

LYNCHBURG ROAD AND BYPASS ROAD CORRIDOR STUDY



JULY 2019



Table of Contents

I. INTRODUCTION.....	1
Study Need & Purpose.....	2
Plan Development Overview.....	4
Study Area & Corridors of Focus.....	5
II. EXISTING CONDITIONS.....	7
Population & Employment.....	7
Land Use.....	9
Transportation.....	10
III. FUTURE CONDITIONS.....	20
Land Use.....	20
Transportation.....	23
IV. RECOMMENDATIONS.....	25
Infrastructure Improvements.....	25
Supportive Strategies & Implementation Tools for Achieving Goals.....	30
V. CONCLUSION.....	39
APPENDIX I. TDOT COUNT STATION TRENDS.....	40
APPENDIX II. EXISTING TURNING MOVEMENT COUNTS.....	44
APPENDIX III. SYNCHRO MODEL OUTPUTS.....	59
APPENDIX IV. DEVELOPMENT SCENARIO ASSUMPTIONS.....	184
APPENDIX V. COST ESTIMATES.....	188
APPENDIX VI. SIGNAL TIMING PLANS.....	191
APPENDIX VII. TURN LANE & SIGNAL WARRANT ANALYSES.....	196

List of Tables

Table 1. Bypass Road Recommended Infrastructure Improvements.....	27
Table 2. Lynchburg Road Recommended Infrastructure Improvements	27
Table 3. Example Traffic Impact Study Mitigation Recommendations.....	37
Table 4. TDOT’s Minimum Traffic Impact Study Thresholds.....	38

List of Figures

Figure 1. General Project Timeline	4
Figure 2. Study Area Map.....	5
Figure 3. Corridor Map.....	6
Figure 4. Winchester Facts	8
Figure 5. Existing Land Use along the Study Corridors	9
Figure 6. Roadway Functional Classification in Winchester	10
Figure 7. Roadway Geometrics for Bypass Corridor	11
Figure 8. Roadway Geometrics for Lynchburg Corridor	12
Figure 9. Corridor Commuting Patterns	13
Figure 10. TDOT Daily Traffic Volumes.....	14
Figure 11. Existing Intersection Level-of-Service	15
Figure 12. Crash Statistics	16
Figure 13. Existing Non-Motorized Infrastructure	17
Figure 14. Non-Motorized Attractors & Generators.....	19
Figure 15. Bypass Road Corridor Land Use Assumptions	21
Figure 16. Lynchburg Road Corridor Land Use Assumptions.....	22
Figure 17. Projected Intersection Level-of-Service	24
Figure 18. Bypass Road Recommended Infrastructure Improvements Map	26
Figure 19. Lynchburg Road Recommended Infrastructure Improvements Map.....	27
Figure 20. Suburban versus Grid Street Pattern.....	32
Figure 21. Vehicular Conflict Points for a Single Driveway	33
Figure 22. Suburban Rural Access Management Spacing Standard Recommendations.....	34
Figure 23. Suburban Urban Access Management Spacing Standard Recommendations.....	35

I. INTRODUCTION

A properly planned transportation system (roadways, sidewalks, greenways, etc.) plays a critical role in a community's sustainability and livability by supporting economic development opportunities; providing safe, convenient, and comfortable access to key goods and services; and encouraging civic engagement. The community's 2011 Downtown Master Plan highlights the importance of this system, noting the threat posed by a poorly planned, congested corridor which could affect the community's economic competitiveness and attractiveness to residents (i.e., quality-of-life). These types of outcomes can be largely attributed to incremental, non-congruent transportation and land use decisions over time. Proper visioning and planning of transportation investments, while mindfully coordinating land use decisions as they arise, help communities to better align the transportation and land use realms. This integrative approach ultimately results in a safer and more fluid transportation system for all users.



Winchester's Downtown Square

Study Need & Purpose

Positioned on Tims Ford Lake, Winchester is experiencing a surge in new development, specifically along Lynchburg Road on the western side of town where a multi-phased development (known as 'Twin Creeks') is under construction. To date, a marina, restaurant, and a portion of the planned residences have been constructed on a large parcel situated between the Lynchburg Road corridor and the lake. At full build-out (which will ultimately include both sides of Lynchburg Road), the development is envisioned to include approximately 400 residences, a hotel and conference center, a public boat ramp, and several wedding venues, to name a few.



Twin Creeks Development Renderings

Bypass Road, the second corridor of focus, provides an important connection between two state routes by bypassing the community's core. Mobility is, therefore, an especially important goal for this corridor. The corridor already accommodates the County's High School and traffic generated from the nearby Franklin County Industrial Park. Given the presence of several large undeveloped parcels prime for development (some of the last within the municipal limits of significant size), preparing for forecasted residential and commercial growth along Bypass Road is imperative for preserving efficient and safe traffic operations, while properly accommodating all users.



Franklin County High School

The core purpose of this Corridor Study is to provide the City with a coordinated plan of transportation improvements to be made as development occurs, or simply as standalone projects, and to improve safety for all roadway users, improve traffic flow, and preserve roadway capacity. Analyses contained within this Study are intended to aid municipal and elected officials in understanding the associated transportation impacts of various land use development scenarios.

This Corridor Study specifically:

- develops Winchester’s long-term vision and goals for the corridors
- inventories and analyzes existing conditions
- evaluates potential impacts to the transportation system from future development scenarios
- recommends a coordinated plan of infrastructure and operation improvements along with planning-level cost estimates
- recommends policy strategies for achieving desired transportation outcomes



Bypass Road Corridor



Lynchburg Road Corridor

Plan Development Overview

Recognizing the need for a deliberate strategy to ensure sustainable growth along these corridors, the City of Winchester applied for the 2018-2019 Community Transportation Planning Grant (CTPG) offered through the Tennessee Department of Transportation (TDOT). This grant assists small towns and rural municipalities across the state in developing planning documents related to the transportation network to specifically encourage network efficiency and safety (for all users). An important emphasis for the grant is ensuring “cohesiveness between multimodal systems and local land use objectives that achieve the statewide transportation goals”.

One of TDOT’s on-call consultants, KCI Technologies, Inc., was selected to assist the municipality in developing the requested corridor study. As illustrated in Figure 1, the Project Committee met in December of 2018 to kick-off the study. This timeline includes additional important project milestones. Core members of the Project Committee included:

- City of Winchester – Beth Rhoton (City Administrator); Yvonne Stewart (Grants Coordinator)
- TDOT – Stacy Morrison (Office of Community Transportation); Andrea Noel (Office of Community Transportation); Landon Castleberry (Region 2)
- South Central Rural Planning Organization – Lisa Cross (RPO Coordinator)
- KCI Technologies, Inc. – Preston Elliott; Kayla Ferguson; Liesel Goethert

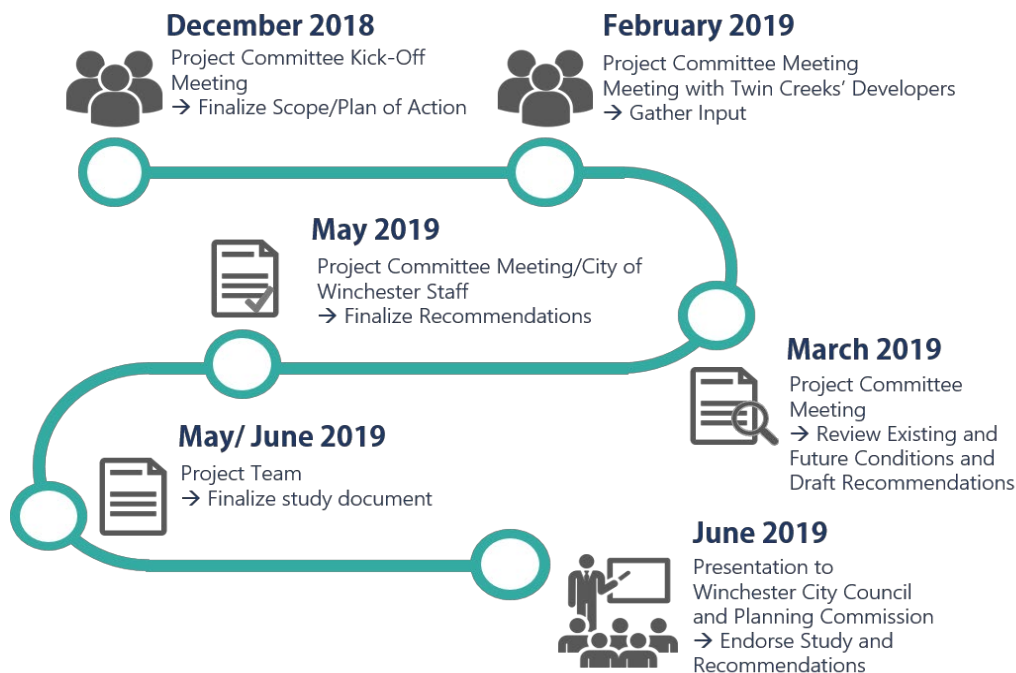


Figure 1. General Project Timeline

Study Area & Corridors of Focus

Winchester, Tennessee is located in Franklin County in southern, middle Tennessee (TDOT Region 2) which is highlighted in Figure 2. It is one of Tennessee’s 22 certified ‘Retire Tennessee’ communities, meaning it possesses the resources and amenities for serving as a viable retirement destination. Winchester’s location within the region also draws new residents, industries, and visitors alike being located within approximately one and a half hours from Nashville, Chattanooga, and Huntsville, as well as for the natural beauty of the local landscape. As previously mentioned, Winchester is located along the southeastern shore of TVA-managed Tims Ford Lake. Community demographics are described in the Existing Conditions chapter.

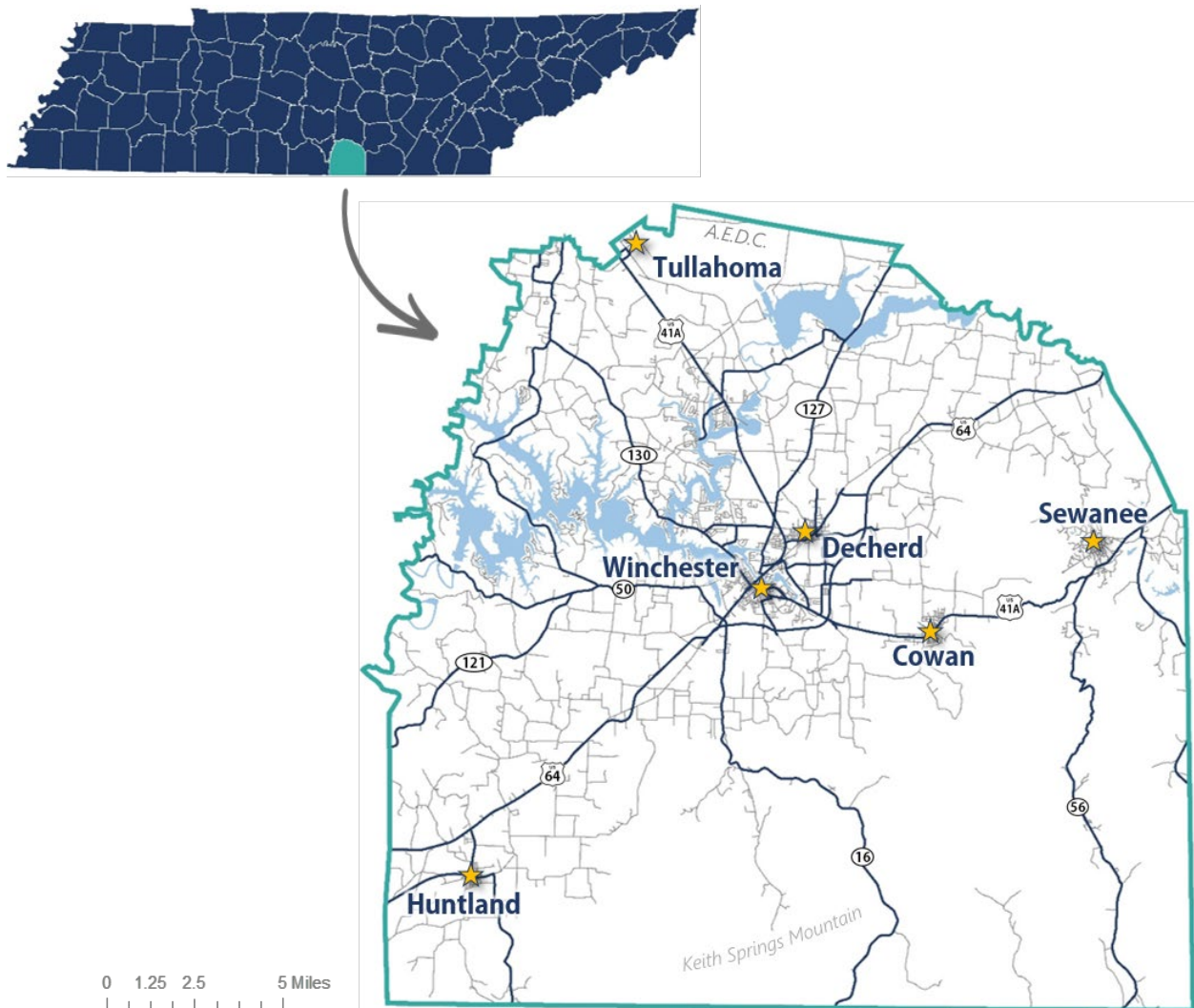


Figure 2. Study Area Map

The focus corridors as well as their core goals for this study are highlighted in Figure 3. Lynchburg Road is located to the west of downtown Winchester providing a connection between N. High Street and State Route (SR) 50/George Fraley Parkway. SR 50 originally followed Lynchburg Road into downtown Winchester; however, in 2016, TDOT completed a new roadway connection, George Fraley Parkway, between the original SR 50 and SR 16/David Crockett Highway to the south. This roadway is now the newly-designated SR 50. Official ownership and maintenance of the original SR 50 (i.e., Lynchburg Road, 4th Avenue NW, N. Cedar Street, and 2nd Avenue NW) into downtown is currently being officially turned over to the City of Winchester by TDOT.

The second corridor of focus is Bypass Road on the eastern side of town. It provides an important north-south connection between U.S. Highway 41A just south of Decherd allowing through traffic to bypass Winchester’s downtown. Franklin County’s High School is centrally located along the corridor. More detailed descriptions relating to each corridor are further provided in Chapter 2.

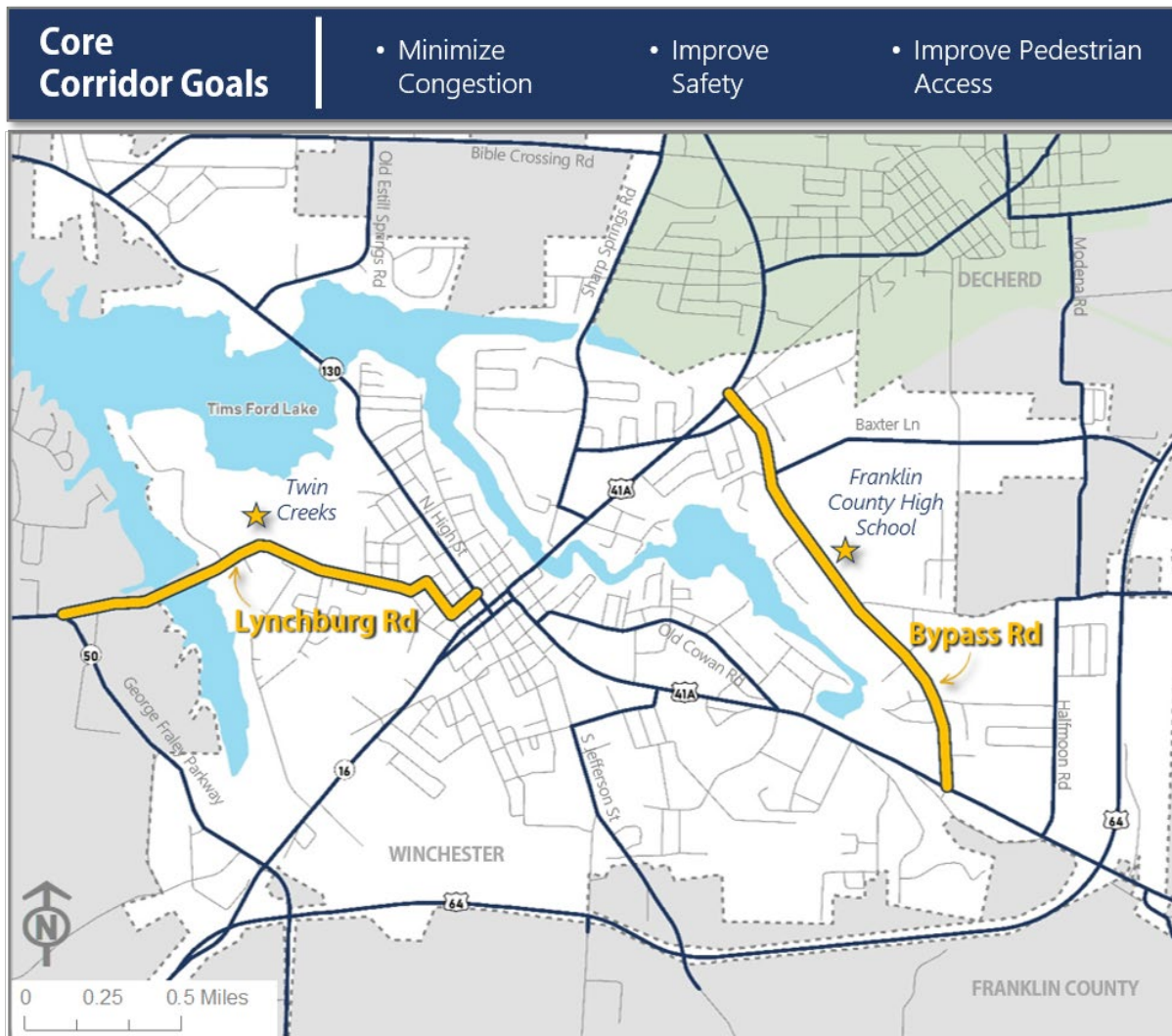


Figure 3. Corridor Map

II. EXISTING CONDITIONS

The development patterns in Winchester have strongly influenced the transportation system and how it operates today. Understanding the linkage between population and employment, how land is developed, and the implications of those on the transportation system is vital to the sustainability of the City. This chapter sets the stage for looking at future growth by first documenting the existing conditions surrounding the study corridors. This analysis will ultimately help inform proactive decision-making that will support the City's existing residents and anticipate needed investments necessitated by future growth.

Population & Employment

Data from the U.S. Census Bureau provides an in depth look at the population and employment within Winchester. Approximately 8,500 people call Winchester home as of 2017, a number that has remained relatively stable over the past decade. In addition, there are approximately 3,200 jobs that exist within Winchester, the majority of which are in the manufacturing and service sectors. Figure 4 highlights some key demographic information related to the City's residents and employees.



With a number of shops, restaurants, and other services, the Downtown Square is a destination in the community

Population


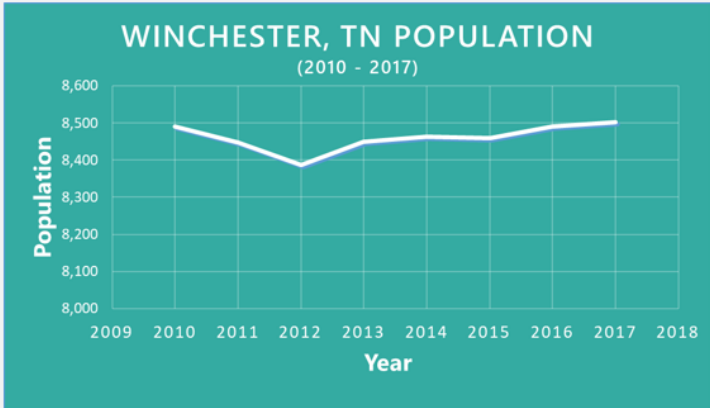
8,467
Population

46.5
Median Age

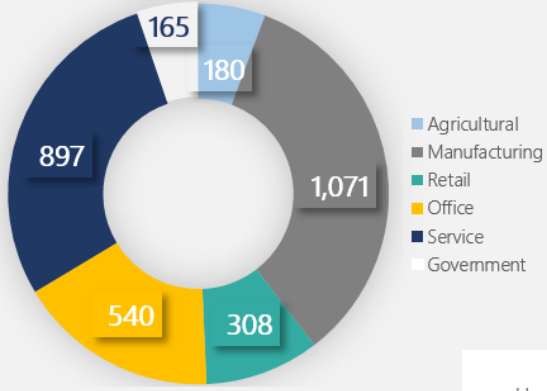
\$44,659
Median Household Income

5.4%
Unemployment Rate

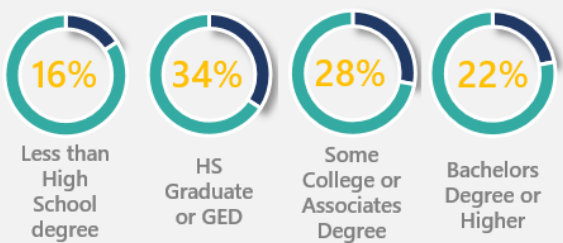
47.1 % 52.9 %

Existing Employment By Type



Educational Attainment



Compared to the Tennessee state average, Winchester's:

- Median household income is **lower**
- Median resident age is **higher**
- Household size is **lower**
- Unemployment rate is **lower**
- Percent of residents without access to a vehicle is **lower**

Known as a population pyramid, this figure illustrates the distribution of resident ages in 2017 by gender.

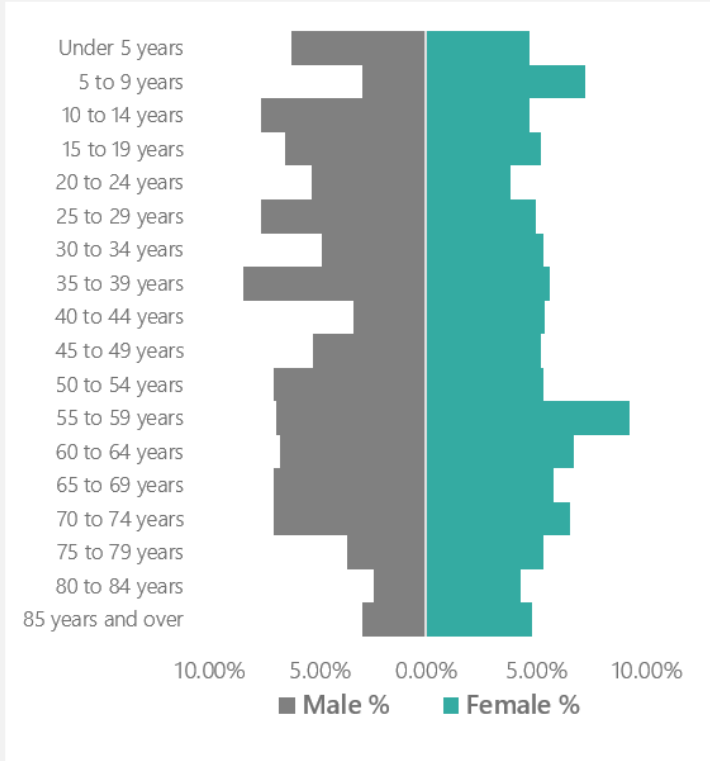


Figure 4. Winchester Facts

Land Use

Identifying land uses is important for understanding community connectivity, as each type of development attracts and generates varying levels of traffic. Land uses also have the potential to negatively impact walking and biking conditions, such as truck traffic generated by industrial land uses.

Figure 5 illustrates the existing land uses along the Bypass Road and the Lynchburg Road corridors. Low-density residential, agricultural, and public use are the dominant land uses in Winchester. Industrial and commercial uses are limited to the northern and southern portions of the Bypass Corridor and to the eastern portion of the Lynchburg Corridor.

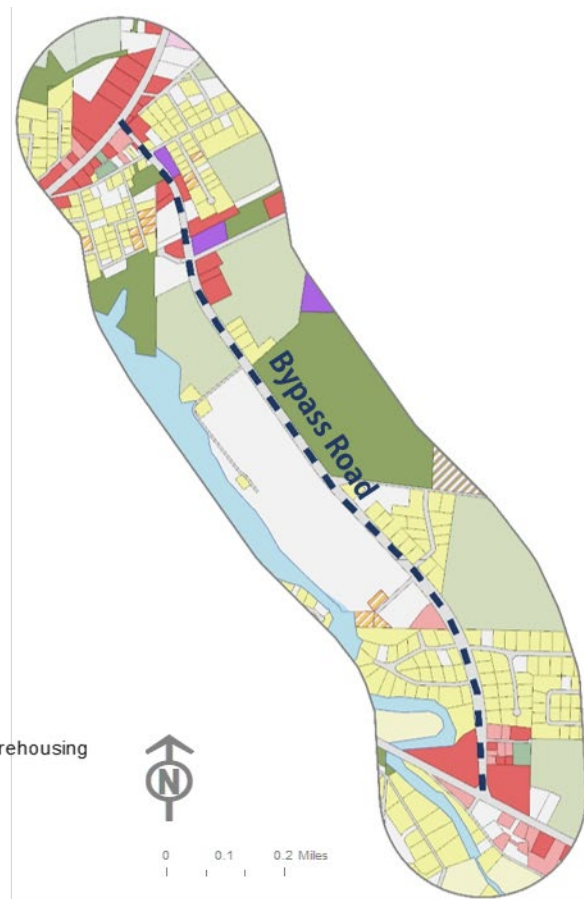
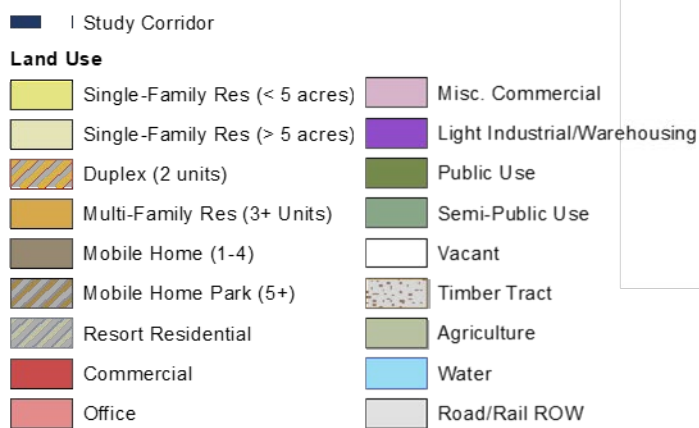


Figure 5. Existing Land Use along the Study Corridors

Transportation

Roadways Infrastructure

Roadways are assigned a functional classification based on a roadway’s design function to provide regional mobility, local accessibility, or both. The Federal Highway Administration (FHWA) establishes four main classes. A description of each of these functional classifications are displayed below. Figure 6 illustrates the classifications of Winchester’s roadway network. Winchester’s minor arterials, such as Bypass Road and Lynchburg Road, play a key role in regional mobility given the number of commuters in the community. These roadways are often characterized by higher speed limits and wider lane widths, which help to provide regional mobility by carrying significant amounts of traffic. Characteristics for the Bypass Road and Lynchburg Road corridors are presented in Figure 7 and Figure 8, respectively.

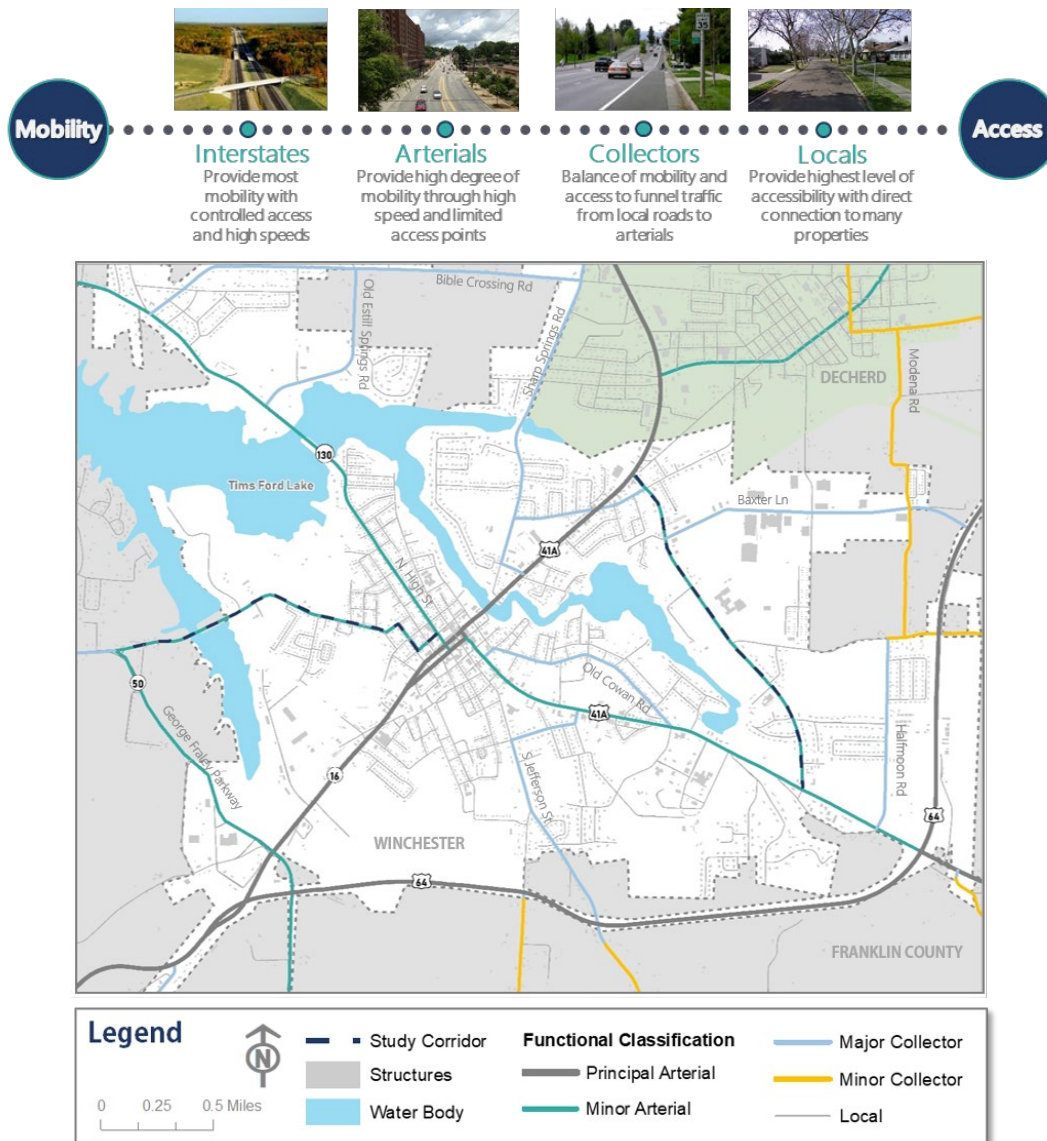


Figure 6. Roadway Functional Classification in Winchester

BYPASS CORRIDOR:

Lane Width

Smaller lane widths typically cause vehicles to move slower, thereby, increasing the delay experienced on the roadway.

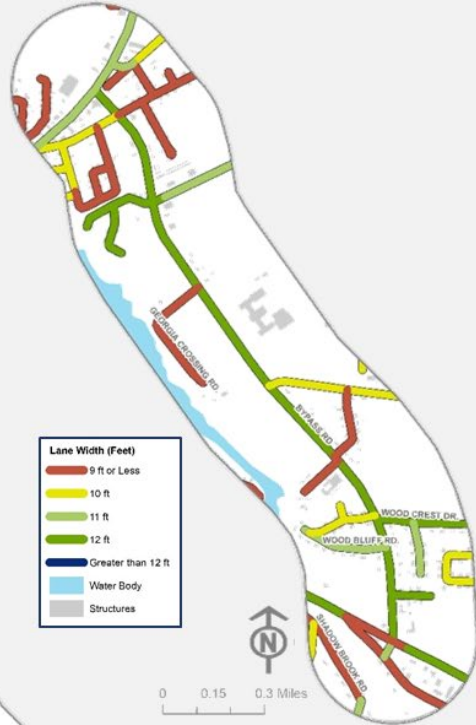
100% of the corridor has lane widths of **12 feet**.

Shoulder Width

Larger shoulders allow for drivers to feel safer traveling along the corridor and could increase the amount of vehicles traversing the network.



66% of the corridor has a shoulder width **between 7 feet and 10 feet**.



Speed Limit

Higher posted speeds and reduced number of access points allow more cars to traverse this corridor during peak hours.

100% of corridor has a speed limit of **40 mph**.

Figure 7. Roadway Geometrics for Bypass Corridor

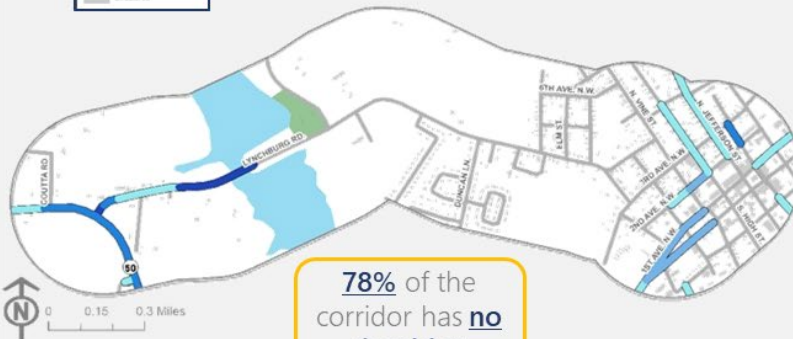
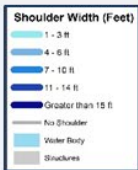
LYNCHBURG CORRIDOR:

Lane Width

Larger lane widths typically allow vehicles to travel faster, thereby, increasing the amount of vehicles traversing the network.



100% of the corridor has lane widths greater than or equal to **10 feet**.



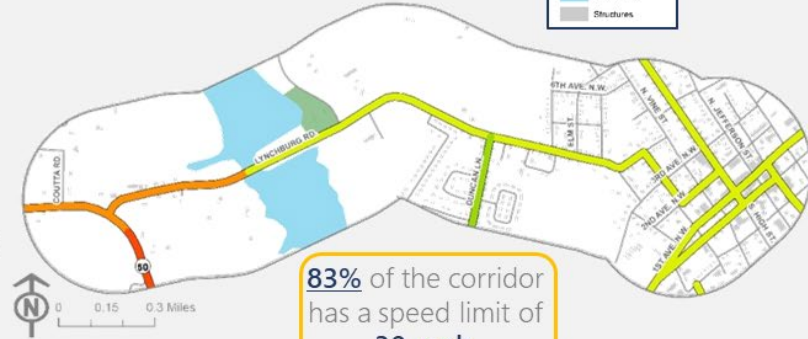
78% of the corridor has **no shoulder**.

Shoulder Width

Similar to lane width, smaller shoulder widths (or no shoulders) reduce speeds and could lead to an increase in delay.

Speed Limit

While lower speed limits are better for the residential areas in the eastern portion of this corridor, it also reduces the number of vehicles moving through the network.



83% of the corridor has a speed limit of **30 mph**.

Figure 8. Roadway Geometrics for Lynchburg Corridor

Traffic Patterns

The U.S. Census Bureau also reports employment travel characteristics using the Longitudinal Employer-Household Dynamics (LEHD) survey. LEHD's Origin-Destination Employment Statistics (LODES) presents commuter travel patterns. In 2015, approximately 95% of workers living along the corridors commuted outside of these areas for employment. Figure 9 illustrates the distribution of residents who commute into and outside of the study corridors on a daily basis as well as their choice of transportation mode. Notably, a significant portion of the commuters near Bypass Road are living or working in areas northwest of the study corridor. For Lynchburg Road, commuters coming to or leaving the corridor for work are making their commuting trip to/from a variety of directions, but mostly north of the study area. In general, commuting trips are a relatively stable form of travel and generally comprise a significant amount of daily traffic volumes. Dominant travel movements in specific directions such as these can lead to peak hour congestion, especially if route choices are limited.

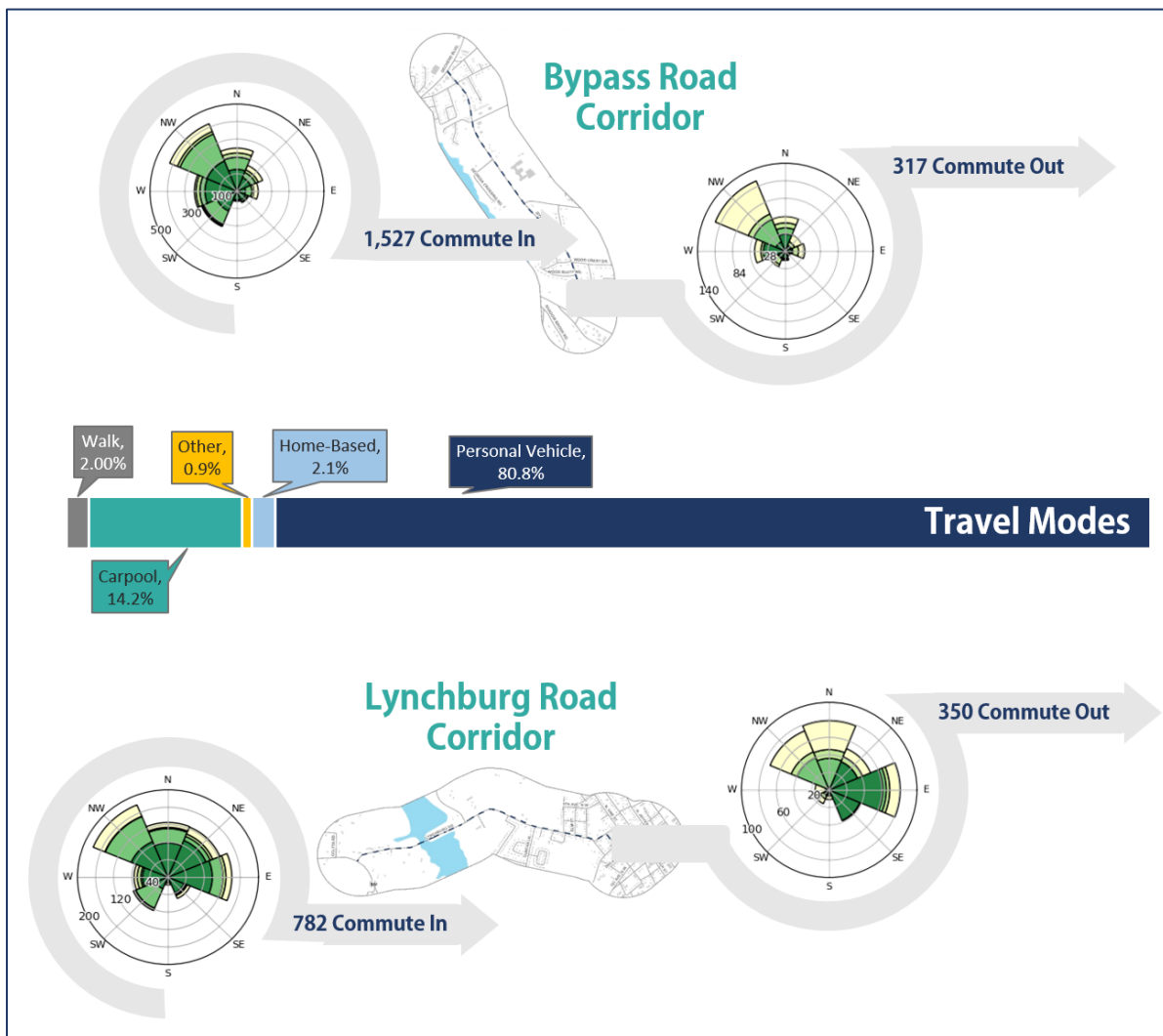


Figure 9. Corridor Commuting Patterns

Annual Average Daily Traffic

TDOT collects information on daily traffic volumes for major roadway corridors across the state. Reported as Annual Average Daily Traffic (AADT) volumes, this data represents the number of vehicles that are on a particular roadway every day of the year on average. There are two locations on the Bypass Road Corridor and two locations on the Lynchburg Road Corridor where this data is collected. According to the TDOT count data, the AADT in 2017 on Bypass Road was approximately 8,683 vehicles per day (vpd), and the AADT in 2017 on Lynchburg Road was approximately 3,508 vpd. This data and the count data for the other count stations in the area is presented in Figure 10. Historic count data for the three stations along the study corridors are provided in Appendix I.

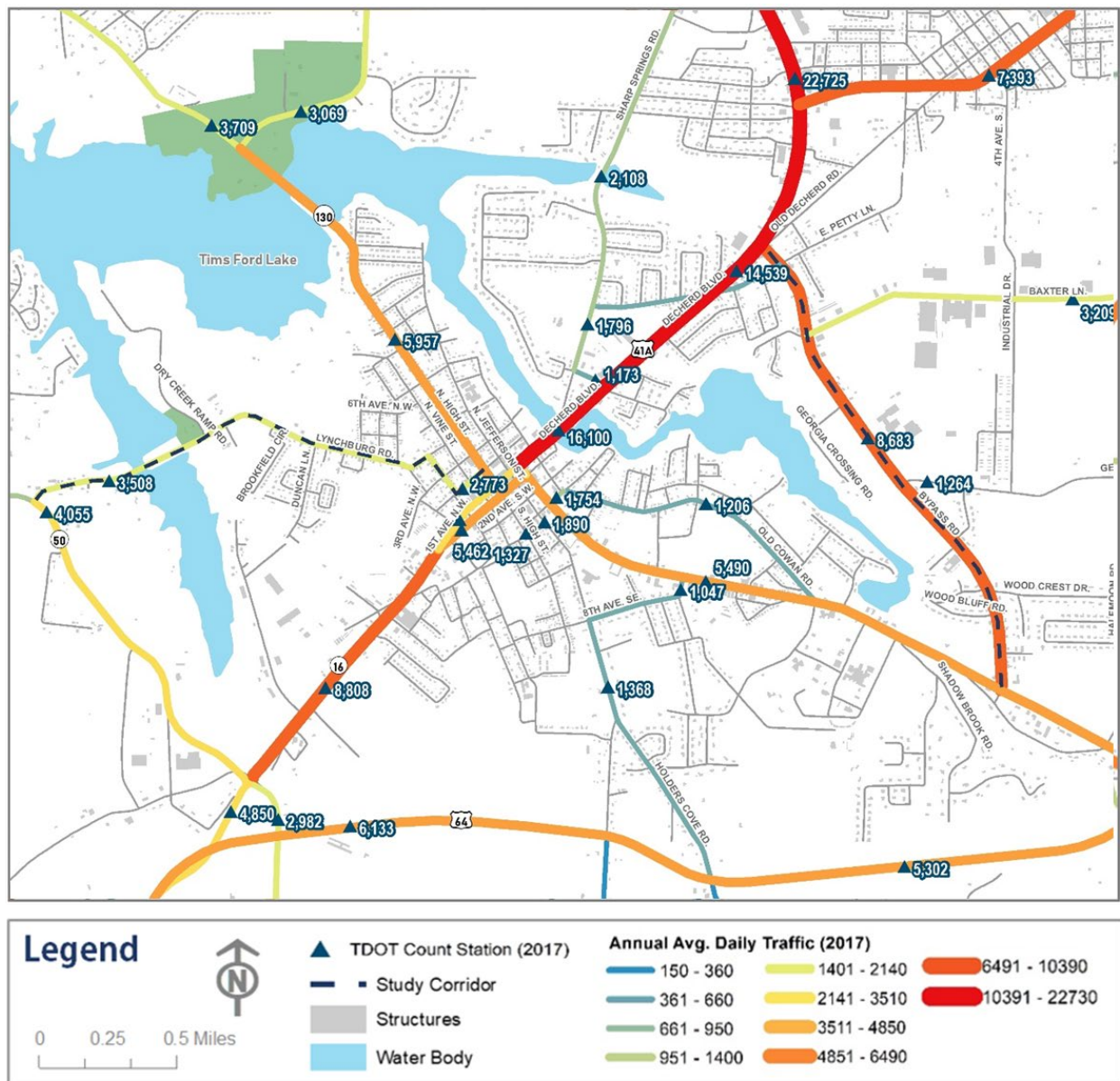


Figure 10. TDOT Daily Traffic Volumes

Operations

Level of service (LOS) is a measurement used to identify how well a roadway segment or intersection is able to accommodate traffic volumes with the roadway's existing capacity. This measure is generally expressed as a function of vehicular delay, or how much time a driver spends at that location. LOS A is the best condition rating with vehicles experiencing minimal delay while LOS F is considered the worst with roadways being congested and travel times poor. LOS C is considered to be acceptable in Winchester. Figure 11 depicts the LOS for each approach as well as the overall LOS for each of the intersections considered within this study. As evident, the major intersections are performing relatively well under existing conditions. The intersection of Bypass Road and Decherd Boulevard is the only study intersection that operates below a LOS B. The existing traffic counts used for this analysis (which also act as the foundation for the future operation analyses) are provided in Appendix II, while Appendix III includes Synchro model outputs from this operations analysis.

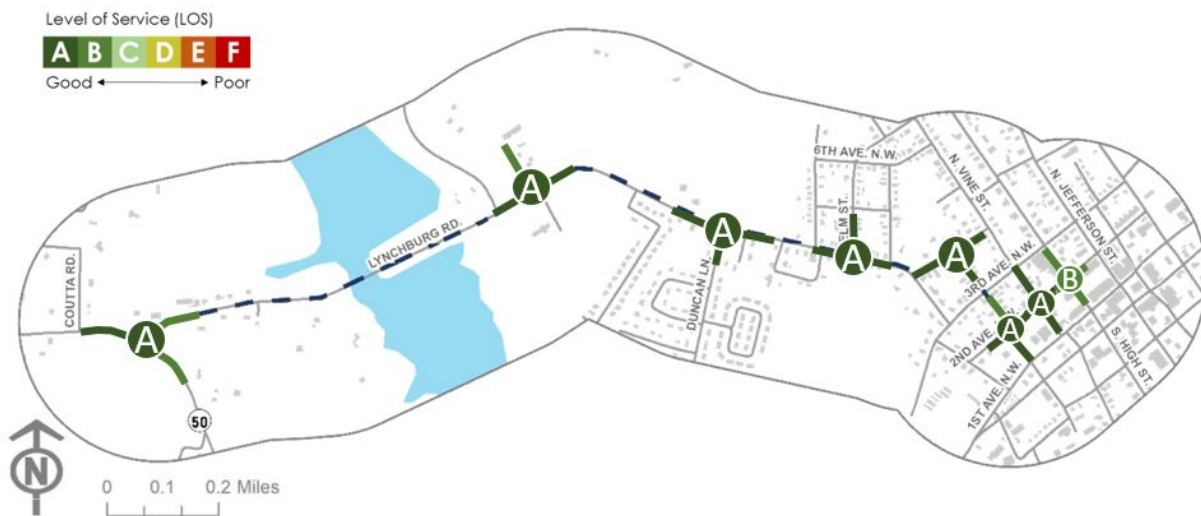


Figure 11. Existing Intersection Level-of-Service

Crashes

Crash histories for each corridor over the past 10 years (May 2009 – May 2019) were evaluated using TDOT eTRIMS to identify high crash locations or other troublesome trends that might warrant safety improvements. For the Bypass Road corridor, the intersection at Dinah Shore Boulevard/Decherd Boulevard/US 41A had the highest number of crashes that occurred within this timeframe with a total of 85 reported crashes (roughly 26% of the total crash number). The N High St/SR 130/2nd Ave NW intersection was the highest for the Lynchburg Road study corridor, which had 32 reported crashes over the past 10 years. This accounted for roughly 25% of the total number of crashes along Lynchburg Road. Figure 12 describes the types of crashes that occurred along both corridors over the course of 10 years, as well as the time of day crashes occurred within the past year. As expected (based on land uses and function of each corridor), Bypass Road crashes typically occurred within either the A.M. or P.M. peak hour timeframes with approximately 65% of reported crashes occurring during these times. For Lynchburg Road, on the other hand, 56% of crashes occurred outside of the A.M. or P.M. peak timeframes.

