PLANNING COMMISSION REGULAR MEETING

Tuesday, March 19, 2024 at 7:00 PM

AGENDA

CALL TO ORDER AND ESTABLISHMENT OF A QUORUM.

ADOPTION OF MINUTES.

1. Draft February 20, 2024 Planning Commission Meeting Minutes

HEARING OF PUBLIC HEARING ITEMS.

2. **Special Use Permit (SUP) 2023-04 W.C. Taylor Middle School**– the Applicant/Owner, Fauquier County School Board, is a requesting a SUP per Article 3-4.9.3 of the Zoning Ordinance for an expansion in excess of 10,000 square feet to an existing middle school. The subject parcel is located in the Public-Semi Public (PSP) District of the Town of Warrenton Zoning Ordinance and is designated in the Greenway and Makers Character District as Public/Semi Public Non-Intensive on the Future Land Use Map. The subject parcel (GPIN 6984-48-7973-500) is located at 350 E. Shirley Avenue on approximately 39.1805 acres. The Applicant is requesting a waiver from Article 2-19 of the Zoning Ordinance to allow mulitple retaining walls in excess of six feet.

WORKSESSION ITEMS.

3. ZOTA 2023-01 A Zoning Ordinance Text Amendment to Reduce the Setback Requirement for Telecommunication Towers (*REVISED BY APPLICANT*). Zoning Ordinance Section 9-18.10 - *Setbacks* requires that all telecommunication towers in all zoning districts be set back from property lines at a distance no less than the full height of the tower. The applicant is requesting that the setback requirement be reduced to allow a setback that is less than the height of the tower, with certification provided from an engineer that a lesser setback is appropriate due to the design of the tower. This text amendment application was revised following the February 20, 2024 Public Hearing, where the representative waived the 100-day deadline for Planning Commission action, and requested a deferral to revise the application so that the setback reduction would apply in all Zoning Districts throughout the Town. Arcola Towers LLC (Applicant)/James P. Downey (Representative)

4. SUP 2022-03 Warrenton Village Center, the Owners, Jefferson Associates LP and Warrenton Center, LLC with the Applicant, NewCastle Development Group, seek a Special Use Permit for two parcels totaling approximately 29.05 acres to create a mixed use development in the existing Warrenton Village Center. The proposal includes apartments, 2 over 2s, and townhomes with the addition of central plaza, parking garage, enhanced internal road network, and pedestrian infrastructure to promote walkability. The properties are zoned Commercial and designated in the New Town Character District of Plan Warrenton 2040. (GPINs 6985-20-7247 and 6984-29-6753)

COMMENTS FROM THE COMMISSION.

5. APA-VA Conference Planning Commissioner Training

6. Draft 2024 Planning Commission Goals

COMMENTS FROM THE STAFF.

ADJOURN.

PLANNING COMMISSION REGULAR MEETING

21 Main Street

Tuesday, February 20, 2024, at 7:00 PM

MINUTES

A REGULAR MEETING OF THE PLANNING COMMISSION OF THE TOWN OF WARRENTON, VIRGINIA, WAS HELD ON February 20, 2024, at 7:00 PM

Regular Meeting

PRESENT	Mr. Ryan Stewart, Chair; Mr. Terry Lasher, Vice Chair; Ms. Darine Barbour, Secretary; Ms. Denise Harris, Planning Manager; and Ms. Heather Jenkins, Zoning Administrator
ABSENT	Mr. James Lawrence; Mr. Steve Ainsworth

The minutes laid out will be a brief recap of the agenda items. Please see recorded video for more in-depth information.

REGULAR MEETING - 7:00 PM

At 7:00 PM on Tuesday, February 20, 2024. The Planning Commission meeting was called to order by the Chair and a quorum was established.

APPROVAL OF THE MINUTES.

Commissioner Lasher motioned to adopt the January 16, 2024, Planning Commission Minutes.

Commissioner Barbour seconded the motion.

Vote 3-0 (Lawrence, Ainsworth Absent) to approve.

Chair Stewart amended the agenda to conduct the Work Session before New Business.

PUBLIC HEARINGS.

1. ZOTA 2023-01 A Zoning Ordinance Text Amendment to Reduce the Setback Requirement for Telecommunication Towers in the PSP (Public Semi Public) Zoning District. Zoning Ordinance Section 9-18.10 - *Setbacks* requires that all telecommunication towers in all zoning districts be set back from property lines at a distance no less than the height of the tower. The applicant is requesting that the setback requirement be reduced within the PSP – Public Semi Public Zoning District to allow a setback that is less than the height of the tower, with certification provided from an engineer that a lesser setback is appropriate due to the design of the tower. Arcola Towers LLC (Applicant)/James P. Downey (Representative)

   Ms. Heather Jenkins gave a brief presentation and provided an update on developments since the December public hearing that was continued per the Applicants request.

Mr. James Downey, Applicant's Representative, requested a deferral due to the desire to review the applicability of the 1996 Telecommunications Act and the position of the Town's consultant, Cityscape, with the endorsement of the Town Attorney, that allowing this text amendment in one zoning district is discriminatory.

Mr. Downey agreed to waive the timelines and 100-day clock established in the Zoning Ordinance.

Chair Stewart opened the Public Hearing at 7:04 PM.

Dr. Jay Harre of 350 Alexandria Pike spoke to the application stating he does not support towers in town.

Chair Stewart closed the Public Hearing at 7:12 PM.

Commissioner Lasher confirmed the Applicant is waiving the 100-Day clock.

Commissioner Lasher moved to recommend deferral of the application per the Applicant's request; the motion was seconded by Commissioner Barbour.

Ayes: Mr. Ryan Stewart, Chair; Mr. Terry Lasher, Vice Chair; Ms. Darine Barbour, Secretary

Nays: ***N/A***

Abstention: ***N/A***

Absent: Mr. James Lawrence; Mr. Steve Ainsworth

The motion passed.

WORKSESSION ITEMS.

1. SUP 2023-04 Taylor Middle School - The Applicant is requesting a Special Use Permit for an expansion to an existing middle school. The property is zoned Public-Semi Public (PSP) on approximately 39.18 acres. The site includes Brumfield Elementary. Article 3- 4.9.3 of the Town of Warrenton's Zoning Ordinance allows school expansion to existing facilities equal to or over 10,000 square feet with the approval a SUP by Town Council.

Ms. Harris gave a brief overview of the application.

Luke Fetcho, the Applicant's Representative from Timmons, gave a presentation and introduced the team that was present, including Tom Edwards (FCPS), Josh Johnston (FCPS), David Graham (FCPS), Patrick VanNuys (Timmons Engineering), Doug Cofer (RRMM Architects), and Jeff Harris (RRMM Architects).

Commissioner Barbour raised concerns about the afternoon pick up for Brumfield and Taylor, stating the cars begin to line up for Brumfield at 2:25 PM.

Chair Stewart inquired what percentage of students is anticipated to walk, take the bus, or be dropped off.

Mr. Graham stated 15-20% of students are dropped off.

Chair Stewart expressed concerns over the circulation paths, conflict points within the parking lot, and inquired if different layouts had been explored.

Mr. Fetcho stated they are meeting the required parking and there are grading issues.

Chair Stewart stated the access road creates operational challenges.

Mr. Fetcho indicated the intent is to have it gated during school hours to prevent cut through traffic.

Chair Stewart inquired why there is no pedestrian accommodations on the access road and pointed out the children from the Arrington neighborhood have no means to walk to the middle schools.

Mr. Fetcho stated they have no looked at how many students might be able to walk from the Arrington development.

Chair Stewart inquired about bicycle/pedestrian connections on Shirley Avenue.

Mr. Fetcho indicated there would be a shared use path from the Greenway crossing to the front of the school and a sidewalk along the existing building's frontage. An easement would be provided along the parking lot and property adjacent to Walmart and the Community Center. He stated no other crosswalks are proposed and the existing pedestrian signal would be utilized.

Chair Stewart raised safety concerns about the height and number of retaining walls on the property.

Mr. Fetcho stated there would be a fall protection guard per code.

Chair Stewart asked if Parks and Recreation had been approached by the schools regarding field usage and would like their input.

Commissioner Lasher inquired about the delineated wetlands and why the fields are being retained in the current configuration as it seems unnecessary due to the size of the parcel. He asked the Applicant to think bigger, broader, and that it would be prudent to think larger. He expressed it is an oversight to not be discussing needs with Parks and Recreation. He stated it was short sighted to focus only on the front portion of the site on Shirley Avenue. He brought up the need for crosswalks, anticipated signals, and asked the anticipated number of drop offs. He further stated the Applicant needed to be thinking long term.

Mr. Fetcho stated the TIA looks at growth values and that it found the school does not impact Shirley Avenue.

Commissioner Barbour raised more concerns about the interaction of the access road and Brumfield.

Chair Stewart encouraged the Applicant review the walkability of the site and to reduce conflicts before the public hearing.

NEW BUSINESS

2023 Draft Planning Commission Annual Report

Ms. Harris provided highlights of the draft report. Members of the Planning Commission expressed they like it.

Commissioner Lasher motioned to accept the 2023 Planning Commission Annual Report; Commissioner Barbour seconded.

Ayes: Mr. Ryan Stewart, Chair; Mr. Terry Lasher, Vice Chair; Ms. Darine Barbour, Secretary

Nays: ***N/A***

Abstention: ***N/A***

Absent: Mr. James Lawrence; Mr. Steve Ainsworth

The motion passed and the Annual Report will be provided to Town Council.

COMMENTS FROM THE COMMISSION.

The Planning Commission discussed training for 2024 and the opportunity to attend the APA-VA Annual Conference in Williamsburg in July. The Chair tabled the discussion until all Planning Commissioners were present.

The Planning Commission reviewed its draft goals for 2024. The Chair tabled the discussion until all Planning Commissioners were present.

COMMENTS FROM THE STAFF.

Staff reviewed the work surrounding the Historic District survey, the upcoming National Register public meeting, and the goal to align the existing local and national districts.

Staff reviewed the current land use applications in process updated submission of Warrenton Village and rezoning for United Methodist/Heros Bridge.

ADJOURN.

Commissioner Lasher moved to adjourn, seconded by Commissioner Barbour . Chair Stewart, with no further business, this meeting was adjourned at 8:09 PM.

I hereby certify that this is a true and exact record of actions taken by the Planning Commission of the Town of Warrenton on February 20, 2024.

Darine Barbour, Secretary
Planning Commission

Community Development Department

STAFF REPORT

Commission Meeting Date:	March 19, 2024
Agenda Title:	Special Use Permit 2023-04 Taylor Middle School Expansion
Requested Action:	Hold a Public Hearing & Recommend to Town Council
Decision Deadline:	May 30, 2024
Staff Lead:	Denise Harris, Planning Manager

EXECUTIVE SUMMARY

Special Use Permit (SUP) 2023-04 Taylor Middle School Expansion, the Applicant, and the Owner, the Fauquier County School Board, seeks a SUP to expand the school the in excess of 10,000 square feet. The subject parcel is in the Public Semi Public (PSP) District of the Town of Warrenton Zoning Ordinance and is designated as Public/Semi Public Non-Intensive in the Greenway and Makers Character District on the Future Land Use Map. The subject parcel (GPIN 6984-48-7973-500) is located at 350 E. Shirley Avenue on approximately 39.1805 acres. The Applicant is seeking a waiver to allow for retaining walls to be built up to twelve feet on the property.

The Planning Commission held a Work Session on February 20, 2024. Commissioners raised concerns regarding conflict points in the transportation design in a number of locations, including the interaction with Brumfield Elementary. Commissioners raised the lack of intermodal access nor the a provision for pedestrian connections to the surrounding neighborhoods and Brumfield. Commissioners expressed safety concerns regarding the prevalence and height of the multiple retaining walls. In conclusion, at the Work Session the Commissioners encouraged the Applicant to review the walkability of the site; to think more holistically about the use of the entire 39-acre property; and to reduce the transportation conflicts.

On March 1, 2024, the Applicant submitted an updated SUP Plan in response to the second round of Agency Comments. The Applicant restructured the access from the parking lots to Shirley Avenue and provided a sidewalk along the new access road. The Applicant continues to acknowledge that Zoning staff cannot verify landscaping, parking, or lighting requirements of the Zoning Ordinance are met until the information is provided at time of site plan.

The draft Conditions of Approval are consistent with other recent SUPs approved by the Town and add site specific conditions regarding the dedication of right-of-way for the upgrades to Alwington Boulevard to be built through a proffered Fauquier County rezoning for the Arrington property and dedication of easements for future shared use paths on Shirley and the southern portion of the property.

BACKGROUND

The Fauquier County School Board seeks to expand W.C. Taylor Middle School to consolidate it with Warrenton Middle School located on Waterloo Street. The approximately 39-acre property contains frontage on Shirley Avenue and Alwington Boulevard, encompasses Brumfield Elementary, and is adjacent to WalMart and the Warrenton Community Center. Its location is an essential public property with the ability to link multiple neighborhoods, schools, community center, and Greenway by providing for walkable/bicycle friendly connections.

During agency review of the application, staff raised several issues mostly focused on the transportation circulation, lack of multi modal provisions, and conflict with Brumfield Elementary. The Applicant was made aware of the ongoing Virginis Department of Transportation Shirley Avenue Pipeline Study that recommends an upgrade Pedestrian Hybrid Beacon in front of the school property where it connects to the Greenway Trail; the Fauquier County Arrington Rezoning that includes proffers for transportation and pump station upgrades; Plan Warrenton 2040 Transportation Map, the Complete Streets Guide, and the Walkability Audit Report that speak to multi-modal goals; and the Town's ongoing offer to facilitate a conversation between the schools and the Virginia Department of Historic Resources, which is interested in the African American history of the site.

Zoning staff indicated they cannot verify the proposal will meet multiple Zoning Ordinance requirements related to parking, lighting, and landscaping. The Applicant stated the intent to provide this information at time of Site Development Plan; however, this may result in a scenario where the constraints of the site as laid out are impacted.

The Planning Commission held a work session on this proposal on February 20, 2024. During that meeting the Planning Commission discussed transportation conflicts, the constraints of the site, the safety concerns of the heights of the retaining walls, the environmental features, the lack of multi-modal connections, and the relationship of the schools with Brumfield, the community center, the Greenway, and the surrounding neighborhoods.

STAFF RECOMMENDATION

Staff recommends the Planning Commission hold a Public Hearing on SUP 23-04 Taylor Middle School Expansion.

Suggested Motions

1. I move that the Planning Commission recommend approval of SUP 23-04, Taylor Middle School Expansion, to Town Council to allow for the addition in excess of 10,000 square feet of approximately an additional 68,231 square feet, subject to the draft Conditions of Approval dated March 19, 2024, the Special Use Permit Plan consisting of 18 sheets created by RRMM Architects with Timmons Group dated September 7, 2023 and revised through March 1, 2024.

OR

2. I move that the Planning Commission forward SUP 23-4, Taylor Middle School Expansion to the next Planning Commission meeting.

OR

3. I move an alternative motion.

OR

4. I move to recommend denial of SUP 23-04 to the Town Council for the following reasons…

ATTACHMENTS

1. Attachment A – Maps
2. Attachment B – March 19, 2024, Staff Analysis
3. Attachment C – March 1, 2024 Special Use Permit Plan
4. Attachment D – March 19, 2024 Draft Conditions of Approval
6. Attachment E – Statement of Justification
7. Attachment F – Agency Comments
8. Attachment G – March 1, 2024 Comment Response Letter
9. Attachment H – Staff Presentation from February 20, 2024 Work Session
10. Attachment I – Applicant Presentation from the February 20, 2024 Work Session

Staff Analysis

This analysis is based on the Comprehensive Plan, Zoning Ordinance, and review comments by Town Departments. The standards/analysis tables in the sections below contain the criteria for Planning Commission and Town Council consideration of Special Use Permits, per Article 11-3.10.3.

This request for a Special Use Permit for Taylor Middle School Expansion with Article 3-4.9 and Article 11-3.10 of the Town Zoning Ordinance. The proposal is to add approximately 68,231 square feet to the existing middle school.

The following table summarizes the area characteristics (see maps in Attachment A):

Approx. Direction	Land Use	Future Land Use Map Designation	Zoning
North	SF Residential/Church	Residential	R-10 Residential
South	Commercial/Community Center	Greenway and Makers District	PSP/ Commercial
East	SF Residential/Commercial/ Greenway Trail	Greenway and Makers District	R-10 Residential/ Commercial
West	County/SF Residential/Vacant	Residential PDR	R-10/PDR

The subject parcel is zoned to the Public Semi Public (PSP) District of the Town of Warrenton Zoning Ordinance and is designated as Greenway and Makers Character District as Public/Semi Public Non-Intensive on the Future Land Use Map. The subject parcel (GPIN 6984-48-7973-500) is located at 350 E. Shirley Avenue on approximately 39 acres.

Comprehensive Plan Future Land Use

Plan Warrenton 2040 designates Taylor Middle School in the Greenway and Makers Character District. The summary of this district *states "Future planning shall ensure that the Town, county, and School District properties are walkable and accessible from adjoining neighborhoods…The Greenway and Makers District will maintain the current zoning of 35 feet, or one to three stories, as a transition zone in areas adjacent to the Warrenton Branch Greenway, industrial zoned areas and where James Brumfield Elementary, Taylor Middle School, and the Warrenton Community Center are located."* Shirley Avenue is considered a "Boulevard" road on the Warrenton Street Typology Map. Greenway and Makers Character District will be promoted as the southern gateway into Town and maintain the critical linkages between education, civic uses and the surrounding neighborhoods.

Historic Resources

Taylor Middle School opened in 1952 as a segregated high school. Named after William C. Taylor who served as the principal for the Warrenton Rosenwald School, the school has stood as an important landmark to the Town's history. It became an integrated junior high in 1969.

While the school is not located within the Town's historic district and it not designated on the National Register, it is an important historical resource. Plan Warrenton 2040 includes the following Historic Resources goals:

- Conserve, reuse, and promote historic resources to enhance the Town's sense of place…
- Preserve the authenticity and tell the stories of historic resources for generations to come through documentation.
- Educate the community on the value of the historic resource.
- Enhance the environment through preservation and sustainability best practices.

Standard	Analysis
Whether the proposed Special Use Permit is consistent with the Comprehensive Plan.	The proposed use falls within the future land use designation of Public Semi Public Non-Intensive of the Greenway and Makers Character District.
The compatibility of the proposed use with other existing or proposed uses in the neighborhood, and adjacent parcels.	Taylor Middle School is an existing use sharing the same parcel as Brumfield Elementary. It is adjacent to the Warrenton Community Center, commercial, and residential uses.

Staff Findings

The Applicant indicated the intention of incorporating the history of the school through graphics throughout the new building and anticipates a future statue of William C. Taylor.

Transportation and Circulation Analysis

Plan Warrenton 2040 includes a Transportation Plan map that includes improvements to Shirley Avenue as well as bicycle and pedestrian connections. "Make Shirley Avenue walkable, with continuous sidewalks that are lined with street trees."

Both comprehensive plans for Fauquier County and the Town illustrate this property as a key linkage for bicycle and pedestrian facilities from neighborhoods to the north, west, and south. L-5.1 states "The Town, County, and School District properties should be walkable and accessible from the adjoining neighborhoods."

A Transportation Impact Analysis was provided and is being reviewed with the SUP plans by the Virginia Department of Transportation (VDOT) and the Town's transportation consultant. In 2017, the Town

conducted Walkability Audits and published a Complete Streets Guide. Both these documents were incorporated and adopted into the 2040 Plan Warrenton comprehensive plan. In addition, VDOT is currently undertaking a "Pipeline Study" of Shirley Avenue.

Standard	Analysis
The traffic expected to be generated by the proposed use, the adequacy of access roads and the vehicular and pedestrian circulation elements (on and off-site) of the proposed use, all in relation to the public's interest in pedestrian and vehicular safety, efficient traffic movement and access in case of fire or catastrophe.	The Applicant provided a Transportation Impact Analysis (TIA) to calculate the potential impacts of the addition. The TIA determined no adverse impacts on the surrounding road network. However, this area of Town contains aging roadway systems that are envisioned to be upgraded in multiple plans and documents to accommodate the modern uses located on it.
Whether the proposed use will facilitate orderly and safe road development and transportation.	

Staff Findings

The Applicant worked with staff, VDOT, and the Town's transportation consultant to address several transportation issues. This included new layouts for the access road with a sidewalk to Alwington Boulevard, moving the access point from Shirley Avenue to the parking lot closer to the community center, and providing easements for a future shared use path from the school entrance to the school's property boundary and along the southern property boundary adjacent to WalMart. In addition, VDOT requested the Applicant upgrade the entrances to the site, which the Applicant accommodated into the parking lot with left and right turn lanes updated to meet current design standards. The Applicant did indicate site constraints at the right turn lane into the bus loop and requested the existing left turn lane condition be allowed to remain. The proposed access road should be considered a private access road. The Applicant is providing a 5' sidewalk along East Shirley Avenue from the crosswalk to the Greenway to the northern property line.

The Fauquier County Arrington Rezoning includes proffers to improve Alwington Boulevard and the intersection in front of Brumfield Elementary, which is included in this parcel. The Arrington developer will need right-of-way dedications and easements on to the property to be able to make these transportation improvements that will improve the safety and circulation of the area and schools. Staff is proposing a Condition of Approval for this application that stipulates the right-of-way and easements will be provided to enable the transportation improvements.

The Applicant is providing a public access easement for the future construction of a shared use path along the parking lot frontage at Shirley Avenue. Since the Applicant is not providing the multi-use trail envisioned in the comprehensive plans and Pipeline Study, staff is proposing a Condition of Approval that the Applicant will grade according to VDOT standards the 10' easement to accommodate a future shared use path.

VDOT is in the final stages of a Shirley Avenue Pipeline Study to address safety and capacity issues along the corridor. The study recommends an upgraded Pedestrian Hybrid Beacon between the school and the Greenway. The Applicant requested that due to the study not being finalized, that this be addressed at a

later time to be funded by others.

Community Facilities and Environmental Analysis

Plan Warrenton 2040's vision includes key aspirations of fostering high quality, equitable, and accessible community facilities; reinforcing the role of County community facilities into the Town fabric; and promoting livability through properly located schools.

CF-1.12 Encourage schools to retain their presence in Town in walkable, safe, environmentally appropriate locations.

CF-3.7 All public facilities and utilities should be designed and developed so as to limit environmental degradation and protect the public environment. Safeguard floodplain and environmentally critical areas through the prohibitions against public facility development.

Standard	Analysis
Whether the proposed Special Use Permit will be served adequately by essential public facilities, services and utilities.	The parcel is located in Town and currently served by Town Police and Fauquier County Emergency Services. There is an existing water and sewer system on the parcel. The Fauquier County Arrington Rezoning includes an upgrade to the existing Town pump station located on the parcel if Arrington is boundary line adjusted into the Town.
The location of any existing and/or proposed adequate on and off-site infrastructure.	

Staff Findings

The property is a key parcel for the realization of Plan Warrenton 2040's goals. By expanding Taylor Middle School, the facility retains its presence in Town. While not as walkable as Warrenton Middle School, Taylor is located on the same parcel as Brumfield Elementary and adjacent to the Greenway Trail. It is served by public water and sewer, as well as the Town Police and Fauquier County Emergency Services. The proposed additions work to avoid the 500 year floodplain. The Applicant is requesting a waiver from Article 2-19 of the Zoning Ordinance to allow multiple retaining walls to exceed six feet. The Statement of Justification points out this is in an effort to avoid/minimize environmentally sensitive lands.

Economic Resources Analysis

An economic goal of Plan Warrenton 2040 is to promote a diverse, equitable stable tax base while preserving the character of the community.

Standard	Analysis
Whether the proposed Special Use Permit use will provide desirable employment and enlarge the tax base by encouraging economic development activities consistent with the Comprehensive Plan.	The proposed use does not change the existing public use on the property.
The number of employees.	The proposed facility is designed to accommodate 850 students, 100 staff, and 25 visitors.
The proposed days/hours of operation.	The school follows the Fauquier County Public School calendar with the building being occupied August – June from 7:00 am to 5:00 PM with some evening hours

Staff Findings
The proposal does not change the existing public use for the site.

Zoning Analysis

The legislative intent of the Public Semi-Public District is to provide for major public, semi-public, and institutional uses, to facilitate future growth of such uses within the district in accordance with the objectives, policies, and proposals of the Comprehensive Plan, including the encouragement of convenient and safe nearby residential neighborhoods, and to provide evidence on the Zoning map of the nature of land use planned for this district.

Standard	Analysis
The level and impact of any noise emanating from the site, including that generated by the proposed use, in relation to the uses in the immediate area.	The proposal does not change the existing school use. The noise will remain consistent with the current land use.
The proposed location, lighting and type of signs in relation to the proposed use, uses in the area, and the sign requirements of this Ordinance.	The Applicant intends to replace the existing monument sign and will address signage at the time of Site Plan Development.
The location and area footprint with dimensions (all drawn to scale), nature and height of existing or proposed buildings, structures, walls, and fences on the site and in the neighborhood.	The Applicant is proposing the school additions match the overall scale and use similar materials as the existing building. As is appropriate with historic resources, the design intent is not to match the existing building but instead to compliment it to enable the distinction between the original building from the addition.
The nature and extent of existing or proposed landscaping, screening and buffering on the site and in the neighborhood.	No new landscaping details are proposed on the SUP Plan. Staff is unable to verify ordinance requirements, which will be required at time of site plan submission

Standard	Analysis
The timing and phasing of the proposed development and the duration of the proposed use.	The project will not be phased with an anticipated duration of 36 months.
Whether the proposed Special Use Permit at the specified location will contribute to or promote the welfare or convenience of the public.	The school renovation will fully sprinkle the building and provide new fire hydrants throughout the site.
Whether, in the case of existing structures proposed to be converted to uses requiring a Special Use Permit, the structures meet all code requirements of the Town of Warrenton.	The building will comply with all applicable code requirements.
The location, character, and size of any outdoor storage.	There is no outdoor storage proposed with this application.
The location of any major floodplain and steep slopes.	There is 500 year, Zone X, floodplain on the site.
The location and use of any existing non-conforming uses and structures.	There are no non-conforming proposed structures with this addition.
The location and type of any fuel and fuel storage.	No fuel storage areas are noted on site.
The location and use of any anticipated accessory uses and structures.	There are no new accessory structures proposed with this application.
The area of each proposed use.	The proposed area for the approximate 68,231 addition is to the south and rear of the existing building.
The location and screening of parking and loading spaces and/or areas.	Parking is located on all sides of the building, with the exception of the northern emergency access road. The Applicant indicates they will screen the parking in conformance with Article 8 of the Zoning Ordinance.
The location and nature of any proposed security features and provisions.	The new access road to Alwington Boulevard and the emergency access drive will have gates with a locking mechanism during school hours.
Any anticipated odors which may be generated by the uses on site.	The site must remain in compliance with Article 9-14.5 regarding the control of odors.
Refuse and service areas.	The loading and refuse/service areas are located at the southwest corner of the proposed building. The mechanical yard with the generator transformer and chillers are located on the west side of the building.
Whether the proposed Special Use Permit will result in the preservation or destruction, loss or damage of any significant topographic or physical, natural, scenic, archaeological or historic feature.	The Applicant is requesting a waiver from Article 2-19 of the Zoning Ordinance for multiple retaining walls in excess of six feet. The reasoning is to protect environmental features as much as possible with the expansion of the school.

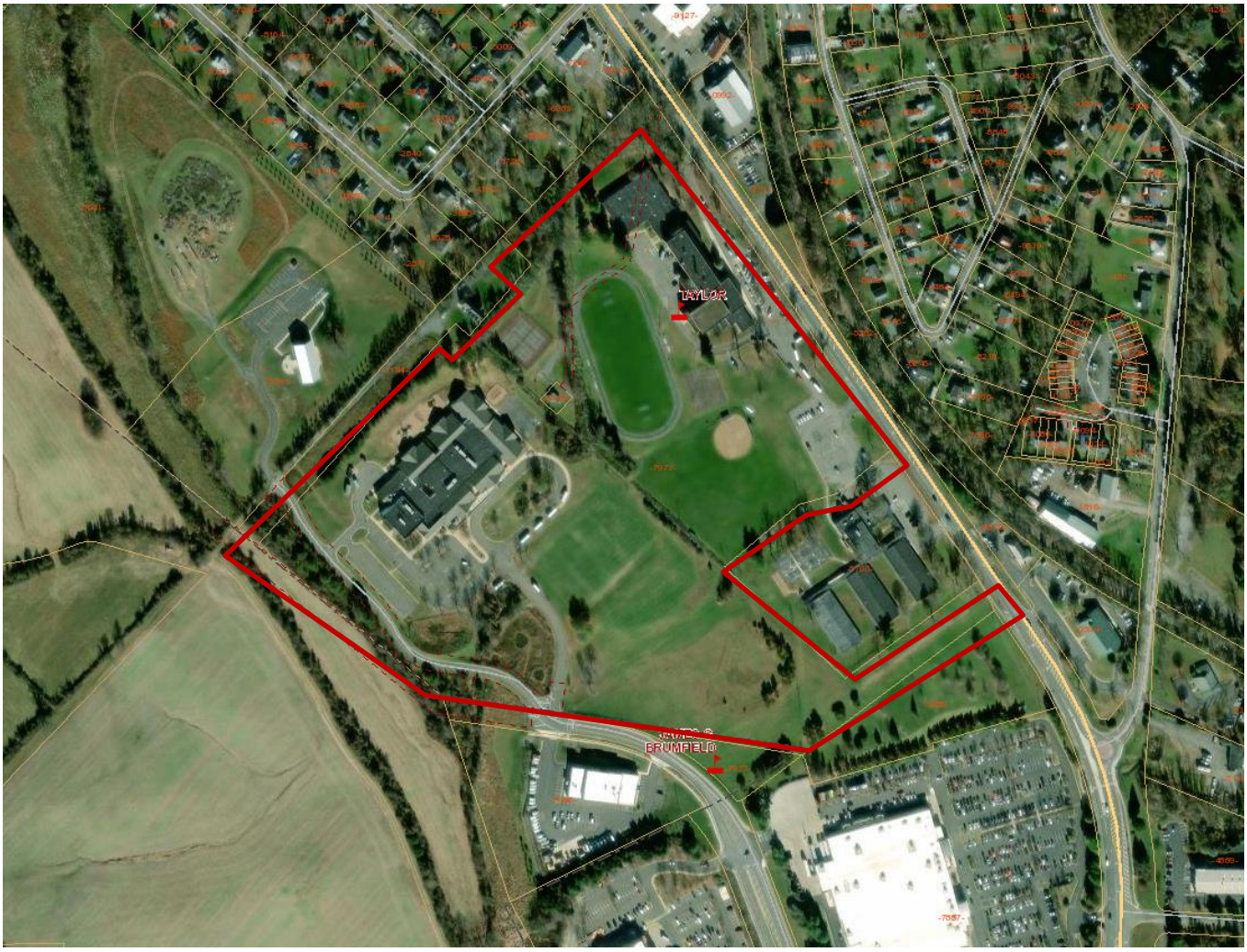
Standard	Analysis
The effect of the proposed Special Use Permit on environmentally sensitive land or natural features, wildlife habitat and vegetation, water quality and air quality. The location of any major floodplain and steep slopes.	The parcel contains 500-year floodplain and wetlands. The proposal includes improvements within the floodplain for the new access road; however, no new building additions are proposed in the floodplain limits. The Applicant intends to preserve as many large trees as possible; however, the Tree Preservation Plan notes the removal of some trees to accommodate the improvements.
The glare or light that may be generated by the proposed use in relation to uses in the immediate area.	The Applicant provided a preliminary photometric plan and is indicating that a detailed lighting plan will be provided at the time of Site Plan.

Staff Findings

The Applicant has indicated that items like lighting, landscaping, parking, and signage will all be addressed at the time of the Site Development Plan. Staff have raised concerns in advisory comments that if the Zoning Ordinance requirements cannot be met at that time, it may result in the need to amend the Special Use Permit and repeat the public hearing process. As with previous SUP approvals, draft Conditions of Approval attempt to address potential LED lights as the Zoning Ordinance has not yet been updated to address this technology. The Applicant has indicated the fields are not to be lit. In addition, there is a draft Condition of Approval with the provision that Fauquier County Emergency Services and the Town of Warrenton Police will be provide with the code and/or keys to be able to open the locked gates on the access road and emergency access drive.

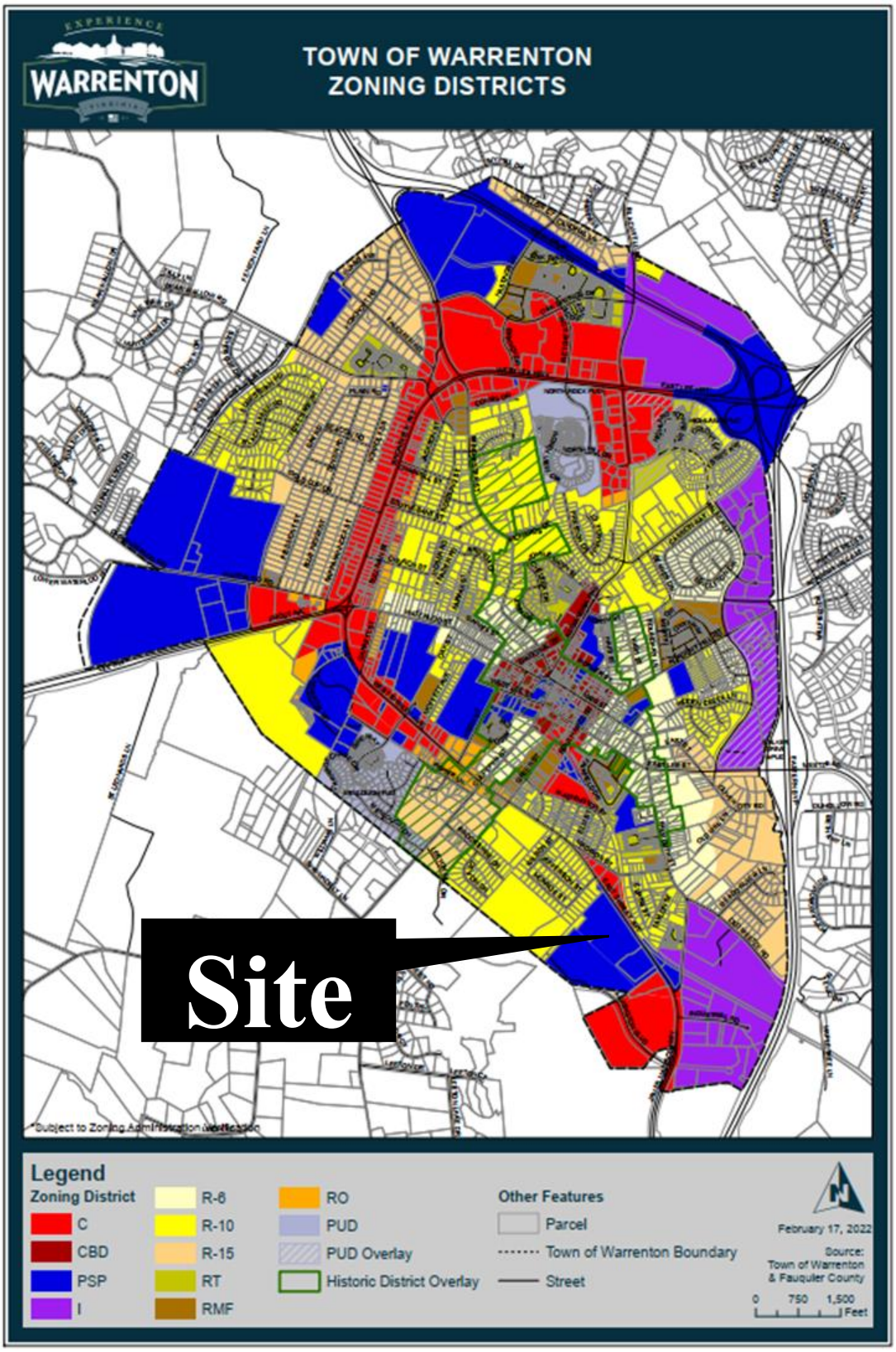
Attachment A – Maps

Vicinity Map:



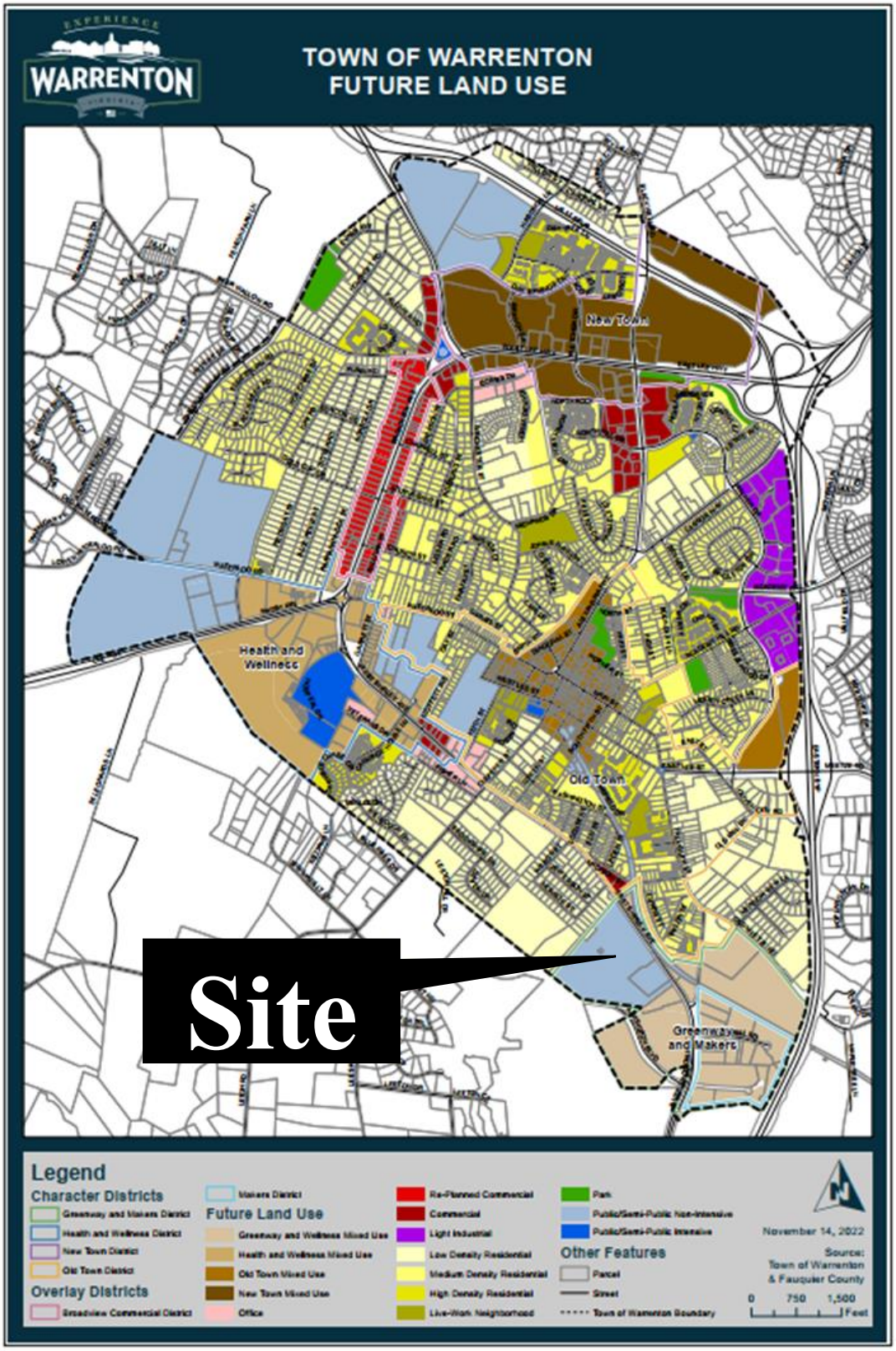
Attachment A – Maps

Zoning Map:



Attachment A – Maps

Future Land Use Map:



DRAFT SPECIAL USE PERMIT CONDITIONS OF APPROVAL
Taylor Middle School
Owner/Applicant: County School Board of Fauquier County
SUP# 2023-04
GPIN 6983-48-7973-500 ("the "Property")
Special Use Permit Area: ± 39.18 Zoning: PSP (Public Semi Public)
Date: March 19, 2023

In approving a Special Use Permit, the Town Council may impose such conditions, safeguards, and restrictions as may be necessary to avoid, minimize, or migate any potentially adverse or injurious effect of such special uses upon other properes in the neighborhood, and to carry out the general purpose and intent of this Ordinance. The Council may require a guarantee or bond to ensure that compliance with the imposed conditions. All required conditions shall be set out in the documentation approving the Special Use Permit (SUP).

1. General: This Special Use Permit is issued covering the entire Property pursuant to the provisions of § 11-3.10 of the Town of Warrenton Zoning Ordinance ("ZO").

2. Site Development: The Property shall be developed in substantial conformance with the Special Use Permit Plan entitled, "Special Use Permit Plat," prepared by Timmons Group, dated September 7, 2023, with revisions made through March 1, 2024. Minor changes and adjustments may be made to the road and street alignments, entrances, parking, dimensions and location of SWM/BMP facilities, the exact configuration and location of building footprints, and other similar features as shown on the SUP Plan, provided they meet the intent of these Conditions and are approved by the Director of Community Development or the Zoning Administrator.

3. Use Parameters:

a. Special Use Permit Area – The Special Use Permit shall apply to the entire +/-39.18 acre site.

b. Use Limitations – The primary use shall be limited to a school as defined in the ZO. Accessory uses are limited to those customarily incidental to a school.

4. Signage: All signage shall comply with the applicable provisions of Article 6 of the Town of Warrenton Zoning Ordinance.

5. Site Maintenance and Refuse Collection: Any refuse storage areas shall be screened with a solid enclosure constructed of materials that are compatible with the buildings on the property. The enclosure shall have gates that screen this area from adjoining properties and public rights-of- way. The gates shall remain closed when not in use and the trash containers shall be emptied as necessary to prevent odors or infestation by vermin. Compliance with this condition shall be demonstrated on each final site plan(s). Deliveries and refuse collection shall follow Town Code (currently Section 11-19(9)).

6. Environment: All landscaping shall be native and drought-resistant except as may be approved on the final site plan(s).

a. Landscaping – The Applicant shall make all efforts to maintain and preserve the existing mature vegetation and hardwood trees when feasible.

b. Minimize Clearing and Grading – The Applicant shall show the limits of clearing and grading for the site on the approved final site plan(s). For portions of buffers located outside the limits of clearing and grading, the existing vegetation shall be preserved and supplemented to meet the intent the buffer as noted above. In addition, existing trees and shrubs shall be incorporated into the landscaping plan. This does not preclude the removal of diseased, noxious and/or invasive vegetation.

c. Stormwater Management –The property owner is required to account for all improvements, regardless of square footage, made to the property since July 1, 2014, and design and construct for the accumulative stormwater management for both quantity and quality in accordance with all applicable State and local requirements in effect at the time of site development plan approval.

7. Lighting:

a. Building-mounted security lighting, which is full cut-off and directed toward the building and in compliance with the Zoning Ordinance, shall be permitted.

c. All new and replacement light fixtures using LED shall consist of full cut-off exterior fixtures with a color temperature of 3,000 K or lower.

d. All other proposed lighting shall be addressed at site plan in accordance with the Zoning Ordinance.

8. Transportation:

a. Vehicular Access – The primary site shall be accessed from E. Shirley Avenue with secondary access from the bus loop entrance to Brumfield ES off of Alwington, which will also be the primary parent drop-off and pick up route. Egress shall be controlled via a stop sign traffic control with stop bar at the exits. The existing traffic signal will control the bus exit from the middle school site.

b. There shall be no stacking of vehicles into the public right-of-way. The school is responsible for ensuring drop off and pick up from the school do not result in backs ups on the public streets.

c. Handicapped Parking and Signage – Handicapped parking and signage shall be provided in accordance with the Public Facilities Manual and the Americans with Disabilities Act.

d. At the time of Final Site Plan, dedication of a public access easement shall be dedicated along E. Shirley Avenue from the southern parking lot entrance to the Southern Property line with the adjacent Community Center as well as on the portion of the school property south of the existing Community Center extending west to Alwington Blvd. The public access easement shall be of sufficient width to facilitate the extension of a future 10’ wide Shared Use Path.

e. At time of Final Site Plan, Applicant shall dedicate right of way and a construction easement at no cost of sufficient right-of-way for transportation improvements as shown in the page C 3.02A of the SUP Plans for the improvement of the extension of Alwington Boulevard, drainage improvements, intersection improvements, and construction of multi-use facilities.

f. Before Final Certificate of Occupancy, the public access easement dedicated along E. Shirley Avenue from the southern parking lot entrance to the Southern Property line with the adjacent Community Center shall be graded according to VDOT standards to accommodate a future extension of a 10' wide Shared Use Path.

9. Water and Sewer: The site shall continue to be served by public water, with the property owner bearing all costs associated with providing the additional onsite services necessary to serve the school use. The site will be served by public sewer, with the Property Owner responsible for the conveyance of the sewer to the Town pump station.

10. Emergency Access: The Property Owner shall provide Fauquier County Emergency Services and the Town of Warrenton Police with current and valid codes and/or locking mechanism keys to be able to open gates located on the property.

SPECIAL USE PERMIT (SUP 23-4)
TAYLOR MIDDLE SCHOOL ADDITION & RENOVATION
FAUQUIER COUNTY PUBLIC SCHOOLS
350 EAST SHIRLEY AVENUE
WARRENTON, VIRGINIA 20186

CENTER MAGISTERIAL DISTRICT
TOWN OF WARRENTON, VIRGINIA
PARCEL ID: 6983-48-7973-500

VICINITY MAP
SCALE: 1" = 2,000'

Sheet List Table

Sheet Number	Sheet Title
C0.00	COVER SHEET
C1.01	GENERAL NOTES
C1.02	OVERALL & ADJACENT OWNERS
C2.01	EXISTING CONDITIONS PLAN
C2.02	EXISTING CONDITIONS PLAN
C3.00	OVERALL SPECIAL USE PERMIT PLAN
C3.01	SPECIAL USE PERMIT PLAN
C3.02	SPECIAL USE PERMIT PLAN
C3.02A	SPECIAL USE PERMIT PLAN - FUTURE ARRINGTON PLANS
C3.03	SPECIAL USE PERMIT PLAN - AUTO-TURN
C3.04	SPECIAL USE PERMIT PLAN - AUTO-TURN
L1.03	SPECIAL USE PERMIT - TREE PRESERVATION
L1.04	SPECIAL USE PERMIT - TREE PRESERVATION
L1.05	SPECIAL USE PERMIT - TREE PRES NOTES AND DETAILS
E-401B	SPECIAL USE PERMIT - ELECTRICAL SITE PLAN
E-402B	SPECIAL USE PERMIT - ELECTRICAL SITE PLAN PHOTOMETRICS
SU-201	SPECIAL USE PERMIT - OVERALL EXTERIOR ELEVATIONS
SU-202	SPECIAL USE PERMIT - OVERALL EXTERIOR ELEVATIONS

OWNER: COUNTY SCHOOL BOARD
OF FAUQUIER COUNTY
320 HOSPITAL DRIVE, SUITE 40
WARRENTON, VA 20186
CONTACT: DAVID GRAHAM
PHONE: 540-422-7017

ARCHITECT: RRMM
115 SOUTH 15TH STREET, SUITE 502
RICHMOND, VA 23219
CONTACT: DOUG COFER, ARCHITECT
PHONE: 804-277-8987

ENGINEER: TIMMONS GROUP
20110 ASHBROOK PLACE, SUITE 100
ASHBURN, VIRGINIA 20147
CONTACT: LUKE FETCHO, PE
EMAIL: LUKE.FETCHO@TIMMONS.COM
PHONE: 703-544-6712

MARK	REVISIONS	DATE	BY	DES
1	SUP 2ND SUB	01/12/2024		
2	SUP 3RD SUB	03/01/2024		

DATE	09/07/2023
PROJECT	21352-00
DESIGNED	TIMMONS
DRAWN	TIMMONS
CHECKED	PVN

RRMM®
ARCHITECTS, PC
115 South 15th Street, Suite 502
Richmond, Virginia 23219
(804)277-8987

NOT FOR CONSTRUCTION
02/29/2024
SUP APPLICATION

IFB: TBD
VIRGINIA DEPARTMENT OF EDUCATION: 030-47-00-101

PROJECT: TAYLOR MIDDLE SCHOOL ADDITION & RENOVATION
FAUQUIER COUNTY PUBLIC SCHOOLS
350 EAST SHIRLEY AVENUE
WARRENTON, VA 20186

DRAWING: COVER SHEET

SHEET
C0.00

PROJECT NARRATIVE

THIS SITE DEVELOPMENT PLAN PROPOSES A CORE ADDITION AND A CLASSROOM ADDITION, ALONG WITH RENOVATIONS TO THE EXISTING TAYLOR MIDDLE SCHOOL BUILDING. ALL EXISTING UTILITIES AND STORM DRAINAGE WILL BE RELOCATED AS NECESSARY.

SITE INFORMATION

APPLICANT:
COUNTY SCHOOL BOARD OF FAUQUIER COUNTY
320 HOSPITAL DR STE 40
WARRENTON VA, 20186

PREPARERS:
TIMMONS GROUP
20110 ASHBROOK PLACE, SUITE 100
ASHBURN, VIRGINIA 20147
(703) 554-6712

RRMM ARCHITECTS
115 SOUTH 15TH STREET, SUITE 502
RICHMOND, VA 23219
(804) 277-8987

1. THE SUBJECT PARCEL SHOWN HEREON IS LOCATED IN TOWN OF WARRENTON:

OWNER	PIN #	ACRES	ZONING	USE
COUNTY SCHOOL BOARD OF FAUQUIER COUNTY	6983-48-7973-500	39.18	PSP	MIDDLE SCHOOL

2. THIS TOPOGRAPHIC SURVEY WAS COMPLETED BY TIMMONS GROUP UNDER THE DIRECT AND RESPONSIBLE CHARGE OF JEFFREY A. SMERALDO, A TIMMONS GROUP LICENSED SURVEYOR, FROM AN ACTUAL GROUND SURVEY MADE UNDER MY SUPERVISION; THAT THE ORIGINAL DATA WAS OBTAINED IN MARCH, 2023. THIS PLAT, MAP AND DIGITAL GEOSPATIAL DATA INCLUDING METADATA MEETS MINIMUM ACCURACY STANDARDS UNLESS OTHERWISE NOTED.
3. SUBSURFACE UTILITIES WERE LOCATED ON MARCH 9 & 10, 2023 BY THIS FIRM.
4. THE BOUNDARY INFORMATION SHOWN HEREON PER RECORD DESCRIPTIONS AND DOES NOT CONSTITUTE A BOUNDARY SURVEY AS DEFINED BY THE COMMONWEALTH OF VIRGINIA.
5. PHYSICAL FEATURES ARE SHOWN BASED ON CONVENTIONAL SURVEYING METHODS AND AERIAL MAPPING PROVIDED BY TUCK MAPPING SOLUTIONS, INC. FROM IMAGERY DATED MARCH 8, 2023.
6. THIS SURVEY WAS PREPARED WITHOUT THE BENEFIT OF A TITLE REPORT.
7. BASED ON FEMA FLOOD INSURANCE RATE MAP (FIRM) 51061C308C, EFFECTIVE DATE FEBRUARY 6, 2008, THE PROPERTY LIES IN UNSHADED ZONE X, WHICH ARE AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN, SHADED ZONE X OR AREAS OF 0.2% ANNUAL CHANCE FLOOD.
8. BASIS OF MERIDIAN: VCS NAD83 (2011)
9. VERTICAL DATUM: NAVD88
10. DATUM AND MERIDIAN WERE ESTABLISHED BY GPS OBSERVATIONS.
11. TOPOGRAPHIC FIELD WORK COMPLETED MARCH 27, 2023.
12. SOILS INFORMATION SHOWN HEREON IS TAKEN FROM THE 2007 FAUQUIER COUNTY SOIL SURVEY AND THE USDA WEB SOIL SURVEY, ORIGINAL SCALE 1" = 1000'.

ZONING TABULATIONS

ZONING REQUIREMENTS (ARTICLE 3-4.9)	EXISTING/REQUIRED	PROPOSED
ZONING DISTRICT:	PUBLIC-SEMI-PUBLIC INSTITUTIONAL (PSP)	PSP (SPECIAL USE PERMIT) TO ALLOW SCHOOLS WITH EXPANSIONS TO SCHOOL FACILITIES EQUAL TO/OVER 10,000 SF (ARTICLE 3-4.9.3)
LOT AND YARD REGULATIONS (ARTICLE 3-4.9.4)	**REQUIRED**	**PROPOSED**
MINIMUM LOT SIZE:	NONE	39.18 AC
MINIMUM LOT FRONTAGE:	50 FEET	1,202 FEET (EAST SHIRLEY AVE)
MAXIMUM LOT COVERAGE:	85%	36% (85% MAX)
FRONT YARD SETBACK (ADJACENT TO C, PSP, R-10, I DISTRICT)	NONE WHEN ADJACENT/ ACROSS FROM C, CBD, I DISTRICTS; 25' WHEN ADJACENT/ACROSS R DISTRICTS	5 FEET/30 FEET*
RIGHT SIDE YARD SETBACK (ADJACENT TO R-10 DISTRICT)	NONE WHEN ADJACENT/ ACROSS FROM C, CBD, I DISTRICTS; 15' WHEN ADJACENT/ACROSS R DISTRICTS	20 FEET*
LEFT SIDE YARD SETBACK (ADJACENT TO C, DISTRICT)	NONE WHEN ADJACENT/ ACROSS FROM C, CBD, I DISTRICTS; 15' WHEN ADJACENT/ACROSS R DISTRICTS	5 FEET*
REAR YARD SETBACK (ADJACENT TO C, RA DISTRICT LOCATED IN FAUQUIER COUNTY)	NONE WHEN ADJACENT/ ACROSS FROM C, CBD, I DISTRICTS; 35' WHEN ADJACENT/ACROSS R DISTRICTS	5 FEET*

*FIVE (5) ADDITIONAL FEET ADDED TO MINIMUM SETBACK REQUIREMENTS BASED ON PROPOSED HEIGHT OF BUILDING (INCREASE OF ONE FOOT FOR EACH FOOT IN HEIGHT OVER 35 FEET)

BUILDING REGULATIONS (ARTICLE 3-4.9.5)	REQUIRED	PROPOSED
MAXIMUM HEIGHT*	35 FEET*	±40 FEET**

*A PUBLIC OR INSTITUTIONAL BUILDING OR CHURCH MAY BE ERECTED TO A HEIGHT OF 60 FEET FROM GRADE PROVIDED THAT REQUIRED FRONT, SIDE, AND REAR YARDS SHALL BE INCREASED BY ONE FOOT FOR EACH FOOT IN HEIGHT OVER 35 FEET.

**EXISTING AND PROPOSED BUILDING HEIGHT OF 38 FEET IS REFERENCED FROM AVERAGE ELEVATION OF GROUND SURFACE ALONG FRONT OF BUILDING (ARTICLE 12). NOTE BUILDING HEIGHT EXCLUDES HEIGHT OF MOUNTED ROOFTOP MECHANICAL EQUIPMENT AND ASSOCIATED SCREENS.

