0	0	14	0	151	0	0	151	0	0	0	0	0	351
05:30 PM	0	180	14	0	194	3	0	0	0	3	0	130	0	0	130	0	0	0	0	0	327
05:45 PM	2	148	10	0	160	1	0	0	0	1	0	138	0	0	138	2	1	2	0	5	304
Total	3	679	38	0	720	39	1	0	0	40	1	573	0	0	574	2	1	3	0	6	1340
06:00 PM	2	175	4	0	181	9	0	0	0	9	0	90	0	0	90	1	0	0	0	1	281
06:15 PM	2	145	2	0	149	14	0	0	0	14	1	117	0	0	118	0	0	0	0	0	281
06:30 PM	1	138	4	0	143	27	0	0	0	27	0	98	0	0	98	0	0	0	0	0	268
06:45 PM	3	106	3	0	112	10	0	0	0	10	0	80	0	0	80	0	0	1	0	1	203
Total	8	564	13	0	585	60	0	0	0	60	1	385	0	0	386	1	0	1	0	2	1033
Grand Total	11	2029	84	0	2124	197	1	0	0	198	2	1453	0	0	1455	4	1	8	2	15	3792
Apprch %	0.5	95.5	4	0		99.5	0.5	0	0		0.1	99.9	0	0		26.7	6.7	53.3	13.3		
Total %	0.3	53.5	2.2	0	56	5.2	0	0	0	5.2	0.1	38.3	0	0	38.4	0.1	0	0.2	0.1	0.4	

	Rt 1 Southbound				Rt 632 Westbound				Rt 1 Northbound				Church Dvwy Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. 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	203	**15**	**218**	25	0	0	25	0	112	0	112	0	0	**1**	**1**	356
04:30 PM	0	**205**	7	212	**30**	0	0	**30**	0	125	0	125	0	0	0	0	**367**
04:45 PM	0	190	5	195	21	0	0	21	0	145	0	145	0	0	1	1	362
05:00 PM	0	171	9	180	21	**1**	0	22	**1**	**154**	0	**155**	0	0	1	1	358
Total Volume	0	769	36	805	97	1	0	98	1	536	0	537	0	0	3	3	1443
% App. Total	0	95.5	4.5		99	1	0		0.2	99.8	0		0	0	100		
PHF	.000	.938	.600	.923	.808	.250	.000	.817	.250	.870	.000	.866	.000	.000	.750	.750	.983

Peggy Malone & Associates

904-992-8072

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Groups Printed- Car

	Rt 1 Southbound					Larkin Chew Rd Westbound					Rt 1 Northbound					North Point Dr Eastbound					
Start Time	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Int. Total**
06:00 AM	0	43	3	0	46	0	0	0	0	0	12	53	0	0	65	1	0	2	0	3	114
06:15 AM	0	47	5	0	52	1	0	0	0	1	7	89	0	0	96	0	0	0	0	0	149
06:30 AM	0	51	1	0	52	0	0	0	0	0	5	103	2	0	110	0	0	2	0	2	164
06:45 AM	1	64	1	0	66	0	0	1	0	1	5	127	0	0	132	0	0	2	0	2	201
Total	1	205	10	0	216	1	0	1	0	2	29	372	2	0	403	1	0	6	0	7	628
07:00 AM	0	56	3	0	59	1	0	0	0	1	7	115	0	0	122	2	0	0	0	2	184
07:15 AM	0	51	2	0	53	2	0	0	0	2	20	109	0	0	129	1	0	1	0	2	186
07:30 AM	1	73	7	0	81	4	0	4	0	8	23	115	3	0	141	0	1	2	0	3	233
07:45 AM	0	73	1	0	74	7	0	11	0	18	26	92	0	0	118	1	0	2	0	3	213
Total	1	253	13	0	267	14	0	15	0	29	76	431	3	0	510	4	1	5	0	10	816
08:00 AM	0	57	2	0	59	0	0	3	0	3	18	93	0	0	111	0	0	0	0	0	173
08:15 AM	0	52	1	0	53	1	1	2	0	4	18	113	0	0	131	0	0	2	0	2	190
08:30 AM	2	71	0	0	73	1	0	19	0	20	23	132	0	0	155	3	1	0	0	4	252
08:45 AM	2	65	2	0	69	2	0	16	0	18	1	96	1	0	98	3	1	1	0	5	190
Total	4	245	5	0	254	4	1	40	0	45	60	434	1	0	495	6	2	3	0	11	805
Grand Total	6	703	28	0	737	19	1	56	0	76	165	1237	6	0	1408	11	3	14	0	28	2249
Apprch %	0.8	95.4	3.8	0		25	1.3	73.7	0		11.7	87.9	0.4	0		39.3	10.7	50	0		
Total %	0.3	31.3	1.2	0	32.8	0.8	0	2.5	0	3.4	7.3	55	0.3	0	62.6	0.5	0.1	0.6	0	1.2	

	Rt 1 Southbound				Larkin Chew Rd Westbound				Rt 1 Northbound				North Point Dr Eastbound				
Start Time	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Int. 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	**73**	1	**74**	**7**	0	11	18	**26**	92	0	118	1	0	**2**	3	213
08:00 AM	0	57	**2**	59	0	0	3	3	18	93	0	111	0	0	0	0	173
08:15 AM	0	52	1	53	1	**1**	2	4	18	113	0	131	0	0	2	2	190
08:30 AM	**2**	71	0	73	1	0	**19**	**20**	23	**132**	0	**155**	**3**	**1**	0	**4**	**252**
Total Volume	2	253	4	259	9	1	35	45	85	430	0	515	4	1	4	9	828
% App. Total	0.8	97.7	1.5		20	2.2	77.8		16.5	83.5	0		44.4	11.1	44.4		
PHF	.250	.866	.500	.875	.321	.250	.461	.563	.817	.814	.000	.831	.333	.250	.500	.563	.821

Peggy Malone & Associates

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Groups Printed- Truck

	Rt 1 Southbound					Larkin Chew Rd Westbound					Rt 1 Northbound					North Point Dr Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
06:00 AM	0	6	0	0	6	10	0	2	0	12	0	4	0	0	4	0	0	0	0	0	22
06:15 AM	0	3	0	0	3	18	0	1	0	19	0	8	0	0	8	0	0	0	0	0	30
06:30 AM	0	3	0	0	3	17	0	1	0	18	0	9	0	0	9	0	0	0	0	0	30
06:45 AM	0	4	1	0	5	9	0	0	0	9	0	6	0	0	6	0	0	0	0	0	20
Total	0	16	1	0	17	54	0	4	0	58	0	27	0	0	27	0	0	0	0	0	102
07:00 AM	2	13	1	0	16	0	0	0	0	0	0	7	0	0	7	0	0	1	0	1	24
07:15 AM	0	14	9	0	23	0	0	0	0	0	2	8	0	0	10	0	0	1	0	1	34
07:30 AM	0	9	9	0	18	11	0	1	0	12	1	11	0	0	12	0	0	0	0	0	42
07:45 AM	1	9	0	0	10	7	0	1	0	8	1	5	0	0	6	1	0	0	0	1	25
Total	3	45	19	0	67	18	0	2	0	20	4	31	0	0	35	1	0	2	0	3	125
08:00 AM	1	6	1	0	8	1	0	0	0	1	1	5	2	0	8	1	0	0	0	1	18
08:15 AM	0	10	6	0	16	2	0	0	0	2	4	7	0	0	11	1	0	0	0	1	30
08:30 AM	1	14	23	0	38	3	0	2	0	5	5	12	0	0	17	0	0	0	0	0	60
08:45 AM	0	5	22	0	27	5	0	3	0	8	5	9	0	0	14	0	0	0	0	0	49
Total	2	35	52	0	89	11	0	5	0	16	15	33	2	0	50	2	0	0	0	2	157
Grand Total	5	96	72	0	173	83	0	11	0	94	19	91	2	0	112	3	0	2	0	5	384
Apprch %	2.9	55.5	41.6	0		88.3	0	11.7	0		17	81.2	1.8	0		60	0	40	0		
Total %	1.3	25	18.8	0	45.1	21.6	0	2.9	0	24.5	4.9	23.7	0.5	0	29.2	0.8	0	0.5	0	1.3	

	Rt 1 Southbound				Larkin Chew Rd Westbound				Rt 1 Northbound				North Point Dr Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	**1**	6	1	8	1	0	0	1	1	5	**2**	8	**1**	0	0	**1**	18
08:15 AM	0	10	6	16	2	0	0	2	4	7	0	11	1	0	0	1	30
08:30 AM	1	**14**	**23**	**38**	3	0	2	5	**5**	**12**	0	**17**	0	0	0	0	**60**
08:45 AM	0	5	22	27	**5**	0	**3**	**8**	5	9	0	14	0	0	0	0	49
Total Volume	2	35	52	89	11	0	5	16	15	33	2	50	2	0	0	2	157
% App. Total	2.2	39.3	58.4		68.8	0	31.2		30	66	4		100	0	0		
PHF	.500	.625	.565	.586	.550	.000	.417	.500	.750	.688	.250	.735	.500	.000	.000	.500	.654

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Groups Printed- Combined

	Rt 1 Southbound					Larkin Chew Rd Westbound					Rt 1 Northbound					North Point Dr Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
06:00 AM	0	49	3	0	52	10	0	2	0	12	12	57	0	0	69	1	0	2	0	3	136
06:15 AM	0	50	5	0	55	19	0	1	0	20	7	97	0	0	104	0	0	0	0	0	179
06:30 AM	0	54	1	0	55	17	0	1	0	18	5	112	2	0	119	0	0	2	0	2	194
06:45 AM	1	68	2	0	71	9	0	1	0	10	5	133	0	0	138	0	0	2	0	2	221
Total	1	221	11	0	233	55	0	5	0	60	29	399	2	0	430	1	0	6	0	7	730
07:00 AM	2	69	4	0	75	1	0	0	0	1	7	122	0	0	129	2	0	1	0	3	208
07:15 AM	0	65	11	0	76	2	0	0	0	2	22	117	0	0	139	1	0	2	0	3	220
07:30 AM	1	82	16	0	99	15	0	5	0	20	24	126	3	0	153	0	1	2	0	3	275
07:45 AM	1	82	1	0	84	14	0	12	0	26	27	97	0	0	124	2	0	2	0	4	238
Total	4	298	32	0	334	32	0	17	0	49	80	462	3	0	545	5	1	7	0	13	941
08:00 AM	1	63	3	0	67	1	0	3	0	4	19	98	2	0	119	1	0	0	0	1	191
08:15 AM	0	62	7	0	69	3	1	2	0	6	22	120	0	0	142	1	0	2	0	3	220
08:30 AM	3	85	23	0	111	4	0	21	0	25	28	144	0	0	172	3	1	0	0	4	312
08:45 AM	2	70	24	0	96	7	0	19	0	26	6	105	1	0	112	3	1	1	0	5	239
Total	6	280	57	0	343	15	1	45	0	61	75	467	3	0	545	8	2	3	0	13	962
Grand Total	11	799	100	0	910	102	1	67	0	170	184	1328	8	0	1520	14	3	16	0	33	2633
Apprch %	1.2	87.8	11	0		60	0.6	39.4	0		12.1	87.4	0.5	0		42.4	9.1	48.5	0		
Total %	0.4	30.3	3.8	0	34.6	3.9	0	2.5	0	6.5	7	50.4	0.3	0	57.7	0.5	0.1	0.6	0	1.3	

	Rt 1 Southbound				Larkin Chew Rd Westbound				Rt 1 Northbound				North Point Dr Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	1	63	3	67	1	0	3	4	19	98	**2**	119	1	0	0	1	191
08:15 AM	0	62	7	69	3	**1**	2	6	22	120	0	142	1	0	**2**	3	220
08:30 AM	**3**	**85**	23	**111**	4	0	**21**	25	**28**	**144**	0	**172**	**3**	**1**	0	4	**312**
08:45 AM	2	70	**24**	96	**7**	0	19	**26**	6	105	1	112	3	1	1	**5**	239
Total Volume	6	280	57	343	15	1	45	61	75	467	3	545	8	2	3	13	962
% App. Total	1.7	81.6	16.6		24.6	1.6	73.8		13.8	85.7	0.6		61.5	15.4	23.1		
PHF	.500	.824	.594	.773	.536	.250	.536	.587	.670	.811	.375	.792	.667	.500	.375	.650	.771

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Groups Printed- Car

	Rt 1 Southbound					Larkin Chew Rd Westbound					Rt 1 Northbound					North Point Dr Eastbound					
Start Time	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Int. Total**
04:00 PM	2	161	2	0	165	2	0	12	0	14	2	111	0	0	113	1	0	0	0	1	293
04:15 PM	2	177	0	0	179	4	0	7	0	11	3	105	0	0	108	0	0	1	0	1	299
04:30 PM	3	195	0	0	198	4	0	11	0	15	3	112	0	0	115	0	0	1	0	1	329
04:45 PM	2	168	3	0	173	6	1	13	0	20	2	130	1	0	133	1	0	3	0	4	330
Total	9	701	5	0	715	16	1	43	0	60	10	458	1	0	469	2	0	5	0	7	1251
05:00 PM	2	156	0	0	158	2	0	16	0	18	3	143	2	0	148	1	0	1	0	2	326
05:15 PM	2	180	1	0	183	3	0	2	0	5	1	141	2	0	144	3	0	2	0	5	337
05:30 PM	1	168	5	0	174	1	0	4	0	5	4	128	1	0	133	0	0	0	0	0	312
05:45 PM	0	141	4	0	145	1	0	1	0	2	2	130	1	0	133	0	0	1	0	1	281
Total	5	645	10	0	660	7	0	23	0	30	10	542	6	0	558	4	0	4	0	8	1256
06:00 PM	0	171	1	0	172	0	0	4	0	4	1	92	0	0	93	0	0	0	0	0	269
06:15 PM	2	143	0	0	145	2	0	9	0	11	0	118	1	0	119	0	0	0	0	0	275
06:30 PM	1	139	0	0	140	5	0	8	0	13	1	80	1	0	82	0	0	1	0	1	236
06:45 PM	1	104	0	0	105	1	0	1	0	2	1	81	0	0	82	1	0	0	0	1	190
Total	4	557	1	0	562	8	0	22	0	30	3	371	2	0	376	1	0	1	0	2	970
Grand Total	18	1903	16	0	1937	31	1	88	0	120	23	1371	9	0	1403	7	0	10	0	17	3477
Apprch %	0.9	98.2	0.8	0		25.8	0.8	73.3	0		1.6	97.7	0.6	0		41.2	0	58.8	0		
Total %	0.5	54.7	0.5	0	55.7	0.9	0	2.5	0	3.5	0.7	39.4	0.3	0	40.4	0.2	0	0.3	0	0.5	

	Rt 1 Southbound				Larkin Chew Rd Westbound				Rt 1 Northbound				North Point Dr Eastbound				
Start Time	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Int. 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	**3**	**195**	0	**198**	4	0	11	15	**3**	112	0	115	0	0	1	1	329
04:45 PM	2	168	**3**	173	**6**	**1**	13	**20**	2	130	1	133	1	0	**3**	4	330
05:00 PM	2	156	0	158	2	0	**16**	18	3	**143**	**2**	**148**	1	0	1	2	326
05:15 PM	2	180	1	183	3	0	2	5	1	141	2	144	**3**	0	2	**5**	**337**
Total Volume	9	699	4	712	15	1	42	58	9	526	5	540	5	0	7	12	1322
% App. Total	1.3	98.2	0.6		25.9	1.7	72.4		1.7	97.4	0.9		41.7	0	58.3		
PHF	.750	.896	.333	.899	.625	.250	.656	.725	.750	.920	.625	.912	.417	.000	.583	.600	.981

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Groups Printed- Truck

	Rt 1 Southbound					Larkin Chew Rd Westbound					Rt 1 Northbound					North Point Dr Eastbound					
Start Time	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Int. Total**
04:00 PM	0	5	13	0	18	1	0	0	0	1	1	7	0	0	8	0	0	0	0	0	27
04:15 PM	0	7	22	0	29	1	0	1	0	2	3	4	0	0	7	0	0	0	0	0	38
04:30 PM	0	2	5	0	7	0	0	1	0	1	0	8	0	0	8	0	0	0	0	0	16
04:45 PM	0	4	9	0	13	0	0	2	0	2	1	2	0	0	3	0	0	0	0	0	18
Total	0	18	49	0	67	2	0	4	0	6	5	21	0	0	26	0	0	0	0	0	99
05:00 PM	0	5	3	0	8	0	0	0	0	0	0	8	0	0	8	0	0	0	0	0	16
05:15 PM	0	3	1	0	4	0	0	0	0	0	0	8	0	0	8	0	0	0	0	0	12
05:30 PM	0	4	1	0	5	1	0	0	0	1	2	1	0	0	3	0	0	0	0	0	9
05:45 PM	0	1	1	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Total	0	13	6	0	19	1	0	0	0	1	2	17	0	0	19	0	0	0	0	0	39
06:00 PM	0	1	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
06:15 PM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	2
06:30 PM	0	1	1	0	2	1	0	0	0	1	0	2	0	0	2	0	0	0	0	0	5
06:45 PM	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2
Total	0	3	1	0	4	2	0	0	0	2	0	5	0	0	5	0	0	0	0	0	11
Grand Total	0	34	56	0	90	5	0	4	0	9	7	43	0	0	50	0	0	0	0	0	149
Apprch %	0	37.8	62.2	0		55.6	0	44.4	0		14	86	0	0		0	0	0	0		
Total %	0	22.8	37.6	0	60.4	3.4	0	2.7	0	6	4.7	28.9	0	0	33.6	0	0	0	0	0	

	Rt 1 Southbound				Larkin Chew Rd Westbound				Rt 1 Northbound				North Point Dr Eastbound				
Start Time	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Int. 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	5	13	18	**1**	0	0	1	1	7	0	**8**	0	0	0	0	27
04:15 PM	0	**7**	**22**	**29**	1	0	1	**2**	**3**	4	0	7	0	0	0	0	**38**
04:30 PM	0	2	5	7	0	0	1	1	0	**8**	0	8	0	0	0	0	16
04:45 PM	0	4	9	13	0	0	**2**	2	1	2	0	3	0	0	0	0	18
Total Volume	0	18	49	67	2	0	4	6	5	21	0	26	0	0	0	0	99
% App. Total	0	26.9	73.1		33.3	0	66.7		19.2	80.8	0		0	0	0		
PHF	.000	.643	.557	.578	.500	.000	.500	.750	.417	.656	.000	.813	.000	.000	.000	.000	.651

Peggy Malone & Associates

904-992-8072

File Name : 8-Route 1 and North Point Dr PM
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Groups Printed- Combined

	Rt 1 Southbound					Larkin Chew Rd Westbound					Rt 1 Northbound					North Point Dr Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	2	166	15	0	183	3	0	12	0	15	3	118	0	0	121	1	0	0	0	1	320
04:15 PM	2	184	22	0	208	5	0	8	0	13	6	109	0	0	115	0	0	1	0	1	337
04:30 PM	3	197	5	0	205	4	0	12	0	16	3	120	0	0	123	0	0	1	0	1	345
04:45 PM	2	172	12	0	186	6	1	15	0	22	3	132	1	0	136	1	0	3	0	4	348
Total	9	719	54	0	782	18	1	47	0	66	15	479	1	0	495	2	0	5	0	7	1350
05:00 PM	2	161	3	0	166	2	0	16	0	18	3	151	2	0	156	1	0	1	0	2	342
05:15 PM	2	183	2	0	187	3	0	2	0	5	1	149	2	0	152	3	0	2	0	5	349
05:30 PM	1	172	6	0	179	2	0	4	0	6	6	129	1	0	136	0	0	0	0	0	321
05:45 PM	0	142	5	0	147	1	0	1	0	2	2	130	1	0	133	0	0	1	0	1	283
Total	5	658	16	0	679	8	0	23	0	31	12	559	6	0	577	4	0	4	0	8	1295
06:00 PM	0	172	1	0	173	1	0	4	0	5	1	92	0	0	93	0	0	0	0	0	271
06:15 PM	2	143	0	0	145	2	0	9	0	11	0	120	1	0	121	0	0	0	0	0	277
06:30 PM	1	140	1	0	142	6	0	8	0	14	1	82	1	0	84	0	0	1	0	1	241
06:45 PM	1	105	0	0	106	1	0	1	0	2	1	82	0	0	83	1	0	0	0	1	192
Total	4	560	2	0	566	10	0	22	0	32	3	376	2	0	381	1	0	1	0	2	981
Grand Total	18	1937	72	0	2027	36	1	92	0	129	30	1414	9	0	1453	7	0	10	0	17	3626
Apprch %	0.9	95.6	3.6	0		27.9	0.8	71.3	0		2.1	97.3	0.6	0		41.2	0	58.8	0		
Total %	0.5	53.4	2	0	55.9	1	0	2.5	0	3.6	0.8	39	0.2	0	40.1	0.2	0	0.3	0	0.5	

	Rt 1 Southbound				Larkin Chew Rd Westbound				Rt 1 Northbound				North Point Dr Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. 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	**3**	**197**	5	**205**	4	0	12	16	**3**	120	0	123	0	0	1	1	345
04:45 PM	2	172	**12**	186	**6**	**1**	15	**22**	3	132	1	136	1	0	**3**	4	348
05:00 PM	2	161	3	166	2	0	**16**	18	3	**151**	**2**	**156**	1	0	1	2	342
05:15 PM	2	183	2	187	3	0	2	5	1	149	2	152	**3**	0	2	**5**	**349**
Total Volume	9	713	22	744	15	1	45	61	10	552	5	567	5	0	7	12	1384
% App. Total	1.2	95.8	3		24.6	1.6	73.8		1.8	97.4	0.9		41.7	0	58.3		
PHF	.750	.905	.458	.907	.625	.250	.703	.693	.833	.914	.625	.909	.417	.000	.583	.600	.991

Peggy Malone & Associates

904-992-8072

File Name : 9-Route 1 and S Roxbury Mill Rd AM
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Groups Printed- Car

	Rt 1 Southbound					S Roxbury Mill Rd Westbound					Rt 1 Northbound					Dollar General Eastbound					
Start Time	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Int. Total**
06:00 AM	0	46	1	0	47	3	0	1	0	4	0	61	1	0	62	1	0	0	0	1	114
06:15 AM	0	47	1	0	48	1	0	0	0	1	1	89	0	0	90	0	1	0	0	1	140
06:30 AM	0	56	0	0	56	3	0	5	0	8	3	112	0	0	115	0	0	0	0	0	179
06:45 AM	0	62	3	0	65	0	0	3	0	3	2	126	0	0	128	0	0	0	0	0	196
Total	0	211	5	0	216	7	0	9	0	16	6	388	1	0	395	1	1	0	0	2	629
07:00 AM	0	66	1	0	67	8	0	0	0	8	4	113	0	0	117	0	0	0	0	0	192
07:15 AM	0	44	1	0	45	6	0	4	0	10	3	122	1	0	126	0	0	0	0	0	181
07:30 AM	0	80	4	0	84	4	0	2	0	6	2	139	1	0	142	0	0	0	0	0	232
07:45 AM	0	73	3	0	76	3	0	0	0	3	4	112	0	0	116	0	0	0	0	0	195
Total	0	263	9	0	272	21	0	6	0	27	13	486	2	0	501	0	0	0	0	0	800
08:00 AM	2	60	2	0	64	4	1	2	0	7	4	105	2	0	111	2	1	0	0	3	185
08:15 AM	0	53	2	0	55	3	0	3	0	6	4	128	2	0	134	2	0	1	0	3	198
08:30 AM	4	78	7	0	89	5	0	0	0	5	2	134	4	0	140	2	0	2	0	4	238
08:45 AM	1	73	8	0	82	3	1	1	0	5	3	97	3	0	103	5	1	3	0	9	199
Total	7	264	19	0	290	15	2	6	0	23	13	464	11	0	488	11	2	6	0	19	820
Grand Total	7	738	33	0	778	43	2	21	0	66	32	1338	14	0	1384	12	3	6	0	21	2249
Apprch %	0.9	94.9	4.2	0		65.2	3	31.8	0		2.3	96.7	1	0		57.1	14.3	28.6	0		
Total %	0.3	32.8	1.5	0	34.6	1.9	0.1	0.9	0	2.9	1.4	59.5	0.6	0	61.5	0.5	0.1	0.3	0	0.9	

	Rt 1 Southbound				S Roxbury Mill Rd Westbound				Rt 1 Northbound				Dollar General Eastbound				
Start Time	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Int. Total**
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	2	60	2	64	4	**1**	2	**7**	**4**	105	2	111	2	**1**	0	3	185
08:15 AM	0	53	2	55	3	0	**3**	6	4	128	2	134	2	0	1	3	198
08:30 AM	**4**	**78**	7	**89**	**5**	0	0	5	2	**134**	**4**	**140**	2	0	2	4	**238**
08:45 AM	1	73	**8**	82	3	1	1	5	3	97	3	103	**5**	1	**3**	**9**	199
Total Volume	7	264	19	290	15	2	6	23	13	464	11	488	11	2	6	19	820
% App. Total	2.4	91	6.6		65.2	8.7	26.1		2.7	95.1	2.3		57.9	10.5	31.6		
PHF	.438	.846	.594	.815	.750	.500	.500	.821	.813	.866	.688	.871	.550	.500	.500	.528	.861

Peggy Malone & Associates

904-992-8072

File Name : 9-Route 1 and S Roxbury Mill Rd AM
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Groups Printed- Truck

	Rt 1 Southbound					S Roxbury Mill Rd Westbound					Rt 1 Northbound					Dollar General Eastbound					
Start Time	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Int. Total**
06:00 AM	0	7	0	0	7	0	0	1	0	1	0	5	0	0	5	0	0	0	0	0	13
06:15 AM	0	6	0	0	6	0	0	0	0	0	0	7	0	0	7	0	0	0	0	0	13
06:30 AM	0	4	0	0	4	0	0	0	0	0	1	9	0	0	10	0	0	0	0	0	14
06:45 AM	0	3	0	0	3	1	0	0	0	1	0	3	0	0	3	0	0	0	0	0	7
Total	0	20	0	0	20	1	0	1	0	2	1	24	0	0	25	0	0	0	0	0	47
07:00 AM	0	9	0	0	9	0	0	0	0	0	0	10	0	0	10	0	0	0	0	0	19
07:15 AM	0	14	0	0	14	1	0	0	0	1	1	7	0	0	8	0	0	0	0	0	23
07:30 AM	0	11	0	0	11	1	0	0	0	1	0	10	0	0	10	0	0	0	0	0	22
07:45 AM	0	8	0	0	8	0	0	0	0	0	0	8	1	0	9	0	0	0	0	0	17
Total	0	42	0	0	42	2	0	0	0	2	1	35	1	0	37	0	0	0	0	0	81
08:00 AM	0	7	0	0	7	0	0	0	0	0	0	7	0	0	7	1	0	0	0	1	15
08:15 AM	1	12	1	0	14	1	0	0	0	1	0	12	0	0	12	0	0	0	0	0	27
08:30 AM	0	14	0	0	14	0	0	0	0	0	0	17	0	0	17	0	0	0	0	0	31
08:45 AM	0	8	2	0	10	1	0	0	0	1	0	14	0	0	14	1	0	0	0	1	26
Total	1	41	3	0	45	2	0	0	0	2	0	50	0	0	50	2	0	0	0	2	99
Grand Total	1	103	3	0	107	5	0	1	0	6	2	109	1	0	112	2	0	0	0	2	227
Apprch %	0.9	96.3	2.8	0		83.3	0	16.7	0		1.8	97.3	0.9	0		100	0	0	0		
Total %	0.4	45.4	1.3	0	47.1	2.2	0	0.4	0	2.6	0.9	48	0.4	0	49.3	0.9	0	0	0	0.9	

	Rt 1 Southbound				S Roxbury Mill Rd Westbound				Rt 1 Northbound				Dollar General Eastbound				
Start Time	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Int. Total**
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	0	7	0	7	0	0	0	0	0	7	0	7	**1**	0	0	**1**	15
08:15 AM	**1**	12	1	**14**	**1**	0	0	**1**	0	12	0	12	0	0	0	0	27
08:30 AM	0	**14**	0	14	0	0	0	0	0	**17**	0	**17**	0	0	0	0	**31**
08:45 AM	0	8	**2**	10	1	0	0	1	0	14	0	14	1	0	0	1	26
Total Volume	1	41	3	45	2	0	0	2	0	50	0	50	2	0	0	2	99
% App. Total	2.2	91.1	6.7		100	0	0		0	100	0		100	0	0		
PHF	.250	.732	.375	.804	.500	.000	.000	.500	.000	.735	.000	.735	.500	.000	.000	.500	.798

Peggy Malone & Associates

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File Name : 9-Route 1 and S Roxbury Mill Rd AM
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Groups Printed- Combined

	Rt 1 Southbound					S Roxbury Mill Rd Westbound					Rt 1 Northbound					Dollar General Eastbound					
Start Time	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Int. Total**
06:00 AM	0	53	1	0	54	3	0	2	0	5	0	66	1	0	67	1	0	0	0	1	127
06:15 AM	0	53	1	0	54	1	0	0	0	1	1	96	0	0	97	0	1	0	0	1	153
06:30 AM	0	60	0	0	60	3	0	5	0	8	4	121	0	0	125	0	0	0	0	0	193
06:45 AM	0	65	3	0	68	1	0	3	0	4	2	129	0	0	131	0	0	0	0	0	203
Total	0	231	5	0	236	8	0	10	0	18	7	412	1	0	420	1	1	0	0	2	676
07:00 AM	0	75	1	0	76	8	0	0	0	8	4	123	0	0	127	0	0	0	0	0	211
07:15 AM	0	58	1	0	59	7	0	4	0	11	4	129	1	0	134	0	0	0	0	0	204
07:30 AM	0	91	4	0	95	5	0	2	0	7	2	149	1	0	152	0	0	0	0	0	254
07:45 AM	0	81	3	0	84	3	0	0	0	3	4	120	1	0	125	0	0	0	0	0	212
Total	0	305	9	0	314	23	0	6	0	29	14	521	3	0	538	0	0	0	0	0	881
08:00 AM	2	67	2	0	71	4	1	2	0	7	4	112	2	0	118	3	1	0	0	4	200
08:15 AM	1	65	3	0	69	4	0	3	0	7	4	140	2	0	146	2	0	1	0	3	225
08:30 AM	4	92	7	0	103	5	0	0	0	5	2	151	4	0	157	2	0	2	0	4	269
08:45 AM	1	81	10	0	92	4	1	1	0	6	3	111	3	0	117	6	1	3	0	10	225
Total	8	305	22	0	335	17	2	6	0	25	13	514	11	0	538	13	2	6	0	21	919
Grand Total	8	841	36	0	885	48	2	22	0	72	34	1447	15	0	1496	14	3	6	0	23	2476
Apprch %	0.9	95	4.1	0		66.7	2.8	30.6	0		2.3	96.7	1	0		60.9	13	26.1	0		
Total %	0.3	34	1.5	0	35.7	1.9	0.1	0.9	0	2.9	1.4	58.4	0.6	0	60.4	0.6	0.1	0.2	0	0.9	

	Rt 1 Southbound				S Roxbury Mill Rd Westbound				Rt 1 Northbound				Dollar General Eastbound				
Start Time	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Int. Total**
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	2	67	2	71	4	**1**	2	**7**	**4**	112	2	118	3	**1**	0	4	200
08:15 AM	1	65	3	69	4	0	**3**	7	4	140	2	146	2	0	1	3	225
08:30 AM	**4**	**92**	7	**103**	**5**	0	0	5	2	**151**	**4**	**157**	2	0	2	4	**269**
08:45 AM	1	81	**10**	92	4	1	1	6	3	111	3	117	**6**	1	**3**	**10**	225
Total Volume	8	305	22	335	17	2	6	25	13	514	11	538	13	2	6	21	919
% App. Total	2.4	91	6.6		68	8	24		2.4	95.5	2		61.9	9.5	28.6		
PHF	.500	.829	.550	.813	.850	.500	.500	.893	.813	.851	.688	.857	.542	.500	.500	.525	.854

Peggy Malone & Associates

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File Name : 9-Route 1 and S Roxbury Mill Rd PM
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Groups Printed- Car

	Rt 1 Southbound					S Roxbury Mill Rd Westbound					Rt 1 Northbound					Dollar General Eastbound					
Start Time	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Int. Total**
04:00 PM	2	173	3	0	178	4	1	5	0	10	4	98	1	0	103	3	1	2	1	7	298
04:15 PM	9	168	0	0	177	5	0	2	0	7	1	107	1	0	109	5	0	2	0	7	300
04:30 PM	2	201	1	0	204	5	0	3	0	8	4	109	4	0	117	8	0	2	0	10	339
04:45 PM	7	186	2	0	195	1	0	8	0	9	2	131	0	0	133	4	0	0	0	4	341
Total	20	728	6	0	754	15	1	18	0	34	11	445	6	0	462	20	1	6	1	28	1278
05:00 PM	3	166	2	0	171	6	1	6	0	13	3	142	3	0	148	6	0	1	2	9	341
05:15 PM	4	188	4	0	196	5	0	2	0	7	2	132	3	0	137	5	0	0	0	5	345
05:30 PM	3	149	4	0	156	3	0	6	0	9	4	130	5	0	139	5	0	2	0	7	311
05:45 PM	3	142	6	0	151	5	1	4	0	10	6	131	5	0	142	9	0	1	0	10	313
Total	13	645	16	0	674	19	2	18	0	39	15	535	16	0	566	25	0	4	2	31	1310
06:00 PM	7	170	5	0	182	4	0	2	2	8	3	79	3	0	85	8	0	2	0	10	285
06:15 PM	3	150	1	0	154	2	1	3	0	6	0	121	4	0	125	4	1	1	0	6	291
06:30 PM	1	138	5	0	144	3	1	4	0	8	0	77	3	0	80	11	0	0	1	12	244
06:45 PM	1	115	0	0	116	2	0	3	0	5	1	78	3	0	82	2	0	1	0	3	206
Total	12	573	11	0	596	11	2	12	2	27	4	355	13	0	372	25	1	4	1	31	1026
Grand Total	45	1946	33	0	2024	45	5	48	2	100	30	1335	35	0	1400	70	2	14	4	90	3614
Apprch %	2.2	96.1	1.6	0		45	5	48	2		2.1	95.4	2.5	0		77.8	2.2	15.6	4.4		
Total %	1.2	53.8	0.9	0	56	1.2	0.1	1.3	0.1	2.8	0.8	36.9	1	0	38.7	1.9	0.1	0.4	0.1	2.5	

	Rt 1 Southbound				S Roxbury Mill Rd Westbound				Rt 1 Northbound				Dollar General Eastbound				
Start Time	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Int. 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	2	**201**	1	**204**	5	0	3	8	**4**	109	**4**	117	**8**	0	**2**	**10**	339
04:45 PM	**7**	186	2	195	1	0	**8**	9	2	131	0	133	4	0	0	4	341
05:00 PM	3	166	2	171	**6**	**1**	6	**13**	3	**142**	3	**148**	6	0	1	7	339
05:15 PM	4	188	**4**	196	5	0	2	7	2	132	3	137	5	0	0	5	**345**
Total Volume	16	741	9	766	17	1	19	37	11	514	10	535	23	0	3	26	1364
% App. Total	2.1	96.7	1.2		45.9	2.7	51.4		2.1	96.1	1.9		88.5	0	11.5		
PHF	.571	.922	.563	.939	.708	.250	.594	.712	.688	.905	.625	.904	.719	.000	.375	.650	.988

Peggy Malone & Associates

904-992-8072

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Groups Printed- Truck

	Rt 1 Southbound					S Roxbury Mill Rd Westbound					Rt 1 Northbound					Dollar General Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	0	4	0	0	4	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	9
04:15 PM	0	7	0	0	7	0	0	0	0	0	0	5	0	0	5	0	0	0	0	0	12
04:30 PM	0	5	0	0	5	0	0	0	0	0	0	6	0	0	6	0	0	0	0	0	11
04:45 PM	0	5	0	0	5	0	0	0	0	0	0	4	0	0	4	0	0	0	0	0	9
Total	0	21	0	0	21	0	0	0	0	0	0	20	0	0	20	0	0	0	0	0	41
05:00 PM	0	5	0	0	5	0	0	1	0	1	0	7	0	0	7	0	0	0	0	0	13
05:15 PM	0	3	0	0	3	0	0	0	0	0	0	8	0	0	8	0	0	0	0	0	11
05:30 PM	0	4	0	0	4	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	7
05:45 PM	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	2
Total	0	13	0	0	13	0	0	1	0	1	0	19	0	0	19	0	0	0	0	0	33
06:00 PM	0	2	0	0	2	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	3
06:15 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1
06:30 PM	0	2	0	0	2	0	0	1	0	1	0	2	0	0	2	0	0	0	0	0	5
06:45 PM	1	2	0	0	3	0	0	0	0	0	1	2	0	0	3	0	0	0	0	0	6
Total	1	6	0	0	7	0	0	1	0	1	1	6	0	0	7	0	0	0	0	0	15
Grand Total	1	40	0	0	41	0	0	2	0	2	1	45	0	0	46	0	0	0	0	0	89
Apprch %	2.4	97.6	0	0		0	0	100	0		2.2	97.8	0	0		0	0	0	0		
Total %	1.1	44.9	0	0	46.1	0	0	2.2	0	2.2	1.1	50.6	0	0	51.7	0	0	0	0	0	

	Rt 1 Southbound				S Roxbury Mill Rd Westbound				Rt 1 Northbound				Dollar General Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. 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	**7**	0	**7**	0	0	0	0	0	5	0	5	0	0	0	0	12
04:30 PM	0	5	0	5	0	0	0	0	0	6	0	6	0	0	0	0	11
04:45 PM	0	5	0	5	0	0	0	0	0	4	0	4	0	0	0	0	9
05:00 PM	0	5	0	5	0	0	**1**	**1**	0	**7**	0	**7**	0	0	0	0	**13**
Total Volume	0	22	0	22	0	0	1	1	0	22	0	22	0	0	0	0	45
% App. Total	0	100	0		0	0	100		0	100	0		0	0	0		
PHF	.000	.786	.000	.786	.000	.000	.250	.250	.000	.786	.000	.786	.000	.000	.000	.000	.865

Peggy Malone & Associates

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	Rt 1 Southbound					S Roxbury Mill Rd Westbound					Rt 1 Northbound					Dollar General Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	2	177	3	0	182	4	1	5	0	10	4	103	1	0	108	3	1	2	1	7	307
04:15 PM	9	175	0	0	184	5	0	2	0	7	1	112	1	0	114	5	0	2	0	7	312
04:30 PM	2	206	1	0	209	5	0	3	0	8	4	115	4	0	123	8	0	2	0	10	350
04:45 PM	7	191	2	0	200	1	0	8	0	9	2	135	0	0	137	4	0	0	0	4	350
Total	20	749	6	0	775	15	1	18	0	34	11	465	6	0	482	20	1	6	1	28	1319
05:00 PM	3	171	2	0	176	6	1	7	0	14	3	149	3	0	155	6	0	1	2	9	354
05:15 PM	4	191	4	0	199	5	0	2	0	7	2	140	3	0	145	5	0	0	0	5	356
05:30 PM	3	153	4	0	160	3	0	6	0	9	4	133	5	0	142	5	0	2	0	7	318
05:45 PM	3	143	6	0	152	5	1	4	0	10	6	132	5	0	143	9	0	1	0	10	315
Total	13	658	16	0	687	19	2	19	0	40	15	554	16	0	585	25	0	4	2	31	1343
06:00 PM	7	172	5	0	184	4	0	2	2	8	3	80	3	0	86	8	0	2	0	10	288
06:15 PM	3	150	1	0	154	2	1	3	0	6	0	122	4	0	126	4	1	1	0	6	292
06:30 PM	1	140	5	0	146	3	1	5	0	9	0	79	3	0	82	11	0	0	1	12	249
06:45 PM	2	117	0	0	119	2	0	3	0	5	2	80	3	0	85	2	0	1	0	3	212
Total	13	579	11	0	603	11	2	13	2	28	5	361	13	0	379	25	1	4	1	31	1041
Grand Total	46	1986	33	0	2065	45	5	50	2	102	31	1380	35	0	1446	70	2	14	4	90	3703
Apprch %	2.2	96.2	1.6	0		44.1	4.9	49	2		2.1	95.4	2.4	0		77.8	2.2	15.6	4.4		
Total %	1.2	53.6	0.9	0	55.8	1.2	0.1	1.4	0.1	2.8	0.8	37.3	0.9	0	39	1.9	0.1	0.4	0.1	2.4	

	Rt 1 Southbound				S Roxbury Mill Rd Westbound				Rt 1 Northbound				Dollar General Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. 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	2	**206**	1	**209**	5	0	3	8	**4**	115	**4**	123	**8**	0	**2**	**10**	350
04:45 PM	**7**	191	2	200	1	0	**8**	9	2	135	0	137	4	0	0	4	350
05:00 PM	3	171	2	176	**6**	**1**	7	**14**	3	**149**	3	**155**	6	0	1	7	352
05:15 PM	4	191	**4**	199	5	0	2	7	2	140	3	145	5	0	0	5	**356**
Total Volume	16	759	9	784	17	1	20	38	11	539	10	560	23	0	3	26	1408
% App. Total	2	96.8	1.1		44.7	2.6	52.6		2	96.2	1.8		88.5	0	11.5		
PHF	.571	.921	.563	.938	.708	.250	.625	.679	.688	.904	.625	.903	.719	.000	.375	.650	.989

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Groups Printed- Car

	Rt 1 Southbound					Mudd Tavern Rd Westbound					Rt 1 Northbound					Morris Rd Eastbound					
Start Time	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Int. Total**
06:00 AM	3	16	33	0	52	19	14	0	0	33	55	33	3	0	91	3	63	13	0	79	255
06:15 AM	6	13	26	0	45	20	20	6	0	46	57	53	6	0	116	4	75	25	0	104	311
06:30 AM	9	16	31	0	56	16	15	11	0	42	91	67	3	0	161	6	86	32	0	124	383
06:45 AM	9	28	31	0	68	27	17	7	0	51	61	73	9	0	143	7	92	31	0	130	392
Total	27	73	121	0	221	82	66	24	0	172	264	226	21	0	511	20	316	101	0	437	1341
07:00 AM	6	22	38	0	66	21	25	12	0	58	49	66	13	0	128	2	79	26	0	107	359
07:15 AM	10	19	23	0	52	29	22	16	0	67	62	67	10	0	139	6	82	29	0	117	375
07:30 AM	13	29	40	0	82	37	28	19	0	84	62	73	10	0	145	5	107	29	0	141	452
07:45 AM	8	35	28	0	71	29	32	28	0	89	45	64	6	0	115	8	60	27	0	95	370
Total	37	105	129	0	271	116	107	75	0	298	218	270	39	0	527	21	328	111	0	460	1556
08:00 AM	5	31	28	0	64	22	21	18	0	61	40	62	4	0	106	1	64	20	1	86	317
08:15 AM	14	23	24	0	61	37	26	10	0	73	44	64	5	0	113	5	58	28	0	91	338
08:30 AM	15	21	37	0	73	27	19	14	0	60	43	73	2	0	118	6	45	43	0	94	345
08:45 AM	14	25	30	0	69	28	17	18	0	63	29	49	8	0	86	4	40	23	0	67	285
Total	48	100	119	0	267	114	83	60	0	257	156	248	19	0	423	16	207	114	1	338	1285
Grand Total	112	278	369	0	759	312	256	159	0	727	638	744	79	0	1461	57	851	326	1	1235	4182
Apprch %	14.8	36.6	48.6	0		42.9	35.2	21.9	0		43.7	50.9	5.4	0		4.6	68.9	26.4	0.1		
Total %	2.7	6.6	8.8	0	18.1	7.5	6.1	3.8	0	17.4	15.3	17.8	1.9	0	34.9	1.4	20.3	7.8	0	29.5	

	Rt 1 Southbound				Mudd Tavern Rd Westbound				Rt 1 Northbound				Morris Rd Eastbound				
Start Time	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Int. Total**
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 06:45 AM																	
06:45 AM	9	28	31	68	27	17	7	51	61	**73**	9	143	**7**	92	**31**	130	392
07:00 AM	6	22	38	66	21	25	12	58	49	66	**13**	128	2	79	26	107	359
07:15 AM	10	19	23	52	29	22	16	67	**62**	67	10	139	6	82	29	117	375
07:30 AM	**13**	**29**	**40**	**82**	**37**	**28**	**19**	**84**	62	73	10	**145**	5	**107**	29	**141**	**452**
Total Volume	38	98	132	268	114	92	54	260	234	279	42	555	20	360	115	495	1578
% App. Total	14.2	36.6	49.3		43.8	35.4	20.8		42.2	50.3	7.6		4	72.7	23.2		
PHF	.731	.845	.825	.817	.770	.821	.711	.774	.944	.955	.808	.957	.714	.841	.927	.878	.873

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Groups Printed- Truck

	Rt 1 Southbound					Mudd Tavern Rd Westbound					Rt 1 Northbound					Morris Rd Eastbound					
Start Time	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Int. Total**
06:00 AM	0	2	4	0	6	3	1	0	0	4	1	2	0	0	3	0	2	1	0	3	16
06:15 AM	3	2	1	0	6	2	1	0	0	3	2	2	1	0	5	1	1	2	0	4	18
06:30 AM	0	3	2	0	5	5	0	0	0	5	3	3	0	0	6	0	1	2	0	3	19
06:45 AM	0	0	3	0	3	1	2	0	0	3	1	2	1	0	4	2	4	1	0	7	17
Total	3	7	10	0	20	11	4	0	0	15	7	9	2	0	18	3	8	6	0	17	70
07:00 AM	2	2	4	0	8	9	2	1	0	12	0	0	2	0	2	1	1	0	0	2	24
07:15 AM	3	2	8	0	13	4	5	0	0	9	1	3	2	0	6	0	0	1	0	1	29
07:30 AM	3	4	5	0	12	5	5	0	0	10	2	3	1	0	6	0	2	0	0	2	30
07:45 AM	2	3	3	0	8	6	6	0	0	12	0	2	2	0	4	0	1	1	0	2	26
Total	10	11	20	0	41	24	18	1	0	43	3	8	7	0	18	1	4	2	0	7	109
08:00 AM	2	4	3	0	9	2	4	0	0	6	3	3	0	0	6	1	5	1	0	7	28
08:15 AM	4	2	7	0	13	3	9	1	0	13	2	5	1	0	8	0	4	4	0	8	42
08:30 AM	2	4	8	0	14	8	5	1	0	14	0	6	0	0	6	4	6	6	0	16	50
08:45 AM	4	3	4	0	11	7	6	0	0	13	2	3	0	0	5	2	1	6	0	9	38
Total	12	13	22	0	47	20	24	2	0	46	7	17	1	0	25	7	16	17	0	40	158
Grand Total	25	31	52	0	108	55	46	3	0	104	17	34	10	0	61	11	28	25	0	64	337
Apprch %	23.1	28.7	48.1	0		52.9	44.2	2.9	0		27.9	55.7	16.4	0		17.2	43.8	39.1	0		
Total %	7.4	9.2	15.4	0	32	16.3	13.6	0.9	0	30.9	5	10.1	3	0	18.1	3.3	8.3	7.4	0	19	

	Rt 1 Southbound				Mudd Tavern Rd Westbound				Rt 1 Northbound				Morris Rd Eastbound				
Start Time	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Int. Total**
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	2	**4**	3	9	2	4	0	6	**3**	3	0	6	1	5	1	7	28
08:15 AM	**4**	2	7	13	3	**9**	**1**	13	2	5	**1**	**8**	0	4	4	8	42
08:30 AM	2	4	**8**	**14**	**8**	5	1	**14**	0	**6**	0	6	**4**	**6**	**6**	**16**	**50**
08:45 AM	4	3	4	11	7	6	0	13	2	3	0	5	2	1	6	9	38
Total Volume	12	13	22	47	20	24	2	46	7	17	1	25	7	16	17	40	158
% App. Total	25.5	27.7	46.8		43.5	52.2	4.3		28	68	4		17.5	40	42.5		
PHF	.750	.813	.688	.839	.625	.667	.500	.821	.583	.708	.250	.781	.438	.667	.708	.625	.790