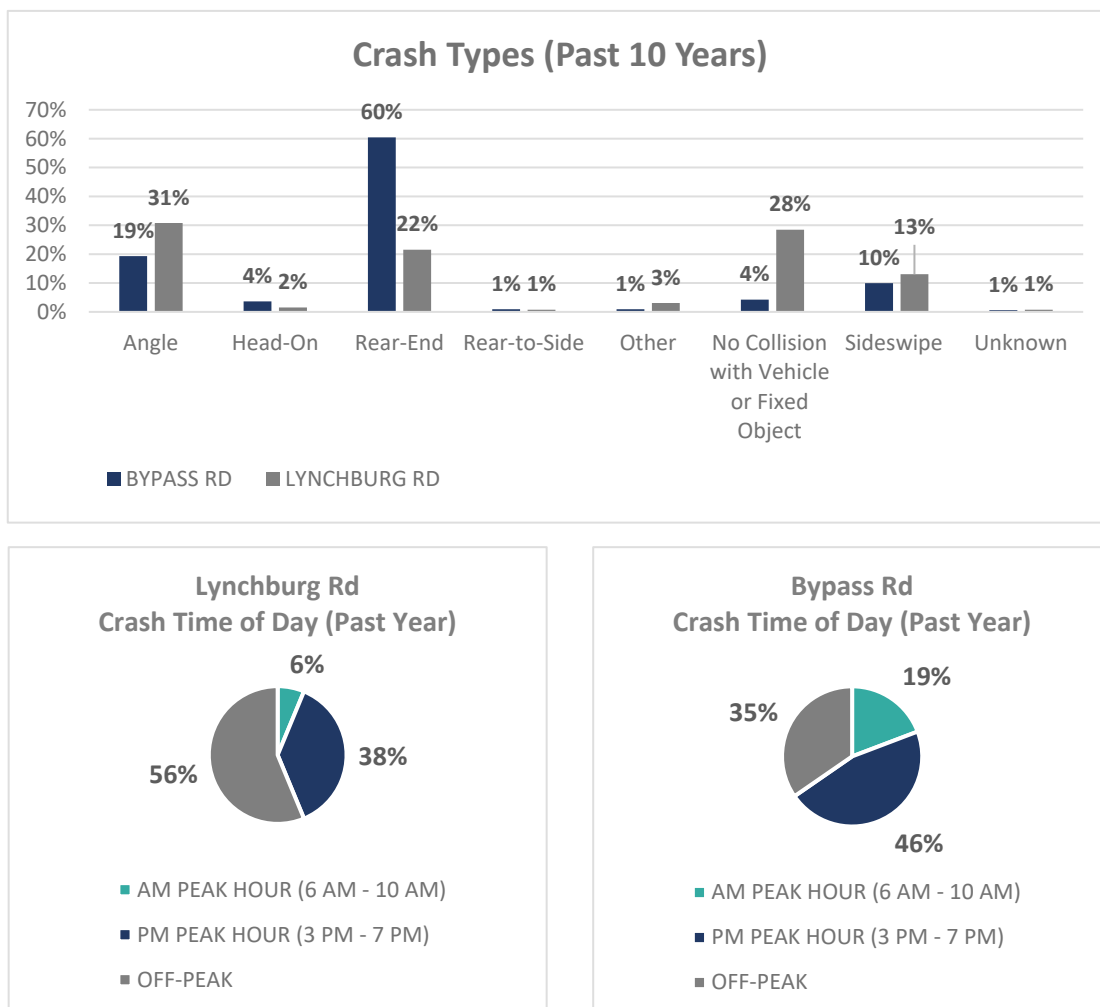


Figure 12. Crash Statistics

Pedestrian and Bicycle (Non-Motorized) Infrastructure

Safe and convenient walking and biking opportunities are an important element of a community's quality-of-life, both from a recreational and transportation perspective. Figure 13 illustrates existing pedestrian and bicycle infrastructure (sidewalks and greenways) for the Bypass Corridor and Lynchburg Corridor, respectively. Bicycle-only facilities, such as bike lanes, do not exist along either of the study corridors. No sidewalk facilities are currently provided along the Bypass Corridor or within a quarter-mile buffer surrounding the corridor. For the Lynchburg Corridor, there are existing sidewalks along the eastern portion of Lynchburg Road, N. Cedar Street, and 2nd Avenue NW providing connectivity between residential areas and Winchester's downtown. While sidewalks exist along Lynchburg Road, the infrastructure is aged and largely not compliant with accessibility requirements.

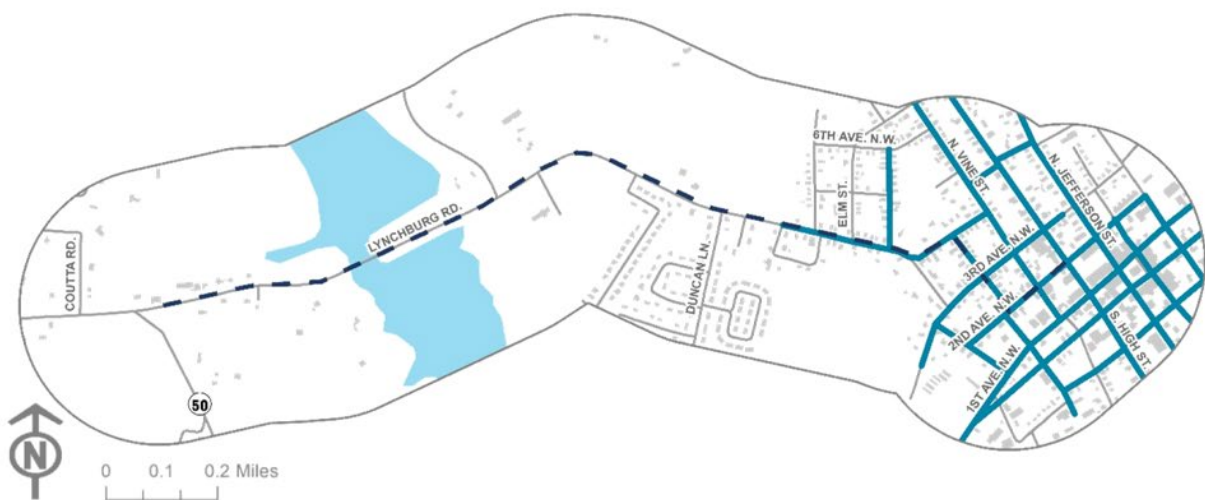
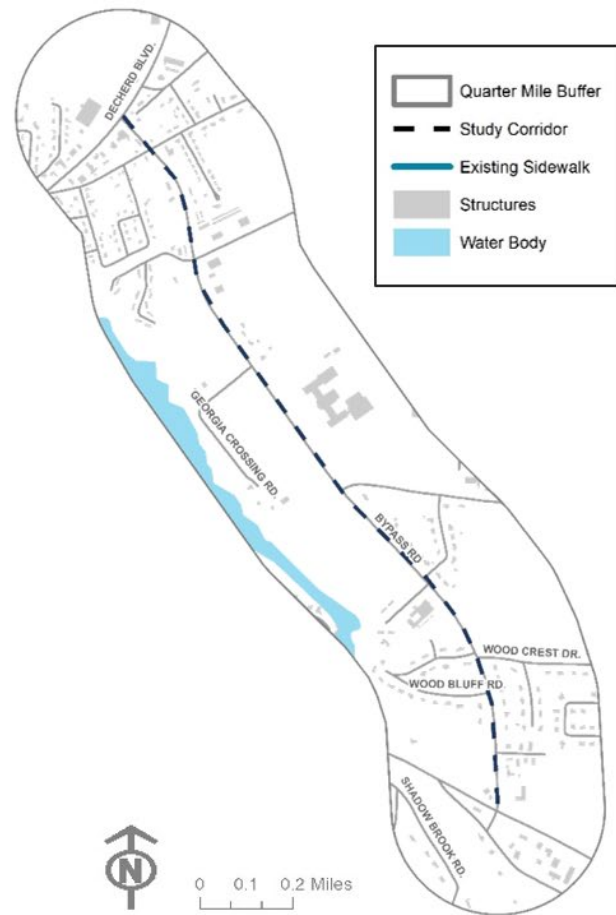


Figure 13. Existing Non-Motorized Infrastructure

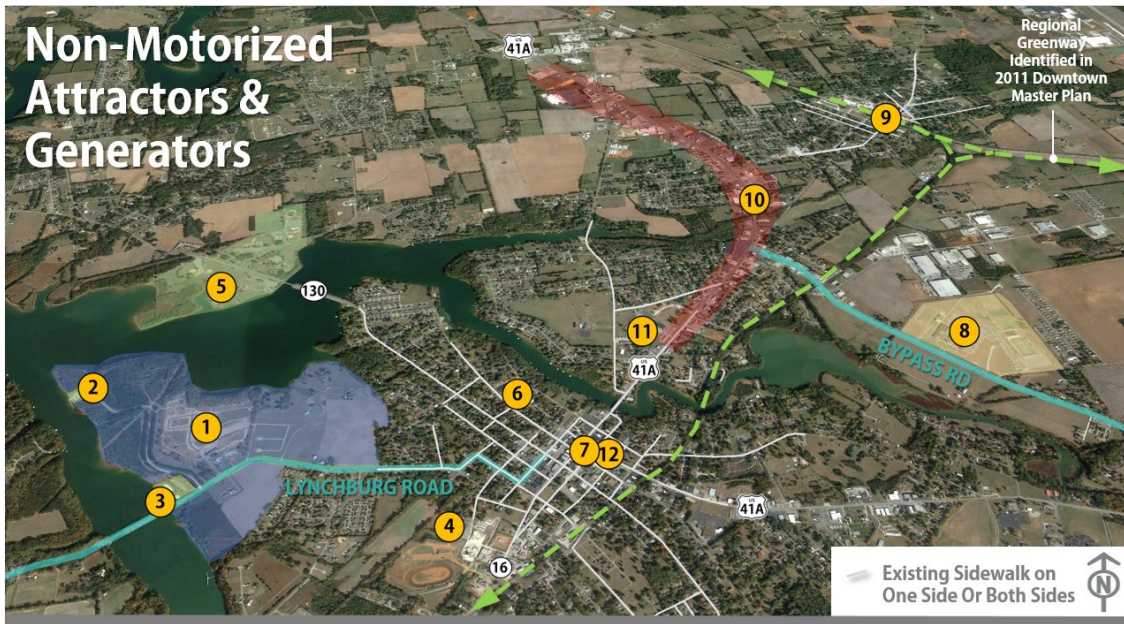
In addition to five miles of paved trails within the Winchester City Park (identified as number 5 in Figure 14), the community also has a long-term regional greenway vision. This vision was documented in the 2011 Downtown Master Plan and follows an abandoned CSX railroad right-of-way through town. Figure 14 further identifies community destinations that attract and generate pedestrians and bicyclists in relation to the two study corridors, as well the existing sidewalk network. Understanding where residents might be walking or biking and where there is, or is not, infrastructure is critical for identifying corridor improvements.

For Lynchburg Road, a key connection (~0.6 miles) is missing between the existing sidewalk network and the free Public Beach to the west, which is an important community asset that is highly-utilized in the summer. While just outside of the corridor study area to the north, this key gap in the network impacts corridor users as the sidewalk along N High Street/SR 130 stops short of the City's 100-acre Recreational Park where almost all of the community's recreational amenities are located. An outdoor stage fully equipped for performances is located on the property as well as space utilized by a number of annual community events, including the 4th of July celebration, a BBQ cook off, fishing tournaments, and a carnival.

As evident in the map, Bypass Road is isolated in terms of sidewalk connectivity. A paved shoulder does exist from the High School to just south of E Petty Lane which provides space for pedestrians walking between the school and neighborhoods located along Dinah Shore Boulevard/Decherd Boulevard/US 41A and E Petty Lane. The envisioned greenway would provide an excellent long-term option for connectivity between downtown/the majority of the city's population and the High School. A pathway would leverage the city's existing resource, Tims Ford Lake, by providing not only a safe and convenient connection, but also one that is aesthetically-pleasing, capable of attracting regional users.



Looking towards Twin Creeks Marina from the southern banks of the City Park



- | | | |
|---|--|--|
| <p>1 Twin Creeks Development
<i>Marina</i>
<i>Restaurant</i>
<i>Hotel/Conference Center (Proposed)</i>
<i>Permanent, Semi-Permanent, & Rental Homes (Proposed)</i>
<i>Wedding Venues (Proposed)</i>
<i>Amphitheatre (Proposed)</i></p> | <p>5 City Park
<i>SwimPlex</i>
<i>Walking Trails</i>
<i>Festival/Special Event Space</i>
<i>Tennis Courts</i>
<i>Disc Golf Course</i>
<i>Dog Park</i>
<i>Community Playground</i>
<i>Fishing Piers</i>
<i>Sports Fields</i></p> | <p>8 Franklin Co. High School
<i>Track</i>
<i>Football Stadium</i>
<i>Sports Fields</i></p> |
| <p>2 Public Boat Ramp</p> | <p>6 Elementary School</p> | <p>9 Downtown Dechard</p> |
| <p>3 Public Beach</p> | <p>7 Downtown Square</p> | <p>10 Commercial Strip</p> |
| <p>4 Sports Fields</p> | <p>11 Former H.S. Track & Football Stadium</p> | <p>12 Public Library</p> |

Figure 14. Non-Motorized Attractors & Generators

III. FUTURE CONDITIONS

In order to understand the implications of future development, a number of scenarios were tested with embedded assumptions related to large parcel conversions, likely land use types, roadway connectivity, and multimodal mobility needs. The outputs of this analysis help to inform City stakeholders on the potentially necessary improvements that can stem from future growth.

Land Use

As previously mentioned, the type and density of development has the potential to significantly impact the transportation system. In Winchester, and specifically along the Bypass and Lynchburg corridors, there are a number of opportunities for future development to occur. Having already examined the existing traffic conditions along the corridors, land use and development assumptions were made and analyzed in order to discern the impacts of a full build out situation on the overall traffic operation.



As a first step in the scenario planning process, large parcels that are located in close proximity to the corridors and that are ripe for development were identified. These vacant properties were then assigned a future land use based on surrounding development character, input from stakeholders, and proximity to other land uses. To illustrate these assumptions, Figure 15 and Figure 16 show the relative location of parcels that were assumed to be developed in the future along

the corridors. In addition, these figures show the mix of residential and non-residential land use types that could be expected for these locations. It should be noted that, based on input from stakeholders, the old racetrack property was examined under two conditions – one with it developing as a campground recreational facility and the other with it developing as a single-family residential subdivision. Development scenario land use assumption details are provided in Appendix IV.

BYPASS CORRIDOR:



Figure 15. Bypass Road Corridor Land Use Assumptions

LYNCHBURG CORRIDOR:

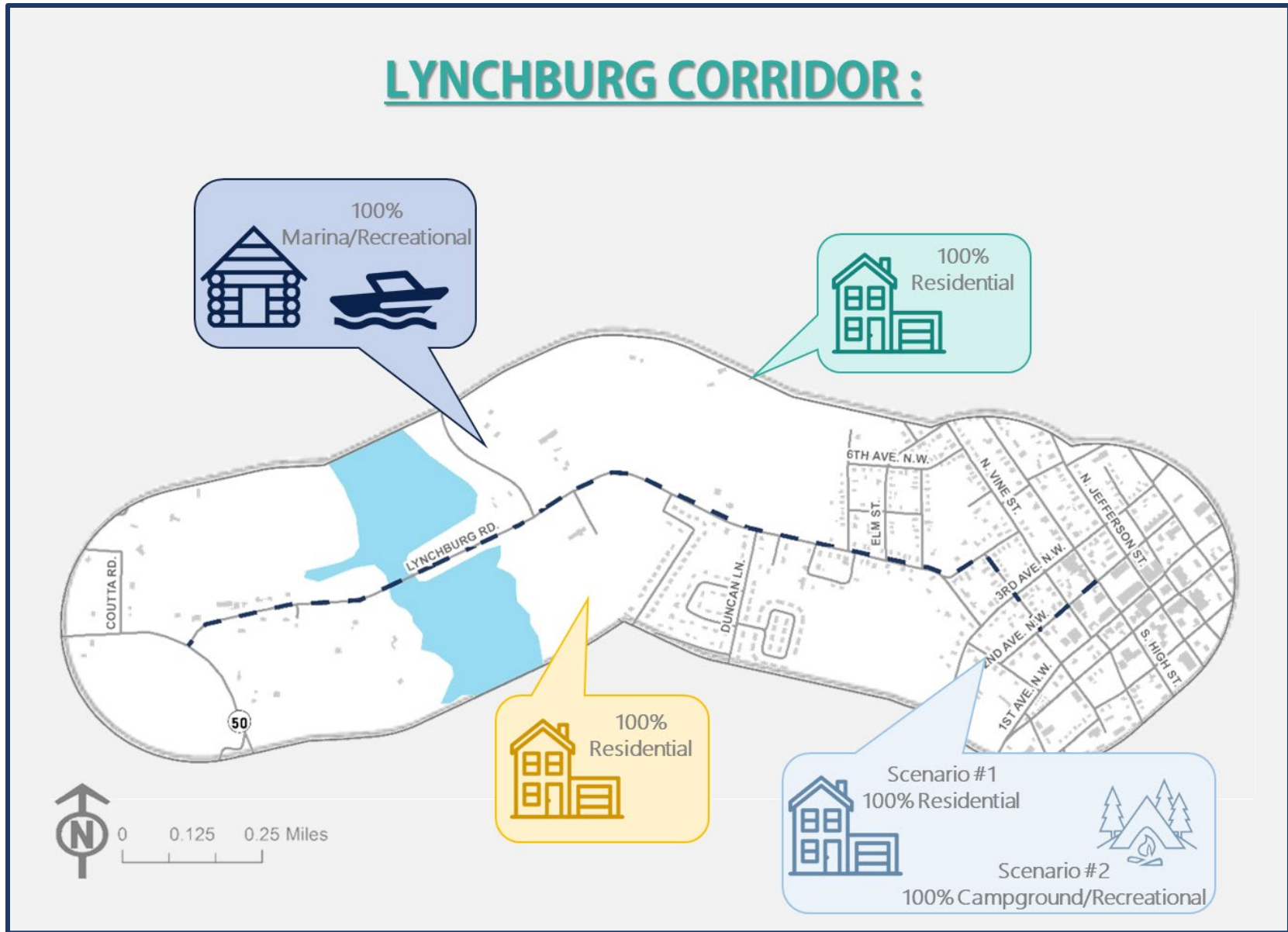
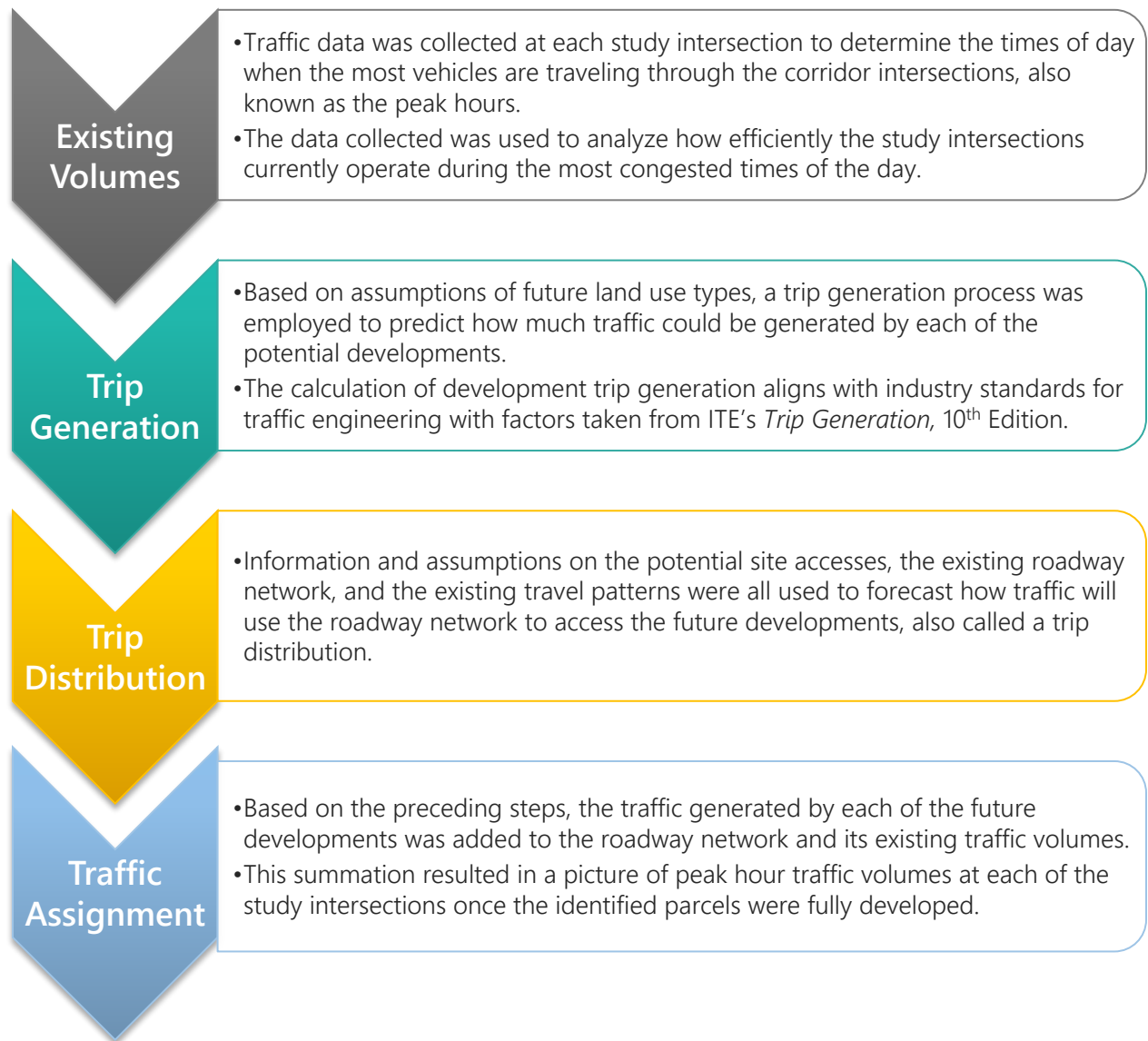


Figure 16. Lynchburg Road Corridor Land Use Assumptions

Transportation

In order to discern the impacts of future development on the transportation system, a traffic impact analysis was carried out for both of the study corridors. The following four-step process was used to project the number of potential trips along the study corridors based on the assumed land uses presented in the Existing Conditions chapter. The results of this process are the projected traffic volumes at intersections along the corridors, which are used to analyze future transportation needs.



Projected Operations

Using the projected peak hour volumes, the study intersections were reevaluated to determine the projected operation of the study corridors once the assumed development occurs. LOS scores projected for the Winchester roadway network are presented in Figure 17. These scores illustrate network operations assuming that no improvements are made and no new roadways are built.

For the Bypass Corridor, LOS conditions in the northern portion of the corridor are expected to decline considerably as development occurs. These intersections are expected to operate at LOS F during peak hours. The Bypass Road/Cowan Highway intersection is also expected to decrease from LOS B to LOS C.

For the Lynchburg Corridor, projected intersection LOS resembles existing conditions, with the exception of the 2nd Avenue NW/N. Vine Street intersection, which deteriorates to LOS C, and the 2nd Avenue NW/N. High Street intersection, which deteriorates to LOS F.

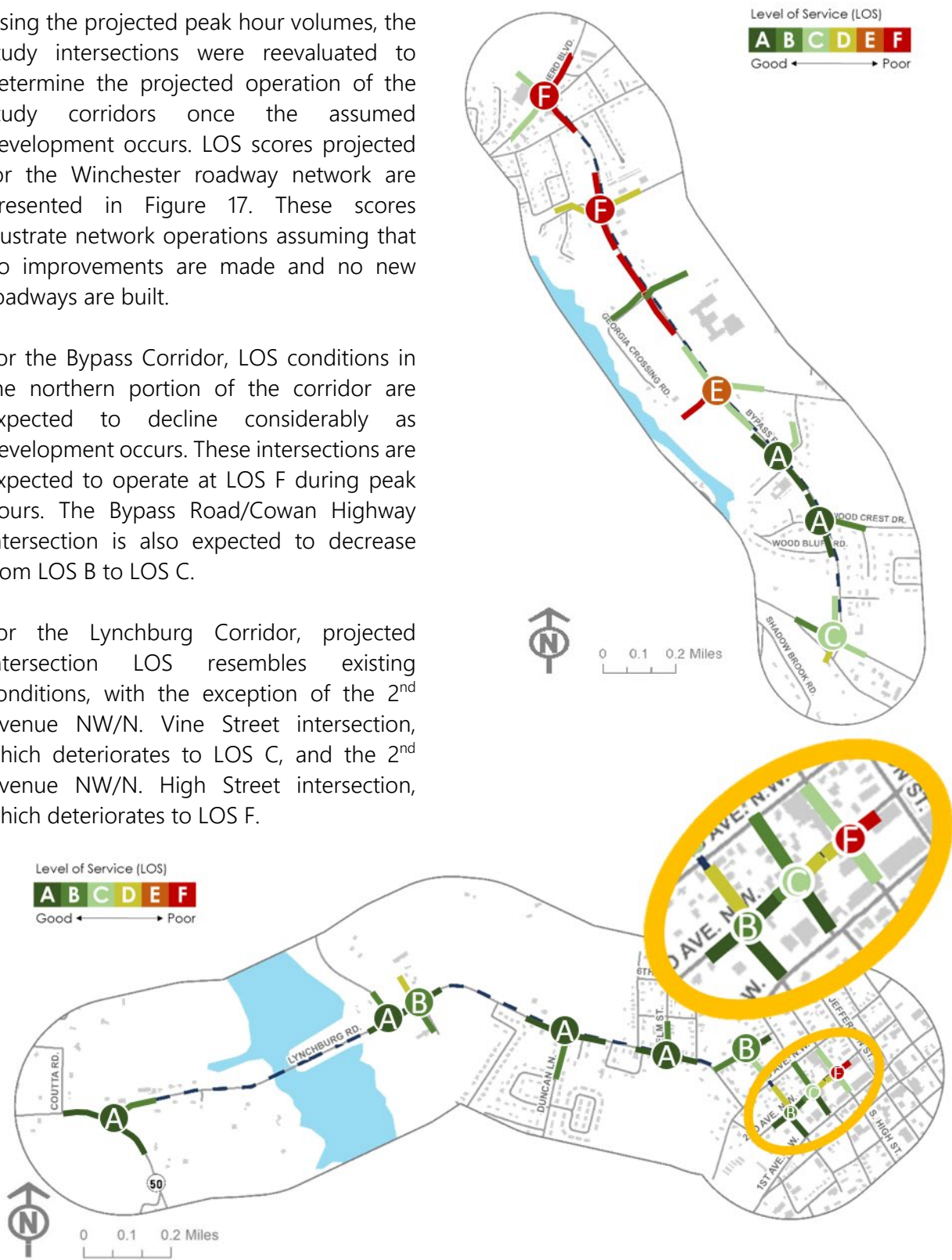


Figure 17. Projected Intersection Level-of-Service

IV. RECOMMENDATIONS

The purpose of this study is to establish a plan for coordinated infrastructure improvements and policy initiatives that address the impacts of forecasted commercial and residential growth in Winchester, specifically upon the safety and mobility of Lynchburg and Bypass Roads. Recommended infrastructure improvements and supportive policy strategies and tools in this chapter are the result of existing observations in the field, technical analyses performed in Chapter 2 and 3, as well as input received from community stakeholders. Projects aim to specifically:

- improve safety for all roadway users (including providing appropriate pedestrian and bicycle accommodations)
- improve traffic operations
- minimize vehicular congestion through proper land use and transportation decisions, of which largely focuses upon access management
- leverage the community's existing resources

Infrastructure Improvements

Overview

Recommended infrastructure projects reflect existing and expected needs of vehicular and non-motorized users along Bypass and Lynchburg Roads. Some projects are intended to be standalone initiatives by the City of Winchester, others are intended to be accomplished through or alongside development or redevelopment. Some recommendations present opportunities for the City and developers to accomplish desired goals through creative partnerships. For example, non-motorized connectivity to and from the new Marina on Lynchburg Road is a mutual goal for both the Twin Creeks development and the City of Winchester. Leveraging both private and public resources strengthens the overall outcomes of investments.

Recommended Infrastructure Improvements

Recommendations are broken down by corridor. Figure 18 and Figure 19 illustrate improvements for Bypass Road and Lynchburg Road respectively, while Table 1 and Table 2 describes each project in further detail. General timeframes for likely project need are also included and based on existing and anticipated future conditions (based on potential development). Planning-level cost estimates are also provided which are based on TDOT 2018 standard unit prices. These costs are scaled according to an assumed year of expenditure based on the project need timeframe. For purposes of estimating, the following years are assumed for year of expenditure: immediate-term (three years), mid-term (seven years), and long-term (10 years). Detailed cost estimates are provided in Appendix V.

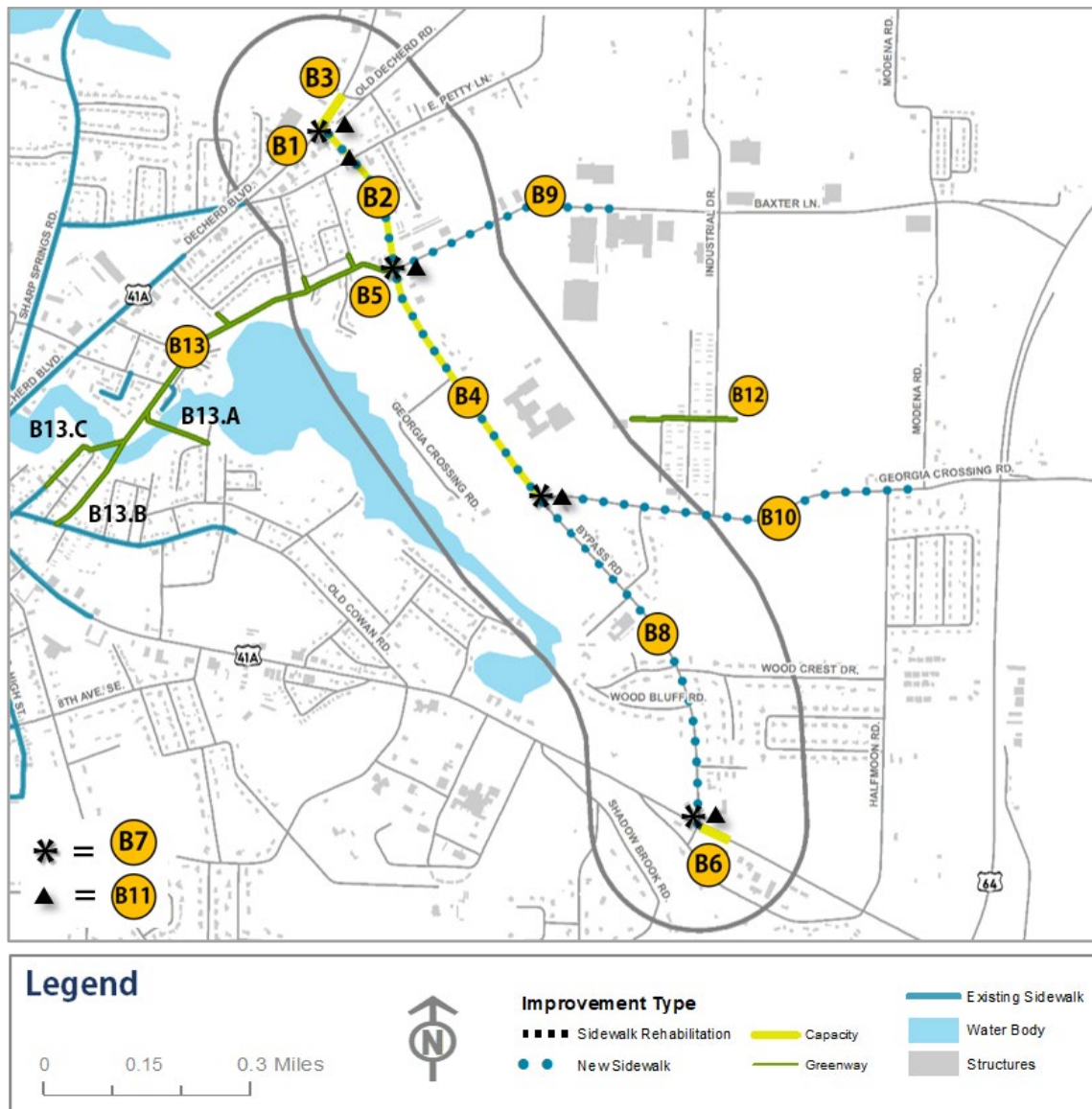
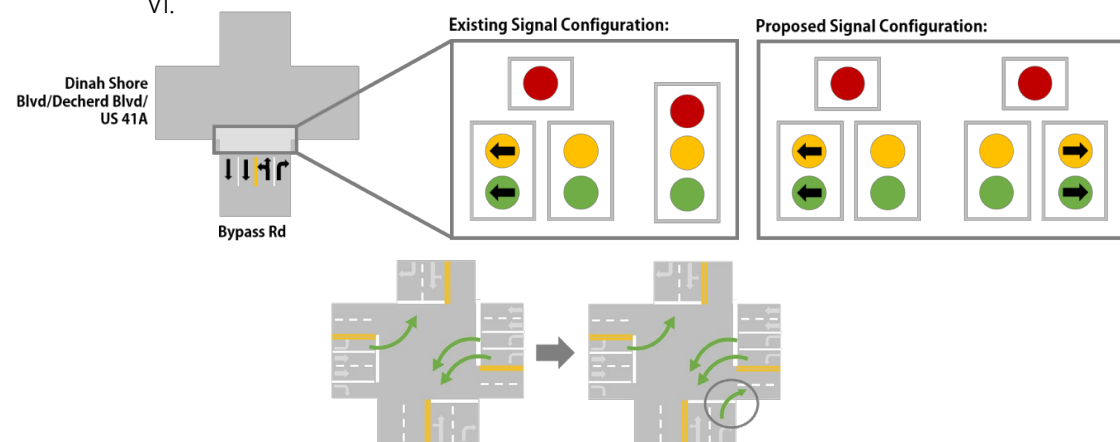


Figure 18. Bypass Road Recommended Infrastructure Improvements Map

Table 1. Bypass Road Recommended Infrastructure Improvements

Project ID	Project	Improvement Type	Description	Timeframe of Project Need	Length	Cost Estimate	Opportunity for Private Cost-Sharing
B1	Bypass Rd and Dinah Shore Blvd/Decherd Blvd/US 41A Signal Improvements	Traffic Signal	<p>Modify signal timing and infrastructure at existing traffic signal to increase efficiency of signal in the near-term, including incorporating an overlap phase for the Bypass Rd northbound right-turning movements (illustrated below). Existing traffic signal timing plans are provided in Appendix VI.</p> 	Immediate-Term Need	--	\$14,210	
B2	Bypass Rd Capacity Improvements – Baxter Ln/Grant St to Dinah Shore Blvd/Decherd Blvd/US 41A	Capacity	<p>Increase capacity for Bypass Rd between Baxter Ln/Grant St and Dinah Shore Blvd/Decherd Blvd/US 41A as development occurs along Bypass Rd, Baxter Ln, and US 64.</p>	Immediate / Long-Term Need	0.4 mi	--	

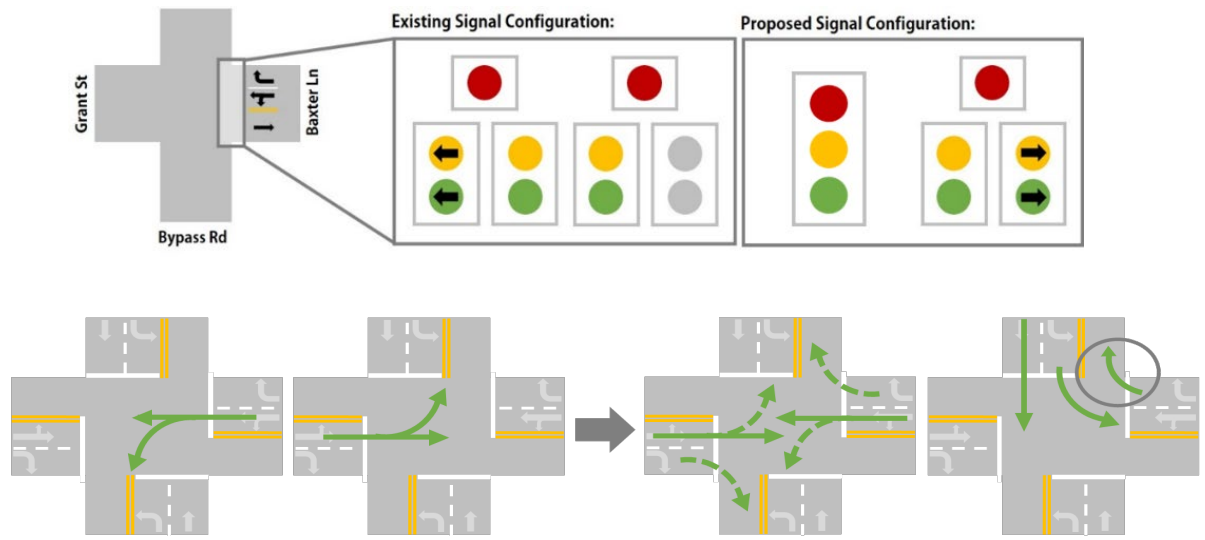
Project ID	Project	Improvement Type	Description	Timeframe of Project Need	Length	Cost Estimate	Opportunity for Private Cost-Sharing
B2.A	Phase I – Restriping		Restripe Bypass Rd cross-section between E Petty Ln and Baxter Ln/Grant St to increase capacity for southbound traffic. This can be accomplished by utilizing the existing center two-way left-turn lane pavement width for the extension of the southbound lanes. See illustration below. Adjust existing signage and striping accordingly (ensure that the solid white centerline for southbound traffic on Bypass Rd approaching E Petty Ln is restriped to a dashed white centerline).	Immediate-Term Need	0.4 mi	\$7,650	



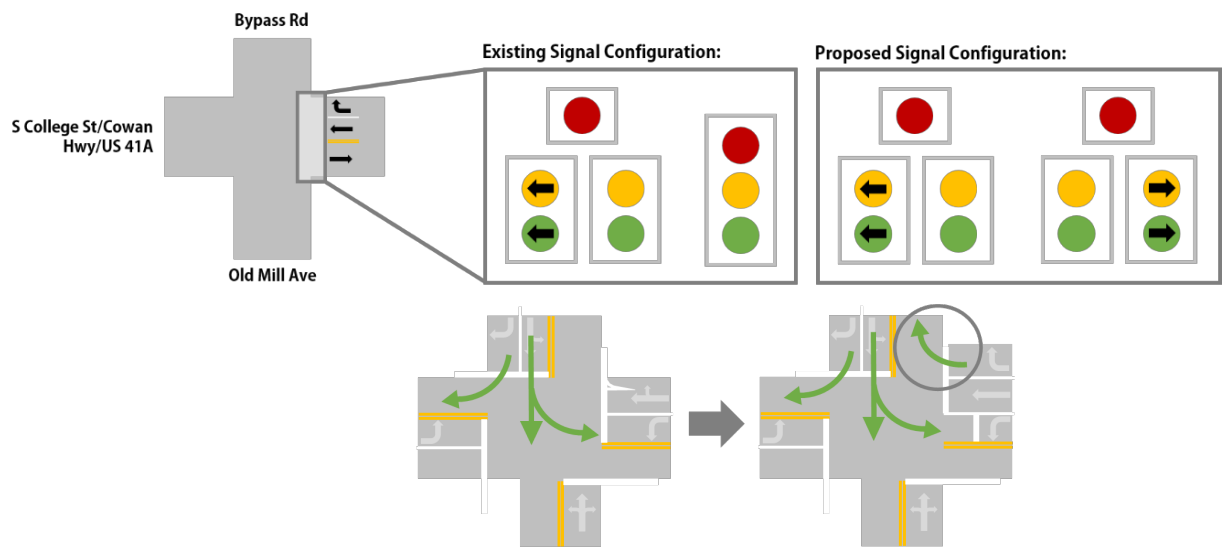
Project ID	Project	Improvement Type	Description	Timeframe of Project Need	Length	Cost Estimate	Opportunity for Private Cost-Sharing
B2.B	Phase II - Widening		Widen Bypass Rd to four lanes. Dedicated turn lanes should be constructed by developers as large developments are implemented/necessary turn lane warrants are met.	Long-Term Need / Development-Driven	0.4 mi	\$117,820	✓
B3	Turn Lane Extension for Left-Turning Southbound Traffic on Dinah Shore Blvd/Decherd Blvd/US 41A at Bypass Rd	Capacity	Extend double-left turn lanes for left-turning southbound traffic on Dinah Shore Blvd/Decherd Blvd/US 41A at the existing Bypass Rd traffic signal to increase storage capacity. *** Need for project will be contingent upon outcomes following the recommended signal modifications at Dinah Shore Blvd/Decherd Blvd/US 41A (B1) as well as the Bypass Rd restriping project (B2.A).	Long-Term Need / Development-Driven	0.1 mi	\$1,050	
B4	Bypass Rd Capacity Improvements – Baxter Ln/Grant St to Georgia Crossing Rd	Capacity	Evaluate and monitor the need to improve capacity for Bypass Road between Baxter Ln/Grant St and Georgia Crossing Rd as development occurs. Depending on the desired vision for the corridor (i.e., level of access and mobility, as well as the style/intensity of future development), recommended design options could include a 4 lane boulevard-style cross-section with turn lanes where warranted or the use of frontage/backage roads for large parcel developments (preferably backage roads to encourage building placement along the main corridor which promotes walkability and placemaking).	Long-Term Need / Development-Driven	0.9 mi	\$6,730,000	✓

Project ID	Project	Improvement Type	Description	Timeframe of Project Need	Length	Cost Estimate	Opportunity for Private Cost-Sharing
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B5	Bypass Rd and Baxter Ln/Grant St Signal Improvements	Traffic Signal	Remove split phasing from the existing signal timing plan for eastbound/westbound approaches at the existing Bypass Rd and Baxter Ln/Grant St traffic signal. Instead, allow for permissive left-turn phases for both approaches (green phase for both Baxter Ln and Grant St at the same time with left-turning vehicles yielding to on-coming traffic versus a green phase for each approach one at a time which allows for protected left turns).	Long-Term Need / Development-Driven	--	\$34,950	✓
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B6	Bypass Rd and S College St/Cowan Hwy/US 41A/Old Mill Ave Intersection and Signal Improvements	Capacity and Traffic Signal	Construct exclusive right-turn only for westbound movements on S College St/Cowan Hwy/US 41A. Modify signal timing and infrastructure at existing traffic signal (illustrated below) to include an overlap phase. This would allow westbound traffic on S College St/Cowan Hwy/US 41A to turn right freely (with a green arrow) onto Bypass Road as left-turning southbound traffic on Bypass Road have a dedicated left-turn green arrow. In addition, consider moving the existing vehicle loop detector and stop bar for left-turning westbound vehicles on S College St/Cowan Hwy/US 41A back ~20 feet (i.e., out of the turning pathway of southbound left- turning vehicles from Bypass Rd onto S College St/Cowan Hwy/US 41A which are currently triggering the vehicle loop detection).	Mid-Term Need / Development -Driven	--	\$16,000	✓
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Project ID	Project	Improvement Type	Description	Timeframe of Project Need	Length	Cost Estimate	Opportunity for Private Cost-Sharing
B7	Coordinated Signal Timing Plan for Bypass Rd	Traffic Signal	Monitor the need for the development of a coordinated signal timing plan for existing and future traffic signals along Bypass Rd to encourage efficient corridor “throughput”. A plan would target a specific section of the corridor that has closely spaced intersections (1/4 mile or less). A general point of reference for needing a timing plan, is if a vehicle cannot travel the specific section without stopping at 50% of the traffic signals. Once established, consider updating plan every 3-5 years if development continues.	Mid-Term Need / Development -Driven	--	\$23,990	✓
B8	Bypass Rd Sidewalks	Non-Motorized	Construct sidewalks (or multi-use paths (MUPs)) on both sides of Bypass Rd to provide a seamless pedestrian connection between Dinah Shore Blvd/Decherd Blvd/US 41A and S College St/Cowan Hwy/US 41A.	Long-Term Need / Development -Driven	1.8 mi	\$4,700,000	✓
B9	Baxter Ln Sidewalks	Non-Motorized	Construct sidewalks on both sides of Baxter Ln to provide a pedestrian connection between places of employment and future development near the Baxter Ln/Grant St/Bypass Rd intersection.	Long-Term Need / Development -Driven	0.5 mi	\$1,020,000	✓
B10	Georgia Crossing Rd Sidewalks	Non-Motorized	Construct sidewalks on both sides of Georgia Crossing Rd to provide a pedestrian connection between existing (and future) neighborhoods, the High School, and Bypass Rd.	Long-Term Need / Development -Driven	0.9 mi	\$1,780,000	✓
B11	Bypass Rd Pedestrian Crossing	Non-Motorized	As sidewalks are constructed and the corridor develops, provide corresponding pedestrian crossing enhancements at existing and future key intersections where demand warrants them (either by the number of existing users or	Long-Term Need / Development -Driven	--	\$75,000	✓

Project ID	Project	Improvement Type	Description	Timeframe of Project Need	Length	Cost Estimate	Opportunity for Private Cost-Sharing
	Intersection Improvements		where demand is likely or desired given nearby destinations). Example existing intersections include: -Bypass Rd and Dinah Shore Blvd/Decherd Blvd/US 41A -Bypass Rd and E Petty Ln -Bypass Rd and Baxter Ln/Grant St -Bypass Rd and Georgia Crossing Rd				
B12	Merritt Village-High School Pedestrian Pathway	Non-Motorized	Explore possible non-motorized connection between Industrial Dr and High School utilizing Merritt Village street network once the large parcel to the east of Industrial Dr develops (if warranted). Future development is predicted to take the form of low-moderate-density residential subdivisions and, thus, a pathway would provide a direct connection to the school. Consider 'shared roadway' design for the Merritt Village roadway portion as low-cost option.	Mid / Long-Term Need / Development -Driven	0.2 mi	\$296,400	✓
B13	Downtown-Baxter Ln Greenway Connection	Non-Motorized	Construct a greenway to connect the Bypass Rd corridor to Downtown utilizing abandoned CSX railroad right-of-way. Provides an attractive multimodal connection between the High School, Downtown, the Public Library, neighborhoods and multifamily housing complexes. Include connections to Swann Ave, Hackberry Dr, and Macon Ave.	Long-Term Need / Development -Driven	0.9-1.0 mi	\$1,130,000	
B13.A	<i>Option A</i>		<i>Construct pedestrian bridge to connect to Oak St.</i> Pros: Amenable topography; Land at Oak St already being used as public park space; Cons: Places users further from downtown; Possible security concerns; Grade change between river banks may increase costs	--	0.2 mi	\$2,724,700	
B13.B	<i>Option B</i>		<i>Construct pedestrian bridge to connect to Old Cowan Rd utilizing abandoned CSX railroad right-of-way.</i>	--	0.3 mi	\$4,361,100	

Project ID	Project	Improvement Type	Description	Timeframe of Project Need	Length	Cost Estimate	Opportunity for Private Cost-Sharing
			Pros: Graded land due to previous railroad tracks; Cons: Trail relatively close to backside of residences; Possible drainage issues.				
B13.C	Option C		<p>Construct pedestrian bridge to 3rd Ave SE/4th Ave SE. Consider 'shared roadway' design for 3rd Ave SE to connect to existing sidewalk as a low-cost option.</p> <p>Pros: Utilizes graded lane, greater privacy for existing homes; Cons: Likely will require longest bridge of the options</p>	--	0.3 mi	\$4,361,100	