BUILDING INFORMATION	
EXISTING BUILDING GROSS AREA (PRE-DEMOLITION):	87,692 SF GFA
EXISTING BUILDING GROSS AREAS (POST-DEMOLITION):	80,794 SF GFA
PROPOSED CORE ADDITION GROSS AREA:	47,353 SF GFA
PROPOSED CLASSROOM ADDITION GROSS AREA:	20,796 SF GFA
COMBINED PROPOSED ADDITIONS GROSS AREA:	68,149 SF GFA
TOTAL MIDDLE SCHOOL GROSS AREA:	148,943 SF GFA

OPEN SPACE CALCULATION (ARTICLE 3-4.9.4)	
MAXIMUM LOT COVERAGE:	85%
TOTAL SITE AREA:	39.1805 AC = 1,706,702.58 SF
EXISTING BUILDING AREA POST-DEMOLITION (TAYLOR MIDDLE SCHOOL):	48,970 SF
PROPOSED CORE ADDITION BUILDING AREA:	34,310 SF
PROPOSED CLASSROOM ADDITION BUILDING AREA:	6,900 SF
COMBINED PROPOSED ADDITIONS BUILDING AREA:	41,210 SF
TOTAL TAYLOR MIDDLE SCHOOL BUILDING AREA:	90,180 SF
ROAD AND PARKING LOT:	208,500 SF
EXISTING BUILDING AREA (JAMES G. BRUMFIELD ELEMENTARY SCHOOL):	81,100 SF
OTHER TOTAL EXISTING IMPERVIOUS AREA:	235,000 SF
PROPOSED LOT COVERAGE:	614,780 SF/1,706,702.58 SF = 36% (MAX 85%)

PARKING STANDARDS FOR INSTITUTIONAL AND COMMUNITY SERVICES USE (ARTICLE 7-4)
1 SPACE PER 15 STUDENTS + 1 SPACE PER EMPLOYEE CALCULATED FOR THE WORK PERIOD CONTAINING THE LARGEST NUMBER OF EMPLOYEES

TOTAL STUDENTS =	850 STUDENTS	
TOTAL EMPLOYEES =	100 EMPLOYEES	
TOTAL SPACES REQUIRED = 1 SPACE/15 STUDENTS * 850 STUDENTS =		57 SPACES
1 SPACE/1 EMPLOYEE * 100 EMPLOYEES =		100 SPACES
		157 SPACES

ADA PARKING SPACES REQUIRED (ARTICLE 7-19.4) = 6 (AT LEAST 1 VAN ACCESSIBLE SPACE)

TOTAL EXISTING SPACES =	134 SPACES (INCLUDES 5 ADA SPACES)
TOTAL SPACES PROVIDED =	164 SPACES (INCLUDES 6 ADA SPACES)

LOADING SPACES REQUIRED (AS THE TOWN ORDINANCE DOES NOT SPECIFY LOADING FOR INSTITUTIONAL USES, THE PROPOSED LOADING IS CONSISTENT WITH OTHER COUNTY MIDDLE SCHOOL FACILITIES AND MEETS THEIR OPERATIONAL NEEDS):

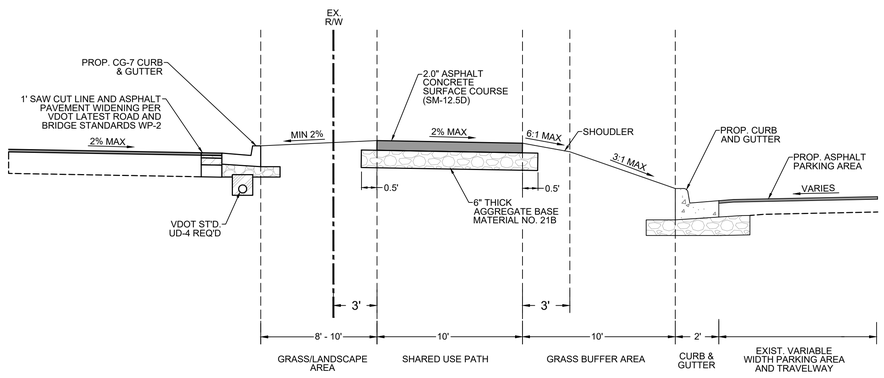
LOADING SPACES PROVIDED = 2

SOIL INFORMATION

MAP. UNIT SYMBOL SOIL NAME SLOPE	SOIL DESCRIPTION	General Characteristics: SOIL FEATURES				K_{Sat}	LAND POTENTIALS	DEVELOPMENT POTENTIAL AND PROBLEMS USING: CENTRAL WATER AND CENTRAL SEWER	DEVELOPMENT POTENTIAL AND PROBLEMS USING: CONVENTIONAL SEPTIC TANK AND DRAINFIELD
12A Rohrersville loam	Very deep, somewhat poorly drained, brownish-yellow loam soils with intermittent high water tables in drainageways; developed in recent greenstone colluvium/alluvium	Slope (%)	0 - 2	Erosional Hazard Potential:	Slight	Surface: Moderate	**AGRICULTURE**	VERY POOR May be within l00-year floodplain; frequent flooding; high water table; concentrated runoff from higher areas; overland flow-significant destructive potential during flooding events	NOT SUITED High water table
		Bedrock Depth (in.):	> 60	K Factor (surface):	0.37	Subsoil: low	SECONDARY PASTURE		
		Watertable Depth (in.):	10 - 20	K Factor (subsoil):	0.32	Substratum: Moderate			
		Shrink-Swell Potential:	Mod.	Hydrologic Group:	D		**FORESTRY (HARDWOOD)**		
	May have Hydric Soil inclusions	Bearing Capacity:	low				MODERATE		
17B Middleburg loam	Very deep, well drained, brown loamy soils in concave swales and along small drainageways; developed in recent colluvium and local wash from crystalline uplands	Slope (%)	2 - 7	Erosional Hazard Potential:	Mod.	Surface: Moderate	**AGRICULTURE**	POOR Frequent flooding; intermittent high water table; concentrated runoff from higher areas; low bearing capacity when wet	NOT SUITED Landscape position
		Bedrock Depth (in.):	> 60	K Factor (surface):	0.37	Subsoil: Moderate	PRIME CROPLAND		
		Watertable Depth (in.):	> 40	K Factor (subsoil):	0.32	Substratum: Moderate			
		Shrink-Swell Potential:	low	Hydrologic Group:	B		**FORESTRY (HARDWOOD)**		
	May have Hydric Soil inclusions	Bearing Capacity:	Mod.				HIGH		
40C Myersville silt loam	Deep, well drained, strong brown silty soils on rolling summits and strongly sloping backslopes; developed in residuum from greenstone and chloritic schist	Slope (%)	7 - 15	Erosional Hazard Potential:	Mod.	Surface: Moderate	**AGRICULTURE**	FAIR Shallow to rock	MARGINAL Shallow to rock
		Bedrock Depth (in.):	40 - 60	K Factor (surface):	0.37	Subsoil: Moderate	SECONDARY CROPLAND		
		Watertable Depth (in.):	> 40	K Factor (subsoil):	0.32	Substratum: Moderate			
		Shrink-Swell Potential:	low	Hydrologic Group:	B	Weathered Bedrock: Impermeable	**FORESTRY (HARDWOOD)**		
		Bearing Capacity:	Mod.				MODERATELY HIGH		
43C Alanthus silt loam	Very deep, well drained, yellowish-red silty soils on strongly sloping backslopes; developed in residuum from greenstone and chloritic schist	Slope (%)	7 - 15	Erosional Hazard Potential:	Mod.	Surface: Moderate	**AGRICULTURE**	GOOD	GOOD
		Bedrock Depth (in.):	> 60	K Factor (surface):	0.37	Subsoil: Moderate	SECONDARY CROPLAND		
		Watertable Depth (in.):	> 40	K Factor (subsoil):	0.32	Substratum: Moderate			
		Shrink-Swell Potential:	low	Hydrologic Group:	B		**FORESTRY (HARDWOOD)**		
		Bearing Capacity:	Mod.				HIGH		
45B Fauquier silt loam	Very deep, well drained, red clayey soils on undulating summits and gently sloping backslopes; developed in residuum from massive greenstone and chloritic schist	Slope (%)	2 - 7	Erosional Hazard Potential:	Mod.	Surface: Moderate	**AGRICULTURE**	GOOD	MARGINAL Slow percolation
		Bedrock Depth (in.):	> 60	K Factor (surface):	0.32	Subsoil: Moderate	PRIME CROPLAND		
		Watertable Depth (in.):	> 40	K Factor (subsoil):	0.28	Substratum: Moderate			
		Shrink-Swell Potential:	Mod.	Hydrologic Group:	C		**FORESTRY (HARDWOOD)**		
		Bearing Capacity:	Mod.				HIGH		
45C Fauquier silt loam	Very deep, well drained, red clayey soils on strongly sloping backslopes; developed in residuum from massive greenstone and chloritic schist	Slope (%)	7 - 15	Erosional Hazard Potential:	Mod.	Surface: Moderate	**AGRICULTURE**	GOOD	MARGINAL Slow percolation
		Bedrock Depth (in.):	> 60	K Factor (surface):	0.32	Subsoil: Moderate	SECONDARY CROPLAND		
		Watertable Depth (in.):	> 40	K Factor (subsoil):	0.28	Substratum: Moderate			
		Shrink-Swell Potential:	Mod.	Hydrologic Group:	C		**FORESTRY (HARDWOOD)**		
		Bearing Capacity:	Mod.				HIGH		

SHARED USE PATH

TYPICAL SECTION A-A
(NOT TO SCALE)



Item 2.

SUP 2ND SUB	SUP 3RD SUB		
		DES	
		BY	
01/12/2024	03/01/2024	DATE	
1	2	MARK	REVISIONS

09/07/2023	21352-00	TIMMONS	TIMMONS	PVN
DATE	PROJECT	DESIGNED	DRAWN	CHECKED

RRMM® ARCHITECTS, PC
115 South 15th Street, Suite 502
Richmond, Virginia 23219
(804)277-8987

NOT FOR CONSTRUCTION
02/29/2024
SUP APPLICATION

IFB: TBD

PROJECT: TAYLOR MIDDLE SCHOOL ADDITION & RENOVATION
FAUQUIER COUNTY PUBLIC SCHOOLS
350 EAST SHIRLEY AVENUE
WARRENTON, VA 20186
VIRGINIA DEPARTMENT OF EDUCATION: 030-87-00-101

DRAWING: GENERAL NOTES

SHEET
C1.01

SCALE 1"=100'
0 100' 200'

SHEETS C2.02

SHEETS C2.01

MATCHLINE

ALWINGTON BLVD

JAMES G. BRUMFIELD ELEMENTARY SHCOOL

WARRENTON COMMUNITY CENTER

TAYLOR MIDDLE SCHOOL

CLEVELAND ST.

EAST SHIRLEY AVE
VARIABLE WIDTH

WARRENTON BRANCH GREENWAY

FALMOUTH ST

PIN: 6983-48-7973-500
COUNTY SCHOOL BOARD OF FAUQUIER COUNTY
D.B. 162, PG. 184
D.B. 813, PG. 1000
35.84459 AC.
ZONE: PSP, PUBLIC-SEMI-PUBLIC INSTITUTIONAL DISTRICT
350 E. SHIRLEY AVE.

3747
538.06
CPP NA

ADJACENT PARCELS:

1. COMMONWEALTH OF VIRGINIA
PIN: 6983-68-0594-000
USE: STATE GOVERNMENT
ZONE: PSP
2. COMMONWEALTH OF VIRGINIA, DEPARTMENT OF TRANSPORTATION
PIN: 6983-58-8813-000
USE: STATE GOVERNMENT
ZONE: PSP
3. FAUQUIER COUNTY BOARD OF SUPERVISORS
PIN: 6983-58-5700-000
USE: GOVERNMENT
ZONE: PSP
4. TOWN OF WARRENTON
PIN: 6983-59-5252-000
USE: TOWN
ZONE: PSP
5. LOWERY, DANIEL M; LOWERY, LINDA T.
PIN: 6983-59-2711-000
USE: COMMERCIAL
ZONE: C
6. LOWERY, DANIEL M; LOWERY, LINDA T.
USF: 6983-59-0992-000
USE: COMMERCIAL
ZONE: C
7. BOWER FAMILY HOLDINGS LLC
PIN: 6983-40-9127-000
USE: COMMERCIAL
ZONE: C
8. CLNB LLC
PIN: 6984-40-8014-000
USE: SINGLE FAMILY URBAN
ZONE: R-10
9. CLNB LLC
PIN: 6984-40-7006-000
USE: SINGLE FAMILY URBAN
ZONE: R-10
10. HEITMAN, JODY ELIZABETH
PIN: 6943-49-6963-000
USE: SINGLE FAMILY URBAN
ZONE: R-10
11. HAWKINS, CHERYL D; HAWKINS, ROBERT J JR
PIN: 6983-49-5896-000
USE: SINGLE FAMILY URBAN
ZONE: R-10
12. OLINGER, CARRELL L
PIN: 6983-49-5728-000
USE: SINGLE FAMILY URBAN
ZONE: R-10
13. SCHREHER, CHRISTOPHER L; SCHREHER, THERESA L
PIN: 6983-49-4752-000
USE: SINGLE FAMILY URBAN
ZONE: R-10
14. TRUESDALE, BENJAMIN F
PIN: 6983-49-3685-000
USE: SINGLE FAMILY URBAN
ZONE: R-10
15. JOHNSON, JULIE LAWS; JOHNSON, KENNETH D
PIN: 6983-49-1144-000
USE: SINGLE FAMILY URBAN
ZONE: R-10
16. ALWINGTON FARM LLC
PIN: 6983-44-5875-000
USE: AGRICULTURE
ZONE: RA
17. VABFT LLC
PIN: 6983-48-7006-000
USE: COMMERCIAL
ZONE: C
18. COUNTY SCHOOL BOARD OF FAUQUIER COUNTY
PIN: 6983-48-7973-000
USE: SCHOOL
ZONE: PSP
19. WAL-MART REAL ESTATE BUSINESS TRUST
PIN: 6983-57-7857-000
USE: COMMERCIAL
ZONE: C
20. WAL-MART REAL ESTATE BUSINESS TRUST
PIN: 6983-58-5289-000
USE: COMMERCIAL
ZONE: C

MARK	DATE	REVISIONS	BY	DES
1	01/12/2024	SUP 2ND SUB		
2	03/01/2024	SUP 3RD SUB		

DATE	09/07/2023
PROJECT	21352-00
DESIGNED	TIMMONS
DRAWN	TIMMONS
CHECKED	PVN

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PROJECT
TAYLOR MIDDLE SCHOOL ADDITION & RENOVATION
FAUQUIER COUNTY PUBLIC SCHOOLS
350 EAST SHIRLEY AVENUE
WARRENTON, VA 20186

IFB: TBD
VIRGINIA DEPARTMENT OF EDUCATION: 030-87-00-101

DRAWING
OVERALL & ADJACENT OWNERS

SHEET
C1.02

MATCHLINE - SEE SHEET C2.02

SCALE 1"=40'
0 40' 80'

LEGEND
PROPERTY BOUNDARY
SOIL BOUNDARY
54 B SOIL IDENTIFICATION
WETLAND BOUNDARY

LEGEND:
MONUMENT FOUND
PROPERTY CORNER FOUND
SIGN / UTILITY MARKER
FLAGPOLE
BOLLARD
TRASH CAN
HANDICAP PARKING
DECIDUOUS TREE
STORM MANHOLE
STORM GRATE
SANITARY MANHOLE
CLEANOUT
YARD LIGHT
LIGHT POLE
UTILITY POLE
GUY WIRE ANCHOR
ELECTRIC METER
TELECOMM PEDESTAL
FIRE HYDRANT
WATER METER
WATER VALVE
GAS VALVE
UTILITY VAULT
EDGE OF PAVEMENT
CURB & GUTTER
FENCE LINE
STORM PIPE
SANITARY LINE
FEMA FLOOD ZONE X
OVERHEAD UTILITY LINE
OVERHEAD POWER LINE
UNDERGROUND POWER LINE
UNDERGROUND TELECOMM LINE
UNDERGROUND FIBER OPTIC LINE
UNDERGROUND GAS LINE
UNDERGROUND WATER LINE
UNDERGROUND UTILITY LINE

MARK	DATE	REVISIONS	BY	DES
1	01/12/2024	SUP 2ND SUB		
2	03/01/2024	SUP 3RD SUB		

DATE	09/07/2023
PROJECT	21352-00
DESIGNED	TIMMONS
DRAWN	TIMMONS
CHECKED	PVN

RRMM®
ARCHITECTS, PC
115 South 15th Street, Suite 502
Richmond, Virginia 23219
(804)277-8987

NOT FOR CONSTRUCTION
02/29/2024
SUP APPLICATION

IFB: TBD
034-67-00-101

PROJECT
TAYLOR MIDDLE SCHOOL ADDITION & RENOVATION
FAUQUIER COUNTY PUBLIC SCHOOLS
350 EAST SHIRLEY AVENUE
WARRENTON, VA 20186
VIRGINIA DEPARTMENT OF EDUCATION: 034-67-00-101

DRAWING
EXISTING CONDITIONS PLAN

SHEET
C2.01

BOUNDARY BETWEEN TOWN OF WARRENTON AND FAUQUIER COUNTY

PIN: 6983-48-7006-000
N/F
VABFT LLC
D.B. 1513, PG. 1796
4.31 AC
ZONE: C, COMMERCIAL DISTRICT

PIN: 6983-38-7973-000
N/F
SCHOOL BOARD OF FAUQUIER COUNTY
D.B. 813, PG. 1000
0.81 AC
ZONE: C, COMMERCIAL DISTRICT

ALWINGTON BLVD

12A (HSG C/D)

45B (HSG B)

17B (HSG A)

ZONE X

SCALE 1"=40'
0 40' 80'

LEGEND
- PROPERTY BOUNDARY
- SOIL BOUNDARY
- 54 B — SOIL IDENTIFICATION
- WETLAND BOUNDARY

LEGEND:
- MONUMENT FOUND
- PROPERTY CORNER FOUND
- SIGN / UTILITY MARKER
- FLAGPOLE
- BOLLARD
- TRASH CAN
- HANDICAP PARKING
- DECIDUOUS TREE
- STORM MANHOLE
- STORM GRATE
- SANITARY MANHOLE
- CLEANOUT
- YARD LIGHT
- LIGHT POLE
- UTILITY POLE
- GUY WIRE ANCHOR
- ELECTRIC METER
- TELECOMM PEDESTAL
- FIRE HYDRANT
- WATER METER
- WATER VALVE
- GAS VALVE
- UTILITY VAULT
- EDGE OF PAVEMENT
- CURB & GUTTER
- FENCE LINE
- STORM PIPE
- SANITARY LINE
- FEMA FLOOD ZONE X
- OVERHEAD UTILITY LINE
- OVERHEAD POWER LINE
- UNDERGROUND POWER LINE
- UNDERGROUND TELECOMM LINE
- UNDERGROUND FIBER OPTIC LINE
- UNDERGROUND GAS LINE
- UNDERGROUND WATER LINE
- UNDERGROUND UTILITY LINE

MATCHLINE - SEE SHEET C2.01

APPROX. LOCATION OF EX. MH (TAKEN FROM PLANS OF RECORD)

72" RCP

CONC. HEADWALL
72" RCP INV. = 517.01'

SANITARY PUMP STATION (LOCKED-INACCESSIBLE)

PIN: 6983-39-6156-000
N/F
TOWN OF WARRENTON
D.B. 214, PG. 210
0.08 AC
ZONE: PSP
PUBLIC-SEMI-PUBLIC
INSTITUTIONAL DISTRICT
USE: PUBLIC/SEMI-PUBLIC
NON-INTENSIVE

SANITARY MANHOLE
TOP = 532.13'
8" TC INV. IN (N) = 525.71'
8" TC INV. IN (SE) = 525.48'
8" TC INV. OUT = 525.24'

SANITARY MANHOLE
TOP = 534.27'
8" TC INV. IN (SE) = 527.82'
8" TC INV. IN (SSE) = 527.87'
8" TC INV. OUT = 527.72'

EOT

18" CMP
INV. IN = 531.26'
INV. OUT = 531.23'

18" CMP
INV. IN = 531.35'
INV. OUT = 531.20'

1	01/12/2024	SUP 2ND SUB		DES
2	03/01/2024	SUP 3RD SUB		BY
			MARK	DATE
			REVISIONS	

DATE	09/07/2023
PROJECT	21352-00
DESIGNED	TIMMONS
DRAWN	TIMMONS
CHECKED	PVN

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FAUQUIER COUNTY PUBLIC SCHOOLS
350 EAST SHIRLEY AVENUE
WARRENTON, VA 20186
VIRGINIA DEPARTMENT OF EDUCATION: 030-67-00-101
IFB: TBD

DRAWING
EXISTING CONDITIONS PLAN

SHEET
C2.02

SCALE 1"=75'
0 75' 150'

JAMES G. BRUMFIELD ELEMENTARY SHCOOL

ALWINGTON BLVD

APPROXIMATE LOCATION OF 12' WIDE PUBLIC ACCESS EASEMENT FOR FUTURE EXTENSION OF 10' WIDE SHARED USE PATH. EASEMENT TO EXTEND FROM THE EAST SHIRLEY AVE ROW TO ALWINGTON BLVD ROW. FINAL CONFIGURATION OF THE EASEMENT TO BE DETERMINED AND APPROVED AT THE TIME OF SITE PLAN.

WARRENTON COMMUNITY CENTER

TAYLOR MIDDLE SCHOOL

EAST SHIRLEY AVE
VARIABLE WIDTH

CLEVELAND ST

3740
538.08
CPP NAIL

ONE WAY

MARK	DATE	REVISIONS	BY	DES
1	01/12/2024	SUP 2ND SUB		
2	03/01/2024	SUP 3RD SUB		

DATE	09/07/2023
PROJECT	21352-00
DESIGNED	TIMMONS
DRAWN	TIMMONS
CHECKED	PVN

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PROJECT
TAYLOR MIDDLE SCHOOL ADDITION & RENOVATION
FAUQUIER COUNTY PUBLIC SCHOOLS
350 EAST SHIRLEY AVENUE
WARRENTON, VA 20186
IFB: TBD
VIRGINIA DEPARTMENT OF EDUCATION: 030-67-00-101

DRAWING
OVERALL SPECIAL USE PERMIT PLAN

SHEET
C3.00

MATCHLINE - SEE SHEET C3.02

NOTE:

1 - NO SPORTS FIELD LIGHTING IS PROPOSED WITH THIS APPLICATION.

2 - PROPOSED SITE LIGHTING WILL BE PROVIDED IN ACCORDANCE WITH REQUIREMENTS SET FORTH BY THE TOWN OF WARRENTON ZONING ORDINANCE. SPECIFIC DETAILS WILL BE PROVIDED AT THE TIME OF SITE PLAN.

3 - PROPOSED SIGNAGE WILL BE PROVIDED IN ACCORDANCE WITH REQUIREMENTS SET FORTH BY THE TOWN OF WARRENTON ZONING ORDINANCE. SPECIFIC DETAILS WILL BE PROVIDED AT THE TIME OF SITE PLAN.

4 - PROPOSED LANDSCAPING WILL BE PROVIDED IN ACCORDANCE WITH REQUIREMENTS SET FORTH BY THE TOWN OF WARRENTON ZONING ORDINANCE. SPECIFIC DETAILS WILL BE PROVIDED AT THE TIME OF SITE PLAN.

SCALE 1"=40'
0 40' 80'

LEGEND

- PROPERTY BOUNDARY
- SITE LIGHTING
- BUILDING LIGHTING
- SCREEN FENCE
- REVERSE CURB
- TRANSITION CURB
- W — WATERLINE
- FIRE HYDRANT
- SAN — SANITARY SEWER
- SANITARY SEWER MANHOLE
- UGP — UNDERGROUND POWER
- G — GAS LINE
- UGT UFO UCATV — UNDERGROUND TELECOMMUNICATIONS
- SIDEWALK
- HEAVY DUTY ASPHALT PAVEMENT
- LIGHT DUTY ASPHALT PAVEMENT
- HEAVY DUTY CONCRETE PAVEMENT
- EDGE MILL
- SHARED USE PATH
- 850 — AVERAGE DAILY TRAFFIC

MARK	DATE	REVISIONS	DES
1	01/12/2024	SUP 2ND SUB	
2	03/01/2024	SUP 3RD SUB	

BY

DATE	09/07/2023			
PROJECT	21352-00			
DESIGNED	TIMMONS			
DRAWN	TIMMONS			
CHECKED	PVN			

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350 EAST SHIRLEY AVENUE
WARRENTON, VA 20186

IFB: TBD
VIRGINIA DEPARTMENT OF EDUCATION: 030-87-00-101

DRAWING
SPECIAL USE PERMIT PLAN

SHEET
C3.01

BOUNDARY BETWEEN TOWN OF WARRENTON AND FAUQUIER COUNTY

ALWINGTON BLVD

SEE SHEETC3.02A FOR FUTURE ALWINGTON BLVD ROAD PLANS PART OF ARRINGTON PLAN, REZN-22-017978 (IMPROVEMENTS NOT PART OF THIS APPLICATION, FOR REFERENCE ONLY)

PROP. SIDEWALK TO TIE INTO EX ALWINGTON BLVD

LOD

CG-6

SCHOOL STAFF TO CLOSE ACCESS ROAD USING GATE W/ EMERGENCY SERVICES-APPROVED LOCKING MECHANISM DURING SCHOOL HOURS AND WILL BE OPEN FOR PICK UP AND DROP OFF ONLY

5' SIDEWALK

850

MATCHLINE - SEE SHEET C3.01

POTENTIAL SWM AREA

APPROXIMATE ESMT AREA

±64,800 SF BASEBALL/SOFTBALL FIELD (FINAL DESIGN AND

SAN

LEGEND

- PROPERTY BOUNDARY
- SITE LIGHTING
- BUILDING LIGHTING
- SCREEN FENCE
- REVERSE CURB
- TRANSITION CURB
- W — WATERLINE
- FIRE HYDRANT
- SAN — SANITARY SEWER
- SANITARY SEWER MANHOLE
- UGP — UNDERGROUND POWER
- G — GAS LINE
- UGT UFO UCATV — UNDERGROUND TELECOMMUNICATIONS
- SIDEWALK
- HEAVY DUTY ASPHALT PAVEMENT
- LIGHT DUTY ASPHALT PAVEMENT
- HEAVY DUTY CONCRETE PAVEMENT
- EDGE MILL
- SHARED USE PATH
- 850 — AVERAGE DAILY TRAFFIC

SCALE 1"=40'

0 40' 80'

MARK	DATE	REVISIONS	BY	DES
1	01/12/2024	SUP 2ND SUB		
2	03/01/2024	SUP 3RD SUB		

DATE	09/07/2023
PROJECT	21352-00
DESIGNED	TIMMONS
DRAWN	TIMMONS
CHECKED	PVN

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FAUQUIER COUNTY PUBLIC SCHOOLS
350 EAST SHIRLEY AVENUE
WARRENTON, VA 20186
VIRGINIA DEPARTMENT OF EDUCATION, 030-67-00-101
IFB: TBD

DRAWING
SPECIAL USE PERMIT PLAN

SHEET
C3.02

FUTURE ALWINGTON BLVD ROAD PLANS
PART OF ARRINGTON PLAN, REZN-22-017978
(TOWN PROVIDED INFORMATION,
IMPROVEMENTS NOT PART OF THIS
APPLICATION, FOR REFERENCE ONLY)

BOUNDARY BETWEEN TOWN OF WARRENTON AND FAUQUIER COUNTY

FAUQUIER COUNTY
TOWN OF WARRENTON

ALWINGTON BLVD

PROP. SIDEWALK TO TIE INTO EX. ALWINGTON BLVD

LOD

CG-6

SCHOOL STAFF TO CLOSE ACCESS-ROAD USING GATE W/ EMERGENCY SERVICES-APPROVED LOCKING MECHANISM DURING SCHOOL HOURS AND WILL BE OPEN FOR PICK UP AND DROP OFF ONLY

5' SIDEWALK

850

24'

CG-8

POTENTIAL SWM AREA

LEGEND

- PROPERTY BOUNDARY
- SITE LIGHTING
- BUILDING LIGHTING
- SCREEN FENCE
- REVERSE CURB
- TRANSITION CURB
- W — WATERLINE
- FIRE HYDRANT
- SAN — SANITARY SEWER
- SANITARY SEWER MANHOLE
- UGP — UNDERGROUND POWER
- G — GAS LINE
- UGT / UFO / UCATV — UNDERGROUND TELECOMMUNICATIONS
- SIDEWALK
- HEAVY DUTY ASPHALT PAVEMENT
- LIGHT DUTY ASPHALT PAVEMENT
- HEAVY DUTY CONCRETE PAVEMENT
- EDGE MILL
- SHARED USE PATH
- 850 — AVERAGE DAILY TRAFFIC

SCALE 1"=40'
0 40' 80'

MARK	DATE	REVISIONS	BY	DES
1	01/12/2024	SUP 2ND SUB		
2	03/01/2024	SUP 3RD SUB		

DATE	09/07/2023
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FAUQUIER COUNTY PUBLIC SCHOOLS
350 EAST SHIRLEY AVENUE
WARRENTON, VA 20186
VIRGINIA DEPARTMENT OF EDUCATION 030-67-00-101
IFB: TBD

DRAWING
SPECIAL USE PERMIT PLAN - FUTURE ARRINGTON PLANS

SHEET
C3.02A

SCALE 1"=40'
0 40' 80'

LEGEND
PROPERTY BOUNDARY

PIN: 6983-49-6156-000
N/F
TOWN OF WARRENTON
D.B. 214, PG. 210
0.08 AC
ZONE: PSP, PUBLIC-SEMI-PUBLIC INSTITUTIONAL DISTRICT
USE: PUBLIC/SEMI-PUBLIC NON-INTENSIVE

PIN: 6983-48-7973-500
COUNTY SCHOOL BOARD OF FAUQUIER COUNTY
D.B. 162, PG. 184
D.B. 813, PG. 1000
35.84459 AC.
ZONE: PSP, PUBLIC-SEMI-PUBLIC INSTITUTIONAL DISTRICT
350 E. SHIRLEY AVE.

PIN: 6983-58-5700-000
N/F
BOARD OF SUPERVISORS OF FAUQUIER COUNTY
D.B. 911, PG. 1600
5.16 AC
ZONE: PSP,PUBLIC-SEMI-PUBLIC INSTITUTIONAL DISTRICT
USE: PUBLIC/SEMI-PUBLIC NON-INTENSIVE

EXISTING 2-STORY BRICK
WILLIAM C. TAYLOR MIDDLE SCHOOL
53,925 SF

FF ELEV.= 563.38'
FF ELEV.= 559.89'
FF ELEV.= 547.82'
FF ELEV.= 548.61'
FF ELEV.= 550.50'
FF ELEV.= 550.47'
FF ELEV.= 550.60'

EX. 8" SANITARY LATERAL

EX. 8" SANITARY MAIN

ONE WAY

GRASS

EAST SHIRLEY AVE
VARIABLE WIDTH

PIN: 6983-59-7096-000
N/F
DEBORAH PHILIPS & DANE RECTOR & MARY RECTOR & RONALD RECTOR & WAYNE RECTOR
D.B. 177, PG. 1297
D.B. 232, PG. 442
0.50 AC
ZONE: R10-RESIDENTIAL
USE: MEDIUM DENSITY RESIDENTIAL

PIN: 6983-59-6245-000
N/F
ANITA RECTOR & DANE RECTOR
D.B. 1552, PG. 1561
1.39 AC
ZONE: R-10, RESIDENTIAL DISTRICT
USE: MEDIUM DENSITY RESIDENTIAL

PIN: 6983-59-5376-000
N/F
ALMA RECTOR & RONALD RECTOR
D.B. 431, PG. 558
0.23 AC
ZONE: R-10, RESIDENTIAL DISTRICT
USE: MEDIUM DENSITY RESIDENTIAL

PIN: 6983-59-5252-000
N/F
TOWN OF WARRENTON
D.B. 778, PG. 184
4.60 AC
ZONE: PSP,PUBLIC/SEMI-PUBLIC INSTITUTIONAL DISTRICT
USE: PUBLIC/SEMI-PUBLIC INTENSIVE

WARRENTON BRANCH GREENWAY

PIN: 6983-59-5418-000
N/F
ANTJWAN BLAND & SHERELLE SMITH
D.B. 278, PG. 2311
0.38 AC
ZONE: R-10, RESIDENTIAL DISTRICT
USE: MEDIUM DENSITY RESIDENTIAL

PIN: 6983-59-4578-000
N/F
JOHN CROCKER & MELISSA CROCKER
D.B. 1730, PG. 862
0.25 AC
ZONE: R-10, RESIDENTIAL DISTRICT
USE: MEDIUM DENSITY RESIDENTIAL

PIN: 6983-58-8813-000
N/F
COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION
D.B. 1730, PG. 486
0.82 AC
ZONE: PSP,PUBLIC/SEMI-PUBLIC INSTITUTIONAL DISTRICT
USE: PUBLIC/SEMI-PUBLIC INTENSIVE

PIN: 6983-59-2711-000
N/F
DANIEL LOWERY & LINDA LOWERY
D.B. 494, PG. 748
0.73 AC
ZONE: C, COMMERCIAL DISTRICT
USE: GREENWAY AND WELLNESS MIXED USE

PIN: 6983-59-0992-000
N/F
DANIEL LOWERY & LINDA LOWERY
D.B. 494, PG. 748
1.01 AC
ZONE: C, COMMERCIAL DISTRICT
USE: GREENWAY AND WELLNESS MIXED USE

PIN: 6983-40-9127-000
N/F
BOWER FAMILY HOLDIN
LLC
D.B. 1522, PG. 803
1.92 AC
ZONE: C, COMMERCIA
DISTRICT
USE: COMMERCIAL US

PIN: 6983-49-5896-000
N/F
CHERYL & ROBERT HAWKINS, JR
D.B. 1254, PG. 1913
0.57 AC
ZONE: R10-RESIDENTIAL
USE: LOW DENSITY RESIDENTIAL

PIN: 6983-49-6983-000
N/F
JODY CHAPMAN
D.B. 1578, PG. 1776
0.58 AC
ZONE: R10-RESIDENTIAL
USE: LOW DENSITY RESIDENTIAL

PIN: 6984-40-8014-000
N/F
CLNB LLC
D.B. 1558, PG. 2321
0.19 AC
ZONE: R10-RESIDENTIAL
USE: LOW DENSITY RESIDENTIAL

MARK	DATE	REVISIONS	BY	DES
1	01/12/2024	SUP 2ND SUB		
2	03/01/2024	SUP 3RD SUB		

DATE	09/07/2023
PROJECT	21352-00
DESIGNED	TIMMONS
DRAWN	TIMMONS
CHECKED	PVN

RRMM®
ARCHITECTS, PC
115 South 15th Street, Suite 502
Richmond, Virginia 23219
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NOT FOR CONSTRUCTION
02/29/2024
SUP APPLICATION

PROJECT
TAYLOR MIDDLE SCHOOL ADDITION & RENOVATION
FAUQUIER COUNTY PUBLIC SCHOOLS
350 EAST SHIRLEY AVENUE
WARRENTON, VA 20186
IFB: TBD
VIRGINIA DEPARTMENT OF EDUCATION: 030-87-00-101

DRAWING
SPECIAL USE PERMIT PLAN - AUTO-TURN

SHEET
C3.03

MATCHLINE - SEE THIS SHEET FOR INSET

MATCHLINE - SEE THIS SHEET

MATCHLINE - SEE THIS SHEET

SCALE 1"=40'
0 40' 80'

LEGEND

PROPERTY BOUNDARY

PARENT DROP OFF STACKING - 81 CARS

DROP OFF/PICKUP ZONE

SCHOOL STAFF TO BLOCK ACCESS TO THE PARENT DROP OFF/PICK UP LANE DURING THE HOURS OF DROP OFF AND PICK UP

ONE WAY

PIN: 6983-49-6156-000
N/F
TOWN OF WARRENTON
D.B. 214, PG. 210
0.08 AC
ZONE: PSP, PUBLIC-SEMI-PUBLIC INSTITUTIONAL DISTRICT
USE: PUBLIC/SEMI-PUBLIC NON-INTENSIVE

PIN: 6983-48-7973-500
COUNTY SCHOOL BOARD OF FAUQUIER COUNTY
D.B. 162, PG. 184
D.B. 813, PG. 1000
35.84459 AC
ZONE: PSP, PUBLIC-SEMI-PUBLIC INSTITUTIONAL DISTRICT
350 E. SHIRLEY AVE.

PIN: 6983-58-5260-000
N/F
BOARD OF SUPERVISORS OF FAUQUIER COUNTY
D.B. 911, PG. 1600
5.16 AC
ZONE: PSP PUBLIC-SEMI-PUBLIC INSTITUTIONAL DISTRICT
USE: PUBLIC/SEMI-PUBLIC NON-INTENSIVE

PIN: 6983-58-8813-000
N/F
COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION
D.B. 1788, PG. 486
0.62 AC
ZONE : PSP,PUBLIC/SEMI-PUBLIC INSTITUTIONAL DISTRICT
USE: PUBLIC/SEMI-PUBLIC INTENSIVE

EXISTING 2-STORY BRICK
WILLIAM C. TAYLOR MIDDLE SCHOOL
53,925 SF

FF ELEV.= 563.38'
FF ELEV.= 559.89'
FF ELEV.= 548.61'
FF ELEV.= 547.82'
FF ELEV.= 550.50'
FF ELEV.= 550.47'
FF ELEV.= 550.60'

PIPE W/ GAS METER
GAS REGULATOR

EX. 8" SANITARY LATERAL

PIN: 6983-49-4752-000
N/F
CHRISTOPHER & THERESA SCHREHER
D.B. 812, PG. 558
0.56 AC
ZONE:
R10-RESIDENTIAL
USE: LOW DENSITY RESIDENTIAL

3747
538.06
CPP NAIL

PIN: 6983-49-5728-000
N/F
CARRELL OLINGER
D.B. 887, PG. 1067
0.57 AC
ZONE:
R10-RESIDENTIAL
USE: LOW DENSITY RESIDENTIAL

PIN: 6983-49-5896-000
N/F
CHERYL & ROBERT HAWKINS JR.
D.B. 1254, PG. 1913
0.57 AC
ZONE:
R10-RESIDENTIAL
USE: LOW DENSITY RESIDENTIAL

PIN: 6983-40-8014-000
N/F
CLNB LLC
D.B. 1552, PG. 2321
0.19 AC
ZONE: R10-RESIDENTIAL
USE: LOW DENSITY RESIDENTIAL

EAST SHIRLEY AVE
VARIABLE WIDTH

MARK	DATE	REVISIONS	BY	DES
1	01/12/2024			SUP 2ND SUB
2	03/01/2024			SUP 3RD SUB

DATE	09/07/2023
PROJECT	21352-00
DESIGNED	TIMMONS
DRAWN	TIMMONS
CHECKED	PVN

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PROJECT
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FAUQUIER COUNTY PUBLIC SCHOOLS
350 EAST SHIRLEY AVENUE
WARRENTON, VA 20186

IFB: TBD
VIRGINIA DEPARTMENT OF EDUCATION: 030-47-00-101

DRAWING
SPECIAL USE PERMIT PLAN - AUTO-TURN

SHEET
C3.04

MATCHLINE - SEE SHEET L1.04

LEGEND

- PROPERTY BOUNDARY
- PROPOSED CONTOUR
- SILT FENCE
- TP — TREE PROTECTION FENCING
- EXISTING TREELINE
- PROPOSED TREELINE
- ROOT PRUNING
- AREA OF ROOT IMPACT
- *CRITICAL ROOT ZONE (CRZ)*
- *EX. TREE*
- *TREE TO BE REMOVED*

SCALE 1"=40'
0 40' 80'

PIN: 6983-49-6156-000
N/F
TOWN OF WARRENTON
D.B. 214, PG. 210
0.08 AC
ZONE: PSP, PUBLIC-SEMI-PUBLIC INSTITUTIONAL DISTRICT
USE: PUBLIC/SEMI-PUBLIC NON-INTENSIVE

PIN: 6983-48-7973-500
COUNTY SCHOOL BOARD OF FAUQUIER COUNTY
D.B. 162, PG. 184
D.B. 813, PG. 1000
35.84459 AC
ZONE: PSP, PUBLIC-SEMI-PUBLIC INSTITUTIONAL DISTRICT
350 E. SHIRLEY AVE.

EXISTING RUNNING TRACK

SOFTBALL FIELD TO BE CONVERTED TO BASEBALL FIELD

BUILDING ADDITION

BUILDING ADDITION

EXISTING SCHOOL BUILDING

PIN: 6983-58-5700-000
N/F
BOARD OF\ SUPERVISORS OF FAUQUIER COUNTY
D.B. 911, PG. 1600
5.16 AC
ZONE: PSP,PUBLIC-SEMI-PUBLIC\ INSTITUTIONAL DISTRICT
USE: PUBLIC/SEMI-PUBLIC NON-INTENSIVE

PIN: 6983-58-8813-000
N/F
COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION
D.B. 1730, PG. 486
0.62 AC
ZONE : PSP,PUBLIC-SEMI-PUBLIC INSTITUTIONAL DISTRICT
USE: PUBLIC/SEMI-PUBLIC INTENSIVE

PIN: 6983-59-7096-000
N/F
DEBORAH PHILIPS & DANE RECTOR & MARY RECTOR & RONALD RECTOR & WAYNE RECTOR
D.B. 177, PG. 1297
D.B. 232, PG. 442
0.50 AC

PIN: 6983-59-6245-000
N/F
ANITA RECTOR & DANE RECTOR
D.B. 552, PG. 1561
0.39 AC
ZONE: R-10, RESIDENTIAL DISTRICT

PIN: 6983-59-5376-000
N/F
ALMA RECTOR & RONALD RECTOR
D.B. 431, PG. 558
0.23 AC
ZONE: R-10, RESIDENTIAL DISTRICT

WARRENTON BRANCH GREENWAY

PIN: 6983-59-5252-000
N/F
TOWN OF WARRENTON
D.B. 778, PG. 184
4.60 AC
ZONE: PSP,PUBLIC/SEMI-PUBLIC

PIN: 6983-59-5418-000
N/F
ANTJWAN BLAND & SHERELLE SMITH
D.B. 278, PG. 2311
0.38 AC
ZONE: R-10, RESIDENTIAL

PIN: 6983-59-4578-000
N/F

PIN: 6983-59-2711-000
N/F
DANIEL LOWERY & LINDA LOWERY
D.B. 494, PG. 748
0.73 AC
ZONE: C, COMMERCIAL DISTRICT
USE: GREENWAY AND WELLNESS MIXED USE

PIN: 6983-59-0992-000
N/F
DANIEL LOWERY & LINDA LOWERY
D.B. 494, PG. 748
1.01 AC
ZONE: C, COMMERCIAL DISTRICT
USE: GREENWAY AND WELLNESS MIXED USE

PIN: 6983-40-9127-000
N/F
BOWER FAMILY HOLDINGS LLC
D.B. 1522, PG. 803
1.92 AC
ZONE: C, COMMERCIAL DISTRICT
USE: COMMERCIAL USE

EAST SHIRLEY AVE
VARIABLE WIDTH

F.O. LINE MARKED BY OTHERS

3747
538.06
CPP NAIL

PIN: 6983-49-5728-000
N/F
CARRELL OLINGER
D.B. 887, PG. 1000
0.57 AC
ZONE: R10-RESIDENTIAL
USE: LOW DENSITY RESIDENTIAL

PIN: 6983-49-5896-000
N/F
CHERYL & ROBERT HAWKINS, JR
D.B. 1254, PG. 1913
0.57 AC
ZONE: R10-RESIDENTIAL
USE: LOW DENSITY RESIDENTIAL

PIN: 6943-49-6952-000
N/F
JODY WISTMAN
D.B. 1528, PG. 1776
0.56 AC
ZONE: R10-RESIDENTIAL
USE: LOW DENSITY RESIDENTIAL

PIN: 6984-40-7006-000
N/F
CLNB LLC
D.B. 1552, PG. 23
0.82 AC
ZONE: R10-RESIDENTIA
USE: LOW DENSITY RESIDENTIAL

PIN: 6984-40-8011-000
N/F
CLNB LLC
D.B. 1552, PG. 2321
0.19 AC
ZONE: R10-RESIDENTIAL
USE: LOW DENSITY RESIDENTIAL

MARK	DATE	REVISIONS	BY	DES
1	01/12/2024	SUP 2ND SUB		
2	03/07/2024	SUP 3RD SUB		

DATE	09/07/2023
PROJECT	21352-00
DESIGNED	TIMMONS
DRAWN	TIMMONS
CHECKED	PVN

RRMM® ARCHITECTS, PC
115 South 15th Street, Suite 502
Richmond, Virginia 23219
(804)277-8987

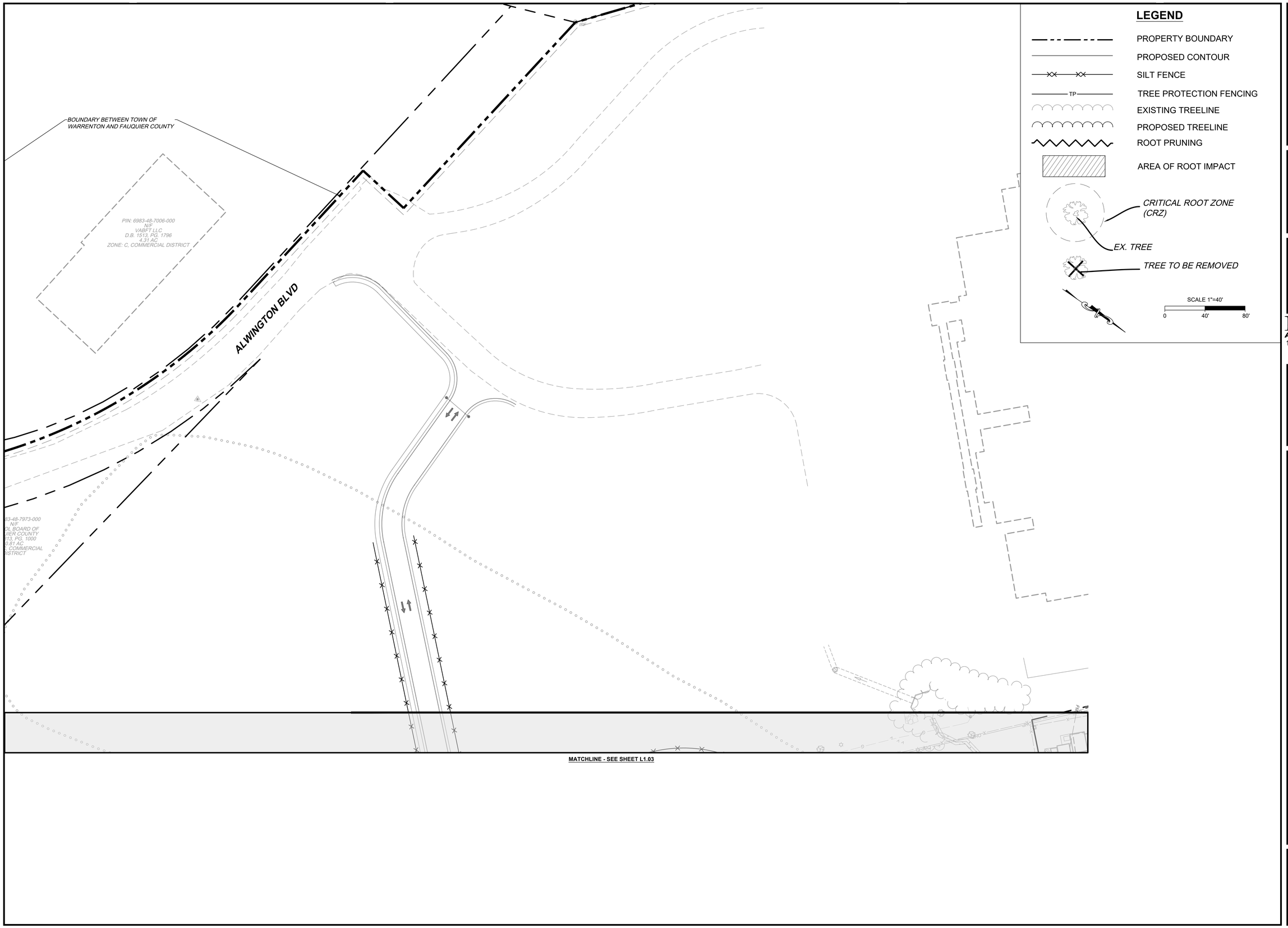
NOT FOR CONSTRUCTION
02/29/2024
SUP APPLICATION

PROJECT: TAYLOR MIDDLE SCHOOL ADDITION & RENOVATION
FAUQUIER COUNTY PUBLIC SCHOOLS
350 EAST SHIRLEY AVENUE
WARRENTON, VA 20186

IFB: TBD
VIRGINIA DEPARTMENT OF EDUCATION: 030-87-00-101

DRAWING: SPECIAL USE PERMIT - TREE PRESERVATION

SHEET
L1.03



LEGEND

- PROPERTY BOUNDARY
- PROPOSED CONTOUR
- SILT FENCE
- TREE PROTECTION FENCING (TP)
- EXISTING TREELINE
- PROPOSED TREELINE
- ROOT PRUNING
- AREA OF ROOT IMPACT
- CRITICAL ROOT ZONE (CRZ)
- EX. TREE
- TREE TO BE REMOVED

SCALE 1"=40'
0 40' 80'

MARK	DATE	REVISIONS	BY	DES
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TAYLOR MIDDLE SCHOOL ADDITION & RENOVATION
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WARRENTON, VA 20186

VIRGINIA DEPARTMENT OF EDUCATION 030-97-00-101
IFB: TBD

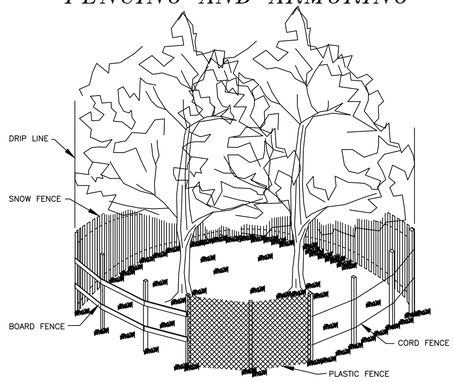
DRAWING
SPECIAL USE PERMIT - TREE PRESERVATION

SHEET
L1.04

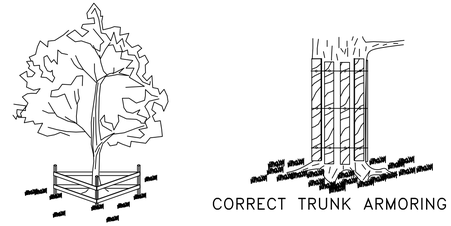
TREE INVENTORY AND CONDITION ANALYSIS

TREE NO.	BOTANICAL NAME	COMMON NAME	D.B.H. (in.)*	CONDITION	CRZ (SF)	CRZ IMPACT (SF)	CRZ IMPACT %	DISPOSITION	STATUS CHECK	ROOT PRUNING	CROWN REDUCTION	WATERING	FERTILIZING	MULCHING	OTHER
1	Quercus alba	White oak	17	70	2,043	358	17.52	SAVE							
2	Quercus alba	White oak	23	100	3,739	1,075	28.75	SAVE							
3	Cornus florida	Flowering dogwood	6	70	254	254	99.82	REMOVE		✓		✓	✓	✓	
4	Quercus alba	White oak	23	70	3,739	3,739	99.99	REMOVE		✓		✓	✓	✓	
5	Quercus alba	White oak	18	70	2,290	2,290	99.99	REMOVE		✓		✓	✓	✓	
6	Prunus spp.	Ornamental Cherry	7.8421936	70	435	435	100.06	REMOVE							
7	Prunus spp.	Ornamental Cherry	10.511898	70	781	781	99.99	REMOVE							
8	Prunus spp.	Ornamental Cherry	11.224972	70	891	891	100.04	REMOVE							
9	Quercus alba	White oak	37	100	9,677	9,677	100.00	REMOVE							
10	Quercus alba	White oak	22	70	3,421	3,132	91.55	REMOVE							
11	Quercus alba	White oak	34	40	8,171	7,549	92.38	REMOVE							
12	Quercus alba	White oak	25	100	4,418	4,418	100.00	REMOVE							
13	Juglans nigra	Black walnut	14	100	1,385	1,385	99.97	REMOVE							
14	Quercus alba	White oak	36	70	9,161	9,161	100.00	REMOVE							
15	Quercus alba	White oak	27	70	5,153	5,153	100.00	REMOVE							
16	Quercus alba	White oak	32	70	7,238	7,238	100.00	REMOVE							
17	Prunus spp.	Ornamental Cherry	20	100	2,827	2,827	99.98	REMOVE							
18	Pinus strobus	Eastern white pine	24	100	4,072	4,072	100.01	REMOVE							
19	Pinus strobus	Eastern white pine	19.026298	100	2,559	2,559	100.01	REMOVE							
20	Pinus strobus	Eastern white pine	23	100	3,739	3,739	99.99	REMOVE							
21	Pinus strobus	Eastern white pine	35	100	8,659	8,659	100.00	REMOVE							
22	Pinus strobus	Eastern white pine	33	100	7,698	7,698	100.00	REMOVE							
23	Lagerstroemia indica	Crape Myrtle	20	100	2,827	624	22.07	SAVE							
24	Pyrus calleryana	Callery pear	20	70	2,827	2,827	99.98	REMOVE							
25	Quercus alba	White oak	31	100	6,793	1,375	20.24	SAVE							
26	Prunus spp.	Ornamental Cherry	8	70	452	452	99.91	REMOVE							
27	Quercus alba	White oak	25.019992	70	4,425	820	18.53	SAVE							
28	Prunus spp.	Ornamental Cherry	12	70	1,018	356	34.97	REMOVE							
29	Cornus florida	Flowering dogwood	6	70	254	43	16.90	SAVE							
30	Ilex opaca	American holly	18	70	2,290	678	29.60	SAVE							

FENCING AND ARMORING



CORRECT METHODS OF TREE FENCING

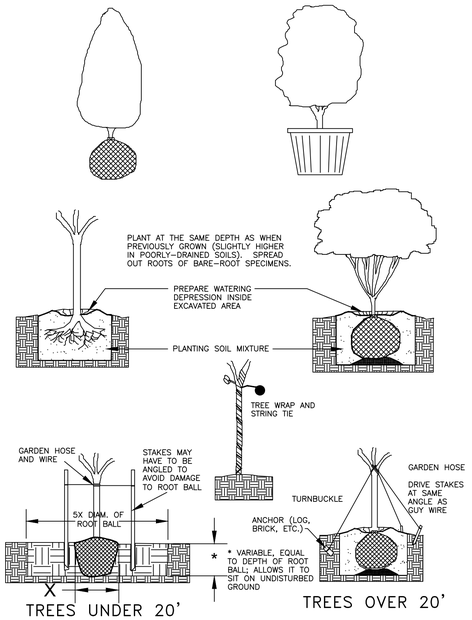


TRIANGULAR BOARD FENCE

CORRECT TRUNK ARMORING

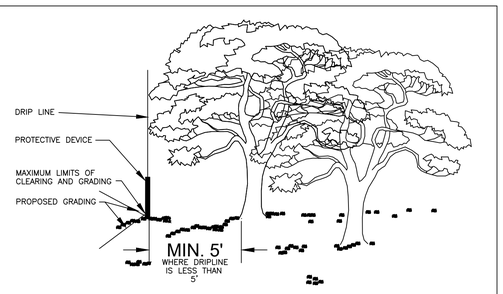
Source: Va. DSCW — Plate 3.38-2

PLANTING BALLED-&-BURLAPPED & CONTAINER-GROWN TREES



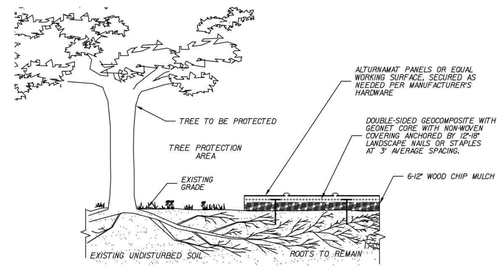
TREES UNDER 20' — TREES OVER 20'

SOURCE: VA. DEPTARTMENT OF FORESTRY — PLATE 3.37-5



CONSTRUCTION OPERATIONS RELATIVE TO THE LOCATION OF PROTECTED TREES

Source: Public Facilities Manual, Vol. III, Fairfax Co., Va., 1976 — Plate 3.38-1



NOTES:

1. MATTING MATERIAL SHALL BE DOUBLE SIDED GEOCOMPOSITE WITH GEONET CORE WITH NON-WOVEN COVERING OR APPROVED EQUIVALENT.
2. RPM SHALL BE INSTALLED BY A CERTIFIED ARBORIST.
3. REQUIRED MULCH DEPTH TO BE DETERMINED BY CERTIFIED ARBORIST.
4. TO BE USED FOR TEMPORARY AND SHORT-TERM CONSTRUCTION ACCESS AND STOCKPILE AREAS.
5. FOR HEAVY TRAFFIC AREAS, REFER TO HEAVY DUTY ROOT PROTECTION MATTING DETAIL.
6. ADDITIONAL LAYERS OF GEOTEXTILE MAY BE NEEDED DEPENDING ON LOADING AND SITE SOIL CHARACTERISTICS.