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	Rt 1 Southbound					Mudd Tavern Rd Westbound					Rt 1 Northbound					Morris Rd Eastbound					
Start Time	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Int. Total**
06:00 AM	3	18	37	0	58	22	15	0	0	37	56	35	3	0	94	3	65	14	0	82	271
06:15 AM	9	15	27	0	51	22	21	6	0	49	59	55	7	0	121	5	76	27	0	108	329
06:30 AM	9	19	33	0	61	21	15	11	0	47	94	70	3	0	167	6	87	34	0	127	402
06:45 AM	9	28	34	0	71	28	19	7	0	54	62	75	10	0	147	9	96	32	0	137	409
Total	30	80	131	0	241	93	70	24	0	187	271	235	23	0	529	23	324	107	0	454	1411
07:00 AM	8	24	42	0	74	30	27	13	0	70	49	66	15	0	130	3	80	26	0	109	383
07:15 AM	13	21	31	0	65	33	27	16	0	76	63	70	12	0	145	6	82	30	0	118	404
07:30 AM	16	33	45	0	94	42	33	19	0	94	64	76	11	0	151	5	109	29	0	143	482
07:45 AM	10	38	31	0	79	35	38	28	0	101	45	66	8	0	119	8	61	28	0	97	396
Total	47	116	149	0	312	140	125	76	0	341	221	278	46	0	545	22	332	113	0	467	1665
08:00 AM	7	35	31	0	73	24	25	18	0	67	43	65	4	0	112	2	69	21	1	93	345
08:15 AM	18	25	31	0	74	40	35	11	0	86	46	69	6	0	121	5	62	32	0	99	380
08:30 AM	17	25	45	0	87	35	24	15	0	74	43	79	2	0	124	10	51	49	0	110	395
08:45 AM	18	28	34	0	80	35	23	18	0	76	31	52	8	0	91	6	41	29	0	76	323
Total	60	113	141	0	314	134	107	62	0	303	163	265	20	0	448	23	223	131	1	378	1443
Grand Total	137	309	421	0	867	367	302	162	0	831	655	778	89	0	1522	68	879	351	1	1299	4519
Apprch %	15.8	35.6	48.6	0		44.2	36.3	19.5	0		43	51.1	5.8	0		5.2	67.7	27	0.1		
Total %	3	6.8	9.3	0	19.2	8.1	6.7	3.6	0	18.4	14.5	17.2	2	0	33.7	1.5	19.5	7.8	0	28.7	

	Rt 1 Southbound				Mudd Tavern Rd Westbound				Rt 1 Northbound				Morris Rd Eastbound				
Start Time	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Int. Total**
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 06:45 AM																	
06:45 AM	9	28	34	71	28	19	7	54	62	75	10	147	**9**	96	**32**	137	409
07:00 AM	8	24	42	74	30	27	13	70	49	66	**15**	130	3	80	26	109	383
07:15 AM	13	21	31	65	33	27	16	76	63	70	12	145	6	82	30	118	404
07:30 AM	**16**	**33**	**45**	**94**	**42**	**33**	**19**	**94**	**64**	**76**	11	**151**	5	**109**	29	**143**	**482**
Total Volume	46	106	152	304	133	106	55	294	238	287	48	573	23	367	117	507	1678
% App. Total	15.1	34.9	50		45.2	36.1	18.7		41.5	50.1	8.4		4.5	72.4	23.1		
PHF	.719	.803	.844	.809	.792	.803	.724	.782	.930	.944	.800	.949	.639	.842	.914	.886	.870

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	Rt 1 Southbound					Mudd Tavern Rd Westbound					Rt 1 Northbound					Morris Rd Eastbound					
Start Time	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Int. Total**
04:00 PM	47	98	38	0	183	28	77	43	0	148	27	46	18	0	91	7	31	14	0	52	474
04:15 PM	51	94	24	0	169	37	71	63	0	171	23	45	9	0	77	10	47	22	0	79	496
04:30 PM	54	124	40	0	218	37	61	53	0	151	20	54	7	0	81	14	46	27	0	87	537
04:45 PM	44	106	41	0	191	44	82	73	0	199	24	64	10	1	99	7	43	26	1	77	566
Total	196	422	143	0	761	146	291	232	0	669	94	209	44	1	348	38	167	89	1	295	2073
05:00 PM	52	97	37	0	186	49	89	67	0	205	27	67	7	0	101	9	28	33	0	70	562
05:15 PM	43	112	34	0	189	39	63	73	0	175	26	73	16	0	115	7	34	27	0	68	547
05:30 PM	52	90	19	0	161	72	78	55	0	205	21	45	14	0	80	10	31	19	0	60	506
05:45 PM	41	84	29	0	154	42	75	59	0	176	27	57	9	0	93	13	51	32	0	96	519
Total	188	383	119	0	690	202	305	254	0	761	101	242	46	0	389	39	144	111	0	294	2134
06:00 PM	42	101	40	0	183	32	60	52	0	144	26	39	16	0	81	11	45	13	0	69	477
06:15 PM	31	87	40	0	158	40	67	43	0	150	20	55	10	0	85	10	43	29	0	82	475
06:30 PM	29	87	35	0	151	25	45	54	0	124	20	38	4	0	62	6	26	18	0	50	387
06:45 PM	27	69	21	0	117	26	52	53	0	131	19	41	4	0	64	14	21	15	0	50	362
Total	129	344	136	0	609	123	224	202	0	549	85	173	34	0	292	41	135	75	0	251	1701
Grand Total	513	1149	398	0	2060	471	820	688	0	1979	280	624	124	1	1029	118	446	275	1	840	5908
Apprch %	24.9	55.8	19.3	0		23.8	41.4	34.8	0		27.2	60.6	12.1	0.1		14	53.1	32.7	0.1		
Total %	8.7	19.4	6.7	0	34.9	8	13.9	11.6	0	33.5	4.7	10.6	2.1	0	17.4	2	7.5	4.7	0	14.2	

	Rt 1 Southbound				Mudd Tavern Rd Westbound				Rt 1 Northbound				Morris Rd Eastbound				
Start Time	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Int. 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	**54**	**124**	40	**218**	37	61	53	151	20	54	7	81	**14**	**46**	27	**87**	537
04:45 PM	44	106	**41**	191	44	82	**73**	199	24	64	10	98	7	43	26	76	**564**
05:00 PM	52	97	37	186	**49**	**89**	67	**205**	**27**	67	7	101	9	28	**33**	70	562
05:15 PM	43	112	34	189	39	63	73	175	26	**73**	**16**	**115**	7	34	27	68	547
Total Volume	193	439	152	784	169	295	266	730	97	258	40	395	37	151	113	301	2210
% App. Total	24.6	56	19.4		23.2	40.4	36.4		24.6	65.3	10.1		12.3	50.2	37.5		
PHF	.894	.885	.927	.899	.862	.829	.911	.890	.898	.884	.625	.859	.661	.821	.856	.865	.980

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	Rt 1 Southbound					Mudd Tavern Rd Westbound					Rt 1 Northbound					Morris Rd Eastbound					
Start Time	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Thru**	**Left**	**Peds**	**App. Total**	**Int. Total**
04:00 PM	1	1	1	0	3	0	1	1	0	2	1	1	0	0	2	3	0	2	0	5	12
04:15 PM	0	0	4	0	4	1	1	1	0	3	2	1	2	0	5	1	7	2	0	10	22
04:30 PM	0	0	2	0	2	1	2	1	0	4	1	0	0	0	1	2	3	1	0	6	13
04:45 PM	0	2	1	0	3	0	1	2	0	3	2	3	0	0	5	0	0	2	0	2	13
Total	1	3	8	0	12	2	5	5	0	12	6	5	2	0	13	6	10	7	0	23	60
05:00 PM	0	6	1	0	7	3	3	0	0	6	0	4	1	0	5	0	0	0	0	0	18
05:15 PM	1	1	1	0	3	7	0	1	0	8	1	0	0	0	1	1	3	1	0	5	17
05:30 PM	1	1	1	0	3	1	1	2	0	4	0	0	1	0	1	0	1	2	0	3	11
05:45 PM	0	0	1	0	1	1	0	2	0	3	0	1	0	0	1	1	1	0	0	2	7
Total	2	8	4	0	14	12	4	5	0	21	1	5	2	0	8	2	5	3	0	10	53
06:00 PM	0	1	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
06:15 PM	0	0	0	0	0	0	3	1	0	4	1	0	0	0	1	1	2	0	0	3	8
06:30 PM	0	2	1	0	3	2	1	1	0	4	0	0	0	0	0	0	1	0	0	1	8
06:45 PM	0	1	1	0	2	1	1	1	0	3	1	1	0	0	2	0	0	1	0	1	8
Total	0	4	2	0	6	4	5	3	0	12	2	1	0	0	3	1	3	1	0	5	26
Grand Total	3	15	14	0	32	18	14	13	0	45	9	11	4	0	24	9	18	11	0	38	139
Apprch %	9.4	46.9	43.8	0		40	31.1	28.9	0		37.5	45.8	16.7	0		23.7	47.4	28.9	0		
Total %	2.2	10.8	10.1	0	23	12.9	10.1	9.4	0	32.4	6.5	7.9	2.9	0	17.3	6.5	12.9	7.9	0	27.3	

	Rt 1 Southbound				Mudd Tavern Rd Westbound				Rt 1 Northbound				Morris Rd Eastbound				
Start Time	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Right**	**Thru**	**Left**	**App. Total**	**Int. 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	0	**4**	4	1	1	1	3	**2**	1	**2**	**5**	1	**7**	**2**	**10**	**22**
04:30 PM	0	0	2	2	1	2	1	4	1	0	0	1	**2**	3	1	6	13
04:45 PM	0	2	1	3	0	1	**2**	3	2	3	0	5	0	0	2	2	13
05:00 PM	0	**6**	1	**7**	**3**	**3**	0	**6**	0	**4**	1	5	0	0	0	0	18
Total Volume	0	8	8	16	5	7	4	16	5	8	3	16	3	10	5	18	66
% App. Total	0	50	50		31.2	43.8	25		31.2	50	18.8		16.7	55.6	27.8		
PHF	.000	.333	.500	.571	.417	.583	.500	.667	.625	.500	.375	.800	.375	.357	.625	.450	.750

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	Rt 1 Southbound					Mudd Tavern Rd Westbound					Rt 1 Northbound					Morris Rd Eastbound					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:00 PM	48	99	39	0	186	28	78	44	0	150	28	47	18	0	93	10	31	16	0	57	486
04:15 PM	51	94	28	0	173	38	72	64	0	174	25	46	11	0	82	11	54	24	0	89	518
04:30 PM	54	124	42	0	220	38	63	54	0	155	21	54	7	0	82	16	49	28	0	93	550
04:45 PM	44	108	42	0	194	44	83	75	0	202	26	67	10	1	104	7	43	28	1	79	579
Total	197	425	151	0	773	148	296	237	0	681	100	214	46	1	361	44	177	96	1	318	2133
05:00 PM	52	103	38	0	193	52	92	67	0	211	27	71	8	0	106	9	28	33	0	70	580
05:15 PM	44	113	35	0	192	46	63	74	0	183	27	73	16	0	116	8	37	28	0	73	564
05:30 PM	53	91	20	0	164	73	79	57	0	209	21	45	15	0	81	10	32	21	0	63	517
05:45 PM	41	84	30	0	155	43	75	61	0	179	27	58	9	0	94	14	52	32	0	98	526
Total	190	391	123	0	704	214	309	259	0	782	102	247	48	0	397	41	149	114	0	304	2187
06:00 PM	42	102	40	0	184	33	60	52	0	145	26	39	16	0	81	11	45	13	0	69	479
06:15 PM	31	87	40	0	158	40	70	44	0	154	21	55	10	0	86	11	45	29	0	85	483
06:30 PM	29	89	36	0	154	27	46	55	0	128	20	38	4	0	62	6	27	18	0	51	395
06:45 PM	27	70	22	0	119	27	53	54	0	134	20	42	4	0	66	14	21	16	0	51	370
Total	129	348	138	0	615	127	229	205	0	561	87	174	34	0	295	42	138	76	0	256	1727
Grand Total	516	1164	412	0	2092	489	834	701	0	2024	289	635	128	1	1053	127	464	286	1	878	6047
Apprch %	24.7	55.6	19.7	0		24.2	41.2	34.6	0		27.4	60.3	12.2	0.1		14.5	52.8	32.6	0.1		
Total %	8.5	19.2	6.8	0	34.6	8.1	13.8	11.6	0	33.5	4.8	10.5	2.1	0	17.4	2.1	7.7	4.7	0	14.5	

	Rt 1 Southbound				Mudd Tavern Rd Westbound				Rt 1 Northbound				Morris Rd Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. 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	**54**	**124**	**42**	**220**	38	63	54	155	21	54	7	82	**16**	**49**	28	**93**	550
04:45 PM	44	108	42	194	44	83	**75**	202	26	67	10	103	7	43	28	78	577
05:00 PM	52	103	38	193	**52**	**92**	67	**211**	**27**	71	8	106	9	28	**33**	70	**580**
05:15 PM	44	113	35	192	46	63	74	183	27	**73**	**16**	**116**	8	37	28	73	564
Total Volume	194	448	157	799	180	301	270	751	101	265	41	407	40	157	117	314	2271
% App. Total	24.3	56.1	19.6		24	40.1	36		24.8	65.1	10.1		12.7	50	37.3		
PHF	.898	.903	.935	.908	.865	.818	.900	.890	.935	.908	.641	.877	.625	.801	.886	.844	.979

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	Rt 1 Southbound				Rt 1 Northbound				Rt 603 Eastbound				
Start Time	**Right**	**Thru**	**Peds**	**App. Total**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Left**	**Peds**	**App. Total**	**Int. Total**
06:00 AM	2	12	0	14	48	0	0	48	0	44	0	44	106
06:15 AM	2	12	0	14	67	0	0	67	3	63	0	66	147
06:30 AM	7	26	0	33	72	0	0	72	0	81	0	81	186
06:45 AM	5	30	0	35	79	0	0	79	0	56	0	56	170
Total	16	80	0	96	266	0	0	266	3	244	0	247	609
07:00 AM	11	26	0	37	72	0	0	72	0	49	0	49	158
07:15 AM	7	22	0	29	78	0	0	78	0	55	0	55	162
07:30 AM	8	34	0	42	80	0	0	80	0	66	0	66	188
07:45 AM	13	35	0	48	75	0	0	75	0	43	0	43	166
Total	39	117	0	156	305	0	0	305	0	213	0	213	674
08:00 AM	12	37	0	49	57	0	0	57	0	59	0	59	165
08:15 AM	10	24	0	34	73	0	0	73	0	47	0	47	154
08:30 AM	14	17	0	31	67	0	0	67	0	43	0	43	141
08:45 AM	15	30	0	45	60	0	0	60	0	26	0	26	131
Total	51	108	0	159	257	0	0	257	0	175	0	175	591
Grand Total	106	305	0	411	828	0	0	828	3	632	0	635	1874
Apprch %	25.8	74.2	0		100	0	0		0.5	99.5	0		
Total %	5.7	16.3	0	21.9	44.2	0	0	44.2	0.2	33.7	0	33.9	

	Rt 1 Southbound			Rt 1 Northbound			Rt 603 Eastbound			
Start Time	**Right**	**Thru**	**App. Total**	**Thru**	**Left**	**App. Total**	**Right**	**Left**	**App. Total**	**Int. Total**
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:15 AM										
07:15 AM	7	22	29	78	0	78	0	55	55	162
07:30 AM	8	34	42	**80**	0	**80**	0	**66**	**66**	**188**
07:45 AM	**13**	35	48	75	0	75	0	43	43	166
08:00 AM	12	**37**	**49**	57	0	57	0	59	59	165
Total Volume	40	128	168	290	0	290	0	223	223	681
% App. Total	23.8	76.2		100	0		0	100		
PHF	.769	.865	.857	.906	.000	.906	.000	.845	.845	.906

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Groups Printed- Truck

	Rt 1 Southbound				Rt 1 Northbound				Rt 603 Eastbound				
Start Time	**Right**	**Thru**	**Peds**	**App. Total**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Left**	**Peds**	**App. Total**	**Int. Total**
06:00 AM	1	2	0	3	1	0	0	1	0	2	0	2	6
06:15 AM	0	2	0	2	3	0	0	3	0	1	0	1	6
06:30 AM	1	3	0	4	2	0	0	2	0	1	0	1	7
06:45 AM	0	1	0	1	2	0	0	2	0	1	0	1	4
Total	2	8	0	10	8	0	0	8	0	5	0	5	23
07:00 AM	0	4	0	4	6	0	0	6	0	0	0	0	10
07:15 AM	0	2	0	2	2	0	0	2	0	0	0	0	4
07:30 AM	2	1	0	3	6	0	0	6	0	0	0	0	9
07:45 AM	0	2	0	2	3	0	0	3	0	1	0	1	6
Total	2	9	0	11	17	0	0	17	0	1	0	1	29
08:00 AM	1	6	0	7	7	0	0	7	0	0	0	0	14
08:15 AM	0	3	0	3	6	0	0	6	0	2	0	2	11
08:30 AM	0	6	0	6	4	0	0	4	0	0	0	0	10
08:45 AM	0	5	0	5	1	0	0	1	0	1	0	1	7
Total	1	20	0	21	18	0	0	18	0	3	0	3	42
Grand Total	5	37	0	42	43	0	0	43	0	9	0	9	94
Apprch %	11.9	88.1	0		100	0	0		0	100	0		
Total %	5.3	39.4	0	44.7	45.7	0	0	45.7	0	9.6	0	9.6	

	Rt 1 Southbound			Rt 1 Northbound			Rt 603 Eastbound			
Start Time	**Right**	**Thru**	**App. Total**	**Thru**	**Left**	**App. Total**	**Right**	**Left**	**App. Total**	**Int. Total**
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 08:00 AM										
08:00 AM	**1**	**6**	**7**	**7**	0	**7**	0	0	0	**14**
08:15 AM	0	3	3	6	0	6	0	**2**	**2**	11
08:30 AM	0	6	6	4	0	4	0	0	0	10
08:45 AM	0	5	5	1	0	1	0	1	1	7
Total Volume	1	20	21	18	0	18	0	3	3	42
% App. Total	4.8	95.2		100	0		0	100		
PHF	.250	.833	.750	.643	.000	.643	.000	.375	.375	.750

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	Rt 1 Southbound				Rt 1 Northbound				Rt 603 Eastbound				
Start Time	**Right**	**Thru**	**Peds**	**App. Total**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Left**	**Peds**	**App. Total**	**Int. Total**
06:00 AM	3	14	0	17	49	0	0	49	0	46	0	46	112
06:15 AM	2	14	0	16	70	0	0	70	3	64	0	67	153
06:30 AM	8	29	0	37	74	0	0	74	0	82	0	82	193
06:45 AM	5	31	0	36	81	0	0	81	0	57	0	57	174
Total	18	88	0	106	274	0	0	274	3	249	0	252	632
07:00 AM	11	30	0	41	78	0	0	78	0	49	0	49	168
07:15 AM	7	24	0	31	80	0	0	80	0	55	0	55	166
07:30 AM	10	35	0	45	86	0	0	86	0	66	0	66	197
07:45 AM	13	37	0	50	78	0	0	78	0	44	0	44	172
Total	41	126	0	167	322	0	0	322	0	214	0	214	703
08:00 AM	13	43	0	56	64	0	0	64	0	59	0	59	179
08:15 AM	10	27	0	37	79	0	0	79	0	49	0	49	165
08:30 AM	14	23	0	37	71	0	0	71	0	43	0	43	151
08:45 AM	15	35	0	50	61	0	0	61	0	27	0	27	138
Total	52	128	0	180	275	0	0	275	0	178	0	178	633
Grand Total	111	342	0	453	871	0	0	871	3	641	0	644	1968
Apprch %	24.5	75.5	0		100	0	0		0.5	99.5	0		
Total %	5.6	17.4	0	23	44.3	0	0	44.3	0.2	32.6	0	32.7	

	Rt 1 Southbound			Rt 1 Northbound			Rt 603 Eastbound			
Start Time	**Right**	**Thru**	**App. Total**	**Thru**	**Left**	**App. Total**	**Right**	**Left**	**App. Total**	**Int. Total**
Peak Hour Analysis From 06:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:15 AM										
07:15 AM	7	24	31	80	0	80	0	55	55	166
07:30 AM	10	35	45	**86**	0	**86**	0	**66**	**66**	**197**
07:45 AM	**13**	37	50	78	0	78	0	44	44	172
08:00 AM	13	**43**	**56**	64	0	64	0	59	59	179
Total Volume	43	139	182	308	0	308	0	224	224	714
% App. Total	23.6	76.4		100	0		0	100		
PHF	.827	.808	.813	.895	.000	.895	.000	.848	.848	.906

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	Rt 1 Southbound				Rt 1 Northbound				Rt 603 Eastbound				
Start Time	**Right**	**Thru**	**Peds**	**App. Total**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Left**	**Peds**	**App. Total**	**Int. Total**
04:00 PM	46	85	0	131	57	1	0	58	0	30	0	30	219
04:15 PM	56	94	0	150	54	1	0	55	1	23	0	24	229
04:30 PM	70	109	0	179	52	0	0	52	0	31	0	31	262
04:45 PM	73	120	0	193	56	0	0	56	0	21	0	21	270
Total	245	408	0	653	219	2	0	221	1	105	0	106	980
05:00 PM	58	98	0	156	67	1	0	68	0	29	0	29	253
05:15 PM	68	105	0	173	75	1	0	76	0	25	0	25	274
05:30 PM	71	103	0	174	58	0	0	58	0	39	0	39	271
05:45 PM	44	96	0	140	53	0	0	53	0	18	0	18	211
Total	241	402	0	643	253	2	0	255	0	111	0	111	1009
06:00 PM	54	92	0	146	57	0	0	57	0	23	0	23	226
06:15 PM	57	85	0	142	65	0	0	65	0	23	0	23	230
06:30 PM	57	90	0	147	40	0	0	40	0	20	0	20	207
06:45 PM	50	81	0	131	30	0	0	30	2	27	0	29	190
Total	218	348	0	566	192	0	0	192	2	93	0	95	853
Grand Total	704	1158	0	1862	664	4	0	668	3	309	0	312	2842
Apprch %	37.8	62.2	0		99.4	0.6	0		1	99	0		
Total %	24.8	40.7	0	65.5	23.4	0.1	0	23.5	0.1	10.9	0	11	

	Rt 1 Southbound			Rt 1 Northbound			Rt 603 Eastbound			
Start Time	**Right**	**Thru**	**App. Total**	**Thru**	**Left**	**App. Total**	**Right**	**Left**	**App. Total**	**Int. 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	**73**	**120**	**193**	56	0	56	0	21	21	270
05:00 PM	58	98	156	67	**1**	68	0	29	29	253
05:15 PM	68	105	173	**75**	1	**76**	0	25	25	**274**
05:30 PM	71	103	174	58	0	58	0	**39**	**39**	271
Total Volume	270	426	696	256	2	258	0	114	114	1068
% App. Total	38.8	61.2		99.2	0.8		0	100		
PHF	.925	.888	.902	.853	.500	.849	.000	.731	.731	.974

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	Rt 1 Southbound				Rt 1 Northbound				Rt 603 Eastbound				
Start Time	**Right**	**Thru**	**Peds**	**App. Total**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Left**	**Peds**	**App. Total**	**Int. Total**
04:00 PM	2	4	0	6	1	0	0	1	0	0	0	0	7
04:15 PM	1	3	0	4	3	0	0	3	0	2	0	2	9
04:30 PM	1	4	0	5	2	0	0	2	0	0	0	0	7
04:45 PM	0	2	0	2	5	0	0	5	0	0	0	0	7
Total	4	13	0	17	11	0	0	11	0	2	0	2	30
05:00 PM	1	4	0	5	4	0	0	4	0	0	0	0	9
05:15 PM	2	2	0	4	0	0	0	0	0	0	0	0	4
05:30 PM	1	3	0	4	1	0	0	1	0	0	0	0	5
05:45 PM	3	0	0	3	1	0	0	1	0	0	0	0	4
Total	7	9	0	16	6	0	0	6	0	0	0	0	22
06:00 PM	2	1	0	3	0	0	0	0	0	0	0	0	3
06:15 PM	1	1	0	2	1	0	0	1	0	0	0	0	3
06:30 PM	1	1	0	2	0	0	0	0	0	0	0	0	2
06:45 PM	0	1	0	1	1	0	0	1	0	1	0	1	3
Total	4	4	0	8	2	0	0	2	0	1	0	1	11
Grand Total	15	26	0	41	19	0	0	19	0	3	0	3	63
Apprch %	36.6	63.4	0		100	0	0		0	100	0		
Total %	23.8	41.3	0	65.1	30.2	0	0	30.2	0	4.8	0	4.8	

	Rt 1 Southbound			Rt 1 Northbound			Rt 603 Eastbound			
Start Time	**Right**	**Thru**	**App. Total**	**Thru**	**Left**	**App. Total**	**Right**	**Left**	**App. Total**	**Int. 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	**1**	3	4	3	0	3	0	**2**	**2**	**9**
04:30 PM	1	**4**	**5**	2	0	2	0	0	0	7
04:45 PM	0	2	2	**5**	0	**5**	0	0	0	7
05:00 PM	1	4	5	4	0	4	0	0	0	9
Total Volume	3	13	16	14	0	14	0	2	2	32
% App. Total	18.8	81.2		100	0		0	100		
PHF	.750	.813	.800	.700	.000	.700	.000	.250	.250	.889

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	Rt 1 Southbound				Rt 1 Northbound				Rt 603 Eastbound				
Start Time	**Right**	**Thru**	**Peds**	**App. Total**	**Thru**	**Left**	**Peds**	**App. Total**	**Right**	**Left**	**Peds**	**App. Total**	**Int. Total**
04:00 PM	48	89	0	137	58	1	0	59	0	30	0	30	226
04:15 PM	57	97	0	154	57	1	0	58	1	25	0	26	238
04:30 PM	71	113	0	184	54	0	0	54	0	31	0	31	269
04:45 PM	73	122	0	195	61	0	0	61	0	21	0	21	277
Total	249	421	0	670	230	2	0	232	1	107	0	108	1010
05:00 PM	59	102	0	161	71	1	0	72	0	29	0	29	262
05:15 PM	70	107	0	177	75	1	0	76	0	25	0	25	278
05:30 PM	72	106	0	178	59	0	0	59	0	39	0	39	276
05:45 PM	47	96	0	143	54	0	0	54	0	18	0	18	215
Total	248	411	0	659	259	2	0	261	0	111	0	111	1031
06:00 PM	56	93	0	149	57	0	0	57	0	23	0	23	229
06:15 PM	58	86	0	144	66	0	0	66	0	23	0	23	233
06:30 PM	58	91	0	149	40	0	0	40	0	20	0	20	209
06:45 PM	50	82	0	132	31	0	0	31	2	28	0	30	193
Total	222	352	0	574	194	0	0	194	2	94	0	96	864
Grand Total	719	1184	0	1903	683	4	0	687	3	312	0	315	2905
Apprch %	37.8	62.2	0		99.4	0.6	0		1	99	0		
Total %	24.8	40.8	0	65.5	23.5	0.1	0	23.6	0.1	10.7	0	10.8	

	Rt 1 Southbound			Rt 1 Northbound			Rt 603 Eastbound			
Start Time	**Right**	**Thru**	**App. Total**	**Thru**	**Left**	**App. Total**	**Right**	**Left**	**App. Total**	**Int. 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	**73**	**122**	**195**	61	0	61	0	21	21	277
05:00 PM	59	102	161	71	**1**	72	0	29	29	262
05:15 PM	70	107	177	**75**	1	**76**	0	25	25	**278**
05:30 PM	72	106	178	59	0	59	0	**39**	**39**	276
Total Volume	274	437	711	266	2	268	0	114	114	1093
% App. Total	38.5	61.5		99.3	0.7		0	100		
PHF	.938	.895	.912	.887	.500	.882	.000	.731	.731	.983

Appendix B: Level-of-Service Concept

Level of service (LOS) is a concept developed to quantify the degree of comfort (including such elements as travel time, number of stops, total amount of stopped delay, and impediments caused by other vehicles) afforded to drivers as they travel through an intersection or roadway segment. Six grades are used to denote the various level of service from "A" to "F".[1]

Signalized Intersections

The six level-of-service grades are described qualitatively for signalized intersections in Table C1. Additionally, Table C2 identifies the relationship between level of service and average control delay per vehicle. Control delay is defined to include initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. Using this definition, Level of Service "D" is generally considered to represent the minimum acceptable design standard.

Table C1: Level-of-Service Definitions (Signalized Intersections)

Level of Service	Average Delay per Vehicle
A	Very low average control delay, less than 10 seconds per vehicle. This occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop at all. Short cycle lengths may also contribute to low delay.
B	Average control delay is greater than 10 seconds per vehicle and less than or equal to 20 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for a level of service A, causing higher levels of average delay.
C	Average control delay is greater than 20 seconds per vehicle and less than or equal to 35 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
D	Average control delay is greater than 35 seconds per vehicle and less than or equal to 55 seconds per vehicle. The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle length, or high volume/capacity ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	Average control delay is greater than 55 seconds per vehicle and less than or equal to 80 seconds per vehicle. This is usually considered to be the limit of acceptable delay. These high delay values generally (but not always) indicate poor progression, long cycle lengths, and high volume/capacity ratios. Individual cycle failures are frequent occurrences.
F	Average control delay is in excess of 80 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with oversaturation. It may

[1] Most of the material in this Appendix is adapted from the Transportation Research Board, Highway Capacity Manual, (2010).

	also occur at high volume/capacity ratios below 1.0 with many individual cycle failures. Poor progression and long cycle lengths may also contribute to such high delay values.

Most of the material in this Appendix is adapted from the Transportation Research Board, Highway Capacity Manual, (2000).

Table C2: Level-of-Service Criteria for Signalized Intersections

Level of Service	Average Control Delay per Vehicle (Seconds)
A	<10.0
B	>10 and (20
C	>20 and (35
D	>35 and (55
E	>55 and (80
F	>80

Unsignalized Intersections

Unsignalized intersections include two-way stop-controlled (TWSC) and all-way stop-controlled (AWSC) intersections. The 2010 Highway Capacity Manual (HCM) provides models for estimating control delay at both TWSC and AWSC intersections. A qualitative description of the various service levels associated with an unsignalized intersection is presented in Table C3. A quantitative definition of level of service for unsignalized intersections is presented in Table C4. Using this definition, Level of Service "E" is generally considered to represent the minimum acceptable design standard.

Table C3: Level-of-Service Criteria for Unsignalized Intersections

Level of Service	Average Delay per Vehicle to Minor Street
A	• Nearly all drivers find freedom of operation. • Very seldom is there more than one vehicle in queue.
B	• Some drivers begin to consider the delay an inconvenience. • Occasionally there is more than one vehicle in queue.
C	• Many times, there is more than one vehicle in queue. • Most drivers feel restricted, but not objectionably so.
D	• Often there is more than one vehicle in queue. • Drivers feel quite restricted.
E	• Represents a condition in which the demand is near or equal to the probable maximum number of vehicles that can be accommodated by the movement. • There is almost always more than one vehicle in queue.

	• Drivers find the delays approaching intolerable levels.
F	• Forced flow. • Represents an intersection failure condition that is caused by geometric and/or operational constraints external to the intersection.

Table C4: Level-of-Service Criteria for Unsignalized Intersections

Level of Service	Average Control Delay per Vehicle (Seconds)
A	<10.0
B	>10.0 and <15.0
C	>15.0 and <25.0
D	>25.0 and <35.0
E	>35.0 and <50.0
F	>50.0

It should be noted that the level-of-service criteria for unsignalized intersections are somewhat different than the criteria used for signalized intersections. The primary reason for this difference is that drivers expect different levels of performance from different kinds of transportation facilities. The expectation is that a signalized intersection is designed to carry higher traffic volumes than an unsignalized intersection. Additionally, there are a number of driver behavior considerations that combine to make delays at signalized intersections less galling than at unsignalized intersections. For example, drivers at signalized intersections are able to relax during the red interval, while drivers on the minor street approaches to TWSC intersections must remain attentive to the task of identifying acceptable gaps and vehicle conflicts. Also, there is often much more variability in the amount of delay experienced by individual drivers at unsignalized intersections than signalized intersections. For these reasons, it is considered that the control delay threshold for any given level of service is less for an unsignalized intersection than for a signalized intersection. While overall intersection level of service is calculated for AWSC intersections, level of service is only calculated for the minor approaches and the major street left turn movements at TWSC intersections. No delay is assumed to the major street through movements. For TWSC intersections, the overall intersection level of service remains undefined: level of service is only calculated for each minor street lane.

In the performance evaluation of TWSC intersections, it is important to consider other measures of effectiveness (MOEs) in addition to delay, such as v/c ratios for individual movements, average queue lengths, and 95th-percentile queue lengths. By focusing on a single MOE for the worst movement only, such as delay for the minor-street left turn, users may make inappropriate traffic control decisions. The potential for making such inappropriate decisions is likely to be particularly pronounced when the HCM level-of-service thresholds are adopted as legal standards, as is the case in many public agencies.

Appendix C: Existing Conditions Level-of-Service

Table C.1. Existing Conditions – Summary of Peak Hour Levels of Service, 95th Percentile Back of Queue, and Delay for Each Lane Group by Intersection

Intersection Information					AM Peak Hour			PM Peak Hour		
Intersection	Traffic Control	Approach	Lane Group	Existing/ Proposed turn-lane lengths	LOS	Back of Queue (feet)	Delay (sec)	LOS	Back of Queue (feet)	Delay (sec)
US-1 and Commonwealth Commuter Lot (Intersection 1)	Two-Way Stop Controlled	EB	EBL	-	A	0	0	A	0	0
			EBR	-	B	0	11	C	10	15.3
		EB Approach			B	-	11	C	-	15.3
		NB	NBL	-	A	0	0	A	0	0
			NBTR	-	-	0	0	-	0	0
		NB Approach			A	-	0	A	-	0
		SB	SBLT	-	-	0	0	-	0	0
			SBR	-	-	0	0	-	0	0
		SB Approach			A	-	0	A	-	0
US-1 and Old Telegraph Road (Intersection 2)	Two-Way Stop Controlled	WB	WBLR	-	C	0	19.1	C	2	23.1
		WB Approach			C	-	19.1	C	-	23.1
		NB	NBT	-	-	0	0	-	0	0
			NBR	-	-	0	0	-	0	0
		NB Approach			A	-	0	A	-	0
		SB	SBL	-	A	0	9.8	B	0	12
			SBT	-	A	0	0	A	0	0.3
		SB Approach			A	-	0	A	-	0.4
US-1 and Lad Land Drive/Central Transport (Intersection 3)	Two-Way Stop Controlled	EB	EBLT	-	C	26	24.2	F	38	73.1
			EBR	50	B	0	10.5	B	2	12.7
		EB Approach			C	-	23.8	F	-	61
		WB	WBLTR	-	C	0	15.6	D	0	34.3
		WB Approach			C	-	15.6	D	-	34.3
		NB	NBL	-	A	0	9	B	0	11.3
			NBT	-	-	0	0	-	0	0
			NBR	185'	-	0	0	-	0	0
		NB Approach			A	-	0	A	-	0.1
		SB	SBLT	-	-	0	0	B	0	10.8
			SBR	400'	-	0	0	-	0	0
		SB Approach			A	-	0	A	-	0

US-1 and Massaponax Church Road (Intersection 4)	Signalized	EB	EBLT	-	E	281	62.4	E	175	71
			EBR	330'	D	46	43.3	D	0	52.8
		EB Approach			D	-	52	E	-	60.3
		WB	WBLT	-	F	482	87.1	E	255	71.3
			WBR	550'	D	44	39	D	0	45.5
		WB Approach			E	-	70	E	-	63.4
		NB	NBL	200'	C	138	30.5	C	64	23.7
			NBT	-	D	235	40.9	C	159	27.9
			NBR	115'	D	62	35.6	B	1	16.2
		NB Approach			D	-	37.7	C	-	24.7
		SB	SBL	180'	C	75	32.2	C	117	27.3
			SBT	-	D	252	47.7	D	262	38.4
			SBR	250'	D	0	37.5	C	0	31.1
		SB Approach			D	-	44.8	C	-	35
		Overall LOS			D	-	49.2	D	-	41
US-1 and Guinea Station Road (Intersection 5)	Two-Way Stop Controlled	EB	EBLTR	-	A	0	0	A	-	0
		EB Approach			A	-	0	A	-	0
		WB	WBLT	200'	F	98	450.2	F	68	124.3
			WBR	-	B	38	14.3	B	16	11.9
		WB Approach			F	-	80.1	E	-	45.1
		NB	NBL	-	A	0	0	A	0	0
			NBT	-	-	0	0	-	0	0
			NBR	115'	-	0	0	-	0	0
		NB Approach			A	-	0	A	-	0
		SB	SBL	390'	B	36	11.8	A	12	9.8
			SBT	-	-	0	0	-	0	0
			SBR	-	-	0	0	-	0	0
		SB Approach			A	-	3.4	A	-	1.2
US-1 and River Run Parkway (Intersection 6)	Signalized	EB	EBLT	-	D	22	35.9	E	71	67.5
			EBR	-	-	0	0	E	0	61.4
		EB Approach			D	-	35.9	E	-	65.5
		WB	WBLT	-	D	30	39.2	E	20	62.2
			WBR	-	B	20	18.8	D	46	47.7
		WB Approach			C	-	23.3	D	-	48.5
		NB	NBL	290'	D	23	53.2	E	17	79.5
			NBT	-	B	197	16	A	151	9.8
			NBR	300'	B	0	12.7	A	0	8
		NB Approach			B	-	16.5	B	-	10.8
		SB	SBL	1000'	C	185	28.2	F	456	204.1
			SBT	-	A	100	5.6	A	96	4.1
			SBR	305'	A	3	4.8	A	0	3.8
		SB Approach			B	-	12.5	D	-	49.1
		Overall LOS			B	-	15	D	-	36.9

US-1 and Hickory Ridge Road (Intersection 7)	Two-Way Stop Controlled	EB	EBL	-	C	16	24.4	D	12	32.1
			EBR	250'	B	4	10.3	B	4	11.6
		EB Approach			C	-	17.4	C	-	19.1
		NB	NBL	315'	A	4	8.9	B	4	10.1
			NBT	-	-	0	0	-	0	0
		NB Approach			A	-	0.8	A	-	0.8
		SB	SBT	-	-	0	0	-	0	0
			SBR	200'	-	0	0	-	0	0
		SB Approach			A	-	0	A	-	0
US-1 and North Roxbury Mill Road (Intersection 8)	Two-Way Stop Controlled	EB	EBLTR	-	E	0	36.9	D	2	28.4
		EB Approach			E	-	36.9	D	-	28.4
		WB	WBLTR	-	B	6	10.8	B	10	10.5
		WB Approach			B	-	10.8	B	-	10.5
		NB	NBL	-	A	0	0	A	0	0
			NBT	-	-	0	0	-	0	0
			NBR	-	-	0	0	-	0	0
		NB Approach			A	-	0	A	-	0
		SB	SBL	-	A	12	10.8	A	2	8.5
			SBT	-	A	0	0.6	A	0	0.2
			SBR	160'	-	0	0	-	0	0
		SB Approach			A	-	3.1	A	-	0.5
US-1 and North Point Drive/Larkinchew Road (Intersection 9)	Two-Way Stop Controlled	EB	EBLTR	-	C	4	19.8	C	2	23.6
		EB Approach			C	-	19.8	C	-	23.6
		WB	WBLTR	-	C	8	15.5	D	22	26.5
		WB Approach			C	-	15.5	D	-	26.5
		NB	NBL	270'	A	0	8	A	0	9.1
			NBT	-	-	0	0	-	0	0
			NBR	245'	-	0	0	-	0	0
		NB Approach			A	-	0	A	-	0
		SB	SBL	557'	B	4	11.7	B	6	11.3
			SBT	-	-	0	0	-	0	0
			SBR	78'	-	0	0	-	0	0
		SB Approach			A	-	1.2	A	-	0.8

US-1 and South Roxbury Mill Road (Intersection 10)	Two-Way Stop Controlled	EB	EBLTR	-	A	0	0	C	4	15.2
		EB Approach			A	-	0	C	-	15.2
		WB	WBLTR	-	B	2	10.8	B	2	10.9
		WB Approach			B	-	10.8	B	-	10.9
		NB	NBL	110'	A	0	7.9	A	0	9.3
			NBT	-	-	0	0	-	0	0
			NBR	-	-	0	0	-	0	0
		NB Approach			A	-	0	A	-	0.1
		SB	SBL	160'	A	0	8.8	A	0	8.3
			SBT	-	-	0	0	-	0	0
			SBR	-	-	0	0	-	0	0
		SB Approach			A	-	0.3	A	-	0.1
US-1 and Morris Road/Mudd Tavern Road (Intersection 11)	Signalized	EB	EBL	-	B	84	19.5	C	69	24.7
			EBTR	-	E	464	77.2	D	229	37.6
		EB Approach			E	-	63.9	C	-	33.7
		WB	WBL	95'	C	46	24.5	C	169	22.4
			WBTR	-	E	268	55.1	**F**	524	108.1
		WB Approach			D	-	49.4	E		78.3
		NB	NBL	264'	D	59	42.3	D	56	40.5
			NBT	-	C	107	27.2	C	76	26.4
			NBR	286'	C	50	25.5	C	33	25
		NB Approach			C	-	27.7	C	-	27.8
		SB	SBL	295'	E	192	56.8	D	168	41.7
			SBT	-	C	45	20.7	C	141	23.3
			SBR	323'	C	2	20.2	C	48	21.1
		SB Approach			D	-	38.7	C	-	26.3
		Overall LOS			D	-	44.4	D	-	44.3
US-1 and Arcadia Road (Intersection 12)	Two-Way Stop Controlled	EB	EBLR	-	B	36	13.7	C	18	15.1
		EB Approach			B	-	13.7	C	-	15.1
		NB	NBL	-	A	0	0	A	0	8.2
			NBT	-	-	0	0	A	0	0
		NB Approach			A	-	0	A	-	0.1
		SB	SBT	-	-	0	0	-	0	0
			SBR	230'	-	0	0	-	0	0
		SB Approach			A	-	0	A	-	0

Appendix D: Future Year 2030 No-Build Traffic Conditions Level-of-Service

Table D.1 Future Conditions – Summary of Peak Hour Levels of Service, 95th Percentile Back of Queue, and Delay for Each Lane Group by Intersection

Intersection Information					AM Peak Hour			PM Peak Hour		
Intersection	Traffic Control	Approach	Lane Group	Existing/ Proposed turn-lane lengths	LOS	Back of Queue (feet)	Delay (sec)	LOS	Back of Queue (feet)	Delay (sec)
US-1 and Commonwealth Commuter Lot (Intersection 1)	Two-Way Stop Controlled	EB	EBL	-	A	0	0	A	0	0
			EBR	-	C	2	16.6	F	88	144.4
		EB Approach			C	-	16.6	F	-	144.4
		NB	NBL	-	A	0	0	A	0	0
			NBTR	-	-	0	0	-	0	0
		NB Approach			A	-	0	A	-	0
		SB	SBLT	-	-	0	0	-	0	0
			SBR	-	-	0	0	-	0	0
		SB Approach			A	-	0	A	-	0
US-1 and Old Telegraph Road (Intersection 2)	Signalized	WB	WBL	250'	D	45	35	D	96	41.8
			WBR	-	D	75	35.3	D	151	42.3
		WB Approach			D	-	35.2	D	-	42.1
		NB	NBT	-	F	894	93.7	D	723	46.1
			NBR	200'	B	26	10.2	B	52	14.9
		NB Approach			F	-	91	D	-	43.5
		SB	SBL	200'	D	147	45.5	F	375	81.4
			SBT	-	A	172	5.3	B	972	19.1
		SB Approach			B	-	13.6	C	-	33.2
		Overall LOS			E	-	57.9	D	-	37.4

US-1 and Lad Land Drive/Central Transport (Intersection 3)	Two-Way Stop Controlled	EB	EBLT	-	F	68	65.7	F	154	2357.3
			EBR	50	B	0	13.7	C	4	19.8
		EB Approach			F	-	64.5	F	-	1904.9
		WB	WBLTR	-	C	2	20.9	F	4	230.2
		WB Approach			C	-	20.9	F	-	230.2
		NB	NBL	-	B	0	10.7	C	2	17.3
			NBT	-	-	0	0	-	0	0
			NBR	185'	-	0	0	-	0	0
		NB Approach			A	-	0	A	-	0.1
		SB	SBLT	-	-	0	0	C	2	18.2
			SBR	400'	-	0	0	-	0	0
		SB Approach			A	-	0	A	-	0
US-1 and Massaponax Church Road (Intersection 4)	Signalized	EB	EBLT	-	F	725	212.6	F	628	211.8
			EBR	330'	F	501	121.3	F	506	157.1
		EB Approach			F	-	166.0	F	-	180.4
		WB	WBLT	-	F	1037	209.2	F	917	204.9
			WBR	550'	D	94	41.2	D	63	45
		WB Approach			F	-	166.3	F	-	166.3
		NB	NBL	200'	F	520	228.7	F	571	208.9
			NBT	-	E	587	65.4	E	656	72.4
			NBR	115'	D	237	45.3	D	358	50.3
		NB Approach			F	-	93	F	-	93.7
		SB	SBL	180'	F	186	115	F	450	125.2
			SBT	-	F	687	147.5	F	908	143
			SBR	250'	D	0	45.7	D	199	42.5
		SB Approach			F	-	135.3	F	-	123.7
		Overall LOS			F	-	132.5	F	-	128.5
US-1 and Guinea Station Road (Intersection 5)	Two-Way Stop Controlled	EB	EBLTR	-	A	-	0	A	-	0
		EB Approach			A	-	0	A	-	0
		WB	WBLT	200'	F	206	11824.5	F	302	13047.6
			WBR	-	D	98	30.1	D	64	29.1
		WB Approach			F	-	2285.5	F	-	4838.2
		NB	NBL	-	A	0	0	A	0	0
			NBT	-	-	0	0	-	0	0
			NBR	115'	-	0	0	-	0	0
		NB Approach			A	-	0	A	-	0
		SB	SBL	390'	D	120	29.4	C	54	23.8
			SBT	-	-	0	0	-	0	0
			SBR	-	-	0	0	-	0	0
		SB Approach			A	-	5.9	A	-	2.1

US-1 and River Run Parkway (Intersection 6)	Signalized	EB	EBLT	-	E	143	72.2	F	313	116.7
			EBR	-	C	0	27.2	C	0	31.5
		EB Approach			E	-	62.9	F	-	96.1
		WB	WBLT	-	C	29	28.5	C	16	31.4
			WBR	-	B	23	17.4	C	60	20.4
		WB Approach			B	-	19.9	C	-	21.0
		NB	NBL	290'	C	53	34.5	E	81	73.9
			NBT	-	D	410	36.9	D	543	40.6
			NBR	300'	B	0	14.1	B	0	16.1
		NB Approach			D	-	36.2	D	-	41.3
		SB	SBL	1000'	F	271	86.4	F	355	92.3
			SBT	-	B	282	15.5	C	612	23.7
			SBR	305'	B	38	10.9	A	0	9.7
		SB Approach			C	-	28.4	C	-	34.5
		Overall LOS			C	-	33.1	D	-	41.8
US-1 and Hickory Ridge Road (Intersection 7)	Two-Way Stop Controlled	EB	EBL	-	F	96	226.3	F	78	442.4
			EBR	250'	B	8	14	C	12	16.9
		EB Approach			F	-	121.1	F	-	174.7
		NB	NBL	315'	B	8	12.2	B	10	14.9
			NBT	-	-	0	0	-	0	0
		NB Approach			A	-	0.8	A	-	0.7
		SB	SBT	-	-	0	0	-	0	0
			SBR	200'	-	0	0	-	0	0
		SB Approach			A	-	0	A	-	0
US-1 and North Roxbury Mill Road (Intersection 8)	Two-Way Stop Controlled	EB	EBLTR	-	F	14	259.9	F	44	763.4
		EB Approach			F	-	259.9	F	-	763.4
		WB	WBLTR	-	B	10	13.2	C	26	17
		WB Approach			B	-	13.2	C	-	17
		NB	NBL	-	A	0	0	A	0	0
			NBT	-	-	0	0	-	0	0
			NBR	-	-	0	0	-	0	0
		NB Approach			A	-	0	A	-	0
		SB	SBL	-	B	22	12.2	B	6	11.9
			SBT	-	A	0	2.7	A	0	2.8
			SBR	160'	-	0	0	-	0	0
		SB Approach			A	-	4.2	A	-	3.1

US-1 and North Point Drive/Larkinchew Road (Intersection 9)	Two-Way Stop Controlled	EB	EBLTR	-	F	12	57.9	F	20	169.5
		EB Approach			F	-	57.9	F	-	169.5
		WB	WBLTR	-	D	18	28.1	F	196	892.9
		WB Approach			D	-	28.1	F	-	892.9
		NB	NBL	270'	B	0	10.6	B	0	12.3
			NBT	-	-	0	0	-	0	0
			NBR	245'	-	0	0	-	0	0
		NB Approach			A	-	0	A	-	0
		SB	SBL	557'	B	8	14.7	C	16	18.7
			SBT	-	-	0	0	-	0	0
			SBR	78'	-	0	0	-	0	0
		SB Approach			A	-	0.7	A	-	0.9
US-1 and South Roxbury Mill Road (Intersection 10)	Two-Way Stop Controlled	EB	EBLTR	-	A	0	0	F	30	66.7
		EB Approach			A	-	0	F	-	66.7
		WB	WBLTR	-	C	14	18.3	D	4	25.7
		WB Approach			C	-	18.3	D	-	25.7
		NB	NBL	110'	B	0	10	B	2	12.7
			NBT	-	-	0	0	-	0	0
			NBR	-	-	0	0	-	0	0
		NB Approach			A	-	0	A	-	0.1
		SB	SBL	160'	B	2	10.5	B	0	11
			SBT	-	-	0	0	-	0	0
			SBR	-	-	0	0	-	0	0
		SB Approach			A	-	0.21	A	-	0.1
US-1 and Morris Road/Mudd Tavern Road (Intersection 11)	Signalized	EB	EBL	225'	D	165	38	D	189	51.7
			EBTR	-	E	295	69.4	D	159	41.2
		EB Approach			E	-	61.6	D	-	44.9
		WB	WBL	150'	C	34	30.7	D	151	37.4
			WBT	-	D	150	41	E	531	63.4
			WBR	-	D	85	35.4	D	233	47.5
		WB Approach			D	-	36.2	D	-	49.7
		NB	NBL	264'	D	79	45.9	E	110	75.7
			NBT	-	D	215	51.6	E	212	60.3
			NBR	286'	D	176	40.7	D	46	52.4
		NB Approach			D	-	46.7	E	-	60.1
		SB	SBL	295'	F	628	89.1	E	726	62.9
			SBT	-	B	54	16	C	249	26.8
			SBR	323'	B	0	15.6	C	54	24.1
		SB Approach			E	-	68.1	D	-	41
		Overall LOS			D	-	54.6	D	-	47.3
		EB	EBLR	-	C	70	18.9	C	36	21.3

US-1 and Arcadia Road (Intersection 12)	Two-Way Stop Controlled	EB Approach			C	-	18.9	C	-	21.3
		NB	NBL	-	A	0	0	A	0	8.5
			NBT	-	-	0	0	A	0	0
		NB Approach			A	-	0	A	-	0.1
		SB	SBT	-	-	0	0	-	0	0
			SBR	230'	-	0	0	-	0	0
		SB Approach			A	-	0	A	-	0

Appendix E: Safety Maps

VDOT Planning

Appendix B.