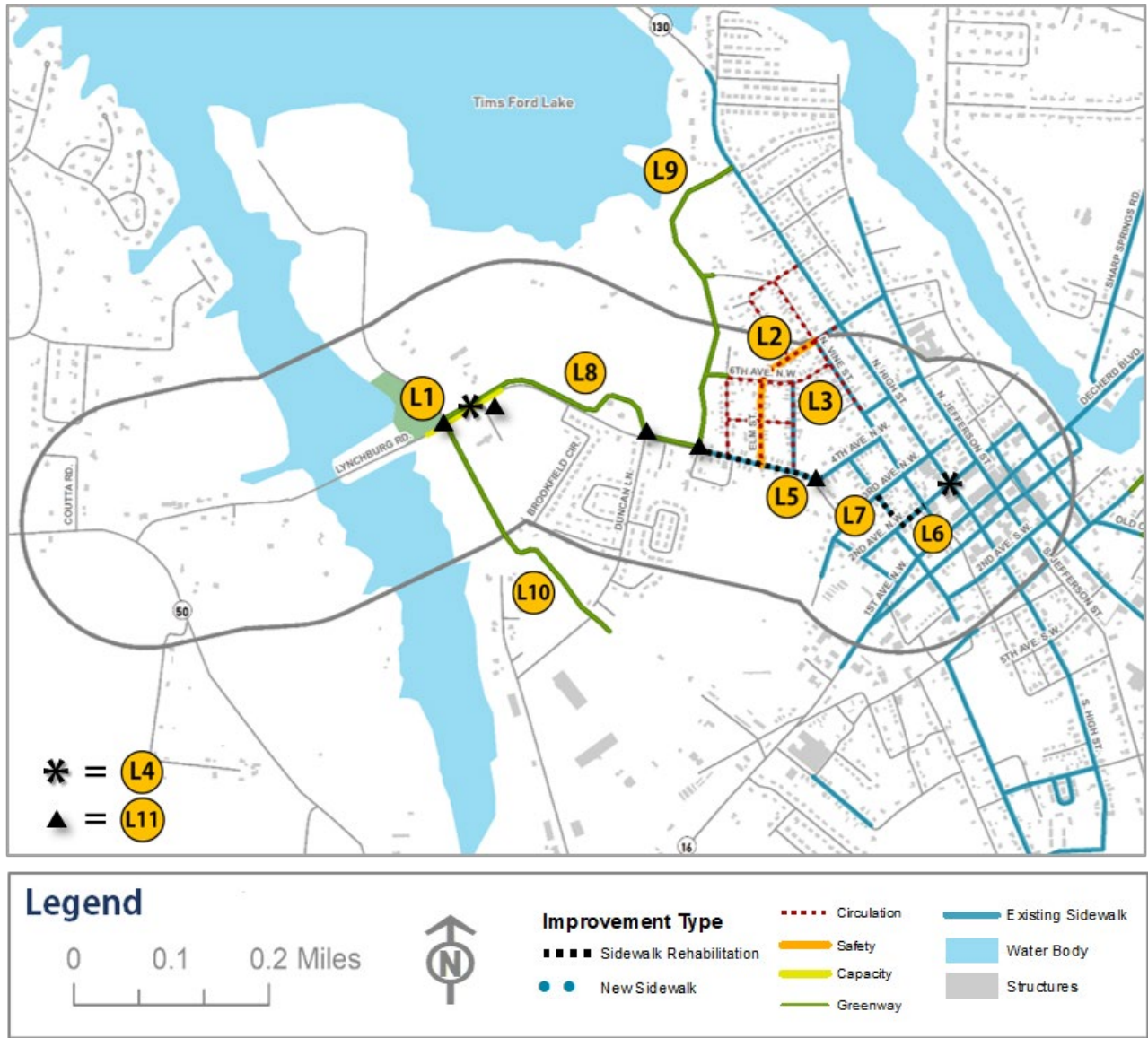


Figure 19. Lynchburg Road Recommended Infrastructure Improvements Map

Table 2. Lynchburg Road Recommended Infrastructure Improvements

Project ID	Project	Improvement Type	Description	Timeframe of Project Need	Length	Cost Estimate	Opportunity for Private Cost-Sharing
L1	Twin Creeks Marina Way and Twin Creeks Dr Intersection Modifications	Capacity, Circulation & Safety	Monitor the need for the construction of dedicated left- and right-turn lanes on Lynchburg Rd to accommodate turning movements onto Twin Creeks Marina Way and Twin Creeks Dr. Consider conducting turn lane warrant analyses following 75%-100% build out of the proposed Twin Creeks development. Design considerations should be given to vehicles pulling boats. Turn lane warrant and signal warrant analyses are provided in Appendix VII.	Mid-Term Need / Development-Driven	--	\$1,207,000	✓
L2	7th Ave NW and Elm St Improvements	Circulation & Safety	Consider making minor geometric improvements to better align the 7th Ave NW/Elm St intersection to allow two vehicles to safely pass. A long-term vision for this intersection is the acquisition of right-of-way (1 parcel) to construct a neighborhood traffic circle at this location. Consider traffic calming measures for both 7th Ave NW and Elm St to reduce impacts of cut-through traffic.	Immediate Need	--	\$117,900 (Long-Term Traffic Circle)	
L3	Truck Restrictions	Circulation	Consider establishing truck restrictions in the study area to increase vehicular safety and operations.	Immediate Need	--	--	
L3.A	<i>Option A</i>		Establish truck restrictions (except for local deliveries) for the following neighborhood streets, at a minimum: Style St, Elm St, Plattenburg St, Maple St, 6th Ave NW, 7th Ave NW, 8th Ave NW, and N Vine St (north of 5th Ave NW). Provide appropriate restriction signage.	--	--	\$2,100	
L3.B	<i>Option B</i>		Coupled with Option A or as a standalone, establish a designated truck route for N High St/SR 130 – George Fraley Pkwy/SR 50 movements by utilizing 2 nd Ave NW, N Cedar St, 4 th Ave NW, and Lynchburg Rd (which are	--	--	\$3,400 (includes Option A signage)	

Project ID	Project	Improvement Type	Description	Timeframe of Project Need	Length	Cost Estimate	Opportunity for Private Cost-Sharing
			designed to state highway standards). Consider warning signage alerting truck drivers to not follow GPS directions.				
L3.C	Option C		Restricting truck movements (except for local deliveries) on Lynchburg Rd all together is an option as it is no longer a state route facility. This would increase the safety and comfort of non-motorized users along the corridors.	--	--	\$1,200 (does not include Option A signage)	
L4	Monitor Need for Traffic Signalization	Traffic Signal	Conduct a traffic signal warrant analysis for the intersection of Lynchburg Rd and Twin Creeks Dr, as well as 2 nd Ave NW and N High St/SR 130 following 75% build out of the proposed Twin Creeks development.	Mid-Term Need / Development-Driven	--	\$16,000 (1 traffic study by consultant)	✓
L5	Lynchburg Rd Sidewalk Rehabilitation	Non-Motorized	Address ADA-compliance issues, including width, utility obstructions, stairs, curb ramps, etc., for the existing sidewalk on the southern side of Lynchburg Rd between Girton St and just east of N Shephard St. Will require drainage work.	Immediate Need	0.3 mi	\$256,700	
L6	2 nd Ave NW Sidewalk Rehabilitation	Non-Motorized	Address utility pole conflicts in existing sidewalk on north side of 2 nd Ave NW. Consider providing additional maneuvering space at pole locations as low-cost alternative to pole relocation.	Long-Term Need	0.06 mi	\$1,700	
L7	N Cedar St Sidewalk Rehabilitation	Non-Motorized	Reconstruct deteriorated segments of the existing sidewalk on the eastside of N Cedar St.	Long-Term Need	0.03 mi	\$16,800	
L8	Lynchburg Rd Multi-Use Path (MUP)	Non-Motorized	Construct MUP (i.e., Greenway) along the north side of Lynchburg Rd between Style St and Twin Creeks Marina Way. Explore potential partnership with Twin Creeks Development to construct. Pathway design should consider potential golf carts/low-speed vehicles. Portion of pathway will require routing between the Bed and	Immediate Need / Development-Driven	0.6 mi	\$1,030,000	✓

Project ID	Project	Improvement Type	Description	Timeframe of Project Need	Length	Cost Estimate	Opportunity for Private Cost-Sharing
			Breakfast and Twin Creeks development due to existing constraints.				
L9	Lynchburg Rd-N High St/SR 130 Greenway Connection	Non-Motorized	Construct Greenway in (potential) dedicated right-of-way on the eastern side of the Twin Creeks development to connect proposed Lynchburg Rd MUP and the existing sidewalk network along N High St/SR 130. Provides non-motorized connectivity between the City Beach, Twin Creeks Development, and neighborhoods to the south and the large City Park to the north. Pathway design should consider potential use by golf carts/low-speed vehicles.	Immediate Need / Development-Driven	0.7 mi	\$1,120,000	✓
L10	Twin Creeks-Racetrack Greenway Connection	Non-Motorized	Construct Greenway in (potential) dedicated right-of-way through the Twin Creeks development should the proposed phase at the old racetrack property occur (by the Twin Creeks developers). Provides a direct, off-roadway connection between the future development (either residential uses or a RV park) and the many amenities at the Twin Creeks development along the lake. Pathway design should consider potential use by golf carts/low-speed vehicles.	Long-Term Need / Development-Driven	0.6 mi	\$1,260,000	✓
L11	Lynchburg Rd Pedestrian Crossing Intersection Improvements	Non-Motorized	Monitor the need for pedestrian crossing enhancements, such as crosswalk striping, user-activated signals, and leading pedestrian interval signal timings, as the corridor develops, specifically at the following intersections: -Lynchburg Rd and Twin Creeks Dr -Lynchburg Rd and Twin Creeks Marina Way/Proposed Twin Creeks-Racetrack Greenway Connection -Lynchburg Rd and Duncan Ln -Lynchburg Rd and Girton St -Lynchburg Rd/4 th Ave NW and N Shephard St	Immediate-Long-Term Need / Development-Driven	--	\$43,000 (per intersection)	✓

Supportive Strategies & Implementation

Tools for Achieving Goals

Goals for the study corridors include preparing for forecasted growth and development while simultaneously increasing safety and mobility for all roadway users. Desired outcomes specifically include minimized congestion and increased opportunities for safely walking and biking. For Bypass Road specifically, ensuring that the corridor grows and evolves in an efficient, safe, and logical manner is paramount for Winchester given:

- the location of the County’s high school along the corridor
- the leveraging potential of several large undeveloped parcels (specifically the ones that include waterfront) to attract high-quality growth
- the opportunity to “get ahead” of forecasted growth by properly planning
- and, finally, the importance the route provides for inter-community travel, one that allows regional traffic, specifically tractor trailers, to bypass the Square

The City of Winchester should consider exploring the following supportive land use and transportation (specifically access management) strategies and implementation tools described in this section to achieve success along both Bypass and Lynchburg Road corridors.



Supportive Land Use and Transportation (Access Management) Strategies

Overview

This section includes supportive land use and transportation strategies that can assist the City in accomplishing desired goals. Given the expectation for growth and development, access management is a core strategy emphasized, particularly for Bypass Road. Principles should underlie both transportation and land use strategies.

FHWA defines access management as the management of the “location, spacing, design, and operation of driveways, median openings, interchanges, and street connections to a roadway”. In the absence of proper access management, corridors can deteriorate functionally and aesthetically as they grow and change as it relates to increasing congestion and safety, particularly for commercial corridors. A greater the number of accesses would result in a greater number of turning movements, potential for driver confusion, and number of conflict points. By applying access management principles during a project’s development phase, particularly for those along Bypass Road, the City can encourage:

- the prevention and/or reduction in crashes and crash potential
- the preservation of roadway capacity
- minimized congestion and travel times
- protection of both private investment in properties and public investments in infrastructure
- integrated accommodations for pedestrians and bicyclists
- coordinated land use and transportation decisions a more efficient/predictable driver experience
- improved aesthetics (less pavement, more visual order)

General principles that underlie a successful access management approach to corridor planning include:

- Limiting the number of conflict points
- Separating conflict points
- Separating turning movements from through movements
- Locating traffic signals (when warranted) to facilitate traffic movement
- Maintaining a hierarchy of functionally-classified roadways, preferably in a grid-like manner
- Limiting direct access on the mainline

Land Use Strategies

- **Encourage Compact, Nodal Development**

Travel demand (i.e., traffic volumes, patterns, behaviors and mode choice) is influenced by the location, density, and mix of land uses. When development is clustered by similar land uses, driving between destinations is reinforced, adding unnecessary vehicular trips that could have been accomplished by walking short distances.

Strip commercial development should be strongly discouraged. Focusing new commercial growth around nodes at key roadway intersections with a mix of other users, as opposed to strip development along the entirety of the corridor, is a more efficient use of municipal resources (land, infrastructure, etc.). This type of development also better supports walkability by locating a mix of uses (destinations) within a close distance of each other.

- **Encourage Connectivity for both Vehicular and Non-Motorized Users**

A grid-like street pattern with appropriate block lengths would provide benefits to both vehicular and non-motorized traffic, particularly as it relates to route choice. Rather than encouraging interparcel activity, typical suburban-style linear strip development often places most or all traffic onto the main corridor, resulting in increased congestion. This often results in wider roadways and further decreases the walkability of the corridor. For those walking or biking, a street grid provides more route options for reaching destinations, in turn providing shorter walking distances. Differences in the street networks are illustrated in Figure 17.

The City should work to encourage the development of a grid-like street network as large parcels develop along Bypass Road. Maintaining a functional classification system is also important for providing appropriately-designed roadways for the context and their intended function. Cul-de-sacs should be avoided as these limit connectivity and force all vehicular traffic onto the main corridor. If cul-de-sacs are used, pathway connections to adjacent parcels for pedestrians and bicyclists should be utilized to ensure these do not also act as barriers to non-motorized connectivity. An example application using the grid street pattern is illustrated in Figure 20.

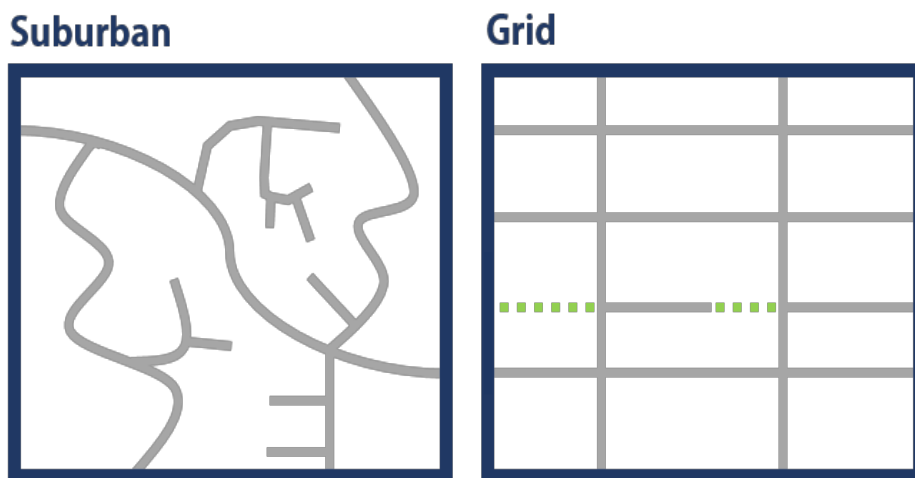


Figure 20. Suburban versus Grid Street Pattern

Transportation (Access Management) Strategies

• Property Access Design Needs

- As the number of vehicular conflict points is nine for per driveway (as illustrated in Figure 21), the City should consider limiting the number of driveways to one per parcel, unless a capacity or safety need is demonstrated requiring additional ones. Encourage shared driveways, when possible.
- Establish minimum driveway spacing standards based on development type (residential, commercial, industrial); and, when applied to a specific corridor, the design speed of the roadway, vision for the corridor, projected traffic volumes, etc.
- Based upon the desired vision for the corridor, identify corresponding design standards for desired minimum and maximum driveway width and corner turning radii widths. For a corridor that emphasizes vehicular mobility, for instance, driveway and corner widths will be greater, while a corridor that seeks to promote walkability, will have smaller widths and radii. Additionally, establish corner clearance standards (meaning the allowable minimum distance between driveways and intersections) based on roadway functional classification and/or posted speed.
- Establish minimum driveway throat lengths to provide more efficient egress and ingress.
- Control the amount of access provided by a driveway or site access to reduce conflict points (such as, limiting access on the main corridor to a “right-in/right-out”-only access if a secondary access is provided on a minor street). Uncontrolled frontage access should not be allowed.
- Align driveways located on opposite sides of the road, whenever possible to provide more predictability and greater visibility for drivers. Driveways should also align with the roadway at a 90 degree angle. These principles equally apply to roadway intersections.

• Interparcel Connectivity

- Encourage connectivity between adjacent parcels using cross-access easements, access driveways, or stub-outs so that when adjacent properties are developed, seamless connections can be made. This helps to keep traffic off of the main corridor when making short connections. Non-motorized connectivity should also be emphasized to encourage mode options.
- Encourage shared driveways to be used by two or more properties in order to reduce the number of curb curbs along the main corridor.

Nine Points of Conflict for One Driveway

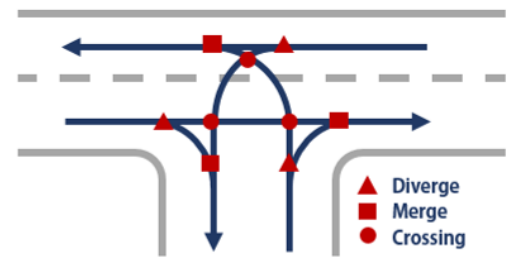


Figure 21. Vehicular Conflict Points for a Single Driveway

Potential Land Use and Transportation Implementation Tools

Overview

Land use and transportation regulatory implementation tools the City should explore further are discussed in this section. For additional guidance relating to access management, driveway design standards, and traffic impact studies, the City may consult TDOT resources available on their website.

Land Use and Transportation Implementation Tools

- **General Regulatory Tools**

There are a number of ways to implement the principles and strategies included within this study. Assessing Winchester's zoning and subdivision regulations should be the first step to ensure that zoning is not encouraging strip commercial development along highway corridors, but instead encouraging more compact, mixed-use development types. Lot frontage requirements as well as setback and building location/parking requirements can also aid in working towards access management goals.

Consider incorporating access management guidelines and/or requirements into land use regulations, such as driveway design and spacing standards. Ensure zoning encourages interconnection between adjacent connections and internal site networks to promote connectivity.

Depending upon the community's land use vision for the Bypass Road corridor, the following access management guidelines should be considered as illustrated in Figure 22 and Figure 23. These standards (for areas considered to be suburban rural or suburban urban) are derived from TDOT's recommended spacing guidelines.

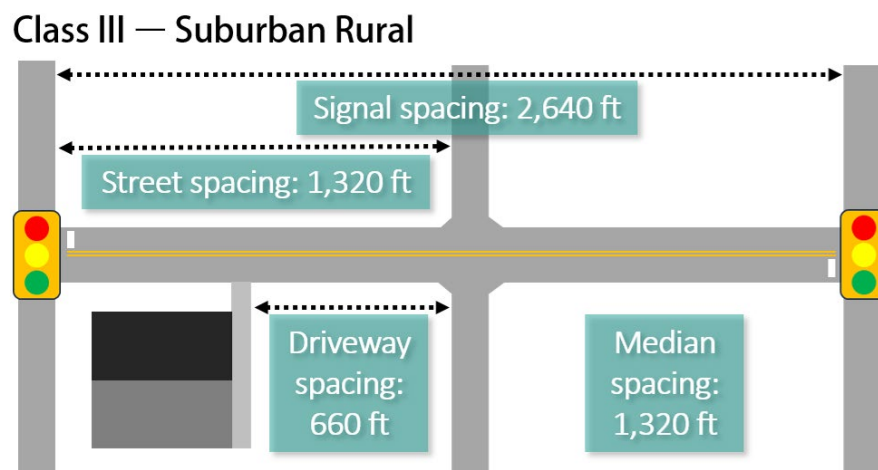


Figure 22. Suburban Rural Access Management Spacing Standard Recommendations

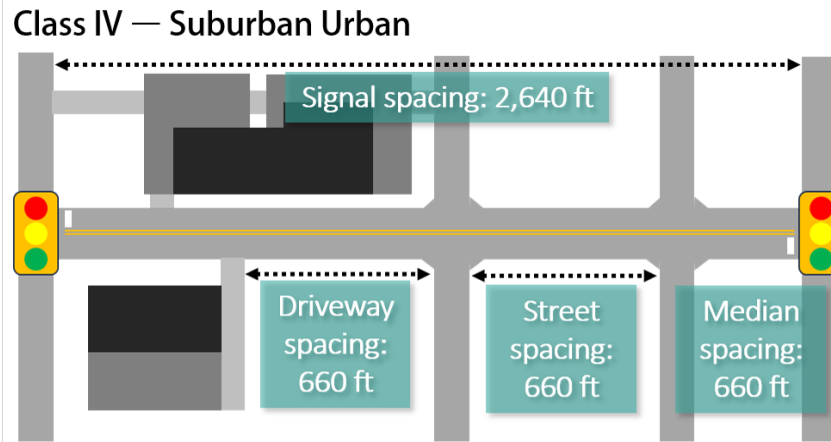


Figure 23. Suburban Urban Access Management Spacing Standard Recommendations

- Targeted Plan and/or Zoning for Bypass Road

Small Area Plan

As previously mentioned, there are a number of ways to implement the desired land use and transportation access management principles and strategies described in this study. The community, however, could especially benefit from the development of a small area plan for the Bypass Road corridor. This type of land use-transportation plan allows for a vision to be established specific to the corridor, which is beneficial given the presence of large, undeveloped tracts of land along the corridor. Identifying an end goal and establishing guidelines and standards in tandem to work towards that goal can result in a more well-thought-out corridor that adequately and appropriately balances mobility and accessibility. Without a clear vision, growing corridors can deteriorate aesthetically and functionally through haphazard, single development-focused decisions. Having a land use and transportation vision that is supported by residents and stakeholders will ultimately lead to more desirable results.

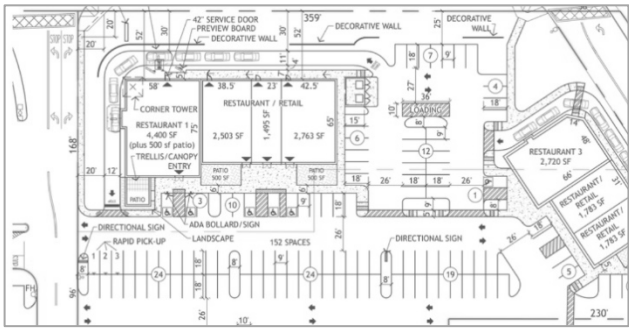
Overlay Zoning

An overlay zone is essentially a zone where special regulations (or incentives) apply in addition to the existing zoning requirements already assigned to the underlying parcels. These regulations or guidelines often relate to specific building materials, development patterns and requirements, or access management requirements, in order to achieve a common vision or goal. These zones can include both mandatory and optional guidelines to accomplish specific land use and/or transportation goals or avoid specific issues.

In relation to this corridor study, the City of Winchester could consider the use of an overlay zone for the Bypass Road corridor given the desire to accomplish specific access management and development goals. On the other hand, incorporating basic access management language and principles into the zoning code could suffice depending upon the scale of the community's goals and desires. An overlay zone can either be established through an independent effort or can be outlined in a small area plan.

- **Master Plan Development for Undeveloped Sites**

The City should consider requiring a master plan for large parcel developments that are located along collector and arterial roadways for access management and site design purposes (building orientation, non-motorized connectivity, driveway design, etc.). Ensure that the plan illustrates the overall design for the entire site. Forethought into site design and site access planning before construction begins helps to minimize the negative impacts that can result from a large development if not properly planned for. Local land use regulations should require applicants to present a site and construction plan for parcels of a specific size identified by the City. If a community-wide regulation is not desired, consider identifying select key undeveloped sites along a corridor and develop a coordinated access management plan to achieve transportation safety and mobility goals.



- **Traffic Impact Study Requirements**

New developments affect the surrounding roadway network by adding additional vehicular and non-motorized trips and/or altering existing travel patterns. This is especially true for developments of significant size. In addition to requiring master site plans, many communities also require traffic impact studies in order to better understand the impacts of such developments upon the roadway network during the development review process. The scope and complexity of a study depends upon the size, location, and type of the proposed development, particularly the number of trips the development is expected to generate. These studies are specifically intended to:

- Document and analyze proposed site accesses in accordance with desired location, spacing, and design standards
- Analyze operational impacts on the adjacent roadway network from the additional vehicular trips generated by the development
- Ensure that proposed internal traffic circulation plan promotes safe and efficient access between the development and surrounding roadway network
- Recommend on- and off-site improvements necessary for accommodating the new development in a manner that preserves the functionality of the adjacent roadway network, while also providing the necessary access to the new development

On- and off-site improvements, or mitigation measures, are a critical outcome of a traffic impact study. If the development's impact on the transportation system is measurable (analyzed largely by impacts to roadway and intersection level-of-services (LOS)), appropriate mitigation measures are identified to ease the impacts. Measures are scaled based upon the impacts to the transportation system. Examples of on- and off-site improvements that might be recommended in a traffic impact study are identified in Table

3. These must be addressed by the developer in order to obtain required development approvals and permits.

Table 3. Example Traffic Impact Study Mitigation Recommendations

Mitigation Category	Example Mitigation Measures
Roadway Improvements	<ul style="list-style-type: none"> • Sight distance improvements • Cross-section reconfigurations • Roadway repaving • Construction of acceleration/deceleration lanes • Pedestrian and bicycle improvements, such as construction of sidewalks or bike lanes • Street realignments
Intersection Improvements	<ul style="list-style-type: none"> • Addition (or extension) of left/right turn lanes • Construction of traffic signal • Traffic signal timing updates • Modification of traffic signal phasing • Pedestrian and bicycle improvements, such as ADA-compliant curb ramps or pedestrian signals
Access Management Improvements	<ul style="list-style-type: none"> • Constructing shared driveways • Installing median dividers • Reducing the number of driveways • Relocation of driveways and/or intersections • Increasing driveway spacing • Pedestrian and bicycle improvements, such as construction of pedestrian refuge islands
Site Plan/Land Use Improvements	<ul style="list-style-type: none"> • Reduction in development size • Adjustments to construction phasing plan • Adjusting driveway queue lengths and/or locations • Minor improvements or site plan adjustments to improve site circulation • On-site wayfinding improvements (signs and pavement markings)
<i>Source: TDOT</i>	

The City of Winchester should consider requiring traffic impact studies for new sizable developments. This provides the City with a means for balancing access and internal circulation needs of the development with the operational integrity of the adjacent roadways that serve the development. It also helps to ensure access management principles are appropriate accommodations for pedestrians and bicyclists.

Establishing procedures and requirements for traffic impact studies helps to create consistency and predictability for developers interested in the community. Core components most often included in these studies include trip generation calculations, analysis of existing

traffic conditions, background traffic growth calculations, future traffic growth calculations (with and without the development), capacity analyses, queuing analyses, and finally, the identification of mitigation measures. As previously mentioned, the scale of a traffic study is dependent upon the development's size, location, and type. The City should consider establishing thresholds to determine traffic impact study requirements. Table 4 describes TDOT's minimums for their required impact studies as well as the study area typically evaluated. This can be used as a guide for the City as they consider the use of traffic impact studies and establishing traffic generation thresholds.

Table 4. TDOT's Minimum Traffic Impact Study Thresholds

Traffic Study Level	Minimum Thresholds	Typical Study Area
1	<ul style="list-style-type: none"> • 50 to 99 new peak hour trips <i>or</i> • 250 to 499 new daily trips, whichever is greater 	All site access intersections to existing adjacent public roads and the existing adjacent public roads to the first control point* from all site access intersections.
2	<ul style="list-style-type: none"> • 100 to 249 new peak hour trips <i>or</i> • 500 to 2,999 new daily trips, whichever is greater 	All site access intersections to existing adjacent public roads, existing major public roads, and study intersections (signalized and unsignalized) within ¼ mile of all site access intersections.
3	<ul style="list-style-type: none"> • 250 to 399 new peak hour trips <i>or</i> • 3,000 to 5,999 new daily trips, whichever is greater 	All site access intersections to existing adjacent public roads, existing major public roads, and study intersections (signalized and unsignalized) within ½ mile of all site access intersections.
4	<ul style="list-style-type: none"> • ≥400 new peak hour trips <i>or</i> • ≥6,000 new daily trips, whichever is greater 	All site access intersections to existing adjacent public roads, existing major public roads, and study intersections (signalized and unsignalized) within ¾ mile of all site access intersections.
<p><i>*Control points are intersections controlled by traffic signal or stop signs. For cases where a traffic control device does not exist within a ¼ mile of a site access intersection, TDOT will determine the extent of the study area.</i></p>		
<p><i>Source: TDOT</i></p>		

V. CONCLUSION

By planning ahead for forecasted growth and development, the City of Winchester is more likely to preserve operational efficiency, improve safety, and properly accommodate non-motorized users along both study corridors. Establishing access management standards and traffic impact study requirements should be considered the next critical step for the City moving forward. City officials and elected bodies should further reference this plan as development continues to better understand development impacts to the transportation network and work towards desired goals for each corridor. Both Winchester's City Council and Planning Commission have adopted a resolution acknowledging the City would work towards the goals and implementation of recommendations contained within this plan.

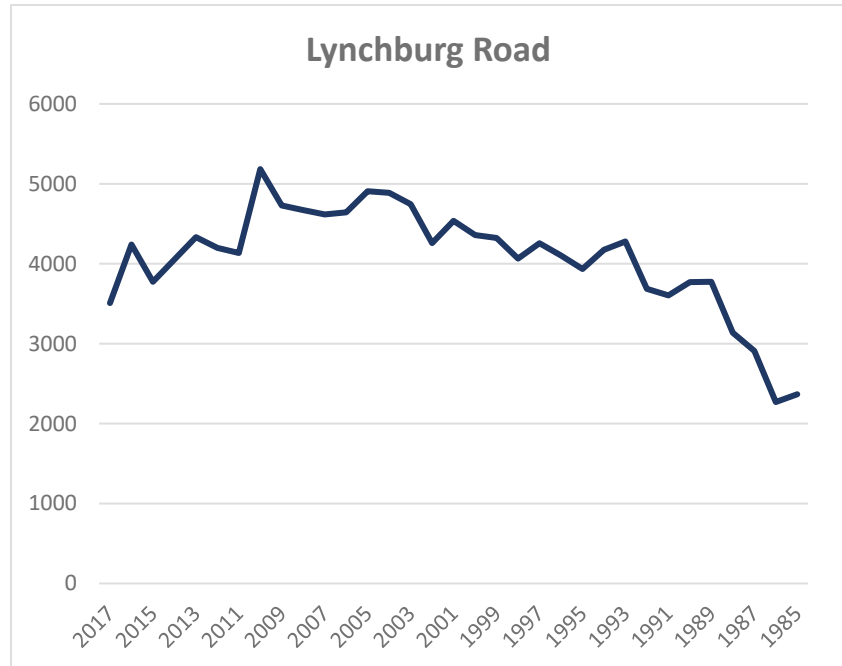
APPENDIX I. TDOT COUNT STATION TRENDS

Lynchburg Road

Station

#: 0000042

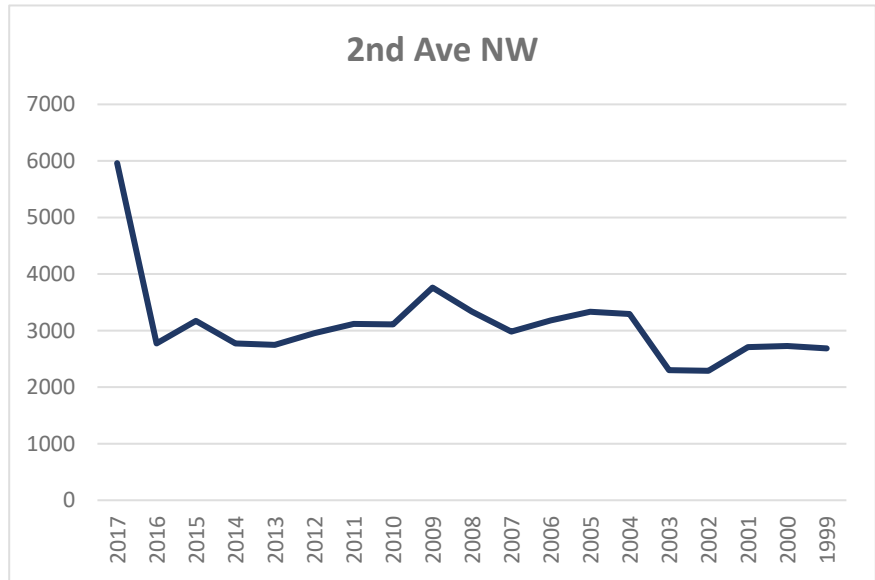
2017	3508
2016	4240
2015	3774
2014	4053
2013	4333
2012	4198
2011	4135
2010	5184
2009	4730
2008	4672
2007	4618
2006	4644
2005	4908
2004	4888
2003	4746
2002	4258
2001	4536
2000	4358
1999	4323
1998	4064
1997	4257
1996	4103
1995	3935
1994	4175
1993	4279
1992	3687
1991	3605
1990	3770
1989	3775
1988	3138
1987	2909
1986	2270
1985	2366



2nd Ave SW

Station #: 000131

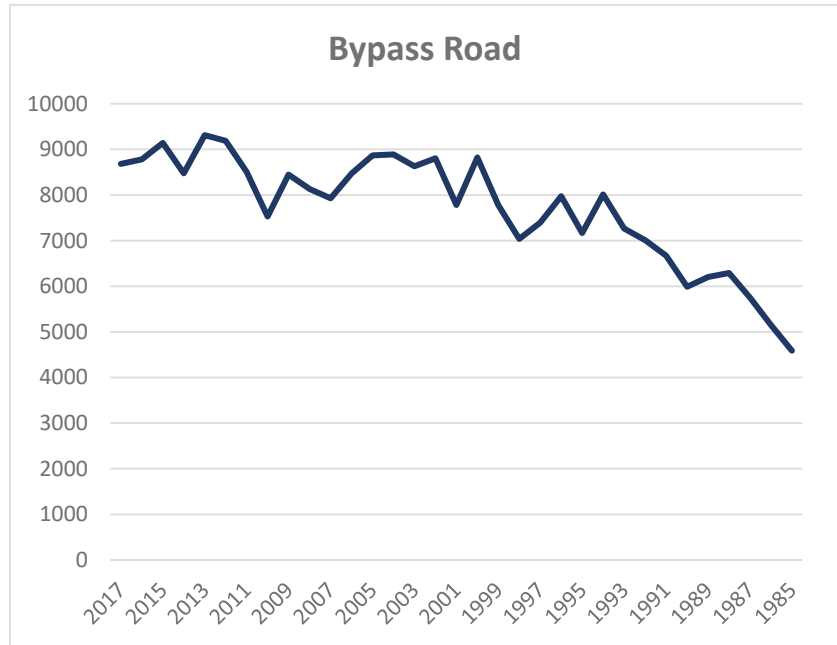
2017	5961
2016	2773
2015	3171
2014	2773
2013	2746
2012	2954
2011	3117
2010	3109
2009	3761
2008	3335
2007	2981
2006	3179
2005	3333
2004	3293
2003	2300
2002	2289
2001	2709
2000	2727
1999	2686



Bypass Road

Station #: 000074

2017	8683
2016	8780
2015	9141
2014	8474
2013	9312
2012	9188
2011	8507
2010	7528
2009	8446
2008	8132
2007	7930
2006	8473
2005	8870
2004	8888
2003	8630
2002	8806
2001	7782
2000	8823
1999	7777
1998	7036
1997	7396
1996	7974
1995	7167
1994	8011
1993	7266
1992	7011
1991	6670
1990	5989
1989	6203
1988	6292
1987	5749
1986	5150
1985	4587



APPENDIX II. EXISTING TURNING MOVEMENT COUNTS

BYPASS ROAD

Study Name 1- Hwy 41a_Decharde Blvd & Bypass Rd
Start Date Tuesday, December 11, 2018 7:00 AM
End Date Tuesday, December 11, 2018 6:00 PM
Site Code

Report Summary

Time Period	Class.	Southbound					Westbound					Northbound					Eastbound					Total					
		R	T	L	U	I	O	R	T	L	U	I	O	R	T	L	U	I	O	R	T			L	U	I	O
Peak 1	All Vehicles (no classification)	15	22	25	0	62	16	4	325	383	0	712	834	408	12	119	0	539	457	52	401	0	0	453	459	1766	N
Specified Period	%	100%	96%	100%	0%	98%	100%	100%	100%	100%	0%	100%	100%	100%	100%	0%	100%	100%	100%	100%	0%	0%	100%	100%	100%		
7:00 AM - 9:00 AM	Bicycles on Road	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	E
One Hour Peak	%	0%	4%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
7:15 AM - 8:15 AM	Total	15	23	25	0	63	16	4	325	383	0	712	834	408	12	119	0	539	458	52	401	0	0	453	459	1767	S
	PHF	0.47	0.82	0.78	0	0.88	0.57	0.33	0.71	0.71	0	0.81	0.88	0.86	0.5	0.58	0	0.77	0.7	0.57	0.91	0	0	0.9	0.68	0.82	
	Approach %					4%	1%					40%	47%					31%	26%					26%	26%		W
Peak 2	All Vehicles (no classification)	14	16	45	0	75	32	26	610	325	0	961	979	378	6	92	0	476	381	40	556	0	0	596	716	2108	N
Specified Period	%	100%	100%	100%	0%	100%	100%	100%	100%	100%	0%	100%	100%	100%	100%	0%	100%	100%	100%	100%	0%	0%	100%	100%	100%		
4:00 PM - 6:00 PM	Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	E
One Hour Peak	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		
4:00 PM - 5:00 PM	Total	14	16	45	0	75	32	26	610	325	0	961	979	378	6	92	0	476	381	40	556	0	0	596	716	2108	S
	PHF	0.7	0.67	0.8	0	0.82	0.73	0.65	0.87	0.9	0	0.94	0.88	0.84	0.5	0.64	0	0.88	0.94	0.71	0.92	0	0	0.93	0.92	0.93	
	Approach %					4%	2%					46%	46%					23%	18%					28%	34%		W

Study Name 2- Baxter Ln & Bypass Rd
Start Date Tuesday, December 11, 2018 7:00 AM
End Date Tuesday, December 11, 2018 6:00 PM
Site Code

Report Summary

Time Period	Class.	Southbound				Westbound				Northbound				Eastbound				Total									
		R	T	L	U	I	O	R	T	L	U	I	O	R	T	L	U			I	O						
Peak 1	All Vehicles (no classification)	7	505	68	0	580	586	95	7	26	0	128	123	43	467	15	0	525	567	36	12	24	0	72	29	1305	N
Specified Period	%	100%	100%	100%	0%	100%	100%	100%	100%	100%	0%	100%	100%	100%	100%	100%	0%	100%	100%	100%	100%	100%	0%	100%	100%	100%	
7:00 AM - 9:00 AM	Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	E
One Hour Peak	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
7:15 AM - 8:15 AM	Total	7	505	68	0	580	586	95	7	26	0	128	123	43	467	15	0	525	567	36	12	24	0	72	29	1305	S
	PHF	0.58	0.78	0.94	0	0.8	0.78	0.57	0.44	0.72	0	0.58	0.81	0.63	0.69	0.54	0	0.68	0.78	0.82	0.75	0.75	0	0.86	0.66	0.78	
	Approach %					44%	45%					10%	9%					40%	43%					6%	2%		W
Peak 2	All Vehicles (no classification)	6	350	62	0	418	495	115	1	17	0	133	79	9	375	7	0	391	388	21	8	5	0	34	14	976	N
Specified Period	%	100%	100%	100%	0%	100%	100%	100%	100%	100%	0%	100%	100%	100%	100%	100%	0%	100%	100%	100%	100%	100%	0%	100%	100%	100%	
4:00 PM - 6:00 PM	Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	E
One Hour Peak	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
4:00 PM - 5:00 PM	Total	6	350	62	0	418	495	115	1	17	0	133	79	9	375	7	0	391	388	21	8	5	0	34	14	976	S
	PHF	0.38	0.83	0.86	0	0.85	0.88	0.78	0.25	0.61	0	0.76	0.9	0.56	0.86	0.58	0	0.87	0.87	0.88	0.5	0.42	0	0.85	0.5	0.95	
	Approach %					43%	51%					14%	8%					40%	40%					3%	1%		W

Study Name 3- Georgia Crossing Rd & Bypass Rd
Start Date Tuesday, December 11, 2018 7:00 AM
End Date Tuesday, December 11, 2018 6:00 PM
Site Code

Report Summary

Time Period	Class.	Southbound					Westbound					Northbound					Total	
		T	L	U	I	O	R	L	U	I	O	R	T	U	I	O		
Peak 1	All Vehicles (no classification)	299	121	0	420	476	147	52	0	199	206	85	329	0	414	351	1033	N
Specified Period	%	100%	100%	0%	100%	100%	100%	100%	0%	100%	100%	100%	100%	0%	100%	100%	100%	
7:00 AM - 9:00 AM	Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	E
One Hour Peak	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
7:15 AM - 8:15 AM	Total	299	121	0	420	476	147	52	0	199	206	85	329	0	414	351	1033	S
	PHF	0.69	0.7	0	0.7	0.7	0.51	0.59	0	0.53	0.65	0.59	0.84	0	0.77	0.68	0.68	
	Approach %				41%	46%				19%	20%				40%	34%		
Peak 2	All Vehicles (no classification)	329	53	0	382	350	58	38	0	96	87	34	292	0	326	367	804	N
Specified Period	%	100%	100%	0%	100%	100%	100%	100%	0%	100%	100%	100%	100%	0%	100%	100%	100%	
4:00 PM - 6:00 PM	Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	E
One Hour Peak	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
4:00 PM - 5:00 PM	Total	329	53	0	382	350	58	38	0	96	87	34	292	0	326	367	804	S
	PHF	0.88	0.74	0	0.88	0.88	0.6	0.73	0	0.71	0.7	0.65	0.91	0	0.95	0.91	0.97	
	Approach %				48%	44%				12%	11%				41%	46%		

Study Name 4- Greenview Dr & Bypass Rd
Start Date Tuesday, December 11, 2018 7:00 AM
End Date Tuesday, December 11, 2018 6:00 PM
Site Code

Report Summary

Time Period	Class.	Southbound					Westbound					Northbound					Total	
		T	L	U	I	O	R	L	U	I	O	R	T	U	I	O		
Peak 1	All Vehicles (no classification)	350	0	0	350	417	0	6	0	6	3	3	417	0	420	356	776	N
Specified Period	%	100%	0%	0%	100%	100%	0%	100%	0%	100%	100%	100%	100%	0%	100%	100%	100%	
7:00 AM - 9:00 AM	Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	E
One Hour Peak	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
7:15 AM - 8:15 AM	Total	350	0	0	350	417	0	6	0	6	3	3	417	0	420	356	776	S
	PHF	0.66	0	0	0.66	0.82	0	0.5	0	0.5	0.38	0.38	0.82	0	0.83	0.67	0.75	
	Approach %				45%	54%				1%	0%			54%	46%			
Peak 2	All Vehicles (no classification)	364	1	0	365	322	1	4	0	5	7	6	321	0	327	368	697	N
Specified Period	%	100%	100%	0%	100%	100%	100%	100%	0%	100%	100%	100%	100%	0%	100%	100%	100%	
4:00 PM - 6:00 PM	Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	E
One Hour Peak	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
4:00 PM - 5:00 PM	Total	364	1	0	365	322	1	4	0	5	7	6	321	0	327	368	697	S
	PHF	0.89	0.25	0	0.89	0.96	0.25	0.5	0	0.62	0.88	0.75	0.96	0	0.96	0.88	0.95	
	Approach %				52%	46%				1%	1%			47%	53%			

Study Name 5- Woodcrest Dr & Bypass Rd
Start Date Tuesday, December 11, 2018 7:00 AM
End Date Tuesday, December 11, 2018 6:00 PM
Site Code

Report Summary

Time Period	Class.	Southbound						Westbound						Northbound						Total	
		T	L	U	I	O	R	L	U	I	O	R	T	U	I	O					
Peak 1	All Vehicles (no classification)	338	8	0	346	418	16	7	0	23	12	4	402	0	406	345	775	N			
Specified Period	%	100%	100%	0%	100%	100%	100%	100%	0%	100%	100%	100%	100%	0%	100%	100%	100%				
7:00 AM - 9:00 AM	Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	E			
One Hour Peak	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%				
7:15 AM - 8:15 AM	Total	338	8	0	346	418	16	7	0	23	12	4	402	0	406	345	775	S			
	PHF	0.75	1	0	0.75	0.82	0.5	0.58	0	0.72	0.75	0.5	0.82	0	0.83	0.74	0.8				
	Approach %				45%	54%				3%	2%				52%	45%					
Peak 2	All Vehicles (no classification)	363	22	0	385	300	12	3	0	15	29	7	288	0	295	366	695	N			
Specified Period	%	100%	100%	0%	100%	100%	100%	100%	0%	100%	100%	100%	100%	0%	100%	100%	100%				
4:00 PM - 6:00 PM	Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	E			
One Hour Peak	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%				
4:00 PM - 5:00 PM	Total	363	22	0	385	300	12	3	0	15	29	7	288	0	295	366	695	S			
	PHF	0.86	0.79	0	0.87	0.94	0.75	0.38	0	0.94	0.72	0.58	0.92	0	0.91	0.86	0.95				
	Approach %				55%	43%				2%	4%				42%	53%					

Study Name 6- Hwy 41a_Cowan Hwy & Bypass Rd
Start Date Tuesday, December 11, 2018 7:00 AM
End Date Tuesday, December 11, 2018 6:00 PM
Site Code

Report Summary

Time Period	Class.	Southbound				Westbound				Northbound				Eastbound				Total									
		R	T	L	U	I	O	R	T	L	U	I	O	R	T	L	U			I	O						
Peak 1	All Vehicles (no classification)	135	10	145	0	290	371	193	259	4	0	456	343	1	7	1	0	9	15	1	197	171	0	369	395	1124	N
Specified Period	%	100%	100%	100%	0%	100%	100%	100%	100%	0%	0%	100%	100%	100%	100%	100%	0%	100%	100%	100%	100%	100%	0%	100%	100%	100%	
7:00 AM - 9:00 AM	Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	E
One Hour Peak	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
7:15 AM - 8:15 AM	Total	135	10	145	0	290	371	193	259	4	0	456	343	1	7	1	0	9	15	1	197	171	0	369	395	1124	S
	PHF	0.66	0.62	0.91	0	0.76	0.87	0.83	0.81	0.5	0	0.83	0.9	0.25	0.88	0.25	0	0.75	0.62	0.25	0.9	0.61	0	0.74	0.79	0.84	
	Approach %					26%	33%					41%	31%					1%	1%					33%	35%		W
Peak 2	All Vehicles (no classification)	139	7	205	0	351	283	156	181	0	0	337	444	4	4	1	0	9	7	0	235	123	0	358	321	1055	N
Specified Period	%	100%	100%	100%	0%	100%	100%	100%	100%	0%	0%	100%	100%	100%	100%	100%	0%	100%	100%	0%	100%	100%	0%	100%	100%	100%	
4:00 PM - 6:00 PM	Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	1	0	1	E
One Hour Peak	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
4:15 PM - 5:15 PM	Total	139	7	205	0	351	283	156	181	0	0	337	445	4	4	1	0	9	7	0	236	123	0	359	321	1056	S
	PHF	0.94	0.58	0.92	0	0.91	0.92	0.91	0.89	0	0	0.91	0.9	0.5	0.5	0.25	0	0.75	0.58	0	0.89	0.73	0	0.83	0.9	0.94	
	Approach %					33%	27%					32%	42%					1%	1%					34%	30%		W

LYNCHBURG ROAD

Study Name 1- Lynchburg Rd & Hwy 50_George Fraley Pkwy
Start Date Tuesday, December 11, 2018 7:00 AM
End Date Tuesday, December 11, 2018 6:00 PM
Site Code Lynchburg Rd Corridor

Report Summary

Time Period	Class.	Northwestbound						Northeastbound					Southeastbound				Total	
		T	L	U	I	O	R	L	U	I	O	R	T	U	I	O		
Peak 1	les (no classi	151	206	0	357	151	77	10	0	87	214	8	74	0	82	161	526	SE
Specified Period	%	100%	100%	0%	100%	100%	100%	100%	0%	100%	100%	100%	100%	0%	100%	100%	100%	
7:00 AM - 9:00 AM	cycles on Roa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	SW
One Hour Peak	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
7:00 AM - 8:00 AM	Total	151	206	0	357	151	77	10	0	87	214	8	74	0	82	161	526	NW
	PHF	0.82	0.82	0	0.83	0.7	0.6	0.62	0	0.62	0.84	0.5	0.74	0	0.76	0.8	0.8	
	Approach %				68%	29%				17%	41%				16%	31%		
Peak 2	les (no classi	91	138	0	229	302	167	8	0	175	154	16	135	0	151	99	555	SE
Specified Period	%	100%	100%	0%	100%	100%	100%	100%	0%	100%	100%	100%	100%	0%	100%	100%	100%	
4:00 PM - 6:00 PM	cycles on Roa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	SW
One Hour Peak	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
4:15 PM - 5:15 PM	Total	91	138	0	229	302	167	8	0	175	154	16	135	0	151	99	555	NW
	PHF	0.73	0.88	0	0.88	0.92	0.85	0.33	0	0.89	0.94	0.33	0.77	0	0.67	0.67	0.98	
	Approach %				41%	54%				32%	28%				27%	18%		

Study Name 2- Lynchburg Rd & Twin Creeks Dr
Start Date Tuesday, December 11, 2018 7:00 AM
End Date Tuesday, December 11, 2018 6:00 PM
Site Code Lynchburg Rd Corridor