TEMP. LIGHT-DUTY ROOT PROTECTION MATTING w/ WOOD CHIPS (TYP)

SCALE:NTS

TEMPORARY ROOT PROTECTION MATTING DETAIL (LIGHT DUTY)

** REFER TO PROJECT SPECIFICATIONS FOR TREE PROTECTION MATERIALS **

Sheet #:	
Scale: NTS	
Date:	

Wetland Studies and Solutions, Inc. — an SWCA company
1131 Benfield Boulevard, Suite L
Millersville, MD 21108
Phone: 410-672-5990 Fax: 410-672-5993
www.wetlandsinc.com

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2	03/01/2024	SUP 3RD SUB		

DATE	09/07/2023
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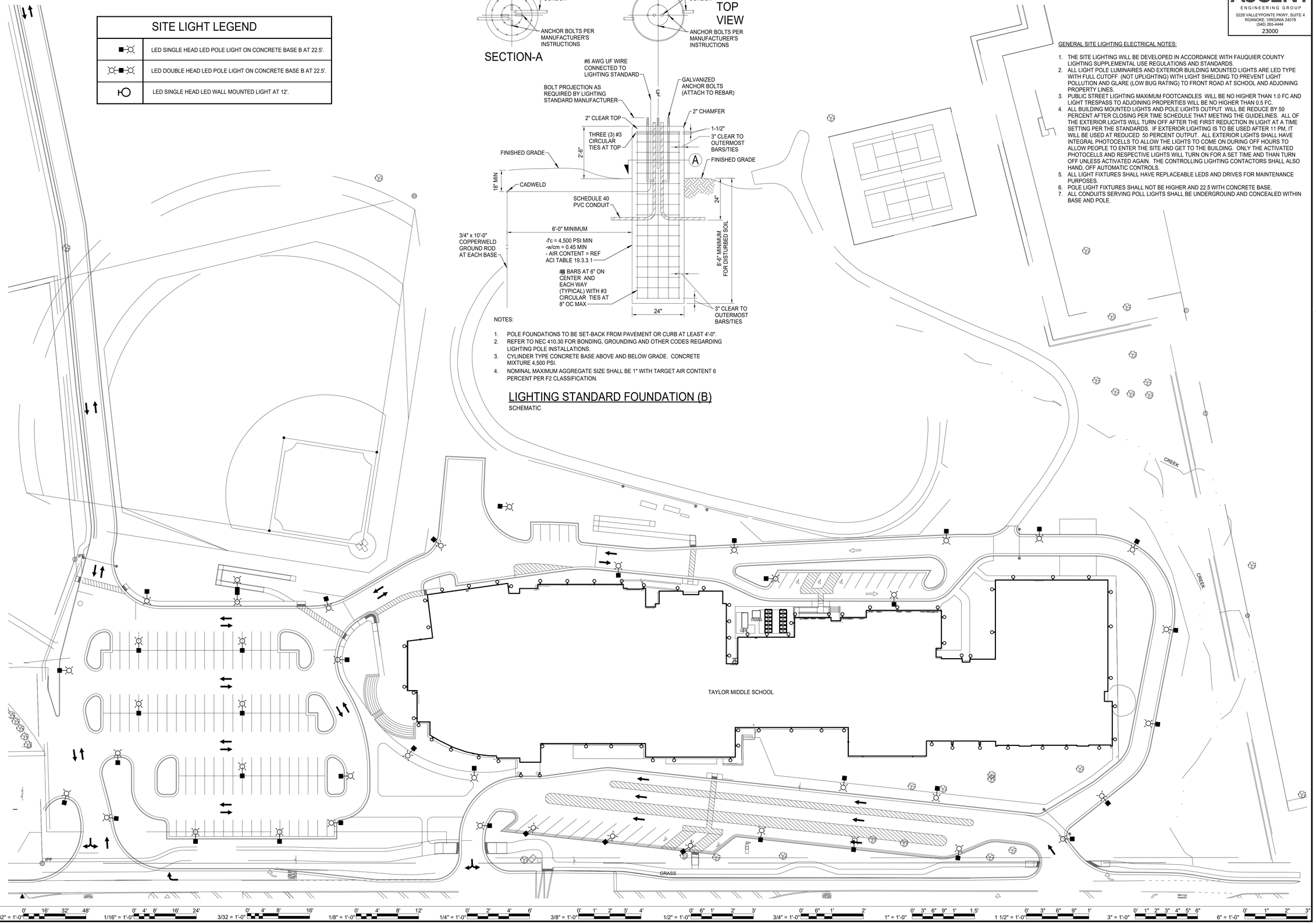
350 EAST SHIRLEY AVENUE
WARRENTON, VA 20186

IFB: TBD
VIRGINIA DEPARTMENT OF EDUCATION: 030-67-00-101

DRAWING: SPECIAL USE PERMIT - TREE PRES NOTES AND DETAILS

SHEET
L1.05
L1.05

SITE LIGHT LEGEND	
■-☼	LED SINGLE HEAD LED POLE LIGHT ON CONCRETE BASE B AT 22.5'.
☼-■-☼	LED DOUBLE HEAD LED POLE LIGHT ON CONCRETE BASE B AT 22.5'.
⊢○	LED SINGLE HEAD LED WALL MOUNTED LIGHT AT 12'.



NOTES:

1. POLE FOUNDATIONS TO BE SET-BACK FROM PAVEMENT OR CURB AT LEAST 4'-0".
2. REFER TO NEC 410.30 FOR BONDING, GROUNDING AND OTHER CODES REGARDING LIGHTING POLE INSTALLATIONS.
3. CYLINDER TYPE CONCRETE BASE ABOVE AND BELOW GRADE. CONCRETE MIXTURE 4,500 PSI.
4. NOMINAL MAXIMUM AGGREGATE SIZE SHALL BE 1" WITH TARGET AIR CONTENT 6 PERCENT PER F2 CLASSIFICATION.

LIGHTING STANDARD FOUNDATION (B)

SCHEMATIC

GENERAL SITE LIGHTING ELECTRICAL NOTES:

1. THE SITE LIGHTING WILL BE DEVELOPED IN ACCORDANCE WITH FAUQUIER COUNTY LIGHTING SUPPLEMENTAL USE REGULATIONS AND STANDARDS.
2. ALL LIGHT POLE LUMINAIRES AND EXTERIOR BUILDING MOUNTED LIGHTS ARE LED TYPE WITH FULL CUTOFF (NOT UPLIGHTING) WITH LIGHT SHIELDING TO PREVENT LIGHT POLLUTION AND GLARE (LOW BUG RATING) TO FRONT ROAD AT SCHOOL AND ADJOINING PROPERTY LINES.
3. PUBLIC STREET LIGHTING MAXIMUM FOOTCANDLES WILL BE NO HIGHER THAN 1.0 FC AND LIGHT TRESPASS TO ADJOINING PROPERTIES WILL BE NO HIGHER THAN 0.5 FC.
4. ALL BUILDING MOUNTED LIGHTS AND POLE LIGHTS OUTPUT WILL BE REDUCE BY 50 PERCENT AFTER CLOSING PER TIME SCHEDULE THAT MEETING THE GUIDELINES. ALL OF THE EXTERIOR LIGHTS WILL TURN OFF AFTER THE FIRST REDUCTION IN LIGHT AT A TIME SETTING PER THE STANDARDS. IF EXTERIOR LIGHTING IS TO BE USED AFTER 11 PM, IT WILL BE USED AT REDUCED 50 PERCENT OUTPUT. ALL EXTERIOR LIGHTS SHALL HAVE INTEGRAL PHOTOCELLS TO ALLOW THE LIGHTS TO COME ON DURING OFF HOURS TO ALLOW PEOPLE TO ENTER THE SITE AND GET TO THE BUILDING. ONLY THE ACTIVATED PHOTOCELLS AND RESPECTIVE LIGHTS WILL TURN ON FOR A SET TIME AND THAN TURN OFF UNLESS ACTIVATED AGAIN. THE CONTROLLING LIGHTING CONTACTORS SHALL ALSO HAND, OFF AUTOMATIC CONTROLS.
5. ALL LIGHT FIXTURES SHALL HAVE REPLACEABLE LEDS AND DRIVES FOR MAINTENANCE PURPOSES.
6. POLE LIGHT FIXTURES SHALL NOT BE HIGHER AND 22.5 WITH CONCRETE BASE.
7. ALL CONDUITS SERVING POLL LIGHTS SHALL BE UNDERGROUND AND CONCEALED WITHIN BASE AND POLE.

ASCENT
ENGINEERING GROUP
5228 VALLEYPOINTE PKWY, SUITE 4
ROANOKE, VIRGINIA 24019
(540) 265-4444
23000

MARK	DATE	REVISIONS	BY	DES
1	01/12/2024	SUP 2ND SUB		
2	03/01/2024	SUP 3RD SUB		

DATE	09/07/2023
PROJECT	21352-00
DESIGNED	ROS
DRAWN	ROS
CHECKED	ROS

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PROJECT
TAYLOR MIDDLE SCHOOL ADDITION & RENOVATION
FAUQUIER COUNTY PUBLIC SCHOOLS
350 EAST SHIRLEY AVENUE
WARRENTON, VA 20186

IFB: TBD
VIRGINIA DEPARTMENT OF EDUCATION 030-67-00-101

DRAWING
SPECIAL USE PERMIT - ELECTRICAL SITE PLAN

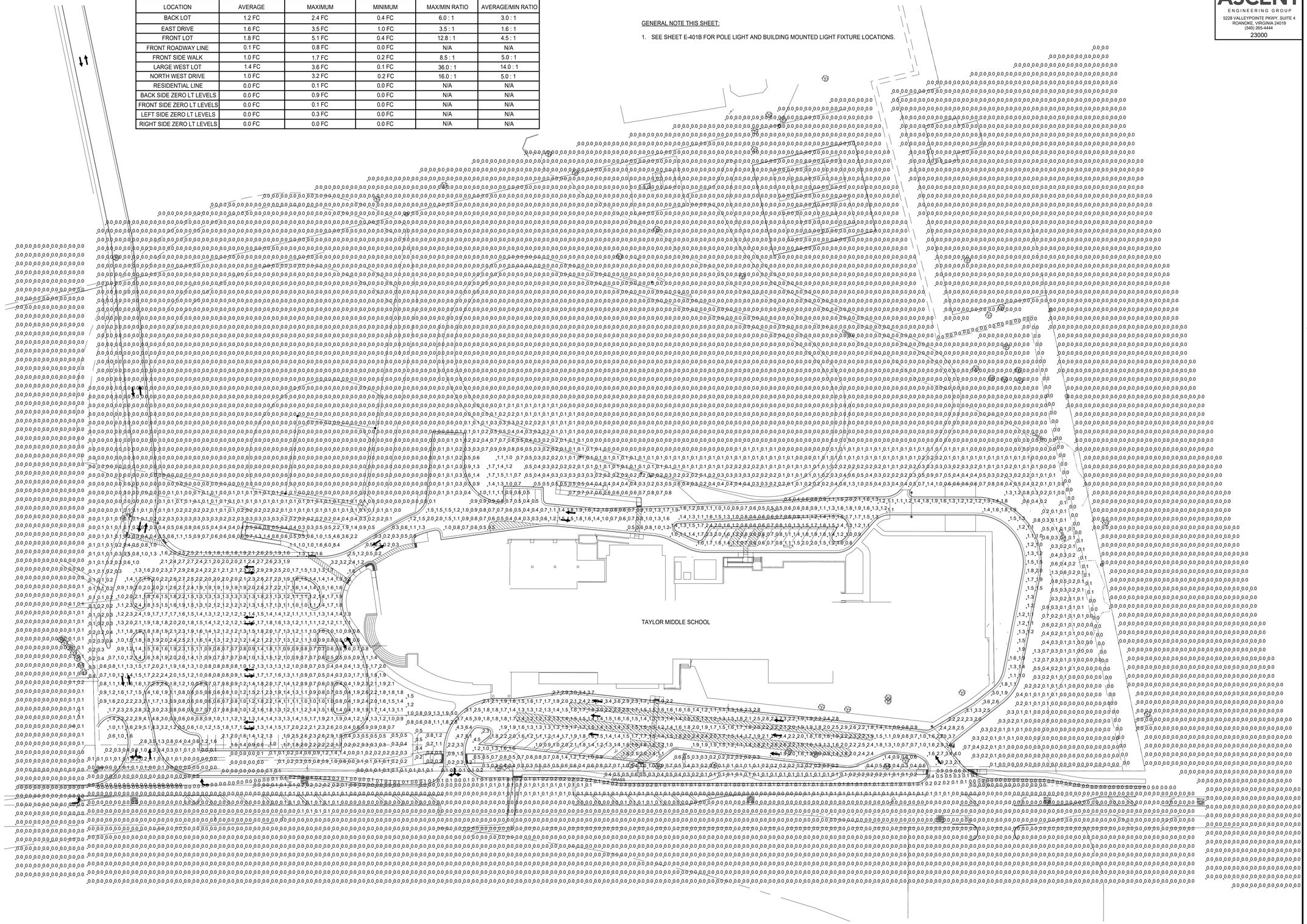
SHEET
E-401B

PHOTOMETRICS

LOCATION	AVERAGE	MAXIMUM	MINIMUM	MAX/MIN RATIO	AVERAGE/MIN RATIO
BACK LOT	1.2 FC	2.4 FC	0.4 FC	6.0 : 1	3.0 : 1
EAST DRIVE	1.6 FC	3.5 FC	1.0 FC	3.5 : 1	1.6 : 1
FRONT LOT	1.8 FC	5.1 FC	0.4 FC	12.8 : 1	4.5 : 1
FRONT ROADWAY LINE	0.1 FC	0.8 FC	0.0 FC	N/A	N/A
FRONT SIDE WALK	1.0 FC	1.7 FC	0.2 FC	8.5 : 1	5.0 : 1
LARGE WEST LOT	1.4 FC	3.6 FC	0.1 FC	36.0 : 1	14.0 : 1
NORTH WEST DRIVE	1.0 FC	3.2 FC	0.2 FC	16.0 : 1	5.0 : 1
RESIDENTIAL LINE	0.0 FC	0.1 FC	0.0 FC	N/A	N/A
BACK SIDE ZERO LT LEVELS	0.0 FC	0.9 FC	0.0 FC	N/A	N/A
FRONT SIDE ZERO LT LEVELS	0.0 FC	0.1 FC	0.0 FC	N/A	N/A
LEFT SIDE ZERO LT LEVELS	0.0 FC	0.3 FC	0.0 FC	N/A	N/A
RIGHT SIDE ZERO LT LEVELS	0.0 FC	0.0 FC	0.0 FC	N/A	N/A

GENERAL NOTE THIS SHEET:

1. SEE SHEET E-401B FOR POLE LIGHT AND BUILDING MOUNTED LIGHT FIXTURE LOCATIONS.



1/32" = 1'-0" | 1/16" = 1'-0" | 3/32" = 1'-0" | 1/8" = 1'-0" | 1/4" = 1'-0" | 3/8" = 1'-0" | 1/2" = 1'-0" | 3/4" = 1'-0" | 1" = 1'-0" | 1 1/2" = 1'-0" | 3" = 1'-0" | 6" = 1'-0"

ASCENT
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(540) 265-4444
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DATE 09/07/2023
PROJECT 21352-00
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DRAWN
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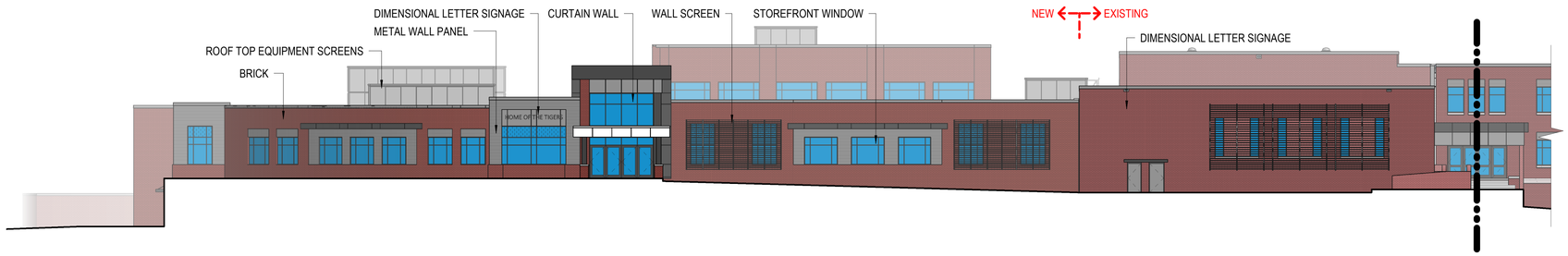
VIRGINIA DEPARTMENT OF EDUCATION: 030-67-00-101

DRAWING ELECTRICAL SITE PLAN PHOTOMETRICS

SHEET
E-402B

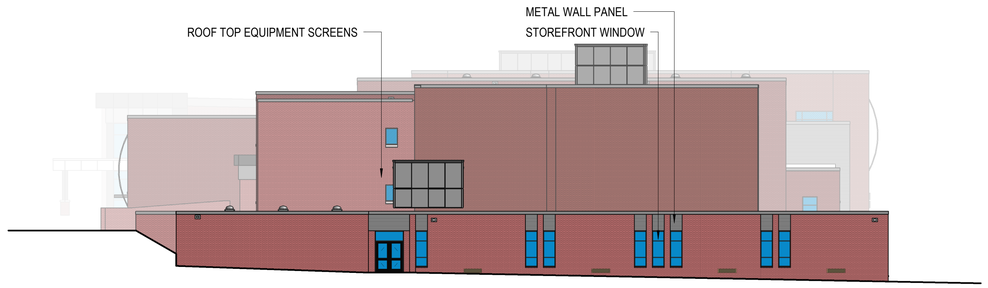


D1 SU-201 PLAN SOUTH ELEVATION (TRUE NORTH-EAST)

SCALE: 1/16" = 1'-0"

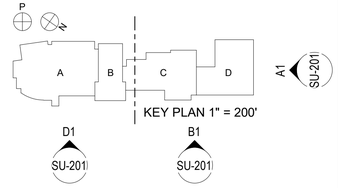
B1 SU-201 PLAN SOUTH ELEVATION (TRUE NORTH-EAST)

SCALE: 1/16" = 1'-0"



A1 SU-201 PLAN EAST ELEVATION (TRUE NORTH-WEST)

SCALE: 1/16" = 1'-0"



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Item 2.

MARK	DATE	REVISIONS	BY
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2	03/01/2024	SUP 3RD SUB	RRMM

DES

DATE	09/07/2023
PROJECT	21352-00
DESIGNED	RRMM
DRAWN	RRMM
CHECKED	JAH

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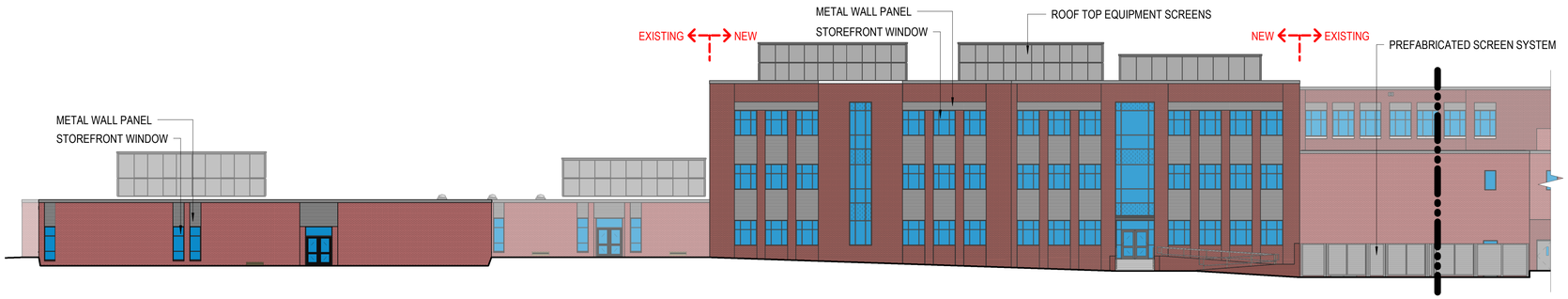
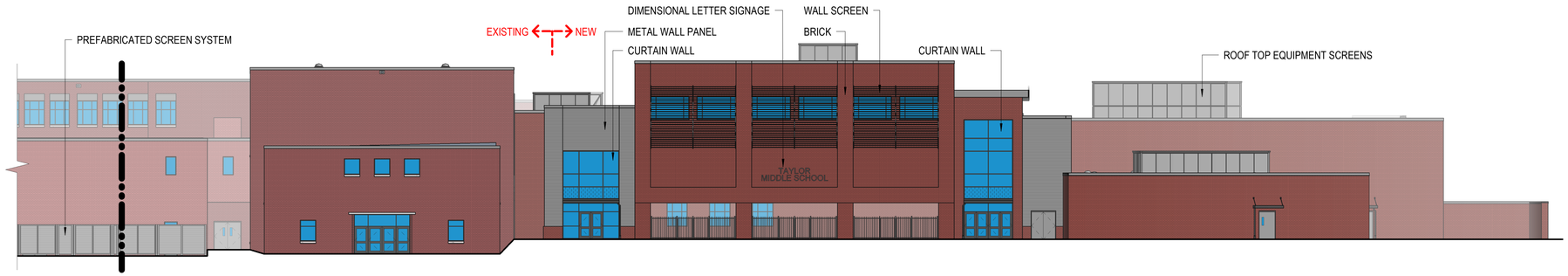
VIRGINIA DEPARTMENT OF EDUCATION 030-67-00-101
IFB: TBD

DRAWING SPECIAL USE PERMIT - OVERALL EXTERIOR ELEVATIONS

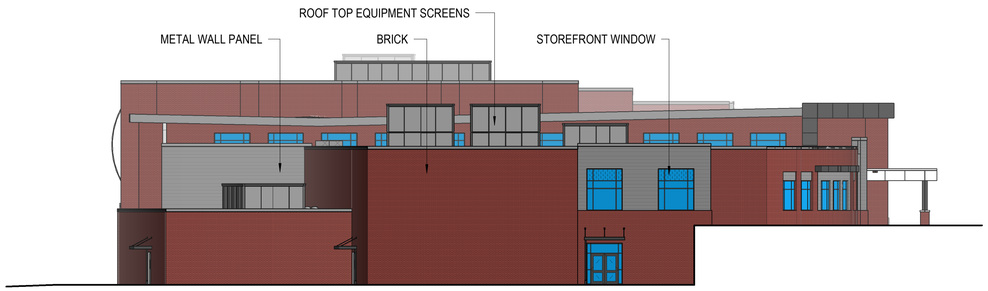
SHEET
SU-201



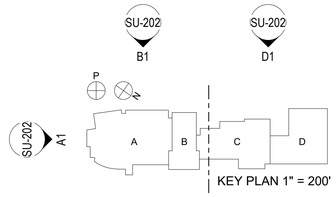
D1 PLAN NORTH ELEVATION (TRUE SOUTH-WEST)
SU-202 SCALE: 1/16" = 1'-0"



B1 PLAN NORTH ELEVATION (TRUE SOUTH-WEST)
SU-202 SCALE: 1/16" = 1'-0"



A1 PLAN WEST ELEVATION (TRUE SOUTH-EAST)
SU-202 SCALE: 1/16" = 1'-0"



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DRAWING SPECIAL USE PERMIT - OVERALL EXTERIOR ELEVATIONS

SHEET
SU-202

TIMMONS GROUP

20110 Ashbrook Place
Suite 100
Ashburn, VA 20147

P 703.554.6700
F 703.726.1345
www.timmons.com

Statement of Justification
Taylor Middle School Addition & Renovation
Special Use Permit SUP# 23-4

GPIN 6983-48-7973-500

Owner/Applicant: County School Board of Fauquier County

September 08, 2023
Revised March 01, 2024

Introduction:

Fauquier County Public Schools is seeking approval of a Special Use Permit, as required by Article 3-4.9.3 of the Town of Warrenton 2006 Zoning Ordinance, for the expansion of Taylor Middle School located on GPIN 6983-48-7973-500 within the limits of the Town of Warrenton. Approval of the Special Use Permit is requested as the application proposes a renovation of the existing school facility as well as additions to the existing building that are approximately 70,000 SF, which exceeds the 10,000 SF maximum as defined by Article 3-4.9.3. This application also proposes to improve and expand the site parking facilities, vehicular and pedestrian travel ways, emergency vehicle access, and the existing physical education field located on the site.

(1) Consistency with Comprehensive Plan

The parcel is located within the Public-Semi Public district in the Future Land Use Map of Plan Warrenton 2040. The Special Use Permit is consistent with the Comprehensive Plan as the proposed improvements plan to promote the following key points of the current Comprehensive Plan:

- As further explained below, the renovation of the existing building strives to reuse and preserve the historic nature of the existing building.
    - William C. Taylor was the first high school to serve African American students in the Warrenton area and has a strong history and roots within the local community. Additions to Taylor Middle School match the overall scale of the existing building and use similar materials to blend the new with the old. The design intent of the additions is not to match the existing building completely, but rather to compliment it with more functional and energy efficient spaces. Renovations to the existing envelope will be limited and will mostly involve replacement of existing fenestrations. Where possible, we will implement similar exterior details on the existing building to further tie the old and new sections together.
    - The existing auditorium was host to many well-known artists throughout its early years and is a particularly important space for members of the W.C. Taylor High School Alumni Committee. As such, the auditorium is being maintained as much as possible. The finishes

will be updated to give the space a fresh look while honoring its history with images of the various performers over the years. Additionally, wall graphics throughout the building will include graphic and literary references to the history of William C. Taylor High School. A statue of William C. Taylor is also anticipated to be donated to the project by the W.C. Taylor High School Alumni Committee.

The improvements proposed with the Special Use Permit helps to achieve further integration of County facilities into the fabric of the Town and provides high-quality, equitable, and accessible community facilities that meet the Town's service requirements and support a high quality of life for the community. The application proposes improved pedestrian and bicycle facilities with additional sidewalks proposed along the frontage and throughout the site as well as an improved connection for users to access the site via the Warrenton Greenway Trail.

(2) Safety from Fire Hazards:

As part of the school renovation and addition project, the building will be fully sprinklered and will comply with 2018 Virginia Statewide Fire Prevention Code and 2014 NFPA 70. Building areas comply with allowable area per 2018 VCC. Fire extinguishers will be found throughout the school.

The proposed improvements reflected on the Special Use Permit plan meet the requirement for "Fire Lanes" where required, providing access to the building on all sides. This includes the construction of a dedicated emergency access lane on the north side of the building providing access around the building that does not currently exist. New fire hydrants will be provided throughout the site to provide coverage as required.

(3) Noise Impact:

The project site currently operates as a middle school. The improvements are not anticipated to generate additional sources of noise from what exists today. The proposed improvements will comply with the noise standards under Article 9-14.2 of the Town of Warrenton Zoning Ordinance.

(4) Lighting Impact:

The applicant will prepare a detailed lighting plan in conformance with 9-8 of the Town of Warrenton Zoning Ordinance at the time of Site Plan and will install lighting in accordance with the plan. All fixtures on site will conform to current lighting standards and be properly shielded. A photometric plan has been provided for reference only with the Special Use Permit Plan and will be updated and finalized at the time of Site Plan. Note that there is no existing or proposed lighting for the existing ball fields.

(5) Signage:

The project includes the replacement of the existing monument sign at the site frontage. All signage will be provided in accordance with Article 6 of the Town of Warrenton Zoning Ordinance and will be submitted with the Site Plan Process.

(6) Land Use and Compatibility with Existing and Proposed Uses Adjacent and in the Vicinity and Economic Impact:

Taylor Middle School is located on a 39.18-acre parcel identified in the Fauquier County Land Records as PIN #6983-48-7973-500, zoned as Public-Semi Public Institutional District. The parcel also includes Brumfield Elementary School. Based on the current zoning and Article 3-4.9.2, "Public Building" is a by right use.

The Taylor Middle School parcel is surrounded by a mix of commercial, Public-Semi Public, and Residential uses as defined below:

To the north: Trinity Lutheran Church, Zoned R10 and PSP and a Residential District Zoned R-10
To the east: Waterloo Motors, Zoned Commercial and Warrenton Branch Greenway Trail, Zoned PSP
To the south: The Warrenton Community Center, Zoned PSP and Walmart, Zoned Commercial
To the west: A residential district zoned R-10, the Gathering Place zoned R10, as well as currently vacant property located within the County of Fauquier.

The proposed Special Use Permit is considered compatible with the existing uses in the vicinity as the site is currently an existing middle school, is by right based on current Zoning, and ultimately serves the community and adjacent residential properties.

(7) Site Conditions, buildings etc.:

Taylor Middle School is located on a 39.18-acre parcel further identified in the Fauquier County Land Records as PIN #6983-48-7973-500, 305 E. Shirley Avenue, in Ward 3 of the Town of Warrenton. The existing middle school shares the parcel with James G. Brumfield Elementary School, located to the southwest of the existing middle school. The existing topography surrounding Taylor Middle School generally slopes from the east to the west with a significant grade change of approximately 35 feet. Stormwater runoff from the northern half of the site which includes the building, bus loop, rear parking area, and the exiting gravel track drains to the existing waterway located just west of the existing gravel track. Stormwater from the existing parking area on the southern half of the parcel, adjacent to the community center, is collected by a storm drainage system that outfalls at the western boundary of the community center property. From there drainage flows via overland westward towards the entrance of James G. Brumfield Elementary School and Alwington Blvd. All existing and proposed improvements can be found on the concept development plan.

(8) Landscaping:

Required landscaping and buffering will be provided at the time of Site Plan in accordance with Article 8 of the Town of Warrenton Zoning Ordinance.

(9) Construction Timeline:

The project construction will not be phased and has an anticipated duration of 36 months. Due to the scale of the renovations and extensive work associated with this project, students have been relocated to other facilities until the new Construction is issued a certificate of occupancy.

The site is served by Town of Warrenton's public water and sanitary sewer system. The project site does contain wetlands and 500yr floodplain (Flood plain X).

(10, 16, & 21) Impact on Existing Features:

The Design Team has conducted a detailed wetland survey and has identified several site features for avoidance if feasible. Along the north and northwestern side of the site there are existing PFO and PSS wetlands that appears to convey storm water runoff from the east side of Shirley Highway through the project site. At the time of site plan, it is the Project Teams intent to make all efforts to avoid wetland impacts. However, should impacts be required, the appropriate permits will be obtained through the required agencies.

A portion of the site does contain a 500yr floodplain (Zone X, 0.2% annual chance of flood) pursuant to FEMA Flood Insurance Rate Map 51061C0308C. This application does propose improvements within the Zone X floodplain with the improvements to the baseball/softball field, secondary access to Alwington Blvd, and the parent drop off/emergency access at the northwest side of the Middle School building. Note that while the existing building is within the limits of the Zone X floodplain, no new building additions are planned within the limits of the floodplain.

The project landscape architect and arborist performed a detailed tree assessment for the existing vegetation located on the site, primarily along the frontage of E Shirley Ave and the northern and northwestern side of the site. As identified with the exhibit provided with this application, there are several large trees within the noted study area. While it is the intent of the Project Team to preserve these tree's where possible, as noted on the tree preservation plan, removal of some of these trees will be required to accommodate the proposed building addition, bus loop reconfiguration, and the extension of the emergency access and Town Pump Station Access at the north side of the site.

Regarding the historical nature of the existing building, it is planned for the additions to Taylor Middle School match the overall scale of the existing building and use similar materials to blend the new with the old. The design intent of the additions is not to match the existing building completely, but rather to compliment it with more functional and energy efficient spaces. Renovations to the existing envelope will be limited and will mostly involve replacement of existing fenestrations. Where possible, the design team will implement similar exterior details on the existing building to further tie the old and new sections together.

Interior to the building, the existing auditorium is being maintained as much as possible. The finishes will be updated to give the space a fresh look while honoring its history with images of the various performers over the years. Additionally, wall graphics throughout the building will include graphic and literary

references to the history of William C. Taylor High School. A statue of William C. Taylor is also anticipated to be donated to the project by the W.C. Taylor High School Alumni Committee.

(11) Walkability, Public Welfare and Convenience:

The proposed project improvements include providing a dedicated bus entry/exit to the site as well two separate passenger vehicle entrances, one from E. Shirley Avenue and one to Alwington Blvd. By separating the bus and passenger vehicles, the current congestion that occurs during drop off and pick up will be alleviated so that there is no impact to the traffic within the public right of way. Additionally, a second entrance to the site from Alwington Blvd provides for an alternate access point for first responders in the case of emergency and will be used as the designated access for the parent drop off/pickup.

Pursuant to the current Town of Warrenton Comprehensive Plan, East Shirley Ave is identified as a "Signature Street". Based on the recommendations of the "Complete Streets Manual", dated September 2017 this application for Special Use Permit proposes to provide curb and gutter and sidewalk along the majority of the frontage of the subject parcel. In addition, the site improvements will include a new sidewalk that will provide a point of connection to the Greenway Trail along the site frontage. The sidewalk will also provide access to the main entry of the middle school as well as the other site features of the school site, including the baseball/softball field, running track, rectangular physical education field, and tennis courts. To further improve the future walkability of the area, this application proposes to construct a portion of Shared Use Path (SUP) that will provide a connection to the Greenway Trail. The SUP will extend south along Shirley Avenue and will terminate at a sidewalk connection to the site. From there a public access easement will be dedicated that will extend to the southern property boundary with the County Owned community center. A second public access easement will be dedicated for the future extension of a SUP at the pipe stem area between the Community center property and the Walmart property, that will extend to the ROW of Allwington BLVD. Placing the future SUP alignment on the outer boundary of the school property will provide sufficient separation from the occupied school building/facilities and public users of the trail, thus enhancing safety to the students and staff. In addition, a sidewalk is proposed along the southern side of the proposed access road that will connect Taylor Middle School with the existing sidewalk at the intersection of Alwington Blvd and the entrance to Brumfield ES.

As noted above, the improvements proposed with this application improve the walkability, welfare and convenience for students, staff, as well as the residents within the Town of Warrenton when compared to the current existing conditions of the site.

(12) Traffic:

As detailed in the provided traffic impact analysis dated September 8, 2023, Revised through Mardh 2024, the site does not have any adverse impacts to the surrounding roadway network and no improvements are required at the study intersections.

It is noted that the Arrington Development received approval of a rezoning case (REZ 22-017978). The SUP concept plan includes an exhibit to show how the proposed Alwington Blvd Improvements interact with the proposed access road between Taylor MS and Brumfield ES.

(13) Safe and Orderly Road Development:

All proposed travel ways are located outside the Town and or VDOT Right of Way. Travel way dimensions and radii will be designed to Town and VDOT standards to allow for efficient maneuvering for the School users. As currently proposed, the site vehicular access points separate bus traffic from staff/public personal vehicles to limit conflict and to provide for a more efficient site. Furthermore, a secondary access to Alwington Blvd is proposed, which will further increase the efficiency of the internal transportation network. It should be noted that Middle School hours start at 7:30am and ends at 2:25pm, while Elementary School hours are from 8:35 am to 3:20 pm. While the secondary entrance shares the entrance to the bus loop of Brumfield Elementary School, the hour difference between the two class times will allow more than adequate time for parents to drop/off pick up at Taylor Middle School before bus traffic begins utilizing the loop at Brumfield ES.

(14) Code Requirements:

Building is not changing use. The renovations and additions will meet the Town of Warrenton code requirements.

(15) Impact on Public Facilities:

Emergency Services:
The existing middle school relies on Town Services such as fire, rescue, and police services. As the site is currently a middle school, it is assumed that there would be no additional impact to the above noted services. Furthermore, the improvements proposed within the building as well as the site will provide for a safer building for occupants as well as first responders as the new construction will be compliant with current building codes and regulations. A sheet is provided within the Special Use Permit plan to illustrate that a fire truck has sufficient turning radii to maneuver through the site with out any conflict with obstructions (parking spaces, curbs, other fixed objects, etc.).

Traffic**:**
As detailed in the provided traffic impact analysis dated September 8, 2023, the site does not have any adverse impacts to the surrounding roadway network and no improvements are required at the study intersections.

Water/Sewer:
Based on VDH Waterworks regulations water and sanitary sewer usage for a school use can be calculated based on an average of 16 gpd / occupant within the building. Based on a total max occupant load (proposed max 850 students, 100 staff, and 25 visitors for a total design occupant load of 975), the total anticipated average water demand would be as follows:

975 occupants * 16 gpd/occupant = 15,600 gpd average daily flow * 1.75 peaking factor = 27,300 gpd peak or +/-19 gpm.

Similarly, the average daily flow for sanitary sewer wastewater generated is approximately 15,600 gpd or 0.0156 mgd. Assuming a peaking factor of 2.5 as specified by SCAT Regulations, the peak daily flow for sanitary sewer generated that would ultimately flow to the existing sanitary sewer pump station is approximately 0.039 mgd.

Schools:

The proposed improvements at Taylor Middle School are needed to improve the learning environment and meet the demands of the growing student population within the Town of Warrenton and surrounding areas and is necessary for Fauquier County Public Schools.

(17) Employment / Economic Impacts:

This project will provide desirable employment opportunities for teachers who are looking for an improved educational environment. This project has the potential to attract highly qualified teachers from neighboring localities who may choose to call Warrenton home.

(18) Affordable Shelter Opportunities for Residents:

Not Applicable to this application.

(19) Location of Outdoor Storage Areas:

There are no outdoor storage areas proposed with this application.

(20) Use of Open Space:

This application proposes to improve the existing diamond physical education field to provide for a more useable field for the school and public and to maintain access to the existing gravel track and tennis courts. Use of the existing and proposed sports fields will also be utilized by Parks and Recreation after school hours and events. The remainder of the existing open space will largely remain the same as it exists today.

(22) Non-conforming Uses and Structures:

There are no non-conforming uses or structures existing or proposed with this application.

(23) Fuel/Fuel Storage:

Not Applicable to this application as there is no fueling areas or fuel storage areas proposed.

(24) Accessory Uses and Structures:

There are no accessory structures proposed with this application.

(25) Area of each Proposed Use:

As illustrated on the concept development plan, there is only one proposed use (Public Building / Institutional) that is proposed to be +/- 148,943 SF.

(26) Hours of Operation:

The school will follow the Fauquier County Public Schools published calendar with teachers, staff and students occupying the building from August to June from 7am-5pm with some evening and weekend events.

(27) Location and Screening of Parking and Loading Spaces/Areas:

Proposed parking is distributed through the site, with most of the parking being located on the south side of the middle school in the same general area where existing parking is located. There will be visitor and ADA parking located adjacent to the bus loop for use outside of the hours of pickup and drop off as well as standard and ADA parking located at the rear or west of the school building. Parking will be screened in accordance with Article 8 of the current Ordinance. Based on the current Zoning Ordinance Article 7-4 for "School, Middle", parking is required at the following rate:

1 space per 15 students + 1 space per employee calculated for the work period containing the largest number of employees.

1 space per 15 students * 850 max students = 57 spaces required
Plus 1 space per employee * 100 employees = 100 spaces required
Total number of spaces required = 157 spaces

At the time of site plan the intent is to meet the minimum number of spaces identified above. Also, it is understood that patrons of the community center utilize the existing parking lot for the middle school. It has been identified by Fauquier County Public Schools that there is no shard parking agreement with the County Board of Supervisors for use by the Community Center. In addition, the existing parking lot between the two uses has a total of +/- 62 spaces. The proposed parking lot with this application will likely provide nearly double the amount of parking than currently exists between the two uses.

(28) Proposed Security Features and Provisions:

A secured vestibule will be provided for visitors to gain access to the main office where they will check in before being granted access to the rest of the school facility.

(29) Number of Employees:

The proposed facility is designed to accommodate the following occupant loads - 850 students, 100 staff, and 25 visitors for a total design occupant load of 975.

(30) Existing and Proposed Infrastructure:

This application proposes significant site utility and infrastructure improvements as required for the renovated and expanded middle school facility. These include upgrades to onsite water and sanitary sewer lines, grading and drainage for storm water management and best management practice systems, telecommunication and power supply, vehicular and pedestrian access, parking to include ADA spaces, sidewalks, emergency access lanes, signage, physical education fields, and landscaping. These

improvements will be provided pursuant to the Town of Warrenton design and construction standards to provide an improve the learning environment and meet the demands due of the growing student population within the Town of Warrenton and surrounding areas and is necessary for Fauquier County Public Schools.

(31) Odors:

There is no proposed change in use and there are no major sources of odors resulting from the proposed improvements.

(32) Refuse/Service Areas:

The loading and refuse/service areas are located at the southwest corner of the proposed building and the mechanical yard where the generator transformer and chillers are located on the west side of the building as shown on the Special Use Permit plan. All screening will be provided in accordance with Section Article 8-8.2.3 of the current Ordinance.

Modifications:

This application is seeking relief from Section 2-19.4 of the Town of Warrenton 2006 Zoning Ordinance that requires "Retaining walls to not exceed a height of six (6) feet in any zoning district unless approved by the Planning Director." Exceeding the maximum height of 6' for retaining walls will be required as part of this application for the following reasons:

1. To avoid/minimize impact to existing wetlands and to minimize clearing at the north/northwest side of the building adjacent to the proposed emergency access road.
2. The proximity of the existing building and slopes on the west side down to the existing gravel track and diamond field. In order to maintain these existing elements (and improve the diamond field), retaining walls in excess of 6' will be required.

EXPERIENCE WARRENTON VIRGINIA EST. 1810

Planning Commission Work Session
SUP 2023-04 Taylor Middle School
February 20, 2024

PC Decision Deadline May 30,2024 Unless Applicant Defers

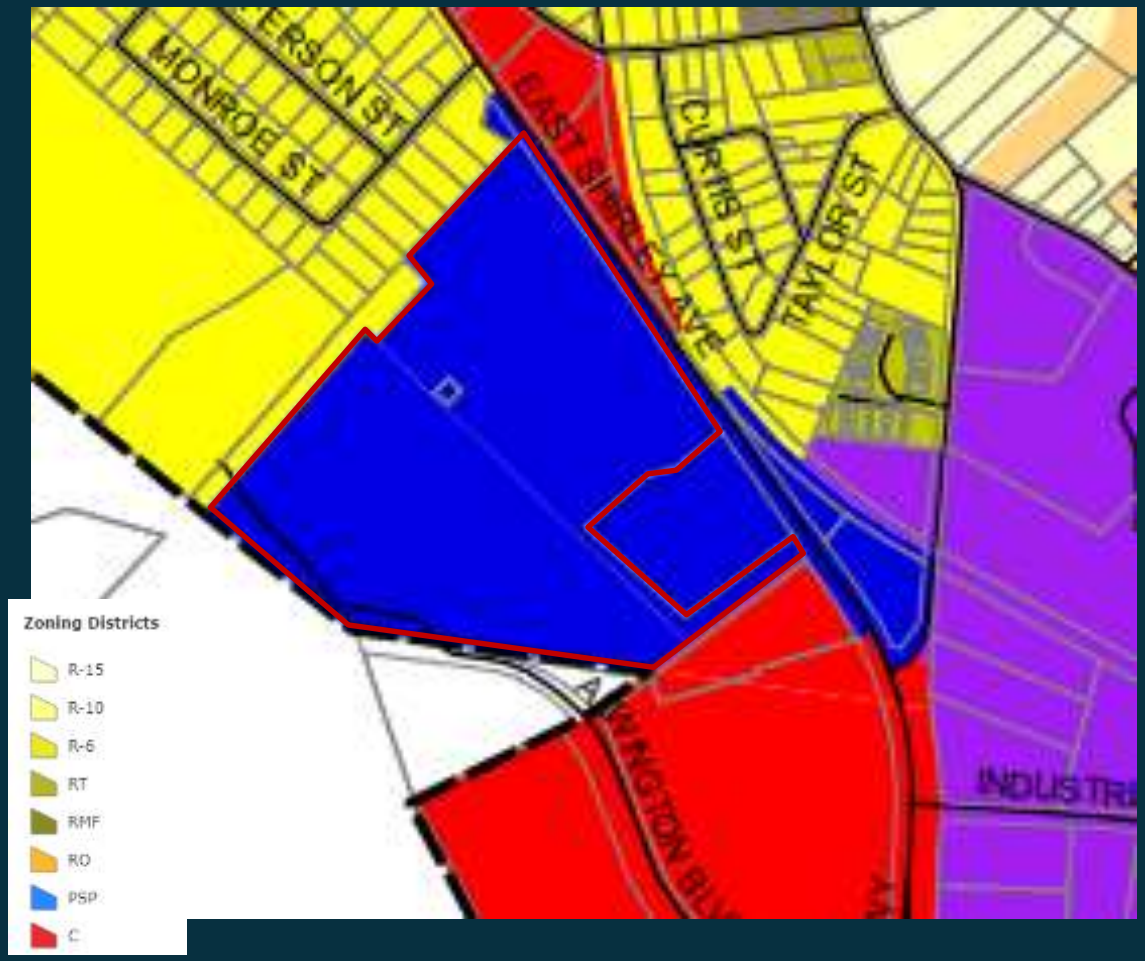
Request

- GPIN **Applicant:** 6984-48-7973-500
- **Property Owner:** Fauquier County School Board
- Representative: Luke Fetcho, Timmons Group
- **Zoning:** PSP (Public/Semi Public)
- **Comprehensive Plan:** Public/Semi Public Non-Intensive
- SUP to allow for an addition in excess of 10,000 square feet (proposing additional approximate 68, 231 square feet)

Location

Adjacent Uses

Zoning Map

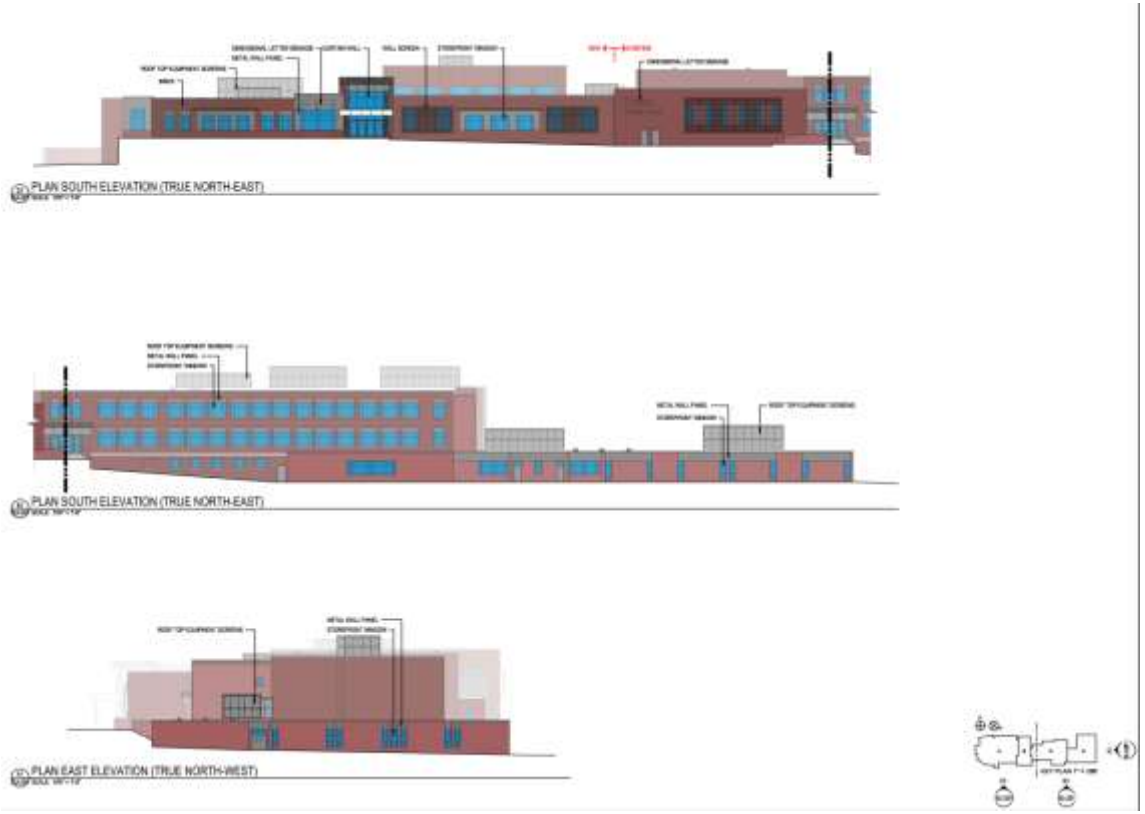


- R-10 Single Family Residential
- Commercial
- Public/Semi Public
- County Approved Future Housing

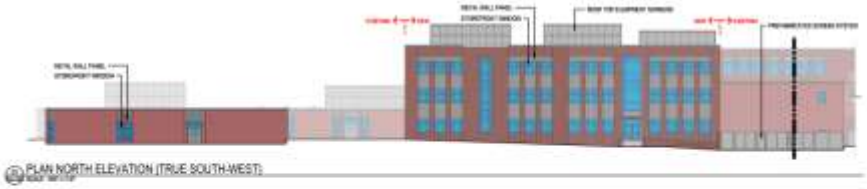
SUP Plan

Proposed SUP Plan

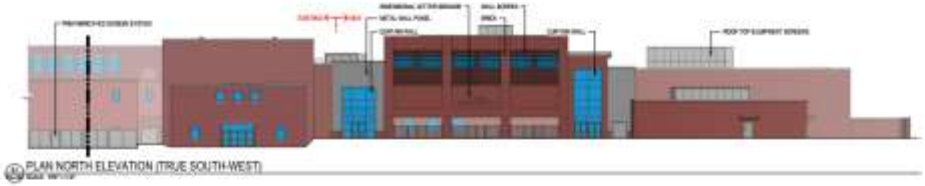
Elevations


PLAN SOUTH ELEVATION (TRUE NORTH-EAST)
PLAN SOUTH ELEVATION (TRUE NORTH-EAST)
PLAN EAST ELEVATION (TRUE NORTH-WEST)

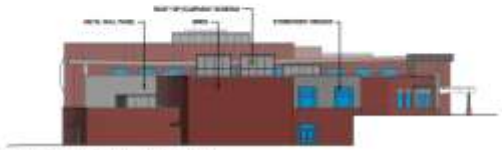
Elevations



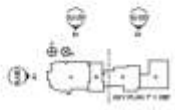
PLAN NORTH ELEVATION (TRUE SOUTH-WEST)



PLAN NORTH ELEVATION (TRUE SOUTH-WEST)



PLAN WEST ELEVATION (TRUE SOUTH-EAST)



Agency Reviews

- Full site
- Transportation and Internal Circulation
- Parking Orientation
- Walkability/Bicycle Connections
- Landscaping
- Lighting
- VDOT Pipeline Study
- Fauquier County Arrington Proffers

Town Policies – Plan Warrenton 2040

- Walkability Audit & Complete Streets
- Transportation Map – Bike/Ped New Facility links to County Plan
- Shirley Ave = Signature Road
- T-1.4 *Maintain the capacity of Signature Streets by providing multimodal accommodations and incorporating innovative approaches.*

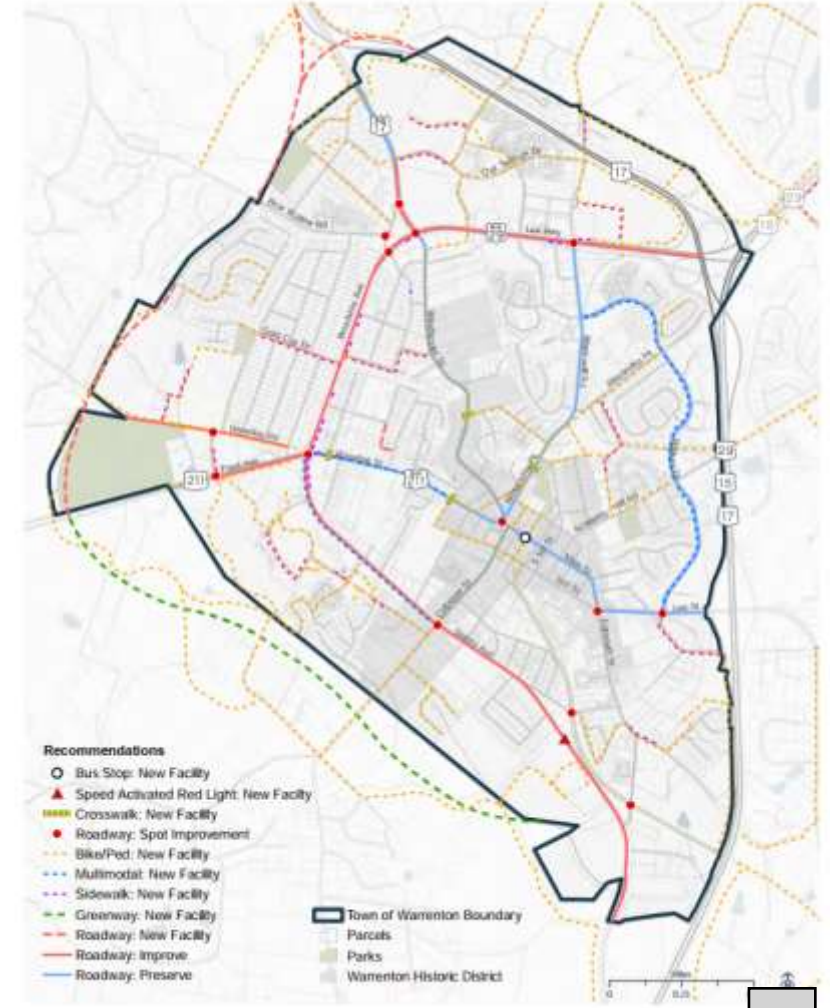
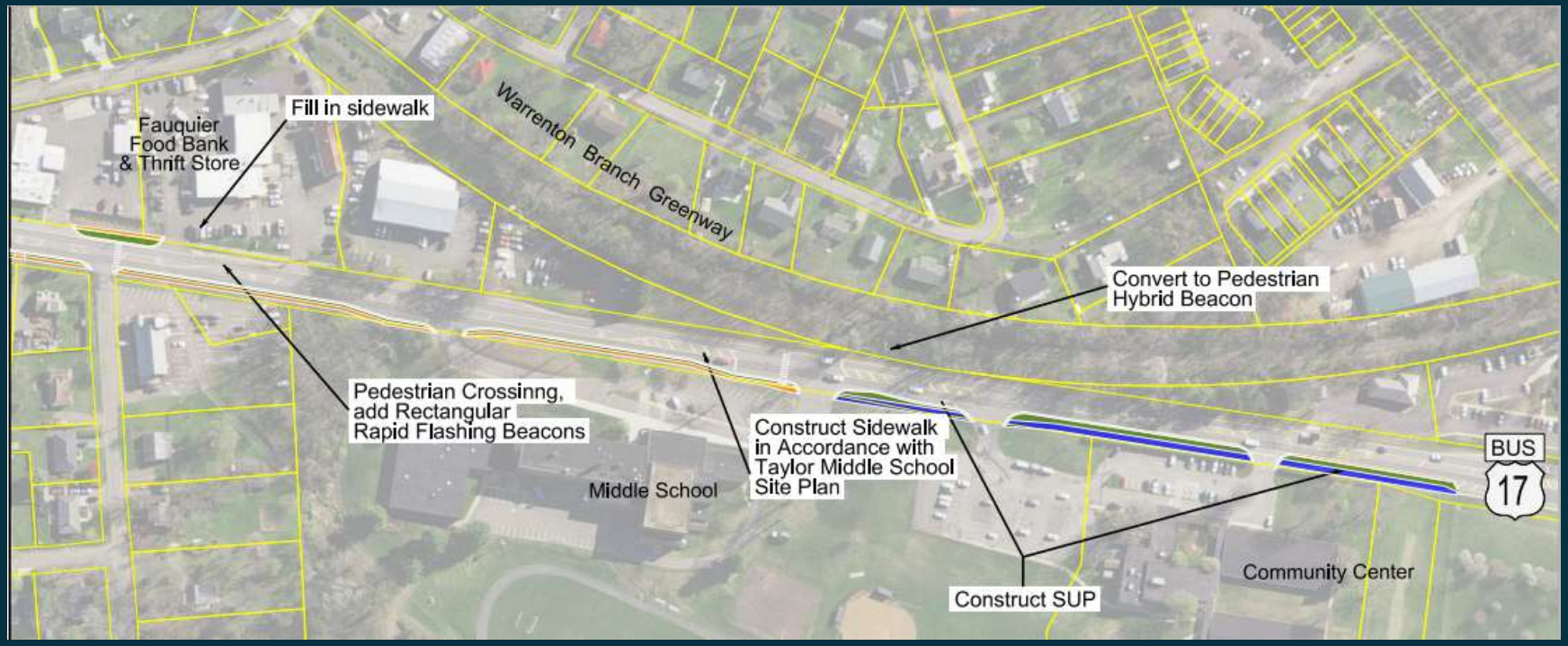


Figure 5-1: Town of Warrenton Transportation Plan map.