Operational Worksheets for Alternatives

VDOT Planning

Commonwealth Drive
&
Old Telegraph Road/Jackson Village Parkway

Intersection	
Int Delay, s/veh	31.5

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	22	22	44	2292	1983	54
Future Vol, veh/h	22	22	44	2292	1983	54
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	-	300	-	-	295
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	4	4	0
Mvmt Flow	24	24	48	2491	2155	59

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	3497	1078	2214	0	-	0
Stage 1	2155	-	-	-	-	-
Stage 2	1342	-	-	-	-	-
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	~ 5	218	240	-	-	-
Stage 1	76	-	-	-	-	-
Stage 2	212	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 4	218	240	-	-	-
Mov Cap-2 Maneuver	~ 4	-	-	-	-	-
Stage 1	61	-	-	-	-	-
Stage 2	212	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, $	3145.2	0.4	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	240	-	8	-	-
HCM Lane V/C Ratio	0.199	-	5.978	-	-
HCM Control Delay (s)	23.7	$	3145.2	-	-
HCM Lane LOS	C	-	F	-	-
HCM 95th %tile Q(veh)	0.7	-	7.4	-	-

Notes

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

Intersection	
Int Delay, s/veh	139.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	169	217	65	2369	3245	56
Future Vol, veh/h	169	217	65	2369	3245	56
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	-	300	-	-	295
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	1	1	0
Mvmt Flow	184	236	71	2575	3527	61

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	4957	1764	3588	0	-	0
Stage 1	3527	-	-	-	-	-
Stage 2	1430	-	-	-	-	-
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	0	~ 75	~ 68	-	-	-
Stage 1	~ 12	-	-	-	-	-
Stage 2	190	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	0	~ 75	~ 68	-	-	-
Mov Cap-2 Maneuver	0	-	-	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	190	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, $	2177.3	6	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	~ 68	-	75	-	-
HCM Lane V/C Ratio	1.039	-	5.594	-	-
HCM Control Delay (s)	224.3	$	2177.3	-	-
HCM Lane LOS	F	-	F	-	-
HCM 95th %tile Q(veh)	5.3	-	46.5	-	-

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

Lane Group	EBL	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	48	48	2491	2155	59
v/c Ratio	0.24	0.51	0.84	0.73	0.04
Control Delay	32.7	31.0	11.6	7.6	1.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	32.7	31.0	11.6	7.6	1.0
Queue Length 50th (ft)	19	11	583	375	0
Queue Length 95th (ft)	52	#82	#924	493	8
Internal Link Dist (ft)	561		1232	829	
Turn Bay Length (ft)		300			295
Base Capacity (vph)	255	94	2965	2965	1388
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.19	0.51	0.84	0.73	0.04

Intersection Summary

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

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	22	22	44	2292	1983	54
Future Volume (veh/h)	22	22	44	2292	1983	54
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1841	1841	1900
Adj Flow Rate, veh/h	24	24	48	2491	2155	59
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	4	4	0
Cap, veh/h	68	68	148	2626	2626	1209
Arrive On Green	0.08	0.08	0.75	0.75	0.75	0.75
Sat Flow, veh/h	836	836	177	3589	3589	1610
Grp Volume(v), veh/h	49	0	48	2491	2155	59
Grp Sat Flow(s),veh/h/ln	1708	0	177	1749	1749	1610
Q Serve(g_s), s	2.3	0.0	20.1	51.5	33.4	0.8
Cycle Q Clear(g_c), s	2.3	0.0	53.5	51.5	33.4	0.8
Prop In Lane	0.49	0.49	1.00			1.00
Lane Grp Cap(c), veh/h	139	0	148	2626	2626	1209
V/C Ratio(X)	0.35	0.00	0.32	0.95	0.82	0.05
Avail Cap(c_a), veh/h	266	0	149	2642	2642	1216
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	36.2	0.0	24.1	9.0	6.7	2.7
Incr Delay (d2), s/veh	1.5	0.0	1.2	8.4	2.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.8	12.7	7.0	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	37.7	0.0	25.4	17.5	8.9	2.7
LnGrp LOS	D	A	C	B	A	A
Approach Vol, veh/h	49			2539	2214	
Approach Delay, s/veh	37.7			17.6	8.8	
Approach LOS	D			B	A	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		69.6		13.8		69.6
Change Period (Y+Rc), s		7.0		7.0		7.0
Max Green Setting (Gmax), s		63.0		13.0		63.0
Max Q Clear Time (g_c+I1), s		55.5		4.3		35.4
Green Ext Time (p_c), s		7.1		0.0		20.3

Intersection Summary	
HCM 6th Ctrl Delay	13.7
HCM 6th LOS	B

Lane Group	EBL	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	420	71	2575	3527	61
v/c Ratio	1.41	1.45	0.98	1.35	0.05
Control Delay	246.5	309.8	33.3	180.9	2.6
Queue Delay	0.0	0.0	4.2	0.0	0.0
Total Delay	246.5	309.8	37.6	180.9	2.6
Queue Length 50th (ft)	~551	~44	1146	~2366	6
Queue Length 95th (ft)	#771	#155	#1468	#2449	18
Internal Link Dist (ft)	548		1250	829	
Turn Bay Length (ft)		300			295
Base Capacity (vph)	298	49	2620	2620	1194
Starvation Cap Reductn	0	0	55	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	1.41	1.45	1.00	1.35	0.05

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.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	169	217	65	2369	3245	56
Future Volume (veh/h)	169	217	65	2369	3245	56
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1885	1885	1900
Adj Flow Rate, veh/h	184	236	71	2575	3527	61
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	1	1	0
Cap, veh/h	128	164	48	2627	2627	1181
Arrive On Green	0.17	0.17	0.73	0.73	0.73	0.73
Sat Flow, veh/h	740	949	44	3676	3676	1610
Grp Volume(v), veh/h	421	0	71	2575	3527	61
Grp Sat Flow(s),veh/h/ln	1692	0	44	1791	1791	1610
Q Serve(g_s), s	26.0	0.0	0.0	102.3	110.0	1.6
Cycle Q Clear(g_c), s	26.0	0.0	110.0	102.3	110.0	1.6
Prop In Lane	0.44	0.56	1.00			1.00
Lane Grp Cap(c), veh/h	293	0	48	2627	2627	1181
V/C Ratio(X)	1.44	0.00	1.48	0.98	1.34	0.05
Avail Cap(c_a), veh/h	293	0	48	2627	2627	1181
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	62.0	0.0	75.0	19.0	20.0	5.5
Incr Delay (d2), s/veh	214.4	0.0	299.1	13.3	156.9	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	28.7	0.0	5.8	39.4	94.4	0.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	276.4	0.0	374.1	32.2	176.9	5.6
LnGrp LOS	F	A	F	C	F	A
Approach Vol, veh/h	421			2646	3588	
Approach Delay, s/veh	276.4			41.4	174.0	
Approach LOS	F			D	F	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		117.0		33.0		117.0
Change Period (Y+Rc), s		7.0		7.0		7.0
Max Green Setting (Gmax), s		110.0		26.0		110.0
Max Q Clear Time (g_c+I1), s		112.0		28.0		112.0
Green Ext Time (p_c), s		0.0		0.0		0.0

Intersection Summary	
HCM 6th Ctrl Delay	127.7
HCM 6th LOS	F

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	24	24	48	2491	2155	59
v/c Ratio	0.12	0.13	0.52	0.84	0.73	0.04
Control Delay	40.0	23.9	33.3	11.9	7.8	1.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.0	23.9	33.3	11.9	7.8	1.0
Queue Length 50th (ft)	15	5	11	583	375	0
Queue Length 95th (ft)	36	27	#37	#897	498	9
Internal Link Dist (ft)	561			1232	829	
Turn Bay Length (ft)		200	300			295
Base Capacity (vph)	256	242	92	2954	2954	1383
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	0.09	0.10	0.52	0.84	0.73	0.04

Intersection Summary

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

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	22	22	44	2292	1983	54
Future Volume (veh/h)	22	22	44	2292	1983	54
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1841	1841	1900
Adj Flow Rate, veh/h	24	24	48	2491	2155	59
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	4	4	0
Cap, veh/h	146	130	149	2628	2628	1210
Arrive On Green	0.08	0.08	0.75	0.75	0.75	0.75
Sat Flow, veh/h	1810	1610	177	3589	3589	1610
Grp Volume(v), veh/h	24	24	48	2491	2155	59
Grp Sat Flow(s),veh/h/ln	1810	1610	177	1749	1749	1610
Q Serve(g_s), s	1.0	1.2	20.1	51.3	33.2	0.8
Cycle Q Clear(g_c), s	1.0	1.2	53.3	51.3	33.2	0.8
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	146	130	149	2628	2628	1210
V/C Ratio(X)	0.16	0.19	0.32	0.95	0.82	0.05
Avail Cap(c_a), veh/h	282	251	150	2645	2645	1218
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	35.7	35.7	24.0	8.9	6.7	2.7
Incr Delay (d2), s/veh	0.5	0.7	1.2	8.3	2.2	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.5	0.8	12.6	7.0	0.1
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	36.2	36.4	25.2	17.3	8.9	2.7
LnGrp LOS	D	D	C	B	A	A
Approach Vol, veh/h	48			2539	2214	
Approach Delay, s/veh	36.3			17.4	8.7	
Approach LOS	D			B	A	

Timer - Assigned Phs		2		4		6
Phs Duration (G+Y+Rc), s		69.6		13.7		69.6
Change Period (Y+Rc), s		7.0		7.0		7.0
Max Green Setting (Gmax), s		63.0		13.0		63.0
Max Q Clear Time (g_c+I1), s		55.3		3.2		35.2
Green Ext Time (p_c), s		7.3		0.1		20.3

Intersection Summary	
HCM 6th Ctrl Delay	13.6
HCM 6th LOS	B

1: ROUTE 1 & COMMONWEALTH COMMUTER LOT

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	184	236	71	2575	3527	61
v/c Ratio	1.18	1.04	0.59	0.88	1.40	0.05
Control Delay	184.7	109.7	88.2	13.5	204.5	3.5
Queue Delay	0.0	0.0	0.0	0.8	0.0	0.0
Total Delay	184.7	109.7	88.2	14.3	204.5	3.5
Queue Length 50th (ft)	~215	~159	69	708	~2417	7
Queue Length 95th (ft)	#377	#340	#132	833	#2500	22
Internal Link Dist (ft)	548			1250	829	
Turn Bay Length (ft)		200	300			295
Base Capacity (vph)	156	226	120	2930	2525	1151
Starvation Cap Reductn	0	0	0	133	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.18	1.04	0.59	0.92	1.40	0.05

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.

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	169	217	65	2369	3245	56
Future Volume (veh/h)	169	217	65	2369	3245	56
Initial Q (Qb), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00	1.00	1.00			1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No	No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1885	1885	1900
Adj Flow Rate, veh/h	184	236	71	2575	3527	61
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	1	1	0
Cap, veh/h	157	140	115	2935	2540	1142
Arrive On Green	0.09	0.09	0.06	0.82	0.71	0.71
Sat Flow, veh/h	1810	1610	1810	3676	3676	1610
Grp Volume(v), veh/h	184	236	71	2575	3527	61
Grp Sat Flow(s),veh/h/ln	1810	1610	1810	1791	1791	1610
Q Serve(g_s), s	13.0	13.0	5.7	69.1	106.0	1.7
Cycle Q Clear(g_c), s	13.0	13.0	5.7	69.1	106.0	1.7
Prop In Lane	1.00	1.00	1.00			1.00
Lane Grp Cap(c), veh/h	157	140	115	2935	2540	1142
V/C Ratio(X)	1.17	1.69	0.62	0.88	1.39	0.05
Avail Cap(c_a), veh/h	157	140	121	2947	2540	1142
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	68.2	68.2	68.2	8.7	21.7	6.6
Incr Delay (d2), s/veh	124.5	337.3	8.5	3.3	177.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	11.5	24.2	2.9	19.4	99.8	0.5
Unsig. Movement Delay, s/veh						
LnGrp Delay(d),s/veh	192.7	405.5	76.8	12.0	199.1	6.6
LnGrp LOS	F	F	E	B	F	A
Approach Vol, veh/h	420			2646	3588	
Approach Delay, s/veh	312.3			13.7	195.8	
Approach LOS	F			B	F	

Timer - Assigned Phs		2		4	5	6
Phs Duration (G+Y+Rc), s		129.5		20.0	16.5	113.0
Change Period (Y+Rc), s		7.0		7.0	7.0	7.0
Max Green Setting (Gmax), s		123.0		13.0	10.0	106.0
Max Q Clear Time (g_c+I1), s		71.1		15.0	7.7	108.0
Green Ext Time (p_c), s		39.7		0.0	0.0	0.0

Intersection Summary	
HCM 6th Ctrl Delay	130.8
HCM 6th LOS	F

Lane Group	EBL	EBR	SBT	SBR	NWL
Lane Group Flow (vph)	24	24	2155	59	48
v/c Ratio	0.24	0.26	0.76	0.04	0.39
Control Delay	63.4	64.7	13.2	0.6	66.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	63.4	64.7	13.2	0.6	66.4
Queue Length 50th (ft)	20	20	545	0	39
Queue Length 95th (ft)	48	49	781	7	80
Internal Link Dist (ft)	317		408		7
Turn Bay Length (ft)		200		300	
Base Capacity (vph)	245	225	2836	1513	251
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.10	0.11	0.76	0.04	0.19

Intersection Summary

Movement	EBL	EBR	SBT	SBR	NWL
Lane Configurations					
Traffic Volume (vph)	22	22	1983	54	44
Future Volume (vph)	22	22	1983	54	44
Ideal Flow (vphpl)	1900	1950	1950	1950	1950
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95
Satd. Flow (prot)	1770	1625	3632	1625	1816
Flt Permitted	0.95	1.00	1.00	1.00	0.95
Satd. Flow (perm)	1770	1625	3632	1625	1816
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	24	24	2155	59	48
RTOR Reduction (vph)	0	0	0	9	0
Lane Group Flow (vph)	24	24	2155	50	48
Turn Type	Prot	Perm	NA	custom	Prot
Protected Phases	4		2	2 4	1
Permitted Phases		4			
Actuated Green, G (s)	6.4	6.4	97.9	110.3	7.7
Effective Green, g (s)	6.4	6.4	97.9	110.3	7.7
Actuated g/C Ratio	0.05	0.05	0.75	0.85	0.06
Clearance Time (s)	6.0	6.0	6.0		6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	87	80	2735	1378	107
v/s Ratio Prot	0.01		c0.59	0.03	c0.03
v/s Ratio Perm		c0.01			
v/c Ratio	0.28	0.30	0.79	0.04	0.45
Uniform Delay, d1	59.6	59.6	9.7	1.5	59.1
Progression Factor	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.7	2.1	2.4	0.0	3.0
Delay (s)	61.3	61.7	12.1	1.6	62.1
Level of Service	E	E	B	A	E
Approach Delay (s)	61.5		11.9		62.1
Approach LOS	E		B		E

Intersection Summary			
HCM 2000 Control Delay	13.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	76.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBR	SBT	SBR	NWL
Lane Group Flow (vph)	184	236	3527	61	71
v/c Ratio	0.87	1.21	1.42	0.04	0.53
Control Delay	99.5	185.7	214.3	0.8	79.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	99.5	185.7	214.3	0.8	79.9
Queue Length 50th (ft)	180	~281	~2436	1	68
Queue Length 95th (ft)	#320	#460	#2575	10	120
Internal Link Dist (ft)	317		408		7
Turn Bay Length (ft)		200		300	
Base Capacity (vph)	212	195	2489	1381	217
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.87	1.21	1.42	0.04	0.33

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.

Movement	EBL	EBR	SBT	SBR	NWL
Lane Configurations					
Traffic Volume (vph)	169	217	3245	56	65
Future Volume (vph)	169	217	3245	56	65
Ideal Flow (vphpl)	1900	1950	1950	1950	1950
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95
Satd. Flow (prot)	1770	1625	3632	1625	1816
Flt Permitted	0.95	1.00	1.00	1.00	0.95
Satd. Flow (perm)	1770	1625	3632	1625	1816
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	184	236	3527	61	71
RTOR Reduction (vph)	0	0	0	8	0
Lane Group Flow (vph)	184	236	3527	53	71
Turn Type	Prot	Perm	NA	custom	Prot
Protected Phases	4		2	2 4	1
Permitted Phases		4			
Actuated Green, G (s)	18.0	18.0	102.8	126.8	11.2
Effective Green, g (s)	18.0	18.0	102.8	126.8	11.2
Actuated g/C Ratio	0.12	0.12	0.69	0.85	0.07
Clearance Time (s)	6.0	6.0	6.0		6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	212	195	2489	1373	135
v/s Ratio Prot	0.10		c0.97	0.03	c0.04
v/s Ratio Perm		c0.15			
v/c Ratio	0.87	1.21	1.42	0.04	0.53
Uniform Delay, d1	64.8	66.0	23.6	1.9	66.8
Progression Factor	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	29.1	132.5	190.1	0.0	3.7
Delay (s)	93.9	198.5	213.7	1.9	70.5
Level of Service	F	F	F	A	E
Approach Delay (s)	152.7		210.1		70.5
Approach LOS	F		F		E

Intersection Summary			
HCM 2000 Control Delay	201.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.31		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	115.9%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	6	0	2233	1518	11
Future Vol, veh/h	0	6	0	2233	1518	11
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Free	-	None	-	None
Storage Length	-	-	-	-	-	200
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	1	1	0
Mvmt Flow	0	7	0	2427	1650	12

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	-	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	0	-	-	-
Stage 1	0	0	0	-	-	-
Stage 2	0	0	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s)	-	0	-	-
HCM Lane LOS	-	A	-	-
HCM 95th %tile Q(veh)	-	-	-	-

2: ROUTE 1 & OLD TELEGRAPH ROAD

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	91	218	2089	70	301	1154
v/c Ratio	0.24	0.66	1.02	0.07	0.85	0.30
Control Delay	41.2	21.5	47.9	4.7	66.4	4.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.2	21.5	47.9	4.7	66.4	4.4
Queue Length 50th (ft)	27	27	~663	6	95	68
Queue Length 95th (ft)	51	102	#902	26	#173	97
Internal Link Dist (ft)	723		465			900
Turn Bay Length (ft)	250			200	350	
Base Capacity (vph)	460	360	2043	943	353	3789
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	0.20	0.61	1.02	0.07	0.85	0.30

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.

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	84	201	1922	64	277	1062
Future Volume (vph)	84	201	1922	64	277	1062
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	0.97	1.00	0.95	1.00	0.97	0.91
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3467	1599	3574	1615	3467	5085
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3467	1599	3574	1615	3467	5085
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	91	218	2089	70	301	1154
RTOR Reduction (vph)	0	152	0	20	0	0
Lane Group Flow (vph)	91	66	2089	50	301	1154
Heavy Vehicles (%)	1%	1%	1%	0%	1%	2%
Turn Type	Prot	Perm	NA	Perm	Prot	NA
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Actuated Green, G (s)	10.9	10.9	56.0	56.0	10.0	73.0
Effective Green, g (s)	10.9	10.9	56.0	56.0	10.0	73.0
Actuated g/C Ratio	0.11	0.11	0.57	0.57	0.10	0.75
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	386	178	2044	923	354	3791
v/s Ratio Prot	0.03		c0.58		c0.09	0.23
v/s Ratio Perm		c0.04		0.03		
v/c Ratio	0.24	0.37	1.02	0.05	0.85	0.30
Uniform Delay, d1	39.7	40.3	21.0	9.3	43.2	4.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	1.3	25.7	0.0	17.4	0.0
Delay (s)	40.0	41.6	46.6	9.3	60.6	4.1
Level of Service	D	D	D	A	E	A
Approach Delay (s)	41.2		45.4			15.8
Approach LOS	D		D			B

Intersection Summary			
HCM 2000 Control Delay	34.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	97.9	Sum of lost time (s)	21.0
Intersection Capacity Utilization	87.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	65	0	1907	3095	19
Future Vol, veh/h	0	65	0	1907	3095	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	Free	-	None	-	None
Storage Length	-	-	-	-	-	200
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	1	1	0
Mvmt Flow	0	71	0	2073	3364	21

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	-	-	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	-
Pot Cap-1 Maneuver	0	0	0	-	-	-
Stage 1	0	0	0	-	-	-
Stage 2	0	0	0	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	-	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-
HCM Control Delay (s)	-	0	-	-
HCM Lane LOS	-	A	-	-
HCM 95th %tile Q(veh)	-	-	-	-

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	198	380	1657	152	726	2482
v/c Ratio	0.49	0.79	0.99	0.19	1.03	0.66
Control Delay	45.3	20.3	47.1	6.3	81.6	7.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	45.3	20.3	47.1	6.3	81.6	7.6
Queue Length 50th (ft)	60	26	518	15	~250	233
Queue Length 95th (ft)	96	#151	#723	52	#375	302
Internal Link Dist (ft)	723		377			900
Turn Bay Length (ft)	250			200	350	
Base Capacity (vph)	458	503	1671	811	704	3773
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	0.43	0.76	0.99	0.19	1.03	0.66

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.

Lad Land Drive

3: ROUTE 1 & CENTRAL TRANSPORT/LAD LAND

Lane Group	EBT	EBR	WBT	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	89	2	4	4	1457	1115	29
v/c Ratio	0.36	0.01	0.01	0.01	0.60	0.49	0.03
Control Delay	31.4	0.0	0.0	4.8	8.3	10.2	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.4	0.0	0.0	4.8	8.3	10.2	0.0
Queue Length 50th (ft)	33	0	0	1	166	110	0
Queue Length 95th (ft)	84	0	0	3	255	307	0
Internal Link Dist (ft)	1025		304		1682	2325	
Turn Bay Length (ft)		200		200			400
Base Capacity (vph)	307	393	361	471	2379	2192	1091
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	0.29	0.01	0.01	0.01	0.61	0.51	0.03

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	82	0	2	0	0	4	4	1340	0	0	1026	27
Future Volume (vph)	82	0	2	0	0	4	4	1340	0	0	1026	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0	7.0		7.0		7.0	7.0			7.0	7.0
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95			0.95	1.00
Frt		1.00	0.85		0.86		1.00	1.00			1.00	0.85
Flt Protected		0.95	1.00		1.00		0.95	1.00			1.00	1.00
Satd. Flow (prot)		1787	1272		913		1805	3438			3374	1599
Flt Permitted		0.76	1.00		1.00		0.18	1.00			1.00	1.00
Satd. Flow (perm)		1421	1272		913		334	3438			3374	1599
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	89	0	2	0	0	4	4	1457	0	0	1115	29
RTOR Reduction (vph)	0	0	2	0	4	0	0	0	0	0	0	13
Lane Group Flow (vph)	0	89	0	0	0	0	4	1457	0	0	1115	16
Heavy Vehicles (%)	1%	0%	27%	0%	0%	80%	0%	5%	0%	0%	7%	1%
Turn Type	Perm	NA	Perm		NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8			2		2	6		6
Actuated Green, G (s)		8.0	8.0		8.0		48.9	48.9			40.3	40.3
Effective Green, g (s)		8.0	8.0		8.0		48.9	48.9			40.3	40.3
Actuated g/C Ratio		0.11	0.11		0.11		0.69	0.69			0.57	0.57
Clearance Time (s)		7.0	7.0		7.0		7.0	7.0			7.0	7.0
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)		160	143		103		263	2371			1917	908
v/s Ratio Prot					0.00		0.00	c0.42			0.33	
v/s Ratio Perm		c0.06	0.00				0.01					0.01
v/c Ratio		0.56	0.00		0.00		0.02	0.61			0.58	0.02
Uniform Delay, d1		29.8	27.9		27.9		5.0	5.9			9.9	6.7
Progression Factor		1.00	1.00		1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2		4.1	0.0		0.0		0.0	0.5			0.5	0.0
Delay (s)		33.9	27.9		27.9		5.0	6.4			10.3	6.7
Level of Service		C	C		C		A	A			B	A
Approach Delay (s)		33.8			27.9			6.4			10.2	
Approach LOS		C			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	9.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	70.9	Sum of lost time (s)	21.0
Intersection Capacity Utilization	62.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

3: ROUTE 1 & CENTRAL TRANSPORT/LAD LAND DRIVE

Lane Group	EBT	EBR	WBT	NBL	NBT	SBL	SBT	SBR
Lane Group Flow (vph)	52	13	1	7	1394	5	1879	64
v/c Ratio	0.27	0.04	0.01	0.02	0.50	0.02	0.68	0.05
Control Delay	35.7	0.2	31.0	4.1	8.2	4.2	11.7	0.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.7	0.2	31.0	4.1	8.2	4.2	11.7	0.1
Queue Length 50th (ft)	26	0	1	1	150	1	264	0
Queue Length 95th (ft)	61	0	5	5	395	4	#737	0
Internal Link Dist (ft)	1025		304		1682		2325	
Turn Bay Length (ft)		200		200		200		400
Base Capacity (vph)	246	371	237	306	2787	265	2760	1250
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.04	0.00	0.02	0.50	0.02	0.68	0.05

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	0	12	1	0	0	7	1338	0	5	1804	61
Future Volume (vph)	50	0	12	1	0	0	7	1338	0	5	1804	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0	7.0		7.0		7.0	7.0		7.0	7.0	7.0
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	0.98
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Frt		1.00	0.85		1.00		1.00	1.00		1.00	1.00	0.85
Flt Protected		0.95	1.00		0.95		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1787	1509		1805		1703	3574		1150	3539	1566
Flt Permitted		0.76	1.00		0.72		0.07	1.00		0.15	1.00	1.00
Satd. Flow (perm)		1424	1509		1374		127	3574		181	3539	1566
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	52	0	12	1	0	0	7	1394	0	5	1879	64
RTOR Reduction (vph)	0	0	12	0	0	0	0	0	0	0	0	22
Lane Group Flow (vph)	0	52	1	0	1	0	7	1394	0	5	1879	42
Confl. Peds. (#/hr)							1		1	1		1
Heavy Vehicles (%)	1%	0%	7%	0%	0%	0%	6%	1%	0%	57%	2%	1%
Turn Type	Perm	NA	Perm	Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8			2		2	6		6
Actuated Green, G (s)		6.0	6.0		6.0		58.0	56.3		58.0	56.3	56.3
Effective Green, g (s)		6.0	6.0		6.0		58.0	56.3		58.0	56.3	56.3
Actuated g/C Ratio		0.07	0.07		0.07		0.68	0.66		0.68	0.66	0.66
Clearance Time (s)		7.0	7.0		7.0		7.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		100	106		96		118	2367		142	2344	1037
v/s Ratio Prot							c0.00	0.39		0.00	c0.53	
v/s Ratio Perm		c0.04	0.00		0.00		0.04			0.02		0.03
v/c Ratio		0.52	0.01		0.01		0.06	0.59		0.04	0.80	0.04
Uniform Delay, d1		38.1	36.7		36.7		9.0	7.9		5.3	10.3	5.0
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		4.8	0.0		0.0		0.2	0.4		0.1	2.1	0.0
Delay (s)		42.9	36.8		36.8		9.3	8.3		5.4	12.4	5.0
Level of Service		D	D		D		A	A		A	B	A
Approach Delay (s)		41.7			36.8			8.3			12.1	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM 2000 Control Delay	11.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	84.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	NWL	NWR
Lane Configurations										
Traffic Vol, veh/h	0	0	0	0	0	0	1026	27	4	0
Future Vol, veh/h	0	0	0	0	0	0	1026	27	4	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Yield	Yield
RT Channelized	-	-	-	-	None	-	-	None	-	None
Storage Length	-	0	-	-	-	-	-	0	0	-
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	0	1115	29	4	0

Major/Minor	Minor2			Major2		
Conflicting Flow All	-	558		-	-	0
Stage 1	-	-		-	-	-
Stage 2	-	-		-	-	-
Critical Hdwy	-	6.94		-	-	-
Critical Hdwy Stg 1	-	-		-	-	-
Critical Hdwy Stg 2	-	-		-	-	-
Follow-up Hdwy	-	3.32		-	-	-
Pot Cap-1 Maneuver	0	473		0	-	-
Stage 1	0	-		0	-	-
Stage 2	0	-		0	-	-
Platoon blocked, %					-	-
Mov Cap-1 Maneuver	-	473		-	-	-
Mov Cap-2 Maneuver	-	-		-	-	-
Stage 1	-	-		-	-	-
Stage 2	-	-		-	-	-

Approach	EB	SB
HCM Control Delay, s	14.4	0
HCM LOS	B	

Minor Lane/Major Mvmt	EBLn1	SBT	SBR
Capacity (veh/h)	473	-	-
HCM Lane V/C Ratio	0.193	-	-
HCM Control Delay (s)	14.4	-	-
HCM Lane LOS	B	-	-
HCM 95th %tile Q(veh)	0.7	-	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	82	0	0	1344	0	0
Future Vol, veh/h	82	0	0	1344	0	0
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	89	0	0	1461	0	0

Major/Minor	Minor2		Major1	
Conflicting Flow All	731	-	-	0
Stage 1	0	-	-	-
Stage 2	731	-	-	-
Critical Hdwy	6.84	-	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-
Follow-up Hdwy	3.52	-	-	-
Pot Cap-1 Maneuver	357	0	0	-
Stage 1	-	0	0	-
Stage 2	437	0	0	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	357	-	-	-
Mov Cap-2 Maneuver	357	-	-	-
Stage 1	-	-	-	-
Stage 2	437	-	-	-

Approach	EB	NB
HCM Control Delay, s	18.4	0
HCM LOS	C	

Minor Lane/Major Mvmt	NBT	EBLn1
Capacity (veh/h)	-	357
HCM Lane V/C Ratio	-	0.25
HCM Control Delay (s)	-	18.4
HCM Lane LOS	-	C
HCM 95th %tile Q(veh)	-	1

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SER
Lane Configurations										
Traffic Vol, veh/h	0	0	0	1422	0	0	0	0	0	0
Future Vol, veh/h	0	0	0	1422	0	0	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Stop	Stop	Stop	Yield	Yield
RT Channelized	-	-	-	-	None	-	-	None	-	None
Storage Length	-	0	-	-	-	-	-	-	0	-
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	1546	0	0	0	0	0	0

Major/Minor	Minor1		Major1		
Conflicting Flow All	-	773	-	0	0
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-
Pot Cap-1 Maneuver	0	342	0	-	-
Stage 1	0	-	0	-	-
Stage 2	0	-	0	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	-	342	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	WB	NB
HCM Control Delay, s	15.7	0
HCM LOS	C	

Minor Lane/Major Mvmt	NBT	NBR	WBLn1
Capacity (veh/h)	-	-	342
HCM Lane V/C Ratio	-	-	0.013
HCM Control Delay (s)	-	-	15.7
HCM Lane LOS	-	-	C
HCM 95th %tile Q(veh)	-	-	0

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	0	0	0	0	1053
Future Vol, veh/h	0	0	0	0	0	1053
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	1145

Major/Minor	Minor1		Major2	
Conflicting Flow All	573	-	-	-
Stage 1	0	-	-	-
Stage 2	573	-	-	-
Critical Hdwy	6.84	-	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-
Follow-up Hdwy	3.52	-	-	-
Pot Cap-1 Maneuver	450	0	0	-
Stage 1	-	0	0	-
Stage 2	527	0	0	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	450	-	-	-
Mov Cap-2 Maneuver	450	-	-	-
Stage 1	-	-	-	-
Stage 2	527	-	-	-

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

Minor Lane/Major Mvmt	WBLn1	SBT
Capacity (veh/h)	-	-
HCM Lane V/C Ratio	-	-
HCM Control Delay (s)	0	-
HCM Lane LOS	A	-
HCM 95th %tile Q(veh)	-	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	NWL	NWR
Lane Configurations										
Traffic Vol, veh/h	0	0	0	0	0	0	1805	61	7	0
Future Vol, veh/h	0	0	0	0	0	0	1805	61	7	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Yield	Yield
RT Channelized	-	-	-	-	None	-	-	None	-	None
Storage Length	-	0	-	-	-	-	-	0	0	-
Veh in Median Storage, #	0	-	-	0	-	-	0	-	0	-
Grade, %	0	-	-	0	-	-	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	0	1880	64	7	0

Major/Minor	Minor2		Major2		
Conflicting Flow All	-	940	-	-	0
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-
Pot Cap-1 Maneuver	0	265	0	-	-
Stage 1	0	-	0	-	-
Stage 2	0	-	0	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	-	265	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	EB	SB
HCM Control Delay, s	22.9	0
HCM LOS	C	

Minor Lane/Major Mvmt	EBLn1	SBT	SBR
Capacity (veh/h)	265	-	-
HCM Lane V/C Ratio	0.244	-	-
HCM Control Delay (s)	22.9	-	-
HCM Lane LOS	C	-	-
HCM 95th %tile Q(veh)	0.9	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	50	0	0	1345	0	0
Future Vol, veh/h	50	0	0	1345	0	0
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, %	2	2	2	2	2	2
Mvmt Flow	52	0	0	1401	0	0

Major/Minor	Minor2		Major1	
Conflicting Flow All	701	-	-	0
Stage 1	0	-	-	-
Stage 2	701	-	-	-
Critical Hdwy	6.84	-	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-
Follow-up Hdwy	3.52	-	-	-
Pot Cap-1 Maneuver	373	0	0	-
Stage 1	-	0	0	-
Stage 2	453	0	0	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	373	-	-	-
Mov Cap-2 Maneuver	373	-	-	-
Stage 1	-	-	-	-
Stage 2	453	-	-	-

Approach	EB	NB
HCM Control Delay, s	16.2	0
HCM LOS	C	

Minor Lane/Major Mvmt	NBT	EBLn1
Capacity (veh/h)	-	373
HCM Lane V/C Ratio	-	0.14
HCM Control Delay (s)	-	16.2
HCM Lane LOS	-	C
HCM 95th %tile Q(veh)	-	0.5

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SER
Lane Configurations										
Traffic Vol, veh/h	0	0	0	1388	0	0	0	0	5	0
Future Vol, veh/h	0	0	0	1388	0	0	0	0	5	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Stop	Stop	Stop	Yield	Yield
RT Channelized	-	-	-	-	None	-	-	None	-	None
Storage Length	-	0	-	-	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	-	-	0	-	0	-
Grade, %	0	-	-	0	-	-	0	-	0	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	1446	0	0	0	0	5	0

Major/Minor	Minor1		Major1		
Conflicting Flow All	-	723	-	0	0
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-
Pot Cap-1 Maneuver	0	369	0	-	-
Stage 1	0	-	0	-	-
Stage 2	0	-	0	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	-	369	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	WB	NB
HCM Control Delay, s	14.8	0
HCM LOS	B	

Minor Lane/Major Mvmt	NBT	NBR	WBLn1
Capacity (veh/h)	-	-	369
HCM Lane V/C Ratio	-	-	0.003
HCM Control Delay (s)	-	-	14.8
HCM Lane LOS	-	-	B
HCM 95th %tile Q(veh)	-	-	0

Intersection	
Int Delay, s/veh	0

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	1	0	0	0	0	1870
Future Vol, veh/h	1	0	0	0	0	1870
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, %	2	2	2	2	2	2
Mvmt Flow	1	0	0	0	0	1948

Major/Minor	Minor1		Major2	
Conflicting Flow All	974	-	-	-
Stage 1	0	-	-	-
Stage 2	974	-	-	-
Critical Hdwy	6.84	-	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-
Follow-up Hdwy	3.52	-	-	-
Pot Cap-1 Maneuver	249	0	0	-
Stage 1	-	0	0	-
Stage 2	327	0	0	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	249	-	-	-
Mov Cap-2 Maneuver	249	-	-	-
Stage 1	-	-	-	-
Stage 2	327	-	-	-

Approach	WB	SB
HCM Control Delay, s	19.5	0
HCM LOS	C	

Minor Lane/Major Mvmt	WBLn1	SBT
Capacity (veh/h)	249	-
HCM Lane V/C Ratio	0.004	-
HCM Control Delay (s)	19.5	-
HCM Lane LOS	C	-
HCM 95th %tile Q(veh)	0	-

Lane Group	EBL	EBR2	SBT	SBR	NWL
Lane Group Flow (vph)	89	2	1115	29	4
v/c Ratio	0.43	0.01	0.41	0.02	0.03
Control Delay	38.6	0.0	6.5	0.5	35.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	38.6	0.0	6.5	0.5	35.0
Queue Length 50th (ft)	42	0	90	0	2
Queue Length 95th (ft)	82	0	241	3	11
Internal Link Dist (ft)	317		408		7
Turn Bay Length (ft)				300	
Base Capacity (vph)	398	460	2713	1573	408
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.22	0.00	0.41	0.02	0.01

Intersection Summary

Movement	EBL	EBR2	SBT	SBR	NWL
Lane Configurations					
Traffic Volume (vph)	82	2	1026	27	4
Future Volume (vph)	82	2	1026	27	4
Ideal Flow (vphpl)	1900	1950	1950	1950	1950
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95
Satd. Flow (prot)	1770	1625	3632	1625	1816
Flt Permitted	0.95	1.00	1.00	1.00	0.95
Satd. Flow (perm)	1770	1625	3632	1625	1816
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	89	2	1115	29	4
RTOR Reduction (vph)	0	2	0	5	0
Lane Group Flow (vph)	89	0	1115	24	4
Turn Type	Prot	Perm	NA	custom	Prot
Protected Phases	4		2	2 4	1
Permitted Phases		4			
Actuated Green, G (s)	8.2	8.2	52.5	66.7	1.3
Effective Green, g (s)	8.2	8.2	52.5	66.7	1.3
Actuated g/C Ratio	0.10	0.10	0.66	0.83	0.02
Clearance Time (s)	6.0	6.0	6.0		6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	181	166	2383	1354	29
v/s Ratio Prot	c0.05		c0.31	0.01	c0.00
v/s Ratio Perm		0.00			
v/c Ratio	0.49	0.00	0.47	0.02	0.14
Uniform Delay, d1	33.9	32.2	6.8	1.1	38.8
Progression Factor	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.1	0.0	0.7	0.0	2.2
Delay (s)	36.0	32.2	7.5	1.1	41.0
Level of Service	D	C	A	A	D
Approach Delay (s)	35.9		7.3		41.0
Approach LOS	D		A		D

Intersection Summary			
HCM 2000 Control Delay	9.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	51.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBR2	SBT	SBR	NWL
Lane Group Flow (vph)	52	13	1879	64	7
v/c Ratio	0.40	0.07	0.62	0.04	0.08
Control Delay	61.0	0.7	6.7	0.3	55.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	61.0	0.7	6.7	0.3	55.7
Queue Length 50th (ft)	39	0	212	0	5
Queue Length 95th (ft)	79	0	536	6	21
Internal Link Dist (ft)	317		408		7
Turn Bay Length (ft)				300	
Base Capacity (vph)	265	313	3026	1590	272
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.20	0.04	0.62	0.04	0.03

Intersection Summary

Movement	EBL	EBR2	SBT	SBR	NWL
Lane Configurations					
Traffic Volume (vph)	50	12	1804	61	7
Future Volume (vph)	50	12	1804	61	7
Ideal Flow (vphpl)	1900	1950	1950	1950	1950
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95
Satd. Flow (prot)	1770	1625	3632	1625	1816
Flt Permitted	0.95	1.00	1.00	1.00	0.95
Satd. Flow (perm)	1770	1625	3632	1625	1816
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	52	12	1879	64	7
RTOR Reduction (vph)	0	12	0	7	0
Lane Group Flow (vph)	52	1	1879	57	7
Turn Type	Prot	Perm	NA	custom	Prot
Protected Phases	4		2	2 4	1
Permitted Phases		4			
Actuated Green, G (s)	7.8	7.8	92.8	106.6	1.4
Effective Green, g (s)	7.8	7.8	92.8	106.6	1.4
Actuated g/C Ratio	0.06	0.06	0.77	0.89	0.01
Clearance Time (s)	6.0	6.0	6.0		6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	115	105	2808	1443	21
v/s Ratio Prot	c0.03		c0.52	0.03	c0.00
v/s Ratio Perm		0.00			
v/c Ratio	0.45	0.01	0.67	0.04	0.33
Uniform Delay, d1	54.0	52.5	6.4	0.8	58.8
Progression Factor	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.8	0.0	1.3	0.0	9.1
Delay (s)	56.9	52.5	7.7	0.8	68.0
Level of Service	E	D	A	A	E
Approach Delay (s)	56.0		7.4		68.0
Approach LOS	E		A		E

Intersection Summary			
HCM 2000 Control Delay	9.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	71.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Massaponax Church Road

Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	411	429	632	217	292	923	297	110	902	98
v/c Ratio	1.29	1.01	1.31	0.40	1.33	0.92	0.57	0.93	1.17	0.20
Control Delay	198.5	80.6	197.5	10.8	212.1	66.4	28.5	103.0	139.2	0.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	198.5	80.6	197.5	10.8	212.1	66.4	28.5	103.0	139.2	0.9
Queue Length 50th (ft)	~510	~272	~793	23	~324	462	134	70	~551	0
Queue Length 95th (ft)	#725	#501	#1037	94	#520	#587	237	#186	#687	0
Internal Link Dist (ft)	472		824			3232			1682	
Turn Bay Length (ft)		330		550	200		115	180		250
Base Capacity (vph)	319	423	481	548	219	1001	523	118	772	486
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.29	1.01	1.31	0.40	1.33	0.92	0.57	0.93	1.17	0.20

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.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	256	122	395	432	149	200	269	849	273	101	830	90
Future Volume (vph)	256	122	395	432	149	200	269	849	273	101	830	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		1%			0%			1%			0%	
Total Lost time (s)		7.5	7.5		7.5	7.5	6.5	8.0	8.0	6.5	8.0	8.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1743	1474		1700	1468	1575	3421	1461	1612	3406	1524
Flt Permitted		0.97	1.00		0.96	1.00	0.10	1.00	1.00	0.12	1.00	1.00
Satd. Flow (perm)		1743	1474		1700	1468	164	3421	1461	200	3406	1524
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	278	133	429	470	162	217	292	923	297	110	902	98
RTOR Reduction (vph)	0	0	154	0	0	133	0	0	95	0	0	76
Lane Group Flow (vph)	0	411	275	0	632	84	292	923	202	110	902	22
Heavy Vehicles (%)	3%	9%	9%	8%	7%	10%	14%	5%	10%	12%	6%	6%
Turn Type	Split	NA	Prot	Split	NA	Prot	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	3	3	3	4	4	4	5	2		1	6	
Permitted Phases							2		2	6		6
Actuated Green, G (s)		27.5	27.5		42.5	42.5	57.0	43.9	43.9	40.6	34.0	34.0
Effective Green, g (s)		27.5	27.5		42.5	42.5	57.0	43.9	43.9	40.6	34.0	34.0
Actuated g/C Ratio		0.18	0.18		0.28	0.28	0.38	0.29	0.29	0.27	0.23	0.23
Clearance Time (s)		7.5	7.5		7.5	7.5	6.5	8.0	8.0	6.5	8.0	8.0
Vehicle Extension (s)		3.5	3.5		3.5	3.5	3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)		319	270		481	415	217	1001	427	116	772	345
v/s Ratio Prot		c0.24	0.19		c0.37	0.06	c0.15	0.27		0.04	0.26	
v/s Ratio Perm							c0.36		0.14	0.21		0.01
v/c Ratio		1.29	1.02		1.31	0.20	1.35	0.92	0.47	0.95	1.17	0.06
Uniform Delay, d1		61.2	61.2		53.8	40.9	45.7	51.4	43.5	48.4	58.0	45.5
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		151.4	60.1		155.5	0.3	183.0	14.0	1.7	66.6	89.5	0.2
Delay (s)		212.6	121.3		209.2	41.2	228.7	65.4	45.3	115.0	147.5	45.7
Level of Service		F	F		F	D	F	E	D	F	F	D
Approach Delay (s)		166.0			166.3			93.0			135.3	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	132.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.35		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	29.5
Intersection Capacity Utilization	114.8%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	346	465	550	175	335	1007	397	286	1251	304
v/c Ratio	1.27	1.06	1.29	0.34	1.29	0.97	0.71	1.08	1.18	0.51
Control Delay	197.2	87.0	192.3	8.0	194.4	72.6	37.4	118.0	135.9	21.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	197.2	87.0	192.3	8.0	194.4	72.6	37.4	118.0	135.9	21.0
Queue Length 50th (ft)	~425	~280	~683	0	~365	513	229	~257	~768	101
Queue Length 95th (ft)	#628	#506	#917	63	#571	#656	358	#450	#908	199
Internal Link Dist (ft)	472		824			3232			1682	
Turn Bay Length (ft)		330		550	200		115	180		250
Base Capacity (vph)	272	439	426	508	259	1043	562	266	1061	601
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.27	1.06	1.29	0.34	1.29	0.97	0.71	1.08	1.18	0.51

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.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	161	175	451	368	166	170	325	977	385	277	1213	295
Future Volume (vph)	161	175	451	368	166	170	325	977	385	277	1213	295
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		1%			0%			1%			0%	
Total Lost time (s)		7.5	7.5		7.5	7.5	6.5	8.0	8.0	6.5	8.0	8.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.98	1.00		0.97	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1818	1530		1801	1583	1778	3556	1575	1752	3539	1599
Flt Permitted		0.98	1.00		0.97	1.00	0.09	1.00	1.00	0.09	1.00	1.00
Satd. Flow (perm)		1818	1530		1801	1583	170	3556	1575	164	3539	1599
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	166	180	465	379	171	175	335	1007	397	286	1251	304
RTOR Reduction (vph)	0	0	210	0	0	134	0	0	100	0	0	122
Lane Group Flow (vph)	0	346	255	0	550	41	335	1007	297	286	1251	182
Heavy Vehicles (%)	0%	3%	5%	2%	2%	2%	1%	1%	2%	3%	2%	1%
Turn Type	Split	NA	Prot	Split	NA	Prot	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	3	3	3	4	4	4	5	2		1	6	
Permitted Phases							2		2	6		6
Actuated Green, G (s)		22.5	22.5		35.5	35.5	61.5	44.0	44.0	63.5	45.0	45.0
Effective Green, g (s)		22.5	22.5		35.5	35.5	61.5	44.0	44.0	63.5	45.0	45.0
Actuated g/C Ratio		0.15	0.15		0.24	0.24	0.41	0.29	0.29	0.42	0.30	0.30
Clearance Time (s)		7.5	7.5		7.5	7.5	6.5	8.0	8.0	6.5	8.0	8.0
Vehicle Extension (s)		3.5	3.5		3.5	3.5	3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)		272	229		426	374	257	1043	462	265	1061	479
v/s Ratio Prot		c0.19	0.17		c0.31	0.03	c0.15	0.28		0.13	0.35	
v/s Ratio Perm							c0.38		0.19	0.32		0.11
v/c Ratio		1.27	1.11		1.29	0.11	1.30	0.97	0.64	1.08	1.18	0.38
Uniform Delay, d1		63.8	63.8		57.2	44.9	47.0	52.3	46.1	47.2	52.5	41.5
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		148.0	93.4		147.6	0.2	161.9	20.2	4.1	78.0	90.5	1.1
Delay (s)		211.8	157.1		204.9	45.0	208.9	72.4	50.3	125.2	143.0	42.5
Level of Service		F	F		F	D	F	E	D	F	F	D
Approach Delay (s)		180.4			166.3			93.7			123.7	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	128.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.28		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	29.5
Intersection Capacity Utilization	123.3%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