Report Summary

Time Period	Class.	Southbound				Westbound				Northbound				Eastbound				Total	Crosswalk										
		R	T	L	U	I	O	R	T	L	U	I	O	R	T	L	U		I	O	Pedestrians	Total							
Peak 1	All Vehicles (no classification)	3	0	7	0	10	9	6	85	0	0	91	231	1	0	0	0	1	0	0	223	3	0	226	88	328	N	0	0
Specified Period	%	100%	0%	100%	0%	100%	100%	100%	100%	0%	0%	100%	100%	100%	0%	0%	0%	100%	0%	0%	100%	100%	0%	100%	100%	100%		0%	0%
7:00 AM - 9:00 AM	Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	E	0	0
One Hour Peak	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		0%	0%
7:15 AM - 8:15 AM	Total	3	0	7	0	10	9	6	85	0	0	91	231	1	0	0	0	1	0	0	223	3	0	226	88	328	S	0	0
	PHF	0.38	0	0.58	0	0.83	0.75	0.75	0.57	0	0	0.58	0.86	0.25	0	0	0	0.25	0	0	0.86	0.75	0	0.87	0.59	0.78		0%	0%
	Approach %					3%	3%					28%	70%					0%	0%					69%	27%		W	0	0
																												0%	0%
																												0	0
Peak 2	All Vehicles (no classification)	1	0	8	0	9	15	10	176	0	0	186	154	0	0	0	0	0	0	0	146	5	0	151	177	346	N	1	1
Specified Period	%	100%	0%	100%	0%	100%	100%	100%	100%	0%	0%	100%	100%	0%	0%	0%	0%	0%	0%	0%	100%	100%	0%	100%	100%	100%		100%	100%
4:00 PM - 6:00 PM	Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	E	1	1
One Hour Peak	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		100%	100%
4:15 PM - 5:15 PM	Total	1	0	8	0	9	15	10	176	0	0	186	154	0	0	0	0	0	0	0	146	5	0	151	177	346	S	2	2
	PHF	0.25	0	0.67	0	0.75	0.75	0.83	0.98	0	0	0.97	0.94	0	0	0	0	0	0	0	0.94	0.62	0	0.94	0.96	0.95		100%	100%
	Approach %					3%	4%					54%	45%					0%	0%					44%	51%		W	0	0
																												0%	0%
																												4	4

Study Name 3- Lynchburg Rd & Duncan Ln
Start Date Tuesday, December 11, 2018 7:00 AM
End Date Tuesday, December 11, 2018 6:00 PM
Site Code Lynchburg Rd Corridor

Report Summary

Time Period	Class.	Westbound					Northbound					Eastbound					Total	
		T	L	U	I	O	R	L	U	I	O	R	T	U	I	O		
Peak 1	All Vehicles (no classification)	111	21	0	132	274	39	3	0	42	25	4	235	0	239	114	413	E
Specified Period	%	100%	100%	0%	100%	100%	100%	100%	0%	100%	100%	100%	100%	0%	100%	100%	100%	
7:00 AM - 9:00 AM	Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S
One Hour Peak	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
7:15 AM - 8:15 AM	Total	111	21	0	132	274	39	3	0	42	25	4	235	0	239	114	413	W
	PHF	0.71	0.58	0	0.69	0.83	0.75	0.75	0	0.75	0.57	0.5	0.84	0	0.83	0.71	0.84	
	Approach %				32%	66%				10%	6%				58%	28%		
Peak 2	All Vehicles (no classification)	201	38	0	239	196	28	4	0	32	44	6	168	0	174	205	445	E
Specified Period	%	100%	100%	0%	100%	100%	100%	100%	0%	100%	100%	100%	100%	0%	100%	100%	100%	
4:00 PM - 6:00 PM	Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S
One Hour Peak	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
4:15 PM - 5:15 PM	Total	201	38	0	239	196	28	4	0	32	44	6	168	0	174	205	445	W
	PHF	0.93	0.79	0	0.92	0.92	0.7	0.5	0	0.73	0.79	0.5	0.93	0	0.95	0.93	0.96	
	Approach %				54%	44%				7%	10%				39%	46%		

Study Name 4- Lynchburg Rd & Elm St
Start Date Tuesday, December 11, 2018 7:00 AM
End Date Tuesday, December 11, 2018 5:00 PM
Site Code Lynchburg Rd Corridor

Report Summary

Time Period	Class.	Southbound				Westbound				Northbound				Eastbound				Crosswalk											
		R	T	L	U	I	O	R	T	L	U	I	O	R	T	L	U	I	O	Total	Pedestrians	Total							
Peak 1	All Vehicles (no classification)	40	0	1	0	41	67	5	83	1	0	89	202	1	0	0	0	1	1	0	200	62	0	262	123	393	N	0	0
Specified Period	%	100%	0%	100%	0%	100%	100%	100%	100%	0%	100%	100%	100%	0%	0%	0%	100%	100%	0%	100%	100%	0%	100%	100%	100%		0%		
7:00 AM - 9:00 AM	Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	E	0	0
One Hour Peak	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		0%		
7:15 AM - 8:15 AM	Total	40	0	1	0	41	67	5	83	1	0	89	202	1	0	0	0	1	1	0	200	62	0	262	123	393	S	0	0
	PHF	0.59	0	0.25	0	0.6	0.73	0.31	0.74	0.25	0	0.7	0.92	0.25	0	0	0	0.25	0.25	0	0.91	0.82	0	0.9	0.68	0.83		0%	
	Approach %					10%	17%					23%	51%					0%	0%					67%	31%		W	0	0
																												0%	
																												0	0
Peak 2	All Vehicles (no classification)	57	0	2	0	59	48	2	155	0	0	157	130	0	0	0	0	0	0	0	128	46	0	174	212	390	N	0	0
Specified Period	%	100%	0%	100%	0%	100%	98%	100%	100%	0%	0%	100%	100%	0%	0%	0%	0%	0%	0%	100%	100%	0%	100%	100%	100%		0%		
4:00 PM - 5:00 PM	Bicycles on Road	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0	1	E	6	6
One Hour Peak	%	0%	0%	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	100%	0%	0%	0%	0%	0%	0%	0%	0%	100%		
4:00 PM - 5:00 PM	Total	57	0	2	0	59	49	2	155	0	0	157	130	0	1	0	0	1	0	0	128	46	0	174	212	391	S	1	1
	PHF	0.89	0	0.25	0	0.87	0.61	0.5	0.82	0	0	0.84	0.88	0	0.25	0	0	0.25	0	0	0.86	0.61	0	0.93	0.84	0.91		100%	
	Approach %					15%	13%					40%	33%					0%	0%					45%	54%		W	0	0
																												0%	
																												7	7

Study Name 5- Lynchburg Rd & N Cedar St
Start Date Tuesday, December 11, 2018 7:00 AM
End Date Tuesday, December 11, 2018 6:00 PM
Site Code Lynchburg Rd Corridor

Report Summary

Time Period	Class.	Westbound					Northbound					Eastbound					Crosswalk			
		T	L	U	I	O	R	L	U	I	O	R	T	U	I	O	Total	Pedestrians	Total	
Peak 1	All Vehicles (no classification)	36	1	0	37	94	0	61	0	61	105	104	94	0	198	97	296	E	0	0
Specified Period	%	100%	100%	0%	100%	100%	0%	100%	0%	100%	100%	100%	100%	0%	100%	100%	100%		0%	
7:00 AM - 9:00 AM	Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0
One Hour Peak	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		0%	
7:30 AM - 8:30 AM	Total	36	1	0	37	94	0	61	0	61	105	104	94	0	198	97	296	W	0	0
	PHF	0.6	0.25	0	0.62	0.64	0	0.85	0	0.85	0.85	0.84	0.64	0	0.8	0.76	0.84		0%	
	Approach %				13%	32%				21%	35%				67%	33%			0	0
Peak 2	All Vehicles (no classification)	64	1	0	65	65	2	140	0	142	69	68	63	0	131	204	338	E	0	0
Specified Period	%	100%	100%	0%	100%	100%	100%	100%	0%	100%	100%	100%	100%	0%	100%	100%	100%		0%	
4:00 PM - 6:00 PM	Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	S	0	0
One Hour Peak	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%		0%	
4:15 PM - 5:15 PM	Total	64	1	0	65	65	2	140	0	142	69	68	63	0	131	204	338	W	1	1
	PHF	0.73	0.25	0	0.74	0.81	0.25	0.85	0	0.87	0.69	0.68	0.79	0	0.73	0.94	0.85		100%	
	Approach %				19%	19%				42%	20%				39%	60%			1	1

Study Name 6- 2nd Ave NW & N Cedar St
Start Date Tuesday, December 11, 2018 7:00 AM
End Date Tuesday, December 11, 2018 6:00 PM
Site Code Lynchburg Rd Corridor

Report Summary

Time Period	Class.	Southbound					Westbound					Eastbound					Total	
		R	L	U	I	O	R	T	U	I	O	T	L	U	I	O		
Peak 1	les (no classi	6	101	0	107	60	46	27	0	73	122	21	14	0	35	33	215	N
Specified Period	%	100%	100%	0%	100%	100%	100%	100%	0%	100%	100%	100%	100%	0%	100%	100%	100%	
7:00 AM - 9:00 AM	cycles on Ro	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	E
One Hour Peak	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
7:15 AM - 8:15 AM	Total	6	101	0	107	60	46	27	0	73	122	21	14	0	35	33	215	W
	PHF	0.5	0.94	0	0.89	0.75	0.77	0.75	0	0.76	0.92	0.88	0.58	0	0.73	0.69	0.85	
	Approach %				50%	28%				34%	57%				16%	15%		
Peak 2	les (no classi	5	68	0	73	158	134	24	0	158	89	21	24	0	45	29	276	N
Specified Period	%	100%	100%	0%	100%	100%	100%	100%	0%	100%	100%	100%	100%	0%	100%	100%	100%	
4:00 PM - 6:00 PM	cycles on Ro	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	E
One Hour Peak	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
4:30 PM - 5:30 PM	Total	5	68	0	73	158	134	24	0	158	89	21	24	0	45	29	276	W
	PHF	0.42	0.71	0	0.73	0.94	0.86	0.67	0	0.92	0.77	0.66	0.67	0	0.75	0.6	0.91	
	Approach %				26%	57%				57%	32%				16%	11%		

Study Name 7- 2nd Ave NW & S Vine St
Start Date Tuesday, December 11, 2018 7:00 AM
End Date Tuesday, December 11, 2018 6:00 PM
Site Code Lynchburg Rd Corridor

Report Summary

Time Period	Class.	Southbound				Westbound				Northbound				Eastbound				Crosswalk												
		R	T	L	U	I	O	R	T	L	U	I	O	R	T	L	U	I	O	Total	Pedestrians	Total								
Peak 1	All Vehicles (no classification)	0	9	69	0	78	34	23	73	5	0	101	187	2	8	0	0	10	19	5	116	3	0	124	73	313	N	0	0	
Specified Period	%	0%	100%	100%	0%	100%	100%	100%	100%	0%	100%	100%	100%	100%	100%	0%	0%	100%	100%	100%	100%	0%	100%	100%	100%	100%	100%	0%	0%	
7:00 AM - 9:00 AM	Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	E	0	0	
One Hour Peak	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
7:15 AM - 8:15 AM	Total	0	9	69	0	78	34	23	73	5	0	101	187	2	8	0	0	10	19	5	116	3	0	124	73	313	S	0	0	
	PHF	0	0.75	0.75	0	0.78	0.71	0.72	0.76	0.62	0	0.74	0.9	0.5	0.67	0	0	0.62	0.59	0.42	0.88	0.38	0	0.89	0.76	0.9		0%	0%	
	Approach %					25%	11%					32%	60%					3%	6%					40%	23%		W	0	0	
																												0%	0%	
																												0	0	
Peak 2	All Vehicles (no classification)	0	14	50	0	64	86	60	151	5	0	216	137	2	19	6	0	27	19	0	85	7	0	92	157	399	N	2	2	
Specified Period	%	0%	93%	100%	0%	98%	100%	100%	100%	100%	0%	100%	100%	100%	100%	100%	0%	100%	95%	0%	100%	100%	0%	100%	100%	100%	100%	100%	100%	
4:00 PM - 6:00 PM	Bicycles on Road	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	E	0	0
One Hour Peak	%	0%	7%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	5%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
4:15 PM - 5:15 PM	Total	0	15	50	0	65	86	60	151	5	0	216	137	2	19	6	0	27	20	0	85	7	0	92	157	400	S	0	0	
	PHF	0	0.54	0.78	0	0.71	0.9	0.88	0.88	0.42	0	0.93	0.82	0.5	0.59	0.75	0	0.68	0.62	0	0.76	0.58	0	0.77	0.89	0.96		0%	0%	
	Approach %					16%	22%					54%	34%					7%	5%					23%	39%		W	0	0	
																												0%	0%	
																												2	2	

Study Name 8- 2nd Ave NW & N High St
Start Date Tuesday, December 11, 2018 7:00 AM
End Date Tuesday, December 11, 2018 6:00 PM
Site Code Lynchburg Rd Corridor






















Report Summary

Time Period	Class.	Southbound				Westbound				Northbound				Eastbound				Crosswalk												
		R	T	L	U	I	O	R	T	L	U	I	O	R	T	L	U	I	O	Total	Pedestrians	Total								
Peak 1	All Vehicles (no classification)	19	198	76	0	293	144	31	77	3	0	111	269	27	106	13	0	146	220	19	166	7	0	192	109	742	N	0	0	
Specified Period	%	100%	100%	100%	0%	100%	100%	100%	100%	0%	100%	100%	100%	100%	100%	100%	0%	100%	100%	100%	100%	0%	100%	100%	100%	100%	100%	0%	0%	0%
7:00 AM - 9:00 AM	Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	E	2	2	
One Hour Peak	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	
7:15 AM - 8:15 AM	Total	19	198	76	0	293	144	31	77	3	0	111	269	27	106	13	0	146	220	19	166	7	0	192	109	742	S	0	0	
	PHF	0.68	0.76	0.79	0	0.82	0.95	0.78	0.77	0.25	0	0.82	0.91	0.56	0.88	0.46	0	0.94	0.8	0.79	0.9	0.58	0	0.91	0.72	0.94		0%	0%	
	Approach %					39%	19%					15%	36%					20%	30%					26%	15%		W	0	0	
																												0%	0%	
																												2	2	
Peak 2	All Vehicles (no classification)	13	111	49	0	173	239	63	172	6	0	241	190	31	163	40	0	234	134	17	110	13	0	140	225	788	N	6	6	
Specified Period	%	100%	100%	100%	0%	100%	100%	100%	100%	0%	100%	100%	100%	100%	100%	100%	0%	100%	100%	100%	100%	0%	100%	100%	100%	100%	100%	100%	100%	100%
4:00 PM - 6:00 PM	Bicycles on Road	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	E	1	1	
One Hour Peak	%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%	0%	0%	
4:15 PM - 5:15 PM	Total	13	111	49	0	173	239	63	172	6	0	241	190	31	163	40	0	234	134	17	110	13	0	140	225	788	S	0	0	
	PHF	0.81	0.77	0.82	0	0.83	0.77	0.75	0.93	0.5	0	0.97	0.83	0.86	0.83	0.83	0	0.91	0.71	0.53	0.71	0.41	0	0.81	0.94	0.92		0%	0%	
	Approach %					22%	30%					31%	24%					30%	17%					18%	29%		W	0	0	
																												0%	0%	
																												7	7	

APPENDIX III. SYNCHRO MODEL OUTPUTS

HCM Signalized Intersection Capacity Analysis
 11: Bypass Rd/Shopping Center & Dechard Blvd

Existing Conditions - AM Peak Hour
 05/21/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	401	52	383	325	4	119	12	408	25	23	15
Future Volume (vph)	0	401	52	383	325	4	119	12	408	25	23	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0	5.0	5.0			5.0	5.0		5.0	5.0
Lane Util. Factor		0.96	1.00	0.97	0.96			1.00	1.00		1.00	1.00
Flt		1.00	0.85	1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00			0.96	1.00		0.97	1.00
Satd. Flow (prot)		3185	1425	3090	3180			1604	1425		1634	1425
Flt Permitted		1.00	1.00	0.95	1.00			0.71	1.00		0.83	1.00
Satd. Flow (perm)		3185	1425	3090	3180			1187	1425		1384	1425
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	436	57	416	353	4	129	13	443	27	25	16
RTOR Reduction (vph)	0	0	35	0	0	0	0	0	343	0	0	12
Lane Group Flow (vph)	0	436	22	416	357	0	0	142	100	0	52	4
Turn Type	pm+pt	NA	Perm	Prot	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2		2				4		4	8		8
Actuated Green, G (s)		35.4	35.4	20.2	60.6			20.5	20.5		20.5	20.5
Effective Green, g (s)		35.4	35.4	20.2	60.6			20.5	20.5		20.5	20.5
Actuated g/C Ratio		0.39	0.39	0.22	0.67			0.23	0.23		0.23	0.23
Clearance Time (s)		5.0	5.0	5.0	5.0			5.0	5.0		5.0	5.0
Vehicle Extension (s)		5.0	5.0	4.0	5.0			5.0	5.0		5.0	5.0
Lane Grp Cap (vph)		1237	553	685	2115			267	320		311	320
w/s Ratio Prot		c0.14		c0.13	0.11							
w/s Ratio Perm			0.02					c0.12	0.07		0.04	0.00
w/c Ratio		0.35	0.04	0.61	0.17			0.53	0.31		0.17	0.01
Uniform Delay, d1		19.7	17.3	31.9	5.8			31.1	29.4		28.4	27.4
Progression Factor		1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2		0.4	0.1	1.8	0.1			3.7	1.2		0.5	0.0
Delay (s)		20.1	17.4	33.7	5.8			34.8	30.6		29.0	27.5
Level of Service		C	B	C	A			C	C		C	C
Approach Delay (s)		19.8			20.8			31.6			28.6	
Approach LOS		B			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			24.1									C
HCM 2000 Volume to Capacity ratio			0.50									
Actuated Cycle Length (s)			91.1						20.0			
Intersection Capacity Utilization			78.1%									D
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 12: Bypass Rd & Grant Street/Baxter Lane













Existing Conditions - AM Peak Hour
 05/21/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕	↗		↕	↗	↗	↖		↖	↖		
Traffic Volume (vph)	24	12	36	26	7	95	15	467	43	68	505	7	
Future Volume (vph)	24	12	36	26	7	95	15	467	43	68	505	7	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		5.0	5.0		5.0	5.0	5.0	5.0		5.0	5.0		
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00		
Frt		1.00	0.85		1.00	0.85	1.00	0.99		1.00	1.00		
Flt Protected		0.97	1.00		0.96	1.00	0.95	1.00		0.95	1.00		
Satd. Flow (prot)		1803	1583		1793	1583	1770	1839		1770	1859		
Flt Permitted		0.97	1.00		0.96	1.00	0.35	1.00		0.27	1.00		
Satd. Flow (perm)		1803	1583		1793	1583	655	1839		502	1859		
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)	26	13	39	28	8	103	16	508	47	74	549	8	
RTOR Reduction (vph)	0	0	36	0	0	90	0	3	0	0	0	0	
Lane Group Flow (vph)	0	39	3	0	36	13	16	552	0	74	557	0	
Turn Type	Split	NA	Perm	Split	NA	Perm	pm+pt	NA		pm+pt	NA		
Protected Phases	3	3		4	4		5	2		1	6		
Permitted Phases			3			4	2			6			
Actuated Green, G (s)		7.3	7.3		10.6	10.6	45.6	42.3		53.2	46.1		
Effective Green, g (s)		7.3	7.3		10.6	10.6	45.6	42.3		53.2	46.1		
Actuated g/C Ratio		0.08	0.08		0.12	0.12	0.52	0.48		0.61	0.53		
Clearance Time (s)		5.0	5.0		5.0	5.0	5.0	5.0		5.0	5.0		
Vehicle Extension (s)		4.0	4.0		5.0	5.0	4.0	5.0		4.0	5.0		
Lane Grp Cap (vph)		150	132		217	192	384	891		409	981		
w/s Ratio Prot		c0.02			c0.02		0.00	c0.30		c0.01	c0.30		
w/s Ratio Perm			0.00			0.01	0.02			0.10			
w/c Ratio		0.26	0.02		0.17	0.07	0.04	0.62		0.18	0.57		
Uniform Delay, d1		37.5	36.7		34.4	34.0	10.6	16.6		9.2	13.9		
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00		
Incremental Delay, d2		1.3	0.1		0.8	0.3	0.1	1.9		0.3	1.2		
Delay (s)		38.7	36.8		35.1	34.3	10.7	18.5		9.5	15.1		
Level of Service		D	D		D	C	B	B		A	B		
Approach Delay (s)		37.8			34.5			18.3			14.5		
Approach LOS		D			C			B			B		
Intersection Summary													
HCM 2000 Control Delay			19.2		HCM 2000 Level of Service						B		
HCM 2000 Volume to Capacity ratio			0.47										
Actuated Cycle Length (s)			87.3		Sum of lost time (s)						20.0		
Intersection Capacity Utilization			60.5%		ICU Level of Service						B		
Analysis Period (min)			15										

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 13: Bypass Rd & Georgia Crossing Rd


Existing Conditions - AM Peak Hour
 05/21/2019

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	52	147	329	85	121	299
Future Volume (vph)	52	147	329	85	121	299
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	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)	1770	1583	1863	1583	1770	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.39	1.00
Satd. Flow (perm)	1770	1583	1863	1583	724	1863
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	57	160	358	92	132	325
RTOR Reduction (vph)	0	135	0	40	0	0
Lane Group Flow (vph)	57	25	358	52	132	325
Turn Type	Prot	Perm	NA	pm+ov	pm+pt	NA
Protected Phases	4		2	4	1	5
Permitted Phases		4		2	5	
Actuated Green, G (s)	8.3	8.3	21.4	29.7	33.9	33.9
Effective Green, g (s)	8.3	8.3	21.4	29.7	33.9	33.9
Actuated g/C Ratio	0.16	0.16	0.41	0.57	0.65	0.65
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	4.0	4.0	5.0	4.0	4.0	5.0
Lane Grp Cap (vph)	281	251	763	1052	620	1209
w/s Ratio Prot	c0.03		c0.19	0.01	0.03	c0.17
w/s Ratio Perm		0.02		0.03	0.11	
w/c Ratio	0.20	0.10	0.47	0.05	0.21	0.27
Uniform Delay, d1	19.1	18.8	11.3	5.0	4.1	3.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	0.2	1.0	0.0	0.2	0.3
Delay (s)	19.6	19.0	12.2	5.0	4.3	4.1
Level of Service	B	B	B	A	A	A
Approach Delay (s)	19.2		10.7			4.2
Approach LOS	B		B			A
Intersection Summary						
HCM 2000 Control Delay			9.7	HCM 2000 Level of Service		A
HCM 2000 Volume to Capacity ratio			0.39			
Actuated Cycle Length (s)			52.2	Sum of lost time (s)	15.0	
Intersection Capacity Utilization			42.3%	ICU Level of Service	A	
Analysis Period (min)			15			

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 14: Bypass Rd & Greenview Dr

Existing Conditions - AM Peak Hour
 05/21/2019

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		Y			Y
Traffic Volume (veh/h)	6	0	417	3	0	350
Future Volume (veh/h)	6	0	417	3	0	350
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	0	453	3	0	380
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	834	454			456	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	834	454			456	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	100			100	
cM capacity (veh/h)	338	606			1105	
Direction, Lane #						
	WB 1	NB 1	SB 1			
Volume Total	7	456	380			
Volume Left	7	0	0			
Volume Right	0	3	0			
cSH	338	1700	1105			
Volume to Capacity	0.02	0.27	0.00			
Queue Length 95th (ft)	2	0	0			
Control Delay (s)	15.9	0.0	0.0			
Lane LOS	C					
Approach Delay (s)	15.9	0.0	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			32.1%	ICU Level of Service	A	
Analysis Period (min)			15			

Intersection						
Int Delay, s/veh	0.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		P			↑
Traffic Vol, veh/h	6	0	417	3	0	350
Future Vol, veh/h	6	0	417	3	0	350
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	7	0	453	3	0	380
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	835	455	0	0	457	0
Stage 1	455	-	-	-	-	-
Stage 2	380	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3,518	3,318	-	-	2,218	-
Pot Cap-1 Maneuver	338	605	-	-	1104	-
Stage 1	639	-	-	-	-	-
Stage 2	691	-	-	-	-	-
Platoon blocked, %						
Mov Cap-1 Maneuver	338	605	-	-	1104	-
Mov Cap-2 Maneuver	338	-	-	-	-	-
Stage 1	639	-	-	-	-	-
Stage 2	691	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	15.9	0	0			
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	338	1104		
HCM Lane V/C Ratio	-	-	0.019	-		
HCM Control Delay (s)	-	-	15.9	0		
HCM Lane LOS	-	-	C	A		
HCM 95th %tile Q(veh)	-	-	0.1	0		

HCM Unsignalized Intersection Capacity Analysis
 15: Bypass Rd & Woodcrest Drive

Existing Conditions - AM Peak Hour
 05/21/2019

	↙	↖	↑	↗	↘	↓
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↘		↗			↘
Traffic Volume (veh/h)	7	16	402	4	8	338
Future Volume (veh/h)	7	16	402	4	8	338
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	17	437	4	9	367
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						
			None		None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume						
		824	439			441
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol						
		824	439			441
tC, single (s)						
		6.4	6.2			4.1
tC, 2 stage (s)						
tF (s)						
		3.5	3.3			2.2
p0 queue free %						
		98	97			99
cM capacity (veh/h)						
		340	618			1119
Direction, Lane #						
	WB 1	NB 1	SB 1			
Volume Total	25	441	376			
Volume Left	8	0	9			
Volume Right	17	4	0			
cSH	490	1700	1119			
Volume to Capacity	0.05	0.26	0.01			
Queue Length 95th (ft)	4	0	1			
Control Delay (s)	12.7	0.0	0.3			
Lane LOS	B		A			
Approach Delay (s)	12.7	0.0	0.3			
Approach LOS	B					
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			34.2%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM 2010 TWSC
15: Bypass Rd & Woodcrest Drive

Existing Conditions - AM Peak Hour
05/21/2019

Intersection						
Int Delay, s/veh	0.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		P			↑
Traffic Vol, veh/h	7	16	402	4	8	338
Future Vol, veh/h	7	16	402	4	8	338
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	8	17	437	4	9	367
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	824	439	0	0	441	0
Stage 1	439	-	-	-	-	-
Stage 2	385	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3,518	3,318	-	-	2,218	-
Pot Cap-1 Maneuver	343	618	-	-	1119	-
Stage 1	650	-	-	-	-	-
Stage 2	688	-	-	-	-	-
Platoon blocked, %						
Mov Cap-1 Maneuver	340	618	-	-	1119	-
Mov Cap-2 Maneuver	340	-	-	-	-	-
Stage 1	650	-	-	-	-	-
Stage 2	681	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	12.7	0	0.2			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBRWBLn1	SBL	SBT		
Capacity (veh/h)	-	-	495	1119	-	
HCM Lane V/C Ratio	-	-	0.051	0.008	-	
HCM Control Delay (s)	-	-	12.7	8.2	0	
HCM Lane LOS	-	-	B	A	A	
HCM 95th %tile Q(veh)	-	-	0.2	0	-	

HCM Signalized Intersection Capacity Analysis Existing Conditions - AM Peak Hour
 16: Connection to Old Mill/Bypass Rd & Hw 41A/Cowan Highway 05/21/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↖	↗		↖	↗			↕			↖	↗	
Traffic Volume (vph)	171	197	1	4	259	193	1	7	1	145	10	135	
Future Volume (vph)	171	197	1	4	259	193	1	7	1	145	10	135	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0			5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	1.00	
Flt	1.00	1.00		1.00	0.94			0.99			1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.96	1.00	
Satd. Flow (prot)	1770	1861		1770	1743			1828			1780	1583	
Flt Permitted	0.27	1.00		0.62	1.00			1.00			0.96	1.00	
Satd. Flow (perm)	499	1861		1162	1743			1828			1780	1583	
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)	186	214	1	4	282	210	1	8	1	158	11	147	
RTOR Reduction (vph)	0	0	0	0	21	0	0	1	0	0	0	123	
Lane Group Flow (vph)	186	215	0	4	471	0	0	9	0	0	169	24	
Turn Type	pm+pt	NA		pm+pt	NA		Split	NA		Split	NA	Perm	
Protected Phases	1	6		5	2		4	4		3	3		
Permitted Phases	6			2								3	
Actuated Green, G (s)	44.1	38.2		31.0	30.1			1.0			11.6	11.6	
Effective Green, g (s)	44.1	38.2		31.0	30.1			1.0			11.6	11.6	
Actuated g/C Ratio	0.62	0.53		0.43	0.42			0.01			0.16	0.16	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	5.0	
Vehicle Extension (s)	3.0	4.0		3.0	4.0			3.0			3.0	3.0	
Lane Grp Cap (vph)	466	991		510	731			25			287	256	
w/s Ratio Prot	c0.05	0.12		0.00	c0.27			c0.00			c0.09		
w/s Ratio Perm	0.20			0.00								0.02	
w/c Ratio	0.40	0.22		0.01	0.64			0.36			0.59	0.09	
Uniform Delay, d1	8.1	8.8		11.6	16.5			35.0			27.8	25.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	1.00	
Incremental Delay, d2	0.6	0.2		0.0	2.2			8.7			3.1	0.2	
Delay (s)	8.7	9.0		11.6	18.7			43.7			30.9	25.7	
Level of Service	A	A		B	B			D			C	C	
Approach Delay (s)		8.8			18.7			43.7			28.5		
Approach LOS		A			B			D			C		
Intersection Summary													
HCM 2000 Control Delay			18.2		HCM 2000 Level of Service						B		
HCM 2000 Volume to Capacity ratio			0.59										
Actuated Cycle Length (s)			71.7		Sum of lost time (s)						20.0		
Intersection Capacity Utilization			62.6%		ICU Level of Service						B		
Analysis Period (min)			15										

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 11: Bypass Rd/Shopping Center & Dechard Blvd

Existing Conditions - PM Peak Hour
 05/21/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	556	40	325	610	26	92	6	378	45	16	14
Future Volume (vph)	0	556	40	325	610	26	92	6	378	45	16	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0	5.0	5.0			5.0	5.0		5.0	5.0
Lane Util. Factor		0.96	1.00	0.97	0.96			1.00	1.00		1.00	1.00
Flt		1.00	0.85	1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00			0.96	1.00		0.96	1.00
Satd. Flow (prot)		3185	1425	3090	3166			1602	1425		1616	1425
Flt Permitted		1.00	1.00	0.95	1.00			0.69	1.00		0.74	1.00
Satd. Flow (perm)		3185	1425	3090	3166			1161	1425		1244	1425
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	604	43	353	663	28	100	7	411	49	17	15
RTOR Reduction (vph)	0	0	25	0	1	0	0	0	327	0	0	12
Lane Group Flow (vph)	0	604	18	353	690	0	0	107	84	0	66	3
Turn Type	pm+pt	NA	Perm	Prot	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2		2				4		4	8		8
Actuated Green, G (s)		35.5	35.5	17.1	57.6			17.3	17.3		17.3	17.3
Effective Green, g (s)		35.5	35.5	17.1	57.6			17.3	17.3		17.3	17.3
Actuated g/C Ratio		0.42	0.42	0.20	0.68			0.20	0.20		0.20	0.20
Clearance Time (s)		5.0	5.0	5.0	5.0			5.0	5.0		5.0	5.0
Vehicle Extension (s)		5.0	5.0	4.0	5.0			5.0	5.0		5.0	5.0
Lane Grp Cap (vph)		1331	595	622	2147			236	290		253	290
w/s Ratio Prot		c0.19		c0.11	0.22							
w/s Ratio Perm			0.01					c0.09	0.06		0.05	0.00
w/c Ratio		0.45	0.03	0.57	0.32			0.45	0.29		0.26	0.01
Uniform Delay, d1		17.7	14.6	30.6	5.6			29.7	28.6		28.4	27.0
Progression Factor		1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2		0.5	0.0	1.4	0.2			2.9	1.2		1.2	0.0
Delay (s)		18.3	14.6	32.0	5.8			32.5	29.8		29.6	27.0
Level of Service		B	B	C	A			C	C		C	C
Approach Delay (s)		18.0			14.7			30.3			29.1	
Approach LOS		B			B			C			C	
Intersection Summary												
HCM 2000 Control Delay			19.7									B
HCM 2000 Volume to Capacity ratio			0.52									
Actuated Cycle Length (s)			84.9									20.0
Intersection Capacity Utilization			76.0%									D
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 12: Bypass Rd & Grant Street/Baxter Lane













Existing Conditions - PM Peak Hour
 05/21/2019

	↖		→		↗		↖		→		↗		
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕	↗		↕	↗	↗	↕		↕	↗		
Traffic Volume (vph)	5	8	21	17	1	115	7	375	9	62	350	6	
Future Volume (vph)	5	8	21	17	1	115	7	375	9	62	350	6	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		5.0	5.0		5.0	5.0	5.0	5.0		5.0	5.0		
Lane Util. Factor		1.00	1.00		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		1.00	1.00		
Flt Protected		0.98	1.00		0.95	1.00	0.95	1.00		0.95	1.00		
Satd. Flow (prot)		1830	1583		1779	1583	1770	1856		1770	1858		
Flt Permitted		0.98	1.00		0.95	1.00	0.52	1.00		0.30	1.00		
Satd. Flow (perm)		1830	1583		1779	1583	976	1856		567	1858		
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)	5	9	23	18	1	125	8	408	10	67	380	7	
RTOR Reduction (vph)	0	0	21	0	0	100	0	1	0	0	1	0	
Lane Group Flow (vph)	0	14	2	0	19	25	8	417	0	67	386	0	
Turn Type	Split	NA	Perm	Split	NA	Perm	pm+pt	NA		pm+pt	NA		
Protected Phases	3	3		4	4		5	2		1	6		
Permitted Phases			3			4	2			6			
Actuated Green, G (s)		5.2	5.2		15.6	15.6	32.2	30.6		43.3	36.7		
Effective Green, g (s)		5.2	5.2		15.6	15.6	32.2	30.6		43.3	36.7		
Actuated g/C Ratio		0.07	0.07		0.20	0.20	0.41	0.39		0.55	0.46		
Clearance Time (s)		5.0	5.0		5.0	5.0	5.0	5.0		5.0	5.0		
Vehicle Extension (s)		4.0	4.0		5.0	5.0	4.0	5.0		4.0	5.0		
Lane Grp Cap (vph)		120	104		350	312	413	717		427	862		
w/s Ratio Prot		c0.01			0.01		0.00	c0.22		c0.02	c0.21		
w/s Ratio Perm			0.00			c0.02	0.01			0.07			
w/c Ratio		0.12	0.01		0.05	0.08	0.02	0.58		0.16	0.45		
Uniform Delay, d1		34.8	34.6		25.8	25.9	14.0	19.2		9.9	14.3		
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00		
Incremental Delay, d2		0.6	0.1		0.1	0.2	0.0	1.9		0.2	0.8		
Delay (s)		35.4	34.6		25.9	26.1	14.0	21.1		10.1	15.1		
Level of Service		D	C		C	C	B	C		B	B		
Approach Delay (s)		34.9			26.1			20.9			14.4		
Approach LOS		C			C			C			B		
Intersection Summary													
HCM 2000 Control Delay			19.3		HCM 2000 Level of Service						B		
HCM 2000 Volume to Capacity ratio			0.37										
Actuated Cycle Length (s)			79.1		Sum of lost time (s)						20.0		
Intersection Capacity Utilization			53.6%		ICU Level of Service						A		
Analysis Period (min)			15										

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 13: Bypass Rd & Georgia Crossing Rd










Existing Conditions - PM Peak Hour
 05/21/2019

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	38	58	292	34	53	329
Future Volume (vph)	38	58	292	34	53	329
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. Factor	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)	1770	1583	1863	1583	1770	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.47	1.00
Satd. Flow (perm)	1770	1583	1863	1583	880	1863
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	41	63	317	37	58	358
RTOR Reduction (vph)	0	58	0	15	0	0
Lane Group Flow (vph)	41	5	317	22	58	358
Turn Type	Prot	Perm	NA	pm+ov	pm+pt	NA
Protected Phases	4		2	4	1	5
Permitted Phases		4		2	5	
Actuated Green, G (s)	4.3	4.3	25.9	30.2	36.0	36.0
Effective Green, g (s)	4.3	4.3	25.9	30.2	36.0	36.0
Actuated g/C Ratio	0.09	0.09	0.51	0.60	0.72	0.72
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	4.0	4.0	5.0	4.0	4.0	5.0
Lane Grp Cap (vph)	151	135	959	1107	720	1333
w/s Ratio Prot	c0.02		c0.17	0.00	0.01	c0.19
w/s Ratio Perm		0.00		0.01	0.05	
w/c Ratio	0.27	0.04	0.33	0.02	0.08	0.27
Uniform Delay, d1	21.5	21.1	7.1	4.1	2.4	2.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.3	0.2	0.4	0.0	0.1	0.2
Delay (s)	22.9	21.3	7.6	4.1	2.5	2.7
Level of Service	C	C	A	A	A	A
Approach Delay (s)	21.9		7.2			2.7
Approach LOS	C		A			A
Intersection Summary						
HCM 2000 Control Delay			6.8		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.33			
Actuated Cycle Length (s)			50.3		Sum of lost time (s)	15.0
Intersection Capacity Utilization			41.7%		ICU Level of Service	A
Analysis Period (min)			15			

c Critical Lane Group










HCM Unsignalized Intersection Capacity Analysis
 14: Bypass Rd & Greenview Dr

Existing Conditions - PM Peak Hour
 05/21/2019

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	4	1	321	6	1	364
Future Volume (veh/h)	4	1	321	6	1	364
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	1	349	7	1	396
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	750	352			356	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	750	352			356	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	378	691			1203	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	5	356	397			
Volume Left	4	0	1			
Volume Right	1	7	0			
cSH	416	1700	1203			
Volume to Capacity	0.01	0.21	0.00			
Queue Length 95th (ft)	1	0	0			
Control Delay (s)	13.8	0.0	0.0			
Lane LOS	B		A			
Approach Delay (s)	13.8	0.0	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			30.0%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 15: Bypass Rd & Woodcrest Drive

Existing Conditions - PM Peak Hour
 05/21/2019

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	3	12	288	7	22	363
Future Volume (veh/h)	3	12	288	7	22	363
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	13	313	8	24	395
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume						
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol						
tC, single (s)						
tC, 2 stage (s)						
tF (s)						
p0 queue free %						
cM capacity (veh/h)						
Direction, Lane #						
	WB 1	NB 1	SB 1			
Volume Total	16	321	419			
Volume Left	3	0	24			
Volume Right	13	8	0			
cSH	612	1700	1239			
Volume to Capacity	0.03	0.19	0.02			
Queue Length 95th (ft)	2	0	1			
Control Delay (s)	11.0	0.0	0.6			
Lane LOS	B		A			
Approach Delay (s)	11.0	0.0	0.6			
Approach LOS	B					
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			47.1%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis Existing Conditions - PM Peak Hour
 16: Connection to Old Mill/Bypass Rd & Hw 41A/Cowan Highway 05/21/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↕			↖	↗
Traffic Volume (vph)	125	221	0	0	178	147	1	3	5	216	6	147
Future Volume (vph)	125	221	0	0	178	147	1	3	5	216	6	147
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0			5.0			5.0	5.0
Lane Util. Factor	1.00	1.00			1.00			1.00			1.00	1.00
Flt	1.00	1.00			0.93			0.93			1.00	0.85
Flt Protected	0.95	1.00			1.00			0.99			0.95	1.00
Satd. Flow (prot)	1770	1863			1736			1714			1776	1583
Flt Permitted	0.31	1.00			1.00			0.99			0.95	1.00
Satd. Flow (perm)	579	1863			1736			1714			1776	1583
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)	136	240	0	0	193	160	1	3	5	235	7	160
RTOR Reduction (vph)	0	0	0	0	28	0	0	5	0	0	0	122
Lane Group Flow (vph)	136	240	0	0	325	0	0	4	0	0	242	38
Turn Type	pm+pt	NA		pm+pt	NA		Split	NA		Split	NA	Perm
Protected Phases	1	6		5	2		4	4		3	3	
Permitted Phases	6			2								3
Actuated Green, G (s)	29.5	29.5			18.2			0.9			14.1	14.1
Effective Green, g (s)	29.5	29.5			18.2			0.9			14.1	14.1
Actuated g/C Ratio	0.50	0.50			0.31			0.02			0.24	0.24
Clearance Time (s)	5.0	5.0			5.0			5.0			5.0	5.0
Vehicle Extension (s)	3.0	4.0			4.0			3.0			3.0	3.0
Lane Grp Cap (vph)	413	923			531			25			420	375
w/s Ratio Prot	c0.03	0.13			c0.19			c0.00			c0.14	
w/s Ratio Perm	0.13											0.02
w/c Ratio	0.33	0.26			0.61			0.16			0.58	0.10
Uniform Delay, d1	9.2	8.7			17.6			28.9			20.1	17.7
Progression Factor	1.00	1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2	0.5	0.2			2.4			3.1			1.9	0.1
Delay (s)	9.6	8.9			20.0			32.0			22.0	17.9
Level of Service	A	A			C			C			C	B
Approach Delay (s)		9.2			20.0			32.0			20.3	
Approach LOS		A			C			C			C	
Intersection Summary												
HCM 2000 Control Delay		16.7			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.55										
Actuated Cycle Length (s)		59.5			Sum of lost time (s)			20.0				
Intersection Capacity Utilization		56.7%			ICU Level of Service			B				
Analysis Period (min)		15										

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1: Bypass Rd & Site Access 4/Site Access 5

Projected Conditions - AM Peak Hour
05/21/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	32	0	8	13	0	66	12	125	16	78	1203	46
Future Volume (vph)	32	0	8	13	0	66	12	125	16	78	1203	46
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00		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		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1583		1770	1583		1770	1859		1770	1852	
Flt Permitted	0.91	1.00		0.91	1.00		0.16	1.00		0.16	1.00	
Satd. Flow (perm)	1693	1583		1693	1583		298	1859		298	1852	
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)	35	0	9	14	0	72	13	1367	17	85	1308	50
RTOR Reduction (vph)	0	8	0	0	32	0	0	1	0	0	2	0
Lane Group Flow (vph)	35	1	0	14	40	0	13	1383	0	85	1356	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	4.4	4.4		4.4	4.4		25.0	25.0		25.0	25.0	
Effective Green, g (s)	4.4	4.4		4.4	4.4		25.0	25.0		25.0	25.0	
Actuated g/C Ratio	0.11	0.11		0.11	0.11		0.65	0.65		0.65	0.65	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	193	181		193	181		194	1210		194	1205	
w/s Ratio Prot		0.00			c0.03			c0.74			0.73	
w/s Ratio Perm	0.02			0.01			0.04			0.29		
w/c Ratio	0.18	0.01		0.07	0.22		0.07	1.14		0.44	1.13	
Uniform Delay, d1	15.4	15.1		15.2	15.4		2.4	6.7		3.3	6.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.0		0.2	0.6		0.7	74.7		7.0	67.7	
Delay (s)	15.8	15.1		15.3	16.1		3.1	81.4		10.3	74.4	
Level of Service	B	B		B	B		A	F		B	E	
Approach Delay (s)		15.7			15.9			80.7			70.6	
Approach LOS		B			B			F			E	
Intersection Summary												
HCM 2000 Control Delay			72.9				HCM 2000 Level of Service				E	
HCM 2000 Volume to Capacity ratio			1.01									
Actuated Cycle Length (s)			38.4			Sum of lost time (s)				9.0		
Intersection Capacity Utilization			83.1%			ICU Level of Service				E		
Analysis Period (min)			15									

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	32	0	8	13	0	66	12	125	16	78	1203	46
Future Volume (veh/h)	32	0	8	13	0	66	12	125	16	78	1203	46
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	35	0	9	14	0	72	13	1367	17	85	1308	50
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	326	0	174	384	0	174	237	1090	14	237	1058	40
Arrive On Green	0.11	0.00	0.11	0.11	0.00	0.11	0.59	0.59	0.59	0.59	0.59	0.59
Sat Flow, veh/h	1323	0	1583	1400	0	1583	399	1836	23	390	1783	68
Grp Volume(v), veh/h	35	0	9	14	0	72	13	0	1384	85	0	1358
Grp Sat Flow(s),veh/hln	1323	0	1583	1400	0	1583	399	0	1859	390	0	1851
Q Serve(g_s), s	0.8	0.0	0.2	0.3	0.0	1.3	0.0	0.0	18.0	0.0	0.0	18.0
Cycle Q Clear(g_c), s	2.1	0.0	0.2	0.4	0.0	1.3	18.0	0.0	18.0	18.0	0.0	18.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.01	1.00		0.04
Lane Grp Cap(c), veh/h	326	0	174	384	0	174	237	0	1103	237	0	1098
W/C Ratio(X)	0.11	0.00	0.05	0.04	0.00	0.41	0.05	0.00	1.25	0.36	0.00	1.24
Avail Cap(c_a), veh/h	966	0	940	1061	0	940	237	0	1103	237	0	1098
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.5	0.0	12.1	12.3	0.0	12.6	15.2	0.0	6.2	15.2	0.0	6.2
Incr Delay (d2), s/veh	0.1	0.0	0.1	0.0	0.0	1.6	0.4	0.0	122.1	4.2	0.0	114.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.1	0.1	0.0	0.6	0.1	0.0	46.3	1.0	0.0	43.7
LnGrp Delay(d),s/veh	13.7	0.0	12.2	12.3	0.0	14.2	15.6	0.0	128.3	19.3	0.0	120.5
LnGrp LOS	B		B	B		B	B		F	B		F
Approach Vol, veh/h		44			86			1397			1443	
Approach Delay, s/veh		13.4			13.9			127.2			114.5	
Approach LOS		B			B			F			F	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		22.5		7.8		22.5		7.8				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		18.0		18.0		18.0		18.0				
Max Q Clear Time (g_c+H), s		20.0		4.1		20.0		3.3				
Green Ext Time (p_c), s		0.0		0.4		0.0		0.4				
Intersection Summary												
HCM 2010 Ctrl Delay			116.1									
HCM 2010 LOS				F								

HCM Signalized Intersection Capacity Analysis
 11: Bypass Rd/Shopping Center & Dechard Blvd

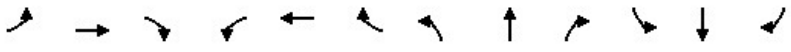
Projected Conditions - AM Peak Hour
 05/21/2019

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement												
Lane Configurations	↘	↗	↗	↘	↘			↗	↗		↘	↘
Traffic Volume (vph)	0	401	219	1025	325	4	291	12	1064	25	23	15
Future Volume (vph)	0	401	219	1025	325	4	291	12	1064	25	23	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0	5.0	5.0			5.0	5.0		5.0	5.0
Lane Util. Factor		0.95	1.00	0.97	0.95			1.00	1.00		1.00	1.00
Flt		1.00	0.85	1.00	1.00			1.00	0.85		1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00			0.95	1.00		0.97	1.00
Satd. Flow (prot)		3185	1425	3090	3180			1600	1425		1634	1425
Flt Permitted		1.00	1.00	0.95	1.00			0.70	1.00		0.72	1.00
Satd. Flow (perm)		3185	1425	3090	3180			1167	1425		1205	1425
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	436	238	1114	353	4	316	13	1157	27	25	16
RTOR Reduction (vph)	0	0	111	0	0	0	0	0	446	0	0	11
Lane Group Flow (vph)	0	436	127	1114	357	0	0	329	711	0	52	5
Turn Type	pm+pt	NA	Perm	Prot	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases	2		2				4		4	8		8
Actuated Green, G (s)		35.0	35.0	25.0	65.0			30.0	30.0		30.0	30.0
Effective Green, g (s)		35.0	35.0	25.0	65.0			30.0	30.0		30.0	30.0
Actuated g/C Ratio		0.33	0.33	0.24	0.62			0.29	0.29		0.29	0.29
Clearance Time (s)		5.0	5.0	5.0	5.0			5.0	5.0		5.0	5.0
Vehicle Extension (s)		5.0	5.0	4.0	5.0			5.0	5.0		5.0	5.0
Lane Grp Cap (vph)		1061	475	735	1968			333	407		344	407
w/s Ratio Prot		c0.14		c0.36	0.11							
w/s Ratio Perm			0.09					0.28	c0.50		0.04	0.00
w/c Ratio		0.41	0.27	1.52	0.18			0.99	1.75		0.15	0.01
Uniform Delay, d1		27.0	25.6	40.0	8.6			37.3	37.5		28.0	26.9
Progression Factor		1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2		0.5	0.6	239.0	0.1			45.9	345.7		0.4	0.0
Delay (s)		27.6	26.3	279.0	8.7			83.2	383.2		28.4	26.9
Level of Service		C	C	F	A			F	F		C	C
Approach Delay (s)		27.1			213.4			316.8			28.1	
Approach LOS		C			F			F			C	
Intersection Summary												
HCM 2000 Control Delay			217.6									F
HCM 2000 Volume to Capacity ratio			1.23									
Actuated Cycle Length (s)			105.0						20.0			
Intersection Capacity Utilization			123.2%						H			
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 12: Bypass Rd & Grant Street/Baxter Lane