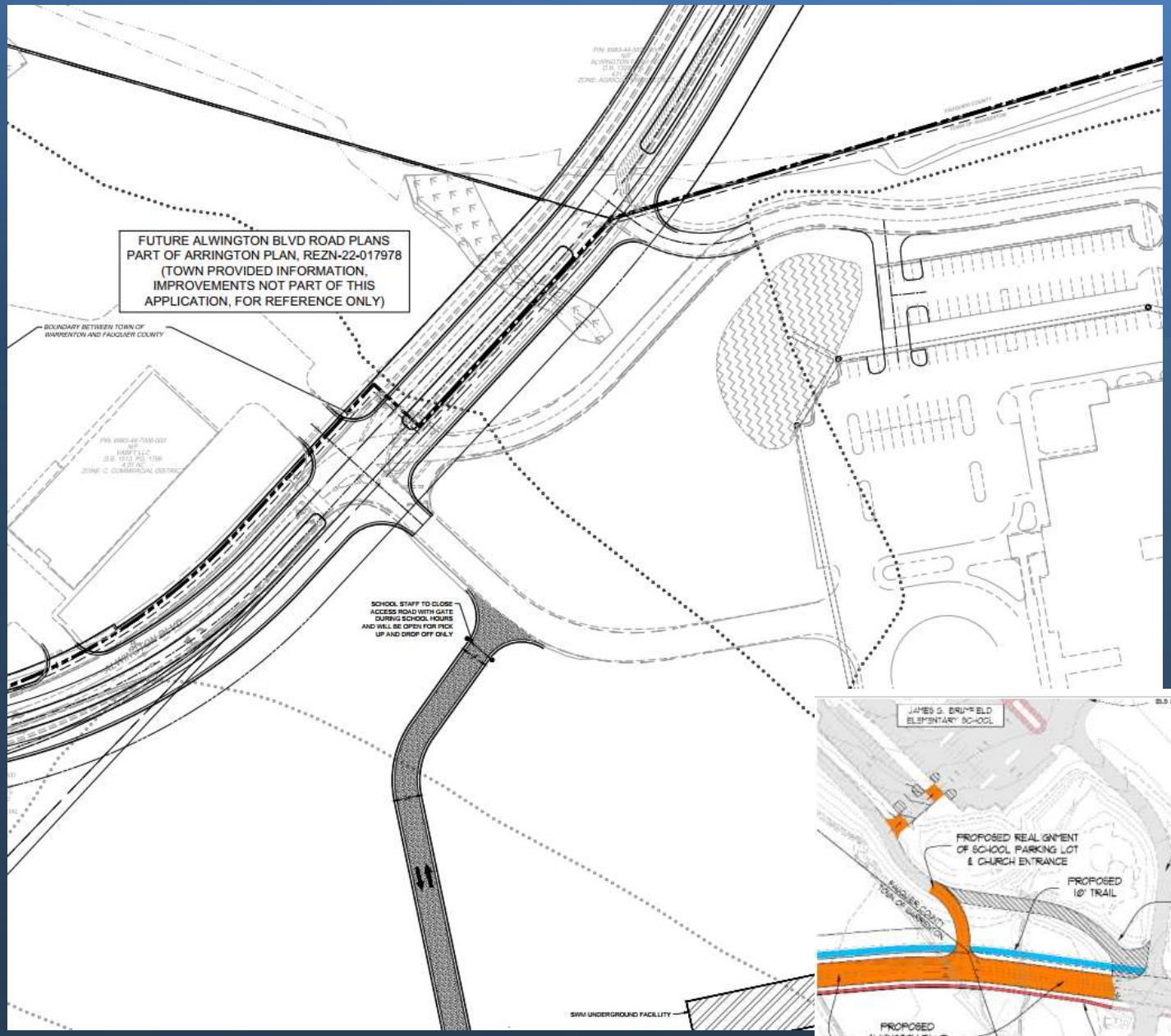
Preliminary VDOT Pipeline

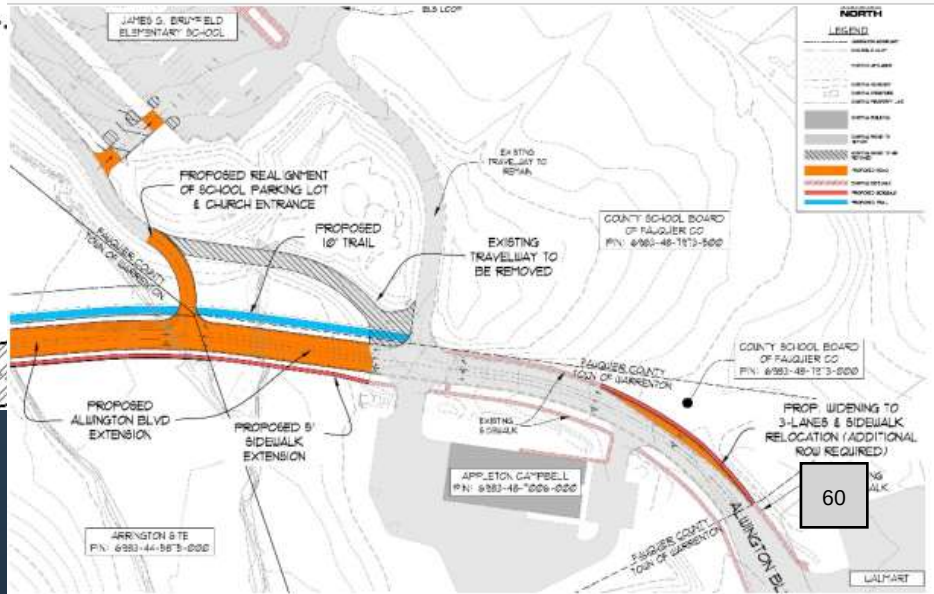
Add Sidewalk from Culpeper to Taylor MS

Construct Shared Use Path Taylor MS to Walmart

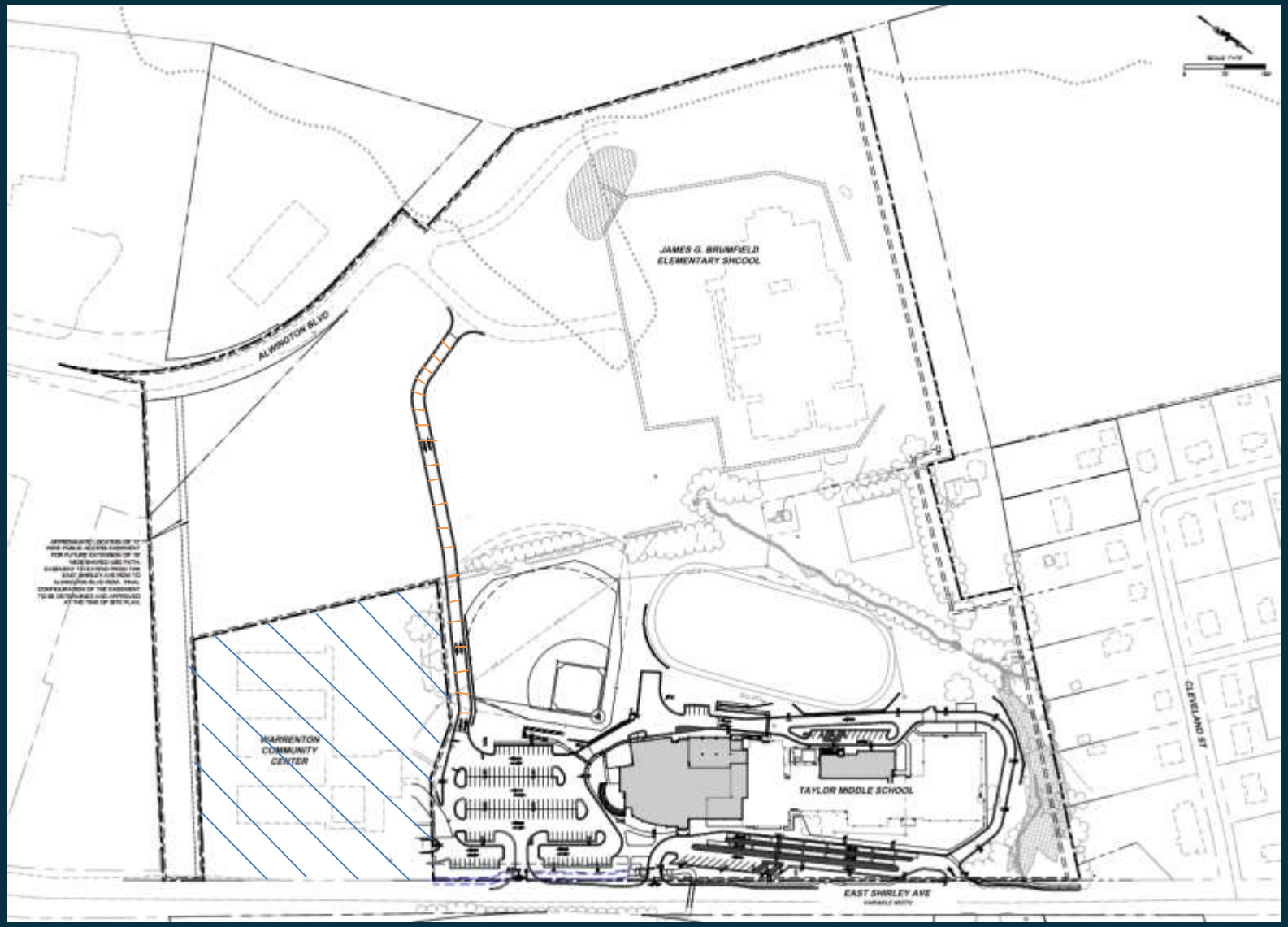


Prior to issuance of 21st occupancy permit for a residential dwelling unit.





SUP Plan



Proposed SUP Plan

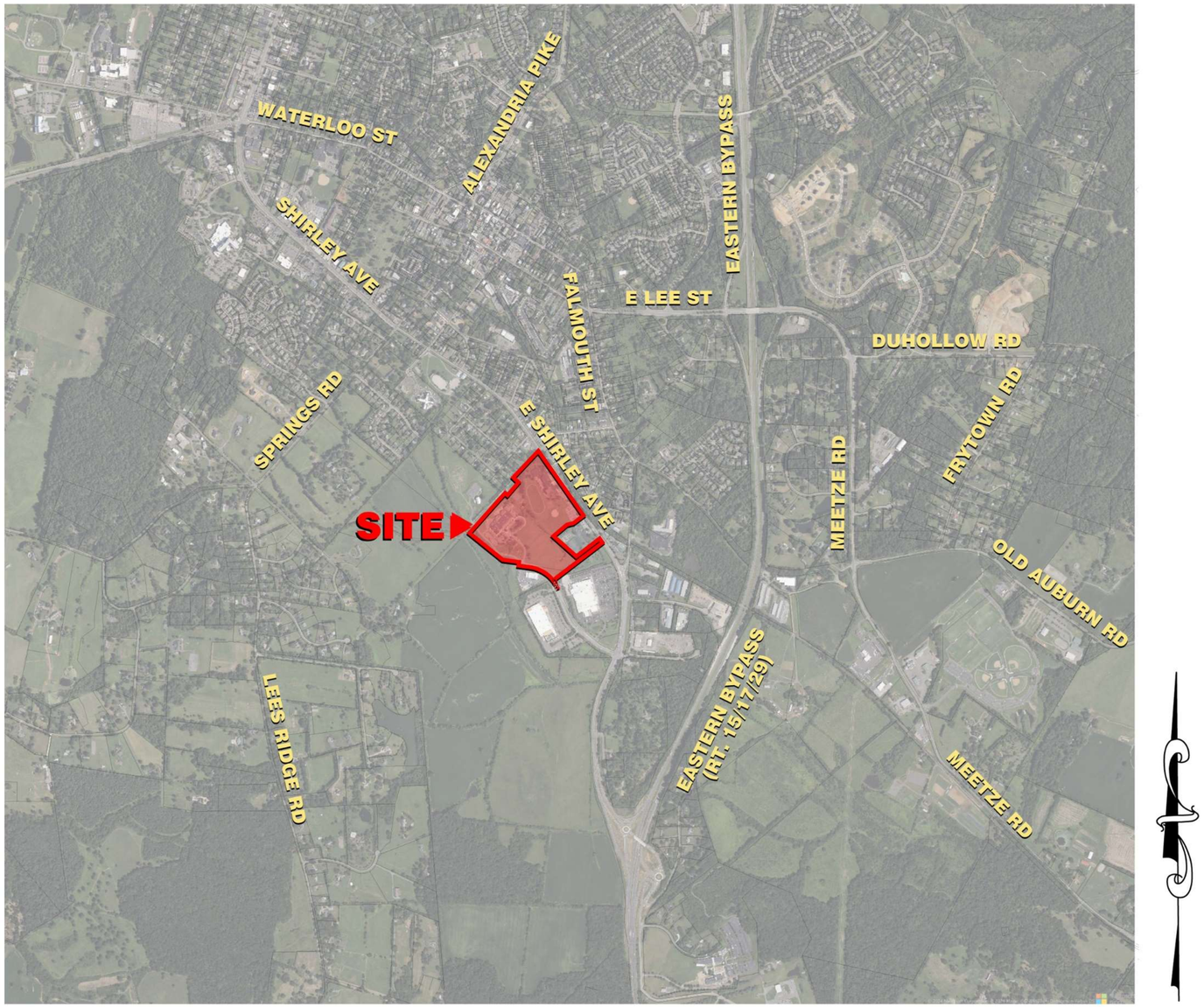
TAYLOR MIDDLE SCHOOL

ADDITION & RENOVATION

FAUQUIER COUNTY PUBLIC SCHOOLS

350 EAST SHIRLEY AVENUE
WARRENTON, VA 20186

TIMMONS GROUP
ENGINEERING | DESIGN | TECHNOLOGY



VICINITY MAP

FAUQUIER COUNTY PUBLIC SCHOOLS

TAYLOR MIDDLE SCHOOL ADDITION & RENOVATION

350 EAST SHIRLEY AVENUE

WARRENTON, VA 20186

TIMMONS GROUP

ENGINEERING | DESIGN | TECHNOLOGY

PROUD LEGACY

- **IN 1952, WILLIAM C. TAYLOR HIGH SCHOOL OPENED AS THE FIRST HIGH SCHOOL TO SERVE AFRICAN AMERICAN STUDENTS IN THE WARRENTON AREA. MANY W.C. TAYLOR ALUMNI REMAIN ACTIVE MEMBERS OF THE WARRENTON COMMUNITY. THE SCHOOL'S HISTORY AND STRONG ROOTS MAKE THIS BUILDING A LANDMARK FOR MANY IN THE LOCAL COMMUNITY.**

- **MANY DESCENDANTS OF W.C. TAYLOR HIGH SCHOOL ALUMNI HAVE ATTENDED, OR CURRENTLY ATTEND, WHAT IS NOW CALLED W.C. TAYLOR MIDDLE SCHOOL. THE SHARED USE OF THE W.C. TAYLOR BUILDING OVER MULTIPLE GENERATIONS HAS ENHANCED THE COMMUNITIES SENSE OF PRIDE AND HERITAGE.**

- **THE W.C. TAYLOR AUDITORIUM CARRIES A RICH LEGACY OF IT'S OWN. THE AUDITORIUM HAS SERVED AS A POPULAR ENTERTAINMENT VENUE, HOSTING MANY WELL-KNOWN REGIONAL AND NATIONAL ARTISTS. THE AUDITORIUM IS A PARTICULARLY IMPORTANT SPACE FOR MEMBERS OF THE W.C. TAYLOR HIGH SCHOOL ALUMNI COMMITTEE.**

- **THE PROPOSED ADDITION / RENOVATION OF W.C. TAYLOR MIDDLE SCHOOL STRIVES TO PRESERVE THE HISTORIC NATURE OF THE EXISTING BUILDING, WHILE IMPROVING THE LEARNING ENVIRONMENT FOR IT'S STUDENTS AND STAFF. THE PROPOSED ADDITIONS COMPLIMENT THE ARCHITECTURE OF THE EXISTING BUILDING, INCREASE STUDENT CAPACITY, AND ALLOW FOR A MORE FUNCTIONAL AND ENERGY EFFICIENT SCHOOL.**

PROJECT HISTORY

FAUQUIER COUNTY PUBLIC SCHOOLS

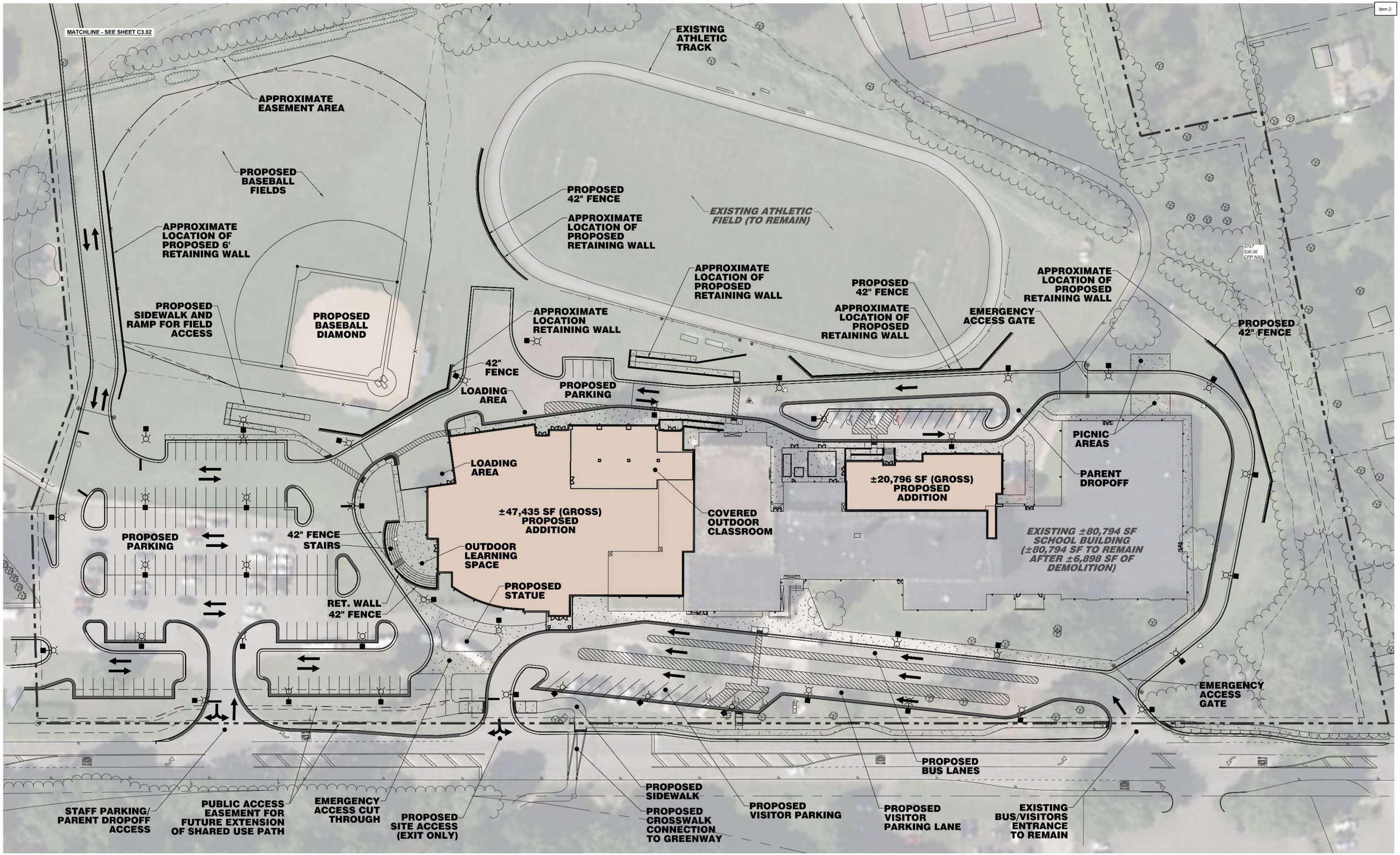
TAYLOR MIDDLE SCHOOL ADDITION & RENOVATION

350 EAST SHIRLEY AVENUE

WARRENTON, VA 20186

TIMMONS GROUP

ENGINEERING | DESIGN | TECHNOLOGY



PROPOSED SITE LAYOUT

FAUQUIER COUNTY PUBLIC SCHOOLS

TAYLOR MIDDLE SCHOOL ADDITION & RENOVATION

350 EAST SHIRLEY AVENUE

WARRENTON, VA 20186

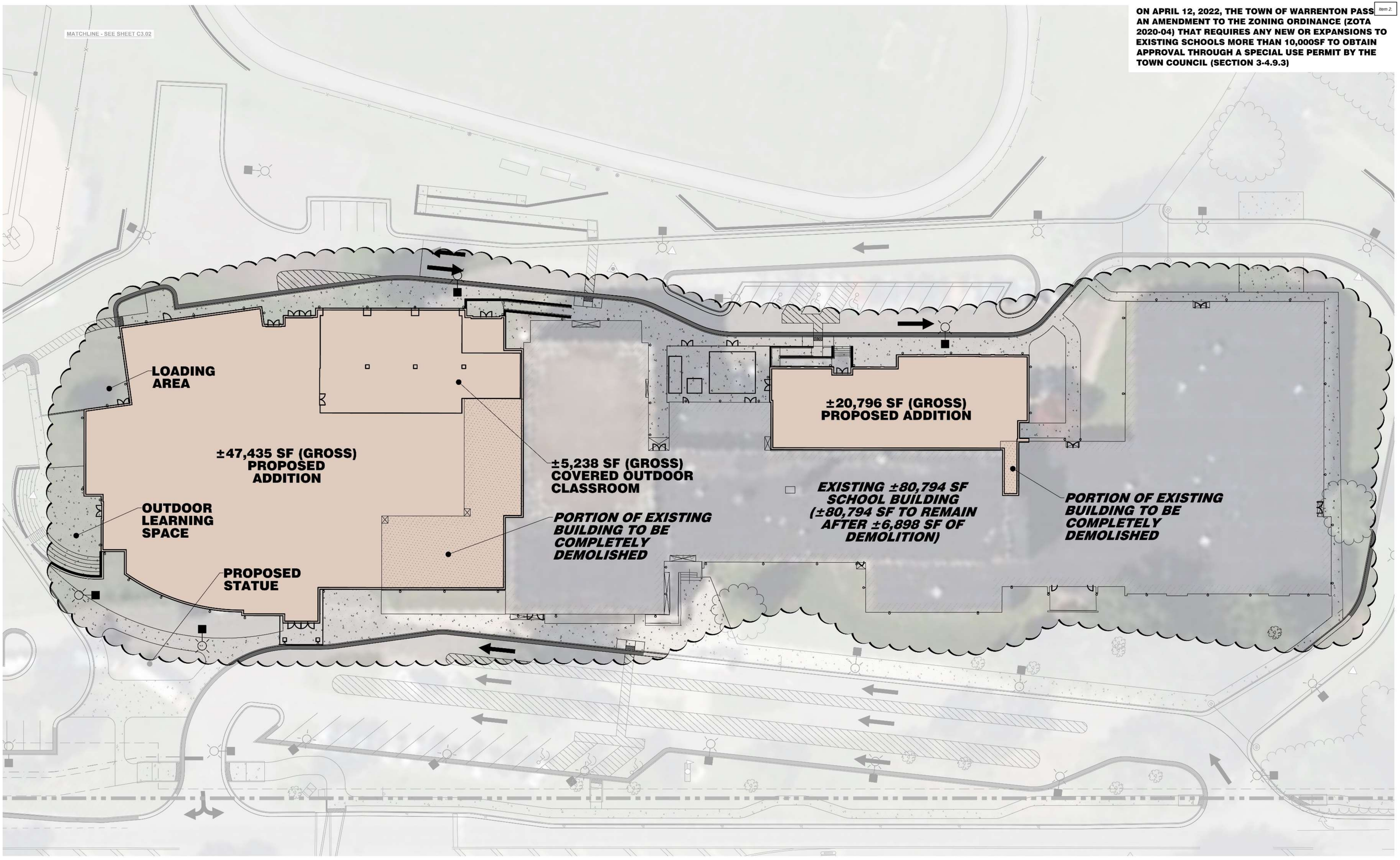
TIMMONS GROUP

ENGINEERING | DESIGN | TECHNOLO

ON APRIL 12, 2022, THE TOWN OF WARRENTON PASSED AN AMENDMENT TO THE ZONING ORDINANCE (ZOTA 2020-04) THAT REQUIRES ANY NEW SCHOOL, OR EXPANSION TO AN EXISTING SCHOOL, GREATER THAN 10,000 SQUARE FEET TO OBTAIN APPROVAL THROUGH A SPECIAL USE PERMIT BY THE TOWN COUNCIL (SECTION 3-4.9.3)

TIMMONS GROUP
ENGINEERING | DESIGN | TECHNOLOGY

ON APRIL 12, 2022, THE TOWN OF WARRENTON PASS AN AMENDMENT TO THE ZONING ORDINANCE (ZOTA 2020-04) THAT REQUIRES ANY NEW OR EXPANSIONS TO EXISTING SCHOOLS MORE THAN 10,000SF TO OBTAIN APPROVAL THROUGH A SPECIAL USE PERMIT BY THE TOWN COUNCIL (SECTION 3-4.9.3)



SPECIAL USE SITE FEATURES

FAUQUIER COUNTY PUBLIC SCHOOLS

TAYLOR MIDDLE SCHOOL ADDITION & RENOVATION

350 EAST SHIRLEY AVENUE

WARRENTON, VA 20186

TIMMONS GROUP

ENGINEERING | DESIGN | TECHNOLO

THIS APPLICATION ALSO REQUESTS A ZONING MODIFICATION TO Z.O. 2-19.4, TO PERMIT SITE RETAINING WALLS TO EXCEED 6' IN HEIGHT, IN ORDER TO:

- **AVOID/MINIMIZE IMPACT TO EXISTING WETLANDS**
- **MINIMIZE CLEARING AT THE NORTH/NORTHWEST SIDE OF THE BUILDING ADJACENT TO THE PROPOSED EMERGENCY ACCESS ROAD.**
- **PRESERVE AND MAINTAIN THE EXISTING GRAVEL TRACK AND BASEBALL FIELD.**

TIMMONS GROUP
ENGINEERING | DESIGN | TECHNOLOGY

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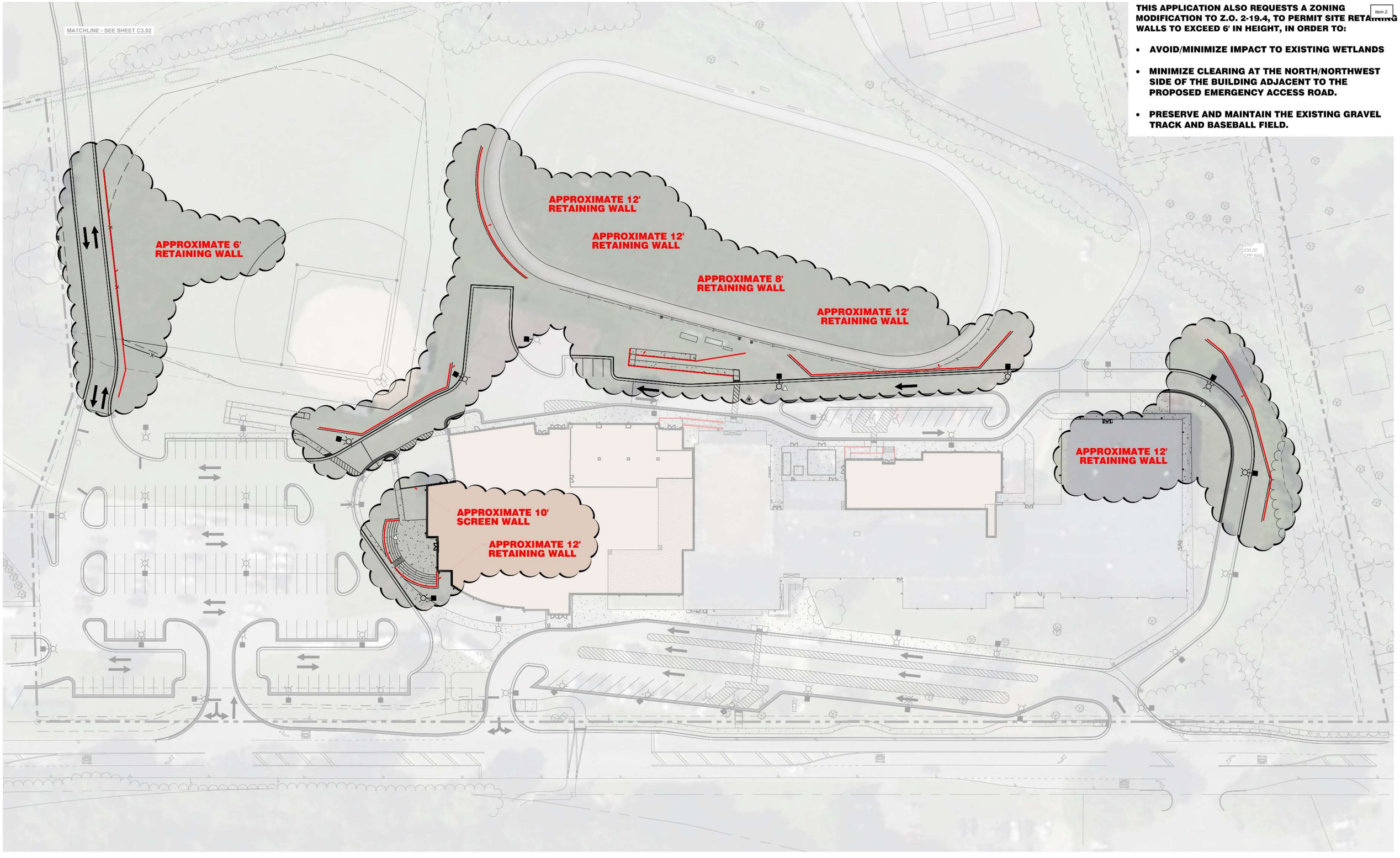


WAIVER REQUESTS

FAUQUIER COUNTY PUBLIC SCHOOLS

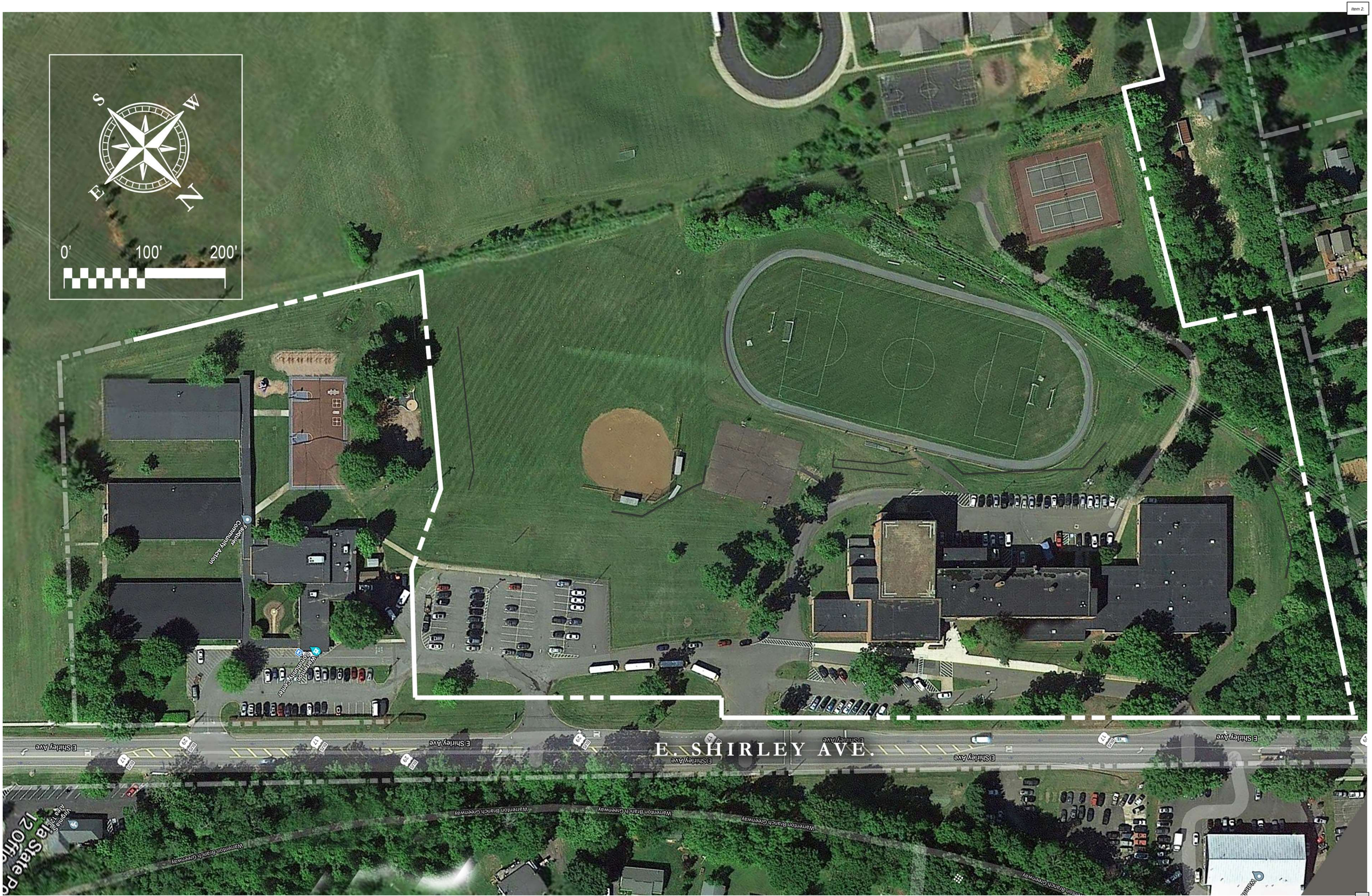
TAYLOR MIDDLE SCHOOL ADDITION & RENOVATION

350 EAST SHIRLEY AVENUE

WARRENTON, VA 20186

TIMMONS GROUP

ENGINEERING | DESIGN | TECHNOLOGY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Fauquier Community Action
Virginia Community Center


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TAYLOR
MIDDLE SCHOOL
RENDERINGS FOR ILLUSTRATIVE PURPOSES ONLY


TAYLOR
MIDDLE SCHOOL
RENDERINGS FOR ILLUSTRATIVE PURPOSES ONLY


TAYLOR
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RENDERINGS FOR ILLUSTRATIVE PURPOSES ONLY


JAMES G. BRUMFIELD
ELEMENTARY SCHOOL
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ADDITION
±20,796 SF
EXISTING SCHOOL
SECURE ENTRY
VISITOR PARKING
BUS DROP-OFF
E. SHIRLEY AVE.

TOWN OF WARRENTON
Department of Community Development
PO BOX 341
WARRENTON, VIRGINIA 20188
http://www.warrentonva.gov
TELEPHONE (540) 347-1101
FAX (540) 349-2414

February 9, 2024

Timmons Group
Attn: Luke Fetcho
20110 Ashbrook Place, Suite 100
Ashburn, VA 20147

RE: Special Use Permit Application (SUP 23-4) Taylor Middle School– Second Round Agency Comments

Dear Mr. Fetcho:

The attached comments are for the above refenced application that was officially accepted as of this date, September 29, 2023, with second submission received January 18, 2024.

REFERRAL AGENCY COMMENT SUMMARY			
Referral Agency	**Date**	**Outstanding Issues**	**Attached**
Planning	2/5/24	SUP Plan, multi-modal connections, transportation	X
Town Transportation Consultant	2/6/24	TIA comments, circulation, multi-modal connections	X
Zoning	2/7/24	Multiple SUP Plan and Zoning requirements	X
PW/PU	2/9/24	Water and sewer coordination	X
Emergency Service	1/22/24	Access gates	X
Police Department	2/7/24	No updates	X
VDOT	2/6/24	Pipeline Study, shared use path, design	X
Town Attorney		Review with Second Submission Conditions of Approval when submitted	

General overall comments continue to relate to the parcels relationship to the greater transportation network both internally and multi-modal interconnections. The Applicant should be aware that decision makers usually look at conditioning items like elevations, mitigating transportation impacts, refuse locations, and the other factors contained Article 11-3.10.3 of the Zoning Ordinance. All comments received to date are attached.

The application is scheduled for a Planning Commission work session on Tuesday, February 20, 2024 at 7:00 PM in Town Council Chambers.

Please do not hesitate to contact me at (540) 347-1101 X313 if you have any questions.

Sincerely,

Denise Harris

Denise Harris, AICP
Planning Manager

TOWN OF WARRENTON
Department of Community Development
PO BOX 341
WARRENTON, VIRGINIA 20188
http://www.warrentonva.gov
TELEPHONE (540) 347-1101
FAX (540) 349-2414

PLANNING STAFF COMMENTS

DATE: February 5, 2024

SUBJECT: Special Use Permit Application (SUP 23-4) Taylor Middle School
Planning 2nd Review Comments

The Applicant is requesting a SUP for an expansion to an existing middle school. The property is zoned Public/Semi Public (PSP) and is approximately 39.18 acres. Article 3-4.9.3 of the Town of Warrenton's Zoning Ordinance (ZO) allows school expansion to existing facilities equal to or over 10,000 square feet with the approval of a Special Use Permit by Town Council.

General Comments

The applicant has stated they are aware that as presented the SUP, and if approved, the subsequent Conditions of Approval, will apply to the entire parcel. If there are proposed modifications to either Taylor Middle School or Brumfield Elementary the approved SUP Plan may need to be amended.

The applicant has indicated the fields are not to be lit.

Fauquier County approved the Arrington rezoning modifications to lift the age restriction proffer. If developed, the residential units located to the southwest will utilize both the elementary and middle schools. The applicant should be aware of the Concept Development Plan and Proffers related to this rezoning as it contains three development options. At this time, the property is located in the County with associated proffers. However, if it boundary line adjusts into the Town there are several additional proffers will be triggered that may impact the schools.

Plan Warrenton 2040

Plan Warrenton 2040 designates Taylor Middle School in the Greenway and Makers Character District. The summary of this district *states "Future planning shall ensure that the Town, county, and School District properties are walkable and accessible from adjoining neighborhoods...The Greenway and Makers District will maintain the current zoning of 35 feet, or one to three stories, as a transition zone in areas adjacent to the Warrenton Branch Greenway, industrial zoned areas and where James Brumfield Elementary, Taylor Middle School, and the Warrenton Community Center are located."* Shirley Avenue is

considered a "Boulevard" road on the Warrenton Street Typology Map. The following are statements from chapters of the comprehensive plan as they relate to schools.

Community Facilities

Vision includes key aspirations of fostering high quality, equitable, and accessible community facilities; reinforcing the role of County community facilities into the Town fabric; and promoting livability through properly located schools.

CF-1.12 Encourage schools to retain their presence in Town in walkable, safe, environmentally appropriate locations.

CF-3.7 All public facilities and utilities should be designed and developed so as to limit environmental degradation and protect the public environment. Safeguard floodplain and environmentally critical areas through the prohibitions against public facility development.

Previous Staff Comment: The applicant should explore options to interconnect Taylor Middle School with the surrounding neighborhoods through multi-modal bicycle/pedestrian facilities. Careful attention should be given to the potential environmental impacts as the proposal includes retaining walls, a new road, and relocated fields. In addition, Brumfield Elementary, located on the same parcel, contains a wetland that was constructed as part of a grant from the Virginia Department of Game and Inland Fisheries as part of the County and Town MS4 programs. How will the proposal impact the wetlands?

Comment Remains: The applicant provided for a right-of-way easement for a multi-use trail on the southern portion of the property adjacent to Walmart. However, there is no connection being built between the elementary and middle school or to the Community Center along the frontage of Shirley Avenue. Nor is there a sidewalk provided on the access road. This will lead to students and residents walking on the access road and through parking lots to create a potentially dangerous situation when mixed with vehicles.

Historic Resources

Taylor Middle School opened in 1952 as a segregated high school. Named after William C. Taylor who served as the principal for the Warrenton Rosenwald School, the school has stood as an important landmark to the Town's history. It became an integrated junior high in 1969.

While the school is not located within the Town's historic district and it not designated on the National Register, it is an important historical resource. Plan Warrenton 2040 includes the following Historic Resources goals:

- Conserve, reuse, and promote historic resources to enhance the Town's sense of place...
- Preserve the authenticity and tell the stories of historic resources for generations to come through documentation.
- Educate the community on the value of the historic resource.
- Enhance the environment through preservation and sustainability best practices.

Previous Staff Comment:

The Applicant's Statement of Justification acknowledges the historical importance of the school. Town staff is available to help facilitate discussions between the applicant and the Virginia Department of Historic Resources as there is a strong desire to help preserve and celebrate African American Heritage sites.

Comment Remains: The applicant provided more detail on how the middle school will work to preserve the historical significance of the school. Town staff offers to help in any fashion on facilitating conversations regarding Historic Resources.

Transportation and Circulation

"Make Shirley Avenue walkable, with continuous sidewalks that are lined with street trees."

Plan Warrenton 2040 includes a Transportation Plan map that includes improvements to Shirley Avenue as well as bicycle and pedestrian connections. Both comprehensive plans for Fauquier County and the Town illustrate this property as a key linkage for bicycle and pedestrian facilities from neighborhoods to the north, west, and south.

Previous Staff Comment: Taylor Middle School and Brumfield Elementary are located on a key public parcel to link neighborhoods and trails to the schools through bicycle and pedestrian connections. Both the Town of Warrenton and Fauquier County comprehensive plans indicate these important linkages on the adopted maps. This is an opportunity for the FCPS, the Town, and VDOT to work together to ensure these linkages are achieved.

Comment Remains: The applicant provided right of way dedication for a multi-use trail on the southern portion of the property but stated it does not intend to build walkable access points from the south or west to access the school. The existing sidewalk on a portion of Shirley will remain with the connection to the Greenway. The VDOT Pipeline Study is currently recommending this is upgraded to an upgraded Pedestrian Hybrid Beacon and a shared use path along the frontage of Shirley Avenue from the crossing to the southern portion of the property.

Land Use and Character District

Greenway and Makers Character District will be promoted as the southern gateway into Town and maintain the critical linkages between education, civic uses and the surrounding neighborhoods. L-5.1 states "The Town, County, and School District properties should be walkable and accessible from the adjoining neighborhoods."

Previous Staff Comment: Schools serve as vital community centers for residents. The Town is dedicated to enhancing its walkability and looks forward to working with the schools and VDOT to bring this to fruition.

Comment Remains: There is no multi-modal infrastructure provided to the west or between the existing schools.

Transportation

A TIA was provided and is being reviewed with the SUP plans by VDOT and the Town's transportation consultant (see attached Kittleson comments). In 2017, the Town conducted Walkability Audits and published a Complete Streets Guide. Both these documents were incorporated and adopted into the 2040 Plan Warrenton comprehensive plan (see above). In addition, VDOT is currently undertaking a "Pipeline Study" of Shirley Avenue to assess multi-modal safety, accessibility, and capacity.

Previous Staff Comment: It would be beneficial for the applicant to meet with the Town, VDOT, and the County to discuss the larger transportation picture in this area. There may be opportunities to ensure the safety and operational efficiencies of both the elementary and middle schools, and ensure multi-modal linkages to adjacent neighborhoods and the Greenway.

Comment: The applicant met with VDOT, the County, and the Town to discuss the larger transportation initiatives and the key role the school parcel plays. As a result of this meeting, the applicant modified the access road alignment and has indicated right-of-way dedication provisions for a multi-use trail on the southern portion of the property adjacent to Walmart and the frontage along Shirley Avenue. However, as the Pipeline Study has progressed, taking the ideas from this meeting into account, there are recommendations for a shared use path along Shirley Avenue from the Greenway crossing south and an upgraded Pedestrian Hybrid Beacon.

Fauquier County Service District

This property is adjacent to the Town/County boundary and serves the surrounding student population of both Warrenton and Fauquier County. An active Rezoning and Special Exception application for Arrington was just passed by the Fauquier County Board of Supervisors that lifts the age restricted housing.

Previous Staff Comment: The property that encompasses Brumfield Elementary and Taylor Middle School will be in easy walking distance from adjacent neighborhoods.

Comment: Fauquier County Board of Supervisors and the Warrenton Town Council have passed resolutions regarding the property owner of the Arrington parcels desire to boundary line adjust into the Town. The applicant is encouraged to review the rezoning and proffers approved by Fauquier County as they contain three development scenarios with proffers that may impact the schools. The applicant did take into account potential transportation improvements at the Brumfield entrance; however, there may be additional proffers related to sewer and other miscellaneous items that interest the applicant.

Legal Comments Provided by Town Attorney

Major Safety Issue

The proposed 12' retaining wall shown on the plan page C3.01 is an ongoing safety issue for a middle school campus. The presence of a 42" fence at the top, as addressed in the Timmons Group Jan. 12 letter, does not necessarily mitigate the impact of this safety issue under the circumstances presented. The justification advanced for the retaining wall in excess of 6' consists solely of (1) minimizing impact to wetlands, (2) minimize clearing on that side of the building adjacent to the proposed emergency access road, and (3) maintaining the existing gravel track and

diamond field. Those are design choices that do not dictate the creation of a retaining wall twice the height of a by-right retaining wall.

Additional Issues

The following are all comments about Page C1.01 of the plans:

1. The project narrative references a site plan; this is incorrect.
2. Site Information Note 2 references a "Jeffrey A. Smeraldo" without indicating his affiliation or qualifications.
3. Note 7 (on floodplain coverage) is unclear because the portions after the first semicolon lack a verb. This needs to be rewritten for clarity.

KITTELSON & ASSOCIATES

TECHNICAL MEMORANDUM

Taylor Middle School Traffic Impact Study (2nd Submittal) Review

Date:	February 6, 2024	Project #: 284490.007
To:	Denise Harris, AICP	
From:	Liz Byrom, PhD, PE; and Chris Tiesler, PE, PTOE	

At the request of the Town of Warrenton, Virginia, Kittelson & Associates, Inc. (Kittelson) reviewed the following documents related to the proposed expansion of Taylor Middle School:

- Taylor Middle School Traffic Impact Analysis (TIA), second submittal dated January 12, 2024, prepared by Timmons Group (Reference 1)
- Taylor Middle School Special Use Permit application and supporting documentation (Reference 2).

All analysis inputs and assumptions were reviewed according to Virginia Department of Transportation (VDOT) *Traffic Operations and Safety Analysis Manual* (TOSAM) and requirements (Reference 3).

FINDINGS AND RECOMMENDATIONS

The following comments are related to function of the proposed development and its impact on the adjacent transportation system:

- Volumes between Site Entrances on Shirley Avenue are still not balanced even though there are no driveways between the intersections that could result in the addition/subtraction of trips. For example, on Figure 8-1, 42 trips are added southbound on Shirley Avenue between Site Entrance #2 and #3 during the AM peak hour. Other smaller imbalances between Site Entrances #1, #2, and #3 exist in all three study time periods and analysis scenarios. Because Site Entrances #2 and #3 operate with minor-street stop control, mainline volumes on Shirley Avenue and the availability of gaps in those traffic streams directly influence the calculated levels of service (LOS), capacity, and forecast 95th percentile queue lengths of critical movements. While the reported traffic operational results indicate that the minor-street stop-controlled movements generally operate within acceptable operational thresholds, these imbalances (and other revisions noted below that may impact traffic operations) should be corrected.

- The TIA does not discuss anticipated pedestrian or bicycle activity between the elementary and middle schools, and the site plan does not identify a route or designated facility to provide for such activity/movements. Given the nature of the middle school and surrounding land uses, pedestrian and bicycle activity between and amongst the residential development (Arrington

Development), two school campuses, and the adjacent community center are likely and should be addressed/accommodated.

- The revised site plan provides approximately 70 feet of throat depth for exiting traffic at Site Entrance #3. However, the analysis shows that during the 2032 School PM peak hour, the forecast 95th percentile queue will be 100 feet. Under this condition, one to two vehicles in the queue will still be stored along the internal perpendicular drive aisle (could be from either direction or both), which may adversely impact on-site circulation and parking maneuvers for several parking spaces in the vicinity of this internal intersection. The current location of Site Entrance #3 in the middle of the parking field also creates unusual "dead end" parking drive aisles closest to Shirley Avenue. Parking maneuvers in these drive aisles may be difficult and could also lead to this portion of the parking lot being underutilized. See **Attachment A** for a rough sketch of an alternative alignment/location for Site Entrance #3 that may provide better separation of parent pick-up/drop off activity and parking circulation. Our cursory review indicates that the northbound left-turn lane on Shirley Avenue could be shifted south to this new entrance and still be developed within the available physical distance between this entrance and the adjacent community center driveway to the south.

- It is unclear what on-site route parents doing pick-up/drop-off should take after entering Site Entrance #3. Does the school intend to have staff direct parents to the appropriate path in order not to complicate student pick-up/drop off? Is wayfinding signage proposed on-site? The current layout of the parking lot will tend to mix vehicles parking and those performing pick-up/drop-off activities, which could create added friction and on-site circulation challenges.

- Page 1-5: Per comments above, the expansion of the middle school will impact local connectivity, especially with the elementary school. Kittelson recommends replacing "no impact on the surrounding network" text with additional narrative that better reflects the anticipated circulation and travel patterns of all modes between the adjacent land uses (two schools, nearby residential development, and community center) as well as planned parent pick-up/drop-off routing of kiss-n-ride vehicular traffic.

- The Synchro files are not utilizing appropriate peak hour factors (PHF) in the future conditions. For example, the intersection of Shirley/Culpepper in the existing conditions has a PHF of 0.88. In the 2026 background conditions, it increases to 0.94. Another example is that the James Madison Highway/Alwington Boulevard intersection has a PHF of 0.86 in the existing conditions and 0.95 in 2026 conditions. Per TOSAM, the future conditions analyses should assume a default PHF of 0.92 when PHF is lower in existing conditions.

- The special use permit plan (C3.01) shows storage lengths that are not consistent with the storage listed on page 6-4. The western entrance (Site Entrance #1) right turn has storage of 85 feet and taper of 50 feet. The northbound left turn for this entrance has 50 feet of taper length that is not

included in the model. Per TOSAM, Synchro and SimTraffic models should reflect "effective storage length", which is equal to the existing striped storage length plus half of the taper length.

- Design plans and traffic analyses should be updated to address these comments so that the operational performance and anticipated queue lengths at the Site Entrances are still adequate and forecast queues can be stored within available turn lane lengths and will not adversely impact on-site circulation or parking maneuvers. After these changes, please confirm that queues are still maintained within the provided storage.

The following comments list minor technical or typographical errors noted in the TIA and analysis files through our review. While we don't anticipate these to fundamentally affect the conclusions or recommendations of the TIA, they should be addressed/corrected to support the technical accuracy of the TIA:

- **Page 2-1**: There appears to be a typo "Route 17 carries approximately 9,700~~0~~ vehicle per day." In addition, we recommend using consistent naming conventions throughout the document when referring to roadways (e.g., Route 15 versus US 15).
- **Page 2-2**: The sentence "No VDOT traffic data available for Alwington Boulevard" is not needed as volumes are provided in the following sentence.
- **Page 3-3**: We recommend that actual lane widths be approximated rather than a standard 12' for all approaches. The existing lane widths along Shirley Avenue appear to be closer to 11'.
- **Page 6-2**: We recommend that sub bullet 'a' be separated from bullet '6' like you have done in other sections.
- Typos are present in the operational summary tables. For example, the WBT at Culpepper St/Shirley Ave in the 2026 Background – School PM peak show a delay of 2.7 seconds and a LOS A. However, the Synchro results show that the calculated delay is 22.7 seconds and has a LOS of C. All tables should be reviewed and corrected. Related text should also be updated.
- Synchro: We recommend all analysis files and level of service tables be updated to reflect any changes related to the comments above.
- Page numbers appear to be off. For example, Section 6 starts on page 6-2.

Thank you for the opportunity to review. If you have any questions, please contact us at 919.473.9529.

ATTACHMENTS

Attachment A – Alternative Site Entrance #3 Location Sketch

REFERENCES

1. Timmons Group. Taylor Middle School – Addition Traffic Impact Analysis. September 2023.
2. Timmons Group. Taylor Middle School Special Use Permit application and supporting documentation. January 2024.

3. Virginia Department of Transportation. *Traffic Operations and Safety Analysis Manual* – Version 2.0. February 2020.

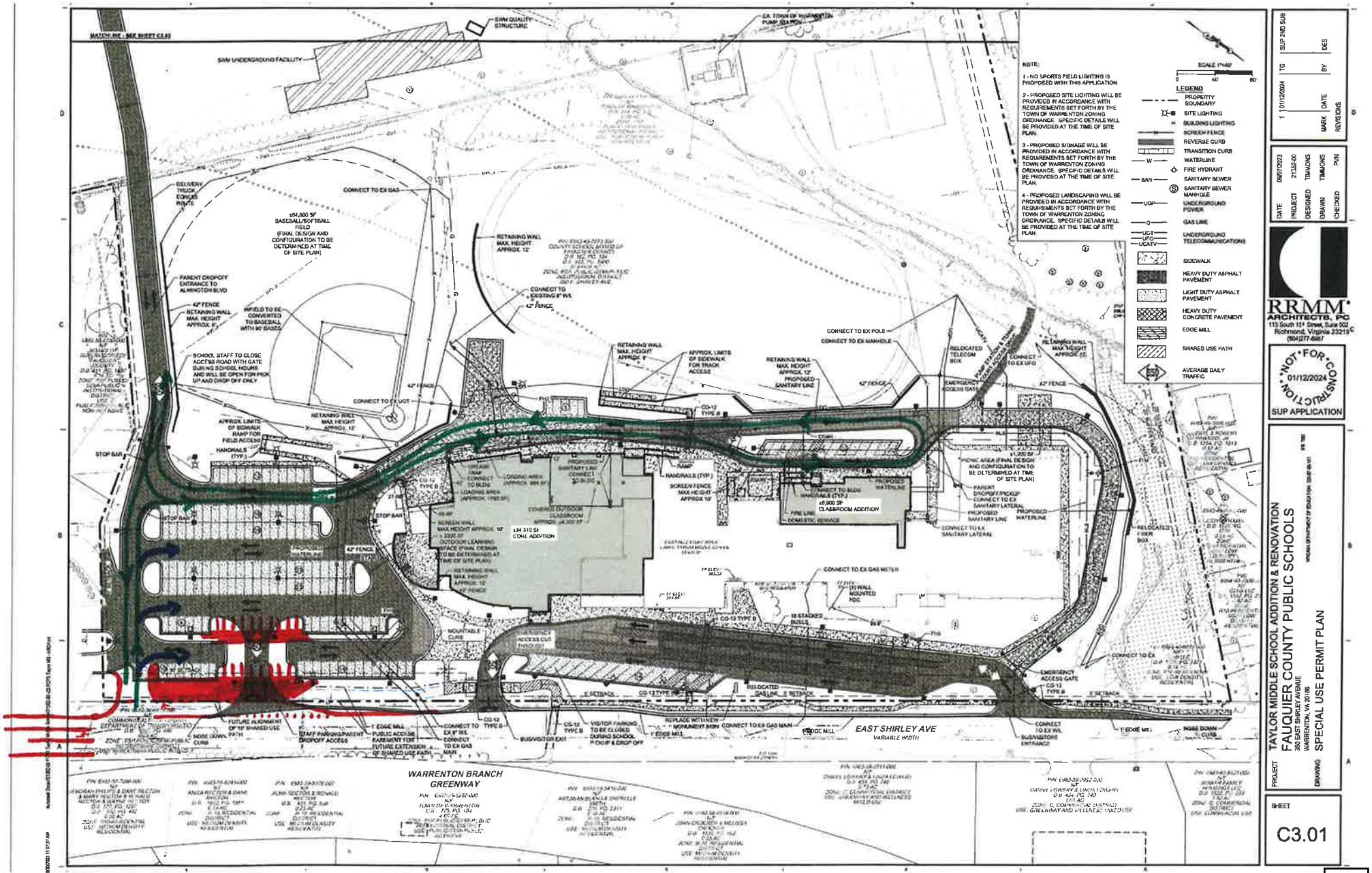
DISCLAIMER

This memorandum prepared by KITTELSON & ASSOCIATES INC. merely represents our professional, unbiased opinion with regard to the deliverable. This opinion is based solely on KITTELSON & ASSOCIATES, INC.'S evaluation of the information provided by the Town of Warrenton, and should not be considered an exhaustive review, insurance against errors or omissions in the deliverable, or advocacy of the intended project. The Town of Warrenton agrees that the purpose and intent of KITTELSON & ASSOCIATES, INC.'S evaluation of the deliverable is to reduce the risk of errors or omissions only and not to eliminate such risk. KITTELSON & ASSOCIATES, INC. offers no warranty or guarantee with regard to this plan review.