4: ROUTE 1 & MASSAPONAX CHURCH

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	278	133	429	470	162	217	292	923	297	110	902	98
v/c Ratio	0.63	0.46	0.97	1.01	0.47	0.46	1.02	0.73	0.46	0.55	0.95	0.17
Control Delay	34.7	50.9	60.4	79.1	48.7	7.7	92.1	36.9	14.5	30.6	62.5	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.7	50.9	60.4	79.1	48.7	7.7	92.1	36.9	14.5	30.6	62.5	0.6
Queue Length 50th (ft)	154	94	167	~316	114	0	~192	322	70	45	361	0
Queue Length 95th (ft)	230	158	#379	#441	184	56	#370	400	151	80	#493	0
Internal Link Dist (ft)		472			824			3232			1682	
Turn Bay Length (ft)	200		330	200		550	200		115	180		250
Base Capacity (vph)	452	290	440	465	342	470	286	1262	645	199	948	587
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.46	0.97	1.01	0.47	0.46	1.02	0.73	0.46	0.55	0.95	0.17

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.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	256	122	395	432	149	200	269	849	273	101	830	90
Future Volume (vph)	256	122	395	432	149	200	269	849	273	101	830	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		1%			0%			1%			0%	
Total Lost time (s)	7.5	7.5	7.5	7.5	7.5	7.5	6.5	8.0	8.0	6.5	8.0	8.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1744	1734	1474	1671	1776	1468	1575	3421	1461	1612	3406	1524
Flt Permitted	0.65	1.00	1.00	0.57	1.00	1.00	0.10	1.00	1.00	0.23	1.00	1.00
Satd. Flow (perm)	1201	1734	1474	1004	1776	1468	166	3421	1461	382	3406	1524
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	278	133	429	470	162	217	292	923	297	110	902	98
RTOR Reduction (vph)	0	0	194	0	0	175	0	0	106	0	0	71
Lane Group Flow (vph)	278	133	235	470	162	42	292	923	191	110	902	27
Heavy Vehicles (%)	3%	9%	9%	8%	7%	10%	14%	5%	10%	12%	6%	6%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8		8	4		4	2		2	6		6
Actuated Green, G (s)	36.6	20.1	20.1	42.6	23.1	23.1	57.4	44.3	44.3	40.0	33.4	33.4
Effective Green, g (s)	36.6	20.1	20.1	42.6	23.1	23.1	57.4	44.3	44.3	40.0	33.4	33.4
Actuated g/C Ratio	0.31	0.17	0.17	0.36	0.19	0.19	0.48	0.37	0.37	0.33	0.28	0.28
Clearance Time (s)	7.5	7.5	7.5	7.5	7.5	7.5	6.5	8.0	8.0	6.5	8.0	8.0
Vehicle Extension (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	440	290	246	464	341	282	284	1262	539	194	948	424
v/s Ratio Prot	0.09	0.08		c0.16	0.09		c0.15	0.27		0.03	0.26	
v/s Ratio Perm	0.11		0.16	c0.19		0.03	c0.34		0.13	0.16		0.02
v/c Ratio	0.63	0.46	0.96	1.01	0.48	0.15	1.03	0.73	0.35	0.57	0.95	0.06
Uniform Delay, d1	34.5	45.0	49.5	36.7	43.1	40.3	36.3	32.7	27.5	29.1	42.5	31.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.1	1.4	45.0	45.1	1.2	0.3	60.9	2.7	0.8	3.8	18.9	0.1
Delay (s)	37.6	46.4	94.5	81.7	44.3	40.6	97.2	35.4	28.3	32.8	61.4	32.0
Level of Service	D	D	F	F	D	D	F	D	C	C	E	C
Approach Delay (s)		68.0			64.1			45.9			56.0	
Approach LOS		E			E			D			E	

Intersection Summary			
HCM 2000 Control Delay	56.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	29.5
Intersection Capacity Utilization	92.8%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

4: ROUTE 1 & MASSAPONAX CHURCH

Year 2030 PM - Minor Street Left-Turn Lanes

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	166	180	465	379	171	175	335	1007	397	286	1251	304
v/c Ratio	0.49	0.64	0.96	1.09	0.52	0.41	1.03	0.78	0.58	0.85	0.99	0.43
Control Delay	38.6	62.5	52.9	110.9	54.6	9.6	95.3	42.1	21.9	50.9	65.7	11.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.6	62.5	52.9	110.9	54.6	9.6	95.3	42.1	21.9	50.9	65.7	11.3
Queue Length 50th (ft)	103	143	158	~299	131	0	~254	404	150	154	~556	50
Queue Length 95th (ft)	164	223	#376	#423	207	64	#448	492	260	#293	#716	129
Internal Link Dist (ft)		472			824			3232			1682	
Turn Bay Length (ft)	200		330	200		550	200		115	180		250
Base Capacity (vph)	347	298	494	349	339	431	326	1293	686	357	1258	708
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.60	0.94	1.09	0.50	0.41	1.03	0.78	0.58	0.80	0.99	0.43

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.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	161	175	451	368	166	170	325	977	385	277	1213	295
Future Volume (vph)	161	175	451	368	166	170	325	977	385	277	1213	295
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		1%			0%			1%			0%	
Total Lost time (s)	7.5	7.5	7.5	7.0	7.5	7.5	6.5	8.0	8.0	6.5	8.0	8.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1796	1835	1530	1770	1863	1583	1778	3556	1575	1752	3539	1599
Flt Permitted	0.63	1.00	1.00	0.43	1.00	1.00	0.09	1.00	1.00	0.13	1.00	1.00
Satd. Flow (perm)	1187	1835	1530	797	1863	1583	160	3556	1575	238	3539	1599
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	166	180	465	379	171	175	335	1007	397	286	1251	304
RTOR Reduction (vph)	0	0	249	0	0	144	0	0	113	0	0	140
Lane Group Flow (vph)	166	180	216	379	171	31	335	1007	284	286	1251	164
Heavy Vehicles (%)	0%	3%	5%	2%	2%	2%	1%	1%	2%	3%	2%	1%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8		8	4		4	2		2	6		6
Actuated Green, G (s)	31.2	19.7	19.7	37.7	22.7	22.7	66.2	46.9	46.9	64.0	45.8	45.8
Effective Green, g (s)	31.2	19.7	19.7	37.7	22.7	22.7	66.2	46.9	46.9	64.0	45.8	45.8
Actuated g/C Ratio	0.24	0.15	0.15	0.29	0.18	0.18	0.51	0.36	0.36	0.50	0.36	0.36
Clearance Time (s)	7.5	7.5	7.5	7.0	7.5	7.5	6.5	8.0	8.0	6.5	8.0	8.0
Vehicle Extension (s)	3.5	3.5	3.5	3.0	3.5	3.5	3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	341	280	234	346	328	278	324	1294	573	332	1258	568
v/s Ratio Prot	0.04	0.10		c0.13	0.09		c0.15	0.28		0.12	0.35	
v/s Ratio Perm	0.07		0.14	c0.19		0.02	c0.38		0.18	0.31		0.10
v/c Ratio	0.49	0.64	0.92	1.10	0.52	0.11	1.03	0.78	0.50	0.86	0.99	0.29
Uniform Delay, d1	40.7	51.2	53.8	43.4	48.1	44.6	41.2	36.3	31.8	29.3	41.4	29.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.3	5.2	38.7	76.5	1.7	0.2	59.1	3.5	1.4	19.8	24.0	0.6
Delay (s)	42.0	56.4	92.5	119.8	49.8	44.8	100.3	39.9	33.2	49.1	65.3	30.4
Level of Service	D	E	F	F	D	D	F	D	C	D	E	C
Approach Delay (s)		74.2			85.2			50.0			57.0	
Approach LOS		E			F			D			E	

Intersection Summary			
HCM 2000 Control Delay	61.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	128.8	Sum of lost time (s)	29.5
Intersection Capacity Utilization	105.3%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Guinea Station Road
&
River Run Parkway

Intersection	
Int Delay, s/veh	226.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	61	0	258	0	1197	73	335	1340	0
Future Vol, veh/h	0	0	0	61	0	258	0	1197	73	335	1340	0
Conflicting Peds, #/hr	0	0	0	0	0	0	1	0	0	0	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	200	-	0	-	-	115	390	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	1	-	-	-3	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	7	0	1	0	6	2	1	7	0
Mvmt Flow	0	0	0	66	0	280	0	1301	79	364	1457	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	2837	3566	730	2758	-	651	1458	0	0	1380	0	0
Stage 1	2186	2186	-	1301	-	-	-	-	-	-	-	-
Stage 2	651	1380	-	1457	-	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.64	-	6.92	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.64	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.64	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.57	-	3.31	2.2	-	-	2.21	-	-
Pot Cap-1 Maneuver	8	6	369	~ 8	0	414	470	-	-	498	-	-
Stage 1	48	85	-	163	0	-	-	-	-	-	-	-
Stage 2	429	214	-	130	0	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	1	2	369	~ 3	-	414	470	-	-	498	-	-
Mov Cap-2 Maneuver	1	2	-	~ 3	-	-	-	-	-	-	-	-
Stage 1	48	23	-	163	-	-	-	-	-	-	-	-
Stage 2	138	214	-	~ 35	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	$ 2285.5	0	5.9
HCM LOS	A	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	470	-	-	-	3	414	498	-	-
HCM Lane V/C Ratio	-	-	-	-	22.101	0.677	0.731	-	-
HCM Control Delay (s)	0	-	-	$ 0	1824.5	30.1	29.4	-	-
HCM Lane LOS	A	-	-	A	F	D	D	-	-
HCM 95th %tile Q(veh)	0	-	-	-	10.3	4.9	6	-	-

Notes

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

6: ROUTE 1 & HIGH SCHOOL/RIVER RUN

Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	124	32	73	79	58	1191	36	293	1038	208
v/c Ratio	0.98	0.08	0.58	0.16	0.39	0.87	0.05	0.87	0.50	0.20
Control Delay	115.9	0.4	54.3	6.2	42.6	30.2	0.1	56.9	11.2	2.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	115.9	0.4	54.3	6.2	42.6	30.2	0.1	56.9	11.2	2.0
Queue Length 50th (ft)	63	0	36	3	28	278	0	142	168	0
Queue Length 95th (ft)	#168	0	#92	29	64	#405	0	#277	225	28
Internal Link Dist (ft)	478		419			2760			1317	
Turn Bay Length (ft)					290		300	1000		305
Base Capacity (vph)	126	397	126	509	151	1385	729	348	2068	1063
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.98	0.08	0.58	0.16	0.38	0.86	0.05	0.84	0.50	0.20

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	113	1	29	67	0	73	53	1096	33	270	955	191
Future Volume (vph)	113	1	29	67	0	73	53	1096	33	270	955	191
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-2%			-1%			5%			-3%	
Total Lost time (s)		7.0	7.0		7.0	7.0	7.0	8.0	8.0	7.0	8.0	8.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.95	1.00		0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1775	1631		1761	1159	1709	3321	1406	1621	3424	1623
Flt Permitted		0.67	1.00		0.68	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1257	1631		1256	1159	1709	3321	1406	1621	3424	1623
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	123	1	32	73	0	79	58	1191	36	293	1038	208
RTOR Reduction (vph)	0	0	29	0	0	48	0	0	20	0	0	87
Lane Group Flow (vph)	0	124	3	0	73	31	58	1191	16	293	1038	121
Heavy Vehicles (%)	3%	0%	0%	3%	0%	40%	3%	6%	12%	13%	7%	1%
Turn Type	Perm	NA	Perm	Perm	NA	pm+ov	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			4	5	1	6		5	2	
Permitted Phases	4		4	4		4			6			2
Actuated Green, G (s)		8.0	8.0		8.0	24.5	4.2	35.5	35.5	16.5	47.8	47.8
Effective Green, g (s)		8.0	8.0		8.0	24.5	4.2	35.5	35.5	16.5	47.8	47.8
Actuated g/C Ratio		0.10	0.10		0.10	0.30	0.05	0.43	0.43	0.20	0.58	0.58
Clearance Time (s)		7.0	7.0		7.0	7.0	7.0	8.0	8.0	7.0	8.0	8.0
Vehicle Extension (s)		4.0	4.0		4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Grp Cap (vph)		122	159		122	445	87	1437	608	326	1995	946
v/s Ratio Prot						0.01	0.03	c0.36		c0.18	0.30	
v/s Ratio Perm		c0.10	0.00		0.06	0.01			0.01			0.07
v/c Ratio		1.02	0.02		0.60	0.07	0.67	0.83	0.03	0.90	0.52	0.13
Uniform Delay, d1		37.0	33.5		35.5	20.6	38.2	20.6	13.3	31.9	10.2	7.7
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		85.9	0.1		8.9	0.1	19.2	4.6	0.0	26.3	0.5	0.1
Delay (s)		122.9	33.5		44.4	20.7	57.4	25.2	13.4	58.2	10.7	7.8
Level of Service		F	C		D	C	E	C	B	E	B	A
Approach Delay (s)		104.6			32.1			26.3			19.4	
Approach LOS		F			C			C			B	

Intersection Summary			
HCM 2000 Control Delay	27.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	82.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	76.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	29.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	25	0	169	0	1557	63	181	1916	0
Future Vol, veh/h	0	0	0	25	0	169	0	1557	63	181	1916	0
Conflicting Peds, #/hr	0	0	0	0	0	0	1	0	0	0	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	200	-	0	-	-	115	390	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	1	-	-	-3	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	0	0	0	0	0	0	1	1	0	2	0
Mvmt Flow	0	0	0	26	0	178	0	1639	66	191	2017	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	3220	4105	1010	3030	-	820	2018	0	0	1705	0	0
Stage 1	2400	2400	-	1639	-	-	-	-	-	-	-	-
Stage 2	820	1705	-	1391	-	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	-	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.5	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.5	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	-	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	4	3	241	~ 6	0	322	286	-	-	378	-	-
Stage 1	35	66	-	107	0	-	-	-	-	-	-	-
Stage 2	340	148	-	152	0	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	1	1	241	~ 4	-	322	286	-	-	378	-	-
Mov Cap-2 Maneuver	1	1	-	~ 4	-	-	-	-	-	-	-	-
Stage 1	35	33	-	107	-	-	-	-	-	-	-	-
Stage 2	152	148	-	75	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	$ 569.1	0	2.1
HCM LOS	A	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	286	-	-	-	4	322	378	-	-
HCM Lane V/C Ratio	-	-	-	-	6.579	0.552	0.504	-	-
HCM Control Delay (s)	0	-	-	$	$ 4219.4	29.1	23.8	-	-
HCM Lane LOS	A	-	-	A	F	D	C	-	-
HCM 95th %tile Q(veh)	0	-	-	-	4.8	3.2	2.7	-	-

Notes

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

6: ROUTE 1 & HIGH SCHOOL/RIVER RUN

Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	260	83	87	137	50	1345	30	322	1687	156
v/c Ratio	1.08	0.17	0.67	0.18	0.57	1.00	0.04	1.00	0.88	0.17
Control Delay	119.3	0.7	61.6	9.3	67.2	53.8	0.1	89.5	26.3	2.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	119.3	0.7	61.6	9.3	67.2	53.8	0.1	89.5	26.3	2.5
Queue Length 50th (ft)	~167	0	46	24	28	~396	0	185	446	0
Queue Length 95th (ft)	#316	0	#121	59	#81	#555	0	#355	#625	29
Internal Link Dist (ft)	478		419			2760			1317	
Turn Bay Length (ft)					290		300	1000		305
Base Capacity (vph)	240	494	129	755	88	1342	739	322	1913	919
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.08	0.17	0.67	0.18	0.57	1.00	0.04	1.00	0.88	0.17

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.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	243	1	78	81	1	129	47	1264	28	303	1586	147
Future Volume (vph)	243	1	78	81	1	129	47	1264	28	303	1586	147
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-2%			-1%			5%			-3%	
Total Lost time (s)		7.0	7.0		7.0	7.0	7.0	8.0	8.0	7.0	8.0	8.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.95	1.00		0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1828	1631		1750	1623	1600	3451	1559	1814	3557	1576
Flt Permitted		0.66	1.00		0.37	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1273	1631		688	1623	1600	3451	1559	1814	3557	1576
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	259	1	83	86	1	137	50	1345	30	322	1687	156
RTOR Reduction (vph)	0	0	68	0	0	39	0	0	18	0	0	73
Lane Group Flow (vph)	0	260	15	0	87	98	50	1345	12	322	1687	83
Heavy Vehicles (%)	0%	0%	0%	4%	0%	0%	10%	2%	1%	1%	3%	4%
Turn Type	Perm	NA	Perm	Perm	NA	pm+ov	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			4	5	1	6		5	2	
Permitted Phases	4		4	4		4			6			2
Actuated Green, G (s)		17.0	17.0		17.0	33.0	4.0	36.4	36.4	16.0	48.4	48.4
Effective Green, g (s)		17.0	17.0		17.0	33.0	4.0	36.4	36.4	16.0	48.4	48.4
Actuated g/C Ratio		0.19	0.19		0.19	0.36	0.04	0.40	0.40	0.18	0.53	0.53
Clearance Time (s)		7.0	7.0		7.0	7.0	7.0	8.0	8.0	7.0	8.0	8.0
Vehicle Extension (s)		4.0	4.0		4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Grp Cap (vph)		236	303		127	710	70	1374	620	317	1883	834
v/s Ratio Prot						0.02	0.03	c0.39		c0.18	c0.47	
v/s Ratio Perm		c0.20	0.01		0.13	0.04			0.01			0.05
v/c Ratio		1.10	0.05		0.69	0.14	0.71	0.98	0.02	1.02	0.90	0.10
Uniform Delay, d1		37.2	30.6		34.7	19.6	43.1	27.1	16.7	37.7	19.2	10.7
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		88.5	0.1		15.4	0.1	30.8	19.4	0.0	54.6	6.4	0.1
Delay (s)		125.7	30.7		50.1	19.8	73.9	46.5	16.7	92.3	25.7	10.8
Level of Service		F	C		D	B	E	D	B	F	C	B
Approach Delay (s)		102.7			31.5			46.8			34.5	
Approach LOS		F			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	44.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	91.4	Sum of lost time (s)	22.0
Intersection Capacity Utilization	90.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

MOVEMENT SUMMARY

Site: 101 [US 1 at Guinea Station_2030_AM]

3-Legged Roundabout
Site Category: (None)
Roundabout
Design Life Analysis (Final Year): Results for 10 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: US 1												
8	T1	1512	2.0	0.698	13.6	LOS B	11.2	283.8	0.86	0.90	1.25	32.5
18	R2	92	0.0	0.698	12.4	LOS B	11.2	283.8	0.85	0.84	1.18	31.7
Approach		1604	1.9	0.698	13.5	LOS B	11.2	283.8	0.86	0.89	1.24	32.4
East: Guinea Station												
1	L2	77	3.0	0.217	14.1	LOS B	1.0	25.6	0.80	0.80	0.80	29.9
16	R2	326	3.0	0.200	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	37.9
Approach		403	3.0	0.217	2.7	LOS A	1.0	25.6	0.15	0.15	0.15	35.9
North: US 1												
7	L2	423	0.0	0.709	12.2	LOS B	9.7	246.0	0.56	0.28	0.56	32.3
4	T1	1693	3.0	0.709	11.4	LOS B	9.8	251.5	0.53	0.25	0.53	33.0
Approach		2116	2.4	0.709	11.6	LOS B	9.8	251.5	0.54	0.26	0.54	32.9
All Vehicles		4123	2.3	0.709	11.5	LOS B	11.2	283.8	0.63	0.49	0.77	33.0

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [US 1 at Guinea Station_2030_PM]

3-Legged Roundabout
Site Category: (None)
Roundabout
Design Life Analysis (Final Year): Results for 10 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: US 1												
8	T1	1967	1.0	0.778	15.5	LOS C	17.4	437.4	0.87	0.75	1.13	31.7
18	R2	80	0.0	0.778	14.4	LOS B	15.2	382.9	0.85	0.68	1.03	30.9
Approach		2046	1.0	0.778	15.4	LOS C	17.4	437.4	0.87	0.75	1.13	31.6
East: Guinea Station												
1	L2	125	0.0	0.410	21.9	LOS C	2.3	57.9	0.89	0.97	1.14	27.4
16	R2	213	1.0	0.487	18.2	LOS C	3.4	85.7	0.94	1.05	1.27	29.0
Approach		339	0.6	0.487	19.6	LOS C	3.4	85.7	0.92	1.02	1.23	28.3
North: US 1												
7	L2	229	0.0	0.923	27.8	LOS D	35.0	886.9	1.00	0.79	1.28	27.1
4	T1	2420	2.0	0.923	26.2	LOS D	35.0	886.9	1.00	0.66	1.11	27.5
Approach		2649	1.8	0.923	26.4	LOS D	35.0	886.9	1.00	0.67	1.13	27.4
All Vehicles		5034	1.4	0.923	21.5	LOS C	35.0	886.9	0.94	0.72	1.13	29.1

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

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Lane Group	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	50	280	960	53	364	1248
v/c Ratio	0.29	0.77	0.41	0.05	0.95	0.52
Control Delay	39.4	29.1	6.0	1.4	50.0	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.4	29.1	6.0	1.4	50.0	6.9
Queue Length 50th (ft)	26	53	98	0	154	144
Queue Length 95th (ft)	60	#163	136	10	#378	195
Internal Link Dist (ft)	1092		1317			3232
Turn Bay Length (ft)				115	390	
Base Capacity (vph)	193	388	2343	1114	385	2413
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	0.26	0.72	0.41	0.05	0.95	0.52

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	46	0	258	0	883	49	335	1148	0
Future Volume (vph)	0	0	0	46	0	258	0	883	49	335	1148	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			1%			-3%	
Total Lost time (s)					7.0	7.0		7.0	7.0	7.0	7.0	
Lane Util. Factor					1.00	1.00		0.95	1.00	1.00	0.95	
Frt					1.00	0.85		1.00	0.85	1.00	1.00	
Flt Protected					0.95	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)					1656	1599		3295	1545	1814	3393	
Flt Permitted					0.76	1.00		1.00	1.00	0.28	1.00	
Satd. Flow (perm)					1320	1599		3295	1545	542	3393	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	50	0	280	0	960	53	364	1248	0
RTOR Reduction (vph)	0	0	0	0	0	156	0	0	15	0	0	0
Lane Group Flow (vph)	0	0	0	0	50	124	0	960	38	364	1248	0
Heavy Vehicles (%)	0%	0%	0%	9%	0%	1%	0%	9%	4%	1%	8%	0%
Turn Type				Perm	NA	Perm		NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)					11.6	11.6		63.0	63.0	63.0	63.0	
Effective Green, g (s)					11.6	11.6		63.0	63.0	63.0	63.0	
Actuated g/C Ratio					0.13	0.13		0.71	0.71	0.71	0.71	
Clearance Time (s)					7.0	7.0		7.0	7.0	7.0	7.0	
Vehicle Extension (s)					3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)					172	209		2342	1098	385	2412	
v/s Ratio Prot								0.29			0.37	
v/s Ratio Perm					0.04	c0.08			0.02	c0.67		
v/c Ratio					0.29	0.59		0.41	0.03	0.95	0.52	
Uniform Delay, d1					34.8	36.3		5.2	3.8	11.3	5.9	
Progression Factor					1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2					0.9	4.4		0.5	0.1	34.0	0.8	
Delay (s)					35.7	40.7		5.8	3.8	45.3	6.6	
Level of Service					D	D		A	A	D	A	
Approach Delay (s)		0.0			39.9			5.7			15.4	
Approach LOS		A			D			A			B	

Intersection Summary			
HCM 2000 Control Delay	14.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	88.6	Sum of lost time (s)	14.0
Intersection Capacity Utilization	82.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBT	WBR	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	75	178	1307	41	191	1631
v/c Ratio	0.37	0.58	0.54	0.04	0.82	0.67
Control Delay	40.0	26.5	7.3	1.2	41.2	8.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.0	26.5	7.3	1.2	41.2	8.9
Queue Length 50th (ft)	39	45	138	0	55	200
Queue Length 95th (ft)	82	112	203	7	#218	291
Internal Link Dist (ft)	1092		1317			3232
Turn Bay Length (ft)				115	390	
Base Capacity (vph)	237	343	2852	1285	273	2881
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	0.32	0.52	0.46	0.03	0.70	0.57

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	0	0	71	0	169	0	1242	39	181	1549	0
Future Volume (vph)	0	0	0	71	0	169	0	1242	39	181	1549	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			1%			-3%	
Total Lost time (s)					7.0	7.0		7.0	7.0	7.0	7.0	
Lane Util. Factor					1.00	1.00		0.95	1.00	1.00	0.95	
Frpb, ped/bikes					1.00	1.00		1.00	1.00	1.00	1.00	
Flpb, ped/bikes					1.00	1.00		1.00	1.00	1.00	1.00	
Frt					1.00	0.85		1.00	0.85	1.00	1.00	
Flt Protected					0.95	1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)					1805	1615		3556	1591	1832	3592	
Flt Permitted					0.76	1.00		1.00	1.00	0.18	1.00	
Satd. Flow (perm)					1439	1615		3556	1591	342	3592	
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)	0	0	0	75	0	178	0	1307	41	191	1631	0
RTOR Reduction (vph)	0	0	0	0	0	78	0	0	13	0	0	0
Lane Group Flow (vph)	0	0	0	0	75	100	0	1307	28	191	1631	0
Confl. Peds. (#/hr)							1					1
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	1%	0%	2%	0%
Turn Type				Perm	NA	Perm		NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)					11.3	11.3		54.5	54.5	54.5	54.5	
Effective Green, g (s)					11.3	11.3		54.5	54.5	54.5	54.5	
Actuated g/C Ratio					0.14	0.14		0.68	0.68	0.68	0.68	
Clearance Time (s)					7.0	7.0		7.0	7.0	7.0	7.0	
Vehicle Extension (s)					3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)					203	228		2428	1086	233	2453	
v/s Ratio Prot								0.37			0.45	
v/s Ratio Perm					0.05	c0.06			0.02	c0.56		
v/c Ratio					0.37	0.44		0.54	0.03	0.82	0.66	
Uniform Delay, d1					31.0	31.3		6.3	4.1	9.1	7.3	
Progression Factor					1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2					1.1	1.3		0.2	0.0	19.7	0.7	
Delay (s)					32.2	32.7		6.6	4.1	28.8	8.0	
Level of Service					C	C		A	A	C	A	
Approach Delay (s)		0.0			32.5			6.5			10.2	
Approach LOS		A			C			A			B	

Intersection Summary			
HCM 2000 Control Delay	10.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	79.8	Sum of lost time (s)	14.0
Intersection Capacity Utilization	103.0%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	WBL	NBT	NBR	SEL
Lane Group Flow (vph)	457	1345	109	364
v/c Ratio	1.05	1.04	0.10	1.00
Control Delay	90.0	66.5	1.7	86.1
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	90.0	66.5	1.7	86.1
Queue Length 50th (ft)	~285	~440	2	~209
Queue Length 95th (ft)	#469	#571	18	#388
Internal Link Dist (ft)	521	265		180
Turn Bay Length (ft)			300	
Base Capacity (vph)	437	1291	1115	363
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	1.05	1.04	0.10	1.00

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.

Movement	WBL	WBR	NBT	NBR	SEL
Lane Configurations					
Traffic Volume (vph)	163	258	1237	100	335
Future Volume (vph)	163	258	1237	100	335
Ideal Flow (vphpl)	1900	1900	1950	1950	1950
Total Lost time (s)	4.5		6.0	6.0	6.0
Lane Util. Factor	1.00		0.95	1.00	1.00
Frt	0.92		1.00	0.85	1.00
Flt Protected	0.98		1.00	1.00	0.95
Satd. Flow (prot)	1676		3632	1625	1816
Flt Permitted	0.98		1.00	1.00	0.95
Satd. Flow (perm)	1676		3632	1625	1816
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	177	280	1345	109	364
RTOR Reduction (vph)	0	0	0	32	0
Lane Group Flow (vph)	457	0	1345	77	364
Turn Type	Prot		NA	custom	Prot
Protected Phases	8		2	2 4	1
Permitted Phases					
Actuated Green, G (s)	23.5		32.0	60.0	18.0
Effective Green, g (s)	23.5		32.0	60.0	18.0
Actuated g/C Ratio	0.26		0.36	0.67	0.20
Clearance Time (s)	4.5		6.0		6.0
Vehicle Extension (s)	3.0		3.0		3.0
Lane Grp Cap (vph)	437		1291	1083	363
v/s Ratio Prot	c0.27		c0.37	0.05	c0.20
v/s Ratio Perm					
v/c Ratio	1.05		1.04	0.07	1.00
Uniform Delay, d1	33.2		29.0	5.2	36.0
Progression Factor	1.00		1.00	1.00	1.00
Incremental Delay, d2	55.5		36.7	0.0	47.9
Delay (s)	88.8		65.7	5.3	83.9
Level of Service	F		E	A	F
Approach Delay (s)	88.8		61.1		83.9
Approach LOS	F		E		F

Intersection Summary			
HCM 2000 Control Delay	70.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	90.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	NBT	NBR	SEL
Lane Group Flow (vph)	333	2275	179	191
v/c Ratio	1.07	1.06	0.13	0.90
Control Delay	128.4	69.5	1.2	105.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	128.4	69.5	1.2	105.3
Queue Length 50th (ft)	~360	~1292	8	187
Queue Length 95th (ft)	#561	#1418	23	#331
Internal Link Dist (ft)	521	265		180
Turn Bay Length (ft)			300	
Base Capacity (vph)	310	2139	1330	217
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	1.07	1.06	0.13	0.88

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.

Movement	WBL	WBR	NBT	NBR	SEL
Lane Configurations					
Traffic Volume (vph)	147	169	2161	170	181
Future Volume (vph)	147	169	2161	170	181
Ideal Flow (vphpl)	1900	1900	1950	1950	1950
Total Lost time (s)	4.5		6.0	6.0	6.0
Lane Util. Factor	1.00		0.95	1.00	1.00
Frt	0.93		1.00	0.85	1.00
Flt Protected	0.98		1.00	1.00	0.95
Satd. Flow (prot)	1689		3632	1625	1816
Flt Permitted	0.98		1.00	1.00	0.95
Satd. Flow (perm)	1689		3632	1625	1816
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	155	178	2275	179	191
RTOR Reduction (vph)	0	0	0	26	0
Lane Group Flow (vph)	333	0	2275	153	191
Turn Type	Prot		NA	custom	Prot
Protected Phases	8		2	2 4	1
Permitted Phases					
Actuated Green, G (s)	27.6		88.3	120.4	17.6
Effective Green, g (s)	27.6		88.3	120.4	17.6
Actuated g/C Ratio	0.18		0.59	0.80	0.12
Clearance Time (s)	4.5		6.0		6.0
Vehicle Extension (s)	3.0		3.0		3.0
Lane Grp Cap (vph)	310		2138	1304	213
v/s Ratio Prot	c0.20		c0.63	0.09	c0.11
v/s Ratio Perm					
v/c Ratio	1.07		1.06	0.12	0.90
Uniform Delay, d1	61.2		30.9	3.2	65.3
Progression Factor	1.00		1.00	1.00	1.00
Incremental Delay, d2	72.2		39.1	0.0	34.6
Delay (s)	133.4		70.0	3.3	99.9
Level of Service	F		E	A	F
Approach Delay (s)	133.4		65.1		99.9
Approach LOS	F		E		F

Intersection Summary			
HCM 2000 Control Delay	75.0	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	100.2%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	11.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	335	0	0	0	319	0	1197	73	0	0	0
Future Vol, veh/h	0	335	0	0	0	319	0	1197	73	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Yield	Yield	Yield	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16979	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	6	2	2	2	2
Mvmt Flow	0	364	0	0	0	347	0	1301	79	0	0	0

Major/Minor	Minor1		Major1			
Conflicting Flow All	-	-	690	-	0	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	6.94	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.32	-	-	-
Pot Cap-1 Maneuver	0	0	388	0	-	-
Stage 1	0	0	-	0	-	-
Stage 2	0	0	-	0	-	-
Platoon blocked, %					-	-
Mov Cap-1 Maneuver	-	0	388	-	-	-
Mov Cap-2 Maneuver	-	0	-	-	-	-
Stage 1	-	0	-	-	-	-
Stage 2	-	0	-	-	-	-

Approach	WB	NB
HCM Control Delay, s	56	0
HCM LOS	F	

Minor Lane/Major Mvmt	NBT	NBR	WBLn1
Capacity (veh/h)	-	-	388
HCM Lane V/C Ratio	-	-	0.894
HCM Control Delay (s)	-	-	56
HCM Lane LOS	-	-	F
HCM 95th %tile Q(veh)	-	-	9.1

Intersection	
Int Delay, s/veh	0.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	61	0	0	0	0	1675
Future Vol, veh/h	61	0	0	0	0	1675
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	-	16974	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	7
Mvmt Flow	66	0	0	0	0	1821

Major/Minor	Minor1		Major2	
Conflicting Flow All	911	-	-	-
Stage 1	0	-	-	-
Stage 2	911	-	-	-
Critical Hdwy	6.84	-	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-
Follow-up Hdwy	3.52	-	-	-
Pot Cap-1 Maneuver	274	0	0	-
Stage 1	-	0	0	-
Stage 2	352	0	0	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	274	-	-	-
Mov Cap-2 Maneuver	274	-	-	-
Stage 1	-	-	-	-
Stage 2	352	-	-	-

Approach	WB	SB
HCM Control Delay, s	22.3	0
HCM LOS	C	

Minor Lane/Major Mvmt	WBLn1	SBT
Capacity (veh/h)	274	-
HCM Lane V/C Ratio	0.242	-
HCM Control Delay (s)	22.3	-
HCM Lane LOS	C	-
HCM 95th %tile Q(veh)	0.9	-

Intersection	
Int Delay, s/veh	10

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑				↱		↑↑↳				
Traffic Vol, veh/h	0	181	0	0	0	268	0	1557	63	0	0	0
Future Vol, veh/h	0	181	0	0	0	268	0	1557	63	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Yield	Yield	Yield	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16979	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	2	0	0	0	0	0	1	0	0	0	0
Mvmt Flow	0	191	0	0	0	282	0	1639	66	0	0	0

Major/Minor	Minor1		Major1			
Conflicting Flow All	-	-	853	-	0	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	6.9	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.3	-	-	-
Pot Cap-1 Maneuver	0	0	307	0	-	-
Stage 1	0	0	-	0	-	-
Stage 2	0	0	-	0	-	-
Platoon blocked, %					-	-
Mov Cap-1 Maneuver	-	0	307	-	-	-
Mov Cap-2 Maneuver	-	0	-	-	-	-
Stage 1	-	0	-	-	-	-
Stage 2	-	0	-	-	-	-

Approach	WB	NB
HCM Control Delay, s	70.5	0
HCM LOS	F	

Minor Lane/Major Mvmt	NBT	NBR	WBLn1
Capacity (veh/h)	-	-	307
HCM Lane V/C Ratio	-	-	0.919
HCM Control Delay (s)	-	-	70.5
HCM Lane LOS	-	-	F
HCM 95th %tile Q(veh)	-	-	8.8

Intersection	
Int Delay, s/veh	1.8

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	99	0	0	0	0	2097
Future Vol, veh/h	99	0	0	0	0	2097
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	-	16974	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	104	0	0	0	0	2207

Major/Minor	Minor1		Major2	
Conflicting Flow All	1104	-	-	-
Stage 1	0	-	-	-
Stage 2	1104	-	-	-
Critical Hdwy	6.84	-	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-
Follow-up Hdwy	3.52	-	-	-
Pot Cap-1 Maneuver	205	0	0	-
Stage 1	-	0	0	-
Stage 2	279	0	0	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	205	-	-	-
Mov Cap-2 Maneuver	205	-	-	-
Stage 1	-	-	-	-
Stage 2	279	-	-	-

Approach	WB	SB
HCM Control Delay, s	39.4	0
HCM LOS	E	

Minor Lane/Major Mvmt	WBLn1	SBT
Capacity (veh/h)	205	-
HCM Lane V/C Ratio	0.508	-
HCM Control Delay (s)	39.4	-
HCM Lane LOS	E	-
HCM 95th %tile Q(veh)	2.6	-

Intersection	
Int Delay, s/veh	6.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑				↱		↑↑↳				
Traffic Vol, veh/h	0	335	0	0	0	273	0	1197	73	0	0	0
Future Vol, veh/h	0	335	0	0	0	273	0	1197	73	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Yield	Yield	Yield	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16979	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	6	2	2	2	2
Mvmt Flow	0	364	0	0	0	297	0	1301	79	0	0	0

Major/Minor	Minor1		Major1			
Conflicting Flow All	-	-	690	-	0	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	6.94	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.32	-	-	-
Pot Cap-1 Maneuver	0	0	388	0	-	-
Stage 1	0	0	-	0	-	-
Stage 2	0	0	-	0	-	-
Platoon blocked, %					-	-
Mov Cap-1 Maneuver	-	0	388	-	-	-
Mov Cap-2 Maneuver	-	0	-	-	-	-
Stage 1	-	0	-	-	-	-
Stage 2	-	0	-	-	-	-

Approach	WB	NB
HCM Control Delay, s	38.8	0
HCM LOS	E	

Minor Lane/Major Mvmt	NBT	NBR	WBLn1
Capacity (veh/h)	-	-	388
HCM Lane V/C Ratio	-	-	0.765
HCM Control Delay (s)	-	-	38.8
HCM Lane LOS	-	-	E
HCM 95th %tile Q(veh)	-	-	6.3

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	15	0	0	0	0	1675
Future Vol, veh/h	15	0	0	0	0	1675
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	-	16974	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	7
Mvmt Flow	16	0	0	0	0	1821

Major/Minor	Minor1		Major2	
Conflicting Flow All	911	-	-	-
Stage 1	0	-	-	-
Stage 2	911	-	-	-
Critical Hdwy	6.84	-	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-
Follow-up Hdwy	3.52	-	-	-
Pot Cap-1 Maneuver	274	0	0	-
Stage 1	-	0	0	-
Stage 2	352	0	0	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	274	-	-	-
Mov Cap-2 Maneuver	274	-	-	-
Stage 1	-	-	-	-
Stage 2	352	-	-	-

Approach	WB	SB
HCM Control Delay, s	19	0
HCM LOS	C	

Minor Lane/Major Mvmt	WBLn1	SBT
Capacity (veh/h)	274	-
HCM Lane V/C Ratio	0.06	-
HCM Control Delay (s)	19	-
HCM Lane LOS	C	-
HCM 95th %tile Q(veh)	0.2	-

Intersection	
Int Delay, s/veh	4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	181	0	0	0	194	0	1557	63	0	0	0
Future Vol, veh/h	0	181	0	0	0	194	0	1557	63	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Yield	Yield	Yield	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	16979	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	0	2	0	0	0	0	0	1	0	0	0	0
Mvmt Flow	0	191	0	0	0	204	0	1639	66	0	0	0

Major/Minor	Minor1		Major1			
Conflicting Flow All	-	-	853	-	0	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	-	6.9	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	-	3.3	-	-	-
Pot Cap-1 Maneuver	0	0	307	0	-	-
Stage 1	0	0	-	0	-	-
Stage 2	0	0	-	0	-	-
Platoon blocked, %					-	-
Mov Cap-1 Maneuver	-	0	307	-	-	-
Mov Cap-2 Maneuver	-	0	-	-	-	-
Stage 1	-	0	-	-	-	-
Stage 2	-	0	-	-	-	-

Approach	WB	NB
HCM Control Delay, s	37.2	0
HCM LOS	E	

Minor Lane/Major Mvmt	NBT	NBR	WBLn1
Capacity (veh/h)	-	-	307
HCM Lane V/C Ratio	-	-	0.665
HCM Control Delay (s)	-	-	37.2
HCM Lane LOS	-	-	E
HCM 95th %tile Q(veh)	-	-	4.4

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	25	0	0	0	0	2097
Future Vol, veh/h	25	0	0	0	0	2097
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	-	16974	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	26	0	0	0	0	2207

Major/Minor	Minor1		Major2	
Conflicting Flow All	1104	-	-	-
Stage 1	0	-	-	-
Stage 2	1104	-	-	-
Critical Hdwy	6.84	-	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-
Follow-up Hdwy	3.52	-	-	-
Pot Cap-1 Maneuver	205	0	0	-
Stage 1	-	0	0	-
Stage 2	279	0	0	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	205	-	-	-
Mov Cap-2 Maneuver	205	-	-	-
Stage 1	-	-	-	-
Stage 2	279	-	-	-

Approach	WB	SB
HCM Control Delay, s	25.1	0
HCM LOS	D	

Minor Lane/Major Mvmt	WBLn1	SBT
Capacity (veh/h)	205	-
HCM Lane V/C Ratio	0.128	-
HCM Control Delay (s)	25.1	-
HCM Lane LOS	D	-
HCM 95th %tile Q(veh)	0.4	-

Lane Group	WBR2	NBT	SEL
Lane Group Flow (vph)	458	1454	364
v/c Ratio	0.80	0.82	0.58
Control Delay	29.9	17.6	17.4
Queue Delay	0.0	0.0	0.0
Total Delay	29.9	17.6	17.4
Queue Length 50th (ft)	141	218	43
Queue Length 95th (ft)	#277	305	31
Internal Link Dist (ft)		310	185
Turn Bay Length (ft)			
Base Capacity (vph)	669	1939	734
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.68	0.75	0.50

Intersection Summary

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

Movement	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SER
Lane Configurations											
Traffic Volume (vph)	0	0	421	0	1237	100	0	0	0	335	0
Future Volume (vph)	0	0	421	0	1237	100	0	0	0	335	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950
Total Lost time (s)			4.5		4.5					4.5	
Lane Util. Factor			1.00		0.95					1.00	
Frt			0.86		0.99					1.00	
Flt Protected			1.00		1.00					0.95	
Satd. Flow (prot)			1654		3592					1816	
Flt Permitted			1.00		1.00					0.95	
Satd. Flow (perm)			1654		3592					1816	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	458	0	1345	109	0	0	0	364	0
RTOR Reduction (vph)	0	0	0	0	10	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	458	0	1444	0	0	0	0	364	0
Turn Type			Perm		NA					Prot	
Protected Phases					6					8	
Permitted Phases			4								
Actuated Green, G (s)			19.0		27.0					19.0	
Effective Green, g (s)			19.0		27.0					19.0	
Actuated g/C Ratio			0.35		0.49					0.35	
Clearance Time (s)			4.5		4.5					4.5	
Vehicle Extension (s)			3.0		3.0					3.0	
Lane Grp Cap (vph)			571		1763					627	
v/s Ratio Prot					c0.40					0.20	
v/s Ratio Perm			c0.28								
v/c Ratio			0.80		0.82					0.58	
Uniform Delay, d1			16.3		11.9					14.7	
Progression Factor			1.00		1.00					0.86	
Incremental Delay, d2			8.0		3.1					1.4	
Delay (s)			24.3		15.0					14.1	
Level of Service			C		B					B	
Approach Delay (s)	24.3				15.0			0.0		14.1	
Approach LOS	C				B			A		B	

Intersection Summary			
HCM 2000 Control Delay	16.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	69.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBR2	NBT	SEL
Lane Group Flow (vph)	333	2454	191
v/c Ratio	0.94	1.00	0.49
Control Delay	70.7	32.3	34.7
Queue Delay	0.0	0.0	0.0
Total Delay	70.7	32.3	34.7
Queue Length 50th (ft)	187	632	69
Queue Length 95th (ft)	#349	#907	82
Internal Link Dist (ft)		310	185
Turn Bay Length (ft)			
Base Capacity (vph)	359	2464	394
Starvation Cap Reductn	0	0	0
Spillback Cap Reductn	0	0	0
Storage Cap Reductn	0	0	0
Reduced v/c Ratio	0.93	1.00	0.48

Intersection Summary

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

Movement	WBL	WBR	WBR2	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SER
Lane Configurations											
Traffic Volume (vph)	0	0	316	0	2161	170	0	0	0	181	0
Future Volume (vph)	0	0	316	0	2161	170	0	0	0	181	0
Ideal Flow (vphpl)	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950	1950
Total Lost time (s)			4.5		4.5					4.5	
Lane Util. Factor			1.00		0.95					1.00	
Frt			0.86		0.99					1.00	
Flt Protected			1.00		1.00					0.95	
Satd. Flow (prot)			1654		3593					1816	
Flt Permitted			1.00		1.00					0.95	
Satd. Flow (perm)			1654		3593					1816	
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
Adj. Flow (vph)	0	0	333	0	2275	179	0	0	0	191	0
RTOR Reduction (vph)	0	0	0	0	6	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	333	0	2448	0	0	0	0	191	0
Turn Type			Perm		NA					Prot	
Protected Phases					6					8	
Permitted Phases			4								
Actuated Green, G (s)			19.3		61.5					19.3	
Effective Green, g (s)			19.3		61.5					19.3	
Actuated g/C Ratio			0.21		0.68					0.21	
Clearance Time (s)			4.5		4.5					4.5	
Vehicle Extension (s)			3.0		3.0					3.0	
Lane Grp Cap (vph)			355		2460					390	
v/s Ratio Prot					c0.68					0.11	
v/s Ratio Perm			c0.20								
v/c Ratio			0.94		0.99					0.49	
Uniform Delay, d1			34.7		14.0					30.9	
Progression Factor			1.00		1.00					0.96	
Incremental Delay, d2			31.8		16.9					1.0	
Delay (s)			66.5		30.9					30.8	
Level of Service			E		C					C	
Approach Delay (s)	66.5				30.9			0.0		30.8	
Approach LOS	E				C			A		C	

Intersection Summary			
HCM 2000 Control Delay	34.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	89.8	Sum of lost time (s)	9.0
Intersection Capacity Utilization	90.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	285	104	242	155	1161	79	304	1242
v/c Ratio	0.70	0.40	0.56	0.47	0.79	0.10	0.76	0.77
Control Delay	20.8	35.8	10.0	15.0	25.1	0.5	28.0	21.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.8	35.8	10.0	15.0	25.1	0.5	28.0	21.8
Queue Length 50th (ft)	39	49	0	21	255	0	76	249
Queue Length 95th (ft)	116	92	60	73	#371	3	#191	357
Internal Link Dist (ft)	2388	1092			1317			3232
Turn Bay Length (ft)			200	200		115	390	
Base Capacity (vph)	438	302	462	328	1476	771	429	1617
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.65	0.34	0.52	0.47	0.79	0.10	0.71	0.77

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	55	207	0	96	223	143	1068	73	280	1133	9
Future Volume (vph)	0	55	207	0	96	223	143	1068	73	280	1133	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			1%			-3%	
Total Lost time (s)		7.0			7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.89			1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		1.00			1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1664			1863	1599	1761	3389	1575	1814	3422	
Flt Permitted		1.00			1.00	1.00	0.13	1.00	1.00	0.12	1.00	
Satd. Flow (perm)		1664			1863	1599	248	3389	1575	231	3422	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	60	225	0	104	242	155	1161	79	304	1232	10
RTOR Reduction (vph)	0	173	0	0	0	208	0	0	45	0	1	0
Lane Group Flow (vph)	0	112	0	0	104	34	155	1161	34	304	1241	0
Confl. Peds. (#/hr)							1					1
Heavy Vehicles (%)	0%	2%	2%	0%	2%	1%	2%	6%	2%	1%	7%	0%
Turn Type		NA			NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases						8	2		2	6		
Actuated Green, G (s)		11.2			11.2	11.2	44.9	34.9	34.9	50.7	37.8	
Effective Green, g (s)		11.2			11.2	11.2	44.9	34.9	34.9	50.7	37.8	
Actuated g/C Ratio		0.14			0.14	0.14	0.56	0.44	0.44	0.63	0.47	
Clearance Time (s)		7.0			7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		232			260	223	328	1478	687	401	1616	
v/s Ratio Prot		c0.07			0.06		0.06	0.34		c0.12	c0.36	
v/s Ratio Perm						0.02	0.21		0.02	0.36		
v/c Ratio		0.48			0.40	0.15	0.47	0.79	0.05	0.76	0.77	
Uniform Delay, d1		31.7			31.3	30.2	10.4	19.3	13.0	16.1	17.5	
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		1.6			1.0	0.3	1.1	4.3	0.1	8.0	3.6	
Delay (s)		33.3			32.4	30.5	11.5	23.6	13.1	24.1	21.0	
Level of Service		C			C	C	B	C	B	C	C	
Approach Delay (s)		33.3			31.1			21.7			21.6	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	23.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	78.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	139	98	23	79	58	1191	36	293	972	208
v/c Ratio	0.93	0.24	0.16	0.15	0.39	0.89	0.05	0.87	0.48	0.20
Control Delay	95.8	1.3	35.2	5.9	42.8	32.7	0.1	57.4	11.4	2.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	95.8	1.3	35.2	5.9	42.8	32.7	0.1	57.4	11.4	2.1
Queue Length 50th (ft)	70	0	11	3	28	285	0	142	158	0
Queue Length 95th (ft)	#177	0	33	28	64	#417	0	#277	212	29
Internal Link Dist (ft)	478		419			2760			1317	
Turn Bay Length (ft)					290		300	1000		305
Base Capacity (vph)	150	414	140	520	150	1335	712	346	2031	1047
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.93	0.24	0.16	0.15	0.39	0.89	0.05	0.85	0.48	0.20