Projected Conditions - AM Peak Hour
 05/21/2019

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↔	↔		↔	↔	↔	↔		↔	↔		
Traffic Volume (vph)	24	12	36	76	7	116	15	1274	91	93	1289	7	
Future Volume (vph)	24	12	36	76	7	116	15	1274	91	93	1289	7	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		5.0	5.0		5.0	5.0	5.0	5.0		5.0	5.0		
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00		
Frt		1.00	0.85		1.00	0.85	1.00	0.99		1.00	1.00		
Flt Protected		0.97	1.00		0.96	1.00	0.95	1.00		0.95	1.00		
Satd. Flow (prot)		1803	1583		1782	1583	1770	1844		1770	1861		
Flt Permitted		0.97	1.00		0.96	1.00	0.07	1.00		0.06	1.00		
Satd. Flow (perm)		1803	1583		1782	1583	128	1844		118	1861		
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)	26	13	39	83	8	126	16	1385	99	101	1401	8	
RTOR Reduction (vph)	0	0	36	0	0	108	0	2	0	0	0	0	
Lane Group Flow (vph)	0	39	3	0	91	18	16	1482	0	101	1409	0	
Turn Type	Split	NA	Perm	Split	NA	Perm	pm+pt	NA		pm+pt	NA		
Protected Phases	3	3		4	4		5	2		1	6		
Permitted Phases			3			4	2			6			
Actuated Green, G (s)		8.0	8.0		15.6	15.6	62.1	58.3		73.3	64.5		
Effective Green, g (s)		8.0	8.0		15.6	15.6	62.1	58.3		73.3	64.5		
Actuated g/C Ratio		0.07	0.07		0.14	0.14	0.55	0.52		0.66	0.58		
Clearance Time (s)		5.0	5.0		5.0	5.0	5.0	5.0		5.0	5.0		
Vehicle Extension (s)		4.0	4.0		5.0	5.0	4.0	5.0		4.0	5.0		
Lane Grp Cap (vph)		128	113		248	220	126	960		224	1072		
w/s Ratio Prot		c0.02			c0.05		0.00	c0.80		c0.04	c0.76		
w/s Ratio Perm			0.00			0.01	0.07			0.25			
w/c Ratio		0.30	0.02		0.37	0.08	0.13	1.54		0.45	1.31		
Uniform Delay, d1		49.3	48.3		43.7	41.9	24.5	26.8		23.7	23.7		
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00		
Incremental Delay, d2		1.8	0.1		1.9	0.3	0.6	249.9		2.0	148.2		
Delay (s)		51.1	48.4		45.6	42.2	25.1	276.7		25.6	171.9		
Level of Service		D	D		D	D	C	F		C	F		
Approach Delay (s)		49.8			43.6			274.1			162.1		
Approach LOS		D			D			F			F		
Intersection Summary													
HCM 2000 Control Delay			202.5		HCM 2000 Level of Service						F		
HCM 2000 Volume to Capacity ratio			1.15										
Actuated Cycle Length (s)			111.9		Sum of lost time (s)					20.0			
Intersection Capacity Utilization			105.9%		ICU Level of Service					G			
Analysis Period (min)			15										
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
13: Bypass Rd & Georgia Crossing Rd

Projected Conditions - AM Peak Hour
05/21/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘
Traffic Volume (vph)	630	39	118	79	42	271	125	359	94	164	323	664
Future Volume (vph)	630	39	118	79	42	271	125	359	94	164	323	664
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Util. 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
Flt	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)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.38	1.00	1.00	0.73	1.00	1.00	0.40	1.00	1.00	0.32	1.00	1.00
Satd. Flow (perm)	715	1863	1583	1359	1863	1583	754	1863	1583	592	1863	1583
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)	685	42	128	86	46	295	136	390	102	178	351	722
RTOR Reduction (vph)	0	0	91	0	0	154	0	0	57	0	0	315
Lane Group Flow (vph)	685	42	37	86	46	141	136	390	45	178	351	407
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	7	4	5	3	8	1	5	2	3	1	6	7
Permitted Phases	4		4	8		8	2		2	6		6
Actuated Green, G (s)	26.2	11.8	22.9	15.0	5.6	17.6	36.6	25.5	34.9	38.4	26.4	42.0
Effective Green, g (s)	26.2	11.8	22.9	15.0	5.6	17.6	36.6	25.5	34.9	38.4	26.4	42.0
Actuated g/C Ratio	0.33	0.15	0.29	0.19	0.07	0.22	0.47	0.32	0.44	0.49	0.34	0.53
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	4.0	5.0	4.0	4.0	5.0	4.0	4.0	5.0	4.0	4.0	5.0	4.0
Lane Grp Cap (vph)	447	279	561	308	132	454	493	603	802	468	624	945
w/s Ratio Prot	c0.30	0.02	0.01	0.03	0.02	0.05	0.04	c0.21	0.01	c0.06	0.19	0.09
w/s Ratio Perm	c0.21		0.01	0.02		0.04	0.09		0.02	0.13		0.17
w/c Ratio	1.53	0.15	0.07	0.28	0.35	0.31	0.28	0.65	0.06	0.38	0.56	0.43
Uniform Delay, d1	24.3	29.1	20.2	27.1	34.8	25.5	12.5	22.7	12.5	12.3	21.4	11.1
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	250.7	0.5	0.1	0.7	3.3	0.5	0.4	3.3	0.0	0.7	1.9	0.4
Delay (s)	275.0	29.6	20.2	27.8	38.1	26.0	13.0	26.0	12.5	13.1	23.3	11.5
Level of Service	F	C	C	C	D	C	B	C	B	B	C	B
Approach Delay (s)		224.8			27.7			21.0			15.1	
Approach LOS		F			C			C			B	
Intersection Summary												
HCM 2000 Control Delay			74.7									HCM 2000 Level of Service E
HCM 2000 Volume to Capacity ratio			1.00									
Actuated Cycle Length (s)			78.7									Sum of lost time (s) 20.0
Intersection Capacity Utilization			83.1%									ICU Level of Service E
Analysis Period (min)			15									

c Critical Lane Group

HCM 2010 Signalized Intersection Summary
 13: Bypass Rd & Georgia Crossing Rd

Projected Conditions - AM Peak Hour
 05/21/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	630	39	118	79	42	271	125	359	94	164	323	664
Future Volume (veh/h)	630	39	118	79	42	271	125	359	94	164	323	664
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	685	42	128	86	46	295	136	390	102	178	351	722
Adj No. of Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	522	499	593	392	308	435	368	632	638	421	636	803
Arrive On Green	0.17	0.27	0.27	0.06	0.17	0.17	0.11	0.34	0.34	0.11	0.34	0.34
Sat Flow, veh/h	1774	1863	1583	1774	1863	1583	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	685	42	128	86	46	295	136	390	102	178	351	722
Grp Sat Flow(s),veh/hln	1774	1863	1583	1774	1863	1583	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	15.0	1.5	5.0	3.6	1.9	15.0	4.2	15.9	3.7	5.6	13.9	31.0
Cycle Q Clear(g_c), s	15.0	1.5	5.0	3.6	1.9	15.0	4.2	15.9	3.7	5.6	13.9	31.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	522	499	593	392	308	435	368	632	638	421	636	803
W/C Ratio (X)	1.31	0.08	0.22	0.22	0.15	0.68	0.37	0.62	0.16	0.42	0.55	0.90
Avail Cap(c_a), veh/h	522	499	593	573	308	435	570	822	799	619	636	803
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	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	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.7	24.9	19.3	28.3	32.4	29.3	16.4	25.0	17.3	17.1	24.2	20.2
Incr Delay (d2), s/veh	153.3	0.2	0.4	0.4	0.5	5.5	0.9	2.1	0.2	1.0	1.8	13.7
Initial Q Delay (d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/h	22.2	0.8	2.2	1.8	1.0	7.2	2.1	8.5	1.7	2.8	7.4	19.2
LnGrp Delay(d),s/veh	183.0	25.0	19.7	28.7	32.8	34.8	17.3	27.1	17.5	18.0	26.0	33.9
LnGrp LOS	F	C	B	C	C	C	B	C	B	B	C	C
Approach Vol, veh/h		855			427			628			1251	
Approach Delay, s/veh		150.8			33.4			23.4			29.4	
Approach LOS		F			C			C			C	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.9	35.8	10.7	29.3	14.7	36.0	20.0	20.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	20.0	40.0	15.0	15.0	20.0	30.0	15.0	15.0				
Max Q Clear Time (g_c+H), s	7.6	17.9	5.6	7.0	6.2	33.0	17.0	17.0				
Green Ext Time (p_c), s	0.6	12.9	0.2	2.5	0.4	0.0	0.0	0.0				
Intersection Summary												
HCM 2010 Ctrl Delay			61.6									
HCM 2010 LOS			E									










HCM Unsignalized Intersection Capacity Analysis
 14: Bypass Rd & Greenview Dr

Projected Conditions - AM Peak Hour
 05/21/2019

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		Y			Y
Traffic Volume (veh/h)	6	0	581	3	0	519
Future Volume (veh/h)	6	0	581	3	0	519
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	7	0	632	3	0	564
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1198	634			635	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1198	634			635	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	100			100	
cM capacity (veh/h)	205	479			948	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	7	635	564			
Volume Left	7	0	0			
Volume Right	0	3	0			
cSH	205	1700	948			
Volume to Capacity	0.03	0.37	0.00			
Queue Length 95th (ft)	3	0	0			
Control Delay (s)	23.2	0.0	0.0			
Lane LOS	C					
Approach Delay (s)	23.2	0.0	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			40.8%		ICU Level of Service A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
 15: Bypass Rd & Woodcrest Drive

Projected Conditions - AM Peak Hour
 05/21/2019

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	7	16	566	4	8	507
Future Volume (veh/h)	7	16	566	4	8	507
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	17	615	4	9	551
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1186	617			619	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1186	617			619	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	97			99	
cM capacity (veh/h)	207	490			961	
Direction, Lane #						
	WB 1	NB 1	SB 1			
Volume Total	25	619	560			
Volume Left	8	0	9			
Volume Right	17	4	0			
cSH	340	1700	961			
Volume to Capacity	0.07	0.36	0.01			
Queue Length 95th (ft)	6	0	1			
Control Delay (s)	16.4	0.0	0.3			
Lane LOS	C		A			
Approach Delay (s)	16.4	0.0	0.3			
Approach LOS	C					
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			43.1%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis Projected Conditions - AM Peak Hour
 16: Connection to Old Mill/Bypass Rd & Hw 41A/Cowan Highway 05/21/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↖	↗		↖	↗			↕			↖	↗	
Traffic Volume (vph)	280	197	1	4	259	248	1	7	1	205	10	244	
Future Volume (vph)	280	197	1	4	259	248	1	7	1	205	10	244	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0			5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	1.00	
Frt	1.00	1.00		1.00	0.93			0.99			1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00			1.00			0.95	1.00	
Satd. Flow (prot)	1770	1861		1770	1726			1828			1778	1583	
Flt Permitted	0.18	1.00		0.62	1.00			1.00			0.95	1.00	
Satd. Flow (perm)	329	1861		1162	1726			1828			1778	1583	
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)	304	214	1	4	282	270	1	8	1	223	11	265	
RTOR Reduction (vph)	0	0	0	0	28	0	0	1	0	0	0	216	
Lane Group Flow (vph)	304	215	0	4	524	0	0	9	0	0	234	49	
Turn Type	pm+pt	NA		pm+pt	NA		Split	NA		Split	NA	Perm	
Protected Phases	1	6		5	2		4	4		3	3		
Permitted Phases	6			2								3	
Actuated Green, G (s)	47.9	42.0		30.9	30.0			1.1			14.6	14.6	
Effective Green, g (s)	47.9	42.0		30.9	30.0			1.1			14.6	14.6	
Actuated g/C Ratio	0.61	0.53		0.39	0.38			0.01			0.19	0.19	
Clearance Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	5.0	
Vehicle Extension (s)	3.0	4.0		3.0	4.0			3.0			3.0	3.0	
Lane Grp Cap (vph)	436	994		463	658			25			330	294	
w/s Ratio Prot	c0.11	0.12		0.00	c0.30			c0.00			c0.13		
w/s Ratio Perm	0.31			0.00								0.03	
w/c Ratio	0.70	0.22		0.01	0.80			0.36			0.71	0.17	
Uniform Delay, d1	11.8	9.6		14.5	21.6			38.4			30.0	26.9	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	1.00	
Incremental Delay, d2	4.8	0.1		0.0	7.0			8.7			6.8	0.3	
Delay (s)	16.6	9.8		14.5	28.6			47.1			36.8	27.2	
Level of Service	B	A		B	C			D			D	C	
Approach Delay (s)		13.8			28.5			47.1			31.7		
Approach LOS		B			C			D			C		
Intersection Summary													
HCM 2000 Control Delay			24.8		HCM 2000 Level of Service						C		
HCM 2000 Volume to Capacity ratio			0.75										
Actuated Cycle Length (s)			78.6		Sum of lost time (s)						20.0		
Intersection Capacity Utilization			75.4%		ICU Level of Service						D		
Analysis Period (min)			15										

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1: Bypass Rd & Site Access 4/Site Access 5

Projected Conditions - PM Peak Hour
05/21/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (vph)	96	0	24	13	64	66	24	1213	13	63	1363	95
Future Volume (vph)	96	0	24	13	64	66	24	1213	13	63	1363	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.92		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1583		1770	1721		1770	1860		1770	1845	
Flt Permitted	0.67	1.00		0.74	1.00		0.18	1.00		0.18	1.00	
Satd. Flow (perm)	1241	1583		1379	1721		342	1860		342	1845	
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)	104	0	26	14	70	72	26	1318	14	68	1482	103
RTOR Reduction (vph)	0	21	0	0	10	0	0	0	0	0	4	0
Lane Group Flow (vph)	104	5	0	14	132	0	26	1332	0	68	1581	0
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	7.3	7.3		7.3	7.3		21.8	21.8		21.8	21.8	
Effective Green, g (s)	7.3	7.3		7.3	7.3		21.8	21.8		21.8	21.8	
Actuated g/C Ratio	0.19	0.19		0.19	0.19		0.57	0.57		0.57	0.57	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	237	303		264	329		195	1064		195	1055	
w/s Ratio Prot		0.00			0.08			0.72			0.86	
w/s Ratio Perm	0.08			0.01			0.08			0.20		
w/c Ratio	0.44	0.02		0.05	0.40		0.13	1.25		0.35	1.50	
Uniform Delay, d1	13.6	12.5		12.6	13.5		3.8	8.2		4.4	8.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.3	0.0		0.1	0.8		1.4	121.0		4.9	229.4	
Delay (s)	14.9	12.5		12.7	14.3		5.2	129.2		9.2	237.6	
Level of Service	B	B		B	B		A	F		A	F	
Approach Delay (s)		14.4			14.1			126.8			228.2	
Approach LOS		B			B			F			F	
Intersection Summary												
HCM 2000 Control Delay		167.9										F
HCM 2000 Volume to Capacity ratio		1.23										
Actuated Cycle Length (s)		38.1							9.0			
Intersection Capacity Utilization		101.5%										G
Analysis Period (min)		15										

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	96	0	24	13	64	66	24	1213	13	63	1363	95
Future Volume (veh/h)	96	0	24	13	64	66	24	1213	13	63	1363	95
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1863	1863	1900	1863	1863	1900	1863	1863	1900	1863	1863	1900
Adj Flow Rate, veh/h	104	0	26	14	70	72	26	1318	14	68	1482	103
Adj No. of Lanes	1	1	0	1	1	0	1	1	0	1	1	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	393	0	348	493	185	191	208	957	10	208	896	62
Arrive On Green	0.22	0.00	0.22	0.22	0.22	0.22	0.52	0.52	0.52	0.52	0.52	0.52
Sat Flow, veh/h	1241	0	1583	1379	843	867	321	1840	20	409	1722	120
Grp Volume(v), veh/h	104	0	26	14	0	142	26	0	1332	68	0	1585
Grp Sat Flow(s),veh/hln	1241	0	1583	1379	0	1710	321	0	1859	409	0	1842
Q Serve(g_s), s	2.7	0.0	0.5	0.3	0.0	2.4	0.0	0.0	18.0	0.0	0.0	18.0
Cycle Q Clear(g_c), s	5.1	0.0	0.5	0.7	0.0	2.4	18.0	0.0	18.0	18.0	0.0	18.0
Prop In Lane	1.00		1.00	1.00		0.51	1.00		0.01	1.00		0.06
Lane Grp Cap(c), veh/h	393	0	348	493	0	376	208	0	967	208	0	958
W/C Ratio (X)	0.26	0.00	0.07	0.03	0.00	0.38	0.12	0.00	1.38	0.33	0.00	1.65
Avail Cap(c_a), veh/h	766	0	823	907	0	889	208	0	967	208	0	958
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(f)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	13.7	0.0	10.7	11.0	0.0	11.5	17.3	0.0	8.3	17.3	0.0	8.3
Incr Delay (d2), s/veh	0.4	0.0	0.1	0.0	0.0	0.6	1.2	0.0	176.4	4.1	0.0	299.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	0.2	0.1	0.0	1.2	0.3	0.0	56.2	0.9	0.0	88.4
LnGrp Delay(d),s/veh	14.0	0.0	10.8	11.0	0.0	12.1	18.5	0.0	184.7	21.4	0.0	307.6
LnGrp LOS	B		B	B		B	B		F	C		F
Approach Vol, veh/h		130			156			1358				1653
Approach Delay, s/veh		13.4			12.0			181.5				295.9
Approach LOS		B			B			F				F
Timer	1	2	3	4	5	6	7	8				
Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		22.5		12.1		22.5		12.1				
Change Period (Y+Rc), s		4.5		4.5		4.5		4.5				
Max Green Setting (Gmax), s		18.0		18.0		18.0		18.0				
Max Q Clear Time (g_c+H), s		20.0		7.1		20.0		4.4				
Green Ext Time (p_c), s		0.0		1.0		0.0		1.1				
Intersection Summary												
HCM 2010 Ctrl Delay				224.2								
HCM 2010 LOS				F								

HCM Signalized Intersection Capacity Analysis
 11: Bypass Rd/Shopping Center & Dechard Blvd

Projected Conditions - PM Peak Hour
 05/21/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↘	↖	↗	↘			↖	↗	↘	↖
Traffic Volume (vph)	0	556	265	1191	610	26	290	6	1145	45	16	14
Future Volume (vph)	0	556	265	1191	610	26	290	6	1145	45	16	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0	5.0	5.0	5.0			5.0	5.0		5.0	5.0
Lane Util. Factor		0.95	1.00	0.97	0.95			1.00	1.00		1.00	1.00
Flt		1.00	0.85	1.00	0.99			1.00	0.85		1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00			0.95	1.00		0.96	1.00
Satd. Flow (prot)		3185	1425	3090	3166			1598	1425		1616	1425
Flt Permitted		1.00	1.00	0.95	1.00			0.68	1.00		0.53	1.00
Satd. Flow (perm)		3185	1425	3090	3166			1144	1425		889	1425
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	604	288	1295	663	28	315	7	1245	49	17	15
RTOR Reduction (vph)	0	0	95	0	1	0	0	0	404	0	0	11
Lane Group Flow (vph)	0	604	193	1295	690	0	0	322	841	0	66	4
Turn Type	pm+pt	NA	Perm	Prot	NA		pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	5	2		1	6		7	4		3		8
Permitted Phases	2		2				4		4	8		8
Actuated Green, G (s)		37.0	37.0	25.0	67.0			30.0	30.0		30.0	30.0
Effective Green, g (s)		37.0	37.0	25.0	67.0			30.0	30.0		30.0	30.0
Actuated g/C Ratio		0.35	0.35	0.23	0.63			0.28	0.28		0.28	0.28
Clearance Time (s)		5.0	5.0	5.0	5.0			5.0	5.0		5.0	5.0
Vehicle Extension (s)		5.0	5.0	4.0	5.0			5.0	5.0		5.0	5.0
Lane Grp Cap (vph)		1101	492	721	1982			320	399		249	399
w/s Ratio Prot		c0.19		c0.42	0.22							
w/s Ratio Perm			0.14					0.28	c0.59		0.07	0.00
w/c Ratio		0.55	0.39	1.80	0.35			1.01	2.11		0.27	0.01
Uniform Delay, d1		28.3	26.5	41.0	9.6			38.5	38.5		29.9	27.8
Progression Factor		1.00	1.00	1.00	1.00			1.00	1.00		1.00	1.00
Incremental Delay, d2		1.0	1.1	363.8	0.2			51.9	507.3		1.2	0.0
Delay (s)		29.2	27.6	404.8	9.8			90.4	545.8		31.1	27.8
Level of Service		C	C	F	A			F	F		C	C
Approach Delay (s)		28.7			267.4			452.2			30.5	
Approach LOS		C			F			F			C	
Intersection Summary												
HCM 2000 Control Delay			280.1									F
HCM 2000 Volume to Capacity ratio			1.47									
Actuated Cycle Length (s)			107.0						20.0			
Intersection Capacity Utilization			128.8%									H
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
12: Bypass Rd & Grant Street/Baxter Lane

Projected Conditions - PM Peak Hour
05/21/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕	↗		↕	↗	↖	↖		↖	↖		
Traffic Volume (vph)	5	8	21	80	1	135	7	1319	67	82	1420	6	
Future Volume (vph)	5	8	21	80	1	135	7	1319	67	82	1420	6	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		5.0	5.0		5.0	5.0	5.0	5.0		5.0	5.0		
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00		
Frt		1.00	0.85		1.00	0.85	1.00	0.99		1.00	1.00		
Flt Protected		0.98	1.00		0.95	1.00	0.95	1.00		0.95	1.00		
Satd. Flow (prot)		1830	1583		1775	1583	1770	1849		1770	1861		
Flt Permitted		0.98	1.00		0.95	1.00	0.07	1.00		0.06	1.00		
Satd. Flow (perm)		1830	1583		1775	1583	126	1849		116	1861		
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)	5	9	23	87	1	147	8	1434	73	89	1543	7	
RTOR Reduction (vph)	0	0	22	0	0	126	0	1	0	0	0	0	
Lane Group Flow (vph)	0	14	1	0	88	21	8	1506	0	89	1550	0	
Turn Type	Split	NA	Perm	Split	NA	Perm	pm+pt	NA		pm+pt	NA		
Protected Phases	3	3		4	4		5	2		1	6		
Permitted Phases			3			4	2			6			
Actuated Green, G (s)		5.5	5.5		15.7	15.7	60.9	59.1		71.7	64.9		
Effective Green, g (s)		5.5	5.5		15.7	15.7	60.9	59.1		71.7	64.9		
Actuated g/C Ratio		0.05	0.05		0.15	0.15	0.56	0.55		0.66	0.60		
Clearance Time (s)		5.0	5.0		5.0	5.0	5.0	5.0		5.0	5.0		
Vehicle Extension (s)		4.0	4.0		5.0	5.0	4.0	5.0		4.0	5.0		
Lane Grp Cap (vph)		93	80		258	230	98	1012		193	1119		
w/s Ratio Prot		c0.01			c0.05		0.00	c0.81		c0.03	c0.83		
w/s Ratio Perm			0.00			0.01	0.04			0.27			
w/c Ratio		0.15	0.01		0.34	0.09	0.08	1.49		0.46	1.39		
Uniform Delay, d1		49.0	48.6		41.4	39.9	24.4	24.4		24.0	21.5		
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00		
Incremental Delay, d2		1.0	0.1		1.7	0.4	0.5	224.8		2.4	178.9		
Delay (s)		50.0	48.7		43.1	40.3	24.9	249.2		26.3	200.4		
Level of Service		D	D		D	D	C	F		C	F		
Approach Delay (s)		49.2			41.3			248.0			191.0		
Approach LOS		D			D			F			F		
Intersection Summary													
HCM 2000 Control Delay			204.4		HCM 2000 Level of Service						F		
HCM 2000 Volume to Capacity ratio			1.14										
Actuated Cycle Length (s)			107.9		Sum of lost time (s)					20.0			
Intersection Capacity Utilization			108.4%		ICU Level of Service					G			
Analysis Period (min)			15										

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
13: Bypass Rd & Georgia Crossing Rd

Projected Conditions - PM Peak Hour
05/21/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↖	↗	↘	↖	↗	↘	↖	↗	↘	↖	↗	↘	
Traffic Volume (vph)	758	47	142	56	52	144	156	327	64	195	365	834	
Future Volume (vph)	758	47	142	56	52	144	156	327	64	195	365	834	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Lane Util. 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	
Fit	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Fit 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)	1770	1863	1583	1770	1863	1583	1770	1863	1583	1770	1863	1583	
Fit Permitted	0.39	1.00	1.00	0.72	1.00	1.00	0.33	1.00	1.00	0.35	1.00	1.00	
Satd. Flow (perm)	726	1863	1583	1348	1863	1583	617	1863	1583	661	1863	1583	
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)	824	51	154	61	57	157	170	355	70	212	397	907	
RTOR Reduction (vph)	0	0	106	0	0	120	0	0	40	0	0	277	
Lane Group Flow (vph)	824	51	48	61	57	37	170	355	30	212	397	630	
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	
Protected Phases	7	4	5	3	8	1	5	2	3	1	6	7	
Permitted Phases	4		4	8		8	2		2	6		6	
Actuated Green, G (s)	26.5	12.7	24.6	14.7	5.9	18.6	36.9	25.0	33.8	38.5	25.8	41.4	
Effective Green, g (s)	26.5	12.7	24.6	14.7	5.9	18.6	36.9	25.0	33.8	38.5	25.8	41.4	
Actuated g/C Ratio	0.33	0.16	0.31	0.19	0.07	0.23	0.47	0.32	0.43	0.49	0.33	0.52	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	4.0	5.0	4.0	4.0	5.0	4.0	4.0	5.0	4.0	4.0	5.0	4.0	
Lane Grp Cap (vph)	448	298	591	297	138	471	460	588	775	499	606	927	
w/s Ratio Prot	c0.36	0.03	0.01	0.02	0.03	0.01	0.06	0.19	0.00	c0.07	0.21	c0.13	
w/s Ratio Perm	c0.25		0.02	0.02		0.01	0.12		0.01	0.14		0.26	
w/c Ratio	1.84	0.17	0.08	0.21	0.41	0.08	0.37	0.60	0.04	0.42	0.66	0.68	
Uniform Delay, d1	24.4	28.7	19.3	27.2	35.0	23.6	13.2	22.9	13.2	12.5	22.9	14.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	386.3	0.6	0.1	0.5	4.2	0.1	0.7	2.6	0.0	0.8	3.4	2.2	
Delay (s)	410.7	29.3	19.4	27.7	39.2	23.7	13.8	25.5	13.3	13.3	26.3	16.2	
Level of Service	F	C	B	C	D	C	B	C	B	B	C	B	
Approach Delay (s)		333.2			27.8			20.7			18.4		
Approach LOS		F			C			C			B		
Intersection Summary													
HCM 2000 Control Delay			114.4									HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio			1.19										
Actuated Cycle Length (s)			79.2									Sum of lost time (s)	20.0
Intersection Capacity Utilization			89.2%									ICU Level of Service	E
Analysis Period (min)			15										

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	758	47	142	56	52	144	156	327	64	195	365	834
Future Volume (veh/h)	758	47	142	56	52	144	156	327	64	195	365	834
Number	7	4	14	3	8	18	5	2	12	1	6	16
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863	1863
Adj Flow Rate, veh/h	824	51	154	61	57	157	170	355	70	212	397	907
Adj No. of Lanes	1	1	1	1	1	1	1	1	1	1	1	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	499	436	552	325	218	369	366	667	660	488	670	847
Arrive On Green	0.18	0.23	0.23	0.06	0.12	0.12	0.11	0.36	0.36	0.12	0.36	0.36
Sat Flow, veh/h	1774	1863	1583	1774	1863	1583	1774	1863	1583	1774	1863	1583
Grp Volume(v), veh/h	824	51	154	61	57	157	170	355	70	212	397	907
Grp Sat Flow(s),veh/hln	1774	1863	1583	1774	1863	1583	1774	1863	1583	1774	1863	1583
Q Serve(g_s), s	15.0	1.8	6.0	2.5	2.4	7.2	4.8	12.9	2.3	6.1	14.9	30.8
Cycle Q Clear(g_c), s	15.0	1.8	6.0	2.5	2.4	7.2	4.8	12.9	2.3	6.1	14.9	30.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	499	436	552	325	218	369	366	667	660	488	670	847
W/C Ratio(X)	1.65	0.12	0.28	0.19	0.26	0.43	0.46	0.53	0.11	0.43	0.59	1.07
Avail Cap(c_a), veh/h	499	436	552	532	326	461	577	870	832	697	670	847
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	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	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	29.9	25.8	20.1	30.2	34.4	28.0	15.3	21.8	15.2	14.7	22.3	19.9
Incr Delay (d2), s/veh	302.7	0.3	0.6	0.4	1.3	1.7	1.3	1.4	0.1	0.9	2.2	51.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/h	46.4	1.0	2.7	1.3	1.3	3.3	2.4	6.9	1.0	3.1	8.0	31.9
LnGrp Delay(d),s/veh	332.6	26.1	20.7	30.5	35.8	29.6	16.6	23.2	15.4	15.6	24.5	71.8
LnGrp LOS	F	C	C	C	D	C	B	C	B	B	C	F
Approach Vol, veh/h		1029			275			595			1516	
Approach Delay, s/veh		270.7			31.1			20.4			51.6	
Approach LOS		F			C			C			D	
Timer	1	2	3	4	5	6	7	8				
Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	14.9	35.7	10.0	25.0	14.8	35.8	20.0	15.0				
Change Period (Y+Rc), s	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Max Green Setting (Gmax), s	20.0	40.0	15.0	15.0	20.0	30.0	15.0	15.0				
Max Q Clear Time (g_c+H), s	8.1	14.9	4.5	8.0	6.8	32.8	17.0	9.2				
Green Ext Time (p_c), s	0.7	15.7	0.1	1.8	0.6	0.0	0.0	0.8				
Intersection Summary												
HCM 2010 Ctrl Delay			110.5									
HCM 2010 LOS			F									










HCM Unsignalized Intersection Capacity Analysis
 14: Bypass Rd & Greenview Dr

Projected Conditions - PM Peak Hour
 05/21/2019

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Y		Y			Y
Traffic Volume (veh/h)	4	1	543	6	1	560
Future Volume (veh/h)	4	1	543	6	1	560
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	4	1	590	7	1	609
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						
			None		None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1204	594			597	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1204	594			597	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	100			100	
cM capacity (veh/h)	203	505			980	
Direction, Lane #						
	WB 1	NB 1	SB 1			
Volume Total	5	597	610			
Volume Left	4	0	1			
Volume Right	1	7	0			
cSH	231	1700	980			
Volume to Capacity	0.02	0.35	0.00			
Queue Length 95th (ft)	2	0	0			
Control Delay (s)	21.0	0.0	0.0			
Lane LOS	C		A			
Approach Delay (s)	21.0	0.0	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			40.3%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 15: Bypass Rd & Woodcrest Drive

Projected Conditions - PM Peak Hour
 05/21/2019

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	3	12	510	7	22	559
Future Volume (veh/h)	3	12	510	7	22	559
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	13	554	8	24	608
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1214	558			562	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1214	558			562	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	98			98	
cM capacity (veh/h)	196	529			1009	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	16	562	632			
Volume Left	3	0	24			
Volume Right	13	8	0			
cSH	401	1700	1009			
Volume to Capacity	0.04	0.33	0.02			
Queue Length 95th (ft)	3	0	2			
Control Delay (s)	14.3	0.0	0.6			
Lane LOS	B		A			
Approach Delay (s)	14.3	0.0	0.6			
Approach LOS	B					
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			57.2%		ICU Level of Service	B
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis Projected Conditions - PM Peak Hour
 16: Connection to Old Mill/Bypass Rd & Hw 41A/Cowan Highway 05/21/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↕			↖	↗
Traffic Volume (vph)	269	221	0	0	178	225	1	3	5	283	6	275
Future Volume (vph)	269	221	0	0	178	225	1	3	5	283	6	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0			5.0			5.0			5.0	5.0
Lane Util. Factor	1.00	1.00			1.00			1.00			1.00	1.00
Flt	1.00	1.00			0.92			0.93			1.00	0.85
Flt Protected	0.95	1.00			1.00			0.99			0.95	1.00
Satd. Flow (prot)	1770	1863			1706			1714			1776	1583
Flt Permitted	0.21	1.00			1.00			0.99			0.95	1.00
Satd. Flow (perm)	389	1863			1706			1714			1776	1583
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)	292	240	0	0	193	245	1	3	5	308	7	299
RTOR Reduction (vph)	0	0	0	0	42	0	0	5	0	0	0	227
Lane Group Flow (vph)	292	240	0	0	396	0	0	4	0	0	315	72
Turn Type	pm+pt	NA		pm+pt	NA		Split	NA		Split	NA	Perm
Protected Phases	1	6		5	2		4	4		3	3	
Permitted Phases	6			2								3
Actuated Green, G (s)	41.3	41.3			23.5			1.1			18.3	18.3
Effective Green, g (s)	41.3	41.3			23.5			1.1			18.3	18.3
Actuated g/C Ratio	0.55	0.55			0.31			0.01			0.24	0.24
Clearance Time (s)	5.0	5.0			5.0			5.0			5.0	5.0
Vehicle Extension (s)	3.0	4.0			4.0			3.0			3.0	3.0
Lane Grp Cap (vph)	445	1016			529			24			429	382
w/s Ratio Prot	c0.11	0.13			c0.23			c0.00			c0.18	
w/s Ratio Perm		0.25										0.05
w/c Ratio	0.66	0.24			0.75			0.17			0.73	0.19
Uniform Delay, d1	12.1	9.0			23.4			36.8			26.5	22.8
Progression Factor	1.00	1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2	3.5	0.2			6.1			3.3			6.4	0.2
Delay (s)	15.5	9.1			29.6			40.2			32.9	23.0
Level of Service	B	A			C			D			C	C
Approach Delay (s)		12.6			29.6			40.2			28.1	
Approach LOS		B			C			D			C	
Intersection Summary												
HCM 2000 Control Delay			23.4		HCM 2000 Level of Service						C	
HCM 2000 Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			75.7		Sum of lost time (s)						20.0	
Intersection Capacity Utilization			73.2%		ICU Level of Service						D	
Analysis Period (min)			15									

c Critical Lane Group

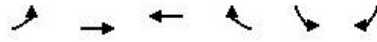
HCM Unsignalized Intersection Capacity Analysis
 21: George Fraley Parkway & Lynchburg Rd

Existing Conditions - AM Peak Hour
 03/29/2019

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↶	↷	↷		↶	↷
Traffic Volume (veh/h)	10	72	78	4	213	142
Future Volume (veh/h)	10	72	78	4	213	142
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	78	85	4	232	154
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	705	87			89	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	705	87			89	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	92			85	
cM capacity (veh/h)	341	971			1506	
Direction, Lane #	WB 1	WB 2	NB 1	SB 1	SB 2	
Volume Total	11	78	89	232	154	
Volume Left	11	0	0	232	0	
Volume Right	0	78	4	0	0	
cSH	341	971	1700	1506	1700	
Volume to Capacity	0.03	0.08	0.05	0.15	0.09	
Queue Length 95th (ft)	2	7	0	14	0	
Control Delay (s)	15.9	9.0	0.0	7.8	0.0	
Lane LOS	C	A		A		
Approach Delay (s)	9.9		0.0	4.7		
Approach LOS	A					
Intersection Summary						
Average Delay			4.8			
Intersection Capacity Utilization			28.5%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 22: Lynchburg Rd & Twin Creeks Drive

Existing Conditions - AM Peak Hour
 03/29/2019



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↗		↙	
Traffic Volume (veh/h)	3	223	85	6	7	3
Future Volume (veh/h)	3	223	85	6	7	3
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	242	92	7	8	3
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	99				344	96
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	99				344	96
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	100
cM capacity (veh/h)	1494				662	961
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	245	99	11			
Volume Left	3	0	8			
Volume Right	0	7	3			
cSH	1494	1700	714			
Volume to Capacity	0.00	0.06	0.02			
Queue Length 95th (ft)	0	0	1			
Control Delay (s)	0.1	0.0	10.1			
Lane LOS	A		B			
Approach Delay (s)	0.1	0.0	10.1			
Approach LOS			B			
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			24.1%		ICU Level of Service	A
Analysis Period (min)			15			

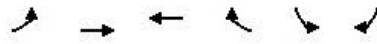
HCM Unsignalized Intersection Capacity Analysis
 23: Duncan Ln & Lynchburg Rd

Existing Conditions - AM Peak Hour
 03/29/2019

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↖	↗	
Traffic Volume (veh/h)	235	4	21	111	3	39
Future Volume (veh/h)	235	4	21	111	3	39
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	255	4	23	121	3	42
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			259		424	257
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			259		424	257
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		99	95
cM capacity (veh/h)			1306		576	782
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	259	144	45			
Volume Left	0	23	3			
Volume Right	4	0	42			
cSH	1700	1306	764			
Volume to Capacity	0.15	0.02	0.06			
Queue Length 95th (ft)	0	1	5			
Control Delay (s)	0.0	1.4	10.0			
Lane LOS		A	B			
Approach Delay (s)	0.0	1.4	10.0			
Approach LOS			B			
Intersection Summary						
Average Delay			1.4			
Intersection Capacity Utilization			32.9%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 24: Lynchburg Rd & Elm Street

Existing Conditions - AM Peak Hour
 03/29/2019



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↗		↙	
Traffic Volume (veh/h)	62	200	83	5	1	40
Future Volume (veh/h)	62	200	83	5	1	40
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	67	217	90	5	1	43
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	95				444	92
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	95				444	92
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				100	96
cM capacity (veh/h)	1499				546	965
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	284	95	44			
Volume Left	67	0	1			
Volume Right	0	5	43			
cSH	1499	1700	948			
Volume to Capacity	0.04	0.06	0.05			
Queue Length 95th (ft)	4	0	4			
Control Delay (s)	2.1	0.0	9.0			
Lane LOS	A		A			
Approach Delay (s)	2.1	0.0	9.0			
Approach LOS			A			
Intersection Summary						
Average Delay			2.3			
Intersection Capacity Utilization			30.6%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 25: N Cedar Street & 4th Avenue NW

Existing Conditions - AM Peak Hour
 03/29/2019

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔		↔
Sign Control	Stop			Stop		Stop
Traffic Volume (vph)	99	104	1	35	56	0
Future Volume (vph)	99	104	1	35	56	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	108	113	1	38	61	0
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total (vph)	221	39	61			
Volume Left (vph)	0	1	61			
Volume Right (vph)	113	0	0			
Hadj (s)	-0.27	0.04	0.23			
Departure Headway (s)	3.8	4.3	4.7			
Degree Utilization, x	0.23	0.05	0.08			
Capacity (veh/h)	924	815	726			
Control Delay (s)	8.0	7.5	8.1			
Approach Delay (s)	8.0	7.5	8.1			
Approach LOS	A	A	A			
Intersection Summary						
Delay			7.9			
Level of Service			A			
Intersection Capacity Utilization			21.6%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 26: N Cedar Street & 2nd Avenue NW

Existing Conditions - AM Peak Hour
 03/29/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	14	21	0	25	27	46	0	0	29	101	0	6
Future Volume (veh/h)	14	21	0	25	27	46	0	0	29	101	0	6
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	23	0	27	29	50	0	0	32	110	0	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	79			23			168	186	23	193	161	54
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	79			23			168	186	23	193	161	54
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			98			100	100	97	85	100	99
cM capacity (veh/h)	1519			1592			774	690	1054	728	712	1013
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	38	106	32	117								
Volume Left	15	27	0	110								
Volume Right	0	50	32	7								
cSH	1519	1592	1054	741								
Volume to Capacity	0.01	0.02	0.03	0.16								
Queue Length 95th (ft)	1	1	2	14								
Control Delay (s)	3.0	2.0	8.5	10.8								
Lane LOS	A	A	A	B								
Approach Delay (s)	3.0	2.0	8.5	10.8								
Approach LOS			A	B								
Intersection Summary												
Average Delay			6.3									
Intersection Capacity Utilization			25.7%		ICU Level of Service				A			
Analysis Period (min)			15									













HCM Unsignalized Intersection Capacity Analysis
 27: N Vine Street & 2nd Avenue NW

Existing Conditions - AM Peak Hour
 03/29/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	3	116	5	5	73	23	0	8	2	69	9	0
Future Volume (vph)	3	116	5	5	73	23	0	8	2	69	9	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	126	5	5	79	25	0	9	2	75	10	0
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	134	109	11	85								
Volume Left (vph)	3	5	0	75								
Volume Right (vph)	5	25	2	0								
Hadj (s)	0.02	-0.09	-0.08	0.21								
Departure Headway (s)	4.3	4.2	4.5	4.7								
Degree Utilization, x	0.16	0.13	0.01	0.11								
Capacity (veh/h)	819	834	751	725								
Control Delay (s)	8.1	7.8	7.5	8.2								
Approach Delay (s)	8.1	7.8	7.5	8.2								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay			8.0									
Level of Service			A									
Intersection Capacity Utilization			25.4%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
 28: N High Street & 2nd Avenue NW

Existing Conditions - AM Peak Hour
 03/29/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	7	166	19	3	77	31	13	106	27	76	19	19
Future Volume (vph)	7	166	19	3	77	31	13	106	27	76	19	19
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	180	21	3	84	34	14	115	29	83	215	21
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	209	121	158	319								
Volume Left (vph)	8	3	14	83								
Volume Right (vph)	21	34	29	21								
Hadj (s)	-0.02	-0.13	-0.06	0.05								
Departure Headway (s)	5.4	5.4	5.2	5.1								
Degree Utilization, x	0.31	0.18	0.23	0.45								
Capacity (veh/h)	617	593	630	666								
Control Delay (s)	10.7	9.6	9.8	12.3								
Approach Delay (s)	10.7	9.6	9.8	12.3								
Approach LOS	B	A	A	B								
Intersection Summary												
Delay			11.0									
Level of Service			B									
Intersection Capacity Utilization			46.8%	ICU Level of Service	A							
Analysis Period (min)			15									

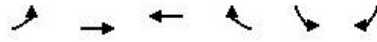
HCM Unsignalized Intersection Capacity Analysis
 21: George Fraley Parkway & Lynchburg Rd

Existing Conditions - PM Peak Hour
 03/29/2019

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰	↱	↩	↱	↰	↩
Traffic Volume (veh/h)	8	167	135	16	138	91
Future Volume (veh/h)	8	167	135	16	138	91
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	9	182	147	17	150	99
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	554	156			164	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	554	156			164	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	80			89	
cM capacity (veh/h)	441	890			1414	
Direction, Lane #	WB 1	WB 2	NB 1	SB 1	SB 2	
Volume Total	9	182	164	150	99	
Volume Left	9	0	0	150	0	
Volume Right	0	182	17	0	0	
cSH	441	890	1700	1414	1700	
Volume to Capacity	0.02	0.20	0.10	0.11	0.06	
Queue Length 95th (ft)	2	19	0	9	0	
Control Delay (s)	13.3	10.1	0.0	7.8	0.0	
Lane LOS	B	B		A		
Approach Delay (s)	10.2		0.0	4.7		
Approach LOS	B					
Intersection Summary						
Average Delay			5.2			
Intersection Capacity Utilization			29.1%	ICU Level of Service	A	
Analysis Period (min)						15

HCM Unsignalized Intersection Capacity Analysis
 22: Lynchburg Rd & Twin Creeks Drive

Existing Conditions - PM Peak Hour
 03/29/2019



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	5	146	176	10	8	1
Future Volume (veh/h)	5	146	176	10	8	1
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	159	191	11	9	1
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	202				366	196
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	202				366	196
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				99	100
cM capacity (veh/h)	1370				632	845
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	164	202	10			
Volume Left	5	0	9			
Volume Right	0	11	1			
cSH	1370	1700	648			
Volume to Capacity	0.00	0.12	0.02			
Queue Length 95th (ft)	0	0	1			
Control Delay (s)	0.3	0.0	10.6			
Lane LOS	A		B			
Approach Delay (s)	0.3	0.0	10.6			
Approach LOS			B			
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			21.7%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 23: Duncan Ln & Lynchburg Rd

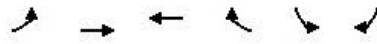
Existing Conditions - PM Peak Hour
 03/29/2019



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔		↔
Traffic Volume (veh/h)	168	6	38	201	4	28
Future Volume (veh/h)	168	6	38	201	4	28
Sign Control	Free			Free Stop		
Grade	0%			0% 0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	183	7	41	218	4	30
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			190		486	186
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			190		486	186
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		99	96
cM capacity (veh/h)			1384		524	856
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	190	259	34			
Volume Left	0	41	4			
Volume Right	7	0	30			
cSH	1700	1384	796			
Volume to Capacity	0.11	0.03	0.04			
Queue Length 95th (ft)	0	2	3			
Control Delay (s)	0.0	1.4	9.7			
Lane LOS		A	A			
Approach Delay (s)	0.0	1.4	9.7			
Approach LOS			A			
Intersection Summary						
Average Delay			1.5			
Intersection Capacity Utilization			35.2%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 24: Lynchburg Rd & Elm Street

Existing Conditions - PM Peak Hour
 03/29/2019



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	57	123	3	182	0	54
Future Volume (veh/h)	57	123	3	182	0	54
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	62	134	3	198	0	59
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	201				360	102
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	201				360	102
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	95				100	94
cM capacity (veh/h)	1371				610	953
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	196	201	59			
Volume Left	62	0	0			
Volume Right	0	198	59			
cSH	1371	1700	953			
Volume to Capacity	0.05	0.12	0.06			
Queue Length 95th (ft)	4	0	5			
Control Delay (s)	2.7	0.0	9.0			
Lane LOS	A		A			
Approach Delay (s)	2.7	0.0	9.0			
Approach LOS			A			
Intersection Summary						
Average Delay			2.3			
Intersection Capacity Utilization			34.4%	ICU Level of Service	A	
Analysis Period (min)			15			

















HCM Unsignalized Intersection Capacity Analysis
 25: N Cedar Street & 4th Avenue NW

Existing Conditions - PM Peak Hour
 03/29/2019

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↖	↗	
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	63	68	1	64	140	2
Future Volume (vph)	63	68	1	64	140	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	68	74	1	70	152	2
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total (vph)	142	71	154			
Volume Left (vph)	0	1	152			
Volume Right (vph)	74	0	2			
Hadj (s)	-0.28	0.04	0.22			
Departure Headway (s)	4.1	4.5	4.6			
Degree Utilization, x	0.16	0.09	0.20			
Capacity (veh/h)	846	762	749			
Control Delay (s)	7.9	7.9	8.7			
Approach Delay (s)	7.9	7.9	8.7			
Approach LOS	A	A	A			
Intersection Summary						
Delay			8.2			
Level of Service			A			
Intersection Capacity Utilization	22.0%		ICU Level of Service	A		
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 26: N Cedar Street & 2nd Avenue NW

Existing Conditions - PM Peak Hour
 03/29/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	16	20	0	12	22	134	6	0	32	70	0	2
Future Volume (veh/h)	16	20	0	12	22	134	6	0	32	70	0	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	17	22	0	13	24	146	7	0	35	76	0	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	170			22			181	252	22	214	179	97
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	170			22			181	252	22	214	179	97
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			99	100	97	89	100	100
cM capacity (veh/h)	1407			1593			767	638	1055	707	700	959
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	39	183	42	78								
Volume Left	17	13	7	76								
Volume Right	0	146	35	2								
cSH	1407	1593	993	712								
Volume to Capacity	0.01	0.01	0.04	0.11								
Queue Length 95th (ft)	1	1	3	9								
Control Delay (s)	3.4	0.6	8.8	10.7								
Lane LOS	A	A	A	B								
Approach Delay (s)	3.4	0.6	8.8	10.7								
Approach LOS			A	B								
Intersection Summary												
Average Delay				4.2								
Intersection Capacity Utilization				27.5%	ICU Level of Service	A						
Analysis Period (min)				15								













HCM Unsignalized Intersection Capacity Analysis
 27: N Vine Street & 2nd Avenue NW

Existing Conditions - PM Peak Hour
 03/29/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	7	85	0	5	151	60	50	15	0	6	19	2
Future Volume (vph)	7	85	0	5	151	60	50	15	0	6	19	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	92	0	5	164	65	54	16	0	7	21	2
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	100	234	70	30								
Volume Left (vph)	8	5	54	7								
Volume Right (vph)	0	65	0	2								
Hadj (s)	0.05	-0.13	0.19	0.04								
Departure Headway (s)	4.4	4.1	4.9	4.8								
Degree Utilization, x	0.12	0.27	0.09	0.04								
Capacity (veh/h)	780	838	688	691								
Control Delay (s)	8.1	8.7	8.4	8.0								
Approach Delay (s)	8.1	8.7	8.4	8.0								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay			8.4									
Level of Service			A									
Intersection Capacity Utilization			29.5%	ICU Level of Service	A							
Analysis Period (min)			15									

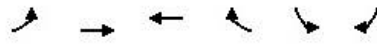
HCM Unsignalized Intersection Capacity Analysis
 28: N High Street & 2nd Avenue NW

Existing Conditions - PM Peak Hour
 03/29/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	13	110	17	6	172	63	40	163	31	49	111	13
Future Volume (vph)	13	110	17	6	172	63	40	163	31	49	111	13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	120	18	7	187	68	43	177	34	53	121	14
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	152	262	254	188								
Volume Left (vph)	14	7	43	53								
Volume Right (vph)	18	68	34	14								
Hadj (s)	-0.02	-0.12	-0.01	0.05								
Departure Headway (s)	5.6	5.3	5.4	5.5								
Degree Utilization, x	0.23	0.38	0.38	0.29								
Capacity (veh/h)	579	630	616	595								
Control Delay (s)	10.3	11.5	11.6	10.7								
Approach Delay (s)	10.3	11.5	11.6	10.7								
Approach LOS	B	B	B	B								
Intersection Summary												
Delay			11.1									
Level of Service			B									
Intersection Capacity Utilization			36.3%	ICU Level of Service	A							
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
 2: Lynchburg Rd & Marina Entrance