Attachment A

Alternative Site Entrance #3

Concept Sketch



MARK	DATE	REVISIONS	BY	DES
1	01/12/2024	SUP 2ND SUB	TG	

DATE	08/07/2023
PROJECT	21352-00
DESIGNED	TIMMONS
DRAWN	TIMMONS
CHECKED	PWN

RRMM ARCHITECTS, PC
113 South 15th Street, Suite 502
Richmond, Virginia 23219
(804)277-8487

NOT FOR CONSTRUCTION
01/12/2024
SUP APPLICATION

PROJECT: TAYLOR MIDDLE SCHOOL ADDITION & RENOVATION
FAUQUIER COUNTY PUBLIC SCHOOLS
350 EAST SHIRLEY AVENUE
WARRENTON, VA 20186
VIRGINIA DEPARTMENT OF EDUCATION

DRAWING: SPECIAL USE PERMIT PLAN

SHEET
C3.01

TOWN OF WARRENTON
Department of Community Development
PO BOX 341
WARRENTON, VIRGINIA 20188
http://www.warrentonva.gov
LandDevelopment@warrentonva.gov
(540) 347-2405

STAFF COMMENTS

TO: Denise Harris, AICP, Planning Manager

FROM: Amber Heflin, CZA, Zoning Official

DATE: February 7, 2024

SUBJECT: Taylor Middle School, 244 Waterloo Street (6983-48-7973-500)
SUP 2023- 4
Submission 01/18/2024; 2nd Review

I. Zoning Ordinance Review

The following analysis is based on the relevant Articles of the Zoning Ordinance.

Article 7 – Parking

Staff comment: ***Advisory comment remains:*** Staff will verify the proposed spaces will meet the required minimum dimensions at the time of site development plan.

The applicant will be required to demonstrate that parking stalls and drive aisle widths will meet minimum requirements at the time of site plan submission. Staff is unable to determine that these requirements have been met at this time.

Staff comment: *Comment remains*: Provide justification that two loading spaces will be adequate to handle the needs of the use.

Clarification: Justification with this submission is utilizing calculations within the Fauquier County Zoning Ordinance. The Town has separate requirements located under Article 7-18 of the Town of Warrenton Zoning Ordinance. Revise justification.

Article 8 – Landscaping

Staff comment: ***Advisory comment remains***: Staff is unable to verify landscaping requirements as no landscaping details have been provided. The statement of justification provided by the applicant notes landscaping will be addressed at the time of site plan submittal.

The applicant will be required to address landscaping at the time of site plan submittal. Zoning staff is unable to complete a full review to verify that landscaping requirements have been met at this time.

Article 9-8 – Lighting

Staff comment: ***Advisory comment remains***: The statement of justification acknowledges all lighting must meet the requirements of the Zoning Ordinance. All fixtures on site will require conformance to current lighting standards, and the photometric plan will be reviewed at the time of site plan submittal.

The applicant will be required to address site lighting at the time of site plan submittal. Zoning staff is unable to complete a full review to verify that lighting requirements have been met at this time.

Staff comment: *Comment remains*: The applicant provided a preliminary photometric plan for review with the SUP submittal, and staff is concerned that the site lighting proposed along Shirley Avenue will exceed 1.0 footcandle at the property line.

Clarification: Overall, the preliminary lighting plan looks acceptable. However, Zoning staff still has concerns about the site lighting at the entrances along Shirley Avenue. A more in-depth review of lighting requirements will be conducted at the time of site development plan, as fixture details may change.

Staff comment: ***Advisory comment remains***: Fixture cutsheets have not been provided for the proposed wall mounted lighting. Staff is unable to verify if proposed lights will meet Zoning Ordinance requirements.

The applicant will be required to address site lighting at the time of site plan submittal. Zoning Staff is unable to complete a full review to verify that lighting requirements have been met at this time.

Staff comment: ***Advisory comment remains***: Complete lighting plan was not provided with this submittal. The photometric plan only shows site lighting within the travel ways. Revise.

The applicant will be required to address site lighting at the time of site plan submittal. Zoning Staff is unable to complete a full review to verify that lighting requirements have been met at this time. See previous comment regarding the photometric plan.

TOWN OF WARRENTON
Department of Public Works & Utilities
PO BOX 341
WARRENTON, VIRGINIA 20188
http://www.warrentonva.gov
TELEPHONE (540) 347-1858
FAX (540) 349-2414

Memorandum

Date: February 5, 2024

To: Denise Harris, Planning Manager

From: Paul Bernard, Town Engineer
Steven Friend, Assistant Director, Public Utilities
John Ward, Assistant Director, Public Works

Re: SUP-23-04 Taylor Middle School Addition – 2nd Submission

The 2nd submittal provides no additional information than the 1st submission. This process for the Taylor Middle School major building addition SUP, the only comments at this time (which will be answered with more detailed plans) is to ensure that the modification to the access points to public streets, and revisions to the water and sanitary sewer system will need to be well coordinated with the current operations of the Taylor Pump Station and the connections to the existing water main ensuring adequate fire protection for the school. The Town is committed to provide adequate water and sewer facilities to support this program. The final project design will need to demonstrate adequate provisions for stormwater management and erosion and sediment controls meeting all the current Town and State ordinances and requirements including details and calculations as part of the final site plan submittal and review process.

This submittal has included a Statement of Justification (SoJ) that indicates the anticipated water demand and wastewater generation. The current monthly water use averages around 69,000 gallons. That would equate to around 3,450 gallons a day, assuming a 5-day week. The SoJ implies the projected wastewater generation from the new school will be around 15,600 gallons per day. While this is a significant increase over what is currently generated, the existing pumps at the pump station should be able to handle this, however, the Town will need to implement improvements to the current pump station's wet-well and structure.

The Traffic Impact Analysis implies no major impacts to the road network this proposal plans to connect to. This assessment is being reviewed by VDOT for their thoughts on the future planning for improvements to Shirley Highway.

More detailed infrastructure designs and details will be required with the construction site plan submittal and review process. Therefore, I have no additional comments at this time.

Warrenton Volunteer Fire Company, Inc.
167 West Shirley Ave. Warrenton, Virginia 20186
Fire Station 1 (540) 347-0522 EMS Station 1 (540) 347-4873
Business Services (540) 347-3232 Fax (540) 347-6513

MEMORANDUM

Date: October 15, 2023

From: James K. Swain, Fire Chief

To: Denise Harris, Planning Manager
Planning and Community Development – Town of Warrenton

Subject: Comments on Taylor Middle School – 350 East Shirley Ave.

Thank you for taking the time to seek our feedback and recommendations on the proposed project. Please see the bullet points below on some of our thoughts/ideas regarding Fire Department access and our ability to operate at the site during an emergency.

- Please provide information on the sprinkler system.
- Fire Department Connection (FDC) should be 4" stortz connection instead of 2.5" siamese.
- Water supply for FDC? It is on the same side of the building and not across the roadway blocking pathway of responding apparatus.
- Please show locations of all fire hydrants on the property so we can ensure coverage and locations are appropriate.
- Concrete pathway around building – width? Aerial apparatus needs at least 18' to set up for above grade operations i.e., access to the roof via aerial ladder.
- Pathways around building – to utilize ground ladders to access windows or rooflines for firefighters the ground needs to be level for ¼ of the height.
- Access gates around building, how are they secured? Will there be access for FD after hours and/or lock boxes? Due to locations lock boxes should be available on all gates.
- Lock boxes in front of the building are recommended as well as on the rear of the building. Due to the size of the building and the time it takes to walk around it we may need additional. We can coordinate later with FCPS Staff.
- Will there be non-ambulatory students or staff on upper floors? Do we have a plan to shelter in place in a particular classroom? Will that classroom be marked by the outside?
- Will the water supply be upgraded into the complex? Will this be a loop system?
- All curbs be rounded for better access?
- What will be the separation from the old building to the new construction?

Date: January 22, 2024

Subject: 2nd Submission Comments

- Access gates – the plans show they are locked during school hours. We need to design a plan where emergency services can gain access during emergencies.
- No further comments

We are looking forward to commenting on and working with the Town Officials as well as County Public Schools Staff relating to this building during construction and once completion has been achieved.

TOWN OF WARRENTON
POLICE DEPARTMENT
333 Carriage House Lane • Warrenton, Virginia 20186
Telephone (540) 347-1107 • Fax (540) 341-4190

To: Chief T. Carter

From: Major A. Arnold

Date: 02/07/24

Re: CPTED Assessment for Taylor Middle School 2nd Submission

I have reviewed the Special Use Permit paperwork and I have read the responses from the applicant on my suggestions submitted previously.

I have no further recommendations / updates at this time.

COMMONWEALTH of VIRGINIA
DEPARTMENT OF TRANSPORTATION
457 East Shirley Avenue
Warrenton, Virginia 20186

Stephen C. Brich, P.E.
Commissioner

Date: February 06, 2024

To: Denise Harris – Planning Manager Town of Warrenton.

cc: Ben Davison, P.E. VDOT

Re: **Taylor Middle School TIA & SUP** – 2nd Submission

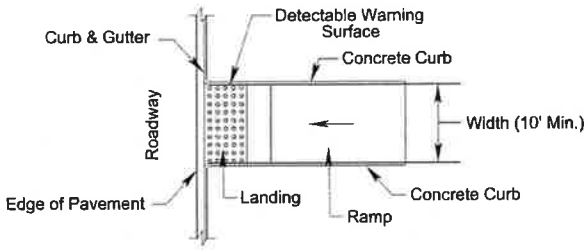
Dear Ms. Harris:

The above referenced Traffic Impact Analysis prepared by Gorove Slade with an engineer seal date of January 12, 2024, and a received by VDOT date of January 24, 2024, has been reviewed.

The following comments are advisory for the Town's consideration.

Special Use Permit Plans:

1. US 17 Business (Shirley Ave) is currently being studied as part of the Project Pipeline. The Pipeline study identified the need for additional Bike and Ped connectivity along Shirley Ave. (Land Use)
2. The shared use path width (10' min) should be extended across East Shirley Ave. The current plan shows narrow CG-12 for the connection with Shirley Ave.



Note: Ramp and Landing to be constructed of Hydraulic Cement Concrete Sidewalk (4" Depth)

Curb & Gutter Typical
(St'd. CG-12, Type B with Buffer Strip)
Not To Scale

FIGURE A(1)-11* ST'D. CG-12 TYPE B FOR SHARED USE PATH WITH CURB & GUTTER

3. While the public access easement for the future trail extension of the shared use path appears to be conceptual feasible, the proposed grading needs to be confirmed in order to ensure that the shared path can be constructed in the future. VDOT recommends that the shared use path is rough

graded with the future site plan. A typical cross section showing existing grades of Shirley Ave, future shared use path and proposed parking lot is recommended.

4. The current/proposed entrance geometry does not appear to meet VDOT standards. The minimum entrance width is 30'. Since this road is within the Town jurisdiction, VDOT will defer to the Town. VDOT recommends that all proposed entrance radius are confirmed with Autoturn movements.

Commercial Entrance Designs along Highways with Curb and Gutter

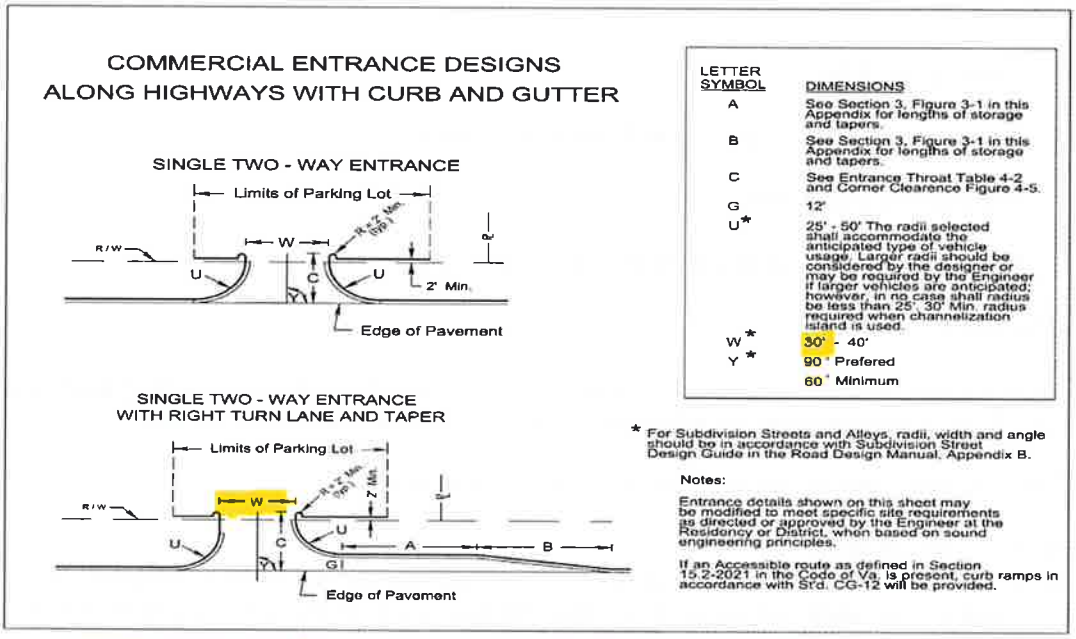


FIGURE 4-10 COMMERCIAL ENTRANCE DESIGNS ALONG HIGHWAYS WITH CURB AND GUTTER*

5. The existing turn lane widths, length of storage, and taper lengths do not appear to meet VDOT min standards. VDOT understands that there are site constraints but standard turn lane geometry is recommended to ensure safety. The SUP plans do not provide enough detail to provide a complete review.

required.

LENGTH OF STORAGE	TAPER - Urban	
Urban - Length determined by capacity analysis for Left and Right Turn Storage (100' Minimum)	- For Design Speeds 50 MPH or Higher	**T - 200' Min.
	- For Design Speeds 45 MPH or Less	**T - 100' Min. (single) **T - 150' Min. (dual)

FIGURE 3-1 RIGHT AND LEFT TURN LANE CRITERIA FOR SINGLE AND DUAL LANES

(*) For instructions on selection of design speed, see *Appendix A1.*

6. Advisory – The parent dropoff access road does not meet corner clearance min. of 225' from Alwington Bvd. Please note that since Alwington Blvd is not currently classified as a major roadway so this comment is advisory.

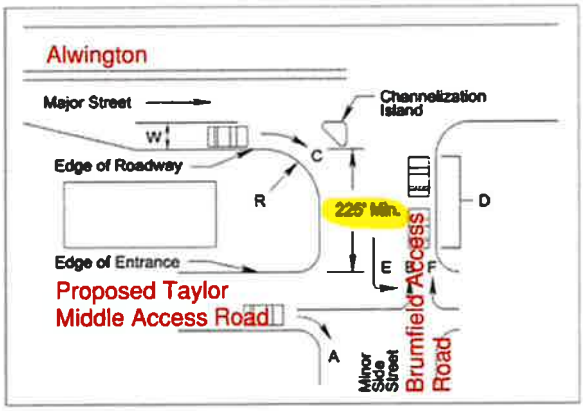


FIGURE 4-5 CORNER CLEARANCE

7. The design speed for the parent dropoff access road to Alwington Blvd should be defined. The retaining wall appears to be within the clearzone of the private access road and should be located either outside of the clearzone or protected with guardrail.
8. Please ensure that clear zone is free of fixed objects and that the slopes within the clear zone meet the town's design requirements based on the proposed design speed.
9. VDOT recommends that the Town ensure that the internal parking lot and internal access roads will handle the school operations.

The Taylor Middle School TIA and SUP was sent to Culpeper District Traffic Engineering and Planning for review. No comments were generated from their review.

Please contact me at 540-229-1164 or craig.simpson@vdot.virginia.gov if there are any questions or concerns.

Sincerely,

Simpson Craig abz63842

Craig M. Simpson, P.E.
Assistant Resident Engineer – Land Use
Warrenton Residency

TIMMONS GROUP

20110 Ashbrook Place
Suite 100
Ashburn, VA 20147

P 703.554.6700
F 703.726.1345
www.timmons.com

March 1, 2024

Denise Harris, AICP
Department of Community Development
Town of Warrenton
PO Box 341
Warrenton, VA 20188

RE: **Taylor Middle School Addition & Renovation – SUP 23-4**
2nd Review

Dear Ms. Harris,

Below are the responses as shown in italic to your comments dated February 9, 2024 for the above referenced project.

Planning Staff Comments

General:

1. The applicant should be aware that as presented the SUP, and if approved, subsequent Conditions of Approval, will apply to the entire parcel. If there are proposed modifications to Either Taylor Middle School or Brumfield Elementary the approved SUP Plan may need to be amended.

   Response: Comment Acknowledged.

2. The applicant has indicated the fields are not to be lit.

   Response: Comment Acknowledged.

3. Fauquier County approved the Arrington rezoning modifications to lift the age restriction proffer. If developed, the residential units located to the southwest will utilize both the elementary and middle schools. The applicant should be aware of the Concept Development Plan and Proffers related to this rezoning as it contains three development options. At this time, the property is located in the County with associated proffers. However, if it boundary line adjusts into the Town, several additional proffers will be triggered that may impact the schools.

   Response: Comment noted. We have reviewed the referenced proffers as recommended.

Community Facilities:

4. The applicant provided for a right-of-way easement for a multi-use trail on the southern portion of the property adjacent to Walmart. However, there is no connection being built between the elementary and middle school or to the Community Center along the frontage of Shirley Avenue. Nor is there a sidewalk provided on the access road. This will lead to students and residents walking on the access road and through parking lots to create a potentially dangerous situation when mixed with vehicles.

   Response: The SUP application has been revised to include a sidewalk along the proposed parent pickup/drop-off access road, that will extend from the Middle School, to the intersection with Alwington Blvd. The easement for the future shared use path cannot be proposed across the Community Center property, as that parcel is under different ownership. Additional coordination with Fauquier County will be required upon design and construction of the shared use path.

Historical Resources:

5. The applicant provided more detail on how the middle school will work to preserve the historical significance of the school. Town staff offers to help in any fashion on facilitating conversations regarding Historic Resources.

   Response: Comment Acknowledged.

Transportation and Circulation:

6. The applicant provided right of way dedication for a multi-use trail on the southern portion of the property, but stated it does not intend to build walkable access points from the south or west to access the school. The existing sidewalk on a portion of Shirley will remain with the connection to the Greenway. The VDOT Pipeline Study is currently recommending this is upgraded to a Pedestrian Hybrid Beacon, and a shared use path along the frontage of Shirley Avenue, from the crossing to the southern portion of the property.

   Response: As discussed at the initial review meeting, the proposed public access easement is being provided for the future extension of a shared use path, that will extend south of the bus loop exit, to the southern property boundary. On the southern portion of the County-owned Community Center property, an additional public access easement is to be dedicated, to extend the shared use path west, to Alwington Blvd.

   Additionally, a crosswalk and 5' sidewalk are being proposed from the Greenway, extending north along E. Shirley Avenue, in accordance with the Complete Streets Manual. This submission has also been revised to include a proposed sidewalk along the access road, that extends from Taylor Middle School, to the existing sidewalk at the intersection of Alwington Blvd, and the Brumfield Elementary School entrance.

   While it is understood that the draft of the VDOT Pipeline Study is recommending a Pedestrian Hybrid Beacon at the crossing for the Greenway Trail, the study is not final, and has not been formally adopted by the Town in their Complete Streets manual, or Comprehensive Plan.

Therefore, we respectfully request that the pedestrian beacon be addressed with future development, that will receive VDOT funding.

Land Use and Character District:

7. There is no multi-modal infrastructure provided to the west or between the existing schools.

   Response: This application has been revised, to include a sidewalk along the proposed parent pick up/drop off road at the rear of the property, that will extend from Taylor Middle School to the sidewalk at the intersection of the entrance of Brumfield Elementary School and Alwington Blvd. Though the School Board has identified potential safety risks in facilitating access to the school property during the school day, this sidewalk will allow for more efficient pedestrian connectivity from Alwington Blvd to E. Shirley Avenue, until the future shared use path is ultimately funded and constructed.

Transportation:

8. The applicant met with VDOT, the County, and the Town to discuss the larger transportation initiatives and the key role the school parcel plays. As a result of this meeting, the applicant modified the access road alignment and has indicated right-of-way dedication provisions for a multi-use trail on the southern portion of the property adjacent to Walmart and the frontage along Shirley Avenue. However, as the Pipeline Study has progressed, taking the ideas from this meeting into account, there are recommendations for a shared use path along Shirley Avenue from the Greenway crossing south and an upgraded Pedestrian Hybrid Beacon.

   Response: While it is understood that the draft of the VDOT Pipeline Study is recommending a Pedestrian Hybrid Beacon at the crossing for the Greenway Trail and extension of a shared use path, the study is not final, and has not been formally adopted by the Town in their Complete Streets manual or Town Plan. Therefore, it is requested to address the pedestrian beacon and final design and construction of the shared use path with a future project that will receive VDOT funding, as discussed at the initial review meeting.

   Furthermore, a complete shared use path alignment cannot be provided along the frontage of E. Shirley Ave., as the School Owned property is bisected by the Fauquier County Owned Community Center. This application will accommodate the future shared use path on the subject property, by dedicating a public access easement across the property frontage as indicated on the plan.

Fauquier County Service District:

9. Fauquier County Board of Supervisors and the Warrenton Town Council have passed resolutions regarding the property owner of the Arrington parcels desire to boundary line adjust into the Town. The applicant is encouraged to review the rezoning and proffers approved by Fauquier County as they contain three development scenarios with proffers that may impact the schools. The applicant did take into account potential transportation improvements at the Brumfield entrance; however, there may be additional proffers related to sewer and other miscellaneous items that interest the applicant.

Response: Comment noted. The referenced proffers will be taken into consideration at the time of final site plan, assuming the Arrington property development is moving forward ahead of the proposed Taylor MS project.

Town Attorney

10. The proposed 12' retaining wall shown on the plan page C3.01 is an ongoing safety issue for a middle school campus. The presence of a 42" fence at the top, as addressed in the Timmons Group Jan. 12 letter, does not necessarily mitigate the impact of this safety issue under the circumstances presented. The justification advanced for the retaining wall in excess of 6' consists solely of (1) minimizing impact to wetlands, (2) minimize clearing on that side of the building adjacent to the proposed emergency access road, and (3) maintaining the existing gravel track and diamond field. Those are design choices that do not dictate the creation of a retaining wall twice the height of a by-right retaining wall.

    Response: The retaining walls are not proposed for the convenience of design, but are a result of existing site constraints, and the School's desire to maintain existing site features. On the north side of the site, the wall is proposed to accommodate fire access around the existing building, that does not currently meet Statewide Fire Prevention code (Section 503.1.1).

    The fire protection code requires new construction to provide fire access within 150' of all portions of the building, while existing nonconforming construction is not required, unless there is a proposed addition along that portion of the building. Since this portion of the building is existing and not being changed with this project, the access is not required to be updated. The Client has chosen to incorporate emergency access for the safety and wellbeing of students and staff. The existing finish floor elevation of the building, the constraints provided by the wetlands, and existing site grades, require the wall at the proposed height in order to provide the emergency access.

    Similarly, the retaining walls around and adjacent to the athletic fields are required, due to the existing finish floor elevation of the building and resulting existing grades of the facilities. The 42" fall protection guard located at the top of the wall will be proposed as required by IBC requirements (Section 1015.2).

    If the walls will not be permitted as proposed, the track, rectangular field and diamond field would be impacted such that they would no longer be a useable amenity for the school and surrounding community. It should be noted that there are existing Fauquier County Public School facilities, including Fauquier High School, which is also located within the Town, that have similar retaining wall conditions. Per the Schools, there are no known instances where student or public safety has been compromised. Furthermore, there are other instances within the Town where similar conditions exist (i.e. Northrock Shopping Center). During the site plan process, efforts will be made to reduce the effective wall height where possible.

11. The project narrative references a site plan; this is incorrect.

    Response: The project narrative on sheet C1.01 has been revised to "SITE DEVELOPMENT PLAN."

12. Site Information Note 2 references a "Jeffrey A. Smeraldo" without indicating his affiliation or qualifications.

    Response: Note 2 on sheet C1.01 has been updated to include Jeffrey A. Smeraldo's affiliations and qualifications.

13. Note 7 (on floodplain coverage) is unclear because the portions after the first semicolon lack a verb. This needs to be rewritten for clarity.

    Response: The provided language was referenced from FEAM Firm 51061C308C, however we have updated it for clarity.

Town Transportation Consultant – Liz Byrom, PhD, PE and Chris Tiesler, PE, PTOE

1. Volumes between Site Entrances on Shirley Avenue are still not balanced even though there are no driveways between the intersections that could result in the addition/subtraction of trips. For example, on Figure 8-1, 42 trips are added southbound on Shirley Avenue between Site Entrance #2 and #3 during the AM peak hour. Other smaller imbalances between Site Entrances #1, #2, and #3 exist in all three study time periods and analysis scenarios. Because Site Entrances #2 and #3 operate with minor-street stop control, mainline volumes on Shirley Avenue and the availability of gaps in those traffic streams directly influence the calculated levels of service LOS), capacity, and forecast 95th percentile queue lengths of critical movements. While the reported traffic operational results indicate that the minor-street stop-controlled movements generally operate within acceptable operational thresholds, these imbalances (and other revisions noted below that may impact traffic operations) should be corrected.

   Response: All volumes have been checked and balanced where necessary.

2. The TIA does not discuss anticipated pedestrian or bicycle activity between the elementary and middle schools, and the site plan does not identify a route or designated facility to provide for such activity/movements. Given the nature of the middle school and surrounding land uses, pedestrian and bicycle activity between and amongst the residential development (Arrington Development), two school campuses, and the adjacent community center are likely and should be addressed/accommodated.

   Response: The TIA has been updated to include a discussion of the pedestrian/bicycle accommodations within the site. However, no reductions in traffic have been taken for pedestrians or bicycles.

3. The revised site plan provides approximately 70 feet of throat depth for exiting traffic at Site Entrance #3. However, the analysis shows that during the 2032 School PM peak hour, the forecast 95th percentile queue will be 100 feet. Under this condition, one to two vehicles in the queue will still be stored along the internal perpendicular drive aisle (could be from either direction or both), which may adversely impact on-site circulation and parking maneuvers for several parking spaces in the vicinity of this internal intersection. The current location of Site

Entrance #3 in the middle of the parking field also creates unusual "dead end" parking drive aisles closest to Shirley Avenue. Parking maneuvers in these drive aisles may be difficult and could also lead to this portion of the parking lot being underutilized. See Attachment A for a rough sketch of an alternative alignment/location for Site Entrance #3 that may provide better separation of parent pick- up/drop off activity and parking circulation. Our cursory review indicates that the northbound left-turn lane on Shirley Avenue could be shifted south to this new entrance and still be developed within the available physical distance between this entrance and the adjacent community center driveway to the south.

Response: The proposed parking lot entrance (Entrance #3) has been revised, as suggested in the comment. The proposed throat exceeds 50' as required by VDOT standards, while maintaining access to and maintaining the existing condition with the adjacent Community Center, and keeping all proposed improvements on the school site.

4. It is unclear what on-site route parents doing pick-up/drop-off should take after entering Site Entrance #3. Does the school intend to have staff direct parents to the appropriate path in order not to complicate student pick-up/drop off? Is wayfinding signage proposed on-site? The current layout of the parking lot will tend to mix vehicles parking and those performing pick-up/drop-off activities, which could create added friction and on-site circulation challenges.

   Response: All parent pickup and drop-off will utilize the new access road from Brumfield Elementary School, and the loop at the rear of the middle school, which provides stacking for ±80 vehicles as shown on sheet C3.04. Also, as noted on sheet C3.04, School staff will block access from the parking lot from E. Shirley Avenue, to prevent traffic from backing up into the right of way. Outside of the designated times for pick up and drop off, the access road will be gated to prevent cut through traffic from the future Arrington Development as noted on sheet C3.01.

5. Page 1-5: Per comments above, the expansion of the middle school will impact local connectivity, especially with the elementary school. Kittelson recommends replacing "no impact on the surrounding network" text with additional narrative that better reflects the anticipated circulation and travel patterns of all modes between the adjacent land uses (two schools, nearby residential development, and community center) as well as planned parent pick-up/drop-off routing of kiss-n-ride vehicular traffic.

   Response: The narrative has been updated as requested.

6. The Synchro files are not utilizing appropriate peak hour factors (PHF) in the future conditions. For example, the intersection of Shirley/Culpepper in the existing conditions has a PHF of 0.88. In the 2026 background conditions, it increases to 0.94. Another example is that the James Madison Highway/Alwington Boulevard intersection has a PHF of 0.86 in the existing conditions and 0.95 in 2026 conditions. Per TOSAM, the future conditions analyses should assume a default PHF of 0.92 when PHF is lower in existing conditions.

   Response: All PHF factors have been checked and updated in future models to 0.92 or the existing, whichever is higher except as noted in the report (school entrances).

7. The special use permit plan (C3.01) shows storage lengths that are not consistent with the storage listed on page 6-4. The western entrance (Site Entrance #1) right turn has storage of 85 feet and taper of 50 feet. The northbound left turn for this entrance has 50 feet of taper length that is not included in the model. Per TOSAM, Synchro and SimTraffic models should reflect "effective storage length", which is equal to the existing striped storage length plus half of the taper length.

   Response: All storage lengths have been checked and updated. The effective storage shown on Figure 2-1, Figure 5-1, the LOS tables, and the Synchro analysis files all match with the revisions.

8. Design plans and traffic analyses should be updated to address these comments so that the operational performance and anticipated queue lengths at the Site Entrances are still adequate and forecast queues can be stored within available turn lane lengths and will not adversely impact on-site circulation or parking maneuvers. After these changes, please confirm that queues are still maintained within the provided storage.

   Response: The analysis has been updated and the queues confirmed to be maintained within the available storage.

9. Page 2-1: There appears to be a typo "Route 17 carries approximately 9,7000 vehicle per day." In addition, we recommend using consistent naming conventions throughout the document when referring to roadways (e.g., Route 15 versus US 15).

   Response: The above noted typo has been fixed in the report.

10. Page 2-2: The sentence "No VDOT traffic data available for Alwington Boulevard" is not needed as volumes are provided in the following sentence.

    Response: The above noted comment has been addressed in the report.

11. Page 3-3: We recommend that actual lane widths be approximated rather than a standard 12' for all approaches. The existing lane widths along Shirley Avenue appear to be closer to 11'.

    Response: All lane widths have been update to the actual width.

12. Page 6-2: We recommend that sub bullet 'a' be separated from bullet '6' like you have done in other sections.

    Response: The above noted comment has been addressed in the report.

13. Typos are present in the operational summary tables. For example, the WBT at Culpepper St/Shirley Ave in the 2026 Background - School PM peak show a delay of 2.7 seconds and a LOS A. However, the Synchro results show that the calculated delay is 22.7 seconds and has a LOS of C. All tables should be reviewed and corrected. Related text should also be updated.

    Response: All tables have been checked and updated as necessary.

14. Synchro: We recommend all analysis files and level of service tables be updated to reflect any changes related to the comments above.

    Response: All files and tables have been checked and updated as necessary.

15. Page numbers appear to be off. For example, Section 6 starts on page 6-2.

    Response: The above noted comment has been addressed in the report.

Zoning – Amber Heflin, CZO

Article 7- Parking:

1. Overall, the plan appears to meet parking space requirements and provides one additional space. Staff will verify the proposed spaces will meet the required minimum dimensions at the time of site development plan. **The applicant will be required to demonstrate that parking stalls and drive aisle widths will meet minimum requirements at the time of site plan submission. Staff is unable to determine that these requirements have been met at this time.**

Response: Comment Acknowledged. Parking and proposed drive isles are proposed in accordance with Section 7-17 for 90 decree parking (9'x18' spaces with 24' wide drive isles. Dimensions have been noted on the plan.

2. Provide justification that two loading spaces will be adequate to handle the needs of the use. Justification with this submission is utilizing calculations within the Fauquier County Zoning Ordinance. The Town has separate requirements located under Article 7-18 of the Town of Warrenton Zoning Ordinance. Revise justification.

Response: As approved in the attached email, the loading spaces for institutional uses are not defined by the Ordinance. As proposed, the loading spaces are consistent with other school facilities and the surrounding localities.

Article 8- Landscaping:

3. Staff is unable to verify landscaping requirements as no landscaping details have been provided. The statement of justification provided by the applicant notes landscaping will be addressed at the time of site plan submittal**. The applicant will be required to address landscaping at the time of site plan submittal. Zoning staff is unable to complete a full review to verify that landscaping requirements have been met at this time.**

Response: Comment Acknowledged. Noted buffer locations have been and are shown on the proposed plan. Additional details will be provided at the time of site plan.

Article 9-8- Lighting:

4. The statement of justification acknowledges all lighting must meet the requirements of the Zoning Ordinance. All fixtures on site will require conformance to current lighting standards, and photometric plan will be reviewed at the time of site plan submittal. **The applicant will be required to address site lighting at the time of site plan submittal. Zoning staff is unable to complete a full review to verify that lighting requirements have been met at this time.**

   Response: Comment noted. Detailed lighting design that complies with Article 9-8 will be provided at the time of site plan.

5. The applicant provided a preliminary photometric plan for review with the SUP submittal, and staff is concerned that the site lighting proposed along Shirley Avenue will exceed 1.0 footcandle at the property line.

   Response: The photometrics have been adjusted to prevent lighting from exceeding 1.0 footcandle at the property line.

6. Fixture cutsheets have not been provided for the proposed wall mounted lighting. Staff is unable to verify if proposed lights will meet Zoning Ordinance requirements. **The applicant will be required to address site lighting at the time of site plan submittal. Zoning Staff is unable to complete a full review to verify that lighting requirements have been met at this time.**

   Response: Comment noted. Detailed lighting design that complies with Article 9-8 will be provided at the time of site plan.

7. Complete lighting plan was not provided with this submittal. The photometric plan only shows site lighting within the travel ways. Revise. **The applicant will be required to address site lighting at the time of site plan submittal. Zoning Staff is unable to complete a full review to verify that lighting requirements have been met at this time. See previous comment regarding the photometric plan.**

   Response: Comment noted. Detailed lighting design that complies with Article 9-8 will be provided at the time of site plan.

Emergency Service – James K. Swain

1. Access gates - the plans show they are locked during school hours. We need to design a plan where emergency services can gain access during emergencies.

   Response: The proposed access gates are common on school sites. At the time of site plan, access will be granted via Knox Boxes, Knox Locks or other required means of access required by Emergency Services.

VDOT – Craig M. Simpson

1. US 17 Business (Shirley Ave) is currently being studied as part of the Project Pipeline. The Pipeline study identified the need for additional Bike and Ped connectivity along Shirley Ave. (Land Use)

   Response: Comment Acknowledged. It is our understanding that the study is in draft form and not final nor has it been formally adopted by the Town for implementation.

2. The shared use path width (10' min) should be extended across East Shirley Ave. The current plan shows narrow CG-12 for the connection with Shirley Ave.

   Response: The CG-12 at the connection to Shirley Ave. has been revised to a width of 10'. See sheet C3.01.

3. While the public access easement for the future trail extension of the shared use path appears to be conceptual feasible, the proposed grading needs to be confirmed in order to ensure that the shared path can be constructed in the future. VDOT recommends that the shared use path is rough graded with the future site plan. A typical cross section showing existing grades of Shirley Ave, future shared use path and proposed parking lot is recommended.

   Response: A representative cross section has been provided on sheet C1.01, that illustrates the constructability of the shared use path along the school frontage.

4. The current/proposed entrance geometry does not appear to meet VDOT standards. The minimum entrance width is 30'. Since this road is within the Town jurisdiction, VDOT will defer to the Town. VDOT recommends that all proposed entrance radius are confirmed with Autoturn movements.

   Response: The entrance width (and location) has been reconfigured to provide a minimum of 50' entrance throat as well as the minimum width of 30'. Note that final design will be provided during the time of site plan and it is intended to meet applicable VDOT standards.

5. The existing turn lane widths, length of storage, and taper lengths do not appear to meet VDOT min standards. VDOT understands that there are site constraints but standard turn lane geometry is recommended to ensure safety. The SUP plans do not provide enough detail to provide a complete review.

   Response: The left and right turn lanes into the proposed parking lot have been updated to current standards. There are significant constraints at the right turn lane into the bus loop as a result of a drainage culvert, that drains from east to west below E. Shirley Avenue, existing grades, delineated wetland/stream, and wooded area. As a result of these constraints, full turn lane lengths cannot be provided without significant impact to the environmental features. As the turn lane is existing and the main intended use is to remain for bus traffic with relatively low volume, it is requested that the condition be left as it currently exists.

6. Advisory - The parent dropoff access road does not meet corner clearance min. of 225' from Alwington Blvd. Please note that since Alwington Blvd is not currently classified as a major roadway so this comment is advisory.

   Response: Comment noted. However, the proposed road is internal to the site and should be considered a private access road.

7. The design speed for the parent dropoff access road to Alwington Blvd should be defined. The retaining wall appears to be within the clearzone of the private access road and should be located either outside of the clearzone or protected with guardrail.

   Response: Additional information will be provided at the time of site plan. Should the wall be required to be within the clear zone, guardrail will be specified as needed.

8. Please ensure that clear zone is free of fixed objects and that the slopes within the clear zone meet the town's design requirements based on the proposed design speed.

   Response: Clear zone will be further considered and additional detail will be provided at the time of final design and site plan.

9. VDOT recommends that the Town ensure that the internal parking lot and internal access roads will handle the school operations.

   Response: Comment noted. The propose parking and access roads will be provided to meet all applicable Town and County codes and will support the School operations.

Should you have any questions regarding the above responses, please feel free to contact me (703) 554-6712.

Thank you,

Luke Fetcho
Senior Project Manager

Luke Fetcho

From: Denise Harris <dharris@warrentonva.gov>
Sent: Tuesday, February 13, 2024 12:13 PM
To: Luke Fetcho
Cc: Patrick Van Nuys
Subject: RE: SUP 23-04 Taylor Middle School Second Round Agency Comments

Good afternoon Luke,

I ran your question by the Zoning Administrator who indicated that a calculation showing that the two proposed spaces are adequate for the use based off of typical school activities will be sufficient.

Thanks,
Denise

From: Luke Fetcho <Luke.Fetcho@timmons.com>
Sent: Monday, February 12, 2024 2:31 PM
To: Denise Harris <dharris@warrentonva.gov>
Cc: Patrick Van Nuys <Patrick.VanNuys@timmons.com>
Subject: RE: SUP 23-04 Taylor Middle School Second Round Agency Comments

Thanks for sending these Denise. In turn, please see the attached draft conditions of approval for review.

Also, I did a real quick review of the comments that were provided. One I have a question on is related to the loading space. The comment references back to Article 7-18 of the Ordinance, however Article 07-18 does not identify a requirement for an institutional/school use. It only lists for retail, office, and industrial uses. Therefore, we referred back to the County Ordinance for schools and provided the calculation based on the County requirements. The County requirement of 2 spaces is inline with what the Schools generally need and is consistent with what is provided on Middle Schools in other local jurisdictions.

Can you please let us know if the loading space calculation can be approved using the County requirement? Otherwise, can you provide guidance on to approach this calculation for an institutional/school use?

Thank you,

Luke Fetcho, PE, LEED AP
Project Manager

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Your Vision Achieved Through Ours

TIMMONS GROUP

Taylor Middle School Addition

Traffic Impact Analysis

September 8, 2023

Revised January 12, 2024

Revised March 1, 2024

Submitted to:
Town of Warrenton, Virginia

Steve Schmidt, PE, PTOE
Project Manager

804-200-6502
Steve.Schmidt@Timmons.com

1001 Boulders Parkway, Suite 300
Richmond, VA 23225

Taylor Middle School – Addition
Traffic Impact Analysis

350 E Shirley Avenue, Warrenton, VA 20186

Prepared By:

Timmons Group
1001 Boulders Parkway, Suite 300
Richmond, VA 23225

Project Manager – Steve Schmidt, PE, PTOE
Analyst – Julie Strunk

September 2023
Revised through March 2024

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1 EXECUTIVE SUMMARY

This report presents the findings of the revised traffic impact analysis (TIA) prepared for the proposed expansion of Taylor Middle School in the Town of Warrenton, Virginia. The original TIA was submitted in September 2023 and the Town issued comments in November 2023. A second round of comments was received in February of 2024. This revised TIA has been prepared to address those comments.

1.1 PROJECT OVERVIEW

The site is generally located south of E Shirley Street, north of Alwington Boulevard, and east of Culpeper Street as shown in Figure 1-1 (all figures are located at the end of their respective chapter).

The existing site encompasses Taylor Middle School and James G. Brumfield Elementary School. The middle school currently accommodates 510 students. The proposed expansion of the middle school will accommodate an increase of 340 students for a total of 850 students.

Access will be provided via three existing entrances on E Shirley Avenue and one new entrance via a connecting road to the existing elementary school and out to Alwington Boulevard. A conceptual plan is shown on Figure 1-2.

For the purposes of this analysis, the expansion was assumed to be complete and occupied by 2026.

When complete, the expansion will generate an increase of 145 AM peak hour trips (84 in and 61 out), 101 School PM peak hour trips (40 in and 61 out), 42 PM peak hour trips (30 in ands 12 out) and 714 average daily trips.

Based on the trips generated by the site and the rezoning application, a traffic study is required by the Town of Warrenton, but a VDOT Chapter 527 TIA is not required.

The purpose of this analysis is to determine the impact of the proposed expansion of the middle school on the surrounding roadway network. The scope of this study was developed in conjunction with the Town of Warrenton and the Virginia Department of Transportation (VDOT). A copy of the scoping documents is included in Appendix A.

1.2 STUDY LIMITS

As agreed, upon in the scoping documents, the study limits include the following seven (7) existing intersections:

1. Shirley Avenue/Culpeper Street (signalized);
2. E Shirley Avenue/Site Entrance #1 (unsignalized);
3. E Shirley Avenue/Site Entrance #2 (signalized);
4. E Shirley Avenue/Site Entrance #3 (unsignalized);
5. E Shirley Avenue/Falmouth Street (roundabout);
6. E Shirley Avenue/Alwington Boulevard (signalized); and
7. Alwington Boulevard/Elementary School Entrance (unsignalized).

It is noted that the Shirley Avenue/Culpeper Street signal is maintained by the Town while the E Shirley Avenue/Alwington Boulevard signal is maintained by VDOT.

In accordance with the scoping agreement, analyses were completed for the following scenarios:

1. 2023 Existing Traffic Conditions;
2. 2026 Background Traffic Conditions (without proposed expansion of the site);
3. 2026 Future Traffic Conditions (with proposed expansion of the site);
4. 2032 Background Traffic Conditions (without proposed expansion of the site); and
5. 2032 Future Traffic Conditions (with proposed expansion of the site).

The analysis examines the AM peak hour (when the school peak coincides with the commuter peak), the school PM peak hour, and the commuter PM peak hour. It is noted the commuter PM peak hour is referred to as the "PM peak hour" and the school PM peak hour is referred to as the "School PM peak hour" in this analysis.

The following steps were taken to determine the potential traffic impacts associated with this project:

1. Data Collection – Existing AM (6-9 AM) and PM (2-6 PM) peak hour traffic counts were collected at the existing study intersections on May 16 and May 18, 2023.

2. Traffic Growth – As agreed upon in the scoping document, a 1% annual growth rate was applied to existing traffic volumes to account for development outside the study area.

3. Other Developments – The traffic from the approved Arrington Development was accounted for in the 2032 scenarios only.

4. Trip Generation – Traffic generated by the proposed development was estimated using the existing traffic counts at the school driveways (peak hours) and the 11th edition of the Institute of Transportation Engineers' *Trip Generation Manual* (average daily traffic).

5. Traffic Distributions – The distribution of trips generated by the proposed developed was based on the existing traffic volumes, the nature of the use, and local knowledge.

6. Site Traffic Projections – Future traffic volumes were determined by combining the 2026 and 2032 background traffic volumes with proposed new trips generated by the site to create the 2026 and 2032 total traffic volumes used in the analysis.

7. Traffic Capacity Analysis – Level of service calculations for existing, background, and future conditions were performed using SYNCHRO Version 11 with SimTraffic for signalized and unsignalized intersections and SIDRA version 9 for the roundabout.

8. Queuing Analysis – The 95th percentile queue lengths (Synchro) and maximum queues (SimTraffic) were reviewed at the intersections listed above.

9. Turn Lane Warrant Analysis – The need for turn lanes at the site entrances on E Shirley Avenue will be analyzed under 2026 and 2032 future traffic conditions.

10. Access Management Review – An evaluation of the access management spacing standards for the site entrances on E Shirley Avenue will be conducted for the reconfigured site entrances.

1.3 PRINCIPAL FINDINGS

Based on the analysis contained herein, the following principal findings are offered:

Under 2023 existing conditions:

1. The East Shirley/Culpeper Street intersection currently operates an overall LOS C in each of the peak hours. Each of the approaches operates at LOS D or better with no queueing concerns.

2. The school entrances along East Shirley Avenue operate at LOS C or better in each of the peak hours. The queues at the left and right turns into the school are contained within the available storage.

3. The roundabout at East Shirley Avenue/Falmouth Street operates at LOS A in each of the peak hours with no queuing concerns.

4. The East Shirley Avenue/Alwington Boulevard intersections operates at LOS C or better in each of the peak hours. Each of the approaches operates at LOS D or better. Each of the queues are contained within the available storage.

5. Each of the movements at the Alwington Boulevard/School Entrance/Commercial Entrance intersection operates at LOS A in all peak hours.

Under 2026 background conditions, all intersections experience similar levels of service, delay, and queueing as under existing conditions. Specifically:

1. The East Shirley/Culpeper Street intersection will operate an overall LOS C or D in each of the peak hours. Each of the approaches operates at LOS D or better with no queueing concerns with the exception of the eastbound left approach which will operate at LOS E in both PM peaks.
    a. It is noted that the traffic signal is running under "free" operations and is likely giving more time to the mainline through movements which results in the LOS E. The delays are less than the overall cycle length of the intersection indicating that the average traffic waits at most one cycle length to traverse the intersection.

2. The school entrances along East Shirley Avenue operate at LOS C or better in each of the peak hours. The queues at the left and right turns into the school are contained within the available storage.

3. The roundabout at East Shirley Avenue/Falmouth Street operates at LOS A in each of the peak hours with no queuing concerns.

4. The East Shirley Avenue/Alwington Boulevard intersections operates at LOS C in each of the peak hours. Each of the approaches operates at LOS D or better. Each of the queues are contained within the available storage.

5. Each of the movements at the Alwington Boulevard/School Entrance/Commercial Entrance intersection operates at LOS A in all peak hours.

Under 2026 total future conditions, with buildout of the proposed development, all intersections experience similar levels of service compared to 2026 background conditions. Specifically:

1. The East Shirley/Culpeper Street intersection will operate an overall LOS C or D in each of the peak hours. Each of the approaches operates at LOS D or better with no queueing concerns with the exception of the eastbound left approach which will operate at LOS E in both PM peaks.
    a. It is noted that the traffic signal is running under "free" operations and is likely giving more time to the mainline through movements which results in the LOS E. The delays are less than the overall cycle length of the intersection indicating that the average traffic waits at most one cycle length to traverse the intersection.

2. The school entrances along East Shirley Avenue operate at LOS C or better in each of the peak hours. The queues at the left and right turns into the school are contained within the available storage.

3. The roundabout at East Shirley Avenue/Falmouth Street operates at LOS A in each of the peak hours with no queuing concerns.

4. The East Shirley Avenue/Alwington Boulevard intersections operates at LOS C in each of the peak hours. Each of the approaches operates at LOS D or better. Each of the queues are contained within the available storage.

5. Each of the movements at the Alwington Boulevard/School Entrance/Commercial Entrance intersection operates at LOS A in all peak hours.

6. The expansion of the middle school will have minimal impact on the external surrounding roadway network and no improvements are required at the study intersections beyond those identified above.

7. The expansion will provide a link between the elementary school and the middle school during school pick up and drop off times only. During all other times, the connection between the schools will be gated to vehicular traffic.

8. The site will provide a public access easement across the frontage for the future extension of the shared use path along Shirley Avenue. A five foot sidewalk will be provided along the roadway connection to the elementary school.

Under 2032 background conditions, all intersections experience similar levels of service, delay, and queueing as under 2026 background conditions. Specifically:

1. The East Shirley/Culpeper Street intersection will operate an overall LOS C or D in each of the peak hours. Each of the approaches operates at LOS D or better with no queueing concerns with the exception of the eastbound left approach which will operate at LOS E in both PM peaks.
    a. It is noted that the traffic signal is running under "free" operations and is likely giving more time to the mainline through movements which results in the LOS E. The delays are less than the overall cycle length of the intersection indicating that the average traffic waits at most one cycle length to traverse the intersection.

2. The school entrances along East Shirley Avenue operate at LOS D or better in each of the peak hours. The queues at the left and right turns into the school are contained within the available storage.

3. The roundabout at East Shirley Avenue/Falmouth Street operates at LOS A or B in each of the peak hours with no queuing concerns.

4. The East Shirley Avenue/Alwington Boulevard intersections operates at LOS C in each of the peak hours. Each of the approaches operates at LOS D or better. Each of the queues are contained within the available storage.

5. Each of the movements at the Alwington Boulevard/School Entrance/Commercial Entrance intersection operates at LOS A in all peak hours.

Under 2032 total future conditions, with buildout of the proposed development, all intersections experience similar levels of service compared to 2026 background conditions. Specifically:

1. The East Shirley/Culpeper Street intersection will operate an overall LOS C or D in each of the peak hours. Each of the approaches operates at LOS D or better with no queueing concerns with the exception of the eastbound left approach which will operate at LOS E in both PM peaks.
    a. It is noted that the traffic signal is running under "free" operations and is likely giving more time to the mainline through movements which results in the LOS E. The delays are less than the overall cycle length of the intersection indicating that the average traffic waits at most one cycle length to traverse the intersection.

2. The school entrances along East Shirley Avenue operate at LOS D or better in each of the peak hours. The queues at the left and right turns into the school are contained within the available storage.

3. The roundabout at East Shirley Avenue/Falmouth Street operates at LOS A or B in each of the peak hours with no queuing concerns.

4. The East Shirley Avenue/Alwington Boulevard intersections operates at LOS C in each of the peak hours. Each of the approaches operates at LOS D or better. Each of the queues are contained within the available storage.

5. Each of the movements at the Alwington Boulevard/School Entrance/Commercial Entrance intersection operates at LOS A in all peak hours.

6. The expansion of the middle school will have minimal impact on the external surrounding roadway network and no improvements are required at the study intersections beyond those identified above.

7. The expansion will provide a link between the elementary school and the middle school during school pick up and drop off times only. During all other times, the connection between the schools will be gated to vehicular traffic.

8. The site will provide a public access easement across the frontage for the future extension of the shared use path along Shirley Avenue. A five foot sidewalk will be provided along the roadway connection to the elementary school.

1.4 RECOMMENDATIONS

The expansion of the middle school will have minimal to no impact on the surrounding roadway network and no improvements are required at the study intersections beyond the turn lanes provided at the eastern site entrance on Shirley Avenue.

The expansion will provide a link between the elementary school and the middle school during school pick up and drop off times only. During all other times, the connection between the schools will be gated to vehicular traffic.

The site will provide a public access easement across the frontage for the future extension of the shared use path along Shirley Avenue. A five foot sidewalk will be provided along the roadway connection to the elementary school.

The traffic control at internal intersections to the school site was not reviewed as part of this study and will the specifics (signage, pavement markings, etc.) will be designed at the time of site plan approval.

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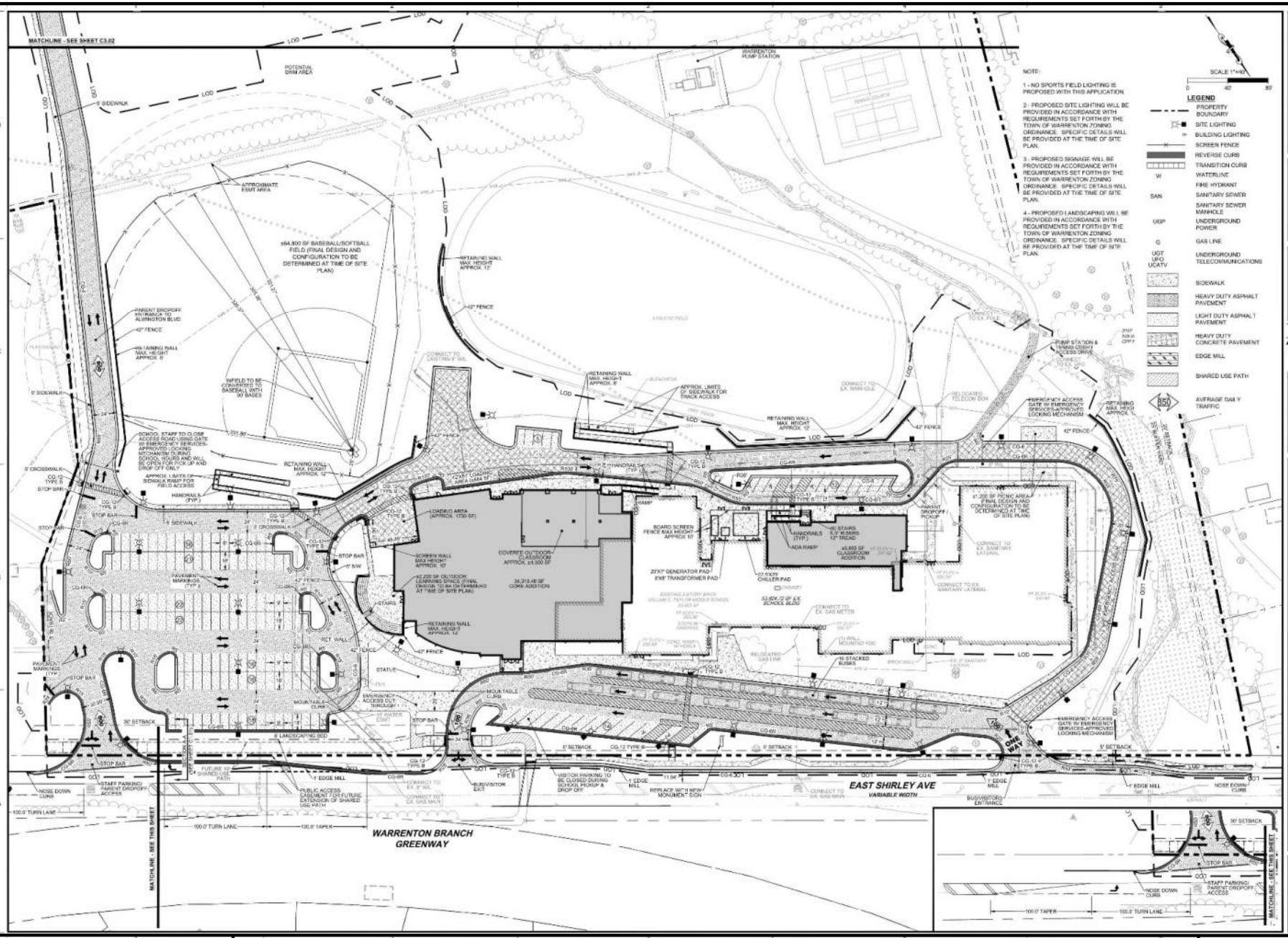
Site Location and Study Intersections
Taylor Middle School – Addition
Town of Warrenton, Virginia

Figure 1-1



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Site Layout
Taylor Middle School – Addition
Town of Warrenton, Virginia

Figure 1-2

2 BACKGROUND INFORMATION

2.1 DESCRIPTION OF ON-SITE DEVELOPMENT

The site is generally located south of E Shirley Street, north of Alwington Boulevard, and east of Culpeper Street as shown in Figure 1-1 (all figures are located at the end of their respective chapter).