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	127	1	90	21	0	73	53	1096	33	270	894	191
Future Volume (vph)	127	1	90	21	0	73	53	1096	33	270	894	191
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-2%			-1%			5%			-3%	
Total Lost time (s)		7.0	7.0		7.0	7.0	7.0	8.0	8.0	7.0	8.0	8.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.95	1.00		0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1775	1631		1761	1159	1709	3321	1406	1621	3424	1623
Flt Permitted		0.71	1.00		0.67	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1325	1631		1239	1159	1709	3321	1406	1621	3424	1623
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	138	1	98	23	0	79	58	1191	36	293	972	208
RTOR Reduction (vph)	0	0	87	0	0	47	0	0	21	0	0	89
Lane Group Flow (vph)	0	139	11	0	23	32	58	1191	15	293	972	119
Heavy Vehicles (%)	3%	0%	0%	3%	0%	40%	3%	6%	12%	13%	7%	1%
Turn Type	Perm	NA	Perm	Perm	NA	pm+ov	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			4	5	1	6		5	2	
Permitted Phases	4		4	4		4			6			2
Actuated Green, G (s)		9.0	9.0		9.0	25.6	4.2	34.8	34.8	16.6	47.2	47.2
Effective Green, g (s)		9.0	9.0		9.0	25.6	4.2	34.8	34.8	16.6	47.2	47.2
Actuated g/C Ratio		0.11	0.11		0.11	0.31	0.05	0.42	0.42	0.20	0.57	0.57
Clearance Time (s)		7.0	7.0		7.0	7.0	7.0	8.0	8.0	7.0	8.0	8.0
Vehicle Extension (s)		4.0	4.0		4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Grp Cap (vph)		144	178		135	458	87	1402	593	326	1961	929
v/s Ratio Prot						0.01	0.03	c0.36		c0.18	0.28	
v/s Ratio Perm		c0.10	0.01		0.02	0.01			0.01			0.07
v/c Ratio		0.97	0.06		0.17	0.07	0.67	0.85	0.03	0.90	0.50	0.13
Uniform Delay, d1		36.5	32.9		33.3	20.0	38.4	21.4	13.9	32.1	10.5	8.1
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		64.2	0.2		0.8	0.1	19.2	5.5	0.0	26.3	0.4	0.1
Delay (s)		100.8	33.1		34.1	20.1	57.6	27.0	13.9	58.4	10.9	8.2
Level of Service		F	C		C	C	E	C	B	E	B	A
Approach Delay (s)		72.8			23.3			28.0			20.0	
Approach LOS		E			C			C			B	

Intersection Summary			
HCM 2000 Control Delay	27.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	82.4	Sum of lost time (s)	22.0
Intersection Capacity Utilization	77.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	314	128	154	206	1449	66	162	1744
v/c Ratio	0.80	0.52	0.45	0.72	0.78	0.07	0.55	0.93
Control Delay	30.1	44.1	10.6	34.1	21.0	0.2	20.8	30.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.1	44.1	10.6	34.1	21.0	0.2	20.8	30.4
Queue Length 50th (ft)	59	68	0	61	336	0	30	471
Queue Length 95th (ft)	#180	123	53	#164	433	1	95	#657
Internal Link Dist (ft)	2300	1092			1317			3232
Turn Bay Length (ft)			200	200		115	390	
Base Capacity (vph)	414	274	365	285	1867	898	293	1882
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.76	0.47	0.42	0.72	0.78	0.07	0.55	0.93

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	27	272	0	122	146	196	1377	63	154	1644	12
Future Volume (vph)	0	27	272	0	122	146	196	1377	63	154	1644	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			1%			-3%	
Total Lost time (s)		7.0			7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frpb, ped/bikes		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.88			1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		1.00			1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1666			1900	1615	1796	3556	1591	1832	3588	
Flt Permitted		1.00			1.00	1.00	0.08	1.00	1.00	0.09	1.00	
Satd. Flow (perm)		1666			1900	1615	160	3556	1591	171	3588	
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)	0	28	286	0	128	154	206	1449	66	162	1731	13
RTOR Reduction (vph)	0	177	0	0	0	134	0	0	31	0	0	0
Lane Group Flow (vph)	0	137	0	0	128	20	206	1449	35	162	1744	0
Confl. Peds. (#/hr)							1					1
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	1%	0%	2%	0%
Turn Type		NA			NA	Perm	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases						8	2		2	6		
Actuated Green, G (s)		11.7			11.7	11.7	57.4	47.3	47.3	57.2	47.2	
Effective Green, g (s)		11.7			11.7	11.7	57.4	47.3	47.3	57.2	47.2	
Actuated g/C Ratio		0.13			0.13	0.13	0.64	0.53	0.53	0.64	0.52	
Clearance Time (s)		7.0			7.0	7.0	7.0	7.0	7.0	7.0	7.0	
Vehicle Extension (s)		3.0			3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		216			247	209	285	1868	836	293	1881	
v/s Ratio Prot		c0.08			0.07		c0.08	0.41		0.06	c0.49	
v/s Ratio Perm						0.01	0.38		0.02	0.29		
v/c Ratio		0.64			0.52	0.10	0.72	0.78	0.04	0.55	0.93	
Uniform Delay, d1		37.1			36.5	34.5	21.5	17.1	10.4	12.6	19.8	
Progression Factor		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		6.0			1.8	0.2	8.7	3.2	0.1	2.3	9.4	
Delay (s)		43.1			38.4	34.7	30.3	20.3	10.4	14.9	29.2	
Level of Service		D			D	C	C	C	B	B	C	
Approach Delay (s)		43.1			36.4			21.1			28.0	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	26.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	92.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	277	188	8	137	50	1345	30	322	1687	156
v/c Ratio	1.06	0.38	0.03	0.18	0.57	1.00	0.04	1.00	0.88	0.17
Control Delay	110.5	4.6	30.4	9.3	67.2	53.8	0.1	89.5	26.3	2.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	110.5	4.6	30.4	9.3	67.2	53.8	0.1	89.5	26.3	2.5
Queue Length 50th (ft)	~175	0	4	24	28	~396	0	185	446	0
Queue Length 95th (ft)	#328	33	16	59	#81	#555	0	#355	#625	29
Internal Link Dist (ft)	478		419			2760			1317	
Turn Bay Length (ft)					290		300	1000		305
Base Capacity (vph)	261	494	241	755	88	1342	739	322	1913	919
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.06	0.38	0.03	0.18	0.57	1.00	0.04	1.00	0.88	0.17

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.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	259	1	177	7	1	129	47	1264	28	303	1586	147
Future Volume (vph)	259	1	177	7	1	129	47	1264	28	303	1586	147
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-2%			-1%			5%			-3%	
Total Lost time (s)		7.0	7.0		7.0	7.0	7.0	8.0	8.0	7.0	8.0	8.0
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt		1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.95	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1828	1631		1768	1623	1600	3451	1559	1814	3557	1576
Flt Permitted		0.72	1.00		0.69	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1385	1631		1276	1623	1600	3451	1559	1814	3557	1576
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	276	1	188	7	1	137	50	1345	30	322	1687	156
RTOR Reduction (vph)	0	0	153	0	0	39	0	0	18	0	0	73
Lane Group Flow (vph)	0	277	35	0	8	98	50	1345	12	322	1687	83
Heavy Vehicles (%)	0%	0%	0%	4%	0%	0%	10%	2%	1%	1%	3%	4%
Turn Type	Perm	NA	Perm	Perm	NA	pm+ov	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			4	5	1	6		5	2	
Permitted Phases	4		4	4		4			6			2
Actuated Green, G (s)		17.0	17.0		17.0	33.0	4.0	36.4	36.4	16.0	48.4	48.4
Effective Green, g (s)		17.0	17.0		17.0	33.0	4.0	36.4	36.4	16.0	48.4	48.4
Actuated g/C Ratio		0.19	0.19		0.19	0.36	0.04	0.40	0.40	0.18	0.53	0.53
Clearance Time (s)		7.0	7.0		7.0	7.0	7.0	8.0	8.0	7.0	8.0	8.0
Vehicle Extension (s)		4.0	4.0		4.0	4.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Grp Cap (vph)		257	303		237	710	70	1374	620	317	1883	834
v/s Ratio Prot						0.02	0.03	c0.39		c0.18	c0.47	
v/s Ratio Perm		c0.20	0.02		0.01	0.04			0.01			0.05
v/c Ratio		1.08	0.12		0.03	0.14	0.71	0.98	0.02	1.02	0.90	0.10
Uniform Delay, d1		37.2	30.9		30.5	19.6	43.1	27.1	16.7	37.7	19.2	10.7
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		78.4	0.2		0.1	0.1	30.8	19.4	0.0	54.6	6.4	0.1
Delay (s)		115.6	31.2		30.6	19.8	73.9	46.5	16.7	92.3	25.7	10.8
Level of Service		F	C		C	B	E	D	B	F	C	B
Approach Delay (s)		81.4			20.4			46.8			34.5	
Approach LOS		F			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	43.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	91.4	Sum of lost time (s)	22.0
Intersection Capacity Utilization	91.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Hickory Ridge Parkway

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	57	56	65	1084	991	33
v/c Ratio	0.16	0.15	0.13	0.41	0.49	0.04
Control Delay	20.9	8.2	5.5	6.0	18.9	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.9	8.2	5.5	6.0	18.9	6.9
Queue Length 50th (ft)	17	0	9	102	176	0
Queue Length 95th (ft)	44	25	21	146	#297	16
Internal Link Dist (ft)	1603			2340	1316	
Turn Bay Length (ft)		250	315			200
Base Capacity (vph)	461	469	514	2458	2011	888
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	0.12	0.12	0.13	0.44	0.49	0.04

Intersection Summary

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

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	56	55	64	1073	981	33
Future Volume (vph)	56	55	64	1073	981	33
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1687	1568	1752	3539	3539	1538
Flt Permitted	0.95	1.00	0.17	1.00	1.00	1.00
Satd. Flow (perm)	1687	1568	316	3539	3539	1538
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	57	56	65	1084	991	33
RTOR Reduction (vph)	0	51	0	0	0	19
Lane Group Flow (vph)	57	5	65	1084	991	14
Heavy Vehicles (%)	7%	3%	3%	2%	2%	5%
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	5.2	5.2	36.6	36.6	24.4	24.4
Effective Green, g (s)	5.2	5.2	36.6	36.6	24.4	24.4
Actuated g/C Ratio	0.09	0.09	0.66	0.66	0.44	0.44
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	157	146	341	2321	1547	672
v/s Ratio Prot	c0.03		0.02	c0.31	c0.28	
v/s Ratio Perm		0.00	0.11			0.01
v/c Ratio	0.36	0.04	0.19	0.47	0.64	0.02
Uniform Delay, d1	23.7	23.0	5.1	4.8	12.3	8.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.4	0.1	0.3	0.1	0.9	0.0
Delay (s)	25.2	23.1	5.4	4.9	13.2	8.9
Level of Service	C	C	A	A	B	A
Approach Delay (s)	24.2			4.9	13.1	
Approach LOS	C			A	B	

Intersection Summary			
HCM 2000 Control Delay	9.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	55.8	Sum of lost time (s)	21.0
Intersection Capacity Utilization	61.3%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Group Flow (vph)	33	57	65	1123	1326	49
v/c Ratio	0.11	0.17	0.16	0.40	0.59	0.05
Control Delay	25.5	9.8	5.0	5.1	17.4	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.5	9.8	5.0	5.1	17.4	4.8
Queue Length 50th (ft)	12	0	9	108	271	0
Queue Length 95th (ft)	34	28	20	147	#415	18
Internal Link Dist (ft)	1603			2340	1316	
Turn Bay Length (ft)		250	315			200
Base Capacity (vph)	395	410	419	2740	2239	991
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	0.08	0.14	0.16	0.41	0.59	0.05

Intersection Summary

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

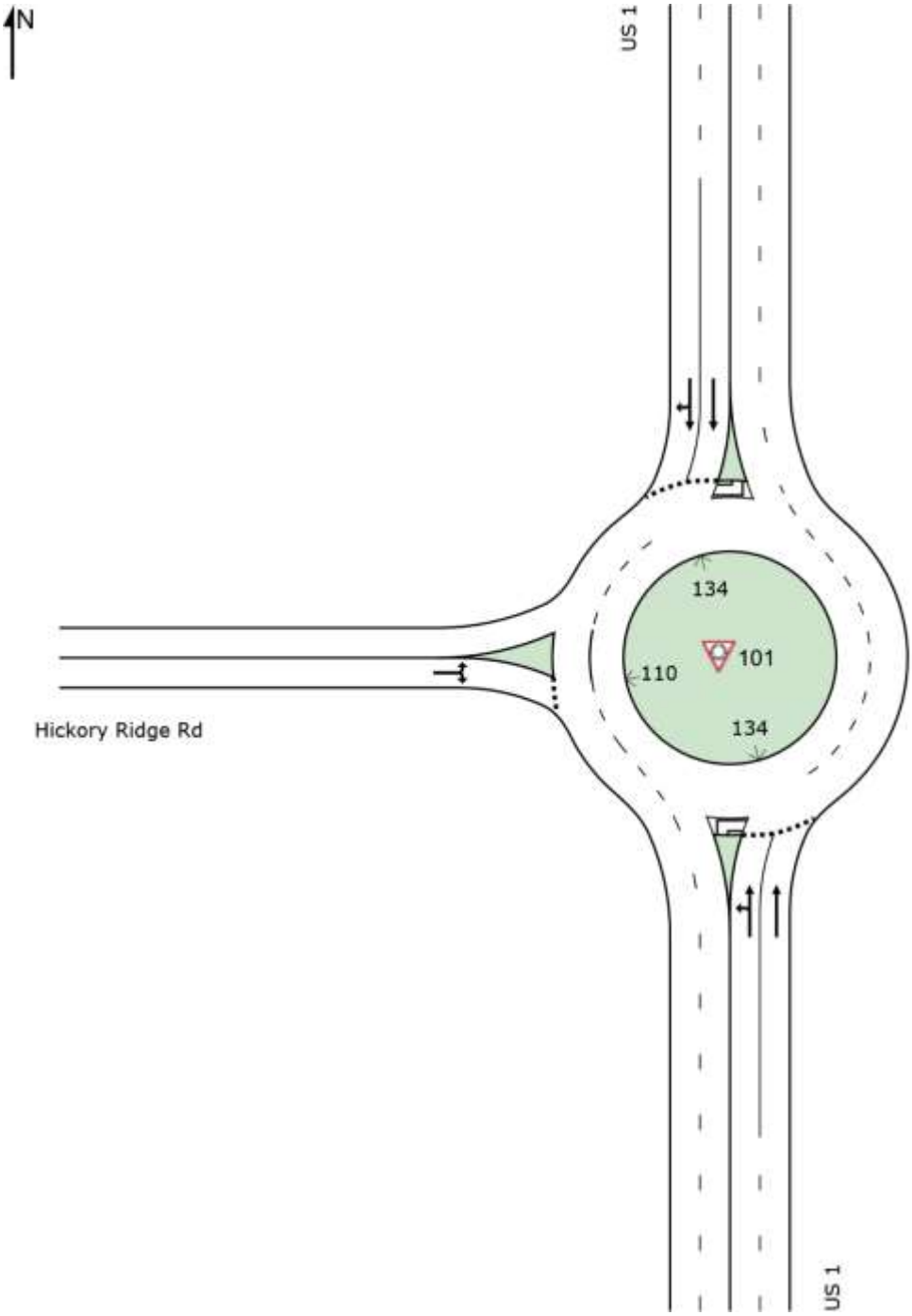
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	33	56	64	1112	1313	49
Future Volume (vph)	33	56	64	1112	1313	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1687	1568	1752	3539	3539	1538
Flt Permitted	0.95	1.00	0.10	1.00	1.00	1.00
Satd. Flow (perm)	1687	1568	192	3539	3539	1538
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	33	57	65	1123	1326	49
RTOR Reduction (vph)	0	52	0	0	0	24
Lane Group Flow (vph)	33	5	65	1123	1326	25
Heavy Vehicles (%)	7%	3%	3%	2%	2%	5%
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	5.2	5.2	45.2	45.2	33.0	33.0
Effective Green, g (s)	5.2	5.2	45.2	45.2	33.0	33.0
Actuated g/C Ratio	0.08	0.08	0.70	0.70	0.51	0.51
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	136	126	260	2483	1813	788
v/s Ratio Prot	c0.02		0.02	c0.32	c0.37	
v/s Ratio Perm		0.00	0.15			0.02
v/c Ratio	0.24	0.04	0.25	0.45	0.73	0.03
Uniform Delay, d1	27.8	27.3	6.7	4.2	12.2	7.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	0.1	0.5	0.1	1.6	0.0
Delay (s)	28.7	27.4	7.2	4.3	13.8	7.8
Level of Service	C	C	A	A	B	A
Approach Delay (s)	27.9			4.5	13.6	
Approach LOS	C			A	B	

Intersection Summary			
HCM 2000 Control Delay	10.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	64.4	Sum of lost time (s)	21.0
Intersection Capacity Utilization	70.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

SITE LAYOUT

Site: 101 [US 1-Hickory Ridge Rd_2030_AM]

New Site
Site Category: (None)
Roundabout



MOVEMENT SUMMARY

Site: 101 [US 1-Hickory Ridge Rd_2030_AM]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: US 1												
3	L2	70	8.0	0.390	6.5	LOS A	3.1	80.8	0.32	0.14	0.32	35.1
8	T1	1009	6.0	0.390	6.2	LOS A	3.1	82.2	0.31	0.14	0.31	35.4
Approach		1078	6.1	0.390	6.2	LOS A	3.1	82.2	0.31	0.14	0.31	35.3
North: US 1												
4	T1	1114	6.0	0.417	6.6	LOS A	3.1	83.1	0.31	0.14	0.31	35.0
14	R2	36	28.0	0.417	6.9	LOS A	3.1	83.1	0.30	0.14	0.30	33.4
Approach		1150	6.7	0.417	6.6	LOS A	3.1	83.1	0.31	0.14	0.31	34.9
West: Hickory Ridge Rd												
5	L2	61	11.0	0.219	9.7	LOS A	0.9	23.3	0.66	0.66	0.66	31.9
12	R2	60	7.0	0.219	9.3	LOS A	0.9	23.3	0.66	0.66	0.66	30.9
Approach		121	9.0	0.219	9.5	LOS A	0.9	23.3	0.66	0.66	0.66	31.4
All Vehicles		2349	6.6	0.417	6.6	LOS A	3.1	83.1	0.33	0.17	0.33	34.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [US 1-Hickory Ridge Rd_2030_PM]

New Site
Site Category: (None)
Roundabout

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: US 1												
3	L2	70	3.0	0.489	7.5	LOS A	4.7	117.8	0.27	0.10	0.27	34.9
8	T1	1392	1.0	0.489	7.1	LOS A	4.7	119.2	0.26	0.09	0.26	35.0
Approach		1462	1.1	0.489	7.1	LOS A	4.7	119.2	0.26	0.09	0.26	35.0
North: US 1												
4	T1	1585	2.0	0.566	8.5	LOS A	5.2	132.9	0.36	0.16	0.36	34.0
14	R2	53	5.0	0.566	8.3	LOS A	5.2	132.9	0.34	0.16	0.34	33.0
Approach		1638	2.1	0.566	8.5	LOS A	5.2	132.9	0.36	0.16	0.36	34.0
West: Hickory Ridge Rd												
5	L2	36	7.0	0.204	10.9	LOS B	0.8	21.9	0.73	0.73	0.73	31.9
12	R2	61	3.0	0.204	10.4	LOS B	0.8	21.9	0.73	0.73	0.73	30.8
Approach		97	4.5	0.204	10.6	LOS B	0.8	21.9	0.73	0.73	0.73	31.2
All Vehicles		3197	1.7	0.566	7.9	LOS A	5.2	132.9	0.32	0.15	0.32	34.3

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Lane Group	EBL	EBR2	SBT	SBR	NWL
Lane Group Flow (vph)	61	60	1066	36	70
v/c Ratio	0.37	0.24	0.44	0.03	0.40
Control Delay	43.6	3.8	10.4	1.2	43.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	43.6	3.8	10.4	1.2	43.8
Queue Length 50th (ft)	33	0	161	0	38
Queue Length 95th (ft)	69	9	253	7	76
Internal Link Dist (ft)	317		408		7
Turn Bay Length (ft)				300	
Base Capacity (vph)	354	412	2440	1442	363
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.17	0.15	0.44	0.02	0.19

Intersection Summary

Movement	EBL	EBR2	SBT	SBR	NWL
Lane Configurations					
Traffic Volume (vph)	56	55	981	33	64
Future Volume (vph)	56	55	981	33	64
Ideal Flow (vphpl)	1900	1950	1950	1950	1950
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95
Satd. Flow (prot)	1770	1625	3632	1625	1816
Flt Permitted	0.95	1.00	1.00	1.00	0.95
Satd. Flow (perm)	1770	1625	3632	1625	1816
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	61	60	1066	36	70
RTOR Reduction (vph)	0	55	0	8	0
Lane Group Flow (vph)	61	5	1066	28	70
Turn Type	Prot	Perm	NA	custom	Prot
Protected Phases	4		2	2 4	1
Permitted Phases		4			
Actuated Green, G (s)	7.4	7.4	56.9	70.3	7.7
Effective Green, g (s)	7.4	7.4	56.9	70.3	7.7
Actuated g/C Ratio	0.08	0.08	0.63	0.78	0.09
Clearance Time (s)	6.0	6.0	6.0		6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	145	133	2296	1269	155
v/s Ratio Prot	c0.03		c0.29	0.02	c0.04
v/s Ratio Perm		0.00			
v/c Ratio	0.42	0.04	0.46	0.02	0.45
Uniform Delay, d1	39.3	38.0	8.6	2.2	39.1
Progression Factor	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.0	0.1	0.7	0.0	2.1
Delay (s)	41.2	38.1	9.3	2.2	41.2
Level of Service	D	D	A	A	D
Approach Delay (s)	39.7		9.1		41.2
Approach LOS	D		A		D

Intersection Summary			
HCM 2000 Control Delay	13.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	49.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBR2	SBT	SBR	NWL
Lane Group Flow (vph)	33	57	1592	49	65
v/c Ratio	0.23	0.25	0.64	0.04	0.38
Control Delay	42.1	3.7	12.4	1.0	43.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	42.1	3.7	12.4	1.0	43.6
Queue Length 50th (ft)	18	0	287	0	35
Queue Length 95th (ft)	46	7	434	8	73
Internal Link Dist (ft)	317		408		7
Turn Bay Length (ft)				300	
Base Capacity (vph)	354	412	2501	1470	363
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.09	0.14	0.64	0.03	0.18

Intersection Summary

Movement	EBL	EBR2	SBT	SBR	NWL
Lane Configurations					
Traffic Volume (vph)	33	56	1576	49	64
Future Volume (vph)	33	56	1576	49	64
Ideal Flow (vphpl)	1900	1950	1950	1950	1950
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95
Satd. Flow (prot)	1770	1625	3632	1625	1816
Flt Permitted	0.95	1.00	1.00	1.00	0.95
Satd. Flow (perm)	1770	1625	3632	1625	1816
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	33	57	1592	49	65
RTOR Reduction (vph)	0	53	0	11	0
Lane Group Flow (vph)	33	4	1592	38	65
Turn Type	Prot	Perm	NA	custom	Prot
Protected Phases	4		2	2 4	1
Permitted Phases		4			
Actuated Green, G (s)	6.1	6.1	58.4	70.5	7.5
Effective Green, g (s)	6.1	6.1	58.4	70.5	7.5
Actuated g/C Ratio	0.07	0.07	0.65	0.78	0.08
Clearance Time (s)	6.0	6.0	6.0		6.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)	119	110	2356	1272	151
v/s Ratio Prot	c0.02		c0.44	0.02	c0.04
v/s Ratio Perm		0.00			
v/c Ratio	0.28	0.04	0.68	0.03	0.43
Uniform Delay, d1	39.9	39.2	9.9	2.2	39.2
Progression Factor	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.3	0.1	1.6	0.0	2.0
Delay (s)	41.1	39.3	11.5	2.2	41.2
Level of Service	D	D	B	A	D
Approach Delay (s)	40.0		11.2		41.2
Approach LOS	D		B		D

Intersection Summary			
HCM 2000 Control Delay	13.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	65.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	1.4

Movement	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	NWL	NWR
Lane Configurations										
Traffic Vol, veh/h	0	0	0	0	0	0	1025	33	64	0
Future Vol, veh/h	0	0	0	0	0	0	1025	33	64	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free	Free	Yield	Yield
RT Channelized	-	-	-	-	None	-	-	None	-	None
Storage Length	-	0	-	-	-	-	-	0	0	-
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	0	1114	36	70	0

Major/Minor	Minor2			Major2		
Conflicting Flow All	-	557		-	-	0
Stage 1	-	-		-	-	-
Stage 2	-	-		-	-	-
Critical Hdwy	-	6.94		-	-	-
Critical Hdwy Stg 1	-	-		-	-	-
Critical Hdwy Stg 2	-	-		-	-	-
Follow-up Hdwy	-	3.32		-	-	-
Pot Cap-1 Maneuver	0	474		0	-	-
Stage 1	0	-		0	-	-
Stage 2	0	-		0	-	-
Platoon blocked, %					-	-
Mov Cap-1 Maneuver	-	474		-	-	-
Mov Cap-2 Maneuver	-	-		-	-	-
Stage 1	-	-		-	-	-
Stage 2	-	-		-	-	-

Approach	EB	SB
HCM Control Delay, s	15.2	0
HCM LOS	C	

Minor Lane/Major Mvmt	EBLn1	SBT	SBR
Capacity (veh/h)	474	-	-
HCM Lane V/C Ratio	0.255	-	-
HCM Control Delay (s)	15.2	-	-
HCM Lane LOS	C	-	-
HCM 95th %tile Q(veh)	1	-	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	56	0	0	992	0	0
Future Vol, veh/h	56	0	0	992	0	0
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	61	0	0	1078	0	0

Major/Minor	Minor2		Major1	
Conflicting Flow All	539	-	-	0
Stage 1	0	-	-	-
Stage 2	539	-	-	-
Critical Hdwy	6.84	-	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-
Follow-up Hdwy	3.52	-	-	-
Pot Cap-1 Maneuver	473	0	0	-
Stage 1	-	0	0	-
Stage 2	549	0	0	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	473	-	-	-
Mov Cap-2 Maneuver	473	-	-	-
Stage 1	-	-	-	-
Stage 2	549	-	-	-

Approach	EB	NB
HCM Control Delay, s	13.7	0
HCM LOS	B	

Minor Lane/Major Mvmt	NBT	EBLn1
Capacity (veh/h)	-	473
HCM Lane V/C Ratio	-	0.129
HCM Control Delay (s)	-	13.7
HCM Lane LOS	-	B
HCM 95th %tile Q(veh)	-	0.4

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	NWL	NWR
Lane Configurations										
Traffic Vol, veh/h	0	0	0	0	0	0	1458	49	64	0
Future Vol, veh/h	0	0	0	0	0	0	1458	49	64	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free	Free	Yield	Yield
RT Channelized	-	-	-	-	None	-	-	None	-	None
Storage Length	-	0	-	-	-	-	-	0	0	-
Veh in Median Storage, #	0	-	-	0	-	-	0	-	0	-
Grade, %	0	-	-	0	-	-	0	-	0	-
Peak Hour Factor	99	99	99	99	99	99	99	99	99	99
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	0	1473	49	65	0

Major/Minor	Minor2				Major2		
Conflicting Flow All	-	737			-	-	0
Stage 1	-	-			-	-	-
Stage 2	-	-			-	-	-
Critical Hdwy	-	6.94			-	-	-
Critical Hdwy Stg 1	-	-			-	-	-
Critical Hdwy Stg 2	-	-			-	-	-
Follow-up Hdwy	-	3.32			-	-	-
Pot Cap-1 Maneuver	0	361			0	-	-
Stage 1	0	-			0	-	-
Stage 2	0	-			0	-	-
Platoon blocked, %						-	-
Mov Cap-1 Maneuver	-	361			-	-	-
Mov Cap-2 Maneuver	-	-			-	-	-
Stage 1	-	-			-	-	-
Stage 2	-	-			-	-	-

Approach	EB	SB
HCM Control Delay, s	18.2	0
HCM LOS	C	

Minor Lane/Major Mvmt	EBLn1	SBT	SBR
Capacity (veh/h)	361	-	-
HCM Lane V/C Ratio	0.249	-	-
HCM Control Delay (s)	18.2	-	-
HCM Lane LOS	C	-	-
HCM 95th %tile Q(veh)	1	-	-

Intersection	
Int Delay, s/veh	0.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	33	0	0	1345	0	0
Future Vol, veh/h	33	0	0	1345	0	0
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	99	99	99	99	99	99
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	33	0	0	1359	0	0

Major/Minor	Minor2		Major1	
Conflicting Flow All	680	-	-	0
Stage 1	0	-	-	-
Stage 2	680	-	-	-
Critical Hdwy	6.84	-	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-
Follow-up Hdwy	3.52	-	-	-
Pot Cap-1 Maneuver	385	0	0	-
Stage 1	-	0	0	-
Stage 2	465	0	0	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	385	-	-	-
Mov Cap-2 Maneuver	385	-	-	-
Stage 1	-	-	-	-
Stage 2	465	-	-	-

Approach	EB	NB
HCM Control Delay, s	15.2	0
HCM LOS	C	

Minor Lane/Major Mvmt	NBT	EBLn1
Capacity (veh/h)	-	385
HCM Lane V/C Ratio	-	0.087
HCM Control Delay (s)	-	15.2
HCM Lane LOS	-	C
HCM 95th %tile Q(veh)	-	0.3

North Roxbury Mill Road

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	1	0	0	0	67	0	840	0	172	768	0
Future Vol, veh/h	0	1	0	0	0	67	0	840	0	172	768	0
Conflicting Peds, #/hr	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
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	200	-	160
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
Heavy Vehicles, %	0	0	0	0	0	2	0	8	0	1	8	0
Mvmt Flow	0	1	0	0	0	73	0	913	0	187	835	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1666	2122	418	1705	2122	457	835	0	0	913	0	0
Stage 1	1209	1209	-	913	913	-	-	-	-	-	-	-
Stage 2	457	913	-	792	1209	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.94	4.1	-	-	4.12	-	-
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	3.32	2.2	-	-	2.21	-	-
Pot Cap-1 Maneuver	65	51	589	60	51	551	807	-	-	748	-	-
Stage 1	197	258	-	298	355	-	-	-	-	-	-	-
Stage 2	558	355	-	353	258	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	46	38	589	47	38	551	807	-	-	748	-	-
Mov Cap-2 Maneuver	46	38	-	47	38	-	-	-	-	-	-	-
Stage 1	197	194	-	298	355	-	-	-	-	-	-	-
Stage 2	484	355	-	263	194	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	102.5	12.5	0	2.1
HCM LOS	F	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	807	-	-	38	551	748	-	-
HCM Lane V/C Ratio	-	-	-	0.029	0.132	0.25	-	-
HCM Control Delay (s)	0	-	-	102.5	12.5	11.4	-	-
HCM Lane LOS	A	-	-	F	B	B	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.5	1	-	-

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	1	0	0	129	0	1049	0	43	1323	0
Future Vol, veh/h	5	0	1	0	0	129	0	1049	0	43	1323	0
Conflicting Peds, #/hr	0	0	0	0	0	0	2	0	0	0	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	200	-	160
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	98	98	98	98	98	98	98	98	98
Heavy Vehicles, %	0	0	0	0	0	1	0	2	0	0	3	0
Mvmt Flow	5	0	1	0	0	132	0	1070	0	44	1350	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1975	2510	677	1833	2510	535	1352	0	0	1070	0	0
Stage 1	1440	1440	-	1070	1070	-	-	-	-	-	-	-
Stage 2	535	1070	-	763	1440	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.5	6.5	6.92	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	3.31	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	38	29	400	48	29	492	516	-	-	659	-	-
Stage 1	142	200	-	240	300	-	-	-	-	-	-	-
Stage 2	502	300	-	367	200	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	26	27	399	45	27	492	515	-	-	659	-	-
Mov Cap-2 Maneuver	26	27	-	45	27	-	-	-	-	-	-	-
Stage 1	142	186	-	240	300	-	-	-	-	-	-	-
Stage 2	368	300	-	342	186	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	147.7	15	0	0.3
HCM LOS	F	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	515	-	-	31	492	659	-	-
HCM Lane V/C Ratio	-	-	-	0.197	0.268	0.067	-	-
HCM Control Delay (s)	0	-	-	147.7	15	10.9	-	-
HCM Lane LOS	A	-	-	F	C	B	-	-
HCM 95th %tile Q(veh)	0	-	-	0.6	1.1	0.2	-	-

Intersection	
Int Delay, s/veh	14.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	173	0	0	0	67	0	1073	0	0	0	0
Future Vol, veh/h	0	173	0	0	0	67	0	1073	0	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	-	-	-	-	-	-
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
Heavy Vehicles, %	2	1	2	2	2	2	2	6	2	2	2	2
Mvmt Flow	0	188	0	0	0	73	0	1166	0	0	0	0

Major/Minor	Minor2		Minor1			Major1			
Conflicting Flow All	583	1166	-	-	-	583	-	0	-
Stage 1	0	0	-	-	-	-	-	-	-
Stage 2	583	1166	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.52	-	-	-	6.94	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4.01	-	-	-	3.32	-	-	-
Pot Cap-1 Maneuver	396	194	0	0	0	456	0	-	0
Stage 1	-	-	0	0	0	-	0	-	0
Stage 2	465	268	0	0	0	-	0	-	0
Platoon blocked, %								-	
Mov Cap-1 Maneuver	333	194	-	-	-	456	-	-	-
Mov Cap-2 Maneuver	333	194	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-
Stage 2	391	268	-	-	-	-	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	106.9	14.4	0
HCM LOS	F	B	

Minor Lane/Major Mvmt	NBT	EBLn1	WBLn1
Capacity (veh/h)	-	194	456
HCM Lane V/C Ratio	-	0.969	0.16
HCM Control Delay (s)	-	106.9	14.4
HCM Lane LOS	-	F	B
HCM 95th %tile Q(veh)	-	8	0.6

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	1	0	0	0	0	0	0	0	1071	0
Future Vol, veh/h	0	0	1	0	0	0	0	0	0	0	1071	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	0	-	-	-	-	-	-	-	-	-
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
Heavy Vehicles, %	2	2	0	2	0	2	2	2	2	2	6	2
Mvmt Flow	0	0	1	0	0	0	0	0	0	0	1164	0

Major/Minor	Minor2			Minor1					Major2		
Conflicting Flow All	-	-	582	582	1164	-			-	-	0
Stage 1	-	-	-	0	0	-			-	-	-
Stage 2	-	-	-	582	1164	-			-	-	-
Critical Hdwy	-	-	6.9	7.54	6.5	-			-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-			-	-	-
Critical Hdwy Stg 2	-	-	-	6.54	5.5	-			-	-	-
Follow-up Hdwy	-	-	3.3	3.52	4	-			-	-	-
Pot Cap-1 Maneuver	0	0	461	396	196	0			0	-	0
Stage 1	0	0	-	-	-	0			0	-	0
Stage 2	0	0	-	466	271	0			0	-	0
Platoon blocked, %										-	
Mov Cap-1 Maneuver	-	-	461	395	196	-			-	-	-
Mov Cap-2 Maneuver	-	-	-	395	196	-			-	-	-
Stage 1	-	-	-	-	-	-			-	-	-
Stage 2	-	-	-	465	271	-			-	-	-

Approach	EB	WB	SB
HCM Control Delay, s	12.8	0	0
HCM LOS	B	A	

Minor Lane/Major Mvmt	EBLn1	WBLn1	SBT
Capacity (veh/h)	461	-	-
HCM Lane V/C Ratio	0.002	-	-
HCM Control Delay (s)	12.8	0	-
HCM Lane LOS	B	A	-
HCM 95th %tile Q(veh)	0	-	-

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	1	0	0	0	67	0	840	0	172	940	0
Future Vol, veh/h	0	1	0	0	0	67	0	840	0	172	940	0
Conflicting Peds, #/hr	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
RT Channelized	-	-	None	-	-	Free	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	-	-	-	-	-	160
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
Heavy Vehicles, %	0	0	0	0	0	2	0	8	0	1	8	0
Mvmt Flow	0	1	0	0	0	73	0	913	0	187	1022	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1853	2309	511	-	-	-	1022	0	0	913	0	0
Stage 1	1396	1396	-	-	-	-	-	-	-	-	-	-
Stage 2	457	913	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	-	-	-	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	6.5	5.5	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	-	-	-	2.2	-	-	2.21	-	-
Pot Cap-1 Maneuver	47	39	513	0	0	0	687	-	-	748	-	-
Stage 1	151	210	-	0	0	0	-	-	-	-	-	-
Stage 2	558	355	-	0	0	0	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	25	16	513	-	-	-	687	-	-	748	-	-
Mov Cap-2 Maneuver	25	16	-	-	-	-	-	-	-	-	-	-
Stage 1	151	89	-	-	-	-	-	-	-	-	-	-
Stage 2	558	355	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	245.8	0	0	1.8
HCM LOS	F	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	687	-	-	16	-	748	-	-
HCM Lane V/C Ratio	-	-	-	0.068	-	0.25	-	-
HCM Control Delay (s)	0	-	-	245.8	0	11.4	-	-
HCM Lane LOS	A	-	-	F	A	B	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	-	1	-	-

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	0	1	0	0	129	0	1049	0	0	1366	0
Future Vol, veh/h	5	0	1	0	0	129	0	1049	0	0	1366	0
Conflicting Peds, #/hr	0	0	0	0	0	0	2	0	0	0	0	2
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	Free	-	-	None	-	-	None
Storage Length	-	-	-	-	-	0	-	-	-	-	-	160
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	98	98	98	98	98	98	98	98	98	98	98	98
Heavy Vehicles, %	0	0	0	0	0	1	0	2	0	0	3	0
Mvmt Flow	5	0	1	0	0	132	0	1070	0	0	1394	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1931	2466	699	-	-	-	1396	0	0	-	-	0
Stage 1	1396	1396	-	-	-	-	-	-	-	-	-	-
Stage 2	535	1070	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	-	-	-	4.1	-	-	-	-	-
Critical Hdwy Stg 1	6.5	5.5	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	-	-	-	2.2	-	-	-	-	-
Pot Cap-1 Maneuver	41	31	387	0	0	0	496	-	-	0	-	-
Stage 1	151	210	-	0	0	0	-	-	-	0	-	-
Stage 2	502	300	-	0	0	0	-	-	-	0	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	41	31	386	-	-	-	495	-	-	-	-	-
Mov Cap-2 Maneuver	41	31	-	-	-	-	-	-	-	-	-	-
Stage 1	151	210	-	-	-	-	-	-	-	-	-	-
Stage 2	502	300	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	90.7	0	0	0
HCM LOS	F	A		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBT	SBR
Capacity (veh/h)	495	-	-	48	-	-	-
HCM Lane V/C Ratio	-	-	-	0.128	-	-	-
HCM Control Delay (s)	0	-	-	90.7	0	-	-
HCM Lane LOS	A	-	-	F	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.4	-	-	-

North Point Drive
&
Larkinchew Road

Intersection	
Int Delay, s/veh	12.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	7	0	3	62	1	24	1	1028	20	71	1235	12
Future Vol, veh/h	7	0	3	62	1	24	1	1028	20	71	1235	12
Conflicting Peds, #/hr	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
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	200	-	-	270	-	245	557	-	78
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	99	99	99	99	99	99	99	99	99	99	99	99
Heavy Vehicles, %	0	0	0	3	0	11	0	1	18	59	1	0
Mvmt Flow	7	0	3	63	1	24	1	1038	20	72	1247	12

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1913	2451	624	1808	2443	519	1259	0	0	1058	0	0
Stage 1	1391	1391	-	1040	1040	-	-	-	-	-	-	-
Stage 2	522	1060	-	768	1403	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.56	6.5	7.12	4.1	-	-	5.28	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.56	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.56	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.53	4	3.41	2.2	-	-	2.79	-	-
Pot Cap-1 Maneuver	42	31	433	~ 49	32	479	559	-	-	401	-	-
Stage 1	152	211	-	244	310	-	-	-	-	-	-	-
Stage 2	511	303	-	358	208	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	33	25	433	~ 42	26	479	559	-	-	401	-	-
Mov Cap-2 Maneuver	33	25	-	~ 42	26	-	-	-	-	-	-	-
Stage 1	152	173	-	244	309	-	-	-	-	-	-	-
Stage 2	483	302	-	292	171	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	104.1	$ 337.1	0	0.9
HCM LOS	F	F		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	559	-	-	46	42	282	401	-	-
HCM Lane V/C Ratio	0.002	-	-	0.22	1.491	0.09	0.179	-	-
HCM Control Delay (s)	11.5	-	-	104.1	$ 465.3	19	15.9	-	-
HCM Lane LOS	B	-	-	F	F	C	C	-	-
HCM 95th %tile Q(veh)	0	-	-	0.7	6.3	0.3	0.6	-	-

Notes

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

9: ROUTE 1 & LARKIN CHEW/NORTH POINT

Lane Group	EBT	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	15	47	4	879	83	47	766	5
v/c Ratio	0.04	0.11	0.01	0.36	0.07	0.11	0.29	0.01
Control Delay	16.2	0.6	5.0	12.9	0.1	5.2	8.5	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.2	0.6	5.0	12.9	0.1	5.2	8.5	0.0
Queue Length 50th (ft)	1	0	0	0	0	0	0	0
Queue Length 95th (ft)	16	0	3	#253	0	17	#206	0
Internal Link Dist (ft)	2454	1385		1038			2499	
Turn Bay Length (ft)			270		245	557		78
Base Capacity (vph)	548	474	615	2472	1122	440	2654	969
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.10	0.01	0.36	0.07	0.11	0.29	0.01

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	1	4	8	0	35	4	809	76	43	705	5
Future Volume (vph)	9	1	4	8	0	35	4	809	76	43	705	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0			7.0		7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.96			0.89		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97			0.99		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1598			1099		1517	3471	1495	1165	3438	1196
Flt Permitted		1.00			0.93		0.36	1.00	1.00	0.28	1.00	1.00
Satd. Flow (perm)		1651			1031		577	3471	1495	340	3438	1196
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	10	1	4	9	0	38	4	879	83	47	766	5
RTOR Reduction (vph)	0	4	0	0	44	0	0	0	42	0	0	2
Lane Group Flow (vph)	0	11	0	0	3	0	4	879	41	47	766	3
Heavy Vehicles (%)	10%	0%	16%	13%	0%	62%	19%	4%	8%	55%	5%	35%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		3.0			3.0		27.3	25.8	25.8	30.3	27.3	27.3
Effective Green, g (s)		3.0			3.0		27.3	25.8	25.8	30.3	27.3	27.3
Actuated g/C Ratio		0.06			0.06		0.52	0.49	0.49	0.57	0.52	0.52
Clearance Time (s)		7.0			7.0		7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		93			58		325	1696	730	241	1777	618
v/s Ratio Prot							0.00	c0.25		c0.01	0.22	
v/s Ratio Perm		c0.01			0.00		0.01		0.03	0.10		0.00
v/c Ratio		0.12			0.05		0.01	0.52	0.06	0.20	0.43	0.00
Uniform Delay, d1		23.6			23.5		6.2	9.2	7.1	5.2	7.9	6.2
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.6			0.3		0.0	0.3	0.0	0.4	0.2	0.0
Delay (s)		24.2			23.9		6.2	9.5	7.1	5.6	8.1	6.2
Level of Service		C			C		A	A	A	A	A	A
Approach Delay (s)		24.2			23.9			9.3			7.9	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	9.2	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	52.8	Sum of lost time (s)	21.0
Intersection Capacity Utilization	55.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBT	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	10	88	1	1038	20	72	1247	12
v/c Ratio	0.03	0.32	0.00	0.53	0.02	0.24	0.54	0.01
Control Delay	0.1	23.0	5.0	15.9	0.1	7.5	12.3	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	0.1	23.0	5.0	15.9	0.1	7.5	12.3	0.0
Queue Length 50th (ft)	0	24	0	187	0	10	126	0
Queue Length 95th (ft)	0	62	2	275	0	26	#402	0
Internal Link Dist (ft)	2454	1385		1038			2499	
Turn Bay Length (ft)			270		245	557		78
Base Capacity (vph)	441	332	461	1957	827	305	2319	1108
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.27	0.00	0.53	0.02	0.24	0.54	0.01

Intersection Summary

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

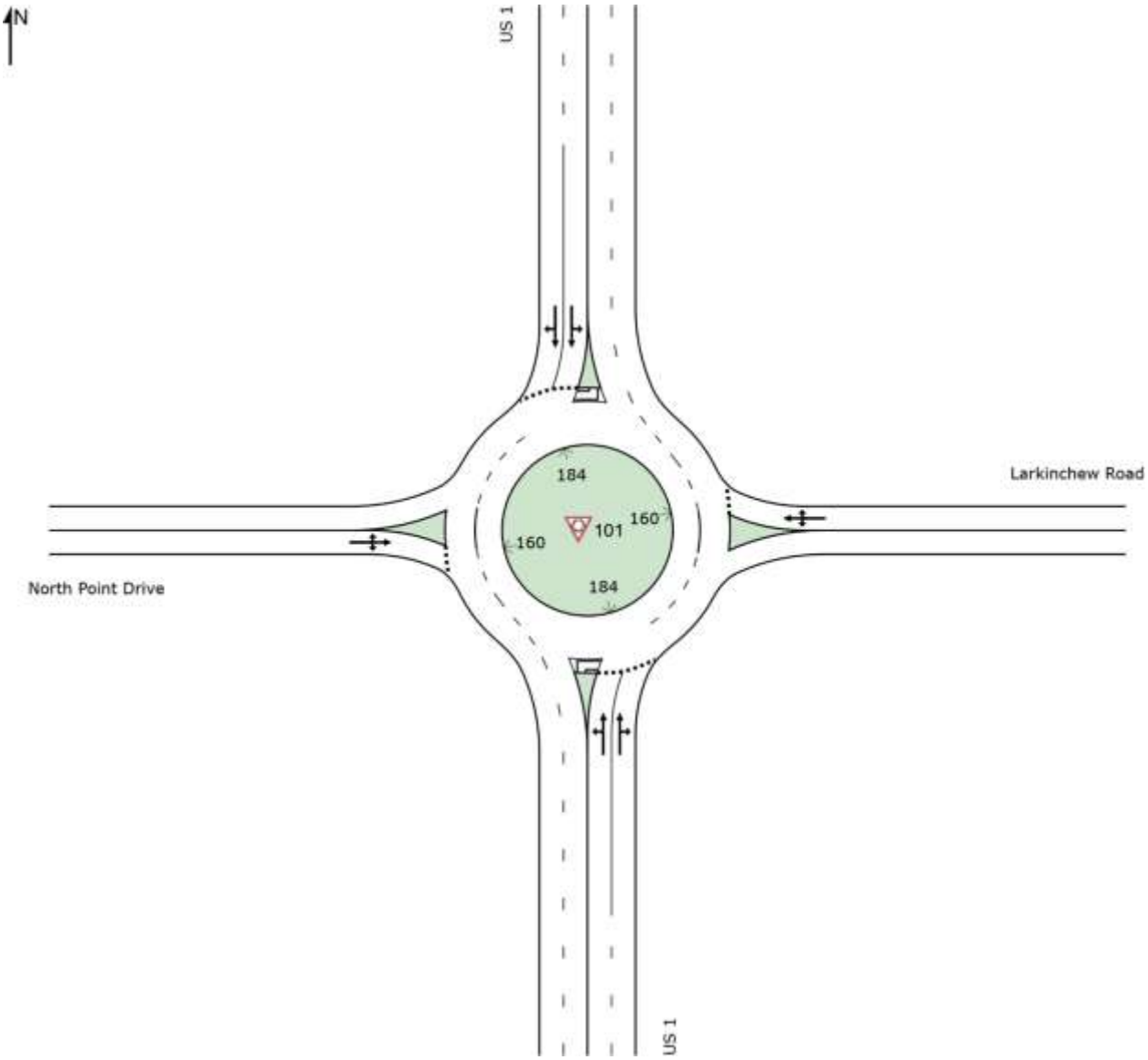
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	0	3	62	1	24	1	1028	20	71	1235	12
Future Volume (vph)	7	0	3	62	1	24	1	1028	20	71	1235	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		7.0			7.0		7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.96			0.96		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97			0.97		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1761			1680		1805	3574	1369	1135	3574	1615
Flt Permitted		0.74			0.78		0.18	1.00	1.00	0.19	1.00	1.00
Satd. Flow (perm)		1343			1361		335	3574	1369	226	3574	1615
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	7	0	3	63	1	24	1	1038	20	72	1247	12
RTOR Reduction (vph)	0	9	0	0	21	0	0	0	10	0	0	5
Lane Group Flow (vph)	0	1	0	0	67	0	1	1038	10	72	1247	7
Heavy Vehicles (%)	0%	0%	0%	3%	0%	11%	0%	1%	18%	59%	1%	0%
Turn Type	Perm	NA		Perm	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		7.9			7.9		34.6	32.9	32.9	41.8	36.5	36.5
Effective Green, g (s)		7.9			7.9		34.6	32.9	32.9	41.8	36.5	36.5
Actuated g/C Ratio		0.12			0.12		0.52	0.49	0.49	0.62	0.54	0.54
Clearance Time (s)		7.0			7.0		7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		158			160		209	1752	671	212	1944	878
v/s Ratio Prot							0.00	0.29		c0.03	c0.35	
v/s Ratio Perm		0.00			c0.05		0.00		0.01	0.18		0.00
v/c Ratio		0.01			0.42		0.00	0.59	0.01	0.34	0.64	0.01
Uniform Delay, d1		26.1			27.5		8.2	12.3	8.8	6.4	10.7	7.0
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.0			1.8		0.0	0.5	0.0	1.0	0.7	0.0
Delay (s)		26.2			29.2		8.2	12.8	8.8	7.3	11.4	7.0
Level of Service		C			C		A	B	A	A	B	A
Approach Delay (s)		26.2			29.2			12.7			11.2	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM 2000 Control Delay	12.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	67.1	Sum of lost time (s)	21.0
Intersection Capacity Utilization	68.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