Projected Conditions - AM Peak Hour
 03/29/2019



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↗	↗	↖	↖	↗
Traffic Volume (veh/h)	24	243	162	37	41	27
Future Volume (veh/h)	24	243	162	37	41	27
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	26	264	176	40	45	29
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	216				492	176
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	216				492	176
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				91	97
cM capacity (veh/h)	1354				526	867
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	26	264	176	40	45	29
Volume Left	26	0	0	0	45	0
Volume Right	0	0	0	40	0	29
cSH	1354	1700	1700	1700	526	867
Volume to Capacity	0.02	0.16	0.10	0.02	0.09	0.03
Queue Length 95th (ft)	1	0	0	0	7	3
Control Delay (s)	7.7	0.0	0.0	0.0	12.5	9.3
Lane LOS	A				B	A
Approach Delay (s)	0.7		0.0		11.2	
Approach LOS					B	
Intersection Summary						
Average Delay			1.8			
Intersection Capacity Utilization			25.2%		ICU Level of Service A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
 21: George Fraley Parkway & Lynchburg Rd

Projected Conditions - AM Peak Hour
 03/29/2019

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	24	165	78	16	252	142
Future Volume (veh/h)	24	165	78	16	252	142
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	26	179	85	17	274	154
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	796	94			102	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	796	94			102	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	.91	.81			.82	
cM capacity (veh/h)	291	963			1490	
Direction, Lane #	WB 1	WB 2	NB 1	SB 1	SB 2	
Volume Total	26	179	102	274	154	
Volume Left	26	0	0	274	0	
Volume Right	0	179	17	0	0	
cSH	291	963	1700	1490	1700	
Volume to Capacity	0.09	0.19	0.06	0.18	0.09	
Queue Length 95th (ft)	7	17	0	17	0	
Control Delay (s)	18.6	9.6	0.0	8.0	0.0	
Lane LOS	C	A		A		
Approach Delay (s)	10.7		0.0	5.1		
Approach LOS	B					
Intersection Summary						
Average Delay			6.0			
Intersection Capacity Utilization			30.6%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 22: Site Access 2/Twin Creeks Drive & Lynchburg Rd

Projected Conditions - AM Peak Hour
 03/29/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (veh/h)	17	272	4	15	146	64	11	0	46	181	0	46
Future Volume (veh/h)	17	272	4	15	146	64	11	0	46	181	0	46
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	18	296	4	16	159	70	12	0	50	197	0	50
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	229		300		575		595		298		608	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	229		300		575		595		298		608	
tC, single (s)	4.1		4.1		7.1		6.5		6.2		7.1	
tC, 2 stage (s)												
tF (s)	2.2		2.2		3.5		4.0		3.3		3.5	
p0 queue free %	99		99		97		100		93		47	
cM capacity (veh/h)	1339		1261		396		407		741		373	
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total	18	300	16	229	12	50	197	50				
Volume Left	18	0	16	0	12	0	197	0				
Volume Right	0	4	0	70	0	50	0	50				
cSH	1339	1700	1261	1700	396	741	373	847				
Volume to Capacity	0.01	0.18	0.01	0.13	0.03	0.07	0.53	0.06				
Queue Length 95th (ft)	1	0	1	0	2	5	74	5				
Control Delay (s)	7.7	0.0	7.9	0.0	14.4	10.2	25.0	9.5				
Lane LOS	A		A		B	B	C	A				
Approach Delay (s)	0.4		0.5		11.0		21.9					
Approach LOS	A		B		C		C					
Intersection Summary												
Average Delay	7.3											
Intersection Capacity Utilization	37.9%			ICU Level of Service			A					
Analysis Period (min)	15											

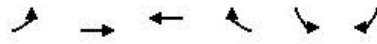
HCM Unsignalized Intersection Capacity Analysis
 23: Duncan Ln & Lynchburg Rd

Projected Conditions - AM Peak Hour
 03/29/2019

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↖	↗	
Traffic Volume (veh/h)	503	4	21	245	3	39
Future Volume (veh/h)	503	4	21	245	3	39
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	547	4	23	266	3	42
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			551		861	549
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			551		861	549
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		99	92
cM capacity (veh/h)			1019		319	535
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	551	289	45			
Volume Left	0	23	3			
Volume Right	4	0	42			
cSH	1700	1019	512			
Volume to Capacity	0.32	0.02	0.09			
Queue Length 95th (ft)	0	2	7			
Control Delay (s)	0.0	0.9	12.7			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.9	12.7			
Approach LOS			B			
Intersection Summary						
Average Delay			0.9			
Intersection Capacity Utilization			40.3%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 24: Lynchburg Rd & Elm Street

Projected Conditions - AM Peak Hour
 03/29/2019



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	89	441	200	5	1	57
Future Volume (veh/h)	89	441	200	5	1	57
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	97	479	217	5	1	62
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	222				892	220
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	222				892	220
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	93				100	92
cM capacity (veh/h)	1347				290	820
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	576	222	63			
Volume Left	97	0	1			
Volume Right	0	5	62			
cSH	1347	1700	797			
Volume to Capacity	0.07	0.13	0.08			
Queue Length 95th (ft)	6	0	6			
Control Delay (s)	2.0	0.0	9.9			
Lane LOS	A		A			
Approach Delay (s)	2.0	0.0	9.9			
Approach LOS			A			
Intersection Summary						
Average Delay			2.1			
Intersection Capacity Utilization			52.5%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 25: N Cedar Street & 4th Avenue NW

Projected Conditions - AM Peak Hour
 03/29/2019

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↖	↗	
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	99	337	1	35	149	0
Future Volume (vph)	99	337	1	35	149	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	108	366	1	38	162	0
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total (vph)	474	39	162			
Volume Left (vph)	0	1	162			
Volume Right (vph)	366	0	0			
Hadj (s)	-0.43	0.04	0.23			
Departure Headway (s)	4.0	4.9	5.2			
Degree Utilization, x	0.52	0.05	0.23			
Capacity (veh/h)	873	688	638			
Control Delay (s)	11.3	8.2	9.8			
Approach Delay (s)	11.3	8.2	9.8			
Approach LOS	B	A	A			
Intersection Summary						
Delay			10.7			
Level of Service			B			
Intersection Capacity Utilization			40.9%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 26: N Cedar Street & 2nd Avenue NW

Projected Conditions - AM Peak Hour
 03/29/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	21	0	25	27	168	0	0	29	430	0	9
Future Volume (veh/h)	17	21	0	25	27	168	0	0	29	430	0	9
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	18	23	0	27	29	183	0	0	32	467	0	10
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	212			23			244	325	23	266	234	120
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	212			23			244	325	23	266	234	120
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			98			100	100	97	28	100	99
cM capacity (veh/h)	1358			1592			687	575	1054	651	647	931
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	41	239	32	477								
Volume Left	18	27	0	467								
Volume Right	0	183	32	10								
cSH	1358	1592	1054	655								
Volume to Capacity	0.01	0.02	0.03	0.73								
Queue Length 95th (ft)	1	1	2	157								
Control Delay (s)	3.4	1.0	8.5	23.8								
Lane LOS	A	A	A	C								
Approach Delay (s)	3.4	1.0	8.5	23.8								
Approach LOS			A	C								
Intersection Summary												
Average Delay			15.2									
Intersection Capacity Utilization			51.2%		ICU Level of Service				A			
Analysis Period (min)			15									

















HCM Unsignalized Intersection Capacity Analysis
 27: N Vine Street & 2nd Avenue NW

Projected Conditions - AM Peak Hour
 03/29/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	3	445	5	5	195	23	0	8	2	69	9	0
Future Volume (vph)	3	445	5	5	195	23	0	8	2	69	9	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	484	5	5	212	25	0	9	2	75	10	0
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	492	242	11	85								
Volume Left (vph)	3	5	0	75								
Volume Right (vph)	5	25	2	0								
Hadj (s)	0.03	-0.02	-0.08	0.21								
Departure Headway (s)	4.5	4.7	5.7	5.8								
Degree Utilization, x	0.62	0.32	0.02	0.14								
Capacity (veh/h)	775	731	532	549								
Control Delay (s)	14.4	9.9	8.8	9.7								
Approach Delay (s)	14.4	9.9	8.8	9.7								
Approach LOS	B	A	A	A								
Intersection Summary												
Delay			12.6									
Level of Service			B									
Intersection Capacity Utilization			42.8%		ICU Level of Service				A			
Analysis Period (min)			15									

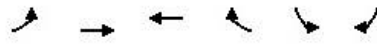
HCM Unsignalized Intersection Capacity Analysis
28: N High Street & 2nd Avenue NW

Projected Conditions - AM Peak Hour
03/29/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	7	495	19	3	199	31	13	106	27	76	198	19
Future Volume (vph)	7	496	19	3	199	31	13	106	27	76	198	19
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	538	21	3	216	34	14	115	29	83	215	21
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	567	253	158	319								
Volume Left (vph)	8	3	14	83								
Volume Right (vph)	21	34	29	21								
Hadj (s)	0.01	-0.04	-0.06	0.05								
Departure Headway (s)	6.4	7.0	7.6	7.2								
Degree Utilization, x	1.00	0.49	0.34	0.63								
Capacity (veh/h)	559	490	439	496								
Control Delay (s)	63.4	16.7	14.4	21.8								
Approach Delay (s)	63.4	16.7	14.4	21.8								
Approach LOS	F	C	B	C								
Intersection Summary												
Delay			38.1									
Level of Service			E									
Intersection Capacity Utilization			65.0%		ICU Level of Service					C		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
 2: Lynchburg Rd & Marina Entrance

Projected Conditions - PM Peak Hour
 03/29/2019



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↗	↗	↗	↖	↗
Traffic Volume (veh/h)	46	244	228	70	44	30
Future Volume (veh/h)	46	244	228	70	44	30
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	50	265	248	76	48	33
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	324				613	248
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	324				613	248
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				89	96
cM capacity (veh/h)	1236				437	791
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	50	265	248	76	48	33
Volume Left	50	0	0	0	48	0
Volume Right	0	0	0	76	0	33
cSH	1236	1700	1700	1700	437	791
Volume to Capacity	0.04	0.16	0.15	0.04	0.11	0.04
Queue Length 95th (ft)	3	0	0	0	9	3
Control Delay (s)	8.0	0.0	0.0	0.0	14.2	9.8
Lane LOS	A				B	A
Approach Delay (s)	1.3		0.0		12.4	
Approach LOS					B	
Intersection Summary						
Average Delay			2.0			
Intersection Capacity Utilization			28.7%		ICU Level of Service A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 21: George Fraley Parkway & Lynchburg Rd

Projected Conditions - PM Peak Hour
 03/29/2019

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↶	↷	↷		↶	↷
Traffic Volume (veh/h)	23	235	135	39	251	91
Future Volume (veh/h)	23	235	135	39	251	91
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	25	255	147	42	273	99
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	813	168			189	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	813	168			189	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	91	71			80	
cM capacity (veh/h)	279	876			1385	
Direction, Lane #	WB 1	WB 2	NB 1	SB 1	SB 2	
Volume Total	25	255	189	273	99	
Volume Left	25	0	0	273	0	
Volume Right	0	255	42	0	0	
cSH	279	876	1700	1385	1700	
Volume to Capacity	0.09	0.29	0.11	0.20	0.06	
Queue Length 95th (ft)	7	30	0	18	0	
Control Delay (s)	19.1	10.8	0.0	8.2	0.0	
Lane LOS	C	B		A		
Approach Delay (s)	11.5		0.0	6.0		
Approach LOS	B					
Intersection Summary						
Average Delay			6.5			
Intersection Capacity Utilization			36.7%	ICU Level of Service	A	
Analysis Period (min)			15			

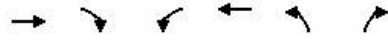
HCM Unsignalized Intersection Capacity Analysis
 22: Site Access 2/Twin Creeks Drive & Lynchburg Rd

Projected Conditions - PM Peak Hour
 03/29/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (veh/h)	55	218	12	50	262	209	7	0	30	126	0	30
Future Volume (veh/h)	55	218	12	50	262	209	7	0	30	126	0	30
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	60	237	13	54	285	227	8	0	33	137	0	33
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	512			250			790			984		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	512			250			790			984		
tC, single (s)	4.1			4.1			7.1			6.5		
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5			4.0		
p0 queue free %	94			96			97			100		
cM capacity (veh/h)	1053			1316			271			225		
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total	60	250	54	512	8	33	137	33				
Volume Left	60	0	54	0	8	0	137	0				
Volume Right	0	13	0	227	0	33	0	33				
cSH	1053	1700	1316	1700	271	795	232	651				
Volume to Capacity	0.06	0.15	0.04	0.30	0.03	0.04	0.59	0.05				
Queue Length 95th (ft)	5	0	3	0	2	3	84	4				
Control Delay (s)	8.6	0.0	7.9	0.0	18.7	9.7	40.8	10.8				
Lane LOS	A		A		C	A	E	B				
Approach Delay (s)	1.7		0.7		11.5		35.0					
Approach LOS	B		D		B		D					
Intersection Summary												
Average Delay	6.8											
Intersection Capacity Utilization	53.5%			ICU Level of Service			A					
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
 23: Duncan Ln & Lynchburg Rd

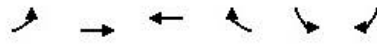
Projected Conditions - PM Peak Hour
 03/29/2019



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔		↔
Traffic Volume (veh/h)	388	6	38	536	4	28
Future Volume (veh/h)	388	6	38	536	4	28
Sign Control	Free			Free		Stop
Grade	0%			0%		0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	422	7	41	583	4	30
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			429		1090	426
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			429		1090	426
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		98	95
cM capacity (veh/h)			1130		229	629
Direction, Lane #						
	EB 1	WB 1	NB 1			
Volume Total	429	624	34			
Volume Left	0	41	4			
Volume Right	7	0	30			
cSH	1700	1130	522			
Volume to Capacity	0.25	0.04	0.07			
Queue Length 95th (ft)	0	3	5			
Control Delay (s)	0.0	1.0	12.4			
Lane LOS		A	B			
Approach Delay (s)	0.0	1.0	12.4			
Approach LOS			B			
Intersection Summary						
Average Delay			0.9			
Intersection Capacity Utilization			64.4%	ICU Level of Service	C	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
24: Lynchburg Rd & Elm Street

Projected Conditions - PM Peak Hour
03/29/2019



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	81	319	478	3	0	93
Future Volume (veh/h)	81	319	478	3	0	93
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	88	347	520	3	0	101
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	523				1044	522
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	523				1044	522
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	92				100	82
cM capacity (veh/h)	1043				232	555
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	435	523	101			
Volume Left	88	0	0			
Volume Right	0	3	101			
cSH	1043	1700	555			
Volume to Capacity	0.08	0.31	0.18			
Queue Length 95th (ft)	7	0	16			
Control Delay (s)	2.5	0.0	12.9			
Lane LOS	A		B			
Approach Delay (s)	2.5	0.0	12.9			
Approach LOS			B			
Intersection Summary						
Average Delay			2.3			
Intersection Capacity Utilization			62.4%		ICU Level of Service	B
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 25: N Cedar Street & 4th Avenue NW

Projected Conditions - PM Peak Hour
 03/29/2019

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘ ↙			↖ ↗		↘ ↙
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	63	236	1	64	420	2
Future Volume (vph)	63	236	1	64	420	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	68	257	1	70	457	2
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total (vph)	325	71	459			
Volume Left (vph)	0	1	457			
Volume Right (vph)	257	0	2			
Hadj (s)	-0.44	0.04	0.23			
Departure Headway (s)	4.9	5.7	5.2			
Degree Utilization, x	0.44	0.11	0.66			
Capacity (veh/h)	695	567	672			
Control Delay (s)	11.6	9.4	17.5			
Approach Delay (s)	11.6	9.4	17.5			
Approach LOS	B	A	C			
Intersection Summary						
Delay			14.6			
Level of Service			B			
Intersection Capacity Utilization			47.9%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
26: N Cedar Street & 2nd Avenue NW

Projected Conditions - PM Peak Hour
03/29/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	22	20	0	12	22	520	6	0	32	300	0	6
Future Volume (veh/h)	22	20	0	12	22	520	6	0	32	300	0	6
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	24	22	0	13	24	565	7	0	35	326	0	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	589			22			410	685	22	438	402	306
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	589			22			410	685	22	438	402	306
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			99			99	100	97	35	100	99
cM capacity (veh/h)	986			1593			534	359	1055	499	519	733
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	46	602	42	333								
Volume Left	24	13	7	326								
Volume Right	0	565	35	7								
cSH	986	1593	907	503								
Volume to Capacity	0.02	0.01	0.05	0.66								
Queue Length 95th (ft)	2	1	4	120								
Control Delay (s)	4.7	0.2	9.2	25.1								
Lane LOS	A	A	A	D								
Approach Delay (s)	4.7	0.2	9.2	25.1								
Approach LOS			A	D								
Intersection Summary												
Average Delay				8.9								
Intersection Capacity Utilization				64.2%	ICU Level of Service	C						
Analysis Period (min)				15								













HCM Unsignalized Intersection Capacity Analysis
27: N Vine Street & 2nd Avenue NW

Projected Conditions - PM Peak Hour
03/29/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	7	315	0	5	537	60	6	19	2	50	15	0
Future Volume (vph)	7	315	0	5	537	60	6	19	2	50	15	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	342	0	5	584	65	7	21	2	54	16	0
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	350	654	30	70								
Volume Left (vph)	8	5	7	54								
Volume Right (vph)	0	65	2	0								
Hadj (s)	0.04	-0.02	0.04	0.19								
Departure Headway (s)	5.1	4.7	6.5	6.5								
Degree Utilization, x	0.49	0.85	0.05	0.13								
Capacity (veh/h)	683	763	505	508								
Control Delay (s)	12.8	27.7	9.9	10.4								
Approach Delay (s)	12.8	27.7	9.9	10.4								
Approach LOS	B	D	A	B								
Intersection Summary												
Delay			21.4									
Level of Service			C									
Intersection Capacity Utilization			51.0%		ICU Level of Service				A			
Analysis Period (min)			15									

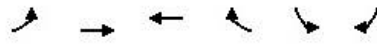
HCM Unsignalized Intersection Capacity Analysis
 28: N High Street & 2nd Avenue NW

Projected Conditions - PM Peak Hour
 03/29/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	13	340	17	6	558	63	40	163	31	49	111	13
Future Volume (vph)	13	340	17	6	558	63	40	163	31	49	111	13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	370	18	7	607	68	43	177	34	53	121	14
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	402	682	254	188								
Volume Left (vph)	14	7	43	53								
Volume Right (vph)	18	68	34	14								
Hadj (s)	0.01	-0.02	-0.01	0.05								
Departure Headway (s)	7.0	6.7	7.6	8.0								
Degree Utilization, x	0.78	1.27	0.54	0.42								
Capacity (veh/h)	402	527	441	405								
Control Delay (s)	30.3	157.8	19.2	16.6								
Approach Delay (s)	30.3	157.8	19.2	16.6								
Approach LOS	D	F	C	C								
Intersection Summary												
Delay			83.8									
Level of Service			F									
Intersection Capacity Utilization			57.6%	ICU Level of Service	B							
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
 2: Lynchburg Rd & Marina Entrance

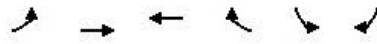
Projected Conditions - AM Peak Hour
 03/29/2019



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↗	↗	↖	↖	↗
Traffic Volume (veh/h)	24	243	162	37	41	27
Future Volume (veh/h)	24	243	162	37	41	27
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	26	264	176	40	45	29
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	216				492	176
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	216				492	176
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				91	97
cM capacity (veh/h)	1354				526	867
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	26	264	176	40	45	29
Volume Left	26	0	0	0	45	0
Volume Right	0	0	0	40	0	29
cSH	1354	1700	1700	1700	526	867
Volume to Capacity	0.02	0.16	0.10	0.02	0.09	0.03
Queue Length 95th (ft)	1	0	0	0	7	3
Control Delay (s)	7.7	0.0	0.0	0.0	12.5	9.3
Lane LOS	A				B	A
Approach Delay (s)	0.7		0.0		11.2	
Approach LOS					B	
Intersection Summary						
Average Delay			1.8			
Intersection Capacity Utilization			25.2%		ICU Level of Service A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
4: Lynchburg Rd


Projected Conditions - AM Peak Hour
03/29/2019



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	16	405	217	32	98	13
Future Volume (veh/h)	16	405	217	32	98	13
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	17	440	236	35	107	14
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	271				72	254
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	271				72	254
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				72	98
cM capacity (veh/h)	1292				386	785
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	457	271	121			
Volume Left	17	0	107			
Volume Right	0	35	14			
cSH	1292	1700	410			
Volume to Capacity	0.01	0.16	0.30			
Queue Length 95th (ft)	1	0	30			
Control Delay (s)	0.4	0.0	17.4			
Lane LOS	A		C			
Approach Delay (s)	0.4	0.0	17.4			
Approach LOS			C			
Intersection Summary						
Average Delay			2.7			
Intersection Capacity Utilization			47.2%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 21: George Fraley Parkway & Lynchburg Rd

Projected Conditions - AM Peak Hour
 03/29/2019

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	24	165	78	16	252	142
Future Volume (veh/h)	24	165	78	16	252	142
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	26	179	85	17	274	154
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	796	94			102	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	796	94			102	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	.91	.81			.82	
cM capacity (veh/h)	291	963			1490	
Direction, Lane #	WB 1	WB 2	NB 1	SB 1	SB 2	
Volume Total	26	179	102	274	154	
Volume Left	26	0	0	274	0	
Volume Right	0	179	17	0	0	
cSH	291	963	1700	1490	1700	
Volume to Capacity	0.09	0.19	0.06	0.18	0.09	
Queue Length 95th (ft)	7	17	0	17	0	
Control Delay (s)	18.6	9.6	0.0	8.0	0.0	
Lane LOS	C	A		A		
Approach Delay (s)	10.7		0.0	5.1		
Approach LOS	B					
Intersection Summary						
Average Delay			6.0			
Intersection Capacity Utilization			30.6%	ICU Level of Service	A	
Analysis Period (min)						15

HCM Unsignalized Intersection Capacity Analysis
 22: Site Access 2/Twin Creeks Drive & Lynchburg Rd

Projected Conditions - AM Peak Hour
 03/29/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (veh/h)	17	272	4	15	146	28	11	0	46	72	0	46
Future Volume (veh/h)	17	272	4	15	146	28	11	0	46	72	0	46
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	18	296	4	16	159	30	12	0	50	78	0	50
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	189			300			575	555	298	588	542	174
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	189			300			575	555	298	588	542	174
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			97	100	93	80	100	94
cM capacity (veh/h)	1385			1261			396	429	741	385	436	869
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total	18	300	16	189	12	50	78	50				
Volume Left	18	0	16	0	12	0	78	0				
Volume Right	0	4	0	30	0	50	0	50				
cSH	1385	1700	1261	1700	396	741	385	869				
Volume to Capacity	0.01	0.18	0.01	0.11	0.03	0.07	0.20	0.06				
Queue Length 95th (ft)	1	0	1	0	2	5	19	5				
Control Delay (s)	7.6	0.0	7.9	0.0	14.4	10.2	16.7	9.4				
Lane LOS	A		A		B	B	C	A				
Approach Delay (s)	0.4		0.6		11.0		13.9					
Approach LOS					B		B					
Intersection Summary												
Average Delay	3.8											
Intersection Capacity Utilization	31.9%			ICU Level of Service			A					
Analysis Period (min)	15											

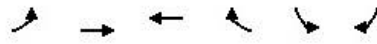
HCM Unsignalized Intersection Capacity Analysis
 23: Duncan Ln & Lynchburg Rd

Projected Conditions - AM Peak Hour
 03/29/2019

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↖	↗	
Traffic Volume (veh/h)	395	4	21	209	3	39
Future Volume (veh/h)	395	4	21	209	3	39
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	429	4	23	227	3	42
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			433		704	431
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			433		704	431
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		99	93
cM capacity (veh/h)			1127		395	624
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	433	250	45			
Volume Left	0	23	3			
Volume Right	4	0	42			
cSH	1700	1127	601			
Volume to Capacity	0.25	0.02	0.07			
Queue Length 95th (ft)	0	2	6			
Control Delay (s)	0.0	0.9	11.5			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.9	11.5			
Approach LOS			B			
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			38.5%	ICU Level of Service	A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
 24: Lynchburg Rd & Elm Street

Projected Conditions - AM Peak Hour
 03/29/2019



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	62	441	200	5	1	40
Future Volume (veh/h)	62	441	200	5	1	40
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	67	479	217	5	1	43
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	222				832	220
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	222				832	220
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	95				100	95
cM capacity (veh/h)	1347				322	820
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	546	222	44			
Volume Left	67	0	1			
Volume Right	0	5	43			
cSH	1347	1700	792			
Volume to Capacity	0.05	0.13	0.06			
Queue Length 95th (ft)	4	0	4			
Control Delay (s)	1.4	0.0	9.8			
Lane LOS	A		A			
Approach Delay (s)	1.4	0.0	9.8			
Approach LOS			A			
Intersection Summary						
Average Delay			1.5			
Intersection Capacity Utilization			50.8%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 25: N Cedar Street & 4th Avenue NW

Projected Conditions - AM Peak Hour
 03/29/2019

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↖	↘	↗
Sign Control	Stop			Stop		Stop
Traffic Volume (vph)	99	337	1	35	149	0
Future Volume (vph)	99	337	1	35	149	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	108	366	1	38	162	0
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total (vph)	474	39	162			
Volume Left (vph)	0	1	162			
Volume Right (vph)	366	0	0			
Hadj (s)	-0.43	0.04	0.23			
Departure Headway (s)	4.0	4.9	5.2			
Degree Utilization, x	0.52	0.05	0.23			
Capacity (veh/h)	873	688	638			
Control Delay (s)	11.3	8.2	9.8			
Approach Delay (s)	11.3	8.2	9.8			
Approach LOS	B	A	A			
Intersection Summary						
Delay			10.7			
Level of Service			B			
Intersection Capacity Utilization			40.9%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
26: N Cedar Street & 2nd Avenue NW

Projected Conditions - AM Peak Hour
03/29/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	21	0	25	27	168	0	0	29	430	0	9
Future Volume (veh/h)	17	21	0	25	27	168	0	0	29	430	0	9
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	18	23	0	27	29	183	0	0	32	467	0	10
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	212			23			244	325	23	266	234	120
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	212			23			244	325	23	266	234	120
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			98			100	100	97	28	100	99
cM capacity (veh/h)	1358			1592			687	575	1054	651	647	931
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	41	239	32	477								
Volume Left	18	27	0	467								
Volume Right	0	183	32	10								
cSH	1358	1592	1054	655								
Volume to Capacity	0.01	0.02	0.03	0.73								
Queue Length 95th (ft)	1	1	2	157								
Control Delay (s)	3.4	1.0	8.5	23.8								
Lane LOS	A	A	A	C								
Approach Delay (s)	3.4	1.0	8.5	23.8								
Approach LOS			A	C								
Intersection Summary												
Average Delay			15.2									
Intersection Capacity Utilization			51.2%		ICU Level of Service				A			
Analysis Period (min)			15									


















HCM Unsignalized Intersection Capacity Analysis
 27: N Vine Street & 2nd Avenue NW

Projected Conditions - AM Peak Hour
 03/29/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	3	445	5	5	195	23	0	8	2	69	9	0
Future Volume (vph)	3	445	5	5	195	23	0	8	2	69	9	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	484	5	5	212	25	0	9	2	75	10	0
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	492	242	11	85								
Volume Left (vph)	3	5	0	75								
Volume Right (vph)	5	25	2	0								
Hadj (s)	0.03	-0.02	-0.08	0.21								
Departure Headway (s)	4.5	4.7	5.7	5.8								
Degree Utilization, x	0.62	0.32	0.02	0.14								
Capacity (veh/h)	775	731	532	549								
Control Delay (s)	14.4	9.9	8.8	9.7								
Approach Delay (s)	14.4	9.9	8.8	9.7								
Approach LOS	B	A	A	A								
Intersection Summary												
Delay			12.6									
Level of Service			B									
Intersection Capacity Utilization			42.8%		ICU Level of Service				A			
Analysis Period (min)			15									

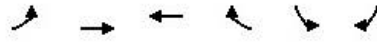
HCM Unsignalized Intersection Capacity Analysis
 28: N High Street & 2nd Avenue NW

Projected Conditions - AM Peak Hour
 03/29/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	7	495	19	3	199	31	13	106	27	76	198	19
Future Volume (vph)	7	496	19	3	199	31	13	106	27	76	198	19
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	538	21	3	216	34	14	115	29	83	215	21
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	567	253	158	319								
Volume Left (vph)	8	3	14	83								
Volume Right (vph)	21	34	29	21								
Hadj (s)	0.01	-0.04	-0.06	0.05								
Departure Headway (s)	6.4	7.0	7.6	7.2								
Degree Utilization, x	1.00	0.49	0.34	0.63								
Capacity (veh/h)	559	490	439	496								
Control Delay (s)	63.4	16.7	14.4	21.8								
Approach Delay (s)	63.4	16.7	14.4	21.8								
Approach LOS	F	C	B	C								
Intersection Summary												
Delay			38.1									
Level of Service			E									
Intersection Capacity Utilization			65.0%		ICU Level of Service					C		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
 2: Lynchburg Rd & Marina Entrance

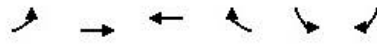
Projected Conditions - PM Peak Hour
 03/29/2019



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↗	↗	↗	↖	↗
Traffic Volume (veh/h)	46	244	228	70	44	30
Future Volume (veh/h)	46	244	228	70	44	30
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	50	265	248	76	48	33
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	324				613	248
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	324				613	248
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				89	96
cM capacity (veh/h)	1236				437	791
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	50	265	248	76	48	33
Volume Left	50	0	0	0	48	0
Volume Right	0	0	0	76	0	33
cSH	1236	1700	1700	1700	437	791
Volume to Capacity	0.04	0.16	0.15	0.04	0.11	0.04
Queue Length 95th (ft)	3	0	0	0	9	3
Control Delay (s)	8.0	0.0	0.0	0.0	14.2	9.8
Lane LOS	A				B	A
Approach Delay (s)	1.3		0.0		12.4	
Approach LOS					B	
Intersection Summary						
Average Delay			2.0			
Intersection Capacity Utilization			28.7%		ICU Level of Service A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
4: Lynchburg Rd

Projected Conditions - PM Peak Hour
03/29/2019



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↗		↙	
Traffic Volume (veh/h)	17	309	423	112	68	26
Future Volume (veh/h)	17	309	423	112	68	26
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	18	336	460	122	74	28
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	582				893	521
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	582				893	521
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				76	95
cM capacity (veh/h)	992				306	555
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	354	582	102			
Volume Left	18	0	74			
Volume Right	0	122	28			
cSH	992	1700	349			
Volume to Capacity	0.02	0.34	0.29			
Queue Length 95th (ft)	1	0	30			
Control Delay (s)	0.6	0.0	19.5			
Lane LOS	A		C			
Approach Delay (s)	0.6	0.0	19.5			
Approach LOS			C			
Intersection Summary						
Average Delay			2.1			
Intersection Capacity Utilization			42.2%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 21: George Fraley Parkway & Lynchburg Rd

Projected Conditions - PM Peak Hour
 03/29/2019

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↶	↷	↷		↶	↷
Traffic Volume (veh/h)	23	235	135	39	251	91
Future Volume (veh/h)	23	235	135	39	251	91
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	25	255	147	42	273	99
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	813	168			189	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	813	168			189	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	91	71			80	
cM capacity (veh/h)	279	876			1385	
Direction, Lane #	WB 1	WB 2	NB 1	SB 1	SB 2	
Volume Total	25	255	189	273	99	
Volume Left	25	0	0	273	0	
Volume Right	0	255	42	0	0	
cSH	279	876	1700	1385	1700	
Volume to Capacity	0.09	0.29	0.11	0.20	0.06	
Queue Length 95th (ft)	7	30	0	18	0	
Control Delay (s)	19.1	10.8	0.0	8.2	0.0	
Lane LOS	C	B		A		
Approach Delay (s)	11.5		0.0	6.0		
Approach LOS	B					
Intersection Summary						
Average Delay			6.5			
Intersection Capacity Utilization			36.7%	ICU Level of Service	A	
Analysis Period (min)						15

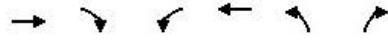
HCM Unsignalized Intersection Capacity Analysis
 22: Site Access 2/Twin Creeks Drive & Lynchburg Rd

Projected Conditions - PM Peak Hour
 03/29/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (veh/h)	55	218	12	50	262	85	7	0	30	52	0	30
Future Volume (veh/h)	55	218	12	50	262	85	7	0	30	52	0	30
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	60	237	13	54	285	92	8	0	33	57	0	33
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	377			250			790			848		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	377			250			790			848		
tC, single (s)	4.1			4.1			7.1			6.5		
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5			4.0		
p0 queue free %	95			96			97			100		
cM capacity (veh/h)	1181			1316			274			271		
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total	60	250	54	377	8	33	57	33				
Volume Left	60	0	54	0	8	0	57	0				
Volume Right	0	13	0	92	0	33	0	33				
cSH	1181	1700	1316	1700	274	795	259	711				
Volume to Capacity	0.05	0.15	0.04	0.22	0.03	0.04	0.22	0.05				
Queue Length 95th (ft)	4	0	3	0	2	3	21	4				
Control Delay (s)	8.2	0.0	7.9	0.0	18.6	9.7	22.8	10.3				
Lane LOS	A		A		C	A	C	B				
Approach Delay (s)	1.6		1.0		11.4		18.2					
Approach LOS	B		C		B		C					
Intersection Summary												
Average Delay	3.5											
Intersection Capacity Utilization	41.8%			ICU Level of Service				A				
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
 23: Duncan Ln & Lynchburg Rd

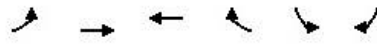
Projected Conditions - PM Peak Hour
 03/29/2019



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↻			↻	↻	
Traffic Volume (veh/h)	314	6	38	412	4	28
Future Volume (veh/h)	314	6	38	412	4	28
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	341	7	41	448	4	30
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			348	874	344	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			348	874	344	
tC, single (s)			4.1	6.4	6.2	
tC, 2 stage (s)						
tF (s)			2.2	3.5	3.3	
p0 queue free %			97	99	96	
cM capacity (veh/h)			1211	309	698	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	348	489	34			
Volume Left	0	41	4			
Volume Right	7	0	30			
cSH	1700	1211	608			
Volume to Capacity	0.20	0.03	0.06			
Queue Length 95th (ft)	0	3	4			
Control Delay (s)	0.0	1.0	11.3			
Lane LOS		A	B			
Approach Delay (s)	0.0	1.0	11.3			
Approach LOS			B			
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			54.0%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 24: Lynchburg Rd & Elm Street

Projected Conditions - PM Peak Hour
 03/29/2019



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	57	319	478	3	0	54
Future Volume (veh/h)	57	319	478	3	0	54
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	62	347	520	3	0	59
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	523				992	522
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	523				992	522
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	94				100	89
cM capacity (veh/h)	1043				256	555
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	409	523	59			
Volume Left	62	0	0			
Volume Right	0	3	59			
cSH	1043	1700	555			
Volume to Capacity	0.06	0.31	0.11			
Queue Length 95th (ft)	5	0	9			
Control Delay (s)	1.9	0.0	12.3			
Lane LOS	A		B			
Approach Delay (s)	1.9	0.0	12.3			
Approach LOS			B			
Intersection Summary						
Average Delay			1.5			
Intersection Capacity Utilization			58.6%		ICU Level of Service	B
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 25: N Cedar Street & 4th Avenue NW

Projected Conditions - PM Peak Hour
 03/29/2019

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↖	↗	
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	63	236	1	64	420	2
Future Volume (vph)	63	236	1	64	420	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	68	257	1	70	457	2
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total (vph)	325	71	459			
Volume Left (vph)	0	1	457			
Volume Right (vph)	257	0	2			
Hadj (s)	-0.44	0.04	0.23			
Departure Headway (s)	4.9	5.7	5.2			
Degree Utilization, x	0.44	0.11	0.66			
Capacity (veh/h)	695	567	672			
Control Delay (s)	11.6	9.4	17.5			
Approach Delay (s)	11.6	9.4	17.5			
Approach LOS	B	A	C			
Intersection Summary						
Delay			14.6			
Level of Service			B			
Intersection Capacity Utilization			47.9%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 26: N Cedar Street & 2nd Avenue NW

Projected Conditions - PM Peak Hour
 03/29/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	22	20	0	12	22	520	6	0	32	300	0	6
Future Volume (veh/h)	22	20	0	12	22	520	6	0	32	300	0	6
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	24	22	0	13	24	565	7	0	35	326	0	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	589			22			410	685	22	438	402	306
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	589			22			410	685	22	438	402	306
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			99			99	100	97	35	100	99
cM capacity (veh/h)	986			1593			534	359	1055	499	519	733
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	46	602	42	333								
Volume Left	24	13	7	326								
Volume Right	0	565	35	7								
cSH	986	1593	907	503								
Volume to Capacity	0.02	0.01	0.05	0.66								
Queue Length 95th (ft)	2	1	4	120								
Control Delay (s)	4.7	0.2	9.2	25.1								
Lane LOS	A	A	A	D								
Approach Delay (s)	4.7	0.2	9.2	25.1								
Approach LOS			A	D								
Intersection Summary												
Average Delay			8.9									
Intersection Capacity Utilization			64.2%		ICU Level of Service				C			
Analysis Period (min)			15									













HCM Unsignalized Intersection Capacity Analysis
 27: N Vine Street & 2nd Avenue NW

Projected Conditions - PM Peak Hour
 03/29/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	7	315	0	5	537	60	6	19	2	50	15	0
Future Volume (vph)	7	315	0	5	537	60	6	19	2	50	15	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	342	0	5	584	65	7	21	2	54	16	0
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	350	654	30	70								
Volume Left (vph)	8	5	7	54								
Volume Right (vph)	0	65	2	0								
Hadj (s)	0.04	-0.02	0.04	0.19								
Departure Headway (s)	5.1	4.7	6.5	6.5								
Degree Utilization, x	0.49	0.85	0.05	0.13								
Capacity (veh/h)	683	763	505	508								
Control Delay (s)	12.8	27.7	9.9	10.4								
Approach Delay (s)	12.8	27.7	9.9	10.4								
Approach LOS	B	D	A	B								
Intersection Summary												
Delay			21.4									
Level of Service			C									
Intersection Capacity Utilization			51.0%		ICU Level of Service					A		
Analysis Period (min)			15									

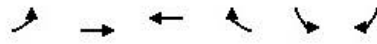
HCM Unsignalized Intersection Capacity Analysis
 28: N High Street & 2nd Avenue NW

Projected Conditions - PM Peak Hour
 03/29/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	13	340	17	6	558	63	40	163	31	49	111	13
Future Volume (vph)	13	340	17	6	558	63	40	163	31	49	111	13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	370	18	7	607	68	43	177	34	53	121	14
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	402	682	254	188								
Volume Left (vph)	14	7	43	53								
Volume Right (vph)	18	68	34	14								
Hadj (s)	0.01	-0.02	-0.01	0.05								
Departure Headway (s)	7.0	6.7	7.6	8.0								
Degree Utilization, x	0.78	1.27	0.54	0.42								
Capacity (veh/h)	402	527	441	405								
Control Delay (s)	30.3	157.8	19.2	16.6								
Approach Delay (s)	30.3	157.8	19.2	16.6								
Approach LOS	D	F	C	C								
Intersection Summary												
Delay			83.8									
Level of Service			F									
Intersection Capacity Utilization			57.6%	ICU Level of Service	B							
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
 2: Lynchburg Rd & Marina Entrance

Projected Conditions - AM Peak Hour
 03/29/2019



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↗	↗	↗	↖	↖
Traffic Volume (veh/h)	24	237	141	29	48	27
Future Volume (veh/h)	24	237	141	29	48	27
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	26	258	153	32	52	29
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	185				463	153
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	185				463	153
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				90	97
cM capacity (veh/h)	1390				547	893
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	26	258	153	32	52	29
Volume Left	26	0	0	0	52	0
Volume Right	0	0	0	32	0	29
cSH	1390	1700	1700	1700	547	893
Volume to Capacity	0.02	0.15	0.09	0.02	0.10	0.03
Queue Length 95th (ft)	1	0	0	0	8	3
Control Delay (s)	7.6	0.0	0.0	0.0	12.3	9.2
Lane LOS	A				B	A
Approach Delay (s)	0.7		0.0		11.2	
Approach LOS					B	
Intersection Summary						
Average Delay			2.0			
Intersection Capacity Utilization			24.1%		ICU Level of Service A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
 21: George Fraley Parkway & Lynchburg Rd

Projected Conditions - AM Peak Hour
 03/29/2019

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↶	↷	↷		↶	↷
Traffic Volume (veh/h)	24	144	78	16	245	142
Future Volume (veh/h)	24	144	78	16	245	142
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	26	157	85	17	266	154
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	780	94			102	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	780	94			102	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	91	84			82	
cM capacity (veh/h)	299	963			1490	
Direction, Lane #	WB 1	WB 2	NB 1	SB 1	SB 2	
Volume Total	26	157	102	266	154	
Volume Left	26	0	0	266	0	
Volume Right	0	157	17	0	0	
cSH	299	963	1700	1490	1700	
Volume to Capacity	0.09	0.16	0.06	0.18	0.09	
Queue Length 95th (ft)	7	15	0	16	0	
Control Delay (s)	18.2	9.5	0.0	7.9	0.0	
Lane LOS	C	A		A		
Approach Delay (s)	10.7		0.0	5.0		
Approach LOS	B					
Intersection Summary						
Average Delay			5.8			
Intersection Capacity Utilization			30.2%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 22: Site Access 2/Twin Creeks Drive & Lynchburg Rd

Projected Conditions - AM Peak Hour
 03/29/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (veh/h)	17	273	4	15	138	64	11	0	46	181	0	46
Future Volume (veh/h)	17	273	4	15	138	64	11	0	46	181	0	46
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	18	297	4	16	150	70	12	0	50	197	0	50
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	220		301		567		587		299		600	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	220		301		567		587		299		600	
tC, single (s)	4.1		4.1		7.1		6.5		6.2		7.1	
tC, 2 stage (s)												
tF (s)	2.2		2.2		3.5		4.0		3.3		3.5	
p0 queue free %	99		99		97		100		93		48	
cM capacity (veh/h)	1349		1260		401		411		741		377	
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total	18	301	16	220	12	50	197	50				
Volume Left	18	0	16	0	12	0	197	0				
Volume Right	0	4	0	70	0	50	0	50				
cSH	1349	1700	1260	1700	401	741	377	857				
Volume to Capacity	0.01	0.18	0.01	0.13	0.03	0.07	0.52	0.06				
Queue Length 95th (ft)	1	0	1	0	2	5	73	5				
Control Delay (s)	7.7	0.0	7.9	0.0	14.3	10.2	24.5	9.5				
Lane LOS	A		A		B	B	C	A				
Approach Delay (s)	0.4		0.5		11.0		21.5					
Approach LOS	A		B		B		C					
Intersection Summary												
Average Delay			7.2									
Intersection Capacity Utilization			38.0%		ICU Level of Service		A					
Analysis Period (min)	15											

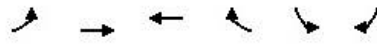
HCM Unsignalized Intersection Capacity Analysis
 23: Duncan Ln & Lynchburg Rd

Projected Conditions - AM Peak Hour
 03/29/2019

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↖	↗	
Traffic Volume (veh/h)	504	4	21	237	3	39
Future Volume (veh/h)	504	4	21	237	3	39
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	548	4	23	258	3	42
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			552		854	550
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			552		854	550
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		99	92
cM capacity (veh/h)			1018		322	535
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	552	281	45			
Volume Left	0	23	3			
Volume Right	4	0	42			
cSH	1700	1018	512			
Volume to Capacity	0.32	0.02	0.09			
Queue Length 95th (ft)	0	2	7			
Control Delay (s)	0.0	0.9	12.7			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.9	12.7			
Approach LOS			B			
Intersection Summary						
Average Delay			0.9			
Intersection Capacity Utilization			39.9%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
24: Lynchburg Rd & Elm Street

Projected Conditions - AM Peak Hour
03/29/2019



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↗		↙	
Traffic Volume (veh/h)	89	442	192	6	2	57
Future Volume (veh/h)	89	442	192	6	2	57
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	97	480	209	7	2	62
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	216				886	212
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	216				886	212
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	93				99	93
cM capacity (veh/h)	1354				292	828
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	577	216	64			
Volume Left	97	0	2			
Volume Right	0	7	62			
cSH	1354	1700	783			
Volume to Capacity	0.07	0.13	0.08			
Queue Length 95th (ft)	6	0	7			
Control Delay (s)	2.0	0.0	10.0			
Lane LOS	A		B			
Approach Delay (s)	2.0	0.0	10.0			
Approach LOS			B			
Intersection Summary						
Average Delay			2.1			
Intersection Capacity Utilization			52.3%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 25: N Cedar Street & 4th Avenue NW

Projected Conditions - AM Peak Hour
 03/29/2019

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↖	↗	
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	99	337	1	35	149	0
Future Volume (vph)	99	337	1	35	149	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	108	366	1	38	162	0
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total (vph)	474	39	162			
Volume Left (vph)	0	1	162			
Volume Right (vph)	366	0	0			
Hadj (s)	-0.43	0.04	0.23			
Departure Headway (s)	4.0	4.9	5.2			
Degree Utilization, x	0.52	0.05	0.23			
Capacity (veh/h)	873	688	638			
Control Delay (s)	11.3	8.2	9.8			
Approach Delay (s)	11.3	8.2	9.8			
Approach LOS	B	A	A			
Intersection Summary						
Delay			10.7			
Level of Service			B			
Intersection Capacity Utilization			40.9%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 26: N Cedar Street & 2nd Avenue NW

Projected Conditions - AM Peak Hour
 03/29/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	21	0	25	27	140	0	0	29	338	0	9
Future Volume (veh/h)	17	21	0	25	27	140	0	0	29	338	0	9
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	18	23	0	27	29	152	0	0	32	367	0	10
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	181			23			228	294	23	250	218	105
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	181			23			228	294	23	250	218	105
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			98			100	100	97	45	100	99
cM capacity (veh/h)	1394			1592			703	599	1054	667	660	949
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	41	208	32	377								
Volume Left	18	27	0	367								
Volume Right	0	152	32	10								
cSH	1394	1592	1054	672								
Volume to Capacity	0.01	0.02	0.03	0.56								
Queue Length 95th (ft)	1	1	2	88								
Control Delay (s)	3.4	1.1	8.5	17.0								
Lane LOS	A	A	A	C								
Approach Delay (s)	3.4	1.1	8.5	17.0								
Approach LOS			A	C								
Intersection Summary												
Average Delay			10.7									
Intersection Capacity Utilization			44.4%		ICU Level of Service				A			
Analysis Period (min)			15									

















HCM Unsignalized Intersection Capacity Analysis
 27: N Vine Street & 2nd Avenue NW

Projected Conditions - AM Peak Hour
 03/29/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	3	353	5	5	167	23	0	8	2	69	9	0
Future Volume (vph)	3	353	5	5	167	23	0	8	2	69	9	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	384	5	5	182	25	0	9	2	75	10	0
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	392	212	11	85								
Volume Left (vph)	3	5	0	75								
Volume Right (vph)	5	25	2	0								
Hadj (s)	0.03	-0.03	-0.08	0.21								
Departure Headway (s)	4.4	4.6	5.4	5.5								
Degree Utilization, x	0.48	0.27	0.02	0.13								
Capacity (veh/h)	792	753	577	587								
Control Delay (s)	11.5	9.3	8.4	9.3								
Approach Delay (s)	11.5	9.3	8.4	9.3								
Approach LOS	B	A	A	A								
Intersection Summary												
Delay			10.5									
Level of Service			B									
Intersection Capacity Utilization			37.9%		ICU Level of Service				A			
Analysis Period (min)			15									

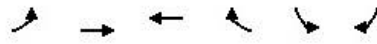
HCM Unsignalized Intersection Capacity Analysis
28: N High Street & 2nd Avenue NW