The existing site encompasses Taylor Middle School and James G. Brumfield Elementary School. The middle school currently accommodates 510 students. The proposed expansion of the middle school will accommodate an increase of 340 students for a total of 850 students. Access will be provided via three existing entrances on E Shirley Avenue and one new entrance via a connecting road to the existing elementary school and out to Alwington Boulevard. A conceptual plan is shown on Figure 1-2.

For the purposes of this analysis, the expansion was assumed to be complete and occupied by 2026.

When complete, the expansion will generate an increase of 145 AM peak hour trips (84 in and 61 out), 101 School PM peak hour trips (40 in and 61 out), 42 PM peak hour trips (30 in ands 12 out) and 714 average daily trips.

Based on the trips generated by the site and the rezoning application, a traffic study is required by the Town of Warrenton, but a VDOT Chapter 527 TIA is not required.

The purpose of this analysis is to determine the impact of the proposed expansion of the middle school on the surrounding roadway network. The scope of this study was developed in conjunction with the Town of Warrenton and the Virginia Department of Transportation (VDOT). A copy of the scoping documents is included in Appendix A.

2.2 STUDY LIMITS

As agreed, upon in the scoping documents, the study limits include the following seven (7) existing intersections:

1. Shirley Avenue/Culpeper Street (signalized);
2. E Shirley Avenue/Site Entrance #1 (unsignalized);
3. E Shirley Avenue/Site Entrance #2 (signalized);
4. E Shirley Avenue/Site Entrance #3 (unsignalized);
5. E Shirley Avenue/Falmouth Street (roundabout);
6. E Shirley Avenue/Alwington Boulevard (signalized); and
7. Alwington Boulevard/Elementary School Entrance (unsignalized).

2.3 EXISTING ROADWAY NETWORK

E Shirley Avenue (US Route 17) is a two-lane, undivided, minor arterial with a posted speed limit of 40 mph from Culpeper Street to Falmouth Street and 25 mph from Falmouth Street to Alwington Boulevard. The 2021 VDOT traffic data shows that E Shirley Avenue carries approximately 15,000 vehicles per day between Culpeper Street and Falmouth Street. The 2021 Virginia Roads traffic data shows that E Shirley Avenue carries approximately 9,700 vehicles per day between the Town of Warrenton Line and the James Madison Highway/Bus US 15 interchange.

An existing school zone speed limit of 25 mph is present on E Shirley Avenue approximately 255 ft west of school entrance #1 and approximately 650 ft east of school entrance #3. It was assumed that the school zone speed limit was active in this area during the AM and school PM peak hour of this analysis.

Falmouth Street (US Route 15) is a two-lane, undivided, minor arterial with a posted speed limit of 25 mph within the site vicinity. The 2021 VDOT traffic data shows that Falmouth Street carries approximately 4,300 vehicles per day between E Shirley Avenue and Mockingbird Lane.

Culpeper Street is a two-lane, undivided, major collector to the west and a minor arterial to the east of E Shirley Avenue, with a posted speed limit of 25 mph within the site vicinity. The 2021 VDOT traffic data shows that Culpeper Street carries approximately 3,300 vehicles per day between Shirley Avenue and Hotel Street.

Alwington Boulevard is a four-lane, divided, local road with a posted speed limit of 35 mph. The 2016 Virginia Roads traffic data shows that Alwington Boulevard carries approximately 7,000 vehicles per day.

The existing lane use and traffic control at the study intersections is shown on Figure 2-1.

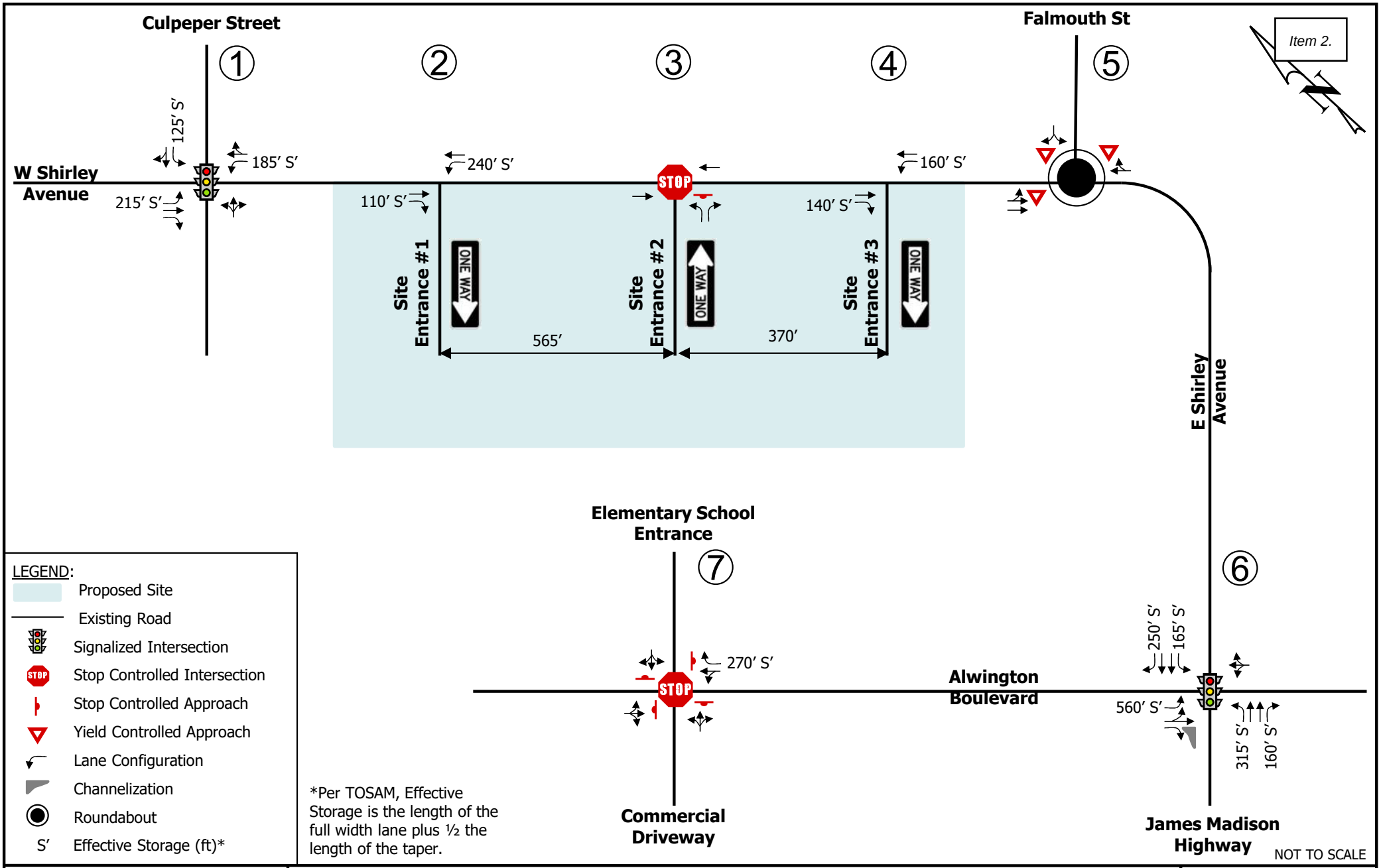
2.4 FUTURE IMPROVEMENTS

There are no improvements at the study intersections that will occur within the timeframe analyzed in the study except the realignment of the Alwington Boulevard/Elementary School Entrance/Commercial Driveway intersection. This improvement is a realignment only and will not impact the capacity of the intersection.

With the expansion, the access to the site will be reworked as shown in Figure 1-2. The two western entrances on East Shirley Avenue will be a bus loop only and the eastern entrance will be combined with the community center entrance and serve all other vehicles. The new entrance off of Alwington Boulevard will service passenger vehicles.

At the eastern entrance, the lanes along Shirley Avenue will be reworked to provide a right and left turn lane with 100 feet of storage and 100 feet of taper (effective storage of 150 feet).

The site will provide a public access easement across the frontage for the future extension of the shared use path along Shirley Avenue. A five foot sidewalk will be provided along the roadway connection to the elementary school.



LEGEND:

- Proposed Site
- Existing Road
- Signalized Intersection
- Stop Controlled Intersection
- Stop Controlled Approach
- Yield Controlled Approach
- Lane Configuration
- Channelization
- Roundabout
- S' Effective Storage (ft)*

*Per TOSAM, Effective Storage is the length of the full width lane plus ½ the length of the taper.

NOT TO SCALE

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Existing Roadway Geometry and Stop Control
Taylor Middle School – Addition
Town of Warrenton, Virginia

Figure 2-1

3 2023 EXISTING CONDITIONS

3.1 EXISTING TRAFFIC VOLUMES

Directional turning movement counts (TMCs) were collected during the AM (6:00-9:00) and PM (2:00-6:00) peak traffic hours. The counts were conducted on May 16, 2023, at intersections 2 through 7 and on May 18, 2023, at intersection 1 on a typical weekday when public schools were in session. The TMCs included heavy vehicles by movement and pedestrian/bicycles counts, where applicable. A copy of the count data is included in Appendix B.

The peak hours analyzed in this report align with the highest traffic volumes of the roadway network. The morning peak hour (7:15-8:15 AM), school PM peak hour (2:15-3:15 PM), and commuter PM peak hour (4:30-5:30 PM) were determined by the highest hour of total traffic on the study area road network. The 2023 existing bus peak hour volumes are shown on Figure 3-1 and the 2023 existing vehicle (no-bus) peak hour volumes are shown on Figure 3-2. Figures 3-1 and 3-2 were added together to yield the 2023 total existing peak hour volumes as shown on Figure 3-3.

Existing signal timings for the Shirley Avenue/Culpeper Street intersection was provided by the Town of Warrenton and the E Shirley Avenue/Alwington Boulevard intersection was provided by VDOT. A copy of the signal timings included in Appendix C.

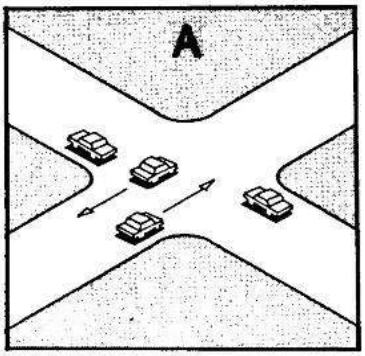
It is noted that both signals operate under "free" operations and are not coordinated with any other traffic signals.

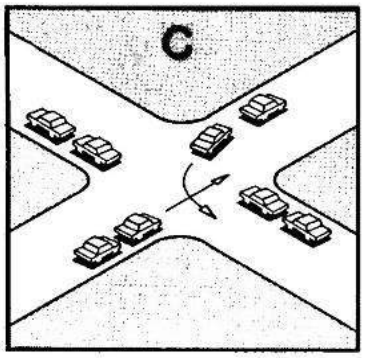
3.2 CAPACITY ANALYSIS

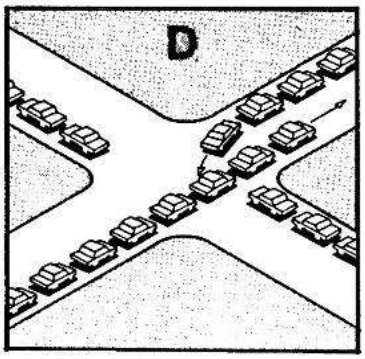
Capacity analysis allows traffic engineers to determine the impacts of traffic on the surrounding roadway network. The Transportation Research Board's (TRB) *Highway Capacity Manual* (HCM) methodologies govern how the capacity analyses are conducted and how the results are interpreted. There are six letter grades of Levels of Service (LOS) from A to F, with LOS A representing the best operating conditions and LOS F the worst operating conditions. Table 3-1 shows in detail how each of these levels of service are interpreted.

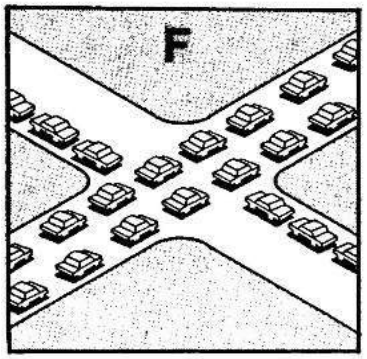
Table 3-1: Level of Service Definitions

Level of Service	Roadway Segments or Controlled Access Highways	Intersections
A	Free flow, low traffic density.	No vehicle waits longer than one signal indication.
B	Delay is not unreasonable, stable traffic flow.	On a rare occasion motorists wait through more than one signal indication.
C	Stable condition, movements somewhat restricted due to higher volumes, but not objectionable for motorists.	Intermittently drivers wait through more than one signal indication, and occasionally backups may develop behind left turning vehicles, traffic flow still stable and acceptable.
D	Movements more restricted, queues and delays may occur during short peaks, but lower demands occur often enough to permit clearing, thus preventing excessive backups.	Delays at intersections may become extensive with some, especially left-turning vehicles waiting two or more signal indications, but enough cycles with lower demand occur to permit periodic clearance, thus preventing excessive backups.
E	Actual capacity of the roadway invloves delay to all motorists due to congestion.	Very long queues may create lengthly delays, especially for left-turning vehicles.
F	Forced flow with demand volumes greater than capacity resulting in complete congestion. Volumes drop to zero in extreme cases.	Backups from locations downstream restrict or prevent movement of vehicles out of approach creating a storage ares during part or all of an hour.









SOURCE: *"A Policy on Design of Design of Urban Highways and Arterial Streets"* - AASHTO, 1973 based upon material published in *"Highway Capacity Manual"*, National Academy of Sciences, 1965.

For signalized and unsignalized intersections, level of service is defined in terms of **delay**, a measure of driver discomfort, frustration, fuel consumption and lost travel time. Table 3-2 summarizes the delay associated with each LOS category:

Table 3-2: Signalized and Unsignalized Intersection Level of Service Criteria

Signalized Intersections		Unsignalized Intersections	
Level of Service	Control Delay per Vehicle (sec/veh)	Level of Service	Average Control Delay (sec/veh)
A	≤ 10	A	0 to 10
B	> 10 to ≤ 20	B	> 10 to ≤ 15
C	> 20 to ≤ 35	C	> 15 to ≤ 25
D	> 35 to ≤ 55	D	> 25 to ≤ 35
E	> 55 to ≤ 80	E	> 35 to ≤ 50
F	> 80	F	> 50

Source: Exhibit 16-2 and Exhibit 17-2 from TRB's "Highway Capacity Manual 2000"

Capacity analyses were performed to assess existing (2023), background (2026 and 2032), and future (2026 and 2032) operational conditions. The signalized and unsignalized intersections were analyzed using SYNCHRO Version 11 and the roundabout was analyzed using SIDRA Version 9.0. All intersections were analyzed based on HCM 2000 methodologies except the all-way stop-control intersection (Alwington Boulevard/Elementary School Entrance/Commercial Entrance) which was based on HCM 6th edition. All analysis uses the with the following assumptions:

- Existing lane widths;
- Existing peak hour factor as determined by the traffic counts (by intersection) for existing scenario;
- The higher of the existing peak hour factor as determined by traffic counts (by intersection) or a peak hour factor of 0.92 for the background and total future scenarios;
- Grades as obtained through Google Earth;
- Turning movements into or out of the school will have a peak hour factor of 0.50;
- Heavy vehicle percentage as determined by the traffic counts (by movement); and
- Traffic signals timing data provided by the Town of Warrenton and VDOT.

Queuing analyses were conducted using both the HCM 2000 Edition methodology (as calculated by SYNCHRO/SIDRA) and SimTraffic simulations. The Synchro 95th percentile queue is the maximum back of queue for a particular lane within a lane group considering 95th percentile traffic volumes. The SimTraffic maximum queues are the average maximum queues after 10 runs of 60 minutes each.

Note that it is possible for the 95th percentile queue to be higher than the SimTraffic maximum queue due to the method in which each software calculates its respective value. The 95th percentile queue is based on an HCM formula while the SimTraffic maximum queue varies based on simulation results.

The signals operate under "free" operations and therefore all splits were optimized in each analysis scenario.

Additionally, the roundabout was modeled in Synchro for simulation purposes only, but all roundabout analysis results were obtained from SIDRA.

3.3 EXISTING CONDITIONS CAPACITY ANALYSIS RESULTS

Table 3-3 summarizes the 2023 existing intersection LOS, delay, 95th percentile queue lengths (Synchro), and maximum queue lengths (SimTraffic) based on the 2023 existing intersection geometry (Figure 2-1), peak hour traffic volumes shown on Figure 3-3 and the existing signal timings as provided by the Town of Warrenton and VDOT. The corresponding SYNCHRO and SimTraffic reports are included in Appendix D.

Note that the intersection numbers shown on the LOS, delay, and queue length summary tables correspond with the intersection numbers used in the SYNCHRO models and report figures.

As shown in Table 3-3, under 2023 existing conditions:

1. The East Shirley/Culpeper Street intersection currently operates an overall LOS C in each of the peak hours. Each of the approaches operates at LOS D or better with no queueing concerns.

2. The school entrances along East Shirley Avenue operate at LOS C or better in each of the peak hours. The queues at the left and right turns into the school are contained within the available storage.

3. The roundabout at East Shirley Avenue/Falmouth Street operates at LOS A in each of the peak hours with no queuing concerns.

4. The East Shirley Avenue/Alwington Boulevard intersections operates at LOS C or better in each of the peak hours. Each of the approaches operates at LOS D or better. Each of the queues are contained within the available storage.

5. Each of the movements at the Alwington Boulevard/School Entrance/Commercial Entrance intersection operates at LOS A in all peak hours.

Table 3-3: 2023 Existing Traffic
Intersection Level of Service and Delay Summary

Intersection and Type of Control	Movement and Approach	Turn Lane Storage (ft)	AM PEAK HOUR				SCHOOL PM PEAK HOUR				COMMUTER PM PEAK HOUR			
			Delay [1] (sec/veh)	LOS [1]	HCS 95th Percentile Queue Length (ft)	Simulated Maximum Queue Length[(2)] (ft)	Delay [1] (sec/veh)	LOS [1]	HCS 95th Percentile Queue Length (ft)	Simulated Maximum Queue Length[(2)] (ft)	Delay [1] (sec/veh)	LOS [1]	HCS 95th Percentile Queue Length (ft)	Simulated Maximum Queue Length[(2)] (ft)
1. Shirley Avenue (E-W) at	EB Left	215	43.6	D	46	119	56.3	E	62	169	46.0	D	57	214
Culpeper Street (N-S)	EB Thru		23.3	C	264	270	28.0	C	#453	374	32.4	C	#488	379
Signalized	EB Right		17.8	B	0	65	17.3	B	11	74	20.7	C	45	71
	EB Approach		*23.8*	*C*	--	--	*28.1*	*C*	--	--	*30.6*	*C*	--	--
	WB Left	185	39.3	D	47	132	42.1	D	61	184	40.4	D	50	162
	WB Thru/Right		25.0	C	#435	354	23.1	C	#452	349	26.9	C	#489	382
	WB Approach		*25.9*	*C*	--	--	*24.4*	*C*	--	--	*27.8*	*C*	--	--
	NB Left/Thru/Right		43.4	D	#226	231	45.5	D	201	224	43.3	D	179	187
	NB Approach		*43.4*	*D*	--	--	*45.5*	*D*	--	--	*43.3*	*D*	--	--
	SB Left	125	39.4	D	29	66	41.0	D	43	72	35.8	D	49	97
	SB Thru/Right		41.0	D	56	109	44.2	D	89	123	41.0	D	140	165
	SB Approach		*40.6*	*D*	--	--	*43.4*	*D*	--	--	*40.0*	*D*	--	--
	Overall		**29.3**	**C**	**--**	**--**	**30.2**	**C**	**--**	**--**	**32.3**	**C**	**--**	**--**
2. E Shirley Avenue (E-W) at	EB Thru		†	†	0	2	†	†	0	--	†	†	0	--
Site Entrance #1 (N-S)	EB Right	110	†	†	0	6	†	†	0	0	†	†	0	2
Unsignalized	*EB Approach*		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
	WB Left	240	8.3	A	4	58	8.5	A	1	31	8.5	A	1	26
	WB Thru		†	†	0	--	†	†	0	--	†	†	0	--
	WB Approach		*0.8*	*A*	--	--	*0.2*	*A*	--	--	*0.1*	*A*	--	--
3. E Shirley Avenue (E-W) at	EB Thru		†	†	0	4	†	†	0	2	†	†	0	--
Site Entrance #2 (N-S)	*EB Approach*		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
Unsignalized	WB Thru		†	†	0	--	†	†	0	--	†	†	0	--
	WB Approach		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
	NB Left		17.8	C	12	79	23.2	C	16	78	19.5	C	5	35
	NB Right		10.7	B	7	82	13.0	B	10	90	11.6	B	0	30
	NB Approach		*13.9*	*B*	--	--	*17.3*	*C*	--	--	*18.4*	*C*	--	--
4. E Shirley Avenue (E-W) at	EB Thru		†	†	0	--	†	†	0	--	†	†	0	--
Site Entrance #3 (N-S)	EB Right	140	†	†	0	2	†	†	0	0	†	†	0	0
Unsignalized	*EB Approach*		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
	WB Left	160	8.0	A	2	31	8.7	A	1	35	8.7	A	2	42
	WB Thru		†	†	0	--	†	†	0	--	†	†	0	--
	WB Approach		*0.4*	*A*	--	--	*0.3*	*A*	--	--	*0.4*	*A*	--	--
5. E Shirley Avenue (E-W) at	*EB Approach*		*1.8*	*A*	*21*	--	*1.9*	*A*	*30*	--	*1.9*	*A*	*30*	--
Falmouth Street (N)	*WB Approach*		*10.5*	*B*	*120*	--	*9.2*	*A*	*100*	--	*12.7*	*B*	*176*	--
Roundabout*	*SB Approach*		*8.7*	*A*	*34*	--	*7.0*	*A*	*31*	--	*7.8*	*A*	*37*	--
	Overall		**7.2**	**A**	**--**	**--**	**5.7**	**A**	**--**	**--**	**7.7**	**A**	**--**	**--**
6. E Shirley Avenue/ (N-S)	EB Left	560	34.1	C	63	123	36.7	D	128	147	38.6	D	128	152
James Madison Highway at	EB Left/Thru		34.1	C	63	90	36.9	D	130	109	38.6	D	129	107
Alwington Boulevard (E-W)	EB Right[(3)]		0.1	A	0	6	0.2	A	0	57	0.2	A	0	52
Signalized	*EB Approach*		*21.2*	*C*	--	--	*22.1*	*C*	--	--	*21.8*	*C*	--	--
	WB Left/Thru/Right		33.0	C	0	53	34.9	C	26	64	37.1	D	0	57
	WB Approach		*33.0*	*C*	--	--	*34.9*	*C*	--	--	*37.1*	*D*	--	--
	NB Left	315	17.6	B	99	171	18.1	B	95	146	18.5	B	102	163
	NB Thru		18.4	B	143	210	18.0	B	83	133	18.2	B	92	150
	NB Right	160	15.8	B	0	22	16.8	B	0	39	16.7	B	0	18
	NB Approach		*18.1*	*B*	--	--	*18.0*	*B*	--	--	*18.3*	*B*	--	--
	SB Left	165	15.2	B	11	39	16.2	B	17	41	16.0	B	15	66
	SB Thru		24.1	C	71	113	25.6	C	129	154	26.9	C	138	164
	SB Right	250	16.9	B	15	104	15.5	B	9	85	15.3	B	0	77
	SB Approach		*20.6*	*C*	--	--	*22.5*	*C*	--	--	*24.4*	*C*	--	--
	Overall		**19.4**	**B**	**--**	**--**	**21.2**	**C**	**--**	**--**	**21.7**	**C**	**--**	**--**
7. Alwington Boulevard (E-W) at	EB Left/Thru/Right		7.3	A	0	8	7.4	A	0	24	7.3	A	3	10
Elementary School Entrance/	*EB Approach*		*7.3*	*A*	--	--	*7.4*	*A*	--	--	*7.3*	*A*	--	--
Commercial Entrance (N-S)	WB Left/Thru		8.7	A	10	75	8.8	A	3	64	8.9	A	3	72
Unsignalized**	WB Right	270	7.1	A	10	63	6.9	A	5	49	6.7	A	3	59
	WB Approach		*7.8*	*A*	--	--	*7.4*	*A*	--	--	*7.8*	*A*	--	--
	NB Left/Thru/Right		6.9	A	3	87	6.6	A	3	68	6.6	A	3	60
	NB Approach		*6.9*	*A*	--	--	*6.6*	*A*	--	--	*6.6*	*A*	--	--
	SB Left/Thru/Right		7.8	A	3	42	7.4	A	0	29	7.4	A	3	31
	NB Approach		*7.8*	*A*	--	--	*7.4*	*A*	--	--	*7.4*	*A*	--	--

[1] *Overall intersection LOS and delay reported for signalized intersections and roundabouts only.*

[2] SimTraffic Queues are average maximum queues after 10 runs of 60 minutes each.

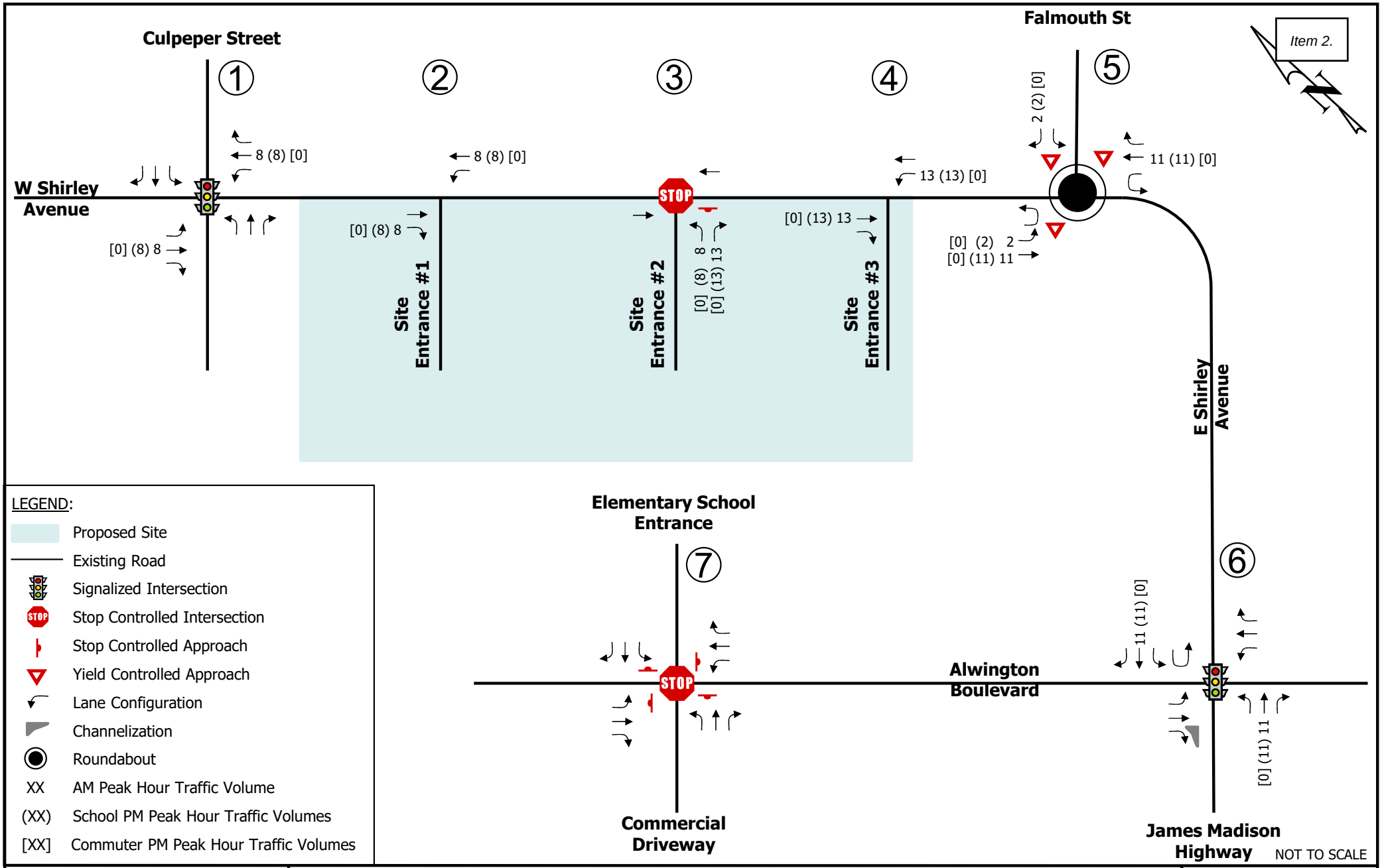
[3] *Channelized right turn not controlled by the signal.*

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

† SYNCHRO does not provide level of service or delay for unsignalized movements with no conflicting volumes.

* Note: SIDRA was used to analyze the roundabout at intersection 5.

** Note: HCM 6th Edition was used to analyze the all way stop controlled intersection at intersection 7.



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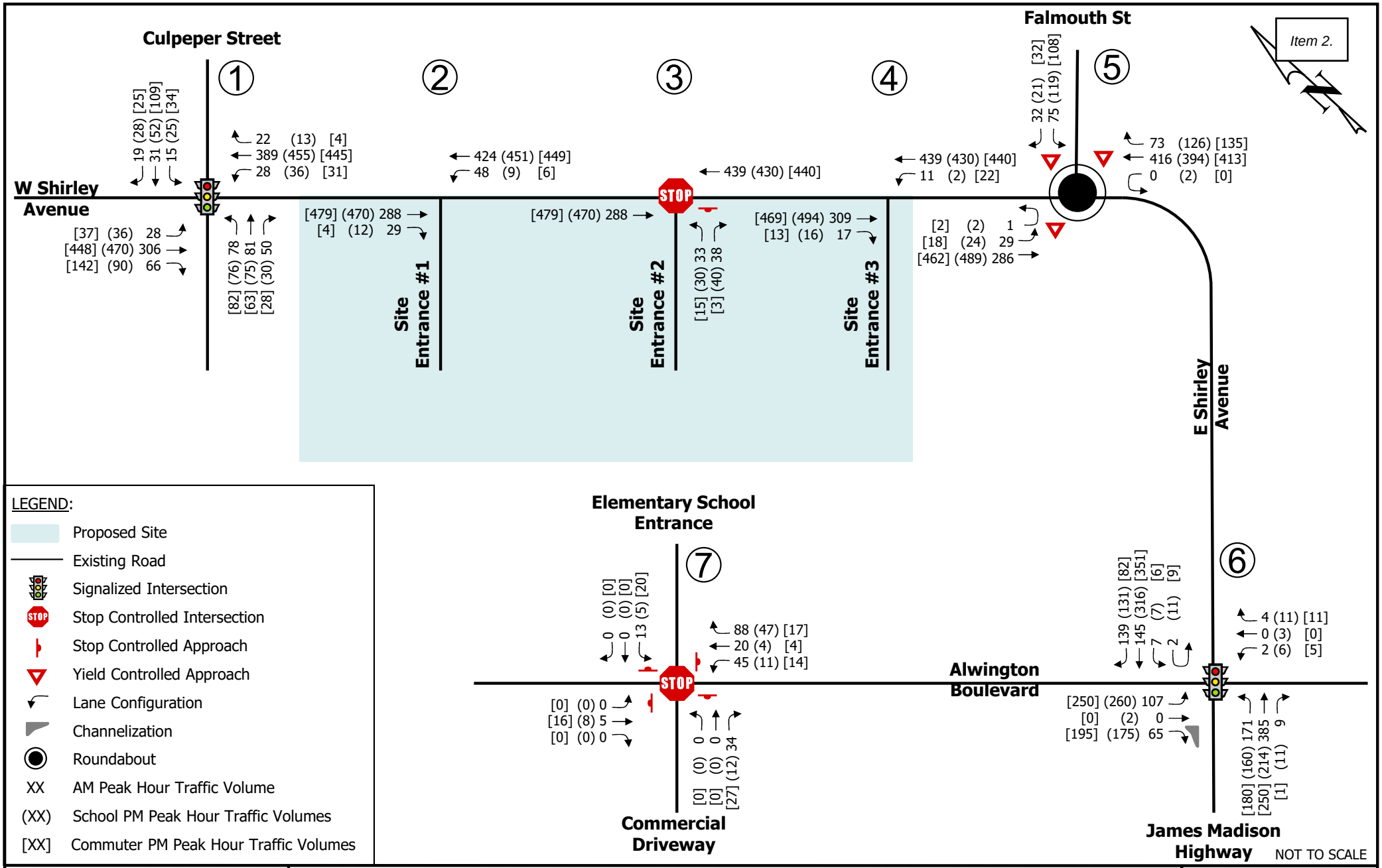
2023 Existing Bus Peak Hour Volumes
Taylor Middle School – Addition
Town of Warrenton, Virginia

Figure 3-1



LEGEND:

- Proposed Site
- Existing Road
- Signalized Intersection
- Stop Controlled Intersection
- Stop Controlled Approach
- Yield Controlled Approach
- Lane Configuration
- Channelization
- Roundabout
- XX AM Peak Hour Traffic Volume
- (XX) School PM Peak Hour Traffic Volumes
- [XX] Commuter PM Peak Hour Traffic Volumes

NOT TO SCALE

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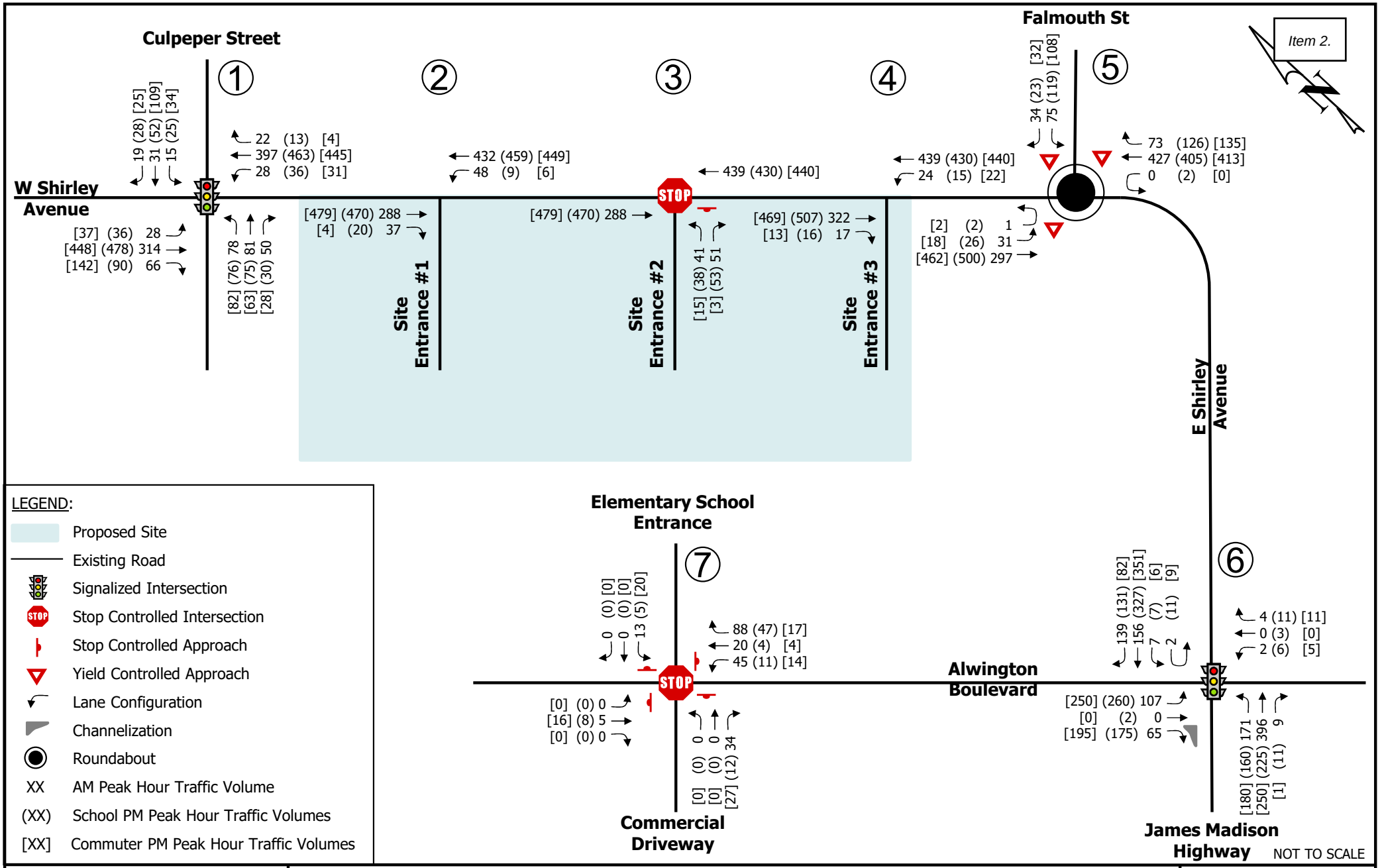
2023 Existing Vehicles (Non-Bus) Peak Hour Volumes
Taylor Middle School – Addition
Town of Warrenton, Virginia

Figure 3-2



LEGEND:

- Proposed Site
- Existing Road
- Signalized Intersection
- Stop Controlled Intersection
- Stop Controlled Approach
- Yield Controlled Approach
- Lane Configuration
- Channelization
- Roundabout
- XX AM Peak Hour Traffic Volume
- (XX) School PM Peak Hour Traffic Volumes
- [XX] Commuter PM Peak Hour Traffic Volumes

NOT TO SCALE

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2023 Total Existing Peak Hour Volumes
Taylor Middle School – Addition
Town of Warrenton, Virginia

Figure 3-3

4 2026 BACKGROUND CONDITIONS

The background 2026 volumes were analyzed assuming existing intersection geometry in conjunction with projected background traffic volumes, which consists of general traffic growth in the area.

4.1 GENERAL TRAFFIC GROWTH

The background volumes were based on a 1.0% annual growth rate and applied to all movements except the turns into and out of the existing school entrances. The growth rate was compounded annually for the three-year period from 2023 to 2026 and was applied to all movements at the study intersections. The resulting 2026 vehicle background (existing + growth) volumes are shown on Figure 4-1.

4.2 BACKGROUND 2026 CAPACITY ANALYSIS RESULTS

Table 4-1 summarizes the 2026 background intersection LOS, delay, 95th percentile queue lengths (Synchro), and maximum queue lengths (SimTraffic) based on the intersection geometry (Figure 2-1), 2026 background peak hour traffic volumes shown on Figure 4-1 and the existing signal timings as provided by the Town of Warrenton and VDOT. The corresponding SYNCHRO and SimTraffic reports are included in Appendix E.

Note that the intersection numbers shown on the LOS, delay, and queue length summary tables correspond with the intersection numbers used in the SYNCHRO models and report figures.

As shown in Table 4-1, under 2026 background conditions, all intersections experience similar levels of service, delay, and queueing as under existing conditions. Specifically:

1. The East Shirley/Culpeper Street intersection will operate an overall LOS C in each of the peak hours. Each of the approaches operates at LOS E or better with no queueing concerns.

2. The school entrances along East Shirley Avenue operate at LOS C or better in each of the peak hours. The queues at the left and right turns into the school are contained within the available storage.

3. The roundabout at East Shirley Avenue/Falmouth Street operates at LOS A in each of the peak hours with no queuing concerns.

4. The East Shirley Avenue/Alwington Boulevard intersections operates at LOS C in each of the peak hours. Each of the approaches operates at LOS D or better. Each of the queues are contained within the available storage.

5. Each of the movements at the Alwington Boulevard/School Entrance/Commercial Entrance intersection operates at LOS A in all peak hours.

Table 4-1: 2026 Background Conditions
Intersection Level of Service and Delay Summary

Intersection and Type of Control	Movement and Approach	Turn Lane Storage (ft)	AM PEAK HOUR				SCHOOL PM PEAK HOUR				COMMUTER PM PEAK HOUR			
			Delay [1] (sec/veh)	LOS [1]	HCS 95th Percentile Queue Length (ft)	Simulated Maximum Queue Length[(2)] (ft)	Delay [1] (sec/veh)	LOS [1]	HCS 95th Percentile Queue Length (ft)	Simulated Maximum Queue Length[(2)] (ft)	Delay [1] (sec/veh)	LOS [1]	HCS 95th Percentile Queue Length (ft)	Simulated Maximum Queue Length[(2)] (ft)
1. Shirley Avenue (E-W) at	EB Left	215	47.5	D	51	101	56.7	E	62	177	53.5	D	63	190
Culpeper Street (N-S)	EB Thru		22.3	C	270	279	28.8	C	#495	404	30.1	C	431	387
Signalized	EB Right		17.4	B	0	65	17.4	B	12	65	19.9	B	42	82
	EB Approach		*23.3*	*C*	--	--	*28.7*	*C*	--	--	*29.1*	*C*	--	--
	WB Left	185	40.9	D	51	136	42.5	D	62	177	43.6	D	56	139
	WB Thru/Right		22.7	C	389	343	23.6	C	#493	400	25.1	C	428	343
	WB Approach		*23.9*	*C*	--	--	*24.9*	*C*	--	--	*26.3*	*C*	--	--
	NB Left/Thru/Right		45.7	D	#236	232	46.7	D	#207	228	46.9	D	197	206
	NB Approach		*45.7*	*D*	--	--	*46.7*	*D*	--	--	*46.9*	*D*	--	--
	SB Left	125	40.9	D	30	50	41.2	D	44	84	37.7	D	53	106
	SB Thru/Right		42.6	D	60	92	44.7	D	93	131	43.9	D	154	191
	SB Approach		*42.2*	*D*	--	--	*43.9*	*D*	--	--	*42.7*	*D*	--	--
	Overall		**28.7**	**C**	**--**	**--**	**30.8**	**C**	**--**	**--**	**31.9**	**C**	**--**	**--**
2. E Shirley Avenue (E-W) at	EB Thru		†	†	0	0	†	†	0	--	†	†	0	--
Site Entrance #1 (N-S)	EB Right	110	†	†	0	6	†	†	0	--	†	†	0	--
Unsignalized	*EB Approach*		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
	WB Left	240	8.6	A	7	57	8.6	A	1	31	8.5	A	1	32
	WB Thru		†	†	0	--	†	†	0	--	†	†	0	--
	WB Approach		*1.4*	*A*	--	--	*0.3*	*A*	--	--	*0.2*	*A*	--	--
3. E Shirley Avenue (E-W) at	EB Thru		†	†	0	0	†	†	0	4	†	†	0	--
Site Entrance #2 (N-S)	*EB Approach*		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
Unsignalized	WB Thru		†	†	0	--	†	†	0	--	†	†	0	--
	WB Approach		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
	NB Left		19.6	C	24	84	25.1	D	30	83	20.5	C	10	45
	NB Right		11.2	B	13	78	13.6	B	19	99	11.6	B	0	27
	NB Approach		*14.9*	*B*	--	--	*18.4*	*C*	--	--	*19.7*	*C*	--	--
4. E Shirley Avenue (E-W) at	EB Thru		†	†	0	--	†	†	0	--	†	†	0	--
Site Entrance #3 (N-S)	EB Right	140	†	†	0	2	†	†	0	4	†	†	0	4
Unsignalized	*EB Approach*		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
	WB Left	160	8.2	A	3	40	8.8	A	2	35	8.8	A	4	48
	WB Thru		†	†	0	--	†	†	0	--	†	†	0	--
	WB Approach		*0.7*	*A*	--	--	*0.5*	*A*	--	--	*0.7*	*A*	--	--
5. E Shirley Avenue (E-W) at	*EB Approach*		*1.8*	*A*	*21*	--	*2.0*	*A*	*31*	--	*1.9*	*A*	*30*	--
Falmouth Street (N)	*WB Approach*		*10.1*	*B*	*125*	--	*9.5*	*A*	*107*	--	*13.1*	*B*	*185*	--
Roundabout*	*SB Approach*		*8.8*	*A*	*35*	--	*7.2*	*A*	*32*	--	*8.0*	*A*	*38*	--
	Overall		**7.4**	**A**	**--**	**--**	**5.9**	**A**	**--**	**--**	**7.9**	**A**	**--**	**--**
6. E Shirley Avenue/ (N-S)	EB Left	560	34.0	C	64	127	37.0	D	132	154	38.5	D	130	145
James Madison Highway at	EB Left/Thru		34.0	C	64	93	37.3	D	133	114	38.5	D	130	114
Alwington Boulevard (E-W)	EB Right[(3)]		0.1	A	0	6	0.2	A	0	59	0.2	A	0	63
Signalized	*EB Approach*		*21.2*	*C*	--	--	*22.3*	*C*	--	--	*21.7*	*C*	--	--
	WB Left/Thru/Right		32.6	C	0	52	35.2	D	27	65	34.9	C	0	48
	WB Approach		*32.6*	*C*	--	--	*35.2*	*D*	--	--	*34.9*	*C*	--	--
	NB Left	315	17.4	B	99	155	18.3	B	99	152	18.1	B	106	155
	NB Thru		18.3	B	143	200	18.1	B	87	161	17.7	B	93	157
	NB Right	160	15.8	B	0	19	16.9	B	0	48	16.3	B	0	8
	NB Approach		*18.0*	*B*	--	--	*18.2*	*B*	--	--	*17.9*	*B*	--	--
	SB Left	165	15.1	B	11	41	16.3	B	18	42	15.8	B	15	89
	SB Thru		23.7	C	70	110	25.9	C	135	163	25.8	C	141	170
	SB Right	250	16.7	B	15	107	15.5	B	9	91	15.4	B	0	76
	SB Approach		*20.3*	*C*	--	--	*22.6*	*C*	--	--	*23.6*	*C*	--	--
	Overall		**19.3**	**B**	**--**	**--**	**21.4**	**C**	**--**	**--**	**21.3**	**C**	**--**	**--**
7. Alwington Boulevard (E-W) at	EB Left/Thru/Right		7.3	A	0	10	7.4	A	0	20	7.2	A	3	10
Elementary School Entrance/	*EB Approach*		*7.3*	*A*	--	--	*7.4*	*A*	--	--	*7.2*	*A*	--	--
Commercial Entrance (N-S)	WB Left/Thru		8.7	A	10	76	8.7	A	3	64	8.9	A	3	69
Unsignalized**	WB Right	270	7.1	A	10	61	6.8	A	5	60	6.7	A	3	59
	WB Approach		*7.8*	*A*	--	--	*7.3*	*A*	--	--	*7.8*	*A*	--	--
	NB Left/Thru/Right		6.9	A	3	83	6.5	A	0	61	6.6	A	3	56
	NB Approach		*6.9*	*A*	--	--	*6.5*	*A*	--	--	*6.6*	*A*	--	--
	SB Left/Thru/Right		7.8	A	3	45	7.3	A	0	29	7.4	A	3	34
	NB Approach		*7.8*	*A*	--	--	*7.3*	*A*	--	--	*7.4*	*A*	--	--

[1] *Overall intersection LOS and delay reported for signalized intersections and roundabouts only.*

[2] SimTraffic Queues are average maximum queues after 10 runs of 60 minutes each.

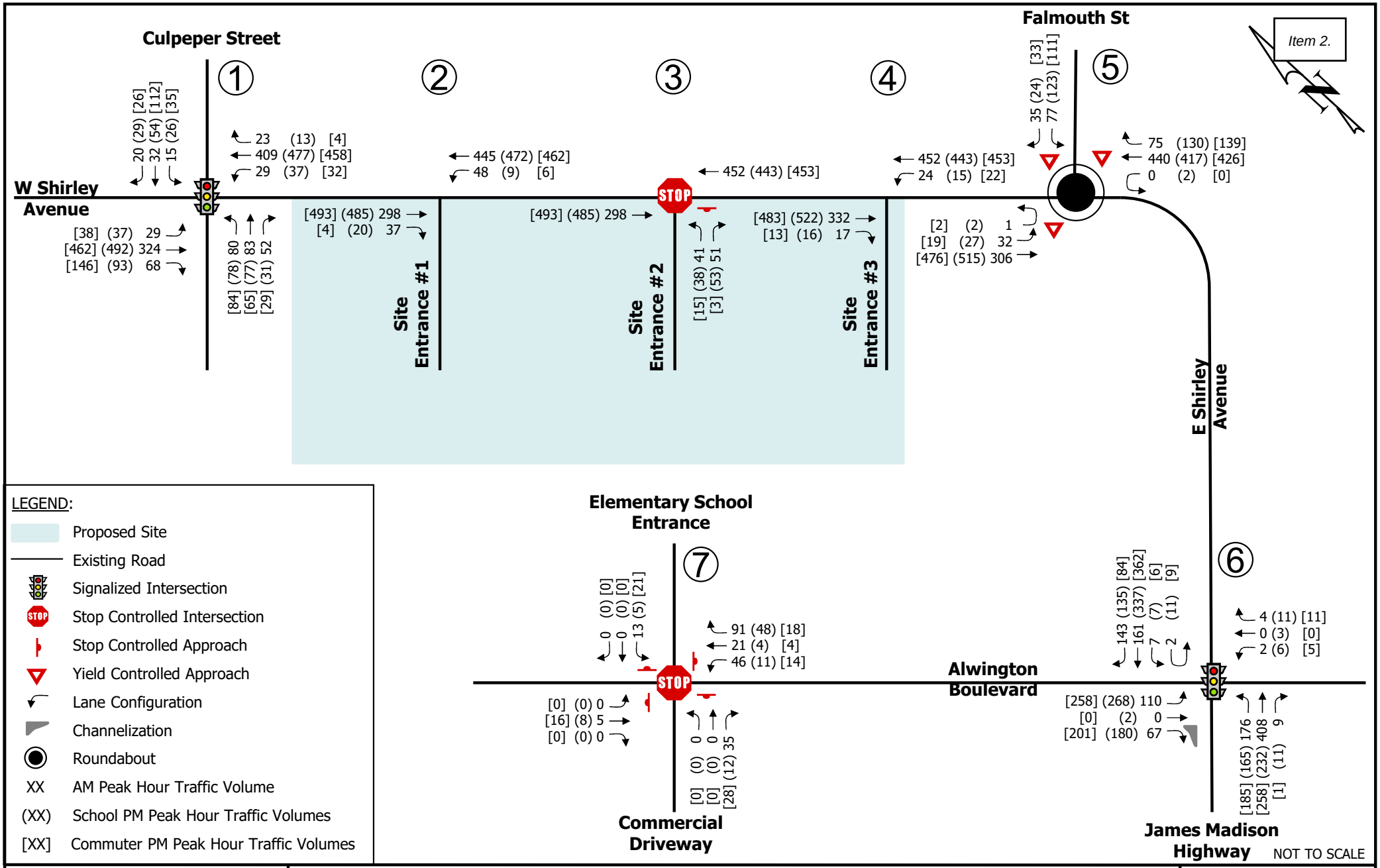
[3] *Channelized right turn not controlled by the signal.*

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

† SYNCHRO does not provide level of service or delay for unsignalized movements with no conflicting volumes.

* Note: SIDRA was used to analyze the roundabout at intersection 5.

** Note: HCM 6th Edition was used to analyze the all way stop controlled intersection at intersection 7.



2026 Total Background Peak Hour Volumes
Taylor Middle School – Addition
Town of Warrenton, Virginia

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Figure 4-1

5 TRIP GENERATION

For purposes of this analysis, the proposed expansion of the middle school will accommodate an increase of 340 students and anticipated to occur by 2026.

Access to the site will be provided via three existing entrances into the site from E Shirley Avenue and one new alternate access from Alwington Boulevard. A site layout is shown on Figure 1-2.

With the expansion, the access to the site will be reworked as shown in Figure 5-1. The two western entrances on East Shirley Avenue will be a bus loop only and the eastern entrance will be combined with the community center entrance and serve all other vehicles. The new entrance off of Alwington Boulevard will service passenger vehicles.

It is anticipated that passenger vehicle traffic from the south on East Shirley Avenue will use the entrance off Alwington Boulevard while all other traffic will use the entrances on East Shirley Avenue.

5.1 ACCESS MANAGEMENT REVIEW

As noted above, the expanded Middle School will utilize the existing three entrances points along E Shirley Avenue under a reworked access scenario. No new access points are proposed on E Shirley Avenue.

As shown on Figure 2-1, the western access point (bus entrance only) is located approximately 565 feet from the middle entrance (bus out only). The middle entrance is spaced approximately 370 feet from the eastern entrance (vehicle in and out).

In accordance with VDOT's Road Design Manual, Appendix F, Table 2-2, on a roadway like E Shirley Avenue (minor arterial with a posted 40 mph speed limit), a Type 3 (full access) entrance requires 470 feet of spacing to other signalized or full access intersections. A Type 4 (partial access) requires 250 feet of spacing from all other intersections.

Since the eastern and middle entrance are Type 4 (partial access), 250 feet of spacing is required between each of the entrances.

The spacing between each entrance exceeds 250 feet and therefore all access management standards are met at the entrances.

5.2 REROUTED TRAFFIC

As noted above, with the expansion, the site driveways will be changed as shown in Figure 5-1. As a result, the existing traffic entering and exiting the school will be rerouted to the new entrances as shown on Figure 5-2 (bus trips) and Figure 5-3 (vehicle trips).

5.3 SITE TRIP GENERATION

The peak hour site-generated traffic volumes shown in Table 5-1 were estimated using existing driveway counts at the school pro-rated for the expansion in students. The average daily traffic was estimated using the 11th Edition of the Institute of Transportation Engineers' (ITE) *Trip Generation Manual* .

Table 5-1: Trip Generation Summary

Land Use	Size	Units	Land Use Code	School AM Peak Hour (1) In	School AM Peak Hour (1) Out	School AM Peak Hour (1) Total	School PM Peak (1) In	School PM Peak (1) Out	School PM Peak (1) Total	Commuter PM Peak Hour (1) In	Commuter PM Peak Hour (1) Out	Commuter PM Peak Hour (1) Total	Average Daily Trips (2)
Existing Capacity													
Middle School	510	Students	522	126	92	218	60	91	151	45	18	63	1071
New Capacity													
Middle School	850	Students	522	210	153	363	100	152	252	75	30	105	1785
Increase	340	Students		84	61	145	40	61	101	30	12	42	714

Note: (1) Peak hour counts based on existing driveway counts conducted for the site for the existing school capacity. New capacity trips pro-rated based on the existing counts and the percent increase in students.
(2) Average Daily Trips based on the Institute of Transportation Engineers Trip Generation, 11th Edition. Assumes General Urban/Suburban land use category.

As shown in Table 5-1, the overall expansion will generate an increase of 145 AM peak hour trips (84 in and 61 out), 101 School PM peak hour trips (40 in and 61 out), 42 PM peak hour trips (30 in ands 12 out) and 714 average daily trips.