SITE LAYOUT

Site: 101 [US 1 at Larkinchew_2030_AM]

2x1 Roundabout
Site Category: (None)
Roundabout



MOVEMENT SUMMARY

Site: 101 [US 1 at Larkinchew_2030_AM]

2x1 Roundabout
Site Category: (None)
Roundabout
Design Life Analysis (Final Year): Results for 10 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: US 1												
3	L2	5	19.0	0.399	6.8	LOS A	2.7	70.8	0.33	0.17	0.33	36.5
8	T1	1080	4.0	0.399	6.1	LOS A	2.8	71.6	0.32	0.16	0.32	36.4
18	R2	92	8.0	0.399	5.8	LOS A	2.8	71.6	0.30	0.15	0.30	35.0
Approach		1177	4.4	0.399	6.1	LOS A	2.8	71.6	0.32	0.16	0.32	36.3
East: Larkinchew Road												
1	L2	10	13.0	0.166	9.3	LOS A	0.6	20.6	0.70	0.70	0.70	31.5
6	T1	1	0.0	0.166	8.2	LOS A	0.6	20.6	0.70	0.70	0.70	31.3
16	R2	44	62.0	0.166	14.9	LOS B	0.6	20.6	0.70	0.70	0.70	29.4
Approach		56	51.6	0.166	13.7	LOS B	0.6	20.6	0.70	0.70	0.70	29.8
North: US 1												
7	L2	56	55.0	0.378	7.2	LOS A	2.9	78.6	0.15	0.04	0.15	35.4
4	T1	1096	4.0	0.378	5.6	LOS A	3.0	76.8	0.14	0.04	0.14	36.6
14	R2	7	35.0	0.378	6.0	LOS A	3.0	76.8	0.13	0.03	0.13	34.8
Approach		1158	6.6	0.378	5.7	LOS A	3.0	78.6	0.14	0.04	0.14	36.5
West: North Point Drive												
5	L2	12	10.0	0.031	6.3	LOS A	0.1	3.0	0.60	0.54	0.60	34.1
2	T1	1	0.0	0.031	5.5	LOS A	0.1	3.0	0.60	0.54	0.60	33.7
12	R2	5	16.0	0.031	6.8	LOS A	0.1	3.0	0.60	0.54	0.60	32.2
Approach		18	11.0	0.031	6.4	LOS A	0.1	3.0	0.60	0.54	0.60	33.5
All Vehicles		2409	6.6	0.399	6.0	LOS A	3.0	78.6	0.24	0.11	0.24	36.2

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101 [US 1 at Larkinchew_2030_PM]

2x1 Roundabout
Site Category: (None)
Roundabout
Design Life Analysis (Final Year): Results for 10 years

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed mph
South: US 1												
3	L2	1	0.0	0.505	8.0	LOS A	4.2	106.0	0.49	0.29	0.49	36.2
8	T1	1436	1.0	0.505	7.5	LOS A	4.3	109.2	0.47	0.28	0.47	35.7
18	R2	24	18.0	0.505	7.5	LOS A	4.3	109.2	0.46	0.26	0.46	34.1
Approach		1462	1.3	0.505	7.5	LOS A	4.3	109.2	0.47	0.28	0.47	35.6
East: Larkinchew Road												
1	L2	78	3.0	0.214	9.8	LOS A	0.9	24.2	0.73	0.73	0.73	32.3
6	T1	1	0.0	0.214	9.4	LOS A	0.9	24.2	0.73	0.73	0.73	31.9
16	R2	30	11.0	0.214	10.6	LOS B	0.9	24.2	0.73	0.73	0.73	30.6
Approach		110	5.2	0.214	10.0	LOS B	0.9	24.2	0.73	0.73	0.73	31.8
North: US 1												
7	L2	90	59.0	0.623	11.9	LOS B	6.9	184.0	0.49	0.25	0.49	33.2
4	T1	1731	1.0	0.623	9.4	LOS A	7.1	179.8	0.46	0.22	0.46	34.6
14	R2	16	0.0	0.623	8.8	LOS A	7.1	179.8	0.44	0.20	0.44	33.6
Approach		1836	3.8	0.623	9.5	LOS A	7.1	184.0	0.46	0.22	0.46	34.5
West: North Point Drive												
5	L2	9	0.0	0.032	8.6	LOS A	0.1	3.6	0.77	0.71	0.77	33.3
2	T1	1	0.0	0.032	8.6	LOS A	0.1	3.6	0.77	0.71	0.77	32.8
12	R2	4	0.0	0.032	8.6	LOS A	0.1	3.6	0.77	0.71	0.77	31.6
Approach		14	0.0	0.032	8.6	LOS A	0.1	3.6	0.77	0.71	0.77	32.8
All Vehicles		3422	2.8	0.623	8.7	LOS A	7.1	184.0	0.47	0.26	0.47	34.9

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Intersection	
Int Delay, s/veh	1.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	9	1	4	8	0	35	4	809	76	43	705	5
Future Vol, veh/h	9	1	4	8	0	35	4	809	76	43	705	5
Conflicting Peds, #/hr	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
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	200	-	-	270	-	245	557	-	78
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
Heavy Vehicles, %	10	0	16	13	0	62	19	4	8	55	5	35
Mvmt Flow	10	1	4	9	0	38	4	879	83	47	766	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1308	1830	383	1365	1752	440	771	0	0	962	0	0
Stage 1	860	860	-	887	887	-	-	-	-	-	-	-
Stage 2	448	970	-	478	865	-	-	-	-	-	-	-
Critical Hdwy	7.7	6.5	7.22	7.76	6.5	8.14	4.48	-	-	5.2	-	-
Critical Hdwy Stg 1	6.7	5.5	-	6.76	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.7	5.5	-	6.76	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.6	4	3.46	3.63	4	3.92	2.39	-	-	2.75	-	-
Pot Cap-1 Maneuver	109	77	577	96	86	427	737	-	-	461	-	-
Stage 1	301	376	-	284	365	-	-	-	-	-	-	-
Stage 2	539	334	-	509	374	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	91	69	577	86	77	427	737	-	-	461	-	-
Mov Cap-2 Maneuver	91	69	-	86	77	-	-	-	-	-	-	-
Stage 1	299	338	-	283	363	-	-	-	-	-	-	-
Stage 2	488	332	-	452	336	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	40.7	21.2	0	0.8
HCM LOS	E	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	737	-	-	116	86	427	461	-	-
HCM Lane V/C Ratio	0.006	-	-	0.131	0.101	0.089	0.101	-	-
HCM Control Delay (s)	9.9	-	-	40.7	51.5	14.3	13.7	-	-
HCM Lane LOS	A	-	-	E	F	B	B	-	-
HCM 95th %tile Q(veh)	0	-	-	0.4	0.3	0.3	0.3	-	-

South Roxbury Mill Road

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	0	0	6	0	54	3	907	10	12	846	0
Future Vol, veh/h	0	0	0	6	0	54	3	907	10	12	846	0
Conflicting Peds, #/hr	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
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	200	110	-	-	160	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	2	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	14	3	0	8	5	5	4	6	5	13
Mvmt Flow	0	0	0	7	0	59	3	986	11	13	920	0

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	1445	1949	460	1484	1944	499	920	0	0	997	0	0
Stage 1	946	946	-	998	998	-	-	-	-	-	-	-
Stage 2	499	1003	-	486	946	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	7.18	7.56	6.5	7.06	4.2	-	-	4.22	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.56	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.56	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.44	3.53	4	3.38	2.25	-	-	2.26	-	-
Pot Cap-1 Maneuver	94	65	517	86	66	501	719	-	-	666	-	-
Stage 1	285	343	-	259	324	-	-	-	-	-	-	-
Stage 2	527	322	-	529	343	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	81	63	517	84	64	501	719	-	-	666	-	-
Mov Cap-2 Maneuver	81	63	-	84	64	-	-	-	-	-	-	-
Stage 1	284	336	-	258	323	-	-	-	-	-	-	-
Stage 2	463	321	-	519	336	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	16.9	0	0.1
HCM LOS	A	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	719	-	-	-	84	501	666	-	-
HCM Lane V/C Ratio	0.005	-	-	-	0.078	0.117	0.02	-	-
HCM Control Delay (s)	10	-	-	0	51.4	13.1	10.5	-	-
HCM Lane LOS	B	-	-	A	F	B	B	-	-
HCM 95th %tile Q(veh)	0	-	-	-	0.2	0.4	0.1	-	-

Intersection	
Int Delay, s/veh	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	8	1	26	49	1	12	8	1138	8	8	140	26
Future Vol, veh/h	8	1	26	49	1	12	8	1138	8	8	140	26
Conflicting Peds, #/hr	0	0	0	0	0	0	1	0	0	0	0	1
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	200	110	-	-	160	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	2	-
Peak Hour Factor	99	99	99	99	99	99	99	99	99	99	99	99
Heavy Vehicles, %	0	0	0	3	0	0	0	2	2	0	1	2
Mvmt Flow	8	1	26	49	1	12	8	1149	8	8	141	26

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	762	1344	85	1256	1353	579	168	0	0	1157	0	0
Stage 1	171	171	-	1169	1169	-	-	-	-	-	-	-
Stage 2	591	1173	-	87	184	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.56	6.5	6.9	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.56	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.56	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.53	4	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	298	153	963	127	151	463	1422	-	-	611	-	-
Stage 1	820	761	-	204	269	-	-	-	-	-	-	-
Stage 2	465	268	-	908	751	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	284	150	962	121	148	463	1421	-	-	611	-	-
Mov Cap-2 Maneuver	284	150	-	121	148	-	-	-	-	-	-	-
Stage 1	815	750	-	203	267	-	-	-	-	-	-	-
Stage 2	449	266	-	870	740	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.8	46.5	0.1	0.5
HCM LOS	B	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1421	-	-	566	121	463	611	-	-
HCM Lane V/C Ratio	0.006	-	-	0.062	0.417	0.026	0.013	-	-
HCM Control Delay (s)	7.5	-	-	11.8	54.6	13	11	-	-
HCM Lane LOS	A	-	-	B	F	B	B	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	1.8	0.1	0	-	-

Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SER
Lane Configurations										
Traffic Vol, veh/h	0	0	0	1084	16	0	0	0	12	0
Future Vol, veh/h	0	0	0	1084	16	0	0	0	12	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free	Free	Yield	Yield
RT Channelized	-	-	-	-	None	-	-	None	-	None
Storage Length	-	0	-	-	-	-	-	-	0	-
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	1178	17	0	0	0	13	0

Major/Minor	Minor1		Major1		
Conflicting Flow All	-	598	-	0	0
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-
Pot Cap-1 Maneuver	0	445	0	-	-
Stage 1	0	-	0	-	-
Stage 2	0	-	0	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	-	445	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	WB	NB
HCM Control Delay, s	14	0
HCM LOS	B	

Minor Lane/Major Mvmt	NBT	NBR	WBLn1
Capacity (veh/h)	-	-	445
HCM Lane V/C Ratio	-	-	0.098
HCM Control Delay (s)	-	-	14
HCM Lane LOS	-	-	B
HCM 95th %tile Q(veh)	-	-	0.3

Intersection	
Int Delay, s/veh	0.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	12	0	0	0	0	824
Future Vol, veh/h	12	0	0	0	0	824
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	0	0	0	0	896

Major/Minor	Minor1		Major2	
Conflicting Flow All	448	-	-	-
Stage 1	0	-	-	-
Stage 2	448	-	-	-
Critical Hdwy	6.84	-	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-
Follow-up Hdwy	3.52	-	-	-
Pot Cap-1 Maneuver	539	0	0	-
Stage 1	-	0	0	-
Stage 2	611	0	0	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	539	-	-	-
Mov Cap-2 Maneuver	539	-	-	-
Stage 1	-	-	-	-
Stage 2	611	-	-	-

Approach	WB	SB
HCM Control Delay, s	11.8	0
HCM LOS	B	

Minor Lane/Major Mvmt	WBLn1	SBT
Capacity (veh/h)	539	-
HCM Lane V/C Ratio	0.024	-
HCM Control Delay (s)	11.8	-
HCM Lane LOS	B	-
HCM 95th %tile Q(veh)	0.1	-

Intersection	
Int Delay, s/veh	0.5

Movement	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SER
Lane Configurations										
Traffic Vol, veh/h	0	0	0	1159	14	0	0	0	8	0
Future Vol, veh/h	0	0	0	1159	14	0	0	0	8	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free	Free	Yield	Yield
RT Channelized	-	-	-	-	None	-	-	None	-	None
Storage Length	-	0	-	-	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	-	-	0	-	0	-
Grade, %	0	-	-	0	-	-	0	-	0	-
Peak Hour Factor	99	99	99	99	99	99	99	99	99	99
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	1171	14	0	0	0	8	0

Major/Minor	Minor1		Major1		
Conflicting Flow All	-	593	-	0	0
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-
Critical Hdwy	-	6.94	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-
Follow-up Hdwy	-	3.32	-	-	-
Pot Cap-1 Maneuver	0	449	0	-	-
Stage 1	0	-	0	-	-
Stage 2	0	-	0	-	-
Platoon blocked, %				-	-
Mov Cap-1 Maneuver	-	449	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-
Stage 1	-	-	-	-	-
Stage 2	-	-	-	-	-

Approach	WB	NB
HCM Control Delay, s	13.9	0
HCM LOS	B	

Minor Lane/Major Mvmt	NBT	NBR	WBLn1
Capacity (veh/h)	-	-	449
HCM Lane V/C Ratio	-	-	0.101
HCM Control Delay (s)	-	-	13.9
HCM Lane LOS	-	-	B
HCM 95th %tile Q(veh)	-	-	0.3

Intersection	
Int Delay, s/veh	0.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	25	0	0	0	0	1572
Future Vol, veh/h	25	0	0	0	0	1572
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	99	99	99	99	99	99
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	25	0	0	0	0	1588

Major/Minor	Minor1		Major2	
Conflicting Flow All	794	-	-	-
Stage 1	0	-	-	-
Stage 2	794	-	-	-
Critical Hdwy	6.84	-	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-
Follow-up Hdwy	3.52	-	-	-
Pot Cap-1 Maneuver	325	0	0	-
Stage 1	-	0	0	-
Stage 2	406	0	0	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	325	-	-	-
Mov Cap-2 Maneuver	325	-	-	-
Stage 1	-	-	-	-
Stage 2	406	-	-	-

Approach	WB	SB
HCM Control Delay, s	17	0
HCM LOS	C	

Minor Lane/Major Mvmt	WBLn1	SBT
Capacity (veh/h)	325	-
HCM Lane V/C Ratio	0.078	-
HCM Control Delay (s)	17	-
HCM Lane LOS	C	-
HCM 95th %tile Q(veh)	0.3	-

Intersection	
Int Delay, s/veh	0.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	12	28	1084	16	12	812
Future Vol, veh/h	12	28	1084	16	12	812
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	-	-	-	160	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	2
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	3	8	5	4	6	5
Mvmt Flow	13	30	1178	17	13	883

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1655	598	0	0	1195	0
Stage 1	1187	-	-	-	-	-
Stage 2	468	-	-	-	-	-
Critical Hdwy	6.86	7.06	-	-	4.22	-
Critical Hdwy Stg 1	5.86	-	-	-	-	-
Critical Hdwy Stg 2	5.86	-	-	-	-	-
Follow-up Hdwy	3.53	3.38	-	-	2.26	-
Pot Cap-1 Maneuver	88	431	-	-	558	-
Stage 1	250	-	-	-	-	-
Stage 2	594	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	86	431	-	-	558	-
Mov Cap-2 Maneuver	86	-	-	-	-	-
Stage 1	250	-	-	-	-	-
Stage 2	580	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	28.5	0	0.2
HCM LOS	D		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	196	558	-
HCM Lane V/C Ratio	-	-	0.222	0.023	-
HCM Control Delay (s)	-	-	28.5	11.6	-
HCM Lane LOS	-	-	D	B	-
HCM 95th %tile Q(veh)	-	-	0.8	0.1	-

11: ROUTE 1 & MUDD TAVERN/MORRIS

Year 2030 AM - Parallel Road in NW Quadrant

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	230	557	78	151	487	68	473	339	633	178	92
v/c Ratio	0.82	0.90	0.20	0.60	0.76	0.45	1.00	0.78	1.03	0.12	0.13
Control Delay	54.2	56.5	24.9	46.5	12.3	48.5	82.8	24.7	74.1	17.3	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.2	56.5	24.9	46.5	12.3	48.5	82.8	24.7	74.1	17.3	0.4
Queue Length 50th (ft)	107	~170	16	81	0	37	~145	44	~392	33	0
Queue Length 95th (ft)	#229	#282	32	143	98	79	#248	#176	#598	55	0
Internal Link Dist (ft)		983		1028			1706			800	
Turn Bay Length (ft)	225		150			264		286	295		323
Base Capacity (vph)	281	620	381	266	649	167	471	434	616	1424	707
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.82	0.90	0.20	0.57	0.75	0.41	1.00	0.78	1.03	0.13	0.13

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.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	212	482	30	72	139	448	63	435	312	582	164	85
Future Volume (vph)	212	482	30	72	139	448	63	435	312	582	164	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-1%			0%			0%			2%	
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	8.0	8.0	6.0	8.0	8.0
Lane Util. Factor	1.00	0.95		0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1728	3505		3467	1696	1524	1656	3505	1583	1718	3309	1402
Flt Permitted	0.57	1.00		0.28	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1028	3505		1007	1696	1524	1656	3505	1583	1718	3309	1402
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	230	524	33	78	151	487	68	473	339	633	178	92
RTOR Reduction (vph)	0	5	0	0	0	410	0	0	218	0	0	54
Lane Group Flow (vph)	230	552	0	78	151	77	68	473	121	633	178	38
Heavy Vehicles (%)	5%	2%	12%	1%	12%	6%	9%	3%	2%	4%	8%	14%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4		4			2			6
Actuated Green, G (s)	21.7	15.7		19.3	14.5	14.5	6.9	13.3	13.3	32.0	38.4	38.4
Effective Green, g (s)	21.7	15.7		19.3	14.5	14.5	6.9	13.3	13.3	32.0	38.4	38.4
Actuated g/C Ratio	0.24	0.17		0.21	0.16	0.16	0.08	0.14	0.14	0.35	0.42	0.42
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	8.0	8.0	6.0	8.0	8.0
Vehicle Extension (s)	4.0	4.0		3.0	4.0	4.0	3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	288	599		340	267	240	124	507	229	598	1384	586
v/s Ratio Prot	c0.05	c0.16		0.01	0.09		0.04	c0.13		c0.37	0.05	
v/s Ratio Perm	0.14			0.04		0.05			0.08			0.03
v/c Ratio	0.80	0.92		0.23	0.57	0.32	0.55	0.93	0.53	1.06	0.13	0.07
Uniform Delay, d1	32.3	37.4		29.6	35.7	34.3	40.9	38.8	36.3	29.9	16.4	16.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	15.0	20.0		0.3	3.3	1.1	4.9	25.1	4.1	53.3	0.1	0.1
Delay (s)	47.3	57.5		30.0	39.1	35.3	45.8	63.9	40.5	83.2	16.5	16.1
Level of Service	D	E		C	D	D	D	E	D	F	B	B
Approach Delay (s)		54.5			35.5			53.5			63.2	
Approach LOS		D			D			D			E	

Intersection Summary			
HCM 2000 Control Delay	52.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	91.8	Sum of lost time (s)	26.0
Intersection Capacity Utilization	86.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Int Delay, s/veh	1.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	25	20	1167	15	8	1564
Future Vol, veh/h	25	20	1167	15	8	1564
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	-	-	-	160	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	2
Peak Hour Factor	99	99	99	99	99	99
Heavy Vehicles, %	3	0	2	2	0	1
Mvmt Flow	25	20	1179	15	8	1580

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	1993	597	0	0	1194	0
Stage 1	1187	-	-	-	-	-
Stage 2	806	-	-	-	-	-
Critical Hdwy	6.86	6.9	-	-	4.1	-
Critical Hdwy Stg 1	5.86	-	-	-	-	-
Critical Hdwy Stg 2	5.86	-	-	-	-	-
Follow-up Hdwy	3.53	3.3	-	-	2.2	-
Pot Cap-1 Maneuver	52	451	-	-	592	-
Stage 1	250	-	-	-	-	-
Stage 2	397	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	51	451	-	-	592	-
Mov Cap-2 Maneuver	51	-	-	-	-	-
Stage 1	250	-	-	-	-	-
Stage 2	391	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	89.9	0	0.1
HCM LOS	F		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	84	592	-
HCM Lane V/C Ratio	-	-	0.541	0.014	-
HCM Control Delay (s)	-	-	89.9	11.2	-
HCM Lane LOS	-	-	F	B	-
HCM 95th %tile Q(veh)	-	-	2.4	0	-

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	176	296	317	396	606	69	324	134	634	637	357
v/c Ratio	0.88	0.50	0.51	1.12	0.76	0.44	0.68	0.31	1.11	0.46	0.43
Control Delay	68.7	34.0	26.2	118.8	10.3	47.3	45.2	1.9	103.3	22.6	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.7	34.0	26.2	118.8	10.3	47.3	45.2	1.9	103.3	22.6	4.2
Queue Length 50th (ft)	75	73	68	~261	0	38	93	0	~417	146	0
Queue Length 95th (ft)	#167	114	102	#437	105	79	138	0	#623	199	57
Internal Link Dist (ft)		983		1028			1706			800	
Turn Bay Length (ft)	225		150			264		286	295		323
Base Capacity (vph)	199	589	627	355	793	177	476	432	570	1389	831
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.88	0.50	0.51	1.12	0.76	0.39	0.68	0.31	1.11	0.46	0.43

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.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	172	232	58	311	388	594	68	318	131	621	624	350
Future Volume (vph)	172	232	58	311	388	594	68	318	131	621	624	350
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-1%			0%			0%			2%	
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	8.0	8.0	6.0	8.0	8.0
Lane Util. Factor	1.00	0.95		0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1761	3395		3465	1881	1599	1770	3574	1583	1769	3539	1565
Flt Permitted	0.27	1.00		0.46	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	494	3395		1688	1881	1599	1770	3574	1583	1769	3539	1565
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)	176	237	59	317	396	606	69	324	134	634	637	357
RTOR Reduction (vph)	0	24	0	0	0	493	0	0	115	0	0	219
Lane Group Flow (vph)	176	272	0	317	396	113	69	324	19	634	637	138
Confl. Peds. (#/hr)			1	1			1					1
Heavy Vehicles (%)	3%	3%	5%	1%	1%	1%	2%	1%	2%	1%	1%	0%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4		4			2			6
Actuated Green, G (s)	21.0	15.0		25.0	17.0	17.0	6.9	13.2	13.2	29.0	35.3	35.3
Effective Green, g (s)	21.0	15.0		25.0	17.0	17.0	6.9	13.2	13.2	29.0	35.3	35.3
Actuated g/C Ratio	0.23	0.16		0.27	0.19	0.19	0.08	0.14	0.14	0.32	0.39	0.39
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	8.0	8.0	6.0	8.0	8.0
Vehicle Extension (s)	4.0	4.0		3.0	4.0	4.0	3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	197	558		618	350	298	133	517	229	562	1369	605
v/s Ratio Prot	c0.06	0.08		0.04	c0.21		0.04	c0.09		c0.36	0.18	
v/s Ratio Perm	0.15			0.10		0.07			0.01			0.09
v/c Ratio	0.89	0.49		0.51	1.13	0.38	0.52	0.63	0.08	1.13	0.47	0.23
Uniform Delay, d1	32.9	34.6		26.5	37.1	32.5	40.6	36.7	33.8	31.1	20.9	18.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	36.7	0.9		0.7	88.7	1.1	3.4	3.3	0.3	78.4	0.5	0.4
Delay (s)	69.6	35.5		27.2	125.8	33.6	43.9	40.0	34.1	109.5	21.4	19.2
Level of Service	E	D		C	F	C	D	D	C	F	C	B
Approach Delay (s)		48.2			59.7			39.0			55.2	
Approach LOS		D			E			D			E	

Intersection Summary			
HCM 2000 Control Delay	53.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	91.2	Sum of lost time (s)	26.0
Intersection Capacity Utilization	96.0%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Mudd Tavern Road/Morris Road

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	167	557	78	151	360	68	410	339	577	151	65
v/c Ratio	0.97	0.82	0.26	0.62	0.70	0.42	0.60	0.62	0.93	0.13	0.10
Control Delay	96.7	41.2	32.4	41.1	12.7	38.3	29.6	10.9	52.6	17.6	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	96.7	41.2	32.4	41.1	12.7	38.3	29.6	10.9	52.6	17.6	0.3
Queue Length 50th (ft)	73	126	16	62	5	28	84	16	127	25	0
Queue Length 95th (ft)	#184	#229	35	#133	#90	65	127	87	#219	46	0
Internal Link Dist (ft)		983		1028			1706			800	
Turn Bay Length (ft)	225		150			264		286	295		323
Base Capacity (vph)	173	682	298	243	515	166	704	552	621	1183	651
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.97	0.82	0.26	0.62	0.70	0.41	0.58	0.61	0.93	0.13	0.10

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	154	482	30	72	139	331	63	377	312	531	139	60
Future Volume (vph)	154	482	30	72	139	331	63	377	312	531	139	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-1%			0%			0%			2%	
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	8.0	8.0	6.0	8.0	8.0
Lane Util. Factor	1.00	0.95		0.97	1.00	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1728	3505		3467	1696	1524	1656	3505	1583	3333	3309	1402
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1728	3505		3467	1696	1524	1656	3505	1583	3333	3309	1402
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	167	524	33	78	151	360	68	410	339	577	151	65
RTOR Reduction (vph)	0	7	0	0	0	293	0	0	229	0	0	43
Lane Group Flow (vph)	167	550	0	78	151	67	68	410	110	577	151	22
Heavy Vehicles (%)	5%	2%	12%	1%	12%	6%	9%	3%	2%	4%	8%	14%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases						4			2			6
Actuated Green, G (s)	7.0	13.4		4.8	11.2	11.2	4.2	16.1	16.1	13.0	24.9	24.9
Effective Green, g (s)	7.0	13.4		4.8	11.2	11.2	4.2	16.1	16.1	13.0	24.9	24.9
Actuated g/C Ratio	0.10	0.18		0.07	0.15	0.15	0.06	0.22	0.22	0.18	0.34	0.34
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	8.0	8.0	6.0	8.0	8.0
Vehicle Extension (s)	4.0	4.0		3.0	4.0	4.0	3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	165	640		227	259	232	94	769	347	591	1124	476
v/s Ratio Prot	c0.10	c0.16		0.02	0.09		0.04	c0.12		c0.17	0.05	
v/s Ratio Perm						0.04			0.07			0.02
v/c Ratio	1.01	0.86		0.34	0.58	0.29	0.72	0.53	0.32	0.98	0.13	0.05
Uniform Delay, d1	33.1	29.0		32.7	28.9	27.5	34.0	25.3	24.0	30.0	16.7	16.2
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	73.3	11.7		0.9	3.9	0.9	23.9	1.3	1.1	30.8	0.1	0.1
Delay (s)	106.4	40.8		33.7	32.8	28.5	57.8	26.6	25.1	60.8	16.9	16.3
Level of Service	F	D		C	C	C	E	C	C	E	B	B
Approach Delay (s)		55.9			30.3			28.6			48.8	
Approach LOS		E			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	41.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	73.3	Sum of lost time (s)	26.0
Intersection Capacity Utilization	66.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	129	296	317	396	606	61	287	134	500	569	263
v/c Ratio	0.91	0.48	0.61	0.88	0.93	0.43	0.48	0.30	0.90	0.51	0.39
Control Delay	94.3	28.0	35.2	50.5	34.8	42.7	30.9	2.4	53.5	24.3	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	94.3	28.0	35.2	50.5	34.8	42.7	30.9	2.4	53.5	24.3	5.3
Queue Length 50th (ft)	61	58	71	178	119	28	63	0	119	124	0
Queue Length 95th (ft)	#159	96	110	#331	#328	64	100	8	#206	176	53
Internal Link Dist (ft)		983		1028			1706			800	
Turn Bay Length (ft)	225		150			264		286	295		323
Base Capacity (vph)	141	611	558	454	656	142	623	456	553	1114	672
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.91	0.48	0.57	0.87	0.92	0.43	0.46	0.29	0.90	0.51	0.39

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	126	232	58	311	388	594	60	281	131	490	558	258
Future Volume (vph)	126	232	58	311	388	594	60	281	131	490	558	258
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-1%			0%			0%			2%	
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	8.0	8.0	6.0	8.0	8.0
Lane Util. Factor	1.00	0.95		0.97	1.00	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1761	3395		3467	1881	1599	1770	3574	1583	3432	3539	1564
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1761	3395		3467	1881	1599	1770	3574	1583	3432	3539	1564
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)	129	237	59	317	396	606	61	287	134	500	569	263
RTOR Reduction (vph)	0	29	0	0	0	273	0	0	108	0	0	183
Lane Group Flow (vph)	129	267	0	317	396	333	61	287	26	500	569	80
Confl. Peds. (#/hr)			1	1			1					1
Heavy Vehicles (%)	3%	3%	5%	1%	1%	1%	2%	1%	2%	1%	1%	0%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases						4			2			6
Actuated Green, G (s)	6.0	12.8		11.1	17.9	17.9	3.6	15.1	15.1	12.0	23.5	23.5
Effective Green, g (s)	6.0	12.8		11.1	17.9	17.9	3.6	15.1	15.1	12.0	23.5	23.5
Actuated g/C Ratio	0.08	0.17		0.14	0.23	0.23	0.05	0.20	0.20	0.16	0.31	0.31
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	8.0	8.0	6.0	8.0	8.0
Vehicle Extension (s)	4.0	4.0		3.0	4.0	4.0	3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	137	564		499	437	371	82	700	310	534	1080	477
v/s Ratio Prot	0.07	0.08		c0.09	c0.21		0.03	0.08		c0.15	c0.16	
v/s Ratio Perm						0.21			0.02			0.05
v/c Ratio	0.94	0.47		0.64	0.91	0.90	0.74	0.41	0.08	0.94	0.53	0.17
Uniform Delay, d1	35.3	29.0		31.0	28.7	28.7	36.2	27.1	25.3	32.1	22.1	19.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	59.5	0.9		2.6	22.4	23.7	30.1	0.8	0.2	24.0	0.9	0.4
Delay (s)	94.8	29.9		33.7	51.1	52.3	66.4	27.9	25.5	56.1	23.0	19.9
Level of Service	F	C		C	D	D	E	C	C	E	C	B
Approach Delay (s)		49.6			47.5			32.1			34.8	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	40.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	77.0	Sum of lost time (s)	26.0
Intersection Capacity Utilization	73.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	167	557	78	151	360	68	410	339	577	151	65
v/c Ratio	0.58	0.78	0.26	0.54	0.67	0.42	0.63	0.66	0.93	0.13	0.10
Control Delay	39.3	37.3	32.4	34.2	11.1	38.2	31.2	13.3	52.1	18.3	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.3	37.3	32.4	34.2	11.1	38.2	31.2	13.3	52.1	18.3	0.3
Queue Length 50th (ft)	36	124	16	60	7	28	86	24	127	25	0
Queue Length 95th (ft)	64	#216	35	114	81	65	130	100	#219	47	0
Internal Link Dist (ft)		983		1028			1706			800	
Turn Bay Length (ft)	225		150			264		286	295		323
Base Capacity (vph)	289	715	299	292	545	166	655	519	623	1149	640
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.78	0.26	0.52	0.66	0.41	0.63	0.65	0.93	0.13	0.10

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	154	482	30	72	139	331	63	377	312	531	139	60
Future Volume (vph)	154	482	30	72	139	331	63	377	312	531	139	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-1%			0%			0%			2%	
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	8.0	8.0	6.0	8.0	8.0
Lane Util. Factor	0.97	0.95		0.97	1.00	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3352	3505		3467	1696	1524	1656	3505	1583	3333	3309	1402
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3352	3505		3467	1696	1524	1656	3505	1583	3333	3309	1402
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	167	524	33	78	151	360	68	410	339	577	151	65
RTOR Reduction (vph)	0	6	0	0	0	281	0	0	217	0	0	44
Lane Group Flow (vph)	167	551	0	78	151	79	68	410	122	577	151	21
Heavy Vehicles (%)	5%	2%	12%	1%	12%	6%	9%	3%	2%	4%	8%	14%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases						4			2			6
Actuated Green, G (s)	6.0	14.1		4.8	12.9	12.9	4.2	15.3	15.3	13.0	24.1	24.1
Effective Green, g (s)	6.0	14.1		4.8	12.9	12.9	4.2	15.3	15.3	13.0	24.1	24.1
Actuated g/C Ratio	0.08	0.19		0.07	0.18	0.18	0.06	0.21	0.21	0.18	0.33	0.33
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	8.0	8.0	6.0	8.0	8.0
Vehicle Extension (s)	4.0	4.0		3.0	4.0	4.0	3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	274	675		227	298	268	95	732	330	591	1089	461
v/s Ratio Prot	c0.05	c0.16		0.02	0.09		0.04	c0.12		c0.17	0.05	
v/s Ratio Perm						0.05			0.08			0.02
v/c Ratio	0.61	0.82		0.34	0.51	0.30	0.72	0.56	0.37	0.98	0.14	0.05
Uniform Delay, d1	32.5	28.3		32.7	27.3	26.2	33.9	25.9	24.8	29.9	17.3	16.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.4	7.9		0.9	1.8	0.8	22.5	1.6	1.5	30.8	0.1	0.1
Delay (s)	36.9	36.2		33.6	29.1	27.0	56.4	27.6	26.3	60.7	17.4	16.8
Level of Service	D	D		C	C	C	E	C	C	E	B	B
Approach Delay (s)		36.4			28.4			29.4			48.9	
Approach LOS		D			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	36.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	73.2	Sum of lost time (s)	26.0
Intersection Capacity Utilization	66.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	129	296	317	396	606	61	287	134	500	569	263
v/c Ratio	0.46	0.51	0.61	0.80	0.89	0.42	0.47	0.30	0.89	0.50	0.39
Control Delay	38.6	28.6	34.8	41.2	29.1	42.4	30.6	2.4	51.5	23.9	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.6	28.6	34.8	41.2	29.1	42.4	30.6	2.4	51.5	23.9	5.2
Queue Length 50th (ft)	30	58	71	178	119	28	63	0	119	124	0
Queue Length 95th (ft)	56	96	110	#331	#328	64	100	8	#206	176	53
Internal Link Dist (ft)		983		1028			1706			800	
Turn Bay Length (ft)	225		150			264		286	295		323
Base Capacity (vph)	279	595	566	497	684	144	632	459	561	1134	679
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.50	0.56	0.80	0.89	0.42	0.45	0.29	0.89	0.50	0.39

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	126	232	58	311	388	594	60	281	131	490	558	258
Future Volume (vph)	126	232	58	311	388	594	60	281	131	490	558	258
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-1%			0%			0%			2%	
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	8.0	8.0	6.0	8.0	8.0
Lane Util. Factor	0.97	0.95		0.97	1.00	1.00	1.00	0.95	1.00	0.97	0.95	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3417	3395		3467	1881	1599	1770	3574	1583	3432	3539	1564
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3417	3395		3467	1881	1599	1770	3574	1583	3432	3539	1564
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)	129	237	59	317	396	606	61	287	134	500	569	263
RTOR Reduction (vph)	0	29	0	0	0	267	0	0	108	0	0	183
Lane Group Flow (vph)	129	267	0	317	396	339	61	287	26	500	569	80
Confl. Peds. (#/hr)			1	1			1					1
Heavy Vehicles (%)	3%	3%	5%	1%	1%	1%	2%	1%	2%	1%	1%	0%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases						4			2			6
Actuated Green, G (s)	4.7	13.1		11.0	19.4	19.4	3.5	15.1	15.1	12.0	23.6	23.6
Effective Green, g (s)	4.7	13.1		11.0	19.4	19.4	3.5	15.1	15.1	12.0	23.6	23.6
Actuated g/C Ratio	0.06	0.17		0.14	0.25	0.25	0.05	0.20	0.20	0.16	0.31	0.31
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	8.0	8.0	6.0	8.0	8.0
Vehicle Extension (s)	4.0	4.0		3.0	4.0	4.0	3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	208	576		494	472	401	80	699	309	533	1081	478
v/s Ratio Prot	0.04	0.08		c0.09	0.21		0.03	0.08		c0.15	c0.16	
v/s Ratio Perm						c0.21			0.02			0.05
v/c Ratio	0.62	0.46		0.64	0.84	0.85	0.76	0.41	0.08	0.94	0.53	0.17
Uniform Delay, d1	35.4	28.9		31.2	27.4	27.5	36.4	27.2	25.4	32.2	22.2	19.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.4	0.8		2.8	12.9	15.7	34.2	0.8	0.2	24.3	0.9	0.3
Delay (s)	41.8	29.7		34.1	40.3	43.1	70.6	28.0	25.6	56.5	23.1	20.0
Level of Service	D	C		C	D	D	E	C	C	E	C	B
Approach Delay (s)		33.4			40.1			32.7			35.0	
Approach LOS		C			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	36.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	77.2	Sum of lost time (s)	26.0
Intersection Capacity Utilization	71.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Arcadia Road

Intersection	
Int Delay, s/veh	6.4

Movement	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	NWL	NWR
Lane Configurations										
Traffic Vol, veh/h	0	0	0	0	0	0	157	43	0	0
Future Vol, veh/h	0	0	0	0	0	0	157	43	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free	Free	Yield	Yield
RT Channelized	-	-	-	-	None	-	-	None	-	None
Storage Length	-	0	-	-	-	-	-	0	0	-
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	0	171	47	0	0

Major/Minor	Minor2			Major2		
Conflicting Flow All	-	86		-	-	0
Stage 1	-	-		-	-	-
Stage 2	-	-		-	-	-
Critical Hdwy	-	6.94		-	-	-
Critical Hdwy Stg 1	-	-		-	-	-
Critical Hdwy Stg 2	-	-		-	-	-
Follow-up Hdwy	-	3.32		-	-	-
Pot Cap-1 Maneuver	0	956		0	-	-
Stage 1	0	-		0	-	-
Stage 2	0	-		0	-	-
Platoon blocked, %					-	-
Mov Cap-1 Maneuver	-	956		-	-	-
Mov Cap-2 Maneuver	-	-		-	-	-
Stage 1	-	-		-	-	-
Stage 2	-	-		-	-	-

Approach	EB	SB
HCM Control Delay, s	10.7	0
HCM LOS	B	

Minor Lane/Major Mvmt	EBLn1	SBT	SBR
Capacity (veh/h)	956	-	-
HCM Lane V/C Ratio	0.339	-	-
HCM Control Delay (s)	10.7	-	-
HCM Lane LOS	B	-	-
HCM 95th %tile Q(veh)	1.5	-	-

Intersection	
Int Delay, s/veh	5.6

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	298	0	0	426	0	0
Future Vol, veh/h	298	0	0	426	0	0
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	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	324	0	0	463	0	0

Major/Minor	Minor2		Major1	
Conflicting Flow All	232	-	-	0
Stage 1	0	-	-	-
Stage 2	232	-	-	-
Critical Hdwy	6.84	-	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-
Follow-up Hdwy	3.52	-	-	-
Pot Cap-1 Maneuver	736	0	0	-
Stage 1	-	0	0	-
Stage 2	785	0	0	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	736	-	-	-
Mov Cap-2 Maneuver	736	-	-	-
Stage 1	-	-	-	-
Stage 2	785	-	-	-

Approach	EB	NB
HCM Control Delay, s	13.7	0
HCM LOS	B	

Minor Lane/Major Mvmt	NBT	EBLn1
Capacity (veh/h)	-	736
HCM Lane V/C Ratio	-	0.44
HCM Control Delay (s)	-	13.7
HCM Lane LOS	-	B
HCM 95th %tile Q(veh)	-	2.3

Intersection	
Int Delay, s/veh	1.6

Movement	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	NWL	NWR
Lane Configurations										
Traffic Vol, veh/h	0	0	0	0	0	0	552	327	3	0
Future Vol, veh/h	0	0	0	0	0	0	552	327	3	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free	Free	Free	Yield	Yield
RT Channelized	-	-	-	-	None	-	-	None	-	None
Storage Length	-	0	-	-	-	-	-	0	0	-
Veh in Median Storage, #	0	-	-	0	-	-	0	-	0	-
Grade, %	0	-	-	0	-	-	0	-	0	-
Peak Hour Factor	98	98	98	98	98	98	98	98	98	98
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	0	563	334	3	0

Major/Minor	Minor2			Major2		
Conflicting Flow All	-	282		-	-	0
Stage 1	-	-		-	-	-
Stage 2	-	-		-	-	-
Critical Hdwy	-	6.94		-	-	-
Critical Hdwy Stg 1	-	-		-	-	-
Critical Hdwy Stg 2	-	-		-	-	-
Follow-up Hdwy	-	3.32		-	-	-
Pot Cap-1 Maneuver	0	715		0	-	-
Stage 1	0	-		0	-	-
Stage 2	0	-		0	-	-
Platoon blocked, %					-	-
Mov Cap-1 Maneuver	-	715		-	-	-
Mov Cap-2 Maneuver	-	-		-	-	-
Stage 1	-	-		-	-	-
Stage 2	-	-		-	-	-

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

Minor Lane/Major Mvmt	EBLn1	SBT	SBR
Capacity (veh/h)	715	-	-
HCM Lane V/C Ratio	0.201	-	-
HCM Control Delay (s)	11.3	-	-
HCM Lane LOS	B	-	-
HCM 95th %tile Q(veh)	0.7	-	-

Intersection	
Int Delay, s/veh	3.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	140	0	0	305	0	0
Future Vol, veh/h	140	0	0	305	0	0
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	98	98	98	98	98	98
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	143	0	0	311	0	0

Major/Minor	Minor2		Major1	
Conflicting Flow All	156	-	-	0
Stage 1	0	-	-	-
Stage 2	156	-	-	-
Critical Hdwy	6.84	-	-	-
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-
Follow-up Hdwy	3.52	-	-	-
Pot Cap-1 Maneuver	820	0	0	-
Stage 1	-	0	0	-
Stage 2	856	0	0	-
Platoon blocked, %				-
Mov Cap-1 Maneuver	820	-	-	-
Mov Cap-2 Maneuver	820	-	-	-
Stage 1	-	-	-	-
Stage 2	856	-	-	-

Approach	EB	NB
HCM Control Delay, s	10.3	0
HCM LOS	B	

Minor Lane/Major Mvmt	NBT	EBLn1
Capacity (veh/h)	-	820
HCM Lane V/C Ratio	-	0.174
HCM Control Delay (s)	-	10.3
HCM Lane LOS	-	B
HCM 95th %tile Q(veh)	-	0.6

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	0	0	805	157	43
Future Vol, veh/h	0	0	0	805	157	43
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	Yield
Storage Length	-	0	-	-	-	230
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	1	0	0	4	8	3
Mvmt Flow	0	0	0	875	171	47

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	86	171	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	4.1	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	0	962	1418	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	962	1418	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

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

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1418	-	-	-	-
HCM Lane V/C Ratio	-	-	-	-	-
HCM Control Delay (s)	0	-	0	-	-
HCM Lane LOS	A	-	A	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

Intersection	
Int Delay, s/veh	13.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	330	0	12	18	0	49	15	426	28	10	141	6
Future Vol, veh/h	330	0	12	18	0	49	15	426	28	10	141	6
Conflicting Peds, #/hr	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
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
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
Heavy Vehicles, %	1	2	2	2	2	2	2	4	2	2	8	3
Mvmt Flow	359	0	13	20	0	53	16	463	30	11	153	7

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	443	704	80	609	692	247	160	0	0	493	0	0
Stage 1	179	179	-	510	510	-	-	-	-	-	-	-
Stage 2	264	525	-	99	182	-	-	-	-	-	-	-
Critical Hdwy	7.52	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.52	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.52	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.51	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	501	360	964	379	366	753	1417	-	-	1067	-	-
Stage 1	808	750	-	514	536	-	-	-	-	-	-	-
Stage 2	721	528	-	896	748	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	456	350	964	366	356	753	1417	-	-	1067	-	-
Mov Cap-2 Maneuver	456	350	-	366	356	-	-	-	-	-	-	-
Stage 1	795	742	-	506	527	-	-	-	-	-	-	-
Stage 2	659	520	-	874	740	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	37.1	12	0.3	0.5
HCM LOS	E	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1417	-	-	465	586	1067	-	-
HCM Lane V/C Ratio	0.012	-	-	0.799	0.124	0.01	-	-
HCM Control Delay (s)	7.6	0.1	-	37.1	12	8.4	0	-
HCM Lane LOS	A	A	-	E	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	7.3	0.4	0	-	-

Intersection	
Int Delay, s/veh	0

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	1	0	462	552	327
Future Vol, veh/h	0	1	0	462	552	327
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	Yield
Storage Length	-	0	-	-	-	230
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	98	98	98	98	98	98
Heavy Vehicles, %	0	0	0	2	2	2
Mvmt Flow	0	1	0	471	563	334

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	-	282	563	0	-	0
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	4.1	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	0	721	1019	-	-	-
Stage 1	0	-	-	-	-	-
Stage 2	0	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	-	721	1019	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	10	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1019	-	721	-	-
HCM Lane V/C Ratio	-	-	0.001	-	-
HCM Control Delay (s)	0	-	10	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	7.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	147	0	14	25	0	13	16	302	24	43	482	28
Future Vol, veh/h	147	0	14	25	0	13	16	302	24	43	482	28
Conflicting Peds, #/hr	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
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
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
Heavy Vehicles, %	1	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	160	0	15	27	0	14	17	328	26	47	524	30

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	831	1021	277	731	1023	177	554	0	0	354	0	0
Stage 1	633	633	-	375	375	-	-	-	-	-	-	-
Stage 2	198	388	-	356	648	-	-	-	-	-	-	-
Critical Hdwy	7.52	6.54	6.94	7.54	6.54	6.94	4.14	-	-	4.14	-	-
Critical Hdwy Stg 1	6.52	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.52	5.54	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.51	4.02	3.32	3.52	4.02	3.32	2.22	-	-	2.22	-	-
Pot Cap-1 Maneuver	264	235	720	310	234	835	1012	-	-	1201	-	-
Stage 1	437	472	-	618	615	-	-	-	-	-	-	-
Stage 2	788	607	-	634	464	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	244	217	720	286	216	835	1012	-	-	1201	-	-
Mov Cap-2 Maneuver	244	217	-	286	216	-	-	-	-	-	-	-
Stage 1	428	445	-	605	602	-	-	-	-	-	-	-
Stage 2	758	594	-	585	438	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	43.7	16	0.5	0.8
HCM LOS	E	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1012	-	-	259	369	1201	-	-
HCM Lane V/C Ratio	0.017	-	-	0.676	0.112	0.039	-	-
HCM Control Delay (s)	8.6	0.1	-	43.7	16	8.1	0.2	-
HCM Lane LOS	A	A	-	E	C	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	4.4	0.4	0.1	-	-

Appendix C.

Recommended Improvements

EXTENSION OF SOUTHBOUND LEFT-TURN LANE STORAGE RELATIVE TO PROPOSED STORAGE AS A PART OF JACKSON VILLAGE DEVELOPMENT

JACKSON VILLAGE PARKWAY TO BE DEVELOPED AS PART OF JACKSON VILLAGE DEVELOPMENT

RIGHT TURN LANE TO BE DEVELOPED AS PART OF COMMUTER LOT PROJECT (STATE PROJECT 0001-088-281)

PLANNED COMMUTER LOT ENTRANCE

PROPOSED 10-FT WIDE SHARED USE PATH TO BE DEVELOPED WITH COMMUTER LOT PROJECT

PROPOSED 10-FT WIDE SHARED USE PATH TO BE DEVELOPED WITH JACKSON VILLAGE PROJECT

PROPOSED LANE DROP

PROPOSED R.O.W.