Projected Conditions - AM Peak Hour
03/29/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	7	403	19	3	171	31	13	106	27	76	198	19
Future Volume (vph)	7	403	19	3	171	31	13	106	27	76	198	19
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	438	21	3	186	34	14	115	29	83	215	21
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	467	223	158	319								
Volume Left (vph)	8	3	14	83								
Volume Right (vph)	21	34	29	21								
Hadj (s)	0.01	-0.05	-0.06	0.05								
Departure Headway (s)	6.0	6.5	6.9	6.5								
Degree Utilization, x	0.78	0.40	0.30	0.58								
Capacity (veh/h)	568	489	454	501								
Control Delay (s)	27.4	13.8	12.8	18.0								
Approach Delay (s)	27.4	13.8	12.8	18.0								
Approach LOS	D	B	B	C								
Intersection Summary												
Delay			20.2									
Level of Service			C									
Intersection Capacity Utilization			60.0%	ICU Level of Service	B							
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
2: Lynchburg Rd & Marina Entrance












Projected Conditions - PM Peak Hour
03/29/2019



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↗	↗	↖	↖	↗
Traffic Volume (veh/h)	46	222	215	80	64	30
Future Volume (veh/h)	46	222	215	80	64	30
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	50	241	234	87	70	33
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	321				575	234
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	321				575	234
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				85	96
cM capacity (veh/h)	1239				460	805
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	50	241	234	87	70	33
Volume Left	50	0	0	0	70	0
Volume Right	0	0	0	87	0	33
cSH	1239	1700	1700	1700	460	805
Volume to Capacity	0.04	0.14	0.14	0.05	0.15	0.04
Queue Length 95th (ft)	3	0	0	0	13	3
Control Delay (s)	8.0	0.0	0.0	0.0	14.2	9.7
Lane LOS	A				B	A
Approach Delay (s)	1.4		0.0		12.8	
Approach LOS					B	
Intersection Summary						
Average Delay			2.4			
Intersection Capacity Utilization			28.2%		ICU Level of Service A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
 21: George Fraley Parkway & Lynchburg Rd

Projected Conditions - PM Peak Hour
 03/29/2019

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	23	221	135	40	229	91
Future Volume (veh/h)	23	221	135	40	229	91
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	25	240	147	43	249	99
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type						
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	766	168			190	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	766	168			190	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	92	73			82	
cM capacity (veh/h)	304	876			1384	
Direction, Lane #						
	WB 1	WB 2	NB 1	SB 1	SB 2	
Volume Total	25	240	190	249	99	
Volume Left	25	0	0	249	0	
Volume Right	0	240	43	0	0	
cSH	304	876	1700	1384	1700	
Volume to Capacity	0.08	0.27	0.11	0.18	0.06	
Queue Length 95th (ft)	7	28	0	16	0	
Control Delay (s)	17.9	10.7	0.0	8.2	0.0	
Lane LOS	C	B		A		
Approach Delay (s)	11.3		0.0	5.8		
Approach LOS	B					
Intersection Summary						
Average Delay			6.3			
Intersection Capacity Utilization			35.6%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 22: Site Access 2/Twin Creeks Drive & Lynchburg Rd

Projected Conditions - PM Peak Hour
 03/29/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (veh/h)	55	216	12	50	259	209	7	0	30	126	0	30
Future Volume (veh/h)	55	216	12	50	259	209	7	0	30	126	0	30
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	60	235	13	54	282	227	8	0	33	137	0	33
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	509			248			784	978	242	892	872	396
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	509			248			784	978	242	892	872	396
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	94			96			97	100	96	41	100	95
cM capacity (veh/h)	1056			1318			273	226	797	234	261	654
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total	60	248	54	509	8	33	137	33				
Volume Left	60	0	54	0	8	0	137	0				
Volume Right	0	13	0	227	0	33	0	33				
cSH	1056	1700	1318	1700	273	797	234	654				
Volume to Capacity	0.06	0.15	0.04	0.30	0.03	0.04	0.59	0.05				
Queue Length 95th (ft)	5	0	3	0	2	3	83	4				
Control Delay (s)	8.6	0.0	7.8	0.0	18.6	9.7	40.2	10.8				
Lane LOS	A		A		C	A	E	B				
Approach Delay (s)	1.7	0.8		11.4		34.5						
Approach LOS		B		B		D						
Intersection Summary												
Average Delay			6.7									
Intersection Capacity Utilization			53.4%		ICU Level of Service		A					
Analysis Period (min)	15											

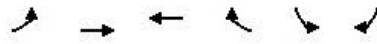
HCM Unsignalized Intersection Capacity Analysis
 23: Duncan Ln & Lynchburg Rd

Projected Conditions - PM Peak Hour
 03/29/2019

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↖	↗	
Traffic Volume (veh/h)	386	6	38	533	4	28
Future Volume (veh/h)	386	6	38	533	4	28
Sign Control	Free			Free Stop		
Grade	0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	420	7	41	579	4	30
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			427		1084	424
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			427		1084	424
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			96		98	95
cM capacity (veh/h)			1132		231	630
Direction, Lane #						
	EB 1	WB 1	NB 1			
Volume Total	427	620	34			
Volume Left	0	41	4			
Volume Right	7	0	30			
cSH	1700	1132	524			
Volume to Capacity	0.25	0.04	0.06			
Queue Length 95th (ft)	0	3	5			
Control Delay (s)	0.0	1.0	12.3			
Lane LOS		A	B			
Approach Delay (s)	0.0	1.0	12.3			
Approach LOS			B			
Intersection Summary						
Average Delay			0.9			
Intersection Capacity Utilization			64.2%	ICU Level of Service	C	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 24: Lynchburg Rd & Elm Street

Projected Conditions - PM Peak Hour
 03/29/2019



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↗		↙	
Traffic Volume (veh/h)	81	317	475	4	2	93
Future Volume (veh/h)	81	317	475	4	2	93
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	88	345	516	4	2	101
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	520				1039	518
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	520				1039	518
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	92				99	82
cM capacity (veh/h)	1046				234	558
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	433	520	103			
Volume Left	88	0	2			
Volume Right	0	4	101			
cSH	1046	1700	543			
Volume to Capacity	0.08	0.31	0.19			
Queue Length 95th (ft)	7	0	17			
Control Delay (s)	2.5	0.0	13.2			
Lane LOS	A		B			
Approach Delay (s)	2.5	0.0	13.2			
Approach LOS			B			
Intersection Summary						
Average Delay			2.3			
Intersection Capacity Utilization			62.3%		ICU Level of Service	B
Analysis Period (min)			15			

















HCM Unsignalized Intersection Capacity Analysis
 25: N Cedar Street & 4th Avenue NW

Projected Conditions - PM Peak Hour
 03/29/2019

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↖	↗	
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	63	236	1	64	420	2
Future Volume (vph)	63	236	1	64	420	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	68	257	1	70	457	2
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total (vph)	325	71	459			
Volume Left (vph)	0	1	457			
Volume Right (vph)	257	0	2			
Hadj (s)	-0.44	0.04	0.23			
Departure Headway (s)	4.9	5.7	5.2			
Degree Utilization, x	0.44	0.11	0.66			
Capacity (veh/h)	695	567	672			
Control Delay (s)	11.6	9.4	17.5			
Approach Delay (s)	11.6	9.4	17.5			
Approach LOS	B	A	C			
Intersection Summary						
Delay			14.6			
Level of Service			B			
Intersection Capacity Utilization			47.9%	ICU Level of Service	A	
Analysis Period (min)			15			

















HCM Unsignalized Intersection Capacity Analysis
26: N Cedar Street & 2nd Avenue NW

Projected Conditions - PM Peak Hour
03/29/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	20	0	12	22	420	6	0	32	240	0	6
Future Volume (veh/h)	22	20	0	12	22	420	6	0	32	240	0	6
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	24	22	0	13	24	457	7	0	35	261	0	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	481			22			356	577	22	384	348	252
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	481			22			356	577	22	384	348	252
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			99			99	100	97	52	100	99
cM capacity (veh/h)	1082			1593			581	414	1055	543	558	786
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	46	494	42	268								
Volume Left	24	13	7	261								
Volume Right	0	457	35	7								
cSH	1082	1593	929	547								
Volume to Capacity	0.02	0.01	0.05	0.49								
Queue Length 95th (ft)	2	1	4	67								
Control Delay (s)	4.5	0.3	9.1	17.7								
Lane LOS	A	A	A	C								
Approach Delay (s)	4.5	0.3	9.1	17.7								
Approach LOS			A	C								
Intersection Summary												
Average Delay			6.4									
Intersection Capacity Utilization			54.7%	ICU Level of Service	A							
Analysis Period (min)			15									


















HCM Unsignalized Intersection Capacity Analysis
 27: N Vine Street & 2nd Avenue NW

Projected Conditions - PM Peak Hour
 03/29/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	7	255	0	5	437	60	6	19	2	50	15	0
Future Volume (vph)	7	255	0	5	437	60	6	19	2	50	15	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	277	0	5	475	65	7	21	2	54	16	0
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	285	545	30	70								
Volume Left (vph)	8	5	7	54								
Volume Right (vph)	0	65	2	0								
Hadj (s)	0.04	-0.04	0.04	0.19								
Departure Headway (s)	4.9	4.5	6.0	6.1								
Degree Utilization, x	0.39	0.69	0.05	0.12								
Capacity (veh/h)	703	778	519	527								
Control Delay (s)	10.9	16.8	9.3	9.9								
Approach Delay (s)	10.9	16.8	9.3	9.9								
Approach LOS	B	C	A	A								
Intersection Summary												
Delay			14.3									
Level of Service			B									
Intersection Capacity Utilization			45.5%	ICU Level of Service	A							
Analysis Period (min)			15									

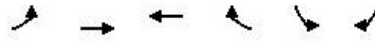
HCM Unsignalized Intersection Capacity Analysis
28: N High Street & 2nd Avenue NW

Projected Conditions - PM Peak Hour
03/29/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	13	280	17	6	458	63	40	163	31	49	111	13
Future Volume (vph)	13	280	17	6	458	63	40	163	31	49	111	13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	304	18	7	498	68	43	177	34	53	121	14
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	336	573	254	188								
Volume Left (vph)	14	7	43	53								
Volume Right (vph)	18	68	34	14								
Hadj (s)	0.01	-0.03	-0.01	0.05								
Departure Headway (s)	6.9	6.4	7.4	7.7								
Degree Utilization, x	0.64	1.03	0.52	0.40								
Capacity (veh/h)	504	552	459	434								
Control Delay (s)	21.5	70.2	18.1	15.8								
Approach Delay (s)	21.5	70.2	18.1	15.8								
Approach LOS	C	F	C	C								
Intersection Summary												
Delay			40.7									
Level of Service			E									
Intersection Capacity Utilization			52.2%	ICU Level of Service	A							
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
 2: Lynchburg Rd & Marina Entrance

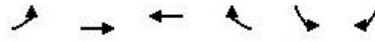
Projected Conditions - AM Peak Hour
 03/29/2019



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↗	↗	↗	↖	↖
Traffic Volume (veh/h)	24	237	141	29	48	27
Future Volume (veh/h)	24	237	141	29	48	27
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	26	258	153	32	52	29
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	185				463	153
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	185				463	153
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				90	97
cM capacity (veh/h)	1390				547	893
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	26	258	153	32	52	29
Volume Left	26	0	0	0	52	0
Volume Right	0	0	0	32	0	29
cSH	1390	1700	1700	1700	547	893
Volume to Capacity	0.02	0.15	0.09	0.02	0.10	0.03
Queue Length 95th (ft)	1	0	0	0	8	3
Control Delay (s)	7.6	0.0	0.0	0.0	12.3	9.2
Lane LOS	A				B	A
Approach Delay (s)	0.7		0.0		11.2	
Approach LOS					B	
Intersection Summary						
Average Delay			2.0			
Intersection Capacity Utilization			24.1%		ICU Level of Service A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
4: Lynchburg Rd


Projected Conditions - AM Peak Hour
03/29/2019



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (veh/h)	16	406	209	34	98	13
Future Volume (veh/h)	16	406	209	34	98	13
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	17	441	227	37	107	14
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	264				720	246
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	264				720	246
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				73	98
cM capacity (veh/h)	1300				389	793
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	458	264	121			
Volume Left	17	0	107			
Volume Right	0	37	14			
cSH	1300	1700	414			
Volume to Capacity	0.01	0.16	0.29			
Queue Length 95th (ft)	1	0	30			
Control Delay (s)	0.4	0.0	17.3			
Lane LOS	A		C			
Approach Delay (s)	0.4	0.0	17.3			
Approach LOS			C			
Intersection Summary						
Average Delay			2.7			
Intersection Capacity Utilization			47.2%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 21: George Fraley Parkway & Lynchburg Rd

Projected Conditions - AM Peak Hour
 03/29/2019

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↶	↷	↷		↶	↷
Traffic Volume (veh/h)	24	144	78	16	245	142
Future Volume (veh/h)	24	144	78	16	245	142
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	26	157	85	17	266	154
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	780	94			102	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	780	94			102	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	91	84			82	
cM capacity (veh/h)	299	963			1490	
Direction, Lane #	WB 1	WB 2	NB 1	SB 1	SB 2	
Volume Total	26	157	102	266	154	
Volume Left	26	0	0	266	0	
Volume Right	0	157	17	0	0	
cSH	299	963	1700	1490	1700	
Volume to Capacity	0.09	0.16	0.06	0.18	0.09	
Queue Length 95th (ft)	7	15	0	16	0	
Control Delay (s)	18.2	9.5	0.0	7.9	0.0	
Lane LOS	C	A		A		
Approach Delay (s)	10.7		0.0	5.0		
Approach LOS	B					
Intersection Summary						
Average Delay			5.8			
Intersection Capacity Utilization			30.2%	ICU Level of Service	A	
Analysis Period (min)						15

HCM Unsignalized Intersection Capacity Analysis
 22: Site Access 2/Twin Creeks Drive & Lynchburg Rd

Projected Conditions - AM Peak Hour
 03/29/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔		↔	↔		↔	↔		↔	↔	
Traffic Volume (veh/h)	17	273	4	15	138	28	11	0	46	72	0	46
Future Volume (veh/h)	17	273	4	15	138	28	11	0	46	72	0	46
Sign Control	Free			Free			Stop			Stop		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	18	297	4	16	150	30	12	0	50	78	0	50
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None			None								
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	180			301			567	547	299	580	534	165
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	180			301			567	547	299	580	534	165
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			97	100	93	80	100	94
cM capacity (veh/h)	1396			1260			402	433	741	389	441	879
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total	18	301	16	180	12	50	78	50				
Volume Left	18	0	16	0	12	0	78	0				
Volume Right	0	4	0	30	0	50	0	50				
cSH	1396	1700	1260	1700	402	741	389	879				
Volume to Capacity	0.01	0.18	0.01	0.11	0.03	0.07	0.20	0.06				
Queue Length 95th (ft)	1	0	1	0	2	5	18	5				
Control Delay (s)	7.6	0.0	7.9	0.0	14.2	10.2	16.6	9.3				
Lane LOS	A		A		B	B	C	A				
Approach Delay (s)	0.4	0.6		11.0		13.7						
Approach LOS		B		B		B						
Intersection Summary												
Average Delay			3.8									
Intersection Capacity Utilization			31.9%		ICU Level of Service				A			
Analysis Period (min)	15											

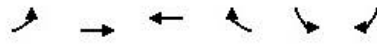
HCM Unsignalized Intersection Capacity Analysis
 23: Duncan Ln & Lynchburg Rd

Projected Conditions - AM Peak Hour
 03/29/2019

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↖	↗	
Traffic Volume (veh/h)	396	4	21	201	3	39
Future Volume (veh/h)	396	4	21	201	3	39
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	430	4	23	218	3	42
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			434		696	432
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			434		696	432
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		99	93
cM capacity (veh/h)			1126		399	624
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	434	241	45			
Volume Left	0	23	3			
Volume Right	4	0	42			
cSH	1700	1126	601			
Volume to Capacity	0.26	0.02	0.07			
Queue Length 95th (ft)	0	2	6			
Control Delay (s)	0.0	1.0	11.5			
Lane LOS		A	B			
Approach Delay (s)	0.0	1.0	11.5			
Approach LOS			B			
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			38.1%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 24: Lynchburg Rd & Elm Street

Projected Conditions - AM Peak Hour
 03/29/2019



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↗		↙	
Traffic Volume (veh/h)	62	443	193	5	1	40
Future Volume (veh/h)	62	443	193	5	1	40
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	67	482	210	5	1	43
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	215				828	212
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	215				828	212
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	95				100	95
cM capacity (veh/h)	1355				324	828
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	549	215	44			
Volume Left	67	0	1			
Volume Right	0	5	43			
cSH	1355	1700	799			
Volume to Capacity	0.05	0.13	0.06			
Queue Length 95th (ft)	4	0	4			
Control Delay (s)	1.4	0.0	9.8			
Lane LOS	A		A			
Approach Delay (s)	1.4	0.0	9.8			
Approach LOS			A			
Intersection Summary						
Average Delay			1.5			
Intersection Capacity Utilization			50.5%		ICU Level of Service	A
Analysis Period (min)			15			

















HCM Unsignalized Intersection Capacity Analysis
 25: N Cedar Street & 4th Avenue NW

Projected Conditions - AM Peak Hour
 03/29/2019

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↖	↘	↗
Sign Control	Stop			Stop		Stop
Traffic Volume (vph)	99	337	1	35	149	0
Future Volume (vph)	99	337	1	35	149	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	108	366	1	38	162	0
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total (vph)	474	39	162			
Volume Left (vph)	0	1	162			
Volume Right (vph)	366	0	0			
Hadj (s)	-0.43	0.04	0.23			
Departure Headway (s)	4.0	4.9	5.2			
Degree Utilization, x	0.52	0.05	0.23			
Capacity (veh/h)	873	688	638			
Control Delay (s)	11.3	8.2	9.8			
Approach Delay (s)	11.3	8.2	9.8			
Approach LOS	B	A	A			
Intersection Summary						
Delay			10.7			
Level of Service			B			
Intersection Capacity Utilization			40.9%	ICU Level of Service	A	
Analysis Period (min)			15			

















HCM Unsignalized Intersection Capacity Analysis
 26: N Cedar Street & 2nd Avenue NW

Projected Conditions - AM Peak Hour
 03/29/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	21	0	25	27	140	0	0	29	338	0	9
Future Volume (veh/h)	17	21	0	25	27	140	0	0	29	338	0	9
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	18	23	0	27	29	152	0	0	32	367	0	10
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	181			23			228	294	23	250	218	105
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	181			23			228	294	23	250	218	105
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			98			100	100	97	45	100	99
cM capacity (veh/h)	1394			1592			703	599	1054	667	660	949
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	41	208	32	377								
Volume Left	18	27	0	367								
Volume Right	0	152	32	10								
cSH	1394	1592	1054	672								
Volume to Capacity	0.01	0.02	0.03	0.56								
Queue Length 95th (ft)	1	1	2	88								
Control Delay (s)	3.4	1.1	8.5	17.0								
Lane LOS	A	A	A	C								
Approach Delay (s)	3.4	1.1	8.5	17.0								
Approach LOS			A	C								
Intersection Summary												
Average Delay			10.7									
Intersection Capacity Utilization			44.4%	ICU Level of Service	A							
Analysis Period (min)			15									

















HCM Unsignalized Intersection Capacity Analysis
 27: N Vine Street & 2nd Avenue NW

Projected Conditions - AM Peak Hour
 03/29/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	3	353	5	5	167	23	0	8	2	69	9	0
Future Volume (vph)	3	353	5	5	167	23	0	8	2	69	9	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	384	5	5	182	25	0	9	2	75	10	0
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	392	212	11	85								
Volume Left (vph)	3	5	0	75								
Volume Right (vph)	5	25	2	0								
Hadj (s)	0.03	-0.03	-0.08	0.21								
Departure Headway (s)	4.4	4.6	5.4	5.5								
Degree Utilization, x	0.48	0.27	0.02	0.13								
Capacity (veh/h)	792	753	577	587								
Control Delay (s)	11.5	9.3	8.4	9.3								
Approach Delay (s)	11.5	9.3	8.4	9.3								
Approach LOS	B	A	A	A								
Intersection Summary												
Delay			10.5									
Level of Service			B									
Intersection Capacity Utilization			37.9%		ICU Level of Service				A			
Analysis Period (min)			15									

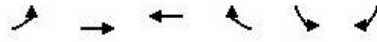
HCM Unsignalized Intersection Capacity Analysis
28: N High Street & 2nd Avenue NW

Projected Conditions - AM Peak Hour
03/29/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	7	403	19	3	171	31	13	106	27	76	198	19
Future Volume (vph)	7	403	19	3	171	31	13	106	27	76	198	19
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	438	21	3	186	34	14	115	29	83	215	21
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	467	223	158	319								
Volume Left (vph)	8	3	14	83								
Volume Right (vph)	21	34	29	21								
Hadj (s)	0.01	-0.05	-0.06	0.05								
Departure Headway (s)	6.0	6.5	6.9	6.5								
Degree Utilization, x	0.78	0.40	0.30	0.58								
Capacity (veh/h)	568	489	454	501								
Control Delay (s)	27.4	13.8	12.8	18.0								
Approach Delay (s)	27.4	13.8	12.8	18.0								
Approach LOS	D	B	B	C								
Intersection Summary												
Delay			20.2									
Level of Service			C									
Intersection Capacity Utilization			60.0%		ICU Level of Service					B		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
 2: Lynchburg Rd & Marina Entrance

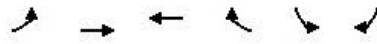
Projected Conditions - PM Peak Hour
 03/29/2019



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↗	↗	↖	↖	↗
Traffic Volume (veh/h)	46	222	215	80	64	30
Future Volume (veh/h)	46	222	215	80	64	30
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	50	241	234	87	70	33
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	321				575	234
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	321				575	234
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				85	96
cM capacity (veh/h)	1239				460	805
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	SB 2
Volume Total	50	241	234	87	70	33
Volume Left	50	0	0	0	70	0
Volume Right	0	0	0	87	0	33
cSH	1239	1700	1700	1700	460	805
Volume to Capacity	0.04	0.14	0.14	0.05	0.15	0.04
Queue Length 95th (ft)	3	0	0	0	13	3
Control Delay (s)	8.0	0.0	0.0	0.0	14.2	9.7
Lane LOS	A				B	A
Approach Delay (s)	1.4		0.0		12.8	
Approach LOS					B	
Intersection Summary						
Average Delay			2.4			
Intersection Capacity Utilization			28.2%		ICU Level of Service A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
4: Lynchburg Rd

Projected Conditions - PM Peak Hour
03/29/2019



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↗		↙	
Traffic Volume (veh/h)	57	319	420	113	68	26
Future Volume (veh/h)	57	319	420	113	68	26
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	62	347	457	123	74	28
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	580				990	518
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	580				990	518
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	94				71	95
cM capacity (veh/h)	994				256	557
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	409	580	102			
Volume Left	62	0	74			
Volume Right	0	123	28			
cSH	994	1700	301			
Volume to Capacity	0.06	0.34	0.34			
Queue Length 95th (ft)	5	0	36			
Control Delay (s)	1.9	0.0	23.0			
Lane LOS	A		C			
Approach Delay (s)	1.9	0.0	23.0			
Approach LOS			C			
Intersection Summary						
Average Delay			2.9			
Intersection Capacity Utilization			64.3%		ICU Level of Service	C
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 21: George Fraley Parkway & Lynchburg Rd

Projected Conditions - PM Peak Hour
 03/29/2019

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↶	↷	↷		↶	↷
Traffic Volume (veh/h)	23	221	135	40	229	91
Future Volume (veh/h)	23	221	135	40	229	91
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	25	240	147	43	249	99
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None		None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	766	168			190	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	766	168			190	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	92	73			82	
cM capacity (veh/h)	304	876			1384	
Direction, Lane #	WB 1	WB 2	NB 1	SB 1	SB 2	
Volume Total	25	240	190	249	99	
Volume Left	25	0	0	249	0	
Volume Right	0	240	43	0	0	
cSH	304	876	1700	1384	1700	
Volume to Capacity	0.08	0.27	0.11	0.18	0.06	
Queue Length 95th (ft)	7	28	0	16	0	
Control Delay (s)	17.9	10.7	0.0	8.2	0.0	
Lane LOS	C	B		A		
Approach Delay (s)	11.3		0.0	5.8		
Approach LOS	B					
Intersection Summary						
Average Delay			6.3			
Intersection Capacity Utilization			35.6%	ICU Level of Service	A	
Analysis Period (min)						15

HCM Unsignalized Intersection Capacity Analysis
 22: Site Access 2/Twin Creeks Drive & Lynchburg Rd

Projected Conditions - PM Peak Hour
 03/29/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↗		↖	↗	
Traffic Volume (veh/h)	55	216	12	50	259	85	7	0	30	52	0	30
Future Volume (veh/h)	55	216	12	50	259	85	7	0	30	52	0	30
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	60	235	13	54	282	92	8	0	33	57	0	33
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None		None								
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	374			248			784	844	242	824	804	328
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	374			248			784	844	242	824	804	328
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			96			97	100	96	78	100	95
cM capacity (veh/h)	1184			1318			276	273	797	261	288	713
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2				
Volume Total	60	248	54	374	8	33	57	33				
Volume Left	60	0	54	0	8	0	57	0				
Volume Right	0	13	0	92	0	33	0	33				
cSH	1184	1700	1318	1700	276	797	261	713				
Volume to Capacity	0.05	0.15	0.04	0.22	0.03	0.04	0.22	0.05				
Queue Length 95th (ft)	4	0	3	0	2	3	20	4				
Control Delay (s)	8.2	0.0	7.8	0.0	18.4	9.7	22.6	10.3				
Lane LOS	A		A		C	A	C	B				
Approach Delay (s)	1.6		1.0		11.4		18.1					
Approach LOS					B		C					
Intersection Summary												
Average Delay			3.5									
Intersection Capacity Utilization			41.7%	ICU Level of Service	A							
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis
 23: Duncan Ln & Lynchburg Rd

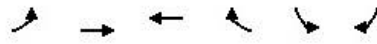
Projected Conditions - PM Peak Hour
 03/29/2019



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Traffic Volume (veh/h)	312	6	38	409	4	28
Future Volume (veh/h)	312	6	38	409	4	28
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	339	7	41	445	4	30
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			346		870	342
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			346		870	342
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			97		99	96
cM capacity (veh/h)			1213		311	700
Direction, Lane #						
	EB 1	WB 1	NB 1			
Volume Total	346	486	34			
Volume Left	0	41	4			
Volume Right	7	0	30			
cSH	1700	1213	610			
Volume to Capacity	0.20	0.03	0.06			
Queue Length 95th (ft)	0	3	4			
Control Delay (s)	0.0	1.0	11.2			
Lane LOS		A	B			
Approach Delay (s)	0.0	1.0	11.2			
Approach LOS			B			
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			53.7%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 24: Lynchburg Rd & Elm Street

Projected Conditions - PM Peak Hour
 03/29/2019



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↗		↙	
Traffic Volume (veh/h)	57	319	476	3	0	54
Future Volume (veh/h)	57	319	476	3	0	54
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	62	347	517	3	0	59
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	520				990	518
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	520				990	518
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	94				100	89
cM capacity (veh/h)	1046				257	557
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	409	520	59			
Volume Left	62	0	0			
Volume Right	0	3	59			
cSH	1046	1700	557			
Volume to Capacity	0.06	0.31	0.11			
Queue Length 95th (ft)	5	0	9			
Control Delay (s)	1.9	0.0	12.2			
Lane LOS	A		B			
Approach Delay (s)	1.9	0.0	12.2			
Approach LOS			B			
Intersection Summary						
Average Delay			1.5			
Intersection Capacity Utilization			58.5%		ICU Level of Service	B
Analysis Period (min)			15			

















HCM Unsignalized Intersection Capacity Analysis
 25: N Cedar Street & 4th Avenue NW

Projected Conditions - PM Peak Hour
 03/29/2019

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↘			↖	↗	
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	63	236	1	64	420	2
Future Volume (vph)	63	236	1	64	420	2
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	68	257	1	70	457	2
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total (vph)	325	71	459			
Volume Left (vph)	0	1	457			
Volume Right (vph)	257	0	2			
Hadj (s)	-0.44	0.04	0.23			
Departure Headway (s)	4.9	5.7	5.2			
Degree Utilization, x	0.44	0.11	0.66			
Capacity (veh/h)	695	567	672			
Control Delay (s)	11.6	9.4	17.5			
Approach Delay (s)	11.6	9.4	17.5			
Approach LOS	B	A	C			
Intersection Summary						
Delay			14.6			
Level of Service			B			
Intersection Capacity Utilization			47.9%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 26: N Cedar Street & 2nd Avenue NW

Projected Conditions - PM Peak Hour
 03/29/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	22	20	0	12	22	420	6	0	32	240	0	6
Future Volume (veh/h)	22	20	0	12	22	420	6	0	32	240	0	6
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	24	22	0	13	24	457	7	0	35	261	0	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	481			22			356	577	22	384	348	252
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	481			22			356	577	22	384	348	252
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			99			99	100	97	52	100	99
cM capacity (veh/h)	1082			1593			581	414	1055	543	558	786
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	46	494	42	268								
Volume Left	24	13	7	261								
Volume Right	0	457	35	7								
cSH	1082	1593	929	547								
Volume to Capacity	0.02	0.01	0.05	0.49								
Queue Length 95th (ft)	2	1	4	67								
Control Delay (s)	4.5	0.3	9.1	17.7								
Lane LOS	A	A	A	C								
Approach Delay (s)	4.5	0.3	9.1	17.7								
Approach LOS			A	C								
Intersection Summary												
Average Delay			6.4									
Intersection Capacity Utilization			54.7%	ICU Level of Service	A							
Analysis Period (min)			15									

















HCM Unsignalized Intersection Capacity Analysis
 27: N Vine Street & 2nd Avenue NW

Projected Conditions - PM Peak Hour
 03/29/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	7	255	0	5	437	60	6	19	2	50	15	0
Future Volume (vph)	7	255	0	5	437	60	6	19	2	50	15	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	8	277	0	5	475	65	7	21	2	54	16	0
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	285	545	30	70								
Volume Left (vph)	8	5	7	54								
Volume Right (vph)	0	65	2	0								
Hadj (s)	0.04	-0.04	0.04	0.19								
Departure Headway (s)	4.9	4.5	6.0	6.1								
Degree Utilization, x	0.39	0.69	0.05	0.12								
Capacity (veh/h)	703	778	519	527								
Control Delay (s)	10.9	16.8	9.3	9.9								
Approach Delay (s)	10.9	16.8	9.3	9.9								
Approach LOS	B	C	A	A								
Intersection Summary												
Delay			14.3									
Level of Service			B									
Intersection Capacity Utilization			45.5%	ICU Level of Service	A							
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
 28: N High Street & 2nd Avenue NW

Projected Conditions - PM Peak Hour
 03/29/2019

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	13	280	17	6	458	63	40	163	31	49	111	13
Future Volume (vph)	13	280	17	6	458	63	40	163	31	49	111	13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	304	18	7	498	68	43	177	34	53	121	14
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	336	573	254	188								
Volume Left (vph)	14	7	43	53								
Volume Right (vph)	18	68	34	14								
Hadj (s)	0.01	-0.03	-0.01	0.05								
Departure Headway (s)	6.9	6.4	7.4	7.7								
Degree Utilization, x	0.64	1.03	0.52	0.40								
Capacity (veh/h)	504	552	459	434								
Control Delay (s)	21.5	70.2	18.1	15.8								
Approach Delay (s)	21.5	70.2	18.1	15.8								
Approach LOS	C	F	C	C								
Intersection Summary												
Delay			40.7									
Level of Service			E									
Intersection Capacity Utilization			52.2%		ICU Level of Service				A			
Analysis Period (min)			15									

APPENDIX IV. DEVELOPMENT SCENARIO ASSUMPTIONS

BYPASS ROAD

TOTAL TRIP GENERATION										
ITE CODE	LAND USE	# UNITS	UNIT TYPE	ADT	AM			PM		
					Enter	Exit	Total	Enter	Exit	Total
210	Single-Family Detached Housing	266	units	2558	48	146	194	164	96	260
210	Single-Family Detached Housing	224	units	2184	41	123	164	139	81	220
210	Single-Family Detached Housing	150	units	1510	28	83	111	95	56	150
850	Supermarket	100	k.s.f.	10678	229	153	382	471	453	924
934	Fast-Food Restaurant with Drive-Through Window	28	k.s.f.	13187	573	551	1125	476	439	915
630	Clinic	5	k.s.f.	191	14	4	18	5	5	16
815	Free-Standing Discount Store	10	k.s.f.	531	8	4	12	24	24	48
816	Hardware/Paint Store	10	k.s.f.	87	5	5	10	13	14	27
881	Pharmacy/Drugstore with Drive-Through Window	15	k.s.f.	1637	31	27	58	77	77	154
110	General Light Industrial	30	k.s.f.	149	18	3	21	2	17	19
151	Mini-Warehouse	16	k.s.f.	24	1	1	2	1	2	3
849	Tire Superstore	10	k.s.f.	204	8	5	13	10	11	21
934	Fast-Food Restaurant with Drive-Through Window	12	k.s.f.	5651	246	236	482	204	188	392
942	Automobile Care Center	25	k.s.f.		37	19	56	35	37	72
TOTAL				38591	1287	1360	2648	1716	1500	3221

LYNCHBURG ROAD

SCENARIO 1 – NO ROADWAY CONNECTION

TOTAL TRIP GENERATION										
ITE CODE	LAND USE	# UNITS	UNIT TYPE	ADT	AM			PM		
					Enter	Exit	Total	Enter	Exit	Total
210	Single-Family Detached Housing	255	units	2460	47	140	186	159	93	252
210	Single-Family Detached Housing	100	units	1040	19	57	76	62	37	99
210	Single-Family Detached Housing	400	units	3722	72	217	289	249	147	396
310	Hotel	115	Rooms	871	31	21	52	31	29	60
416	Campground/Recreational Vehicle Park	25	Occupied Campsites		2	4	7	5	2	7
420	Marina	400	Berths	964	9	19	28	50	28	84
932	High-Turnover (Sit-Down) Restaurant	6	k.s.f.	673	33	27	60	37	22	59
TOTAL				9730	213	485	698	593	358	957

SCENARIO 1 – WITH ROADWAY CONNECTION

TOTAL TRIP GENERATION										
ITE CODE	LAND USE	# UNITS	UNIT TYPE	ADT	AM			PM		
					Enter	Exit	Total	Enter	Exit	Total
210	Single-Family Detached Housing	255	units	2460	47	140	186	159	93	252
210	Single-Family Detached Housing	100	units	1040	19	57	76	62	37	99
210	Single-Family Detached Housing	400	units	3722	72	217	289	249	147	396
310	Hotel	115	Rooms	871	31	21	52	31	29	60
416	Campground/Recreational Vehicle Park	25	Occupied Campsites	2	4	7	5	2	7	7
420	Marina	400	Berths	964	9	19	28	50	28	84
932	High-Turnover (Sit-Down) Restaurant	6	k.s.f.	673	33	27	60	37	22	59
TOTAL				9730	213	485	698	593	358	957

SCENARIO 2 – NO ROADWAY CONNECTION

TOTAL TRIP GENERATION										
ITE CODE	LAND USE	# UNITS	UNIT TYPE	ADT	AM			PM		
					Enter	Exit	Total	Enter	Exit	Total
416	Campground/Recreational Vehicle Park	200	Occupied Campsites	13	22	35	35	19	54	54
210	Single-Family Detached Housing	100	units	1040	19	57	76	62	37	99
210	Single-Family Detached Housing	400	units	3722	72	217	289	249	147	396
310	Hotel	115	Rooms	871	31	21	52	31	29	60
416	Campground/Recreational Vehicle Park	25	Occupied Campsites	2	4	7	5	2	7	7
420	Marina	400	Berths	964	9	19	28	50	28	84
932	High-Turnover (Sit-Down) Restaurant	6	k.s.f.	673	33	27	60	37	22	59
TOTAL				7270	179	367	547	469	284	759

SCENARIO 2 – WITH ROADWAY CONNECTION

TOTAL TRIP GENERATION										
ITE CODE	LAND USE	# UNITS	UNIT TYPE	ADT	AM			PM		
					Enter	Exit	Total	Enter	Exit	Total
416	Campground/Recreational Vehicle Park	200	Occupied Campsites		13	22	35	35	19	54
210	Single-Family Detached Housing	100	units	1040	19	57	76	62	37	99
210	Single-Family Detached Housing	400	units	3722	72	217	289	249	147	396
310	Hotel	115	Rooms	871	31	21	52	31	29	60
416	Campground/Recreational Vehicle Park	25	Occupied Campsites		2	4	7	5	2	7
420	Marina	400	Berths	964	9	19	28	50	28	84
932	High-Turnover (Sit-Down) Restaurant	6	k.s.f.	673	33	27	60	37	22	59
TOTAL				7270	179	367	547	469	284	759

APPENDIX V. COST ESTIMATES

BYPASS ROAD

Project Number	Timeframe	Improvement Description	Project Measurement	Measurement Unit	Avg. Cost / Unit	Cost for Proposed Recommendations	Contingency (30%)	Timeframe YOE		Total	Rounded Total
								Factor			
B1	Immediate	SIGNAL TIMING IMPROVEMENT BY CONSULTANT				\$ 10,000.00	\$ 3,000.00	\$ 13,000.00	1.093	\$ 14,209.00	\$ 14,300.00
B2.A	Immediate	REMOVAL OF PAVEMENT MARKING (LINE)	1300	LF	\$ 0.75	\$ 975.00	\$ 292.50	\$ 1,267.50	1.093	\$ 1,385.38	\$ 1,390.00
		REMOVAL OF PAVEMENT MKG (DOTTED LINE)	1300	LF	\$ 0.50	\$ 650.00	\$ 195.00	\$ 845.00	1.093	\$ 923.59	\$ 930.00
		REMOVAL OF PVMT MKG (TURN LANE ARROW)	2	EACH	\$ 50.00	\$ 100.00	\$ 30.00	\$ 130.00	1.093	\$ 142.09	\$ 150.00
		SIGN REMOVAL (DESCRIPTION)	2	LS	\$ 256.25	\$ 512.50	\$ 153.75	\$ 666.25	1.093	\$ 728.21	\$ 730.00
		PAINTED PAVEMENT MARKING (6" LINE)	0.5	LM	\$ 924.97	\$ 462.49	\$ 138.75	\$ 601.23	1.093	\$ 657.14	\$ 660.00
		PLASTIC PAVEMENT MARKING (6" DOTTED LINE)	1300	LF	\$ 1.10	\$ 1,430.00	\$ 429.00	\$ 1,859.00	1.093	\$ 2,031.89	\$ 2,040.00
		SIGNS (36" X 36" ALUMINUM FLAT SHEET)	4	EACH	\$ 307.05	\$ 1,228.20	\$ 368.46	\$ 1,596.66	1.093	\$ 1,745.15	\$ 1,750.00
Project Total										\$ 7,700.00	
B2.B	Long-Term	REMOVAL OF ASPHALT PAVEMENT	35	SY	\$ 18.54	\$ 648.90	\$ 194.67	\$ 843.57	1.344	\$ 1,133.76	\$ 1,140.00
		MIN. AGG. TYPE A BASE, GR. D	15	TON	\$ 37.12	\$ 556.80	\$ 167.04	\$ 723.84	1.344	\$ 972.84	\$ 980.00
		BITUMINOUS MATERIAL FOR PRIME COAT (PC)	0.02	TON	\$ 678.33	\$ 13.57	\$ 4.07	\$ 17.64	1.344	\$ 23.70	\$ 30.00
		ASPHALT PAVEMENT REPAIR	15	SY	\$ 439.00	\$ 6,585.00	\$ 1,975.50	\$ 8,560.50	1.344	\$ 11,505.31	\$ 11,510.00
		SAW CUTTING ASPHALT PAVEMENT	75	LF	\$ 3.04	\$ 228.00	\$ 68.40	\$ 296.40	1.344	\$ 398.36	\$ 400.00
		CONCRETE CURB	50	CY	\$ 29.58	\$ 1,479.00	\$ 443.70	\$ 1,922.70	1.344	\$ 2,584.11	\$ 2,590.00
		SIGNS (36" X 36" ALUMINUM FLAT SHEET)	4	EACH	\$ 307.05	\$ 1,228.20	\$ 368.46	\$ 1,596.66	1.344	\$ 2,145.91	\$ 2,150.00
		SIGNS (24" X 30" ALUMINUM FLAT SHEET)	4	EACH	\$ 268.66	\$ 1,074.64	\$ 322.39	\$ 1,397.03	1.344	\$ 1,877.61	\$ 1,880.00
		SIGNS (24" X 24" ALUMINUM FLAT SHEET)	5	EACH	\$ 133.47	\$ 667.35	\$ 200.21	\$ 867.56	1.344	\$ 1,165.99	\$ 1,170.00
		SIGNS (12" X 36" ALUMINUM FLAT SHEET)	1	EACH	\$ 92.40	\$ 92.40	\$ 27.72	\$ 120.12	1.344	\$ 161.44	\$ 170.00
		SIGNS (24" X 18" ALUMINUM FLAT SHEET)	4	EACH	\$ 126.60	\$ 506.40	\$ 151.92	\$ 658.32	1.344	\$ 884.78	\$ 890.00
		PLASTIC PAVEMENT MARKING (STOP LINE)	30	LF	\$ 11.20	\$ 336.00	\$ 100.80	\$ 436.80	1.344	\$ 587.06	\$ 590.00
		ENHANCED FLATLINE THERMO PVMT MRKNG (4IN LINE)	0.05	LM	\$ 2,745.24	\$ 137.26	\$ 41.18	\$ 178.44	1.344	\$ 239.82	\$ 240.00
		PROPERTY ACQUISITION	1	EACH	\$ 50,000.00	\$ 50,000.00		\$ 50,000.00	1.344	\$ 67,200.00	\$ 67,200.00
		DEMOLITION	1	EACH	\$ 20,000.00	\$ 20,000.00		\$ 20,000.00	1.344	\$ 26,880.00	\$ 26,880.00
Project Total										\$ 117,900.00	
B3	Long-Term	REMOVAL OF PAVEMENT MARKING (LINE)	300	LF	\$ 0.75	\$ 225.00	\$ 67.50	\$ 292.50	1.344	\$ 393.12	\$ 400.00
		REMOVAL OF PVMT MKG (TURN LANE ARROW)	1	EACH	\$ 50.00	\$ 50.00	\$ 15.00	\$ 65.00	1.344	\$ 87.36	\$ 90.00
		<i>*Assumes 200' of grinding, 200' of new lines, 1 grinding of arrow, 1 addition of arrow</i>									
		ENHANCED FLAT THERMO P.M. (4IN)	0.06	LM	\$ 2,745.24	\$ 164.71	\$ 49.41	\$ 214.13	1.344	\$ 287.79	\$ 290.00
		PLASTIC PAVEMENT MKG (TURN LANE ARROW)	1	EACH	\$ 154.77	\$ 154.77	\$ 46.43	\$ 201.20	1.344	\$ 270.41	\$ 270.00
Project Total										\$ 1,100.00	
B4	Long-Term	BACKAGE ROAD (TDOT COST TOOL)				\$ 3,848,000.00	\$ 1,154,400.00	\$ 5,002,400.00	1.344	\$ 6,723,225.60	\$ 6,730,000.00
		<i>*Assumes 0.8 mile backage road from Baxter Ln to Georgia Crossing Rd, C&G & SW on one side</i>									
B5	Long-Term	SIGNAL TIMING IMPROVEMENT BY CONSULTANT						\$ 20,000.00	1.344	\$ 26,880.00	\$ 34,950.00
B6	Mid-Term	SIGNAL TIMING IMPROVEMENT BY CONSULTANT						\$ 10,000.00	1.23	\$ 12,300.00	\$ 16,000.00
B7	Mid-Term	SIGNAL TIMING IMPROVEMENT BY CONSULTANT						\$ 15,000.00	1.23	\$ 18,450.00	\$ 23,990.00
		<i>*Assumes 3 intersections</i>									
B8	Long-Term	SIDEWALK ONE SIDE						\$ 2,689,000.00	1.344	\$ 3,614,016.00	\$ 4,700,000.00
		<i>*Assumes one side only, no additional ROW, includes traffic control and over(?) estimates drainage, includes sodding</i>									
B9	Long-Term	SIDEWALK ONE SIDE						\$ 756,000.00	1.344	\$ 1,016,064.00	\$ 1,020,000.00
		<i>*Assumes one side only, no additional ROW, includes traffic control and over(?) estimates drainage, includes sodding</i>									
B10	Long-Term	SIDEWALK ONE SIDE						\$ 1,319,000.00	1.344	\$ 1,772,736.00	\$ 1,780,000.00
		<i>*Assumes traffic control, portable fence barriers, seeding and sodding, and addition of drainage</i>									
B11	Long-Term	RECTANGULAR RAPID FLASHING BEACON	1	EACH	\$ 42,457.10	\$ 42,457.10	\$ 12,737.13	\$ 55,194.23	1.344	\$ 74,181.05	\$ 75,000.00
B12	Mid-Term	GREENWAY	0.06	LM	\$ 1,200,000.00	\$ 72,000.00	\$ 21,600.00	\$ 93,600.00	1.23	\$ 88,560.00	\$ 295,200.00
		<i>*Assumes trail section between Merritt Village drive and field house drive. Shared roadway between trail end and Industrial Dr</i>									
	Mid-Term	(SHARED ROADWAY) ENHANCED FLATLINE THERMO PVMT MRKNG (4IN LINE)	0.12	LM	\$ 2,745.24	\$ 329.43	\$ 98.83	\$ 428.26	1.23	\$ 405.20	\$ 410.00
	Mid-Term	(SHARED ROADWAY) SIGNS (36" X 36" ALUMINUM FLAT SHEET)	2	EACH	\$ 307.05	\$ 614.10	\$ 184.23	\$ 798.33	1.23	\$ 755.34	\$ 760.00
Project Total										\$ 296,400.00	
B13	Long-Term	GREENWAY	0.7	LM	\$ 1,200,000.00	\$ 840,000.00	\$ 252,000.00	\$ 1,092,000.00	1.344	\$ 1,128,960.00	\$ 1,130,000.00
		<i>*Does not include neighborhood spurs</i>									
B13A	Long-Term	PREFABRICATED BRIDGE	1056	LF	\$ 1,500.00	\$ 1,584,000.00	\$ 475,200.00	\$ 2,059,200.00	1.344	\$ 2,767,564.80	\$ 2,532,820.00
		CONCRETE BRIDGE ABUTMENT	4	EACH	\$ 30,000.00	\$ 120,000.00	\$ 36,000.00	\$ 156,000.00	1.344	\$ 209,664.00	\$ 191,880.00
Project Total										\$ 2,724,700.00	
B13B	Long-Term	PREFABRICATED BRIDGE	1584	LF	\$ 1,500.00	\$ 2,376,000.00	\$ 712,800.00	\$ 3,088,800.00	1.344	\$ 4,151,347.20	\$ 4,151,350.00
		CONCRETE BRIDGE ABUTMENT	4	EACH	\$ 30,000.00	\$ 120,000.00	\$ 36,000.00	\$ 156,000.00	1.344	\$ 209,664.00	\$ 209,670.00
Project Total										\$ 4,361,100.00	
B13C	Long-Term	PREFABRICATED BRIDGE	1584	LF	\$ 1,500.00	\$ 2,376,000.00	\$ 712,800.00	\$ 3,088,800.00	1.344	\$ 4,151,347.20	\$ 4,151,350.00
		CONCRETE BRIDGE ABUTMENT	4	EACH	\$ 30,000.00	\$ 120,000.00	\$ 36,000.00	\$ 156,000.00	1.344	\$ 209,664.00	\$ 209,670.00
Project Total										\$ 4,361,100.00	