5.4 External Trip Distributions

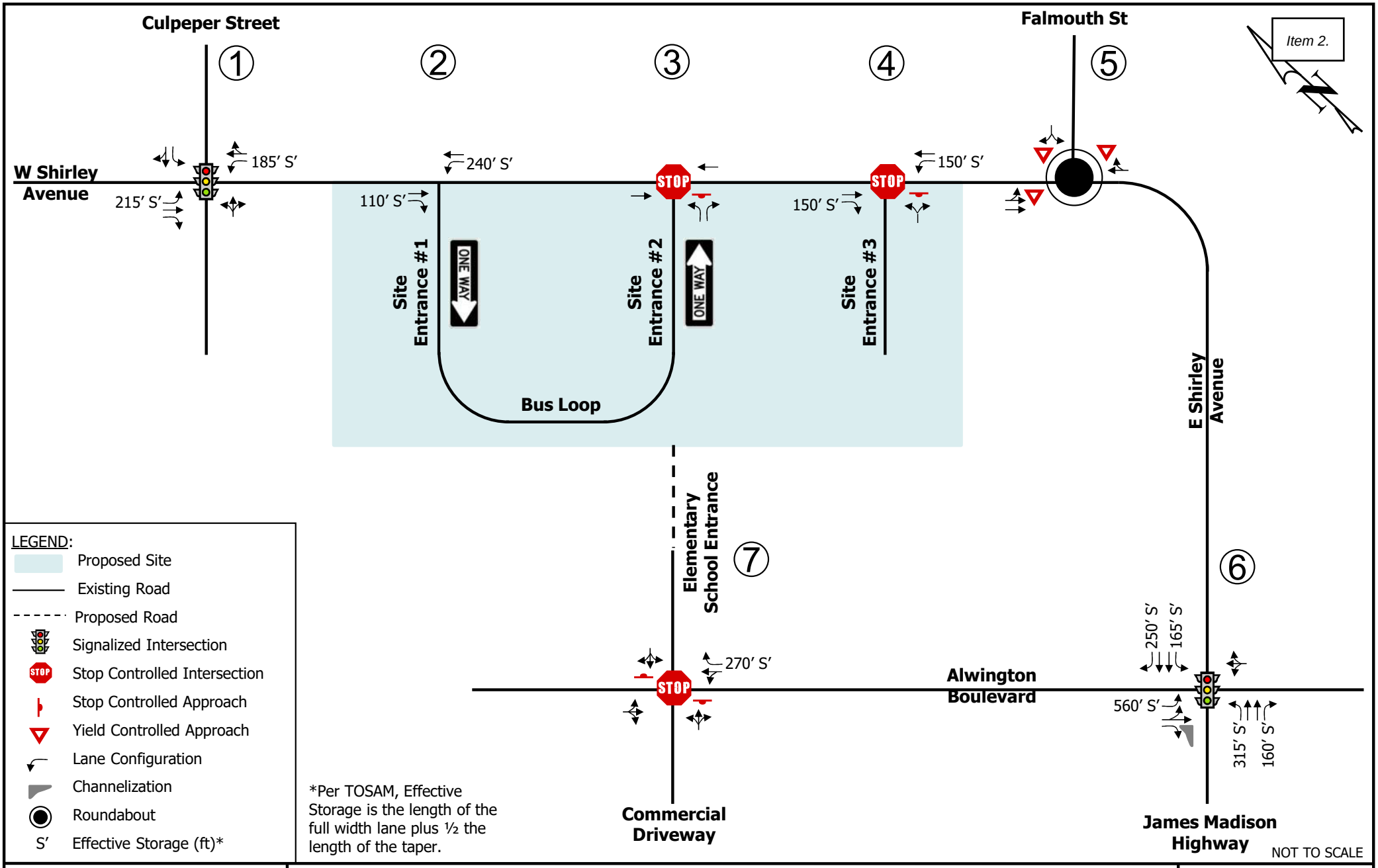
The distribution of trips generated by the proposed developed was based on other traffic studies in the area, the existing traffic volumes, the nature of the use, the school attendance map and local knowledge.

The following directional distributions were assumed for the site:

- 40% from the west on East Shirley Avenue;
- 10% from the north on Falmouth Street; and
- 50% from the south on East Shirley Avenue.

5.5 Traffic Assignment

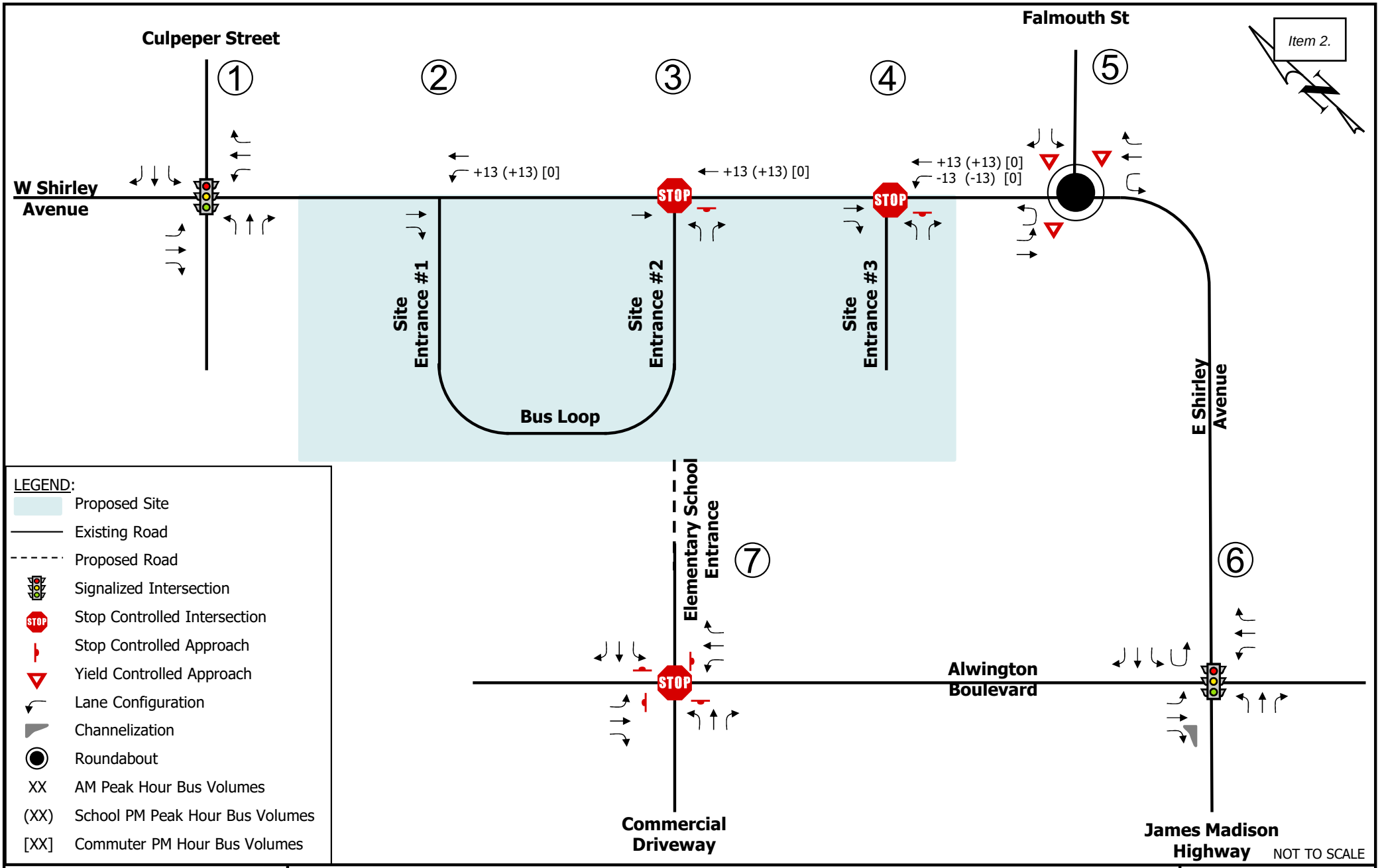
The trip distribution percentages for the new traffic generated by the site were applied to the site driveways as shown in Figure 5-4 (bus trips) and Figure 5-5 (vehicle trips). The distributions were then applied to the new trips shown in Table 5-1 and the resulting new external trips are shown in Figure 5-6 (bus trips) and Figure 5-7 (vehicle trips).



TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Future Geometry and Stop Control
Taylor Middle School – Addition
Town of Warrenton, Virginia

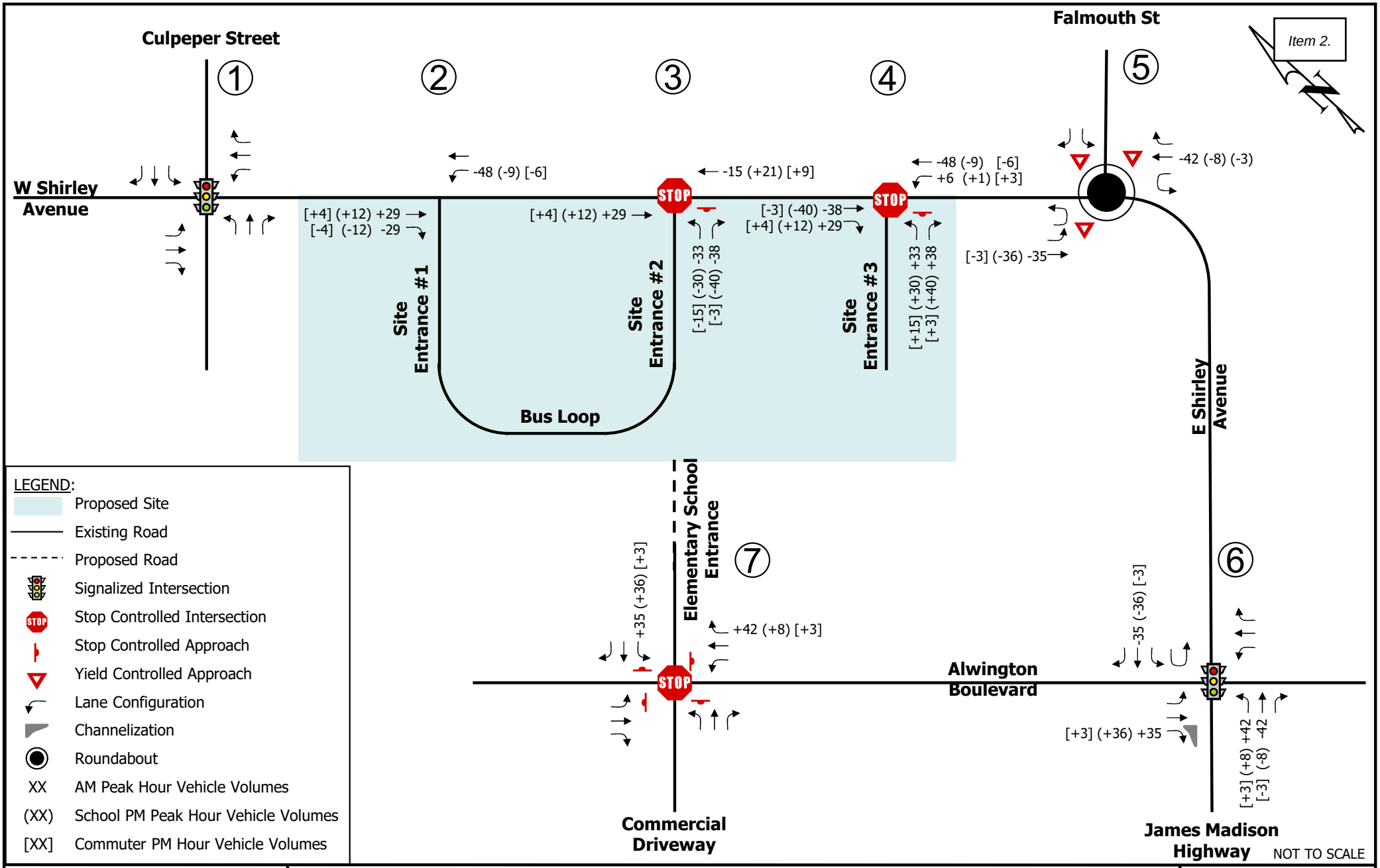
Figure 5-1



TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Rerouted Existing Buses
Taylor Middle School – Addition
Town of Warrenton, Virginia

Figure 5-2



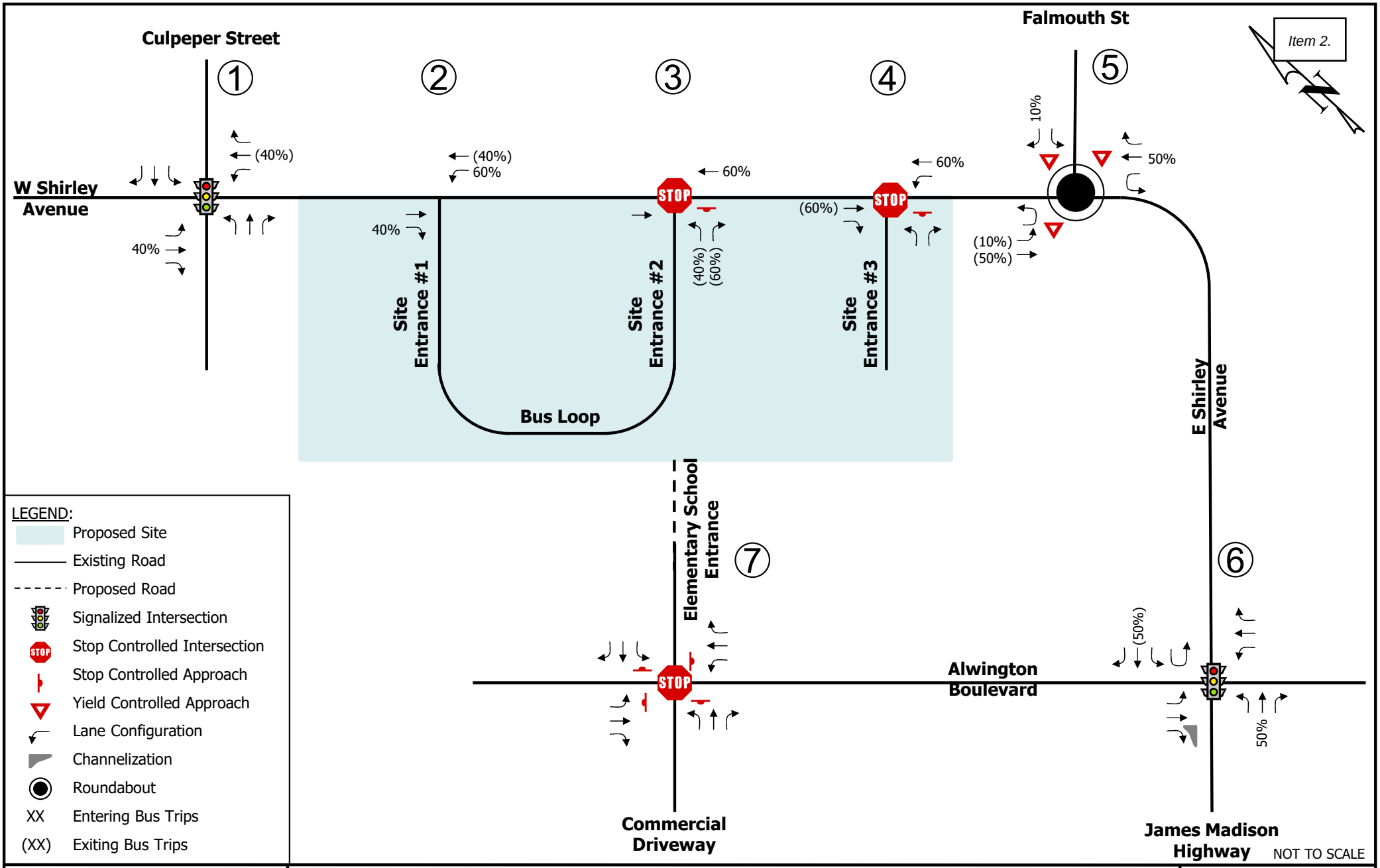
LEGEND:

- Proposed Site
- Existing Road
- Proposed Road
- Signalized Intersection
- Stop Controlled Intersection
- Stop Controlled Approach
- Yield Controlled Approach
- Lane Configuration
- Channelization
- Roundabout
- XX AM Peak Hour Vehicle Volumes
- (XX) School PM Peak Hour Vehicle Volumes
- [XX] Commuter PM Hour Vehicle Volumes

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Rerouted Existing Vehicles (Non-Bus)
Taylor Middle School – Addition
Town of Warrenton, Virginia

Figure 5-3



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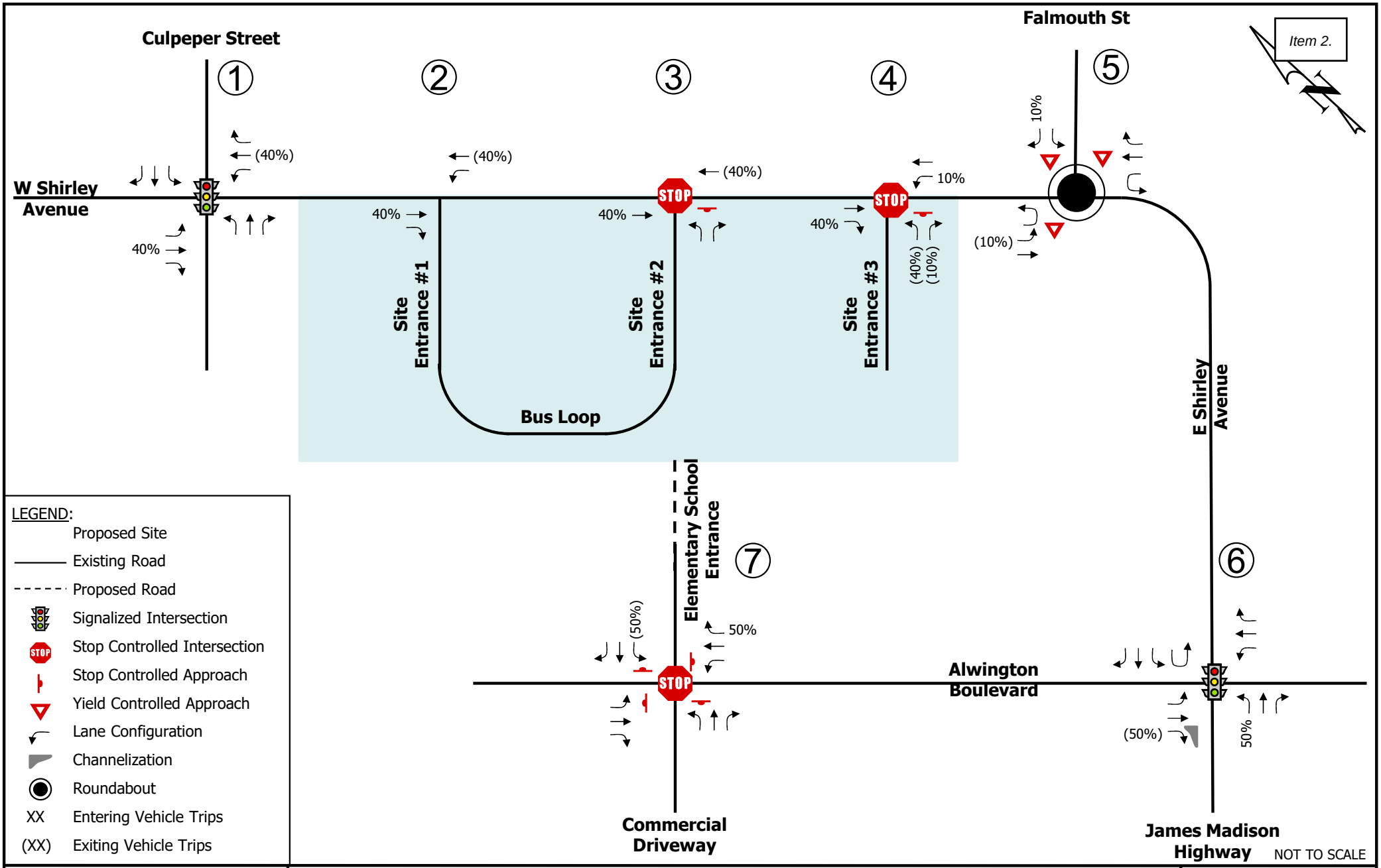
Additional Bus Trip Distributions
Taylor Middle School – Addition
Town of Warrenton, Virginia

Figure 5-4



TIMMONS GROUP
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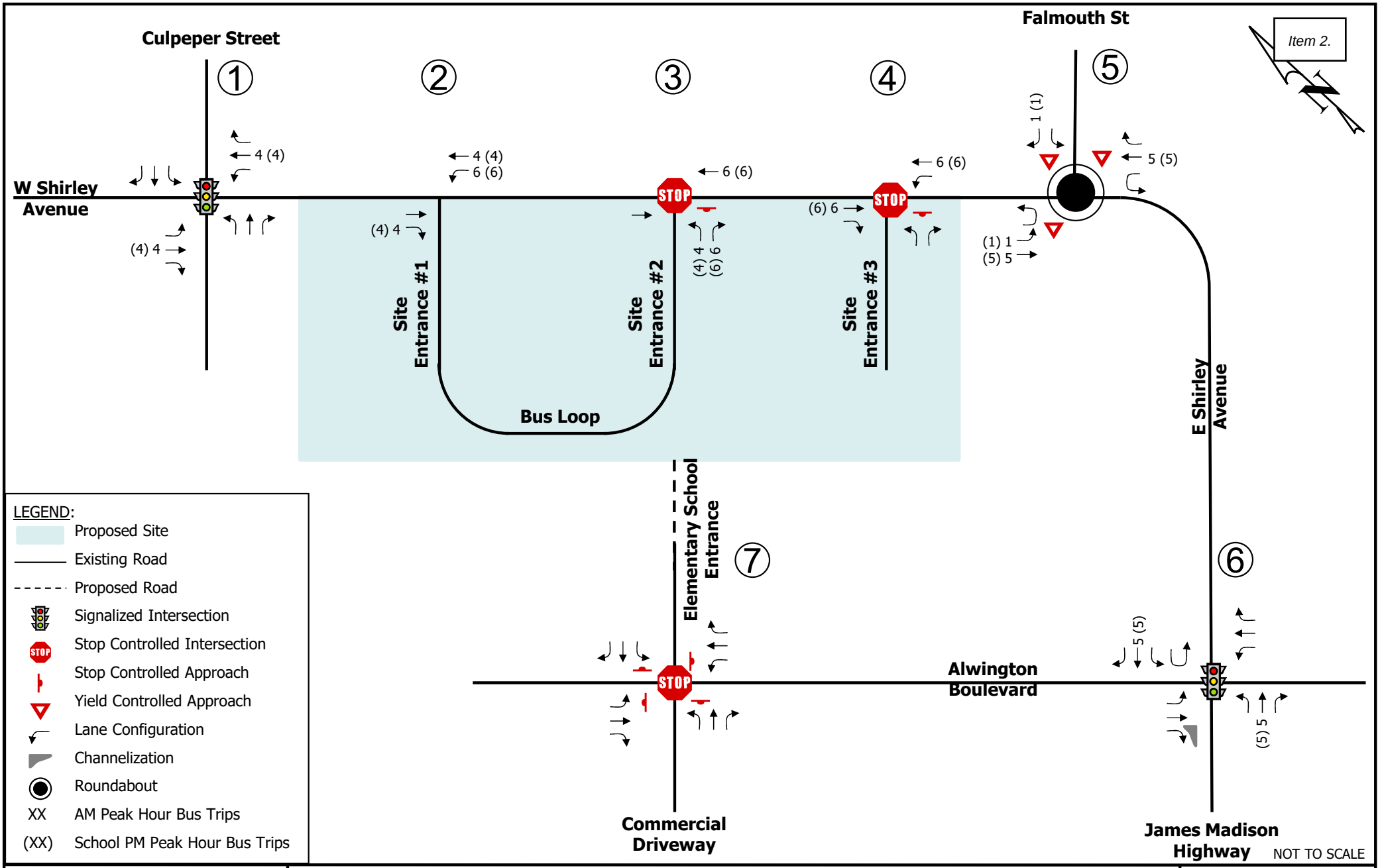
Additional Vehicle (Non-Bus) Trip Distributions
Taylor Middle School – Addition
Town of Warrenton, Virginia

Figure 5-5



NOT TO SCALE

TIMMONS GROUP
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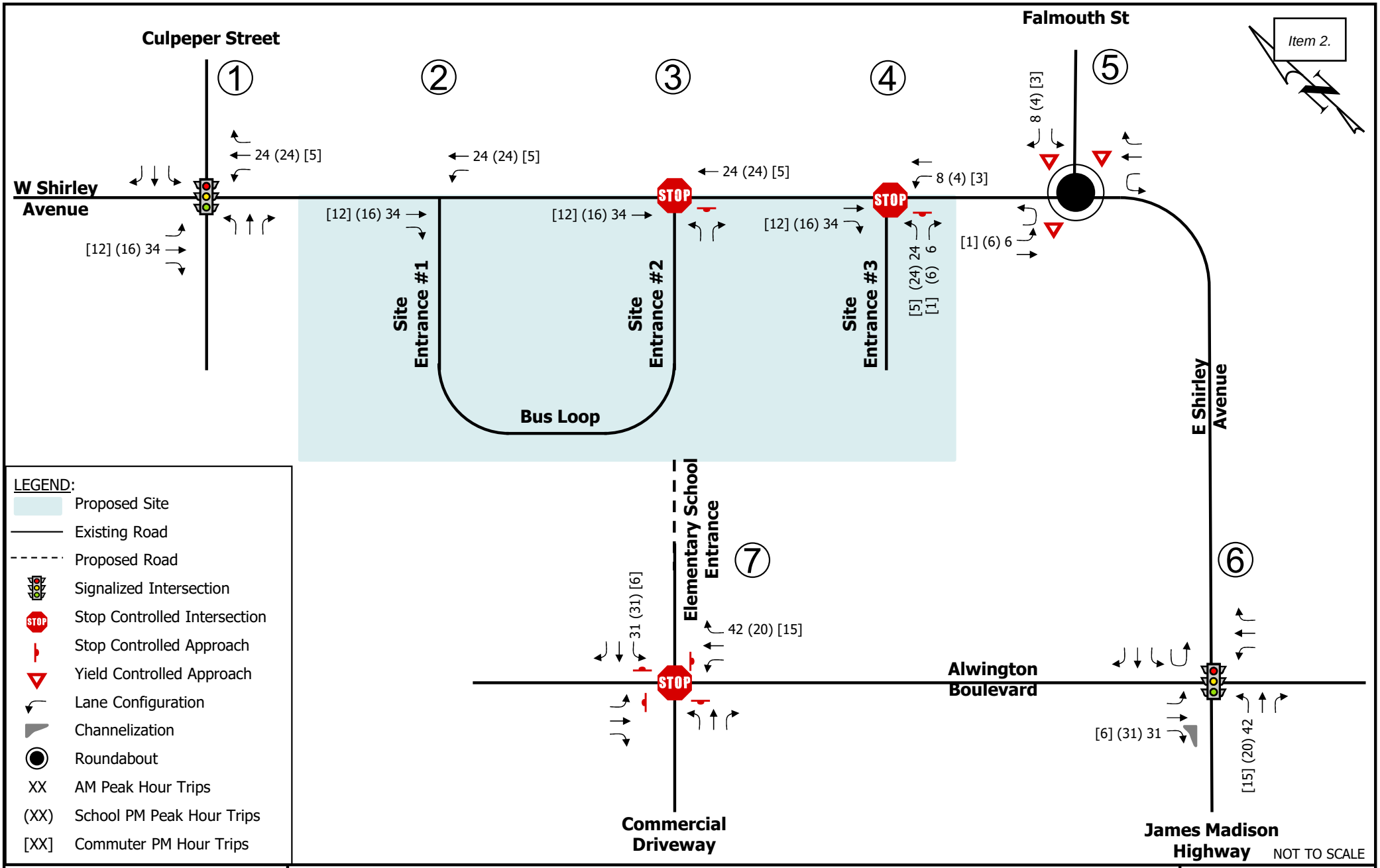
Site Generated Additional Bus Trips
Taylor Middle School – Addition
Town of Warrenton, Virginia

Figure 5-6



NOT TO SCALE

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Site Generated Additional Vehicle (Non-Bus) Trips
Taylor Middle School – Addition
Town of Warrenton, Virginia

Figure 5-7

6 2026 TOTAL FUTURE CONDITIONS

To complete the analysis of 2026 total conditions (with the proposed development), the estimated site trips were added to the background 2026 traffic volumes. The projected volumes were then used to complete the capacity analysis.

6.1 TOTAL FUTURE TRAFFIC VOLUMES

The rerouted existing trips shown on Figures 5-2 and 5-3 and site generated trips shown on Figures 5-6 and 5-7 were added to the 2026 background traffic volumes (Figure 4-1) to yield the 2026 total future traffic volumes shown in Figure 6-1.

6.2 2026 FUTURE CONDITIONS ANALYSIS RESULTS

Table 6-1 summarizes the 2026 future intersection LOS, delay, 95th percentile queue lengths (Synchro), and maximum queue lengths (SimTraffic) based on the future intersection geometry (Figure 5-1), 2026 future peak hour traffic volumes shown on Figure 6-1 and the existing signal timings as provided by the Town of Warrenton and VDOT. The corresponding SYNCHRO and SimTraffic reports are included in Appendix F.

Note that the intersection numbers shown on the LOS, delay, and queue length summary tables correspond with the intersection numbers used in the SYNCHRO models and report figures.

As shown in Table 6-1, under 2026 future conditions, all intersections experience similar levels of service, delay, and queueing as under 2026 background conditions. Specifically:

1. The East Shirley/Culpeper Street intersection will operate an overall LOS C or D in each of the peak hours. Each of the approaches operates at LOS E or better with no queueing concerns with the exception of the eastbound left approach which will operate at LOS E in both PM peaks.
    a. It is noted that the traffic signal is running under "free" operations and is likely giving more time to the mainline through movements which results in the LOS E. The delays are less than the overall cycle length of the intersection indicating that the average traffic waits at most one cycle length to traverse the intersection.

2. The school entrances along East Shirley Avenue operate at LOS D or better in each of the peak hours. The queues at the left and right turns into the school are contained within the available storage.

3. The roundabout at East Shirley Avenue/Falmouth Street operates at LOS A in each of the peak hours with no queuing concerns.

4. The East Shirley Avenue/Alwington Boulevard intersections operates at LOS C in each of the peak hours. Each of the approaches operates at LOS D or better. Each of the queues are contained within the available storage.

5. Each of the movements at the Alwington Boulevard/School Entrance/Commercial Entrance intersection operates at LOS A in all peak hours.

Table 6-1: 2026 Total Future Conditions
Intersection Level of Service and Delay Summary

Intersection and Type of Control	Movement and Approach	Turn Lane Storage (ft)	AM PEAK HOUR				SCHOOL PM PEAK HOUR				COMMUTER PM PEAK HOUR			
			Delay [1] (sec/veh)	LOS [1]	HCS 95th Percentile Queue Length (ft)	Simulated Maximum Queue Length[2] (ft)	Delay [1] (sec/veh)	LOS [1]	HCS 95th Percentile Queue Length (ft)	Simulated Maximum Queue Length[2] (ft)	Delay [1] (sec/veh)	LOS [1]	HCS 95th Percentile Queue Length (ft)	Simulated Maximum Queue Length[2] (ft)
1. Shirley Avenue (E-W) at	EB Left	215	47.8	D	51	169	58.1	E	62	202	53.6	D	63	202
Culpeper Street (N-S)	EB Thru		23.1	C	302	304	29.8	C	#529	394	30.8	C	446	411
Signalized	EB Right		17.1	B	0	74	17.4	B	12	66	19.8	B	42	116
	EB Approach		*23.8*	*C*	--	--	*29.7*	*C*	--	--	*29.6*	*C*	--	--
	WB Left	185	41.2	D	51	160	42.9	D	62	175	43.8	D	56	141
	WB Thru/Right		23.4	C	415	384	24.7	C	#541	423	25.2	C	434	373
	WB Approach		*24.4*	*C*	--	--	*25.9*	*C*	--	--	*26.4*	*C*	--	--
	NB Left/Thru/Right		47.9	D	#248	224	47.2	D	#207	242	47.2	D	197	192
	NB Approach		*47.9*	*D*	--	--	*47.2*	*D*	--	--	*47.2*	*D*	--	--
	SB Left	125	41.2	D	30	48	41.7	D	44	95	37.9	D	53	120
	SB Thru/Right		43.0	D	60	95	45.2	D	93	140	44.1	D	154	186
	SB Approach		*42.6*	*D*	--	--	*44.4*	*D*	--	--	*42.9*	*D*	--	--
	Overall		**29.3**	**C**	**--**	**--**	**31.5**	**C**	**--**	**--**	**32.2**	**C**	**--**	**--**
2. E Shirley Avenue (E-W) at	EB Thru		†	†	0	2	†	†	0	--	†	†	0	--
Site Entrance #1 (N-S)	EB Right	110	†	†	0	--	†	†	0	0	†	†	0	--
Unsignalized	*EB Approach*		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
	WB Left	240	8.4	A	3	42	8.7	A	3	34	†	†	0	--
	WB Thru		†	†	0	--	†	†	0	--	†	†	0	--
	WB Approach		*0.6*	*A*	--	--	*0.6*	*A*	--	--	*†*	*†*	--	--
3. E Shirley Avenue (E-W) at	EB Thru		†	†	0	--	†	†	0	4	†	†	0	--
Site Entrance #2 (N-S)	*EB Approach*		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
Unsignalized	WB Thru		†	†	0	--	†	†	0	--	†	†	0	--
	WB Approach		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
	NB Left		18.8	C	7	52	23.3	C	9	60	†	†	0	--
	NB Right		11.1	B	5	64	12.8	B	6	65	†	†	0	--
	NB Approach		*14.1*	*B*	--	--	*16.8*	*C*	--	--	*†*	*†*	--	--
4. E Shirley Avenue (E-W) at	EB Thru		†	†	0	0	†	†	0	2	†	†	0	0
Site Entrance #3 (N-S)	EB Right	150	†	†	0	6	†	†	0	0	†	†	0	0
Unsignalized	*EB Approach*		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
	WB Left	150	8.4	A	4	37	8.8	A	1	30	9.0	A	5	52
	WB Thru		†	†	0	--	*†*	*†*	--	--	*†*	*†*	--	--
	WB Approach		*0.9*	*A*	--	--	*0.2*	*A*	--	--	*0.9*	*A*	--	--
	NB Left-Right		21.4	C	64	108	30.5	D	91	134	23.5	C	18	42
	NB Approach		*21.4*	*C*	--	--	*30.5*	*D*	--	--	*23.5*	*C*	--	--
5. E Shirley Avenue (E-W) at	*EB Approach*		*1.8*	*A*	*20*	--	*1.9*	*A*	*30*	--	*1.9*	*A*	*30*	--
Falmouth Street (N)	*WB Approach*		*10.1*	*B*	*109*	--	*9.6*	*A*	*106*	--	*13.1*	*B*	*182*	--
Roundabout*	*SB Approach*		*8.6*	*A*	*36*	--	*7.3*	*A*	*34*	--	*8.1*	*A*	*39*	--
	Overall		**7.0**	**A**	**--**	**--**	**6.0**	**A**	**--**	**--**	**7.9**	**A**	**--**	**--**
6. E Shirley Avenue/ (N-S)	EB Left	560	35.6	D	68	133	37.0	D	130	164	36.7	D	125	151
James Madison Highway at	EB Left/Thru		35.6	D	68	96	37.3	D	132	125	36.7	D	125	113
Alwington Boulevard (E-W)	EB Right[3]		0.2	A	0	27	0.3	A	0	69	0.2	A	0	47
Signalized	*EB Approach*		*16.2*	*B*	--	--	*19.5*	*B*	--	--	*20.3*	*C*	--	--
	WB Left/Thru/Right		34.1	C	0	61	35.2	D	26	65	34.8	C	0	50
	WB Approach		*34.1*	*C*	--	--	*35.2*	*D*	--	--	*34.8*	*C*	--	--
	NB Left	315	18.2	B	146	213	18.7	B	115	164	19.0	B	122	181
	NB Thru		17.4	B	129	166	18.1	B	86	148	18.1	B	95	173
	NB Right	160	15.3	B	0	19	16.9	B	0	42	16.7	B	0	28
	NB Approach		*17.7*	*B*	--	--	*18.4*	*B*	--	--	*18.5*	*B*	--	--
	SB Left	165	14.6	B	11	43	16.3	B	18	51	16.2	B	15	74
	SB Thru		25.1	C	63	103	25.9	C	123	154	25.8	C	140	167
	SB Right	250	18.1	B	0	113	15.8	B	9	89	15.1	B	1	78
	SB Approach		*21.2*	*C*	--	--	*22.6*	*C*	--	--	*23.5*	*C*	--	--
	Overall		**18.3**	**B**	**--**	**--**	**20.4**	**C**	**--**	**--**	**20.9**	**C**	**--**	**--**
7. Alwington Boulevard (E-W) at	EB Left/Thru/Right		7.6	A	0	8	7.6	A	0	23	7.3	A	3	8
Elementary School Entrance/	*EB Approach*		*7.6*	*A*	--	--	*7.6*	*A*	--	--	*7.3*	*A*	--	--
Commercial Entrance (N-S)	WB Left/Thru		9.0	A	10	74	8.9	A	3	65	8.9	A	3	75
Unsignalized**	WB Right	270	7.9	A	20	86	7.2	A	8	68	6.8	A	3	68
	WB Approach		*8.2*	*A*	--	--	*7.5*	*A*	--	--	*7.5*	*A*	--	--
	NB Left/Thru/Right		7.2	A	3	83	6.7	A	0	63	6.6	A	3	56
	NB Approach		*7.2*	*A*	--	--	*6.7*	*A*	--	--	*6.6*	*A*	--	--
	SB Left/Thru/Right		8.5	A	10	68	7.8	A	8	50	7.5	A	3	36
	NB Approach		*8.5*	*A*	--	--	*7.8*	*A*	--	--	*7.5*	*A*	--	--

[1] *Overall intersection LOS and delay reported for signalized intersections and roundabouts only.*

[2] SimTraffic Queues are average maximum queues after 10 runs of 60 minutes each.

[3] *Channelized right turn not controlled by the signal.*

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

† SYNCHRO does not provide level of service or delay for unsignalized movements with no conflicting volumes.

* Note: SIDRA was used to analyze the roundabout at intersection 5.

** Note: HCM 6th Edition was used to analyze the all way stop controlled intersection at intersection 7.

6. The expansion of the middle school will have minimal impact on the external surrounding roadway network and no improvements are required at the study intersections beyond those identified above.

7. The expansion will provide a link between the elementary school and the middle school during school pick up and drop off times only. During all other times, the connection between the schools will be gated to vehicular traffic.

8. The site will provide a public access easement across the frontage for the future extension of the shared use path along Shirley Avenue. A five foot sidewalk will be provided along the roadway connection to the elementary school.

6.3 2026 Turn Lane Warrant Analysis

As shown in Figures 2-1 and 5-1, the following right and left turn lanes are present under existing conditions at the site entrances on E Shirley Avenue:

Western Site Entrance (Bus Ingress Only)

Eastbound right turn lane with 125 feet of storage

Westbound left turn lane with 255 feet of storage

Eastern Site Entrance (Vehicle Ingress and Egress)

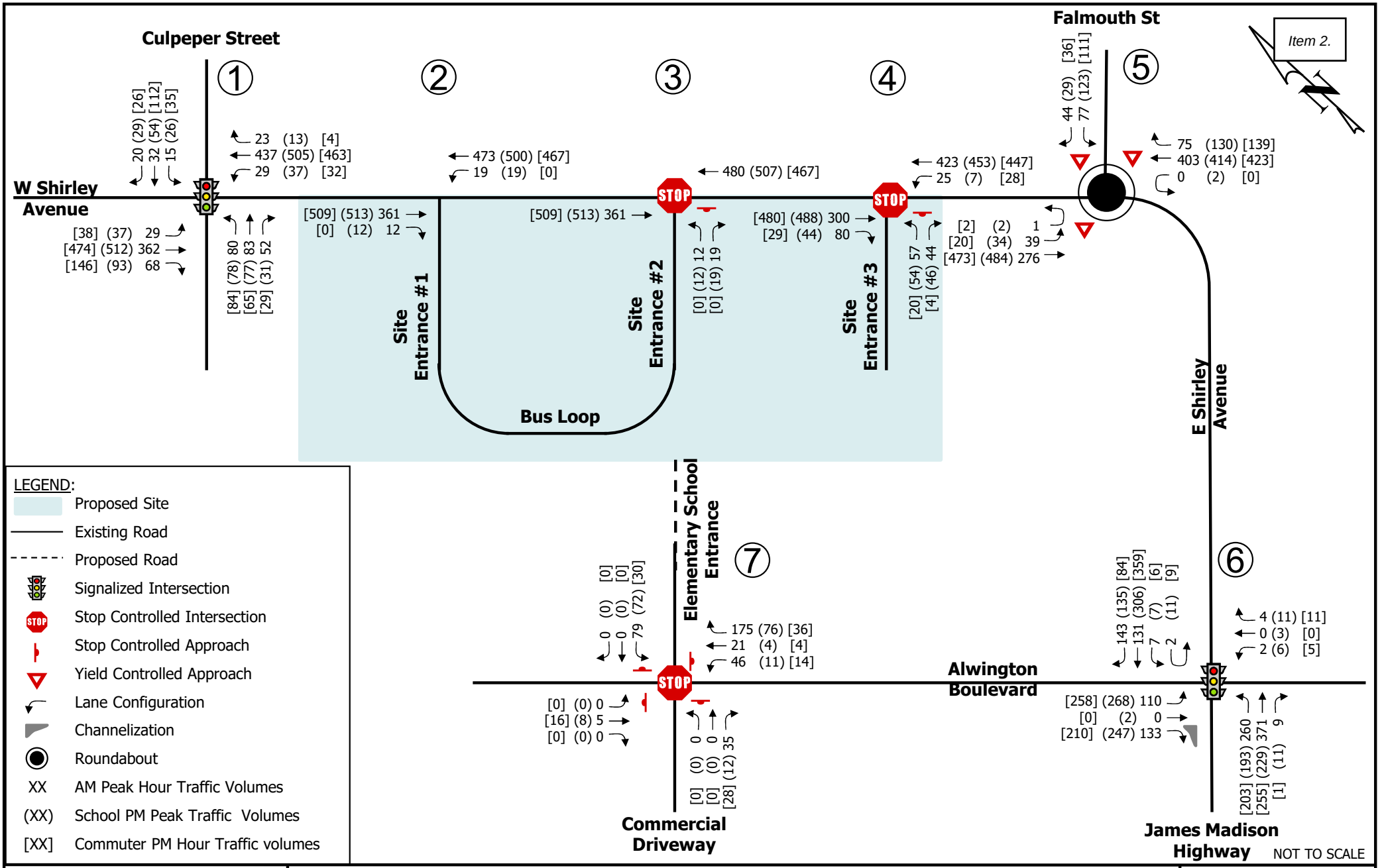
Eastbound right turn lane with 140 feet of storage

Westbound left turn lane with 160 feet of storage

As discussed above, with the expansion of the site, the access to the site will be reworked as shown in Figure 1-2. The two western entrances on East Shirley Avenue will be a bus loop only and the eastern entrance will be combined with the community center entrance and serve all other vehicles.

At the eastern entrance, the lanes along Shirley Avenue will be reworked to provide a right and left turn lane with 100 feet of storage and 100 feet of taper (effective storage of 150 feet).

As shown in Table 6-1, under 2026 future conditions, the 95th percentile and maximum queues at the site entrances will be contained within the existing available storage. No additional storage is required.



LEGEND:

- Proposed Site
- Existing Road
- Proposed Road
- Signalized Intersection
- Stop Controlled Intersection
- Stop Controlled Approach
- Yield Controlled Approach
- Lane Configuration
- Channelization
- Roundabout
- XX AM Peak Hour Traffic Volumes
- (XX) School PM Peak Traffic Volumes
- [XX] Commuter PM Hour Traffic volumes

NOT TO SCALE

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2026 Total Future Peak Hour Volumes
Taylor Middle School – Addition
Town of Warrenton, Virginia

Figure 6-1

7 2032 BACKGROUND CONDITIONS

The background 2032 volumes were analyzed assuming existing intersection geometry in conjunction with projected background traffic volumes, which consists of general traffic growth and growth due to an approved and the neighboring Arrington development.

7.1 General Traffic Growth

The background volumes were based on a 1.0% annual growth rate. The growth rate was compounded annually for the nine-year period from 2023 to 2032 and was applied to all movements at the study intersections. The resulting 2032 vehicle background (existing + growth) volumes are shown on Figure 7-1.

7.2 Approved Background Developments

Per coordination with the Town of Warrenton, the traffic associated with the approved Arrington Development was included in the 2032 background conditions analysis.

The generated site trips were included in the approved Arrington Development TIA were extracted and applied to the study area intersections and are shown on Figure 7-2. Note that the study area for the Arrington Development TIA is south of the study area for this report. As a result, the distributions were assigned to the study area road network according to existing travel patterns, the nature of the use, the 2023 existing traffic volumes, and local knowledge.

7.3 2032 Total Background

The Arrington development trips shown on Figure 7-2 were added to the existing + growth traffic shown on Figure 7-1 to yield the total 2032 background traffic forecasts which are shown on Figure 7-3.

7.4 Background 2032 Capacity Analysis Results

Table 7-1 summarizes the 2032 background intersection LOS, delay, 95th percentile queue lengths (Synchro), and maximum queue lengths (SimTraffic) based on the existing intersection geometry (Figure 2-1), 2032 background peak hour traffic volumes shown on Figure 7-3 and the existing signal timings as provided by the Town of Warrenton and VDOT.

The corresponding SYNCHRO and SimTraffic reports are included in Appendix G. Note that the intersection numbers shown on the LOS, delay, and queue length summary tables correspond with the intersection numbers used in the SYNCHRO models and report figures.

As shown in Table 7-1, under 2032 background conditions, all intersections experience similar levels of service, delay, and queueing as under 2026 background conditions. Specifically:

1. The East Shirley/Culpeper Street intersection will operate an overall LOS C or D in each of the peak hours. Each of the approaches operates at LOS E or better with no queueing concerns with the exception of the eastbound left approach which will operate at LOS E in both PM peaks.
    a. It is noted that the traffic signal is running under "free" operations and is likely giving more time to the mainline through movements which results in the LOS E. The delays are less than the overall cycle length of the intersection indicating that the average traffic waits at most one cycle length to traverse the intersection.

2. The school entrances along East Shirley Avenue operate at LOS D or better in each of the peak hours. The queues at the left and right turns into the school are contained within the available storage.

3. The roundabout at East Shirley Avenue/Falmouth Street operates at LOS A or B in each of the peak hours with no queuing concerns.

4. The East Shirley Avenue/Alwington Boulevard intersections operates at LOS C in each of the peak hours. Each of the approaches operates at LOS D or better. Each of the queues are contained within the available storage.

5. Each of the movements at the Alwington Boulevard/School Entrance/Commercial Entrance intersection operates at LOS A in all peak hours.

Table 7-1: 2032 Background Conditions
Intersection Level of Service and Delay Summary

Intersection and Type of Control	Movement and Approach	Turn Lane Storage (ft)	AM PEAK HOUR				SCHOOL PM PEAK HOUR				COMMUTER PM PEAK HOUR			
			Delay [1] (sec/veh)	LOS [1]	HCS 95th Percentile Queue Length (ft)	Simulated Maximum Queue Length[(2)] (ft)	Delay [1] (sec/veh)	LOS [1]	HCS 95th Percentile Queue Length (ft)	Simulated Maximum Queue Length[(2)] (ft)	Delay [1] (sec/veh)	LOS [1]	HCS 95th Percentile Queue Length (ft)	Simulated Maximum Queue Length[(2)] (ft)
1. Shirley Avenue (E-W) at	EB Left	215	49.4	D	53	135	61.7	E	64	214	59.7	E	67	214
Culpeper Street (N-S)	EB Thru		23.1	C	302	301	34.5	C	#621	477	39.1	D	#630	454
Signalized	EB Right		17.2	B	0	68	17.5	B	16	96	20.1	C	49	83
	EB Approach		*24.0*	*C*	--	--	*33.6*	*C*	--	--	*36.4*	*D*	--	--
	WB Left	185	42.3	D	54	162	44.5	D	64	184	46.4	D	58	161
	WB Thru/Right		26.2	C	#524	494	27.2	C	#617	452	28.8	C	#577	452
	WB Approach		*27.1*	*C*	--	--	*28.3*	*C*	--	--	*29.8*	*C*	--	--
	NB Left/Thru/Right		51.1	D	#272	239	50.0	D	#237	234	51.7	D	210	208
	NB Approach		*51.1*	*D*	--	--	*50.0*	*D*	--	--	*51.7*	*D*	--	--
	SB Left	125	42.0	D	31	50	42.8	D	45	91	39.6	D	55	117
	SB Thru/Right		43.9	D	62	95	46.8	D	97	140	47.1	D	164	197
	SB Approach		*43.5*	*D*	--	--	*45.9*	*D*	--	--	*45.6*	*D*	--	--
	Overall		**31.1**	**C**	**--**	**--**	**34.5**	**C**	**--**	**--**	**36.9**	**D**	**--**	**--**
2. E Shirley Avenue (E-W) at	EB Thru		†	†	0	4	†	†	0	--	†	†	0	--
Site Entrance #1 (N-S)	EB Right	110	†	†	0	9	†	†	0	--	†	†	0	0
Unsignalized	*EB Approach*		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
	WB Left	240	8.7	A	7	60	8.9	A	1	30	8.9	A	1	29
	WB Thru		†	†	0	--	†	†	0	--	†	†	0	--
	WB Approach		*1.2*	*A*	--	--	*0.3*	*A*	--	--	*0.2*	*A*	--	--
3. E Shirley Avenue (E-W) at	EB Thru		†	†	0	4	†	†	0	2	†	†	0	--
Site Entrance #2 (N-S)	*EB Approach*		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
Unsignalized	WB Thru		†	†	0	--	†	†	0	--	†	†	0	--
	WB Approach		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
	NB Left		24.3	C	31	93	32.6	D	40	79	26.6	D	13	47
	NB Right		11.6	B	14	84	14.9	B	22	98	12.8	B	1	30
	NB Approach		*17.3*	*C*	--	--	*22.3*	*C*	--	--	*24.3*	*C*	--	--
4. E Shirley Avenue (E-W) at	EB Thru		†	†	0	--	†	†	0	--	†	†	0	--
Site Entrance #3 (N-S)	EB Right	140	†	†	0	0	†	†	0	2	†	†	0	2
Unsignalized	*EB Approach*		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
	WB Left	160	8.3	A	3	40	9.0	A	3	35	9.3	A	4	51
	WB Thru		†	†	0	--	†	†	0	--	†	†	0	--
	WB Approach		*0.6*	*A*	--	--	*0.5*	*A*	--	--	*0.7*	*A*	--	--
5. E Shirley Avenue (E-W) at	*EB Approach*		*1.9*	*A*	*25*	--	*2.1*	*A*	*37*	--	*2.1*	*A*	*39*	--
Falmouth Street (N)	*WB Approach*		*14.3*	*B*	*203*	--	*11.3*	*B*	*149*	--	*18.1*	*B*	*317*	--
Roundabout*	*SB Approach*		*10.8*	*B*	*48*	--	*8.3*	*A*	*42*	--	*10.4*	*B*	*58*	--
	Overall		**9.7**	**A**	**--**	**--**	**6.9**	**A**	**--**	**--**	**10.2**	**B**	**--**	**--**
6. E Shirley Avenue/ (N-S)	EB Left	560	35.3	D	88	149	38.2	D	151	180	40.4	D	154	176
James Madison Highway at	EB Left/Thru		35.6	D	88	109	38.6	D	153	143	40.5	D	155	132
Alwington Boulevard (E-W)	EB Right[(3)]		0.1	A	0	5	0.2	A	0	47	0.2	A	0	60
Signalized	*EB Approach*		*23.8*	*C*	--	--	*23.8*	*C*	--	--	*23.8*	*C*	--	--
	WB Left/Thru/Right		33.7	C	0	56	35.6	D	29	68	36.2	D	0	47
	WB Approach		*33.7*	*C*	--	--	*35.6*	*D*	--	--	*36.2*	*D*	--	--
	NB Left	315	18.0	B	110	157	19.0	B	105	168	19.3	B	119	176
	NB Thru		19.2	B	172	210	19.7	B	99	177	19.5	B	111	168
	NB Right	160	16.1	B	0	20	18.1	B	0	47	17.6	B	0	21
	NB Approach		*18.8*	*B*	--	--	*19.4*	*B*	--	--	*19.4*	*B*	--	--
	SB Left	165	15.5	B	12	46	16.7	B	19	49	16.4	B	17	80
	SB Thru		24.8	C	82	127	26.9	C	150	186	27.9	C	174	187
	SB Right	250	16.8	B	20	109	15.5	B	16	105	15.7	B	12	92
	SB Approach		*20.8*	*C*	--	--	*23.2*	*C*	--	--	*24.6*	*C*	--	--
	Overall		**20.4**	**C**	**--**	**--**	**22.4**	**C**	**--**	**--**	**22.9**	**C**	**--**	**--**
7. Alwington Boulevard (E-W) at	EB Left/Thru/Right		7.6	A	5	20	7.6	A	5	49	7.6	A	5	29
Elementary School Entrance/	*EB Approach*		*7.6*	*A*	--	--	*7.6*	*A*	--	--	*7.6*	*A*	--	--
Commercial Entrance (N-S)	WB Left/Thru		8.9	A	13	81	8.8	A	8	71	9.4	A	13	82
Unsignalized**	WB Right	270	7.2	A	10	73	6.9	A	5	63	6.8	A	3	57
	WB Approach		*8.0*	*A*	--	--	*7.8*	*A*	--	--	*8.9*	*A*	--	--
	NB Left/Thru/Right		7.1	A	3	81	6.7	A	0	69	6.9	A	3	57
	NB Approach		*7.1*	*A*	--	--	*6.7*	*A*	--	--	*6.9*	*A*	--	--
	SB Left/Thru/Right		8.0	A	3	54	7.5	A	0	26	7.7	A	3	31
	NB Approach		*8.0*	*A*	--	--	*7.5*	*A*	--	--	*7.7*	*A*	--	--

[1] *Overall intersection LOS and delay reported for signalized intersections and roundabouts only.*

[2] SimTraffic Queues are average maximum queues after 10 runs of 60 minutes each.

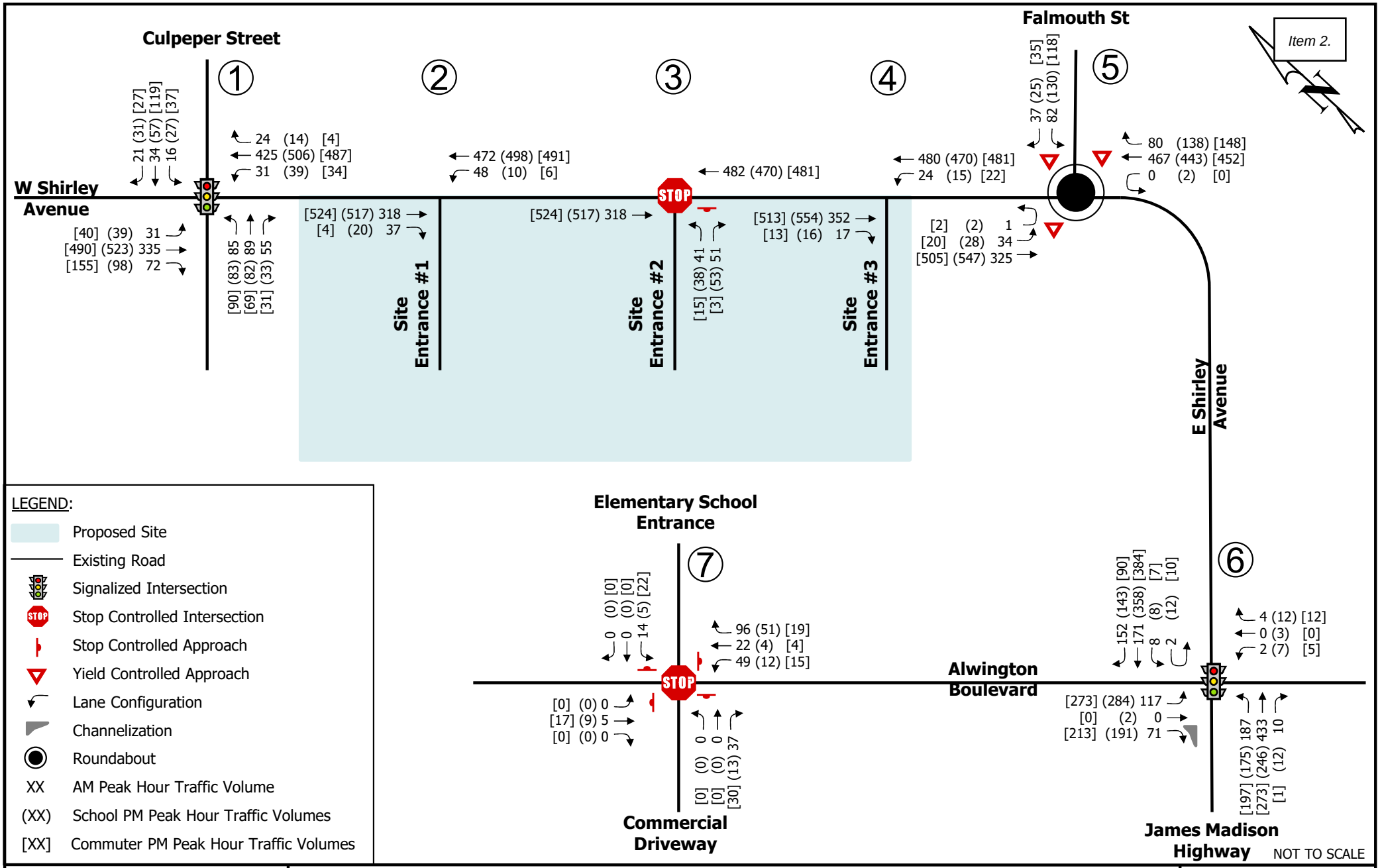
[3] *Channelized right turn not controlled by the signal.*

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

† SYNCHRO does not provide level of service or delay for unsignalized movements with no conflicting volumes.