R.O.W.

PROPOSED R.O.W.

PROPOSED R.O.W.

PROPOSED R.O.W.

EXISTING INTERSECTION

Scale: 1" = 100'

100 50 0 100

FOR INFORMATION ONLY

VDOT Virginia Department of Transportation

KITTELSON & ASSOCIATES
11480 COMMERCE PARK DRIVE, SUITE 450
RESTON, VA 20191
P 703.885.8970

#	DATE	REVISION	APP'D

Submission Date: MM/DD/YYYY

Drawn: JCC | Designed: JCC | Checked: KJH

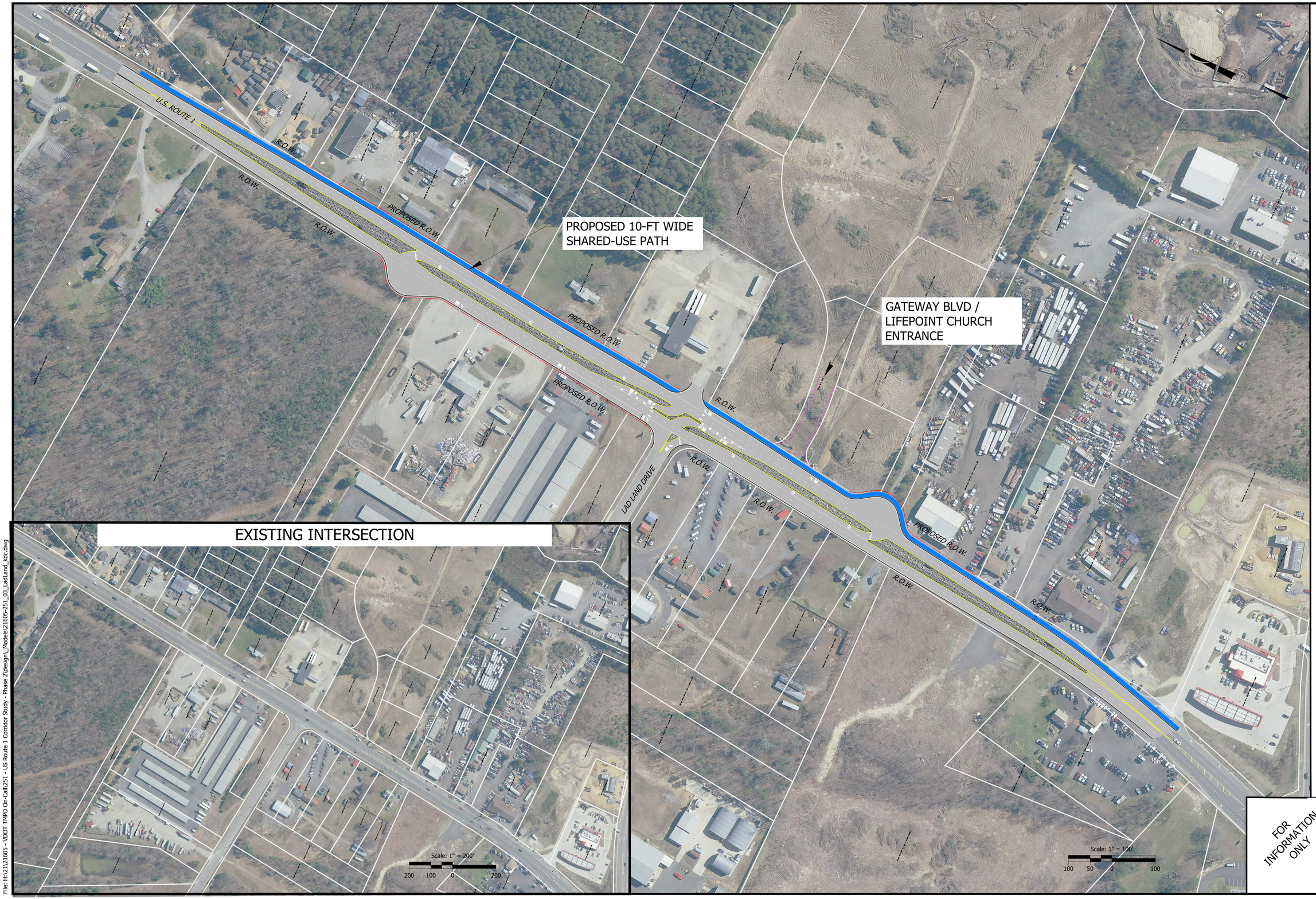
PROJECT NO. 21605.251

Route 1 Corridor Study: Spotsylvania County

Commonwealth Commuter Lot & Old Telegraph Road

SHEET NO. C-1

Plot Stamp: 8/12/2021 9:49:31 PM - Kylie Caviness
File: H:\21\21605 - VDOT TMPD On-Call\251 - US Route 1 Corridor Study - Phase 2\design_Models\21605-251_02_Old Telegraph_v2_kdc.dwg



FOR INFORMATION ONLY

VDOT
Virginia Department of Transportation

KITTELSON & ASSOCIATES
11480 COMMERCE PARK DRIVE, SUITE 450
RESTON, VA 20191
P 703.885.8970

#	DATE	REVISION	APP'D

Submission Date: 08/12/2021

Drawn:	Designed:	Checked:
JCC	JCC	KJH

PROJECT NO.
21605.251

Route 1 Corridor Study: Spotsylvania County

Lad Land Drive RCUT

SHEET NO.
C-2

Plot Stamp: 8/12/2021 9:47:53 PM - Kylie Cavness
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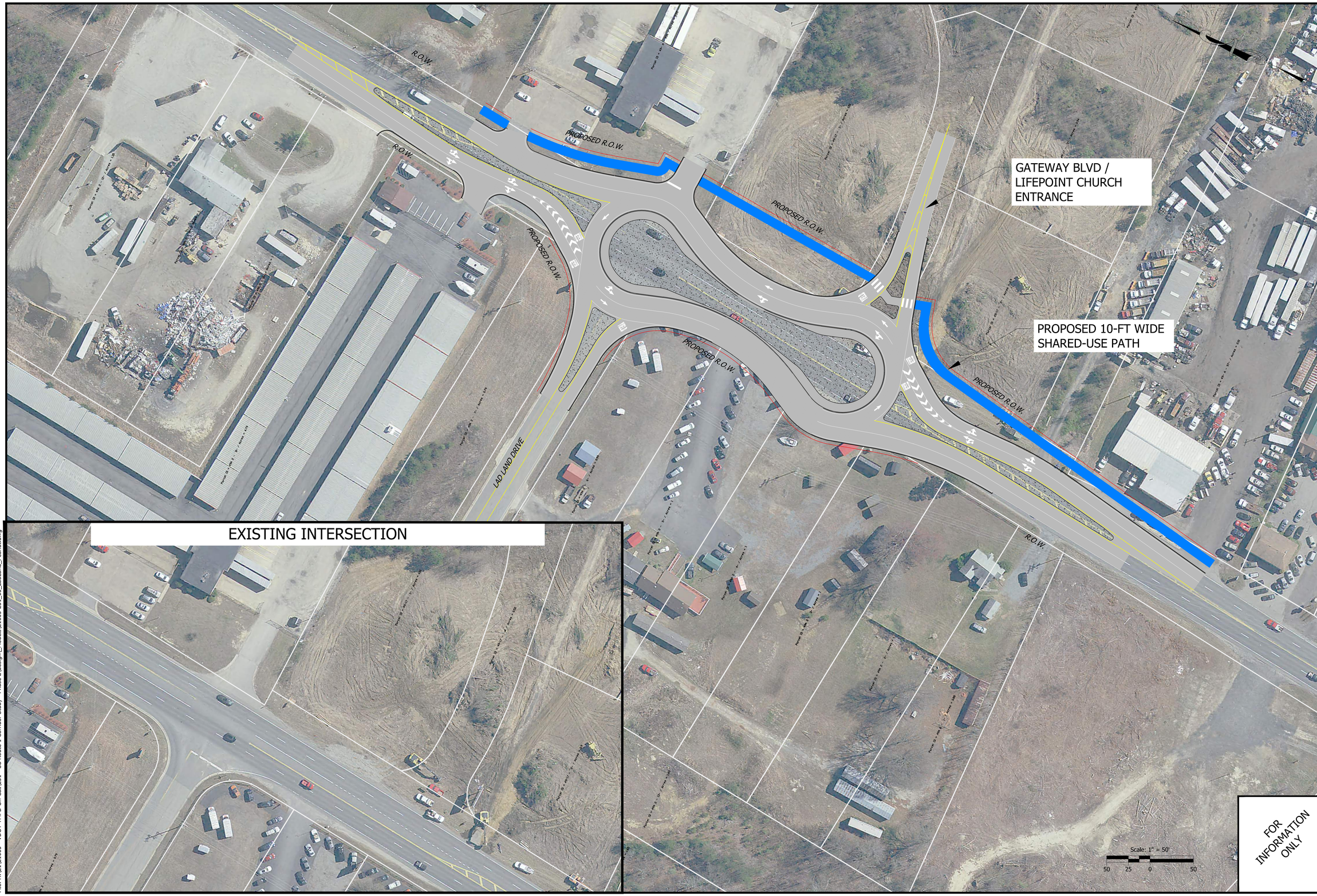

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VDOT
Virginia Department of Transportation

KITTELSON & ASSOCIATES
11480 COMMERCE PARK DRIVE, SUITE 450
RESTON, VA 20191
P 703.885.8970

#	DATE	REVISION	APP'D

Submission Date: 08/12/2021

Drawn:	Designed:	Checked:
JCC	JCC	KJH

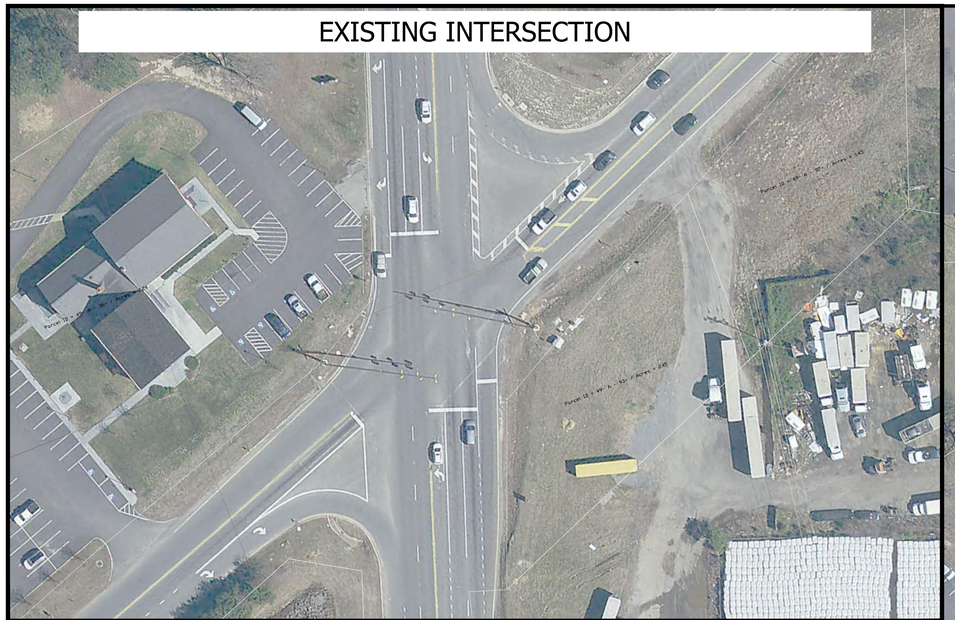
PROJECT NO. 21605.251

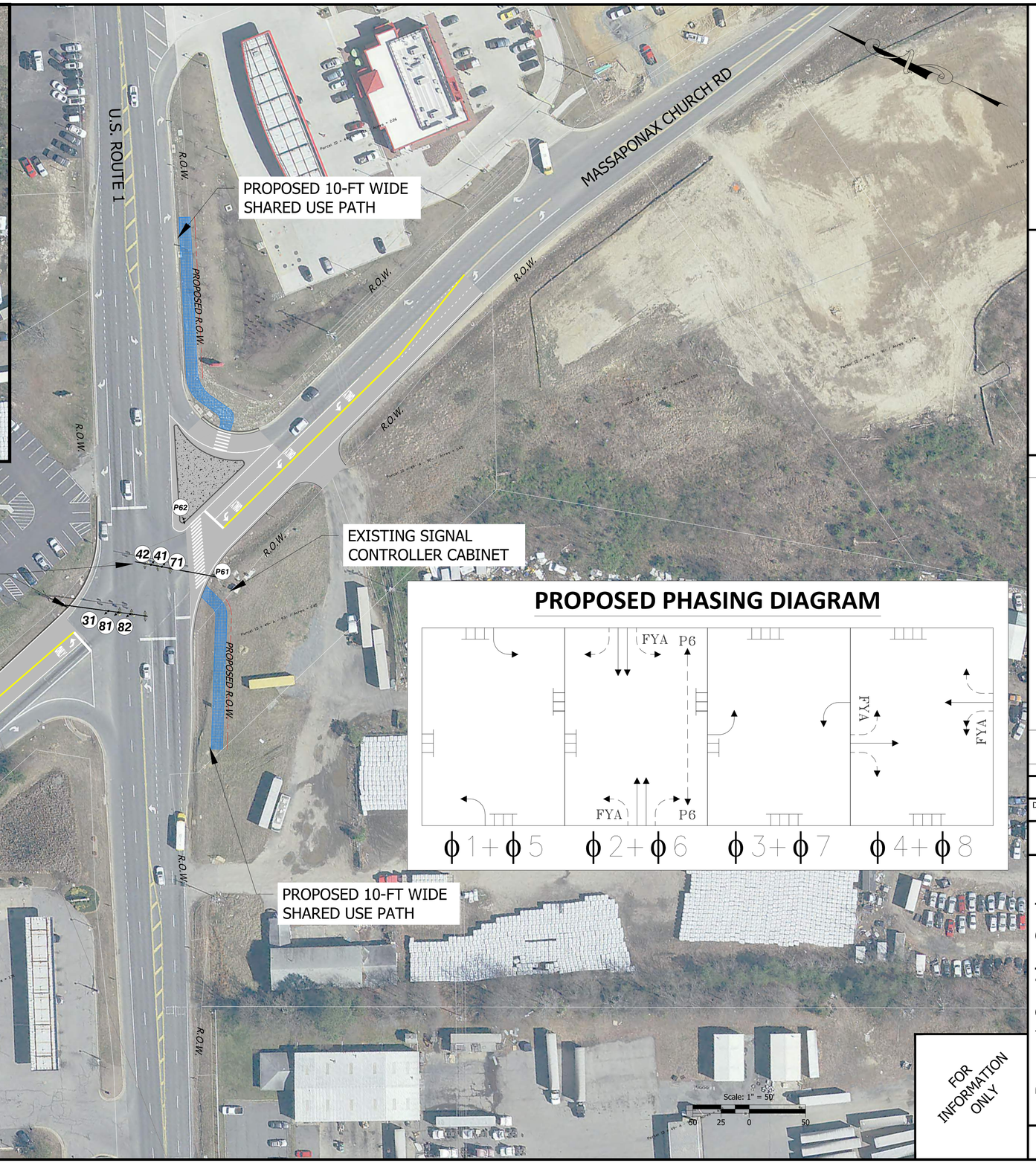
Route 1 Corridor Study: Spotsylvania County

Lad Land Drive Peanutabout

SHEET NO. C-3

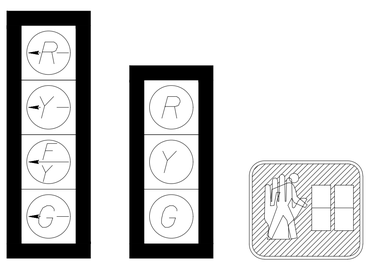
Plot Stamp: 8/12/2021 10:03:07 PM - Kylie Caviness
File: H:\21\21605 - VDOT TMPD On-Call\251 - US Route 1 Corridor Study - Phase 2\design_Models\21605-251_03_LadLand_Peanut.dwg





PROPOSED SIGNALS

(SIGNALS FOR U.S. ROUTE 1 APPROACHES TO REMAIN UNCHANGED)



HEADS 31,71 | **HEADS 41,42,81,82** | **HEADS P61,P62**

PROPOSED PHASING DIAGRAM

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Submission Date: 08/12/2021

Drawn: JCC | Designed: JCC | Checked: KJH

PROJECT NO. 21605.251

Route 1 Corridor Study: Spotsylvania County

Massaponax Church Road Left-Turn Lanes

SHEET NO. C-4

Plot Stamp: 8/12/2021 6:49:27 PM - Kylie Caviness
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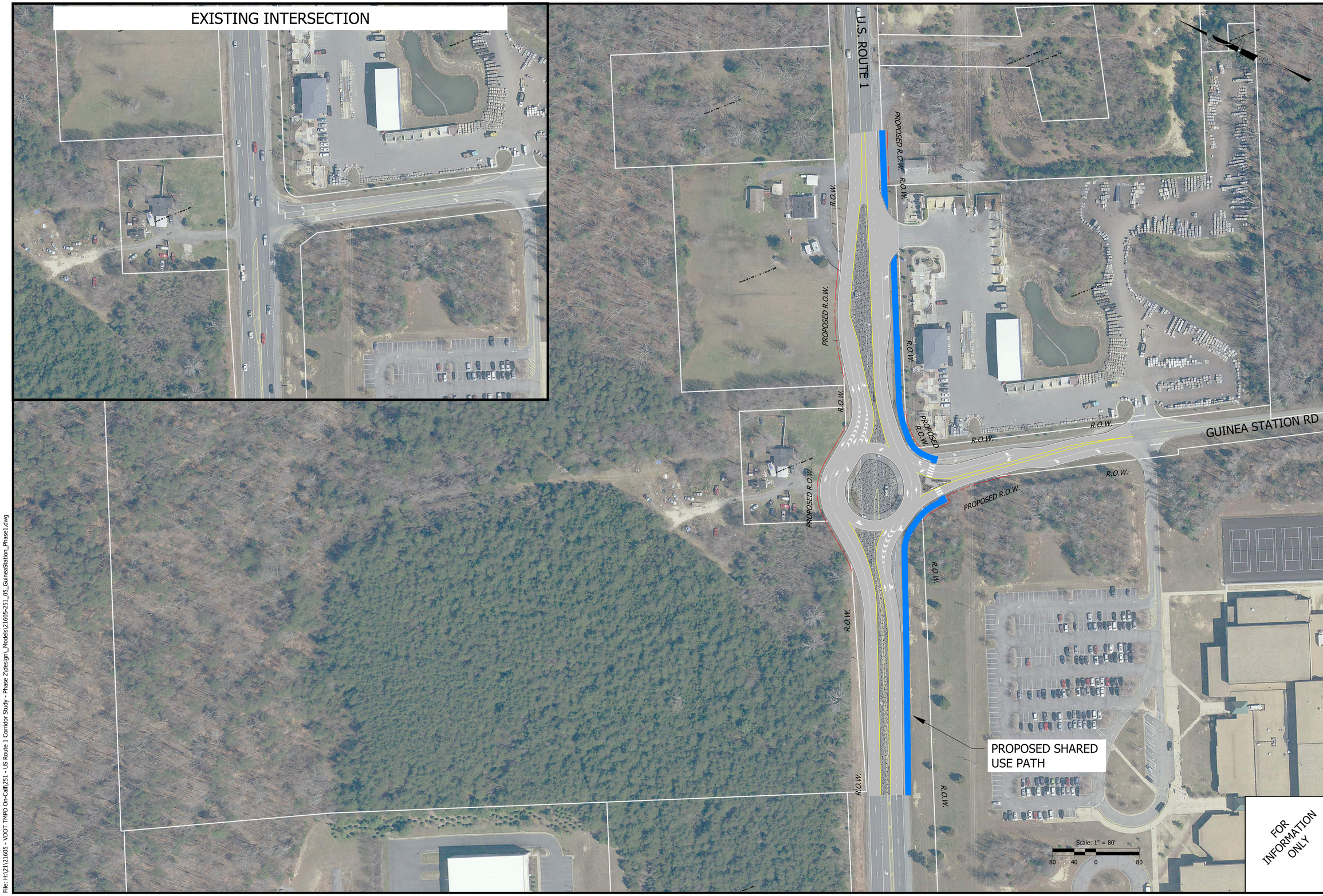

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#	DATE	REVISION	APP'D

Submission Date: 08/12/2021

Drawn:	Designed:	Checked:
JCC	JCC	KJH

PROJECT NO.
21605.251

Route 1 Corridor Study: Spotsylvania County

Guinea Station Road Roundabout - Phase 1

SHEET NO.
C-6

Plot Stamp: 8/12/2021 7:11:25 PM - Kylie Cavness
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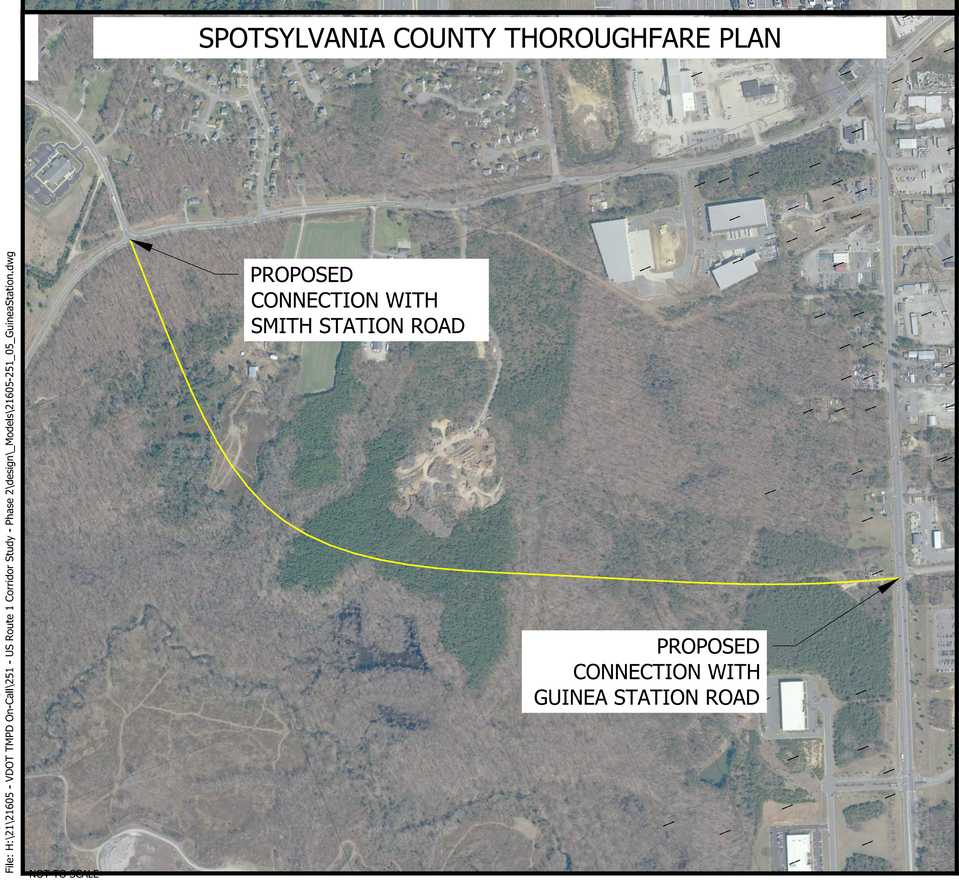

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#	DATE	REVISION	APP'D

Submission Date: 08/12/2021

Drawn:	Designed:	Checked:
JCC	JCC	KJH

PROJECT NO. 21605.251

Route 1 Corridor Study: Spotsylvania County

Guinea Station Road Roundabout - Phase 2

SHEET NO. C-7

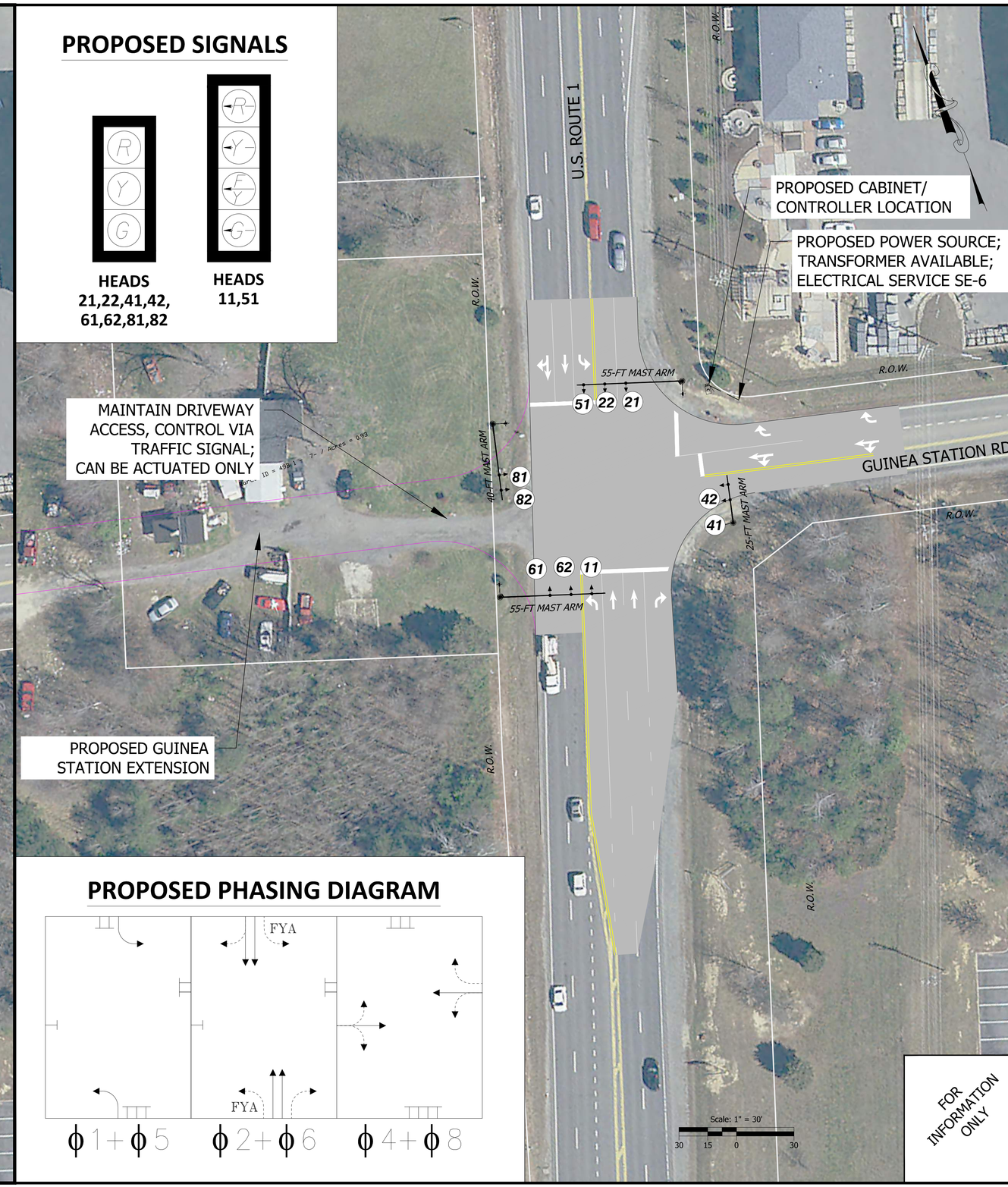
NOT TO SCALE

Plot Stamp: 8/12/2021 7:01:02 PM - Kylie Caviness
File: H:\21\21605 - VDOT TMPD On-Call\251 - US Route 1 Corridor Study - Phase 2\design_Models\21605-251_05_GuineaStation.dwg

PROPOSED SIGNALS

HEADS 21,22,41,42, 61,62,81,82

HEADS 11,51



PROPOSED PHASING DIAGRAM

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#	DATE	REVISION	APP'D

Submission Date: 08/12/2021

Drawn: JCC | Designed: JCC | Checked: KJH

PROJECT NO. 21605.251

Route 1 Corridor Study: Spotsylvania County

Guinea Station Road 3-Legged - Signal

SHEET NO. C-8

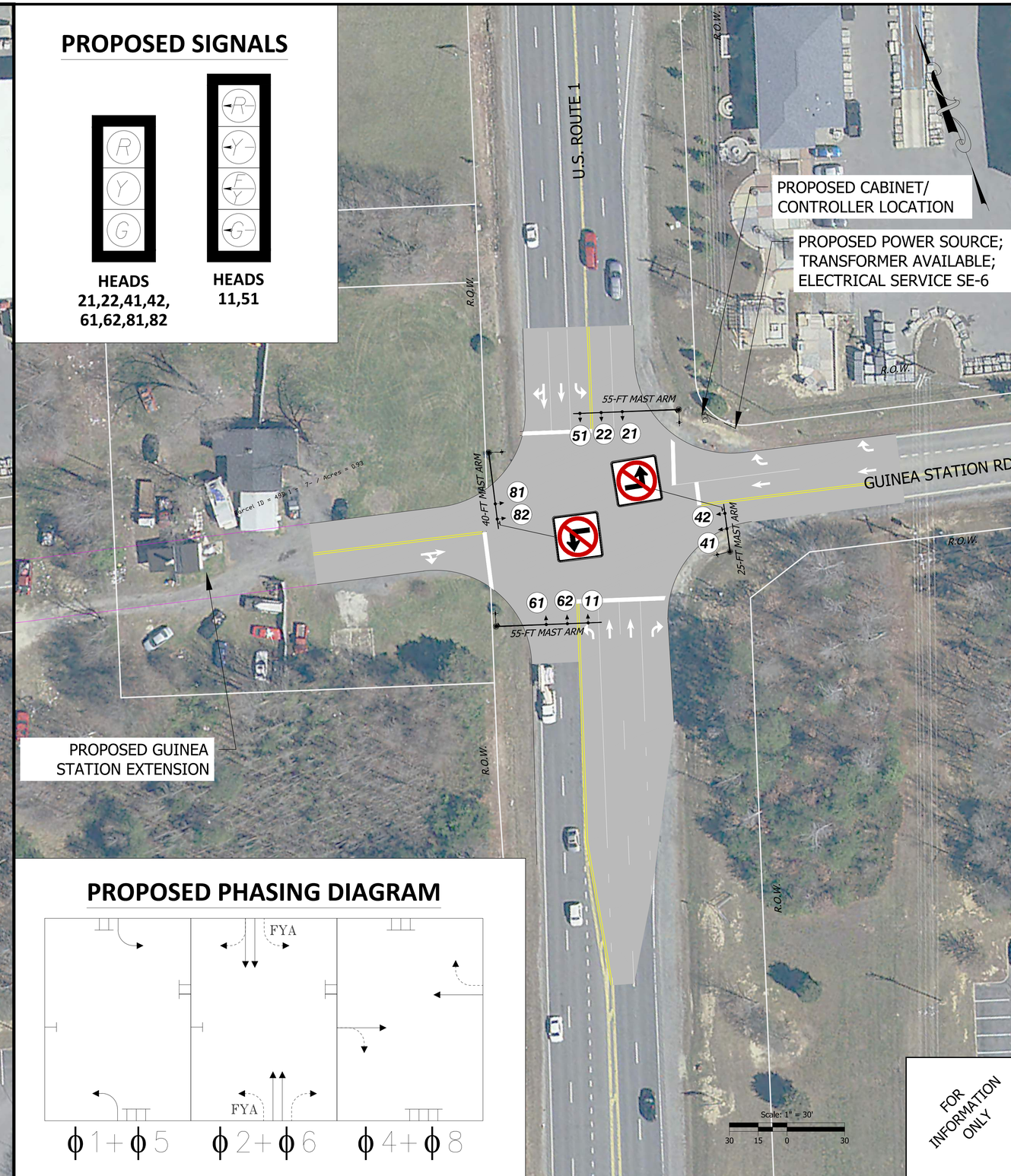
Plot Stamp: 8/12/2021 7:23:31 PM - Kylie Caviness
File: H:\21\21605 - VDOT TMPD On-Call\251 - US Route 1 Corridor Study - Phase 2\design_Models\21605-251_05_GuineaStationB.dwg

EXISTING INTERSECTION

PROPOSED SIGNALS

HEADS 21,22,41,42, 61,62,81,82

HEADS 11,51



PROPOSED PHASING DIAGRAM

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Submission Date: 08/12/2021

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PROJECT NO. 21605.251

Route 1 Corridor Study: Spotsylvania County

Guinea Station Road Quadrant - Signal

SHEET NO. C-9

Plot Stamp: 8/12/2021 7:36:26 PM - Kylie Caviness
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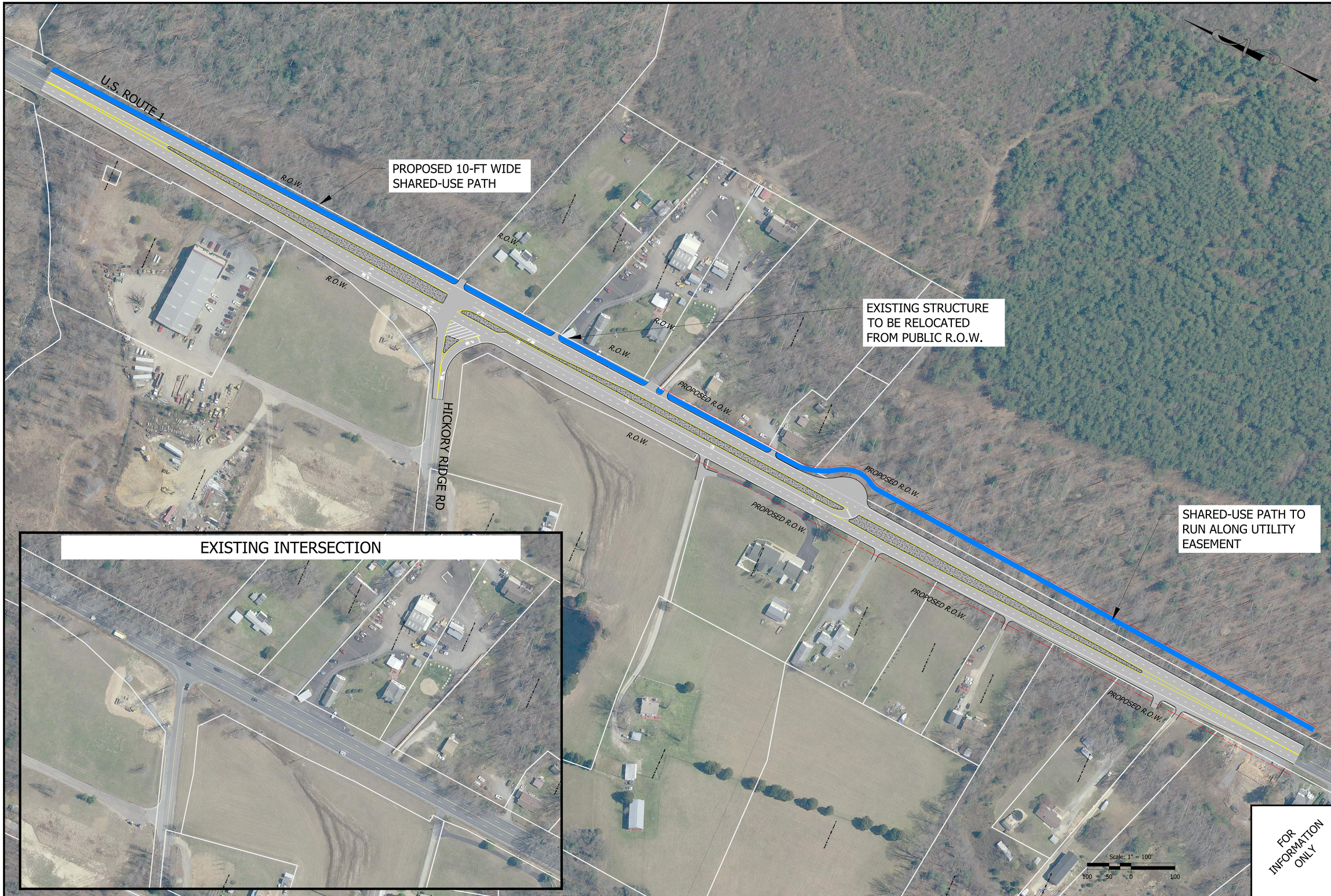

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#	DATE	REVISION	APP'D

Submission Date: 08/12/2021

Drawn: JCC | Designed: JCC | Checked: KJH

PROJECT NO. 21605.251

Route 1 Corridor Study: Spotsylvania County

Hickory Ridge Road RCUT

SHEET NO. C-10

Plot Stamp: 8/12/2021 7:52:42 PM - Kylie Cavness
File: H:\21\21605 - VDOT TMPD On-Call\251 - US Route 1 Corridor Study - Phase 2\design_Models\21605-251_07_Hickory Ridge_A.dwg

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#	DATE	REVISION	APP'D

Submission Date: 08/12/2021

Drawn:	Designed:	Checked:
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PROJECT NO.
21605.251

Route 1 Corridor Study: Spotsylvania County

Hickory Ridge Road Roundabout

SHEET NO.
C-11

Plot Stamp: 8/12/2021 8:09:38 PM - Kyllie Caviness
File: H:\21\21605 - VDOT TMPD On-Call\251 - US Route 1 Corridor Study - Phase 2\design_Models\21605-251_07_Hickory Ridge_RDBT.dwg

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#	DATE	REVISION	APP'D

Submission Date: 08/12/2021

Drawn:	Designed:	Checked:
JCC	JCC	KJH

PROJECT NO.
21605.251

Route 1 Corridor Study: Spotsylvania County

N Roxbury Mill Road Right-in/Right-out

SHEET NO.
C-12

Plot Stamp: 8/12/2021 9:54 PM - Kylie Caviness
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#	DATE	REVISION	APP'D

Submission Date: 08/12/2021

Drawn:	Designed:	Checked:
JCC	JCC	KJH

PROJECT NO. 21605.251

Route 1 Corridor Study: Spotsylvania County

N Roxbury Mill Road Right-in/Right-out with Northbound Left Turn Lane

SHEET NO. C-13

Plot Stamp: 8/12/2021 9:52 PM - Kylie Caviness
File: H:\21\21605 - VDOT TMPD On-Call\251 - US Route 1 Corridor Study - Phase 2\design_Models

PROPOSED SIGNALS

HEADS 21,22,41,42, 61,62,81,82

HEADS 11,51

PROPOSED PHASING DIAGRAM

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Submission Date: 08/12/2021

Drawn: JCC | Designed: JCC | Checked: KJH

PROJECT NO. 21605.251

Route 1 Corridor Study: Spotsylvania County

North Pointe Drive/Larkinchew Rd Concept Signal Installation

SHEET NO. C-14

Plot Stamp: 8/12/2021 8:39:54 PM - Kylie Cavness
File: H:\21\21605 - VDOT TMPD On-Call\251 - US Route 1 Corridor Study - Phase 2\design_Models\21605-251_09_North Point Larkinchew.dwg

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#	DATE	REVISION	APP'D

Submission Date: 08/12/2021

Drawn:	Designed:	Checked:
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PROJECT NO.
21605.251

Route 1 Corridor Study: Spotsylvania County

North Pointe Drive/Larkinchew Rd Roundabout

SHEET NO.
C-15

Plot Stamp: 8/12/2021 8:47:32 PM - Kylie Caviness
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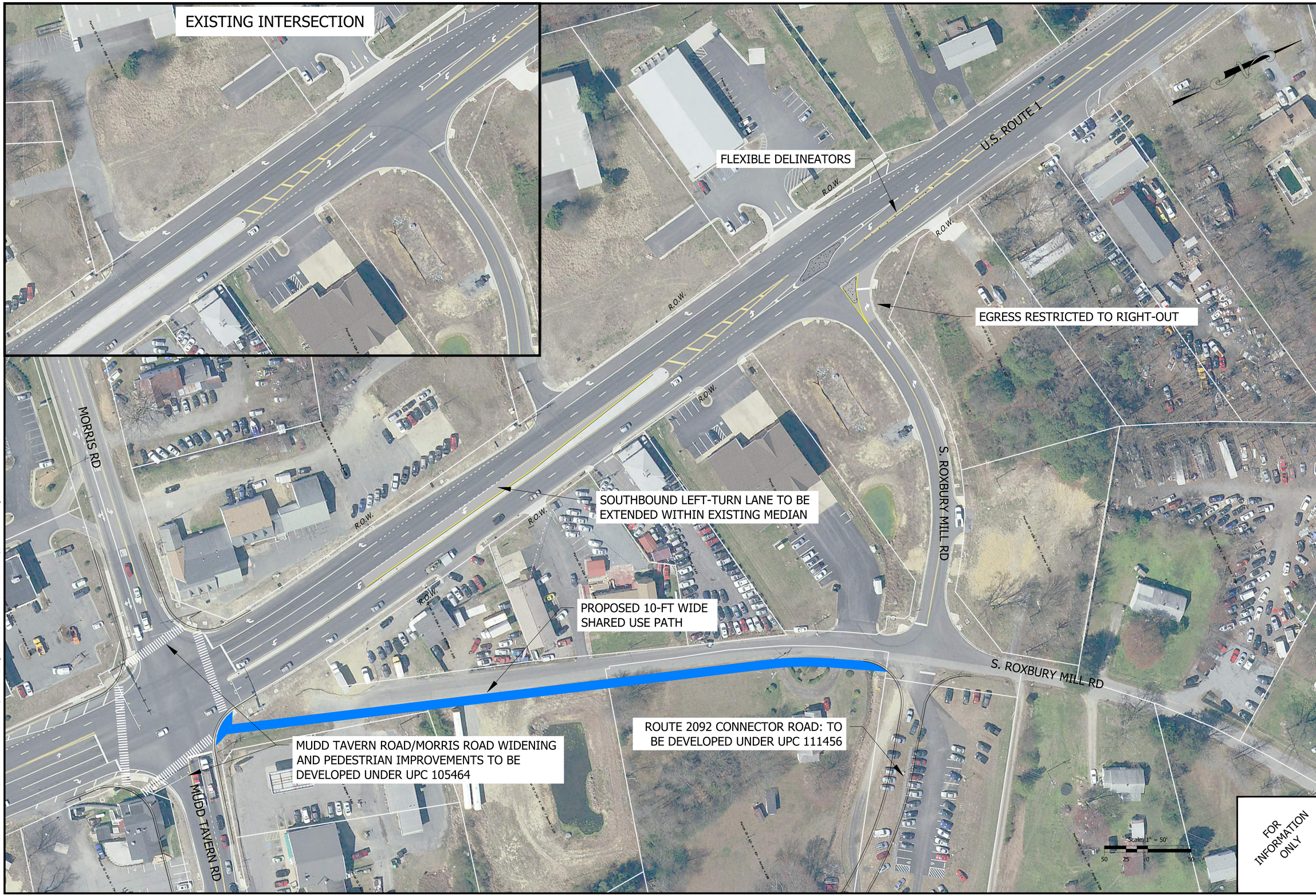

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#	DATE	REVISION	APP'D

Submission Date: 08/12/2021

Drawn: JCC | Designed: JCC | Checked: KJH

PROJECT NO. 21605.251

Route 1 Corridor Study: Spotsylvania County

S. Roxbury Mill Rd & Mudd Tavern Rd Improvements

SHEET NO. C-16

Plot Stamp: 8/12/2021 8:24:31 PM - Kylie Caviness
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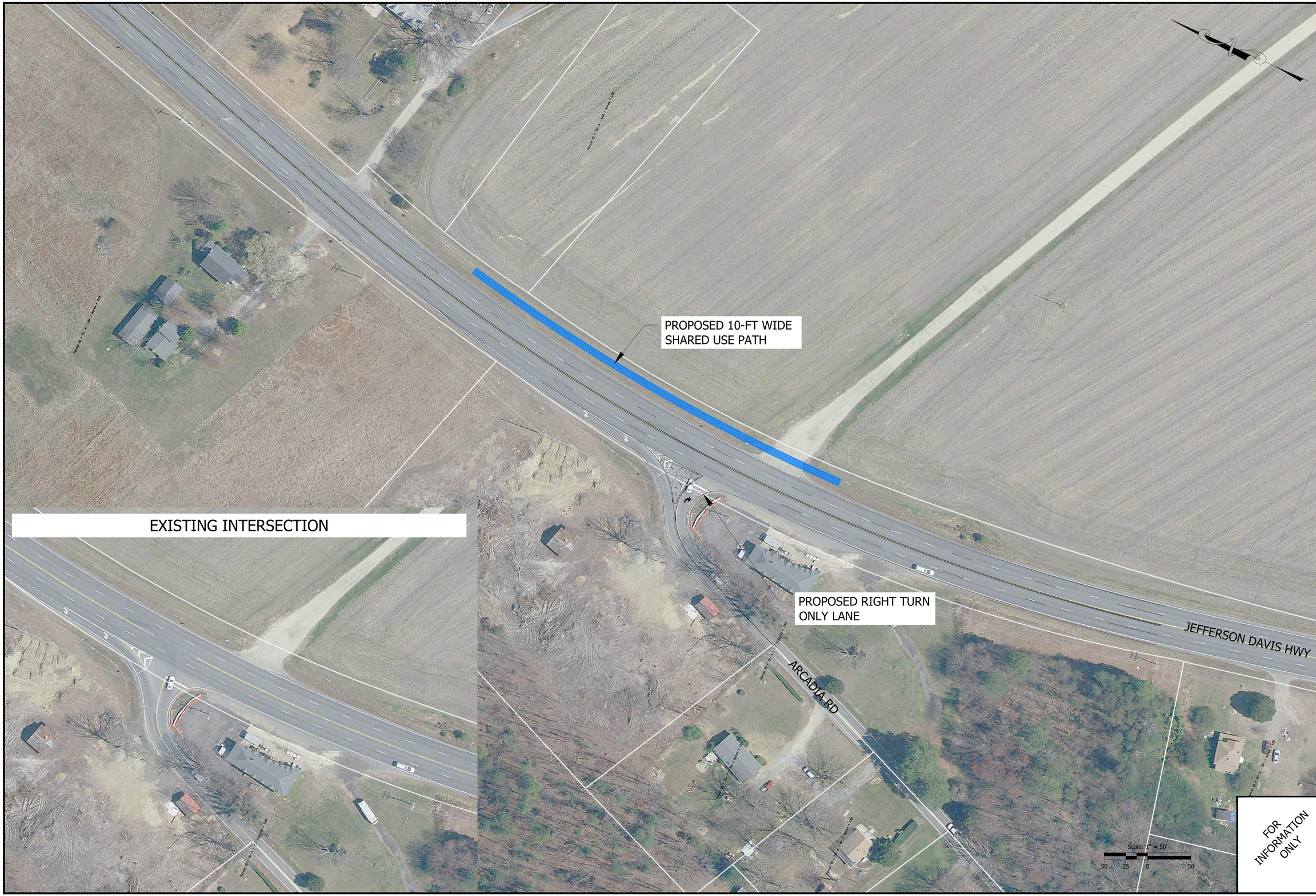

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#	DATE	REVISION	APP'D

Submission Date: 08/12/2021

Drawn:	Designed:	Checked:
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PROJECT NO. 21605.251

Route 1 Corridor Study: Spotsylvania County

Arcadia Road Right-Turn Only

SHEET NO. C-17

Plot Stamp: 8/12/2021 8:32:10 PM - Kylie Caviness
File: H:\21\21605 - VDOT TMPD On-Call\251 - US Route 1 Corridor Study - Phase 2\design_Models\21605-251_12_Arcadia.dwg

Appendix D.
Cost Estimates for
Recommended Improvements

VDOT Planning

	PS&E/Const Mgmt	R/W	Construction	30% Contingency	**TOTAL**
1 - Commonwealth Dr Lot accel lane; & 2 - Rte 749 (Old Telegraph Rd) mod lane config + extend SB Left	$ 325,500	$ 106,200	$ 1,084,853	$ 454,970	**$ 1,971,500**
3 - Lad Land Drive - Unsignalized RCUT	$ 1,037,300	$ 620,100	$ 3,457,099	$ 1,534,350	**$ 6,648,800**
3B - Lad Land Drive Peanut Roundabout	$ 788,300	$ 1,260,000	$ 2,627,317	$ 1,402,690	**$ 6,078,300**
4 - Route 608 (Massaponax Church Rd) - Exclusive EB and WB Left Turn Lanes	$ 88,500	$ -	$ 294,825	$ 115,000	**$ 498,300**
5A - Route 607 (Guinea Station Rd) - 3-legged Roundabout (not incl W leg)	$ 655,800	$ 438,600	$ 2,185,716	$ 984,040	**$ 4,264,200**
5B - Route 607 (Guinea Station Rd) - Signal/Quadrant	$ 135,600	$ -	$ 451,547	$ 176,150	**$ 763,300**
5C - Route 607 (Guinea Station Rd) - Internal High School Connection	$ 38,400	$ -	$ 127,619	$ 49,810	**$ 215,800**
7 - Route 632 (Hickory Ridge Rd) - Unsignalized RCUT	$ 813,500	$ 2,020,200	$ 2,711,047	$ 1,663,430	**$ 7,208,200**
7B - Route 632 (Hickory Ridge Rd) - Roundabout	$ 523,200	$ 270,000	$ 1,743,569	$ 761,040	**$ 3,297,800**
8A - Route 632 (North Roxbury Mill Rd) - RIRO with Accel Lane	$ 147,800	$ -	$ 492,042	$ 191,960	**$ 831,800**
8B - Route 632 (North Roxbury Mill Rd) - RIRO with Accel Lane + NB Left into Church	$ 309,200	$ -	$ 1,030,425	$ 401,890	**$ 1,741,500**
#REF!	#REF!	#REF!	#REF!	#REF!	**#REF!**
9A - North Point Drive / Larkinchew Rd - roundabout	$ 310,100	$ 297,000	$ 1,033,081	$ 492,060	**$ 2,132,200**
9B - North Point Drive / Larkinchew Rd - signal	$ 119,000	$ -	$ 396,500	$ 154,650	**$ 670,200**
10 - Convert S Roxbury Mill Rd to RIRO, and 11 - Morris Rd/Mudd Tavern Rd - Extend SB Lt	$ 92,700	$ -	$ 308,772	$ 120,450	**$ 521,900**
12 - Route 603 (Arcadia Road) - channelized RT at Arcadia + divert LT to Marye Rd	$ 118,800	$ -	$ 395,840	$ 154,400	**$ 669,000**
12B - Route 603 (Arcadia Road) - Extend Plantation Estates Way	$ 289,800	$ 900,000	$ 965,934	$ 646,730	**$ 2,802,500**