LYNCHBURG ROAD

Project Number	Timeframe	Improvement Description	Project Measurement	Measurement Unit	Avg. Cost / Unit	Cost for Proposed Recommendations		Contingency (30%)		Timeframe YOY		
										Factor	Total	Rounded Total
L1	Mid-Term	WIDEN LYNCHBURG FOR TURN LANES <i>*Does not include sidewalks</i>	TDOT TOOL						\$ 981,000.00	1.23	\$ 1,206,630.00	\$ 1,207,000.00
L2	Immediate-Term	SPEED CUSHION SET, INCLUDING SIGNS	3	EACH	\$ 15,000.00	\$ 45,000.00	\$ 13,500.00	\$ 58,500.00	1.093		\$ 63,940.50	\$ 64,000.00
L2	Immediate-Term	ENHANCED FLATLINE THERMO PVMT MRKNG (4IN LINE)	0.6	LM	\$ 2,745.24	\$ 1,647.14	\$ 494.14	\$ 2,141.29	1.093		\$ 2,340.43	\$ 2,400.00
L2	Long-Term	REMOVAL OF ASPHALT PAVEMENT	35	SY	\$ 18.54	\$ 648.90	\$ 194.67	\$ 843.57	1.344		\$ 1,133.76	\$ 1,140.00
		MIN. AGG. TYPE A BASE, GR. D	15	TON	\$ 37.12	\$ 556.80	\$ 167.04	\$ 723.84	1.344		\$ 972.84	\$ 980.00
		BITUMINOUS MATERIAL FOR PRIME COAT (PC)	0.02	TON	\$ 678.33	\$ 13.57	\$ 4.07	\$ 17.64	1.344		\$ 23.70	\$ 30.00
		ASPHALT PAVEMENT REPAIR	15	SY	\$ 439.00	\$ 6,585.00	\$ 1,975.50	\$ 8,560.50	1.344		\$ 11,505.31	\$ 11,510.00
		SAW CUTTING ASPHALT PAVEMENT	75	LF	\$ 3.04	\$ 228.00	\$ 68.40	\$ 296.40	1.344		\$ 398.36	\$ 400.00
		CONCRETE CURB	50	CY	\$ 29.58	\$ 1,479.00	\$ 443.70	\$ 1,922.70	1.344		\$ 2,584.11	\$ 2,590.00
		SIGNS (36" X 36" ALUMINUM FLAT SHEET)	4	EACH	\$ 307.05	\$ 1,228.20	\$ 368.46	\$ 1,596.66	1.344		\$ 2,145.91	\$ 2,150.00
		SIGNS (24" X 30" ALUMINUM FLAT SHEET)	4	EACH	\$ 268.66	\$ 1,074.64	\$ 322.39	\$ 1,397.03	1.344		\$ 1,877.61	\$ 1,880.00
		SIGNS (24" X 24" ALUMINUM FLAT SHEET)	5	EACH	\$ 133.47	\$ 667.35	\$ 200.21	\$ 867.56	1.344		\$ 1,165.99	\$ 1,170.00
		SIGNS (12" X 36" ALUMINUM FLAT SHEET)	1	EACH	\$ 92.40	\$ 92.40	\$ 27.72	\$ 120.12	1.344		\$ 161.44	\$ 170.00
		SIGNS (24" X 18" ALUMINUM FLAT SHEET)	4	EACH	\$ 126.60	\$ 506.40	\$ 151.92	\$ 658.32	1.344		\$ 884.78	\$ 890.00
		PLASTIC PAVEMENT MARKING (STOP LINE)	30	LF	\$ 11.20	\$ 336.00	\$ 100.80	\$ 436.80	1.344		\$ 587.06	\$ 590.00
		ENHANCED FLATLINE THERMO PVMT MRKNG (4IN LINE)	0.05	LM	\$ 2,745.24	\$ 137.26	\$ 41.18	\$ 178.44	1.344		\$ 239.82	\$ 240.00
		PROPERTY ACQUISITION	1	EACH	\$ 50,000.00	\$ 50,000.00		\$ 50,000.00	1.344		\$ 67,200.00	\$ 67,200.00
		DEMOLITION	1	EACH	\$ 20,000.00	\$ 20,000.00		\$ 20,000.00	1.344		\$ 26,880.00	\$ 26,880.00
											Project Total	\$ 117,900.00
L3A	Immediate-Term	SIGNS (24" X 24" ALUMINUM FLAT SHEET)	11	EACH	\$ 133.47	\$ 1,468.17	\$ 440.45	\$ 1,908.62	1.093		\$ 2,086.12	\$ 2,100.00
L3B	Immediate-Term	FLAT SHEET ALUMINUM SIGNS (0.080" THICK) <i>*Assumes 4 signs at size of 36"x48"</i>	48	SF	\$ 12.66	\$ 607.68	\$ 182.30	\$ 789.98	1.093		\$ 863.45	\$ 870.00
		SIGNS (24" X 24" ALUMINUM FLAT SHEET)	2	EACH	\$ 133.47	\$ 266.94	\$ 80.08	\$ 347.02	1.093		\$ 379.30	\$ 380.00
											Project Total	\$ 1,300.00
L3C	Immediate-Term	FLAT SHEET ALUMINUM SIGNS (0.080" THICK) <i>*Assumes 4 signs at size of 36"x48", 2 small signs</i>	24	SF	\$ 12.66	\$ 303.84	\$ 91.15	\$ 394.99	1.093		\$ 431.73	\$ 440.00
		SIGNS (24" X 24" ALUMINUM FLAT SHEET)	4	EACH	\$ 133.47	\$ 533.88	\$ 160.16	\$ 694.04	1.093		\$ 758.59	\$ 760.00
											Project Total	\$ 1,200.00
L4	Mid-Term	AVG COST FOR TIS, TMCs ? <i>*Assumes 2 signs at size of 36"x48", 4 small signs</i>	1	EACH	\$ 10,000.00	\$ 10,000.00	\$ 3,000.00	\$ 13,000.00	1.23		\$ 15,990.00	\$ 16,000.00
											Project Total	\$ 16,000.00
L5	Immediate-Term	REMOVAL OF RIGID PVMT, SIDEWALK, ETC. <i>*Assumes 5' wide sidewalk, 60% contg</i>	426	SY	\$ 25.36	\$ 10,803.36	\$ 6,482.02	\$ 17,285.38	1.093		\$ 18,892.92	\$ 18,900.00
		CONCRETE SIDEWALK (4 ")	1035	SF	\$ 7.53	\$ 7,793.55	\$ 4,676.13	\$ 12,469.68	1.093		\$ 13,629.36	\$ 13,630.00
		REMOVE & RELOCATE UTILITY POLE	10	EACH	\$ 4,000.00	\$ 40,000.00	\$ 24,000.00	\$ 64,000.00	1.093		\$ 69,952.00	\$ 70,000.00
		CONCRETE CURB RAMP <i>*Assumes 4 curb ramps at size = 110 sq ft</i>	440	SF	\$ 23.84	\$ 10,489.60	\$ 6,293.76	\$ 16,783.36	1.093		\$ 18,344.21	\$ 18,350.00
		TRUNCATED DOME DETECTABLE WARNING MAT <i>*Assumes 4 at size of 2'x5'</i>	40	SF	\$ 53.50	\$ 2,140.00	\$ 1,284.00	\$ 3,424.00	1.093		\$ 3,742.43	\$ 3,750.00
		DRAINAGE <i>*Utilizing the TDOT Cost Estimate Spreadsheet</i>						\$ 120,000.00	1.093		\$ 131,160.00	\$ 132,000.00
											Project Total	\$ 256,700.00
L6	Long-Term	CONCRETE SIDEWALK (4 ") <i>*Assumes add'l SW width vs moving utility pole; 2 at size 5'x10'; 60% contg</i>	100	SF	\$ 7.53	\$ 753.00	\$ 451.80	\$ 1,204.80	1.344		\$ 1,619.25	\$ 1,700.00
L7	Long-Term	REMOVAL OF RIGID PVMT, SIDEWALK, ETC. <i>*Assumes length of 185' (61 yards)</i>	104	SY	\$ 25.36	\$ 2,637.44	\$ 791.23	\$ 3,428.67	1.344		\$ 4,608.14	\$ 4,610.00
		CONCRETE SIDEWALK (4 ")	925	SF	\$ 7.53	\$ 6,965.25	\$ 2,089.58	\$ 9,054.83	1.344		\$ 12,169.68	\$ 12,170.00
											Project Total	\$ 16,800.00
L8	0.6	GREENWAY	0.6	LM	\$ 1,200,000.00	\$ 720,000.00	\$ 216,000.00	\$ 936,000.00	1.093		\$ 1,023,048.00	\$ 1,030,000.00
L9	0.7	GREENWAY	0.7	LM	\$ 1,200,000.00	\$ 840,000.00	\$ 252,000.00	\$ 1,092,000.00	1.093		\$ 1,193,556.00	\$ 1,120,000.00
L10	0.6	GREENWAY	0.6	LM	\$ 1,200,000.00	\$ 720,000.00	\$ 216,000.00	\$ 936,000.00	1.344		\$ 1,257,984.00	\$ 1,260,000.00
L11	Immediate-Term	PEDESTRIAN INTERSECTION IMPROVEMENTS <i>*Does not include construction/mobilization costs</i>	1	EACH	\$ 30,197.87	\$ 30,197.87	\$ 9,059.36	\$ 39,257.23	1.093		\$ 42,908.15	\$ 43,000.00

APPENDIX VI. SIGNAL TIMING PLANS

Winchester, Tennessee

INTERSECTION: Bypass Road & Dechard Boulevard
 INSTALLATION DATE: _____
 PROGRAMMED BY: _____
 NOTES: _____

LOCAL CONTROLLER PROGRAMMING



EAGLE EPAC SERIES

MASTER TYPE: Eagle EPAC 300
 MASTER LOCATION: N/A

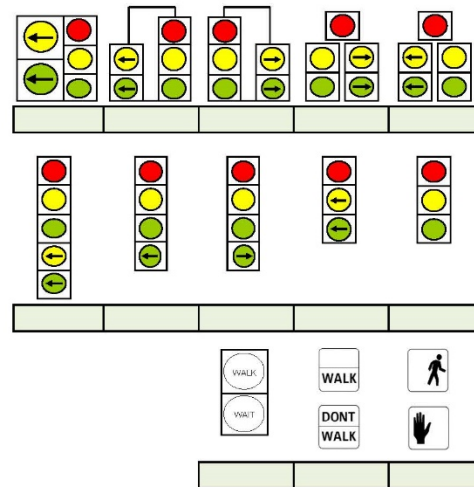
TIME BY PHASE (SEC) & FUNCTIONS

PHASE	1	2	3	4	5	6	7	8
INITIAL	10	35	10	10	10	35	10	10
PASSAGE	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0
YELLOW	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
RED CLEAR	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
WALK		7		7		7		7
PED CLEAR		8		8		8		8
MAX 1	30	50	40	35	25	50	40	50
MAX 2	35	50	30	50	30	50	40	50
MAX 3 LIMIT								
MAX 3 ADJUST								
CNA 1								
CNA 2								
WALK REST MOD.								
FLASH WALK								
INHIBIT MAX								
PED RECYCLE								
MIN RECALL		X				X		
MAX RECALL								
PED RECALL								
SOFT RECALL								
NON-LOCK								
VEHICLE OMIT								
PED OMIT								
MAX OUTS								
TO ADJ MAX 3								
GAP OUTS								
TO ADJ MAX 3								

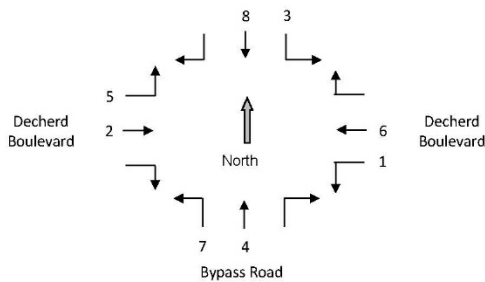
CONTROLLER OPTIONS

PHASE	1	2	3	4	5	6	7	8
START UP								
UCF LAST								
UCF EXIT								
SIM. GAP								
MIN RED REVERT		UCF OVERRIDE HOLD				PRE-EMPT		
RED REVERT TIME		UCF TEST A OR B				OVERRIDES		
AUTO PED CLEAR		PASSAGE SEQUENTIAL				STOP TIME		
START UP FLASH		ENABLE SIM. GAP						
START UP INTERVAL		ENHANCED PED OPERATION						
START UP ALL RED		EXT. START OVERRIDES						
FLASH								
FREE								
SPECIAL								

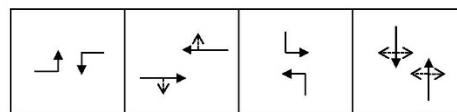
SIGNAL DISPLAYS



PHASING SCHEMATIC



PHASING SEQUENCE



LOCAL CONTROLLER PROGRAMMING



EAGLE EPAC SERIES

Winchester, Tennessee

INTERSECTION: Bypass Road & Grant Street/Baxter Lane
 INSTALLATION DATE: _____
 PROGRAMMED BY: _____
 NOTES: _____

MASTER TYPE: Eagle EPAC 300

MASTER LOCATION: N/A

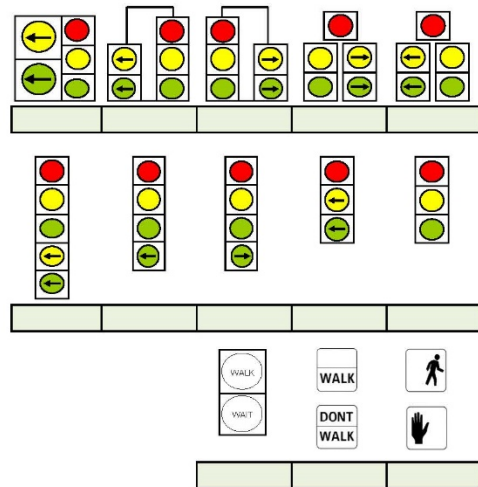
TIME BY PHASE (SEC) & FUNCTIONS

PHASE	1	2	3	4	5	6	7	8
INITIAL	10	15	10	15	10	15		
PASSAGE	4.0	5.0	4.0	5.0	4.0	5.0		
YELLOW	4.0	4.0	4.0	4.0	4.0	4.0		
RED CLEAR	1.0	1.0	1.0	1.0	1.0	1.0		
WALK		7		7		7		7
PED CLEAR		8		8		8		8
MAX 1	15	60	25	25	25	60		
MAX 2	30	50	30	50	30	50		
MAX 3 LIMIT								
MAX 3 ADJUST								
CNA 1								
CNA 2								
WALK REST MOD.								
FLASH WALK								
INHIBIT MAX								
PED RECYCLE								
MIN RECALL		X				X		
MAX RECALL								
PED RECALL								
SOFT RECALL								
NON-LOCK								
VEHICLE OMIT								
PED OMIT								
MAX OUTS								
TO ADJ MAX 3								
GAP OUTS								
TO ADJ MAX 3								

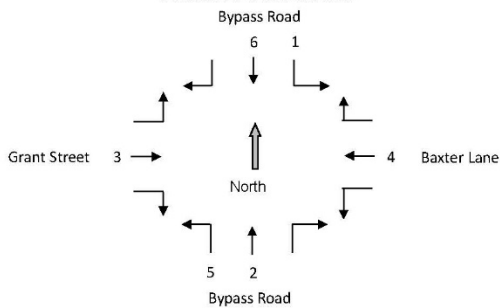
CONTROLLER OPTIONS

PHASE	1	2	3	4	5	6	7	8
START UP								
UCF LAST								
UCF EXIT								
SIM. GAP								
MIN RED REVERT		UCF OVERRIDE HOLD				PRE-EMPT		
RED REVERT TIME		UCF TEST A OR B				OVERRIDES		
AUTO PED CLEAR		PASSAGE SEQUENTIAL				STOP TIME		
START UP FLASH		ENABLE SIM. GAP						
START UP INTERVAL		ENHANCED PED OPERATION						
START UP ALL RED		EXT. START OVERRIDES						
FLASH								
FREE								
SPECIAL								

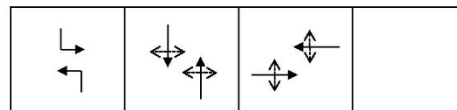
SIGNAL DISPLAYS



PHASING SCHEMATIC



PHASING SEQUENCE



Winchester, Tennessee

INTERSECTION: Bypass Road & Georgia Crossing Road
 INSTALLATION DATE: _____
 PROGRAMMED BY: _____
 NOTES: _____

LOCAL CONTROLLER PROGRAMMING



EAGLE EPAC SERIES

MASTER TYPE: Eagle EPAC 300
 MASTER LOCATION: N/A

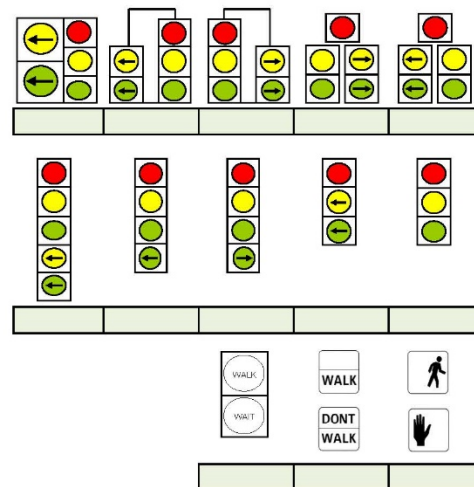
TIME BY PHASE (SEC) & FUNCTIONS

PHASE	1	2	3	4	5	6	7	8
INITIAL	10	20		5	15			
PASSAGE	4.0	5.0		4.0	5.0			
YELLOW	4.0	4.0		4.0	4.0			
RED CLEAR	1.0	1.0		1.0	1.0			
WALK		7		7		7		7
PED CLEAR		8		8		8		8
MAX 1	25	45		20	35			
MAX 2	30	50		50	30			
MAX 3 LIMIT								
MAX 3 ADJUST								
CNA 1								
CNA 2								
WALK REST MOD.								
FLASH WALK								
INHIBIT MAX								
PED RECYCLE								
MIN RECALL		X						
MAX RECALL								
PED RECALL								
SOFT RECALL								
NON-LOCK								
VEHICLE OMIT								
PED OMIT								
MAX OUTS								
TO ADJ MAX 3								
GAP OUTS								
TO ADJ MAX 3								

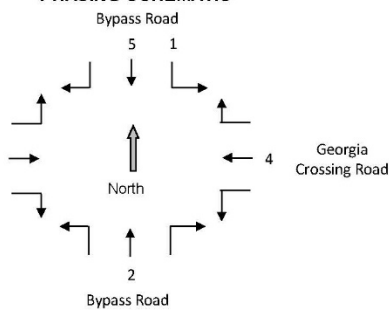
CONTROLLER OPTIONS

PHASE	1	2	3	4	5	6	7	8
START UP								
UCF LAST								
UCF EXIT								
SIM. GAP								
MIN RED REVERT		UCF OVERRIDE HOLD				PRE-EMPT		
RED REVERT TIME		UCF TEST A OR B				OVERRIDES		
AUTO PED CLEAR		PASSAGE SEQUENTIAL				STOP TIME		
START UP FLASH		ENABLE SIM. GAP						
START UP INTERVAL		ENHANCED PED OPERATION						
START UP ALL RED		EXT. START OVERRIDES						
FLASH								
FREE								
SPECIAL								

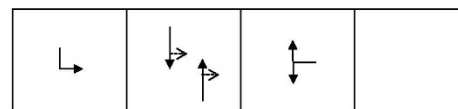
SIGNAL DISPLAYS



PHASING SCHEMATIC



PHASING SEQUENCE



LOCAL CONTROLLER PROGRAMMING



EAGLE EPAC SERIES

Winchester, Tennessee

INTERSECTION: Bypass Road & Cowan Highway
 INSTALLATION DATE: _____
 PROGRAMMED BY: _____
 NOTES: _____

MASTER TYPE: Eagle EPAC 300

MASTER LOCATION: N/A

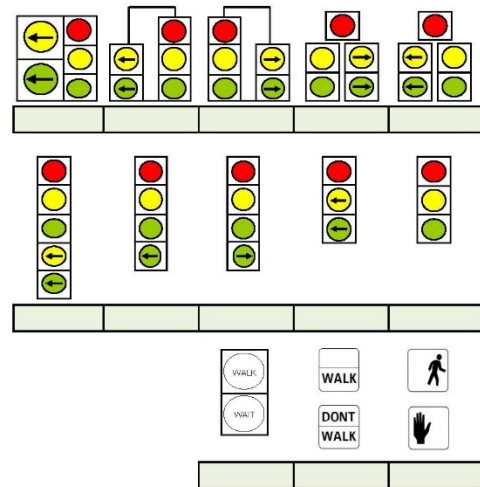
TIME BY PHASE (SEC) & FUNCTIONS

PHASE	1	2	3	4	5	6	7	8
INITIAL	5	5	5	5	5	5	10	15
PASSAGE	3.0	4.0	3.0	3.0	3.0	4.0	4.0	5.0
YELLOW	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
RED CLEAR	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
WALK		7		7		7		7
PED CLEAR		8		8		8		8
MAX 1	25	30	25	20	15	30	25	35
MAX 2	30	50	30	50	30	50	30	50
MAX 3 LIMIT								
MAX 3 ADJUST								
CNA 1								
CNA 2								
WALK REST MOD.								
FLASH WALK								
INHIBIT MAX								
PED RECYCLE								
MIN RECALL		X				X		
MAX RECALL								
PED RECALL								
SOFT RECALL								
NON-LOCK								
VEHICLE OMIT								
PED OMIT								
MAX OUTS								
TO ADJ MAX 3								
GAP OUTS								
TO ADJ MAX 3								

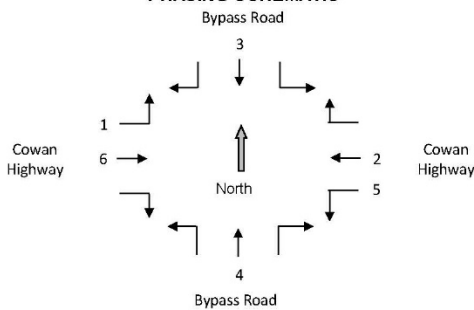
CONTROLLER OPTIONS

PHASE	1	2	3	4	5	6	7	8
START UP								
UCF LAST								
UCF EXIT								
SIM. GAP								
MIN RED REVERT		UCF OVERRIDE HOLD				PRE-EMPT		
RED REVERT TIME		UCF TEST A OR B				OVERRIDES		
AUTO PED CLEAR		PASSAGE SEQUENTIAL				STOP TIME		
START UP FLASH		ENABLE SIM. GAP						
START UP INTERVAL		ENHANCED PED OPERATION						
START UP ALL RED		EXT. START OVERRIDES						
FLASH								
FREE								
SPECIAL								

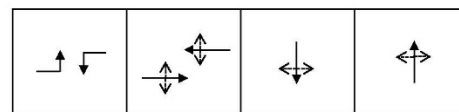
SIGNAL DISPLAYS



PHASING SCHEMATIC



PHASING SEQUENCE



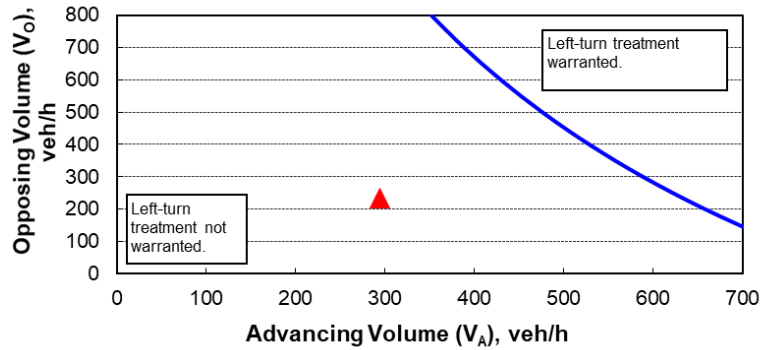
APPENDIX VII. TURN LANE & SIGNAL WARRANT ANALYSES

LYNCHBURG RD @ TWIN CREEKS DR

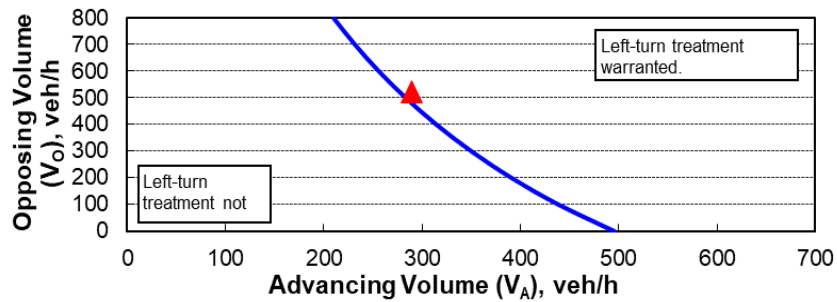
SCENARIO 1 (RESIDENTIAL, NO CONNECTOR, FULL BUILD-OUT) → Eastbound Left-Turn Lane

85TH PERCENTILE SPEED = 30 MPH

AM

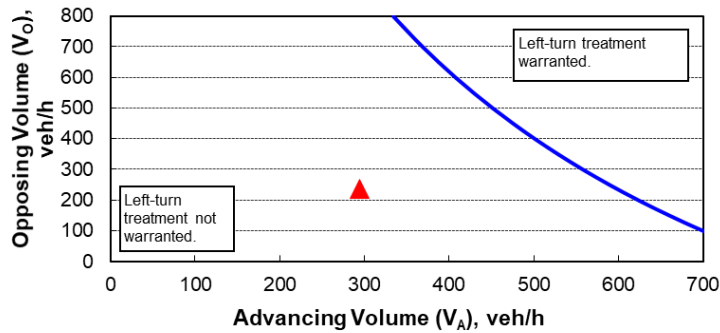


PM

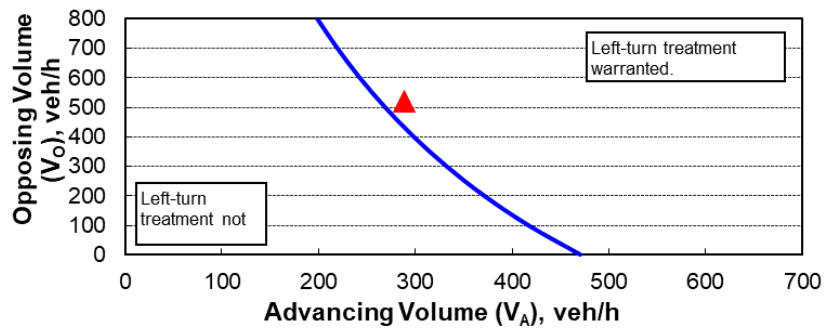


85TH PERCENTILE SPEED = 35 MPH

AM



PM

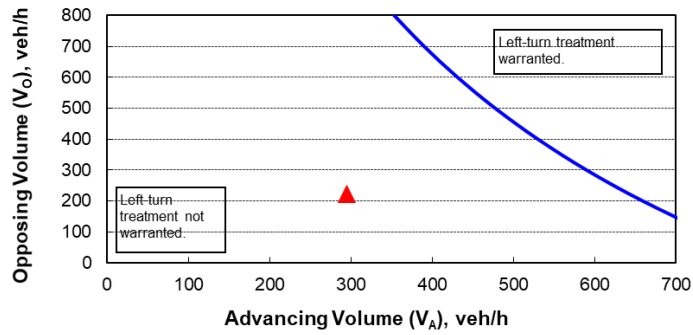


LYNCHBURG RD @ TWIN CREEKS DR

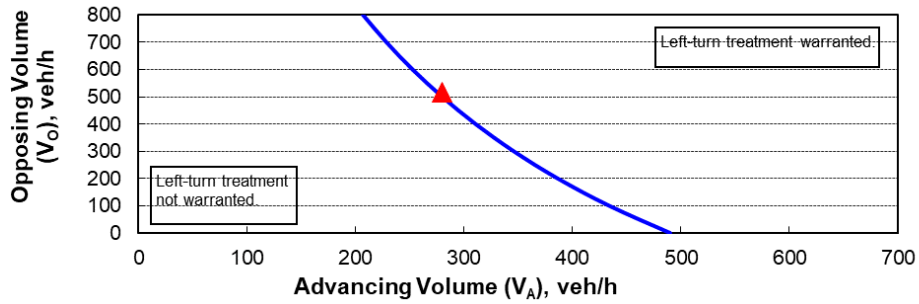
SCENARIO 2 (RV PARK, NO CONNECTOR, FULL BUILD-OUT) → Eastbound Left-Turn Lane

85TH PERCENTILE SPEED = 30 MPH

AM

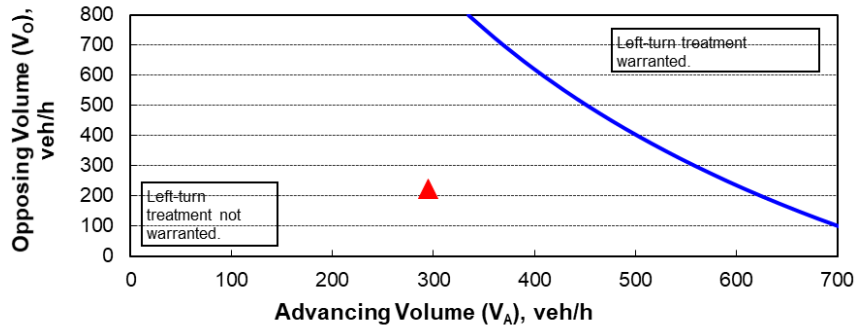


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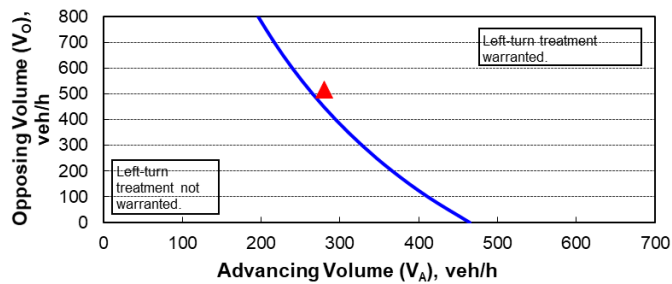


85TH PERCENTILE SPEED = 35 MPH

AM



PM

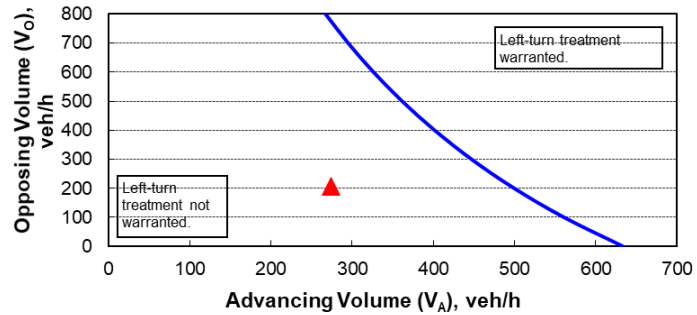


LYNCHBURG RD @ TWIN CREEKS MARINA WAY

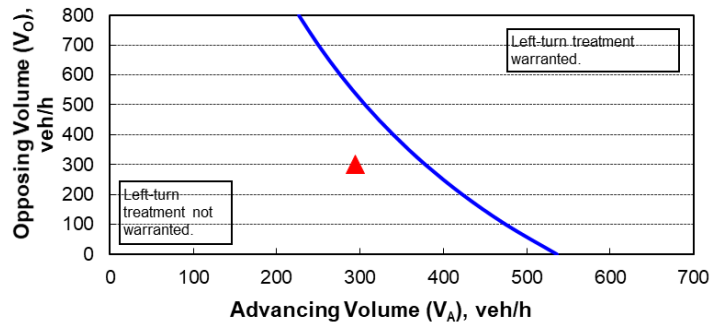
SCENARIO 1 (RESIDENTIAL, NO CONNECTOR, FULL BUILD-OUT) → Eastbound Left-Turn Lane

85TH PERCENTILE SPEED = 30 MPH

AM

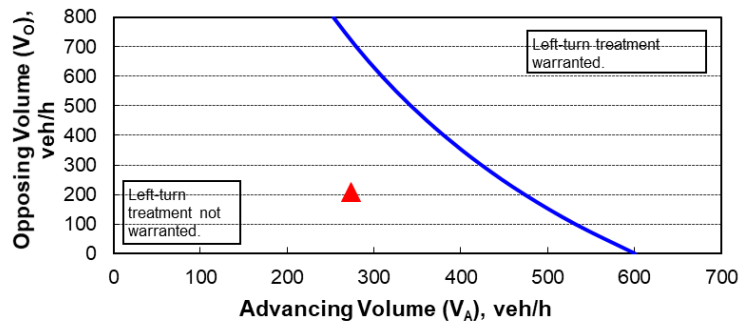


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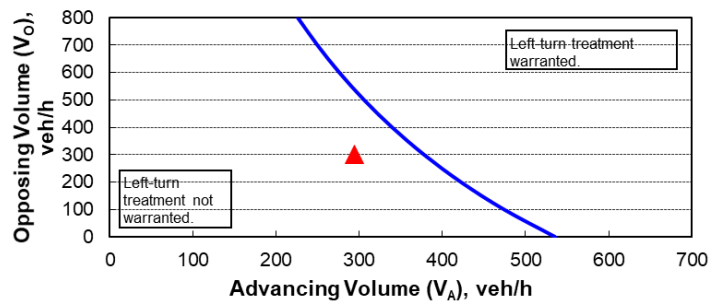


85TH PERCENTILE SPEED = 35 MPH

AM



PM

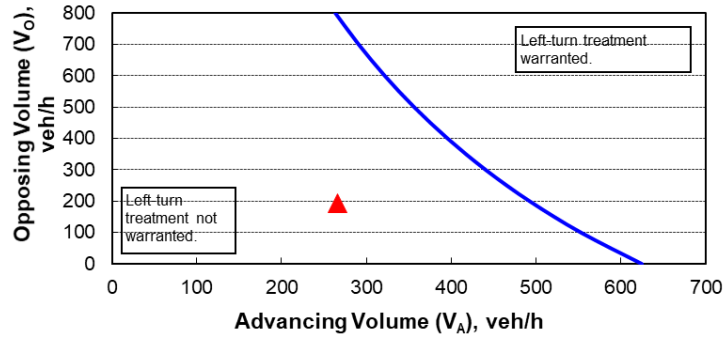


LYNCHBURG RD @ TWIN CREEKS MARINA WAY

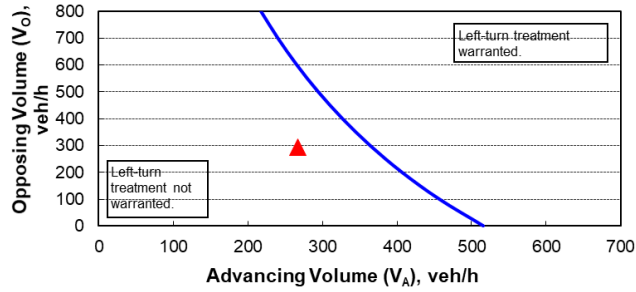
SCENARIO 2 (RV PARK, NO CONNECTOR, FULL BUILD-OUT) → Eastbound Left-Turn Lane

85TH PERCENTILE SPEED = 30 MPH

AM

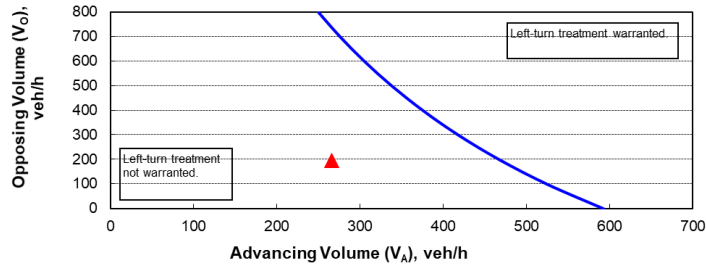


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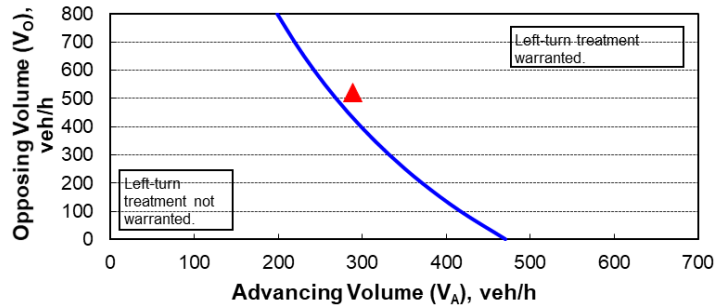


85TH PERCENTILE SPEED = 35 MPH

AM



PM



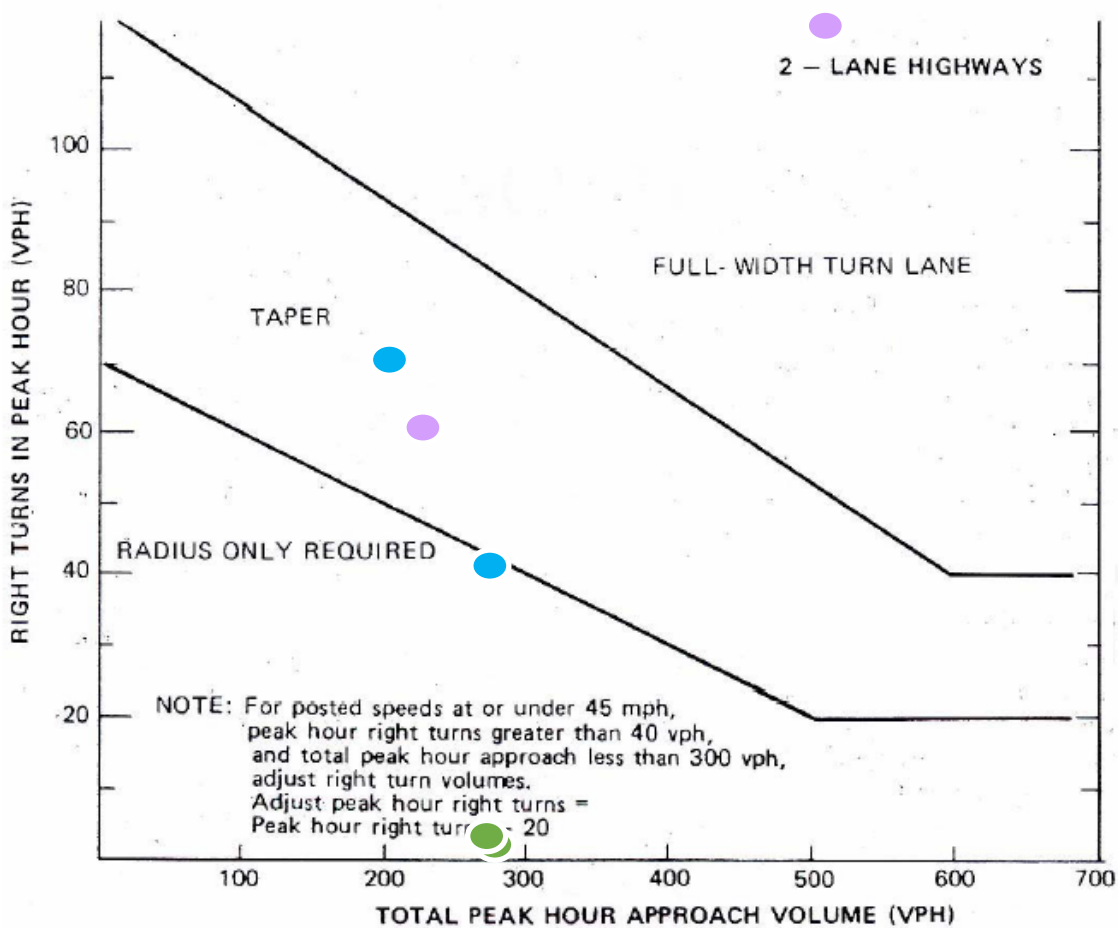
SCENARIO 1

Projected Conditions (Peak Hours) RIGHT TURN LANE WARRANT ANALYSES

(Based on Intersection Channelization Design Guide)

Intersection Approach	AM Peak Hour			PM Peak Hour		
	V_R^*	V_A^*	Warrant Met?	V_R^*	V_A^*	Warrant Met?
Eastbound Lynchburg Rd at Twin Creeks Project Site 2 Access ●	4	294	No	12	289	No
Westbound Lynchburg Rd at Twin Creeks Dr ●	64	235	Yes (Taper)	209	523	Yes (Full-Width Turn Lane)
Westbound Lynchburg Rd at Dry Creek Ramp Rd ●	43	274	No	70	208	Yes (Taper)

* V_R = Right Turn Volumes, V_A = Advancing Volumes



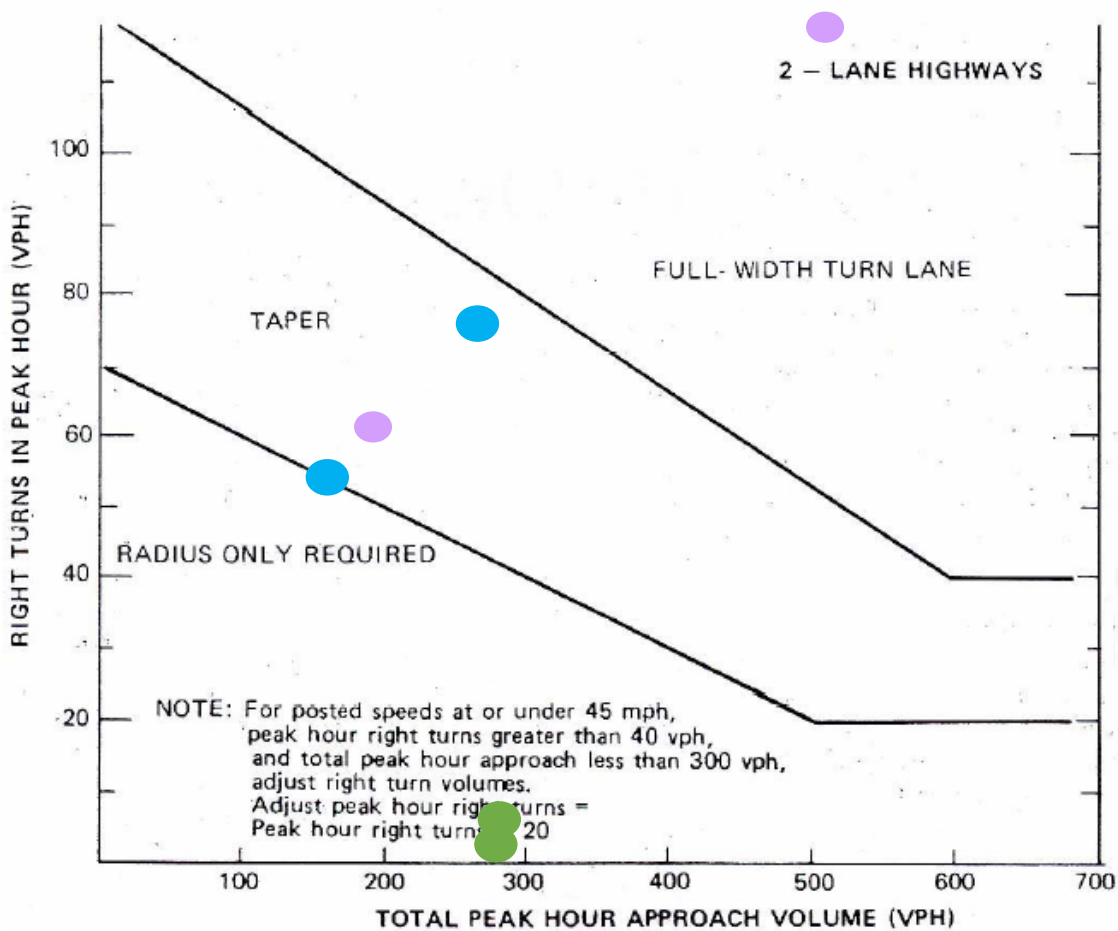
SCENARIO 2

Projected Conditions (Peak Hours) RIGHT TURN LANE WARRANT ANALYSES

(Based on Intersection Channelization Design Guide)

Intersection Approach	AM Peak Hour			PM Peak Hour		
	V_R^*	V_A^*	Warrant Met?	V_R^*	V_A^*	Warrant Met?
Eastbound Lynchburg Rd at Twin Creeks Project Site 2 Access ●	4	293	No	12	280	No
Westbound Lynchburg Rd at Twin Creeks Dr ●	64	222	Yes (Taper)	209	517	Yes (Full)
Westbound Lynchburg Rd at Dry Creek Ramp Rd ●	54	194	Yes (Taper)	79	294	Yes (Taper)

* V_R = Right Turn Volumes, V_A = Advancing Volumes



Traffic Signal Warrant Analysis

The *Manual on Uniform Traffic Control Devices* (MUTCD) sets forth nine different warrants that have been developed by the traffic engineering profession to facilitate the determination of whether a signal is warranted. These warrants include minimum conditions that normally indicate when a traffic signal is justified at a particular location.

Although the MUTCD provides nine different warrants, only three of these are potentially applicable at the intersection under study. These three warrants, described in the MUTCD, are the volume-related signal warrants, which are described as follows:

Warrant 1A, Minimum Vehicular Volume

The Minimum Vehicular Volume warrant is intended for application where the volume of intersecting traffic is the principal reason for consideration of signal installation. The warrant is satisfied when, for each of any eight hours of an average day, the traffic volumes given below exist on the major street and on the higher volume minor street approach to the intersection.

MINIMUM VEHICULAR VOLUMES FOR WARRANT 1A

Number Of Lanes For Moving Traffic On Each Approach		Vehicles Per Hour On Minor Street	Vehicles Per Hour On Higher Volume Minor Approach
Major Street	Minor Street	Total of Both Approaches	One Direction Only
1 Lane	1 Lane	500	150
2 Lanes or More	1 Lane	600	150
2 Lanes or More	2 Lanes or More	600	200
1 Lane	2 Lanes or More	500	200

Warrant 1B, Interruption of Continuous Traffic

The Interruption of Continuous Traffic warrant applies to operating conditions where the traffic volume on a major street is so heavy that traffic on a minor intersecting street suffers excessive delay or hazard when entering or crossing the major street. The warrant is satisfied when, for each of any eight hours of an average day, the traffic volumes given below exist on the major street and on the higher volume minor street approach to an intersection. Also, the signal installation shall not seriously disrupt progressive traffic flow.

MINIMUM VEHICULAR VOLUMES FOR WARRANT 1B

Number Of Lanes For Moving Traffic On Each Approach		Vehicles Per Hour On Minor Street	Vehicles Per Hour On Higher Volume Minor Approach
Major Street	Minor Street	Total of Both Approaches	One Direction Only
1 Lane	1 Lane	750	75
2 Lanes or More	1 Lane	900	75
2 Lanes or More	2 Lanes or More	900	100
1 Lane	2 Lanes or More	750	100

In exceptional cases, traffic signals occasionally may be justified where no single warrant is satisfied but where Warrants 1A and 1B are satisfied to the extent of 80 percent or more of the stated values. This warrant is referred to as Warrant 1C (Combination Warrant).

When only peak hour data is collected, preliminary traffic signal warrant analyses can be based on estimated of the eighth highest hour of a typical day, based off the highest peak hour. The method for this estimation is described in the *Manual of Traffic Signal Design*, by Iris Fullerton and Kames H. Kell. This estimation procedure is based on the assumption that the eight highest hours will each exceed 6.25% of the ADT and that the peak hour traffic volume is approximately 10% of the ADT.

Warrant 2, Four-Hour Volume

The Four-Hour Volume warrant is satisfied when for each of any four high hours of an average day, the plotted points representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher volume minor street approach (one direction only) all fall above the curve in Figure 8, for the appropriate combination of approach lanes.

Warrant 3, Peak Hour Volume

The Peak Hour Volume warrant is intended for application when traffic conditions are such that for one hour of the day, minor street traffic suffers undue traffic delay in entering or crossing the major street. The Peak Hour Volume warrant is satisfied when the plotted points representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher volume minor street approach (one direction only) for one hour (any four consecutive 15 minute periods) of an average day falls above the curve in Figure 9 for the appropriate combination of approach lanes. The colored dots below represent the results for each peak hour.

Study Corridor Results

Based on the existing geometry of the intersection, the analyses were performed based on one lane on the major street (George Fraley Parkway) and one lane on the minor street (Lynchburg Road). The results of the warrant analyses indicated that at the completion of the development, the projected traffic volumes at the intersection will not warrant a traffic signal. Specifically, the intersection is expected to meet Warrant 1B for eight hours, Warrant 2 in the AM and PM peak hour, and Warrant 3 in the AM and PM peak hour. Results of the warrant analyses are shown below.

LYNCHBURG ROAD & GEORGE FRALEY PARKWAY EXISTING CONDITIONS SIGNAL WARRANT RESULTS

Hour	Main Street Both Directions	Minor Street Highest Approach	1A	1B	1C	2	3
8 th Highest Hour	273	109	--	--	n/a	n/a	n/a
AM Peak Hour	437	82	n/a	n/a	n/a	--	--
PM Peak Hour	380	175	n/a	n/a	n/a	--	--

LYNCHBURG ROAD & GEORGE FRALEY PARKWAY PROJECTED CONDITIONS SIGNAL WARRANT RESULTS

Hour	Main Street Both Directions	Minor Street Highest Approach	1A	1B	1C	2	3
8 th Highest Hour	325	163	--	--	n/a	n/a	n/a
AM Peak Hour	493	192	n/a	n/a	n/a	--	--
PM Peak Hour	520	260	n/a	n/a	n/a	Yes	--

N HIGH ST & 2ND AVE NW EXISTING CONDITIONS SIGNAL WARRANT RESULTS

Hour	Main Street Both Directions	Minor Street Highest Approach	1A	1B	1C	2	3
8 th Highest Hour	274	151	--	--	n/a	n/a	n/a
AM Peak Hour	439	192	n/a	n/a	n/a	--	--
PM Peak Hour	407	241	n/a	n/a	n/a	--	--

N HIGH ST & 2ND AVE NW PROJECTED CONDITIONS SIGNAL WARRANT RESULTS

Hour	Main Street Both Directions	Minor Street Highest Approach	1A	1B	1C	2	3
8 th Highest Hour	638	183	Yes	--	n/a	n/a	n/a
AM Peak Hour	775	293	n/a	n/a	n/a	Yes	Yes
PM Peak Hour	1,020	234	n/a	n/a	n/a	Yes	Yes