ASSUMPTIONS:
- R/W cost is $30/SF

Route 1 Corridor Study

Alternatives Cost Matrix **Project No. 21605.251**

KITTELSON & ASSOCIATES

Engineer's Opinion of Probable Construction Costs

Prepared by: Josh Hurst, P.E.			*Date: August 9, 2021*		
	This Estimate has a Rating of:		**2C**	*(See rating scale guide below.)*	
			1 - Commonwealth Dr Lot accel lane; & 2 - Rte 749 (Old Telegraph Rd) mod lane config + extend SB		
	ITEM	**UNIT**	**QUANTITY**	**UNIT PRICE**	**TOTAL COST**
100	Mobilization / Construction Surveying	LS	1	$89,000.00	$89,000.00
	Traffic Control	LS	1	$74,000.00	$74,000.00
	Erosion Control	LS	1	$35,000.00	$35,000.00
	Removal of Structures and Obstructions	LS	1	$13,000.00	$13,000.00
	Clearing and Grubbing	LS	1	$9,000.00	$9,000.00
120	REGULAR EXCAVATION	CY	2,300	$60.00	$138,000.00
10100	AGGR. MATL. NO. 21B	TON	387	$40.00	$15,480.00
	Truck Apron / Construction Entrance, 9"	SY	187	$275.00	$51,333.33
	Sidewalk / Shared Use Path	SY	2,230	$90.00	$200,700.00
12020	STD CURB CG-2	LF	200	$35.00	$7,000.00
	STD COMB CURB & GUTTER CG-6	LF	0	$40.00	$0.00
					$0.00
10635	ASPHALT CONC.TY. SM-9.5A	TON	235	$110.00	$25,887.95
10642	ASPHALT CONC. BASE COURSE TY. BM-25.0A	TON	516	$105.00	$54,151.53
	Roadway Lighting	EA	27	$7,000.00	$189,000.00
	Traffic Signal Modifications	EA	1	$50,000.00	$50,000.00
	Storm Drainage RCP Pipe	LF	0	$100.00	$0.00
	Storm Drainage Structures	EA	0	$8,000.00	$0.00
	Landscaping, Complete	LS	1	$29,300.00	$29,300.00
	Pavement Markings	LF	18,000	$ 2.50	$45,000.00
	Signage, Complete	LS	1	$ 9,000.00	$9,000.00
	Water, Sewer, and Franchise Utility Relocations	LS	1	$ 50,000.00	$50,000.00
	TOTAL CONSTRUCTION COST				**$ 1,084,853**
	ENGINEERING, R/W, CEI				
	Engineering (PS&E)	LS	10%	$ 1,084,852.82	$108,500.00
	Potential New Right-of-Way Needed	SF	3,540	$ 30.00	$106,200.00
	Construction Management & Inspection	LS	20%	$ 1,084,852.82	$217,000.00
	ENGINEERING, R/W, CEI SUBTOTAL				**$ 431,700**
	TOTAL ENGINEERING, R/W, CEI, AND CONSTRUCTION SUBTOTAL				**$ 1,516,553**
	30% Contingency				**$ 454,970**
	TOTAL ESTIMATED ENGINEERING, R/W, CEI, AND CONSTRUCTION COST				**$ 1,971,500**

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 1 Corridor Study

Alternatives Cost Matrix

Project No. 21605.251

KITTELSON & ASSOCIATES

Engineer's Opinion of Probable Construction Costs

Prepared by: Josh Hurst, P.E.			*Date: August 9, 2021*		
	This Estimate has a Rating of:		**2C**	*(See rating scale guide below.)*	
			3 - Lad Land Drive - Unsignalized RCUT		
	ITEM	**UNIT**	**QUANTITY**	**UNIT PRICE**	**TOTAL COST**
100	Mobilization / Construction Surveying	LS	1	$289,000.00	$289,000.00
	Traffic Control	LS	1	$235,000.00	$235,000.00
	Erosion Control	LS	1	$50,000.00	$50,000.00
	Removal of Structures and Obstructions	LS	1	$43,000.00	$43,000.00
	Clearing and Grubbing	LS	1	$29,000.00	$29,000.00
120	REGULAR EXCAVATION	CY	3,300	$60.00	$198,000.00
10100	AGGR. MATL. NO. 21B	TON	2,269	$40.00	$90,760.00
	Truck Apron / Construction Entrance, 9"	SY	400	$275.00	$110,000.00
	Sidewalk / Shared Use Path	SY	3,230	$90.00	$290,700.00
12020	STD CURB CG-2	LF	4,800	$35.00	$168,000.00
	STD COMB CURB & GUTTER CG-6	LF	5,800	$40.00	$232,000.00
				$0.00	$0.00
10635	ASPHALT CONC.TY. SM-9.5A	TON	3,271	$110.00	$359,813.67
10642	ASPHALT CONC. BASE COURSE TY. BM-25.0A	TON	3,025	$105.00	$317,625.00
	Roadway Lighting	EA	39	$7,000.00	$273,000.00
	Traffic Signal Modifications	EA	0	$50,000.00	$0.00
	Storm Drainage RCP Pipe	LF	2,900	$100.00	$290,000.00
	Storm Drainage Structures	EA	29	$8,000.00	$232,000.00
	Landscaping, Complete	LS	1	$93,200.00	$93,200.00
	Pavement Markings	LF	11,600	$ 2.50	$29,000.00
	Signage, Complete	LS	1	$ 27,000.00	$27,000.00
	Water, Sewer, and Franchise Utility Relocations	LS	1	$ 100,000.00	$100,000.00
	TOTAL CONSTRUCTION COST				**$ 3,457,099**
	ENGINEERING, R/W, CEI				
	Engineering (PS&E)	LS		$ 3,457,098.67	$345,800.00
	Potential New Right-of-Way Needed	SF	20,670	$ 30.00	$620,100.00
	Construction Management & Inspection	LS		$ 3,457,098.67	$691,500.00
	ENGINEERING, R/W, CEI SUBTOTAL				**$ 1,657,400**
	TOTAL ENGINEERING, R/W, CEI, AND CONSTRUCTION SUBTOTAL				**$ 5,114,499**
	30% Contingency				**$ 1,534,350**
	TOTAL ESTIMATED ENGINEERING, R/W, CEI, AND CONSTRUCTION COST				**$ 6,648,800**

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 1 Corridor Study

Alternatives Cost Matrix

Project No. 21605.251

KITTELSON & ASSOCIATES

Engineer's Opinion of Probable Construction Costs

Prepared by: Josh Hurst, P.E.			*Date: August 9, 2021*		
	This Estimate has a Rating of:		**2C**	*(See rating scale guide below.)*	
			3B - Lad Land Drive Peanut Roundabout		
	ITEM	**UNIT**	**QUANTITY**	**UNIT PRICE**	**TOTAL COST**
100	Mobilization / Construction Surveying	LS	1	$221,000.00	$221,000.00
	Traffic Control	LS	1	$179,000.00	$179,000.00
	Erosion Control	LS	1	$20,000.00	$20,000.00
	Removal of Structures and Obstructions	LS	1	$33,000.00	$33,000.00
	Clearing and Grubbing	LS	1	$22,000.00	$22,000.00
120	REGULAR EXCAVATION	CY	1,300	$60.00	$78,000.00
10100	AGGR. MATL. NO. 21B	TON	1,412	$40.00	$56,466.67
	Truck Apron / Construction Entrance, 9"	SY	1,800	$275.00	$495,000.00
	Sidewalk / Shared Use Path	SY	3,000	$90.00	$270,000.00
12020	STD CURB CG-2	LF	3,650	$35.00	$127,750.00
	STD COMB CURB & GUTTER CG-6	LF	2,000	$40.00	$80,000.00
				$0.00	$0.00
10635	ASPHALT CONC.TY. SM-9.5A	TON	1,613	$110.00	$177,466.67
10642	ASPHALT CONC. BASE COURSE TY. BM-25.0A	TON	1,882	$105.00	$197,633.33
	Roadway Lighting	EA	15	$7,000.00	$105,000.00
	Traffic Signal Modifications	EA	0	$50,000.00	$0.00
	Storm Drainage RCP Pipe	LF	2,000	$100.00	$200,000.00
	Storm Drainage Structures	EA	20	$8,000.00	$160,000.00
	Landscaping, Complete	LS	1	$71,500.00	$71,500.00
	Pavement Markings	LF	5,000	$ 2.50	$12,500.00
	Signage, Complete	LS	1	$ 21,000.00	$21,000.00
	Water, Sewer, and Franchise Utility Relocations	LS	1	$ 100,000.00	$100,000.00
	TOTAL CONSTRUCTION COST				**$ 2,627,317**
	ENGINEERING, R/W, CEI				
	Engineering (PS&E)	LS		$ 2,627,316.67	$262,800.00
	Potential New Right-of-Way Needed	SF	42,000	$ 30.00	$1,260,000.00
	Construction Management & Inspection	LS		$ 2,627,316.67	$525,500.00
	ENGINEERING, R/W, CEI SUBTOTAL				**$ 2,048,300**
	TOTAL ENGINEERING, R/W, CEI, AND CONSTRUCTION SUBTOTAL				**$ 4,675,617**
	30% Contingency				**$ 1,402,690**
	TOTAL ESTIMATED ENGINEERING, R/W, CEI, AND CONSTRUCTION COST				**$ 6,078,300**

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 1 Corridor Study

Alternatives Cost Matrix

Project No. 21605.251

KITTELSON & ASSOCIATES

Engineer's Opinion of Probable Construction Costs

Prepared by: Josh Hurst, P.E.			*Date: August 9, 2021*		
	This Estimate has a Rating of:		**2C**	*(See rating scale guide below.)*	
			4 - Route 608 (Massaponax Church Rd) - Exclusive EB and WB Left Turn Lanes		
	ITEM	**UNIT**	**QUANTITY**	**UNIT PRICE**	**TOTAL COST**
100	Mobilization / Construction Surveying	LS	1	$25,000.00	$25,000.00
	Traffic Control	LS	1	$20,000.00	$20,000.00
	Erosion Control	LS	1	$3,000.00	$3,000.00
	Removal of Structures and Obstructions	LS	1	$4,000.00	$4,000.00
	Clearing and Grubbing	LS	1	$3,000.00	$3,000.00
120	REGULAR EXCAVATION	CY	200	$60.00	$12,000.00
10100	AGGR. MATL. NO. 21B	TON	0	$40.00	$0.00
	Truck Apron / Construction Entrance, 9"	SY	160	$275.00	$44,000.00
	Sidewalk / Shared Use Path	SY	390	$90.00	$35,100.00
12020	STD CURB CG-2	LF	175	$35.00	$6,125.00
	STD COMB CURB & GUTTER CG-6	LF	60	$40.00	$2,400.00
				$0.00	$0.00
10635	ASPHALT CONC.TY. SM-9.5A	TON	0	$110.00	$0.00
10642	ASPHALT CONC. BASE COURSE TY. BM-25.0A	TON	0	$105.00	$0.00
	Roadway Lighting	EA	6	$7,000.00	$42,000.00
	Traffic Signal Modifications	EA	1	$50,000.00	$50,000.00
	Storm Drainage RCP Pipe	LF	0	$100.00	$0.00
	Storm Drainage Structures	EA	0	$8,000.00	$0.00
	Landscaping, Complete	LS	1	$7,700.00	$7,700.00
	Pavement Markings	LF	5,000	$ 2.50	$12,500.00
	Signage, Complete	LS	1	$ 3,000.00	$3,000.00
	Water, Sewer, and Franchise Utility Relocations	LS	1	$ 25,000.00	$25,000.00
	TOTAL CONSTRUCTION COST				**$ 294,825**
	ENGINEERING, R/W, CEI				
	Engineering (PS&E)	LS		$ 294,825.00	$29,500.00
	Potential New Right-of-Way Needed	SF		$ 30.00	$0.00
	Construction Management & Inspection	LS		$ 294,825.00	$59,000.00
	ENGINEERING, R/W, CEI SUBTOTAL				**$ 88,500**
	TOTAL ENGINEERING, R/W, CEI, AND CONSTRUCTION SUBTOTAL				**$ 383,325**
	30% contingency				**$ 115,000**
	TOTAL ESTIMATED ENGINEERING, R/W, CEI, AND CONSTRUCTION COST				**$ 498,300**

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 1 Corridor Study

Alternatives Cost Matrix

Project No. 21605.251

KITTELSON & ASSOCIATES

Engineer's Opinion of Probable Construction Costs

Prepared by: Josh Hurst, P.E.			*Date: August 9, 2021*		
	This Estimate has a Rating of:		**2C**	*(See rating scale guide below.)*	
			5A - Route 607 (Guinea Station Rd) - 3-legged Roundabout (not incl W leg)		
	ITEM	**UNIT**	**QUANTITY**	**UNIT PRICE**	**TOTAL COST**
100	Mobilization / Construction Surveying	LS	1	$182,000.00	$182,000.00
	Traffic Control	LS	1	$149,000.00	$149,000.00
	Erosion Control	LS	1	$35,000.00	$35,000.00
	Removal of Structures and Obstructions	LS	1	$27,000.00	$27,000.00
	Clearing and Grubbing	LS	1	$18,000.00	$18,000.00
120	REGULAR EXCAVATION	CY	2,300	$60.00	$138,000.00
10100	AGGR. MATL. NO. 21B	TON	1,436	$40.00	$57,450.80
	Truck Apron / Construction Entrance, 9"	SY	547	$275.00	$150,333.33
	Sidewalk / Shared Use Path	SY	1,340	$90.00	$120,600.00
12020	STD CURB CG-2	LF	2,500	$35.00	$87,500.00
	STD COMB CURB & GUTTER CG-6	LF	3,500	$40.00	$140,000.00
				$0.00	$0.00
10635	ASPHALT CONC.TY. SM-9.5A	TON	2,022	$110.00	$222,454.47
10642	ASPHALT CONC. BASE COURSE TY. BM-25.0A	TON	1,915	$105.00	$201,077.80
	Roadway Lighting	EA	27	$7,000.00	$189,000.00
	Traffic Signal Modifications	EA	0	$50,000.00	$0.00
	Storm Drainage RCP Pipe	LF	2,000	$100.00	$200,000.00
	Storm Drainage Structures	EA	20	$8,000.00	$160,000.00
	Landscaping, Complete	LS	1	$60,300.00	$60,300.00
	Pavement Markings	LF	12,000	$ 2.50	$30,000.00
	Signage, Complete	LS	1	$ 18,000.00	$18,000.00
	Water, Sewer, and Franchise Utility Relocations	LS	1		$0.00
	TOTAL CONSTRUCTION COST				**$ 2,185,716**
	ENGINEERING, R/W, CEI				
	Engineering (PS&E)	LS		$ 2,185,716.40	$218,600.00
	Potential New Right-of-Way Needed	SF	14,620	$ 30.00	$438,600.00
	Construction Management & Inspection	LS		$ 2,185,716.40	$437,200.00
	ENGINEERING, R/W, CEI SUBTOTAL				**$ 1,094,400**
	TOTAL ENGINEERING, R/W, CEI, AND CONSTRUCTION SUBTOTAL				**$ 3,280,116**
	30% Contingency				**$ 984,040**
	TOTAL ESTIMATED ENGINEERING, R/W, CEI, AND CONSTRUCTION COST				**$ 4,264,200**

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 1 Corridor Study

Alternatives Cost Matrix

Project No. 21605.251

KITTELSON & ASSOCIATES

Engineer's Opinion of Probable Construction Costs

Prepared by: Josh Hurst, P.E.			*Date: August 9, 2021*		
	This Estimate has a Rating of:		**2C**	*(See rating scale guide below.)*	
			5B - Route 607 (Guinea Station Rd) - Signal/Quadrant		
	ITEM	**UNIT**	**QUANTITY**	**UNIT PRICE**	**TOTAL COST**
100	Mobilization / Construction Surveying	LS	1	$39,000.00	$39,000.00
	Traffic Control	LS	1	$31,000.00	$31,000.00
	Erosion Control	LS	1	$0.00	$0.00
	Removal of Structures and Obstructions	LS	1	$6,000.00	$6,000.00
	Clearing and Grubbing	LS	1	$4,000.00	$4,000.00
120	REGULAR EXCAVATION	CY	0	$60.00	$0.00
10100	AGGR. MATL. NO. 21B	TON	0	$40.00	$0.00
	Truck Apron / Construction Entrance, 9"	SY	0	$275.00	$0.00
	Sidewalk / Shared Use Path	SY	0	$90.00	$0.00
12020	STD CURB CG-2	LF		$35.00	$0.00
	STD COMB CURB & GUTTER CG-6	LF		$40.00	$0.00
				$0.00	$0.00
10635	ASPHALT CONC.TY. SM-9.5A	TON	161	$110.00	$17,746.67
10642	ASPHALT CONC. BASE COURSE TY. BM-25.0A	TON		$105.00	$0.00
	Roadway Lighting	EA	4	$7,000.00	$28,000.00
	Traffic Signal Modifications	EA	1	$250,000.00	$250,000.00
	Storm Drainage RCP Pipe	LF		$100.00	$0.00
	Storm Drainage Structures	EA	0	$8,000.00	$0.00
	Landscaping, Complete	LS	1	$11,800.00	$11,800.00
	Pavement Markings	LF	4,000	$ 2.50	$10,000.00
	Signage, Complete	LS	1	$ 4,000.00	$4,000.00
	Water, Sewer, and Franchise Utility Relocations	LS	1	$ 50,000.00	$50,000.00
	TOTAL CONSTRUCTION COST				**$ 451,547**
	ENGINEERING, R/W, CEI				
	Engineering (PS&E)	LS		$ 451,546.67	$45,200.00
	Potential New Right-of-Way Needed	SF		$ 30.00	$0.00
	Construction Management & Inspection	LS		$ 451,546.67	$90,400.00
	ENGINEERING, R/W, CEI SUBTOTAL				**$ 135,600**
	TOTAL ENGINEERING, R/W, CEI, AND CONSTRUCTION SUBTOTAL				**$ 587,147**
	30% Contingency				**$ 176,150**
	TOTAL ESTIMATED ENGINEERING, R/W, CEI, AND CONSTRUCTION COST				**$ 763,300**

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%.

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Route 1 Corridor Study

Alternatives Cost Matrix **Project No. 21605.251**

Engineer's Opinion of Probable Construction Costs

Prepared by: Josh Hurst, P.E.			*Date: August 9, 2021*		
	This Estimate has a Rating of:		**2C**	*(See rating scale guide below.)*	
			5C - Route 607 (Guinea Station Rd) - Internal High School Connection		
	ITEM	**UNIT**	**QUANTITY**	**UNIT PRICE**	**TOTAL COST**
100	Mobilization / Construction Surveying	LS	1	$11,000.00	$11,000.00
	Traffic Control	LS	1	$13,000.00	$13,000.00
	Erosion Control	LS	1	$3,000.00	$3,000.00
	Removal of Structures and Obstructions	LS	1	$2,000.00	$2,000.00
	Clearing and Grubbing	LS	1	$1,000.00	$1,000.00
120	REGULAR EXCAVATION	CY	200	$60.00	$12,000.00
10100	AGGR. MATL. NO. 21B	TON	71	$40.00	$2,823.33
	Truck Apron / Construction Entrance, 9"	SY	0	$275.00	$0.00
	Sidewalk / Shared Use Path	SY	0	$90.00	$0.00
12020	STD CURB CG-2	LF	0	$35.00	$0.00
	STD COMB CURB & GUTTER CG-6	LF	300	$40.00	$12,000.00
				$0.00	$0.00
10635	ASPHALT CONC.TY. SM-9.5A	TON	71	$110.00	$7,764.17
10642	ASPHALT CONC. BASE COURSE TY. BM-25.0A	TON	94	$105.00	$9,881.67
	Roadway Lighting	EA	1	$7,000.00	$7,000.00
	Traffic Signal Modifications	EA	0	$50,000.00	$0.00
	Storm Drainage RCP Pipe	LF	200	$100.00	$20,000.00
	Storm Drainage Structures	EA	2	$8,000.00	$16,000.00
	Landscaping, Complete	LS	1	$2,900.00	$2,900.00
	Pavement Markings	LF	500	$ 2.50	$1,250.00
	Signage, Complete	LS	1	$ 1,000.00	$1,000.00
	Water, Sewer, and Franchise Utility Relocations	LS	1	$ 5,000.00	$5,000.00
	TOTAL CONSTRUCTION COST			**$**	**127,619**
	ENGINEERING, R/W, CEI				
	Engineering (PS&E)	LS		$ 127,619.17	$12,800.00
	Potential New Right-of-Way Needed	SF	0	$ 20.00	$0.00
	Construction Management & Inspection	LS		$ 127,619.17	$25,600.00
	ENGINEERING, R/W, CEI SUBTOTAL			**$**	**38,400**
	TOTAL ENGINEERING, R/W, CEI, AND CONSTRUCTION SUBTOTAL			**$**	**166,019**
	30% Contingency			**$**	**49,810**
	TOTAL ESTIMATED ENGINEERING, R/W, CEI, AND CONSTRUCTION COST			**$**	**215,800**

Scope Accuracy:

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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%.

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Route 1 Corridor Study

Alternatives Cost Matrix

Project No. 21605.251

KITTELSON & ASSOCIATES

Engineer's Opinion of Probable Construction Costs

Prepared by: Josh Hurst, P.E.			*Date: August 9, 2021*		
	This Estimate has a Rating of:		**2C**	*(See rating scale guide below.)*	
			7 - Route 632 (Hickory Ridge Rd) - Unsignalized RCUT		
	ITEM	**UNIT**	**QUANTITY**	**UNIT PRICE**	**TOTAL COST**
100	Mobilization / Construction Surveying	LS	1	$228,000.00	$228,000.00
	Traffic Control	LS	1	$184,000.00	$184,000.00
	Erosion Control	LS	1	$27,000.00	$27,000.00
	Removal of Structures and Obstructions	LS	1	$34,000.00	$34,000.00
	Clearing and Grubbing	LS	1	$23,000.00	$23,000.00
120	REGULAR EXCAVATION	CY	1,800	$60.00	$108,000.00
10100	AGGR. MATL. NO. 21B	TON	1,129	$40.00	$45,173.33
	Truck Apron / Construction Entrance, 9"	SY	187	$275.00	$51,333.33
	Sidewalk / Shared Use Path	SY	3,560	$90.00	$320,400.00
12020	STD CURB CG-2	LF	5,000	$35.00	$175,000.00
	STD COMB CURB & GUTTER CG-6	LF	2,500	$40.00	$100,000.00
				$0.00	$0.00
10635	ASPHALT CONC.TY. SM-9.5A	TON	3,227	$110.00	$354,933.33
10642	ASPHALT CONC. BASE COURSE TY. BM-25.0A	TON	1,506	$105.00	$158,106.67
	Roadway Lighting	EA	43	$7,000.00	$301,000.00
	Traffic Signal Modifications	EA	0	$50,000.00	$0.00
	Storm Drainage RCP Pipe	LF	2,000	$100.00	$200,000.00
	Storm Drainage Structures	EA	20	$8,000.00	$160,000.00
	Landscaping, Complete	LS	1	$72,600.00	$72,600.00
	Pavement Markings	LF	19,000	$ 2.50	$47,500.00
	Signage, Complete	LS	1	$ 21,000.00	$21,000.00
	Water, Sewer, and Franchise Utility Relocations	LS	1	$ 100,000.00	$100,000.00
	TOTAL CONSTRUCTION COST				**$ 2,711,047**
	ENGINEERING, R/W, CEI				
	Engineering (PS&E)	LS		$ 2,711,046.67	$271,200.00
	Potential New Right-of-Way Needed	SF	67,340	$ 30.00	$2,020,200.00
	Construction Management & Inspection	LS		$ 2,711,046.67	$542,300.00
	ENGINEERING, R/W, CEI SUBTOTAL				**$ 2,833,700**
	TOTAL ENGINEERING, R/W, CEI, AND CONSTRUCTION SUBTOTAL				**$ 5,544,747**
	30% Contingency				**$ 1,663,430**
	TOTAL ESTIMATED ENGINEERING, R/W, CEI, AND CONSTRUCTION COST				**$ 7,208,200**

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:

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Route 1 Corridor Study

Alternatives Cost Matrix

Project No. 21605.251

KITTELSON & ASSOCIATES

Engineer's Opinion of Probable Construction Costs

Prepared by: Josh Hurst, P.E.			*Date: August 9, 2021*		
	This Estimate has a Rating of:		**2C**	*(See rating scale guide below.)*	
			7B - Route 632 (Hickory Ridge Rd) - Roundabout		
	ITEM	**UNIT**	**QUANTITY**	**UNIT PRICE**	**TOTAL COST**
100	Mobilization / Construction Surveying	LS	1	$146,000.00	$146,000.00
	Traffic Control	LS	1	$119,000.00	$119,000.00
	Erosion Control	LS	1	$26,000.00	$26,000.00
	Removal of Structures and Obstructions	LS	1	$22,000.00	$22,000.00
	Clearing and Grubbing	LS	1	$15,000.00	$15,000.00
120	REGULAR EXCAVATION	CY	1,700	$60.00	$102,000.00
10100	AGGR. MATL. NO. 21B	TON	1,660	$40.00	$66,388.67
	Truck Apron / Construction Entrance, 9"	SY	314	$275.00	$86,394.00
	Sidewalk / Shared Use Path	SY	1,340	$90.00	$120,600.00
12020	STD CURB CG-2	LF	2,040	$35.00	$71,400.00
	STD COMB CURB & GUTTER CG-6	LF	1,400	$40.00	$56,000.00
				$0.00	$0.00
10635	ASPHALT CONC.TY. SM-9.5A	TON	1,536	$110.00	$168,926.08
10642	ASPHALT CONC. BASE COURSE TY. BM-25.0A	TON	2,213	$105.00	$232,360.33
	Roadway Lighting	EA	10	$7,000.00	$70,000.00
	Traffic Signal Modifications	EA	0	$50,000.00	$0.00
	Storm Drainage RCP Pipe	LF	1,500	$100.00	$150,000.00
	Storm Drainage Structures	EA	15	$8,000.00	$120,000.00
	Landscaping, Complete	LS	1	$45,000.00	$45,000.00
	Pavement Markings	LF	5,000	$ 2.50	$12,500.00
	Signage, Complete	LS	1	$ 14,000.00	$14,000.00
	Water, Sewer, and Franchise Utility Relocations	LS	1	$ 100,000.00	$100,000.00
	TOTAL CONSTRUCTION COST				**$ 1,743,569**
	ENGINEERING, R/W, CEI				
	Engineering (PS&E)	LS		$ 1,743,569.08	$174,400.00
	Potential New Right-of-Way Needed	SF	9,000	$ 30.00	$270,000.00
	Construction Management & Inspection	LS		$ 1,743,569.08	$348,800.00
	ENGINEERING, R/W, CEI SUBTOTAL				**$ 793,200**
	TOTAL ENGINEERING, R/W, CEI, AND CONSTRUCTION SUBTOTAL				**$ 2,536,769**
	30% contingency				**$ 761,040**
	TOTAL ESTIMATED ENGINEERING, R/W, CEI, AND CONSTRUCTION COST				**$ 3,297,800**

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 1 Corridor Study

Alternatives Cost Matrix

Project No. 21605.251

KITTELSON & ASSOCIATES

Engineer's Opinion of Probable Construction Costs

Prepared by: Josh Hurst, P.E.			*Date: August 9, 2021*		
	This Estimate has a Rating of:		**2C**	*(See rating scale guide below.)*	
			8A - Route 632 (North Roxbury Mill Rd) - RIRO with Accel Lane		
	ITEM	**UNIT**	**QUANTITY**	**UNIT PRICE**	**TOTAL COST**
100	Mobilization / Construction Surveying	LS	1	$41,000.00	$41,000.00
	Traffic Control	LS	1	$34,000.00	$34,000.00
	Erosion Control	LS	1	$9,000.00	$9,000.00
	Removal of Structures and Obstructions	LS	1	$6,000.00	$6,000.00
	Clearing and Grubbing	LS	1	$4,000.00	$4,000.00
120	REGULAR EXCAVATION	CY	600	$60.00	$36,000.00
10100	AGGR. MATL. NO. 21B	TON	101	$40.00	$4,033.33
	Truck Apron / Construction Entrance, 9"	SY	0	$275.00	$0.00
	Sidewalk / Shared Use Path	SY	1,230	$90.00	$110,700.00
12020	STD CURB CG-2	LF	350	$35.00	$12,250.00
	STD COMB CURB & GUTTER CG-6	LF	0	$40.00	$0.00
				$0.00	$0.00
10635	ASPHALT CONC.TY. SM-9.5A	TON	101	$110.00	$11,091.67
10642	ASPHALT CONC. BASE COURSE TY. BM-25.0A	TON	134	$105.00	$14,116.67
	Roadway Lighting	EA	4	$7,000.00	$28,000.00
	Traffic Signal Modifications	EA	0	$50,000.00	$0.00
	Storm Drainage RCP Pipe	LF	750	$100.00	$75,000.00
	Storm Drainage Structures	EA	8	$8,000.00	$60,000.00
	Landscaping, Complete	LS	1	$11,600.00	$11,600.00
	Pavement Markings	LF	2,500	$ 2.50	$6,250.00
	Signage, Complete	LS	1	$ 4,000.00	$4,000.00
	Water, Sewer, and Franchise Utility Relocations	LS	1	$ 25,000.00	$25,000.00
	TOTAL CONSTRUCTION COST				**$ 492,042**
	ENGINEERING, R/W, CEI				
	Engineering (PS&E)	LS		$ 492,041.67	$49,300.00
	Potential New Right-of-Way Needed	SF		$ 30.00	$0.00
	Construction Management & Inspection	LS		$ 492,041.67	$98,500.00
	ENGINEERING, R/W, CEI SUBTOTAL				**$ 147,800**
	TOTAL ENGINEERING, R/W, CEI, AND CONSTRUCTION SUBTOTAL				**$ 639,842**
	30% contingency				**$ 191,960**
	TOTAL ESTIMATED ENGINEERING, R/W, CEI, AND CONSTRUCTION COST				**$ 831,800**

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 1 Corridor Study

Alternatives Cost Matrix

Project No. 21605.251

KITTELSON & ASSOCIATES

Engineer's Opinion of Probable Construction Costs

Prepared by: Josh Hurst, P.E.			*Date: August 9, 2021*		
	This Estimate has a Rating of:		**2C**	*(See rating scale guide below.)*	
			8B - Route 632 (North Roxbury Mill Rd) - RIRO with Accel Lane + NB Left into Church		
	ITEM	**UNIT**	**QUANTITY**	**UNIT PRICE**	**TOTAL COST**
100	Mobilization / Construction Surveying	LS	1	$86,000.00	$86,000.00
	Traffic Control	LS	1	$70,000.00	$70,000.00
	Erosion Control	LS	1	$23,000.00	$23,000.00
	Removal of Structures and Obstructions	LS	1	$13,000.00	$13,000.00
	Clearing and Grubbing	LS	1	$9,000.00	$9,000.00
120	REGULAR EXCAVATION	CY	1,500	$60.00	$90,000.00
10100	AGGR. MATL. NO. 21B	TON	403	$40.00	$16,133.33
	Truck Apron / Construction Entrance, 9"	SY	27	$275.00	$7,333.33
	Sidewalk / Shared Use Path	SY	1,230	$90.00	$110,700.00
12020	STD CURB CG-2	LF	350	$35.00	$12,250.00
	STD COMB CURB & GUTTER CG-6	LF	150	$40.00	$6,000.00
				$0.00	$0.00
10635	ASPHALT CONC.TY. SM-9.5A	TON	1,916	$110.00	$210,741.67
10642	ASPHALT CONC. BASE COURSE TY. BM-25.0A	TON	538	$105.00	$56,466.67
	Roadway Lighting	EA	14	$7,000.00	$98,000.00
	Traffic Signal Modifications	EA	0	$50,000.00	$0.00
	Storm Drainage RCP Pipe	LF	500	$100.00	$50,000.00
	Storm Drainage Structures	EA	5	$8,000.00	$40,000.00
	Landscaping, Complete	LS	1	$26,300.00	$26,300.00
	Pavement Markings	LF	9,000	$ 2.50	$22,500.00
	Signage, Complete	LS	1	$ 8,000.00	$8,000.00
	Water, Sewer, and Franchise Utility Relocations	LS	1	$ 75,000.00	$75,000.00
	TOTAL CONSTRUCTION COST				**$ 1,030,425**
	ENGINEERING, R/W, CEI				
	Engineering (PS&E)	LS		$ 1,030,425.00	$103,100.00
	Potential New Right-of-Way Needed	SF		$ 30.00	$0.00
	Construction Management & Inspection	LS		$ 1,030,425.00	$206,100.00
	ENGINEERING, R/W, CEI SUBTOTAL				**$ 309,200**
	TOTAL ENGINEERING, R/W, CEI, AND CONSTRUCTION SUBTOTAL				**$ 1,339,625**
	30% Contingency				**$ 401,890**
	TOTAL ESTIMATED ENGINEERING, R/W, CEI, AND CONSTRUCTION COST				**$ 1,741,500**

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 1 Corridor Study

Alternatives Cost Matrix

Project No. 21605.251

KITTELSON & ASSOCIATES

Engineer's Opinion of Probable Construction Costs

Prepared by: Josh Hurst, P.E.			*Date: August 9, 2021*		
	This Estimate has a Rating of:		**2C**	*(See rating scale guide below.)*	
			9A - North Point Drive / Larkinchew Rd - roundabout		
	ITEM	**UNIT**	**QUANTITY**	**UNIT PRICE**	**TOTAL COST**
100	Mobilization / Construction Surveying	LS	1	$86,000.00	$86,000.00
	Traffic Control	LS	1	$71,000.00	$71,000.00
	Erosion Control	LS	1	$18,000.00	$18,000.00
	Removal of Structures and Obstructions	LS	1	$13,000.00	$13,000.00
	Clearing and Grubbing	LS	1	$9,000.00	$9,000.00
120	REGULAR EXCAVATION	CY	1,200	$60.00	$72,000.00
10100	AGGR. MATL. NO. 21B	TON	484	$40.00	$19,360.00
	Truck Apron / Construction Entrance, 9"	SY	306	$275.00	$84,027.78
	Sidewalk / Shared Use Path	SY	670	$90.00	$60,300.00
12020	STD CURB CG-2	LF	1,800	$35.00	$63,000.00
	STD COMB CURB & GUTTER CG-6	LF	1,200	$40.00	$48,000.00
				$0.00	$0.00
10635	ASPHALT CONC.TY. SM-9.5A	TON	807	$110.00	$88,733.33
10642	ASPHALT CONC. BASE COURSE TY. BM-25.0A	TON	645	$105.00	$67,760.00
	Roadway Lighting	EA	8	$7,000.00	$56,000.00
	Traffic Signal Modifications	EA	0	$50,000.00	$0.00
	Storm Drainage RCP Pipe	LF	1,000	$100.00	$100,000.00
	Storm Drainage Structures	EA	10	$8,000.00	$80,000.00
	Landscaping, Complete	LS	1	$26,400.00	$26,400.00
	Pavement Markings	LF	5,000	$ 2.50	$12,500.00
	Signage, Complete	LS	1	$ 8,000.00	$8,000.00
	Water, Sewer, and Franchise Utility Relocations	LS	1	$ 50,000.00	$50,000.00
	TOTAL CONSTRUCTION COST				**$ 1,033,081**
	ENGINEERING, R/W, CEI				
	Engineering (PS&E)	LS		$ 1,033,081.11	$103,400.00
	Potential New Right-of-Way Needed	SF	9,900	$ 30.00	$297,000.00
	Construction Management & Inspection	LS		$ 1,033,081.11	$206,700.00
	ENGINEERING, R/W, CEI SUBTOTAL				**$ 607,100**
	TOTAL ENGINEERING, R/W, CEI, AND CONSTRUCTION SUBTOTAL				**$ 1,640,181**
	30% contingency				**$ 492,060**
	TOTAL ESTIMATED ENGINEERING, R/W, CEI, AND CONSTRUCTION COST				**$ 2,132,200**

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 1 Corridor Study

Alternatives Cost Matrix

Project No. 21605.251

KITTELSON & ASSOCIATES

Engineer's Opinion of Probable Construction Costs

Prepared by: Josh Hurst, P.E. | *Date: August 9, 2021*

This Estimate has a Rating of: **2C** *(See rating scale guide below.)*

9B - North Point Drive / Larkinchew Rd - signal

	ITEM	UNIT	QUANTITY	UNIT PRICE	TOTAL COST
100	Mobilization / Construction Surveying	LS	1	$33,000.00	$33,000.00
	Traffic Control	LS	1	$39,000.00	$39,000.00
	Erosion Control	LS	1	$0.00	$0.00
	Removal of Structures and Obstructions	LS	1	$5,000.00	$5,000.00
	Clearing and Grubbing	LS	1	$4,000.00	$4,000.00
120	REGULAR EXCAVATION	CY	0	$60.00	$0.00
10100	AGGR. MATL. NO. 21B	TON	0	$40.00	$0.00
	Truck Apron / Construction Entrance, 9"	SY	0	$275.00	$0.00
	Sidewalk / Shared Use Path	SY	0	$90.00	$0.00
12020	STD CURB CG-2	LF		$35.00	$0.00
	STD COMB CURB & GUTTER CG-6	LF		$40.00	$0.00
				$0.00	$0.00
10635	ASPHALT CONC.TY. SM-9.5A	TON		$110.00	$0.00
10642	ASPHALT CONC. BASE COURSE TY. BM-25.0A	TON		$105.00	$0.00
	Roadway Lighting	EA	0	$7,000.00	$0.00
	Traffic Signal Modifications	EA	1	$250,000.00	$250,000.00
	Storm Drainage RCP Pipe	LF		$100.00	$0.00
	Storm Drainage Structures	EA	0	$8,000.00	$0.00
	Landscaping, Complete	LS	1	$10,000.00	$10,000.00
	Pavement Markings	LF	1,000	$ 2.50	$2,500.00
	Signage, Complete	LS	1	$ 3,000.00	$3,000.00
	Water, Sewer, and Franchise Utility Relocations	LS	1	$ 50,000.00	$50,000.00
	TOTAL CONSTRUCTION COST				**$ 396,500**
	ENGINEERING, R/W, CEI				
	Engineering (PS&E)	LS		$ 396,500.00	$39,700.00
	Potential New Right-of-Way Needed	SF		$ 30.00	$0.00
	Construction Management & Inspection	LS		$ 396,500.00	$79,300.00
	ENGINEERING, R/W, CEI SUBTOTAL				**$ 119,000**
	TOTAL ENGINEERING, R/W, CEI, AND CONSTRUCTION SUBTOTAL				**$ 515,500**
	30% contingency				**$ 154,650**
	TOTAL ESTIMATED ENGINEERING, R/W, CEI, AND CONSTRUCTION COST				**$ 670,200**

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 1 Corridor Study

Alternatives Cost Matrix

Project No. 21605.251

KITTELSON & ASSOCIATES

Engineer's Opinion of Probable Construction Costs

Prepared by: Josh Hurst, P.E.			*Date: August 9, 2021*		
	This Estimate has a Rating of:		**2C**	*(See rating scale guide below.)*	
			10 - Convert S Roxbury Mill Rd to RIRO, and 11 - Morris Rd/Mudd Tavern Rd - Extend SB Lt		
	ITEM	**UNIT**	**QUANTITY**	**UNIT PRICE**	**TOTAL COST**
100	Mobilization / Construction Surveying	LS	1	$26,000.00	$26,000.00
	Traffic Control	LS	1	$21,000.00	$21,000.00
	Erosion Control	LS	1	$9,000.00	$9,000.00
	Removal of Structures and Obstructions	LS	1	$4,000.00	$4,000.00
	Clearing and Grubbing	LS	1	$3,000.00	$3,000.00
120	REGULAR EXCAVATION	CY	600	$60.00	$36,000.00
10100	AGGR. MATL. NO. 21B	TON	145	$40.00	$5,808.00
	Truck Apron / Construction Entrance, 9"	SY	0	$275.00	$0.00
	Sidewalk / Shared Use Path	SY	0	$90.00	$0.00
12020	STD CURB CG-2	LF	550	$35.00	$19,250.00
	STD COMB CURB & GUTTER CG-6	LF	1,000	$40.00	$40,000.00
				$0.00	$0.00
10635	ASPHALT CONC.TY. SM-9.5A	TON	73	$110.00	$7,986.00
10642	ASPHALT CONC. BASE COURSE TY. BM-25.0A	TON	194	$105.00	$20,328.00
	Roadway Lighting	EA	4	$7,000.00	$28,000.00
	Traffic Signal Modifications	EA	0	$50,000.00	$0.00
	Storm Drainage RCP Pipe	LF	150	$100.00	$15,000.00
	Storm Drainage Structures	EA	2	$8,000.00	$12,000.00
	Landscaping, Complete	LS	1	$6,900.00	$6,900.00
	Pavement Markings	LF	1,000	$ 2.50	$2,500.00
	Signage, Complete	LS	1	$ 2,000.00	$2,000.00
	Water, Sewer, and Franchise Utility Relocations	LS	1	$ 50,000.00	$50,000.00
	TOTAL CONSTRUCTION COST				**$ 308,772**
	ENGINEERING, R/W, CEI				
	Engineering (PS&E)	LS		$ 308,772.00	$30,900.00
	Potential New Right-of-Way Needed	SF		$ 30.00	$0.00
	Construction Management & Inspection	LS		$ 308,772.00	$61,800.00
	ENGINEERING, R/W, CEI SUBTOTAL				**$ 92,700**
	TOTAL ENGINEERING, R/W, CEI, AND CONSTRUCTION SUBTOTAL				**$ 401,472**
	30% Contingency				**$ 120,450**
	TOTAL ESTIMATED ENGINEERING, R/W, CEI, AND CONSTRUCTION COST				**$ 521,900**

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 1 Corridor Study

Alternatives Cost Matrix

Project No. 21605.251

KITTELSON & ASSOCIATES

Engineer's Opinion of Probable Construction Costs

Prepared by: Josh Hurst, P.E. — *Date: August 9, 2021*

This Estimate has a Rating of: **2C** *(See rating scale guide below.)*

12 - Route 603 (Arcadia Road) - channelized RT at Arcadia + divert LT to Marye Rd

	ITEM	UNIT	QUANTITY	UNIT PRICE	TOTAL COST
100	Mobilization / Construction Surveying	LS	1	$32,000.00	$32,000.00
	Traffic Control	LS	1	$39,000.00	$39,000.00
	Erosion Control	LS	1	$14,000.00	$14,000.00
	Removal of Structures and Obstructions	LS	1	$5,000.00	$5,000.00
	Clearing and Grubbing	LS	1	$4,000.00	$4,000.00
120	REGULAR EXCAVATION	CY	900	$60.00	$54,000.00
10100	AGGR. MATL. NO. 21B	TON	81	$40.00	$3,226.67
	Truck Apron / Construction Entrance, 9"	SY	27	$275.00	$7,333.33
	Sidewalk / Shared Use Path	SY	1,670	$90.00	$150,300.00
12020	STD CURB CG-2	LF	500	$35.00	$17,500.00
	STD COMB CURB & GUTTER CG-6	LF	0	$40.00	$0.00
				$0.00	$0.00
10635	ASPHALT CONC.TY. SM-9.5A	TON	40	$110.00	$4,436.67
10642	ASPHALT CONC. BASE COURSE TY. BM-25.0A	TON	108	$105.00	$11,293.33
	Roadway Lighting	EA	2	$7,000.00	$14,000.00
	Traffic Signal Modifications	EA	0	$50,000.00	$0.00
	Storm Drainage RCP Pipe	LF	0	$100.00	$0.00
	Storm Drainage Structures	EA	0	$8,000.00	$0.00
	Landscaping, Complete	LS	1	$10,500.00	$10,500.00
	Pavement Markings	LF	500	$ 2.50	$1,250.00
	Signage, Complete	LS	1	$ 3,000.00	$3,000.00
	Water, Sewer, and Franchise Utility Relocations	LS	1	$ 25,000.00	$25,000.00
	TOTAL CONSTRUCTION COST				**$ 395,840**
	ENGINEERING, R/W, CEI				
	Engineering (PS&E)	LS		$ 395,840.00	$39,600.00
	Potential New Right-of-Way Needed	SF		$ 30.00	$0.00
	Construction Management & Inspection	LS		$ 395,840.00	$79,200.00
	ENGINEERING, R/W, CEI SUBTOTAL				**$ 118,800**
	TOTAL ENGINEERING, R/W, CEI, AND CONSTRUCTION SUBTOTAL				**$ 514,640**
	30% contingency				**$ 154,400**
	TOTAL ESTIMATED ENGINEERING, R/W, CEI, AND CONSTRUCTION COST				**$ 669,000**

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 1 Corridor Study

Alternatives Cost Matrix

Project No. 21605.251

KITTELSON & ASSOCIATES

Engineer's Opinion of Probable Construction Costs

Prepared by: Josh Hurst, P.E.			*Date: August 9, 2021*		
	This Estimate has a Rating of:		**2C**	*(See rating scale guide below.)*	
			12B - Route 603 (Arcadia Road) - Extend Plantation Estates Way		
	ITEM	**UNIT**	**QUANTITY**	**UNIT PRICE**	**TOTAL COST**
100	Mobilization / Construction Surveying	LS	1	$77,000.00	$77,000.00
	Traffic Control	LS	1	$96,000.00	$96,000.00
	Erosion Control	LS	1	$30,000.00	$30,000.00
	Removal of Structures and Obstructions	LS	1	$12,000.00	$12,000.00
	Clearing and Grubbing	LS	1	$8,000.00	$8,000.00
120	REGULAR EXCAVATION	CY	2,000	$60.00	$120,000.00
10100	AGGR. MATL. NO. 21B	TON	774	$40.00	$30,976.00
	Truck Apron / Construction Entrance, 9"	SY	0	$275.00	$0.00
	Sidewalk / Shared Use Path	SY	0	$90.00	$0.00
12020	STD CURB CG-2	LF	0	$35.00	$0.00
	STD COMB CURB & GUTTER CG-6	LF	0	$40.00	$0.00
				$0.00	$0.00
10635	ASPHALT CONC.TY. SM-9.5A	TON	387	$110.00	$42,592.00
10642	ASPHALT CONC. BASE COURSE TY. BM-25.0A	TON	1,033	$105.00	$108,416.00
	Roadway Lighting	EA	11	$7,000.00	$77,000.00
	Traffic Signal Modifications	EA	0	$50,000.00	$0.00
	Storm Drainage RCP Pipe	LF	1,000	$100.00	$100,000.00
	Storm Drainage Structures	EA	10	$8,000.00	$80,000.00
	Landscaping, Complete	LS	1	$19,200.00	$19,200.00
	Pavement Markings	LF	3,500	$ 2.50	$8,750.00
	Signage, Complete	LS	1	$ 6,000.00	$6,000.00
	Water, Sewer, and Franchise Utility Relocations	LS	1	$ 150,000.00	$150,000.00
	TOTAL CONSTRUCTION COST				**$ 965,934**
	ENGINEERING, R/W, CEI				
	Engineering (PS&E)	LS		$ 965,934.00	$96,600.00
	Potential New Right-of-Way Needed	SF	45,000	$ 20.00	$900,000.00
	Construction Management & Inspection	LS		$ 965,934.00	$193,200.00
	ENGINEERING, R/W, CEI SUBTOTAL				**$ 1,189,800**
	TOTAL ENGINEERING, R/W, CEI, AND CONSTRUCTION SUBTOTAL				**$ 2,155,734**
	30% Contingency				**$ 646,730**
	TOTAL ESTIMATED ENGINEERING, R/W, CEI, AND CONSTRUCTION COST				**$ 2,802,500**

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%.