* Note: SIDRA was used to analyze the roundabout at intersection 5.

** Note: HCM 6th Edition was used to analyze the all way stop controlled intersection at intersection 7.



LEGEND:

- Proposed Site
- Existing Road
- Signalized Intersection
- Stop Controlled Intersection
- Stop Controlled Approach
- Yield Controlled Approach
- Lane Configuration
- Channelization
- Roundabout
- XX AM Peak Hour Traffic Volume
- (XX) School PM Peak Hour Traffic Volumes
- [XX] Commuter PM Peak Hour Traffic Volumes

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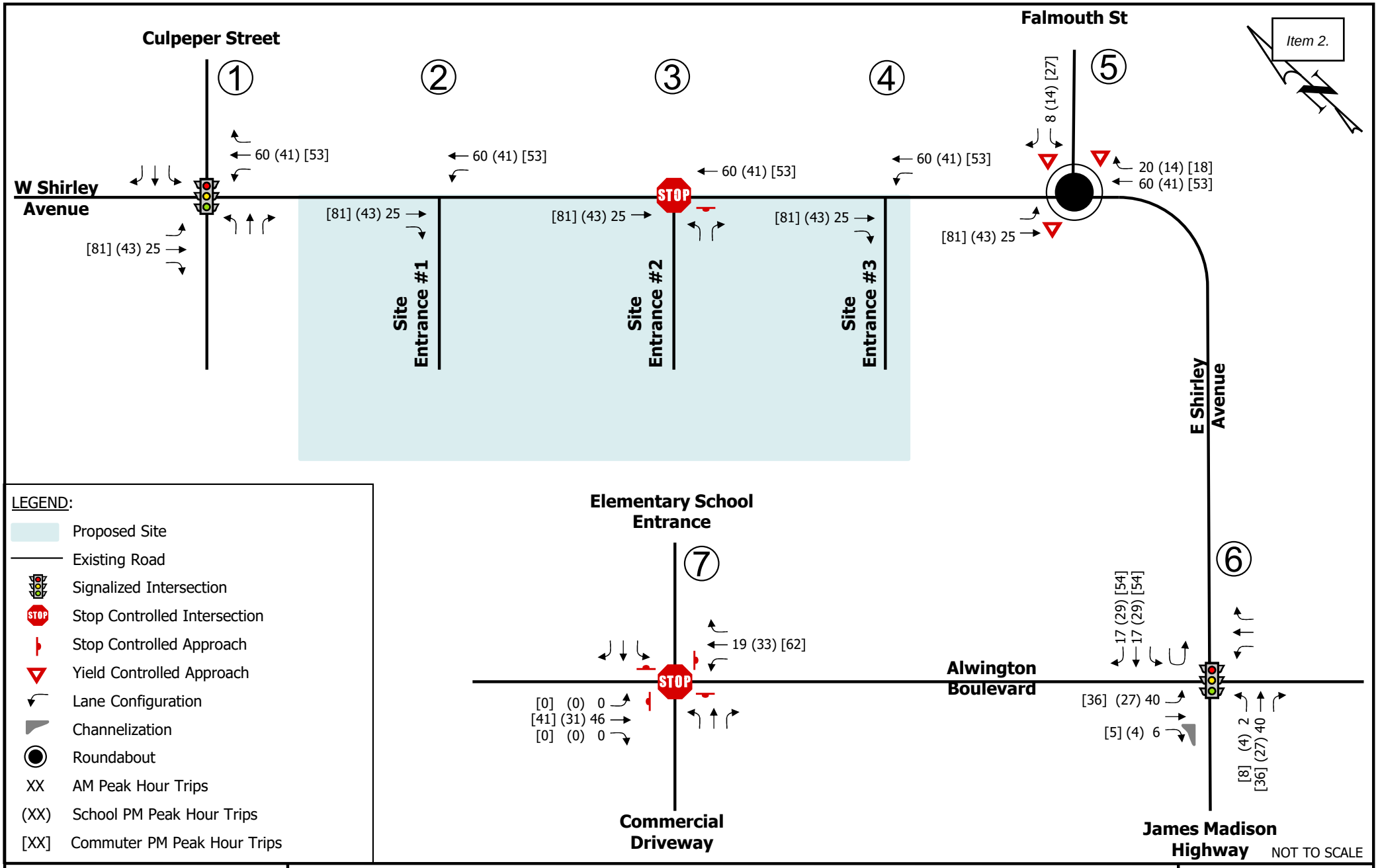
2032 Existing + Growth Peak Hour Volumes
Taylor Middle School – Addition
Town of Warrenton, Virginia

Figure 7-1



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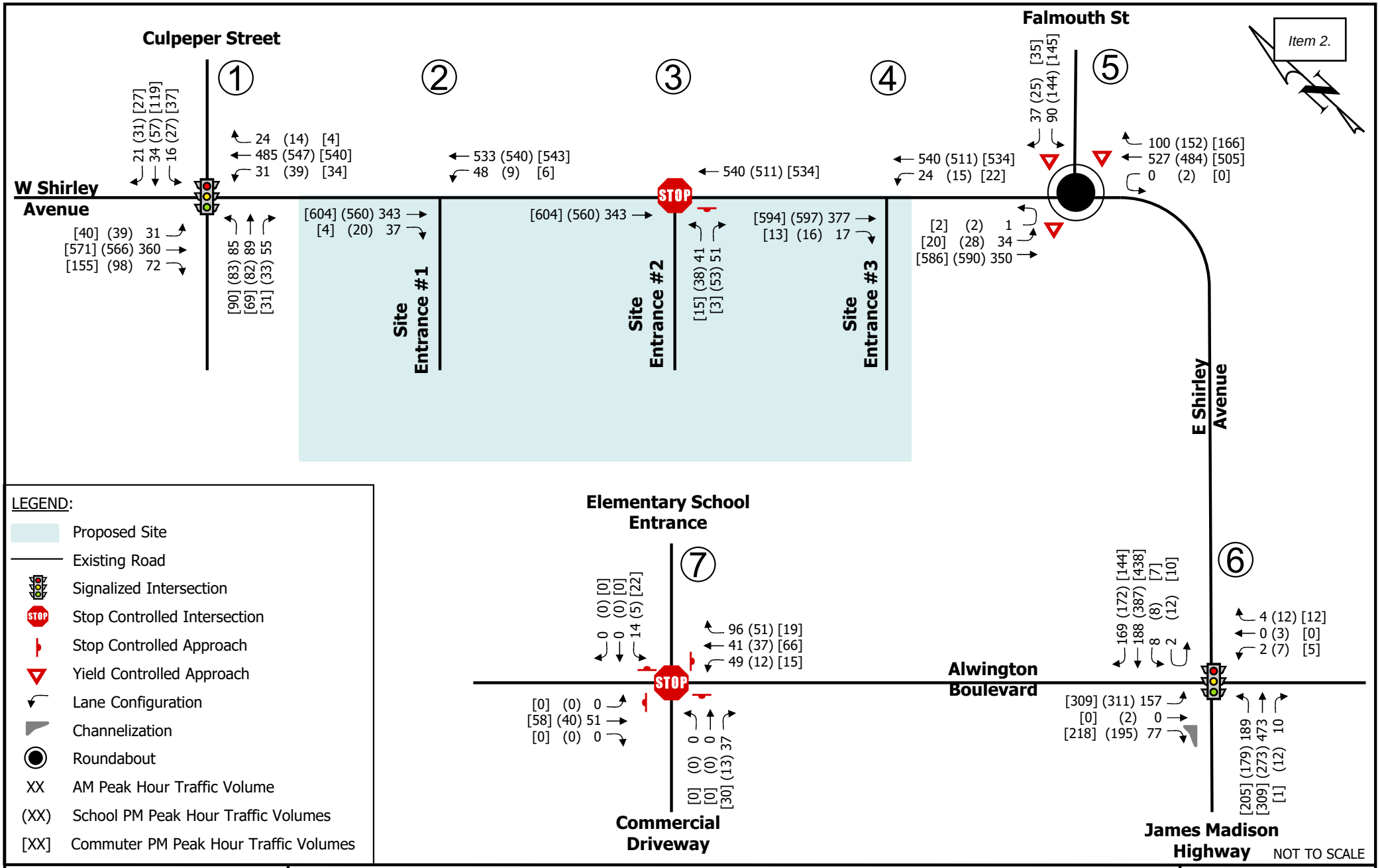
Arrington Development Trips
Taylor Middle School – Addition
Town of Warrenton, Virginia

Figure 7-2



LEGEND:

- Proposed Site
- Existing Road
- Signalized Intersection
- Stop Controlled Intersection
- Stop Controlled Approach
- Yield Controlled Approach
- Lane Configuration
- Channelization
- Roundabout
- XX AM Peak Hour Traffic Volume
- (XX) School PM Peak Hour Traffic Volumes
- [XX] Commuter PM Peak Hour Traffic Volumes

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2032 Total Background Peak Hour Volumes
Taylor Middle School – Addition
Town of Warrenton, Virginia

Figure 7-3

8 2032 TOTAL FUTURE CONDITIONS

To complete the analysis of 2032 total conditions (with the proposed expansion), the estimated site trips were added to the background 2032 traffic volumes. The projected volumes were then used to complete the capacity analysis.

8.1 2032 TOTAL FUTURE TRAFFIC VOLUMES

The rerouted existing trips shown on Figure 5-2 and Figure 5-3 and The site generated trips shown on Figures 5-6 and 5-7 were added to the 2032 total background traffic volumes (Figure 7-3) to yield the 2032 total future traffic volumes shown in Figure 8-1.

8.2 2032 FUTURE CONDITIONS ANALYSIS RESULTS

Table 8-1 summarizes the 2032 future intersection LOS, delay, 95th percentile queue lengths (Synchro), and maximum queue lengths (SimTraffic) based on the future intersection geometry (Figure 5-1), 2032 future peak hour traffic volumes shown on Figure 8-1 and the existing signal timings as provided by the Town of Warrenton and VDOT. The corresponding SYNCHRO and SimTraffic reports are included in Appendix H.

Note that the intersection numbers shown on the LOS, delay, and queue length summary tables correspond with the intersection numbers used in the SYNCHRO models and report figures.

As shown in Table 8-1, under 2032 future conditions, all intersections experience similar levels of service, delay, and queueing as under 2032 background conditions. Specifically:

9. The East Shirley/Culpeper Street intersection will operate an overall LOS C or D in each of the peak hours. Each of the approaches operates at LOS D or better with no queueing concerns with the exception of the eastbound left approach which will operate at LOS E in both PM peaks.
    a. It is noted that the traffic signal is running under "free" operations and is likely giving more time to the mainline through movements which results in the LOS E. The delays are less than the overall cycle length of the intersection indicating that the average traffic waits at most one cycle length to traverse the intersection.

10. The school entrances along East Shirley Avenue operate at LOS D or better in each of the peak hours. The queues at the left and right turns into the school are contained within the available storage.

11. The roundabout at East Shirley Avenue/Falmouth Street operates at LOS A or B in each of the peak hours with no queuing concerns.

12. The East Shirley Avenue/Alwington Boulevard intersections operates at LOS C in each of the peak hours. Each of the approaches operates at LOS D or better. Each of the queues are contained within the available storage.

13. Each of the movements at the Alwington Boulevard/School Entrance/Commercial Entrance intersection operates at LOS A in all peak hours.

14. The expansion of the middle school will have minimal impact on the external surrounding roadway network and no improvements are required at the study intersections beyond those identified above.

15. The expansion will provide a link between the elementary school and the middle school during school pick up and drop off times only. During all other times, the connection between the schools will be gated to vehicular traffic.

16. The site will provide a public access easement across the frontage for the future extension of the shared use path along Shirley Avenue. A five foot sidewalk will be provided along the roadway connection to the elementary school.

8.3 2026 TURN LANE WARRANT ANALYSIS

As shown in Figures 2-1 and 5-1, the following right and left turn lanes are present under existing conditions at the site entrances on E Shirley Avenue:

Western Site Entrance (Bus Ingress Only)

Eastbound right turn lane with 125 feet of storage

Westbound left turn lane with 255 feet of storage

Eastern Site Entrance (Vehicle Ingress and Egress)

Eastbound right turn lane with 140 feet of storage

Westbound left turn lane with 160 feet of storage

As discussed above, with the expansion of the site, the access to the site will be reworked as shown in Figure 1-2. The two western entrances on East Shirley Avenue will be a bus loop only and the eastern entrance will be combined with the community center entrance and serve all other vehicles.

At the eastern entrance, the lanes along Shirley Avenue will be reworked to provide a right and left turn lane with 100 feet of storage and 100 feet of taper (effective storage of 150 feet).

As shown in Table 8-1, under 2032 future conditions, the 95th percentile and maximum queues at the site entrances will be contained within the existing available storage. No additional storage is required.

2032 TURN LANE WARRANT ANALYSIS

As shown in Figures 2-1 and 5-1, the following right and left turn lanes are present under existing conditions at the site entrances on E Shirley Avenue:

Table 8-1: 2032 Total Future Conditions
Intersection Level of Service and Delay Summary

Intersection and Type of Control	Movement and Approach	Turn Lane Storage (ft)	AM PEAK HOUR				SCHOOL PM PEAK HOUR				COMMUTER PM PEAK HOUR			
			Delay [1] (sec/veh)	LOS [1]	HCS 95th Percentile Queue Length (ft)	Simulated Maximum Queue Length[(2)] (ft)	Delay [1] (sec/veh)	LOS [1]	HCS 95th Percentile Queue Length (ft)	Simulated Maximum Queue Length[(2)] (ft)	Delay [1] (sec/veh)	LOS [1]	HCS 95th Percentile Queue Length (ft)	Simulated Maximum Queue Length[(2)] (ft)
1. Shirley Avenue (E-W) at	EB Left	215	49.4	D	53	112	61.5	E	64	214	59.9	E	67	214
Culpeper Street (N-S)	EB Thru		24.6	C	342	308	35.9	D	#654	505	40.9	D	#650	590
Signalized	EB Right		17.2	B	0	66	17.3	B	16	137	20.1	C	51	119
	EB Approach		*25.1*	*C*	--	--	*34.8*	*C*	--	--	*37.7*	*D*	--	--
	WB Left	185	42.3	D	54	172	45.2	D	64	184	46.6	D	58	184
	WB Thru/Right		28.3	C	#572	451	28.8	C	#665	573	29.0	C	#586	459
	WB Approach		*29.1*	*C*	--	--	*29.8*	*C*	--	--	*30.0*	*C*	--	--
	NB Left/Thru/Right		51.1	D	#272	258	51.4	D	#237	255	52.3	D	210	237
	NB Approach		*51.1*	*D*	--	--	*51.4*	*D*	--	--	*52.3*	*D*	--	--
	SB Left	125	42.0	D	31	53	43.4	D	45	85	39.7	D	55	118
	SB Thru/Right		43.9	D	62	99	47.6	D	97	149	47.3	D	164	190
	SB Approach		*43.5*	*D*	--	--	*46.6*	*D*	--	--	*45.8*	*D*	--	--
	Overall		**32.0**	**C**	**--**	**--**	**35.7**	**D**	**--**	**--**	**37.6**	**D**	**--**	**--**
2. E Shirley Avenue (E-W) at	EB Thru		†	†	0	--	†	†	0	--	†	†	0	--
Site Entrance #1 (N-S)	EB Right	110	†	†	0	5	†	†	0	6	†	†	0	--
Unsignalized	*EB Approach*		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
	WB Left	240	8.6	A	3	55	9.0	A	3	48	†	†	0	--
	WB Thru		†	†	0	--	†	†	0	--	†	†	0	--
	WB Approach		*0.5*	*A*	--	--	*0.5*	*A*	--	--	*†*	*†*	--	--
3. E Shirley Avenue (E-W) at	EB Thru		†	†	0	0	†	†	0	--	†	†	0	--
Site Entrance #2 (N-S)	*EB Approach*		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
Unsignalized	WB Thru		†	†	0	--	†	†	0	--	†	†	0	--
	WB Approach		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
	NB Left		22.2	C	8	53	28.4	D	11	58	†	†	0	--
	NB Right		11.5	B	5	56	13.7	B	7	63	†	†	0	--
	NB Approach		*15.7*	*C*	--	--	*19.4*	*C*	--	--	*†*	*†*	--	--
4. E Shirley Avenue (E-W) at	EB Thru		†	†	0	11	†	†	0	--	†	†	0	0
Site Entrance #3 (N-S)	EB Right	150	†	†	0	12	†	†	0	2	†	†	0	2
Unsignalized	*EB Approach*		*†*	*†*	--	--	*†*	*†*	--	--	*†*	*†*	--	--
	WB Left	150	8.6	A	4	43	9.0	A	1	30	9.4	A	5	57
	WB Thru		†	†	0	--	*†*	*†*	--	--	*†*	*†*	--	--
	WB Approach		*0.7*	*A*	--	--	*0.2*	*A*	--	--	*0.8*	*A*	--	--
	NB Left-Right		19.4	C	31	81	26.1	D	45	92	28.3	D	12	43
	NB Approach		*19.4*	*C*	--	--	*26.1*	*D*	--	--	*28.3*	*D*	--	--
5. E Shirley Avenue (E-W) at	*EB Approach*		*1.8*	*A*	*23*	--	*2.1*	*A*	*35*	--	*2.1*	*A*	*39*	--
Falmouth Street (N)	*WB Approach*		*13.3*	*B*	*174*	--	*11.5*	*B*	*148*	--	*18.0*	*B*	*312*	--
Roundabout*	*SB Approach*		*10.5*	*B*	*48*	--	*8.4*	*A*	*43*	--	*10.4*	*B*	*59*	--
	Overall		**9.1**	**A**	**--**	**--**	**7.1**	**A**	**--**	**--**	**10.4**	**B**	**--**	**--**
6. E Shirley Avenue/ (N-S)	EB Left	560	37.3	D	90	155	38.1	D	151	168	41.3	D	155	184
James Madison Highway at	EB Left/Thru		37.4	D	91	114	38.5	D	153	134	41.4	D	156	144
Alwington Boulevard (E-W)	EB Right[(3)]		0.2	A	0	36	0.3	A	0	84	0.2	A	0	60
Signalized	*EB Approach*		*19.7*	*B*	--	--	*21.0*	*C*	--	--	*23.9*	*C*	--	--
	WB Left/Thru/Right		35.1	D	0	55	35.8	D	29	74	36.3	D	0	65
	WB Approach		*35.1*	*D*	--	--	*35.8*	*D*	--	--	*36.3*	*D*	--	--
	NB Left	315	19.3	B	160	208	19.4	B	120	186	19.6	B	128	204
	NB Thru		18.4	B	157	209	19.7	B	98	172	19.3	B	109	168
	NB Right	160	15.7	B	0	20	18.1	B	0	46	17.5	B	0	28
	NB Approach		*18.7*	*B*	--	--	*19.5*	*B*	--	--	*19.4*	*B*	--	--
	SB Left	165	15.1	B	12	45	16.7	B	19	59	16.2	B	17	175
	SB Thru		26.3	C	75	123	27.6	C	142	180	28.0	C	173	192
	SB Right	250	18.3	B	3	111	16.2	B	18	103	15.9	B	13	99
	SB Approach		*22.0*	*C*	--	--	*23.6*	*C*	--	--	*24.7*	*C*	--	--
	Overall		**19.8**	**B**	**--**	**--**	**21.6**	**C**	**--**	**--**	**22.9**	**C**	**--**	**--**
7. Alwington Boulevard (E-W) at	EB Left/Thru/Right		8.0	A	5	23	7.9	A	5	35	7.6	A	5	29
Elementary School Entrance/	*EB Approach*		*8.0*	*A*	--	--	*7.9*	*A*	--	--	*7.6*	*A*	--	--
Commercial Entrance (N-S)	WB Left/Thru		9.2	A	13	79	9.1	A	8	66	9.4	A	13	71
Unsignalized**	WB Right	270	8.1	A	23	78	7.2	A	8	69	6.9	A	3	64
	WB Approach		*8.5*	*A*	--	--	*7.9*	*A*	--	--	*8.6*	*A*	--	--
	NB Left/Thru/Right		7.4	A	3	84	6.9	A	0	63	7.0	A	3	57
	NB Approach		*7.4*	*A*	--	--	*6.9*	*A*	--	--	*7.0*	*A*	--	--
	SB Left/Thru/Right		8.8	A	10	78	8.0	A	8	54	7.8	A	3	35
	NB Approach		*8.8*	*A*	--	--	*8.0*	*A*	--	--	*7.8*	*A*	--	--

[1] Overall intersection LOS and delay reported for signalized intersections and roundabouts only.

[2] SimTraffic Queues are average maximum queues after 10 runs of 60 minutes each.

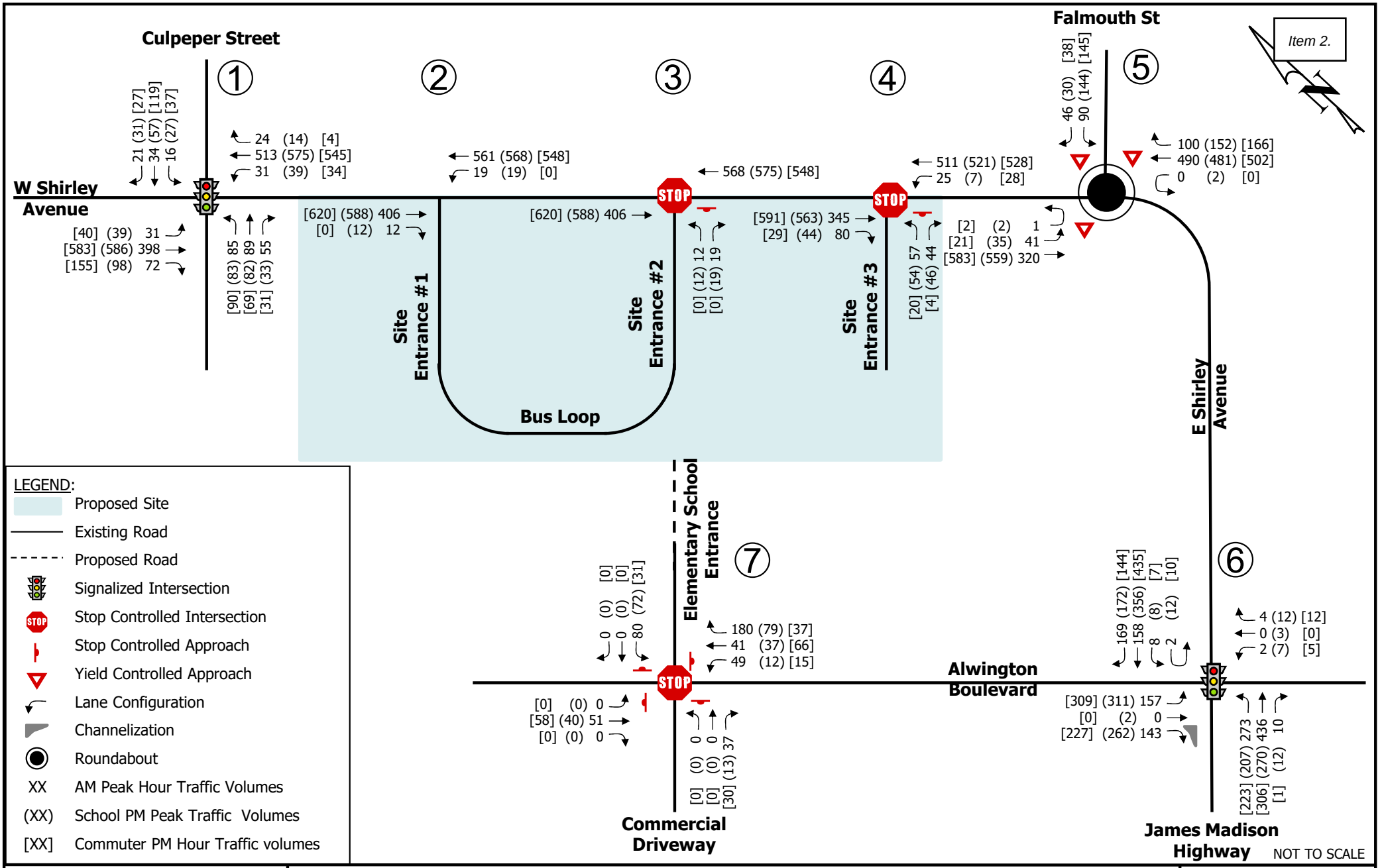
[3] Channelized right turn not controlled by the signal.

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

† SYNCHRO does not provide level of service or delay for unsignalized movements with no conflicting volumes.

* Note: SIDRA was used to analyze the roundabout at intersection 5.

** Note: HCM 6th Edition was used to analyze the all way stop controlled intersection at intersection 7.



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2032 Total Future Peak Hour Volumes
Taylor Middle School – Addition
Town of Warrenton, Virginia

Figure 8-1

9 CONCLUSIONS

9.1 PRINCIPAL FINDINGS

Based on the analysis contained herein, the following principal findings are offered:

Under 2023 existing conditions:

1. The East Shirley/Culpeper Street intersection currently operates an overall LOS C in each of the peak hours. Each of the approaches operates at LOS D or better with no queueing concerns.

2. The school entrances along East Shirley Avenue operate at LOS C or better in each of the peak hours. The queues at the left and right turns into the school are contained within the available storage.

3. The roundabout at East Shirley Avenue/Falmouth Street operates at LOS A in each of the peak hours with no queuing concerns.

4. The East Shirley Avenue/Alwington Boulevard intersections operates at LOS C or better in each of the peak hours. Each of the approaches operates at LOS D or better. Each of the queues are contained within the available storage.

5. Each of the movements at the Alwington Boulevard/School Entrance/Commercial Entrance intersection operates at LOS A in all peak hours.

Under 2026 background conditions, all intersections experience similar levels of service, delay, and queueing as under existing conditions. Specifically:

1. The East Shirley/Culpeper Street intersection will operate an overall LOS C or D in each of the peak hours. Each of the approaches operates at LOS D or better with no queueing concerns with the exception of the eastbound left approach which will operate at LOS E in both PM peaks.
    a. It is noted that the traffic signal is running under "free" operations and is likely giving more time to the mainline through movements which results in the LOS E. The delays are less than the overall cycle length of the intersection indicating that the average traffic waits at most one cycle length to traverse the intersection.

2. The school entrances along East Shirley Avenue operate at LOS C or better in each of the peak hours. The queues at the left and right turns into the school are contained within the available storage.

3. The roundabout at East Shirley Avenue/Falmouth Street operates at LOS A in each of the peak hours with no queuing concerns.

4. The East Shirley Avenue/Alwington Boulevard intersections operates at LOS C in each of the peak hours. Each of the approaches operates at LOS D or better. Each of the queues are contained within the available storage.

5. Each of the movements at the Alwington Boulevard/School Entrance/Commercial Entrance intersection operates at LOS A in all peak hours.

Under 2026 total future conditions, with buildout of the proposed development, all intersections experience similar levels of service compared to 2026 background conditions. Specifically:

1. The East Shirley/Culpeper Street intersection will operate an overall LOS C or D in each of the peak hours. Each of the approaches operates at LOS D or better with no queueing concerns with the exception of the eastbound left approach which will operate at LOS E in both PM peaks.
    a. It is noted that the traffic signal is running under "free" operations and is likely giving more time to the mainline through movements which results in the LOS E. The delays are less than the overall cycle length of the intersection indicating that the average traffic waits at most one cycle length to traverse the intersection.

2. The school entrances along East Shirley Avenue operate at LOS C or better in each of the peak hours. The queues at the left and right turns into the school are contained within the available storage.

3. The roundabout at East Shirley Avenue/Falmouth Street operates at LOS A in each of the peak hours with no queuing concerns.

4. The East Shirley Avenue/Alwington Boulevard intersections operates at LOS C in each of the peak hours. Each of the approaches operates at LOS D or better. Each of the queues are contained within the available storage.

5. Each of the movements at the Alwington Boulevard/School Entrance/Commercial Entrance intersection operates at LOS A in all peak hours.

6. The expansion of the middle school will have minimal impact on the external surrounding roadway network and no improvements are required at the study intersections beyond those identified above.

7. The expansion will provide a link between the elementary school and the middle school during school pick up and drop off times only. During all other times, the connection between the schools will be gated to vehicular traffic.

8. The site will provide a public access easement across the frontage for the future extension of the shared use path along Shirley Avenue. A five foot sidewalk will be provided along the roadway connection to the elementary school.

Under 2032 background conditions, all intersections experience similar levels of service, delay, and queueing as under 2026 background conditions. Specifically:

1. The East Shirley/Culpeper Street intersection will operate an overall LOS C or D in each of the peak hours. Each of the approaches operates at LOS D or better with no queueing concerns with the exception of the eastbound left approach which will operate at LOS E in both PM peaks.
    a. It is noted that the traffic signal is running under "free" operations and is likely giving more time to the mainline through movements which results in the LOS E. The delays are less

than the overall cycle length of the intersection indicating that the average traffic waits at most one cycle length to traverse the intersection.

2. The school entrances along East Shirley Avenue operate at LOS D or better in each of the peak hours. The queues at the left and right turns into the school are contained within the available storage.

3. The roundabout at East Shirley Avenue/Falmouth Street operates at LOS A or B in each of the peak hours with no queuing concerns.

4. The East Shirley Avenue/Alwington Boulevard intersections operates at LOS C in each of the peak hours. Each of the approaches operates at LOS D or better. Each of the queues are contained within the available storage.

5. Each of the movements at the Alwington Boulevard/School Entrance/Commercial Entrance intersection operates at LOS A in all peak hours.

Under 2032 total future conditions, with buildout of the proposed development, all intersections experience similar levels of service compared to 2026 background conditions. Specifically:

1. The East Shirley/Culpeper Street intersection will operate an overall LOS C or D in each of the peak hours. Each of the approaches operates at LOS D or better with no queueing concerns with the exception of the eastbound left approach which will operate at LOS E in both PM peaks.
    a. It is noted that the traffic signal is running under "free" operations and is likely giving more time to the mainline through movements which results in the LOS E. The delays are less than the overall cycle length of the intersection indicating that the average traffic waits at most one cycle length to traverse the intersection.

2. The school entrances along East Shirley Avenue operate at LOS D or better in each of the peak hours. The queues at the left and right turns into the school are contained within the available storage.

3. The roundabout at East Shirley Avenue/Falmouth Street operates at LOS A or B in each of the peak hours with no queuing concerns.

4. The East Shirley Avenue/Alwington Boulevard intersections operates at LOS C in each of the peak hours. Each of the approaches operates at LOS D or better. Each of the queues are contained within the available storage.

5. Each of the movements at the Alwington Boulevard/School Entrance/Commercial Entrance intersection operates at LOS A in all peak hours.

6. The expansion of the middle school will have minimal impact on the external surrounding roadway network and no improvements are required at the study intersections beyond those identified above.

7. The expansion will provide a link between the elementary school and the middle school during school pick up and drop off times only. During all other times, the connection between the schools will be gated to vehicular traffic.

8. The site will provide a public access easement across the frontage for the future extension of the shared use path along Shirley Avenue. A five foot sidewalk will be provided along the roadway connection to the elementary school.

9.2 RECOMMENDATIONS

The expansion of the middle school will have minimal to no impact on the surrounding roadway network and no improvements are required at the study intersections beyond the turn lanes provided at the eastern site entrance on Shirley Avenue.

The expansion will provide a link between the elementary school and the middle school during school pick up and drop off times only. During all other times, the connection between the schools will be gated to vehicular traffic.

The site will provide a public access easement across the frontage for the future extension of the shared use path along Shirley Avenue. A five foot sidewalk will be provided along the roadway connection to the elementary school.

The traffic control at internal intersections to the school site was not reviewed as part of this study and will the specifics (signage, pavement markings, etc.) will be designed at the time of site plan approval.

Appendix A
Scoping Agreement

VDOT Virginia Department of Transportation

PRE-SCOPE OF WORK MEETING FORM

Information on the Project
Traffic Impact Analysis Base Assumptions

The applicant is responsible for entering the relevant information and submitting the form to VDOT and the locality no less than three (3) business days prior to the meeting. If a form is not received by this deadline, the scope of work meeting may be postponed.

Contact Information				
Consultant Name: Tele: E-mail:	Steve Schmidt 804.200.6502 steve.schmidt@timmons.com			
Developer/Owner Name: Tele: E-mail:				
Project Information				
Project Name:	Taylor Middle School Expansion	Locality/County:	Town of Warrenton	
Project Location: (Attach regional and site specific location map)	The site is generally located south of Buisness 17 (East Shirley Avenue) and north of Alwington Boulevard in the Town of Warrenton as shown in Figure 1.			
Submission Type	Comp Plan ☐	Rezoning ☐	SUP Site Plan ☒	Subd Plat ☐
Project Description: (Including details on the land use, acreage, phasing, access location, etc. Attach additional sheet if necessary)	The expansion of the existing Taylor Middle School will add a total of 69,000 sf of additional building area to increase the capacity of the school from 510 students to 850 students. Site improvements also include a dedicated loop for school buses, a separate loop for parent drop off, as well as parking lot improvements. Access to the site is proposed via the three (3) existing entrances to Taylor Middle School (on Business 17) and one new access via Alwington Boulevard via the James Brumfield Elementary School access road. See Figure 2 for the conceptual plan and Tables 1/2 for the trip generation table for traffic generated by the site. Table 1 shows the trip generation based on the existing driveway counts and Table 2 shows the trip generation based on ITE rates/equations. It is proposed to use the local counts (Table 1) as they represent actual operations at the school.			
Proposed Use(s): (Check all that apply; attach additional pages as necessary)	Residential ☐	Commercial ☐	Mixed Use ☐	Other ☒

It is important for the applicant to provide sufficient information to county and VDOT staff so that questions regarding geographic scope, alternate methodology, or other issues can be answered at the scoping meeting.

	Residential Uses(s) Number of Units: ____ ITE LU Code(s): ____ ____ ____ **Commercial Use(s)** ITE LU Code(s): ____ ____ ____ Square Ft or Other Variable:		**Other Use(s)** ITE LU Code(s): 522 Independent Variable(s): Students	
Total Peak Hour Trip Projection:	Less than 100 ☐	100 – 499 ☒	500 – 999 ☐	1,000 or more ☐

Traffic Impact Analysis Assumptions

Study Period	Existing Year: 2023	Build-out Year: 2026	Design Year: 2032
Study Area Boundaries (Attach map)	North: Route 17	South: Alwington Boulevard	
	East: Alwington Boulevard	West: Cleveland Street	
External Factors That Could Affect Project (Planned road improvements, other nearby developments)	1. The traffic generated by the Arrington development will be included in all future analyses. 2. With the Arrington development, the elementary school entrances will be reconfigured. This will be assumed in all future analyses. 3. VDOT Pipeline Study on Route 17 - this will be discussed in the report but not analyzed in any scenario as the improvements are not funded.		
Consistency With Comprehensive Plan (Land use, transportation plan)	The site is currently a middle school and there is no change in land use		
Available Traffic Data (Historical, forecasts)	VDOT AADT Data, AM (6-9AM) and PM (2-6PM) counts conducted in May '23 prior to school letting out.		
Trip Distribution (Attach sketch)	Road Name: see Figure 3 and notes	Road Name:	
	Road Name:	Road Name:	
Annual Vehicle Trip Growth Rate:	1%	Peak Period for Study (check all that apply)	☒ AM ☒ PM ☐ SAT
		Peak Hour of the Generator	PM School Peak
Study Intersections and/or Road Segments (Attach additional sheets as necessary)	1.Culpeper St/Shirley Ave	6.Route 17 and Alwington Boulevard	
	2.Site Entrance 1 and Route 17	7.Alwington Boulevard and ES School Entrance	
	3.Site Entrance 2 and Route 17	8.	

It is important for the applicant to provide sufficient information to county and VDOT staff so that questions regarding geographic scope, alternate methodology, or other issues can be answered at the scoping meeting.

	4.Site Entrance 3 and Route 17	9.
	5.Route 17 and Route 15	10.
Trip Adjustment Factors	Internal allowance: ☐ Yes ☒ No Reduction: _____% trips	Pass-by allowance: ☐ Yes ☒ No Reduction: _____% trips
Software Methodology	☒ Synchro ☐ HCS (v.2000/+) ☒ aaSIDRA ☐ CORSIM ☐ Other _____	
Traffic Signal Proposed or Affected (Analysis software to be used, progression speed, cycle length)	Existing Signals: Culpeper St/Shirley Ave and Route 17/Alwington Boulevard	
Improvement(s) Assumed or to be Considered	1. The traffic generated by the Arrington development will be included in all future analyses. 2. With the Arrington development, the elementary school entrances will be reconfigured. This will be assumed in all future analyses. 3. VDOT Pipeline Study on Route 17 - this will be discussed in the report but not analyzed in any scenario as the improvements are not funded.	
Background Traffic Studies Considered	TIA for the Arrington Development will be used to compare traffic counts, growth rates, etc.	
Plan Submission	☐ Master Development Plan (MDP) ☒ Generalized Development Plan (GDP) ☐ Preliminary/Sketch Plan ☐ Other Plan type (Final Site, Subd. Plan)	
Additional Issues to be Addressed	☒ Queuing analysis ☐ Actuation/Coordination ☐ Weaving analysis ☐ Merge analysis ☒ Bike/Ped Accommodations ☒ Intersection(s) ☐ TDM Measures ☒ Other Turn Lane Warrant Analysis	

NOTES on ASSUMPTIONS: See Tables 1/2 for the trip generation table for traffic generated by the site. Table 1 shows the trip generation based on the existing driveway counts and Table 2 shows the trip generation based on ITE rates/equations. It is proposed to use the local counts (Table 1) as they represent actual operations at the school and are generally in line with ITE rates/equations.

The overall site trip distributions are shown on Figure 3 and are based on the existing traffic counts at the school driveways and the County school attendance map for Taylor Middle School.

Turn lane warrant analyses will be completed for all site entrances

Study will include a review of Access Management Spacing Standards.

It is important for the applicant to provide sufficient information to county and VDOT staff so that questions regarding geographic scope, alternate methodology, or other issues can be answered at the scoping meeting.

SIGNED: _____ DATE: 08/28/23
Applicant or Consultant

PRINT NAME: Steve Schmidt
Applicant or Consultant

It is important for the applicant to provide sufficient information to county and VDOT staff so that questions regarding geographic scope, alternate methodology, or other issues can be answered at the scoping meeting.

SCOPE OF WORK MEETING CONCLUSIONS

ADDITIONS TO THE VDOT REQUIRED ELEMENTS, CHANGES TO THE METHODOLOGY OR STANDARD ASSUMPTIONS, AND SIGNATURE PAGE

Any additions to the VDOT Required Elements or changes to the Methodology or Standard Assumptions due to special circumstances that are approved by VDOT:

The applicant will contact VDOT and the locality prior to the preparation of the traffic impact analysis study in the event there are any substantial changes in the existing conditions that will affect the scope of the study.

AGREED: _____ DATE: 08/28/23
Applicant or Consultant

PRINT NAME: Steve Schmidt
Applicant or Consultant

SIGNED: _____ DATE: _____
VDOT Representative

PRINT NAME: _____
VDOT Representative

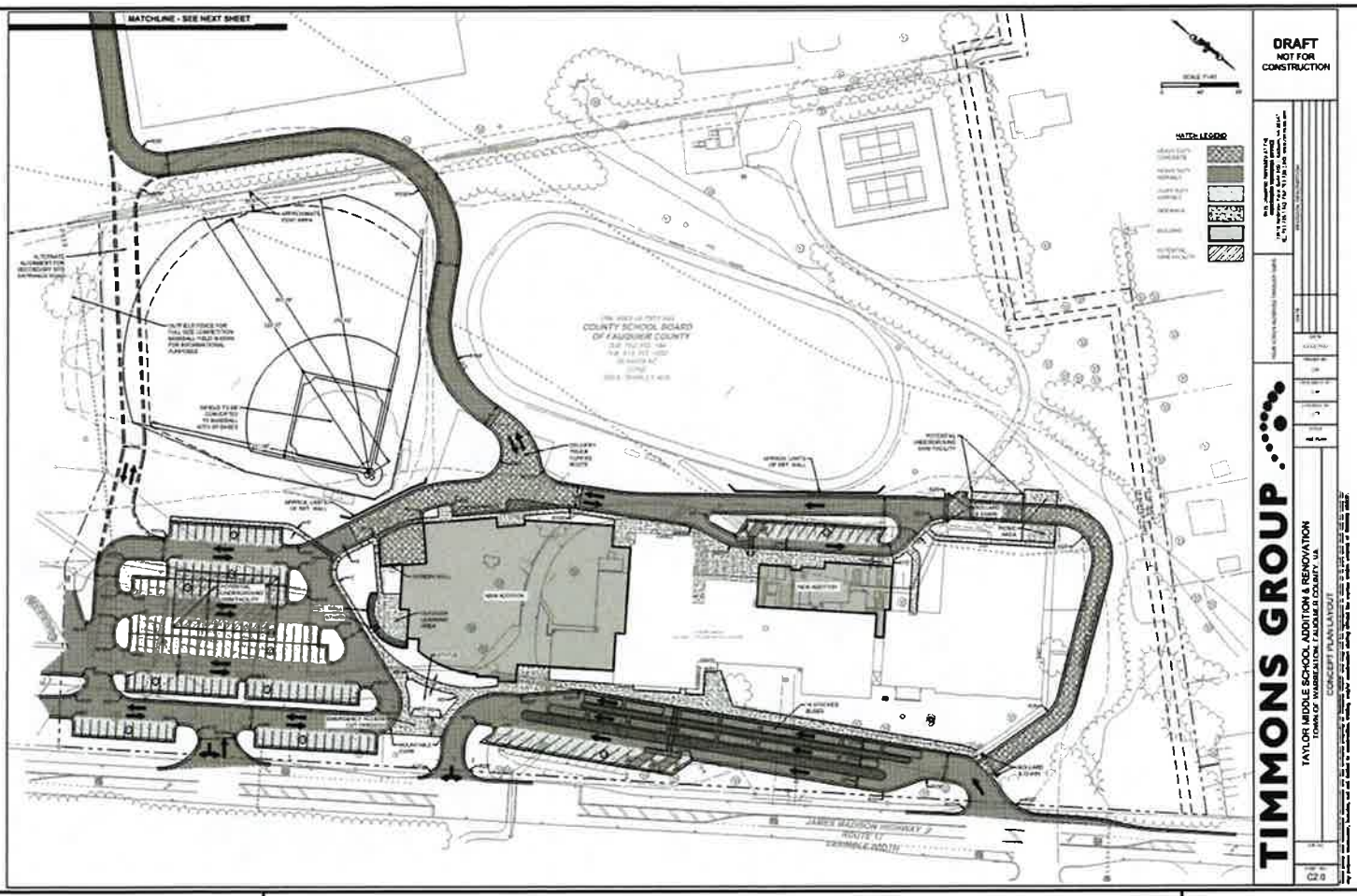
SIGNED: Denise Harris DATE: 8/29/23
Local Government Representative

PRINT NAME: Denise Harris
Local Government Representative

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Surrounding Roadway Network and Site Location
Taylor Middle School Addition
Town of Warrenton, Virginia

Figure
1



TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Conceptual Plan
Taylor Middle School Addition
Town of Warrenton, Virginia

Figure
2

TIMMONS GROUP
YOUR VISION ACHIEVED THROUGH OURS.

Proposed Overall Site Distributions
Taylor Middle School – Addition & Renovation
Town of Warrenton, Virginia

Figure
3

Table 1
Taylor Middle School Addition
Existing Counts as Basis For Trip Generation

Land Use	Size	Units	Land Use Code	School AM Peak Hour (1) In	Out	Total	School PM Peak (1) In	Out	Total	Commuter PM Peak Hour (1) In	Out	Total	Average Daily Trips (2)
Existing Capacity Middle School	510	Students	522	126	92	218	60	91	151	45	18	63	1071
New Capacity Middle School	850	Students	522	210	153	363	100	152	252	75	30	105	1785
Increase	340	Students		84	61	145	40	61	101	30	12	42	714

Note: (1) Peak hour counts based on existing driveway counts conducted for the site for the existing school capacity. New capacity trips pro-rated based on the existing counts and the percent increase in students.
(2) Average Daily Trips based on the Institute of Transportation Engineers Trip Generation, 11th Edition. Assumes General Urban/Suburban land use category.

Table 2
Taylor Middle School Addition
ITE Trip Generation as Basis for Trip Generation

Land Use	Size	Units	Land Use Code	School AM Peak Hour In	Out	Total	School PM Peak In	Out	Total	Commuter PM Peak Hour In	Out	Total	Average Daily Trips
Existing Capacity Middle School	510	Students	522	233	190	423	91	107	198	37	40	77	1071
New Capacity Middle School	850	Students	522	354	290	644	143	167	310	61	67	128	1785
Increase	340	Students		121	100	221	52	60	112	24	27	51	714

Note: (1) Based on the Institute of Transportation Engineers Trip Generation, 11th Edition. Assumes General Urban/Suburban land use category.

Appendix B
Traffic Count Data

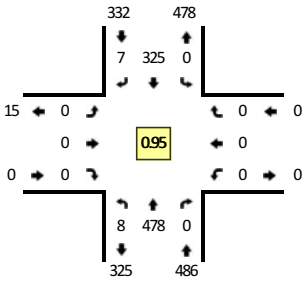
Type of peak hour being reported: Intersection Peak

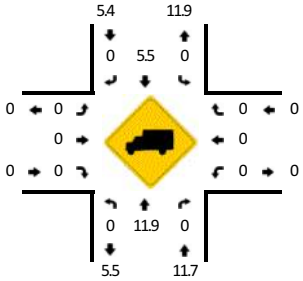
Method for determining peak hour: Total Entering

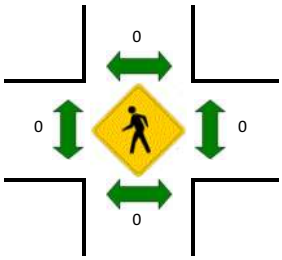
LOCATION: Rte 17 Bus -- Western Dwy
CITY/STATE: Warrenton, VA

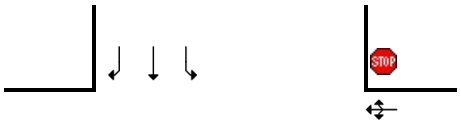
QC JOB #: 16218101
DATE: Tue, May 16 2023

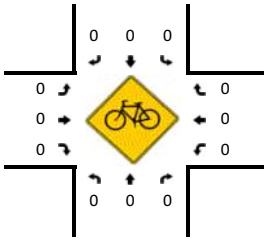
Peak-Hour: 7:45 AM -- 8:45 AM
Peak 15-Min: 8:15 AM -- 8:30 AM

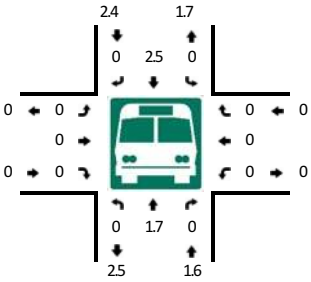


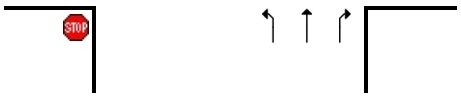


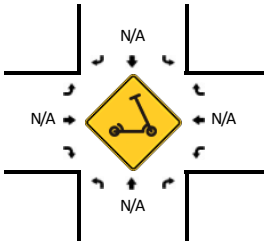












15-Min Count Period Beginning At	Rte 17 Bus (Northbound)				Rte 17 Bus (Southbound)				Western Dwy (Eastbound)				Western Dwy (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	0	25	0	0	0	26	1	0	0	0	0	0	0	0	0	0	52	
6:15 AM	0	28	0	0	0	28	0	0	0	0	0	0	0	0	0	0	56	
6:30 AM	2	51	0	0	0	35	1	0	0	0	0	0	0	0	0	0	89	
6:45 AM	7	65	0	0	0	63	7	0	0	0	0	0	0	0	0	0	142	339
7:00 AM	26	59	0	0	0	58	14	0	0	0	0	0	0	0	0	0	157	444
7:15 AM	32	109	0	0	0	58	24	0	0	0	0	0	0	0	0	0	223	611
7:30 AM	13	90	0	0	0	65	9	0	0	0	0	0	0	0	0	0	177	699
7:45 AM	1	125	0	0	0	74	3	0	0	0	0	0	0	0	0	0	203	760
8:00 AM	2	107	0	0	0	98	1	0	0	0	0	0	0	0	0	0	208	811
8:15 AM	3	128	0	0	0	84	1	0	0	0	0	0	0	0	0	0	216	804
8:30 AM	2	118	0	0	0	69	2	0	0	0	0	0	0	0	0	0	191	818
8:45 AM	1	102	0	0	0	83	2	0	0	0	0	0	0	0	0	0	188	803

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	12	512	0	0	0	336	4	0	0	0	0	0	0	0	0	0	864
Heavy Trucks	0	48	0		0	16	0		0	0	0		0	0	0		64
Buses	0	20	0		0	4	0		0	0	0		0	0	0		24
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 8/22/2023 10:52 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

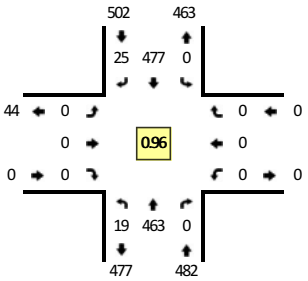
Type of peak hour being reported: Intersection Peak

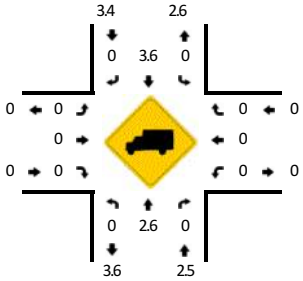
Method for determining peak hour: Total Entering

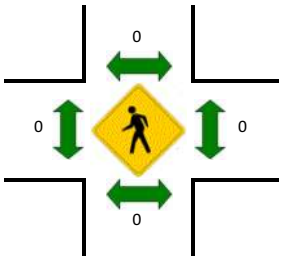
LOCATION: Rte 17 Bus -- Western Dwy
CITY/STATE: Warrenton, VA

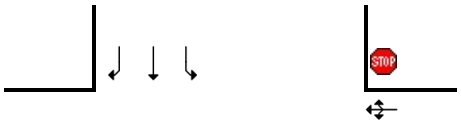
QC JOB #: 16218102
DATE: Tue, May 16 2023

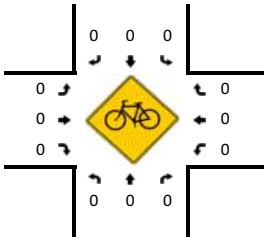
Peak-Hour: 2:00 PM -- 3:00 PM
Peak 15-Min: 2:15 PM -- 2:30 PM

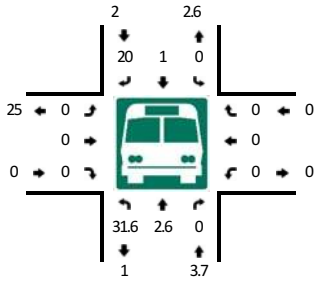


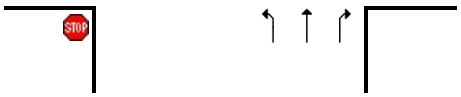


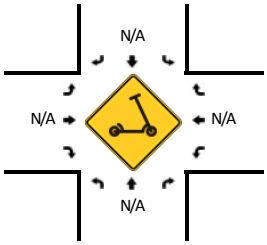












15-Min Count Period Beginning At	Rte 17 Bus (Northbound)				Rte 17 Bus (Southbound)				Western Dwy (Eastbound)				Western Dwy (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
2:00 PM	10	108	0	0	0	128	5	0	0	0	0	0	0	0	0	0	251	
2:15 PM	5	124	0	0	0	113	13	0	0	0	0	0	0	0	0	0	255	
2:30 PM	4	124	0	0	0	121	3	0	0	0	0	0	0	0	0	0	252	
2:45 PM	0	107	0	0	0	115	4	0	0	0	0	0	0	0	0	0	226	984
3:00 PM	0	98	0	0	0	120	0	0	0	0	0	0	0	0	0	0	218	951
3:15 PM	2	96	0	0	0	124	0	0	0	0	0	0	0	0	0	0	222	918
3:30 PM	2	150	0	0	0	131	0	0	0	0	0	0	0	0	0	0	283	949
3:45 PM	0	111	0	0	0	103	1	0	0	0	0	0	0	0	0	0	215	938
4:00 PM	1	101	0	0	0	120	2	0	0	0	0	0	0	0	0	0	224	944
4:15 PM	1	99	0	0	0	119	1	0	0	0	0	0	0	0	0	0	220	942
4:30 PM	3	118	0	0	0	144	0	0	0	0	0	0	0	0	0	0	265	924
4:45 PM	1	102	0	0	0	126	4	0	0	0	0	0	0	0	0	0	233	942
5:00 PM	1	105	0	0	0	95	0	0	0	0	0	0	0	0	0	0	201	919
5:15 PM	1	124	0	0	0	113	0	0	0	0	0	0	0	0	0	0	238	937
5:30 PM	0	107	0	0	0	106	1	0	0	0	0	0	0	0	0	0	214	886
5:45 PM	0	82	0	0	0	73	1	0	0	0	0	0	0	0	0	0	156	809

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	20	496	0	0	0	452	52	0	0	0	0	0	0	0	0	0	1020
Heavy Trucks	0	12	0		0	16	0		0	0	0		0	0	0		28
Buses	0	12	0		0	0	4		0	0	0		0	0	0		16
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 8/22/2023 10:52 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

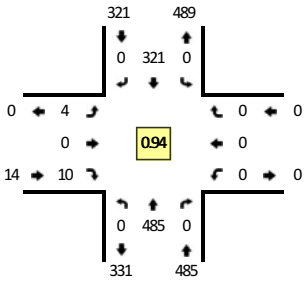
Type of peak hour being reported: Intersection Peak

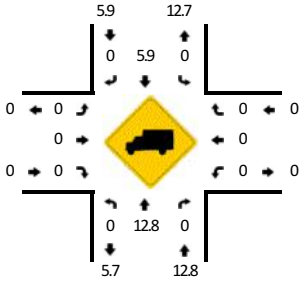
Method for determining peak hour: Total Entering

LOCATION: Rte 17 Bus -- Center Dwy
CITY/STATE: Warrenton, VA

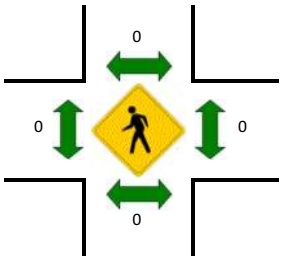
QC JOB #: 16218103
DATE: Tue, May 16 2023

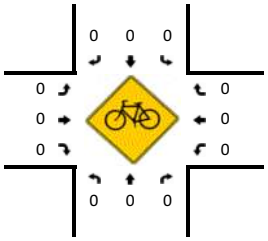
Peak-Hour: 7:45 AM -- 8:45 AM
Peak 15-Min: 8:15 AM -- 8:30 AM

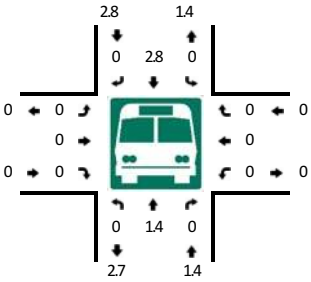


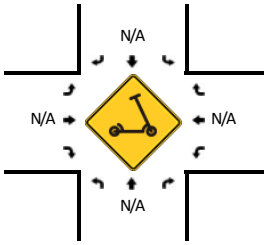


TRUE DATA TO IMPROVE MOBILITY









15-Min Count Period Beginning At	Rte 17 Bus (Northbound)				Rte 17 Bus (Southbound)				Center Dwy (Eastbound)				Center Dwy (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	0	25	0	0	0	25	1	0	0	0	0	0	0	0	0	0	51	
6:15 AM	0	26	0	0	0	26	0	0	2	0	0	0	0	0	0	0	54	
6:30 AM	0	53	0	0	0	37	1	0	0	0	2	0	0	0	0	0	93	
6:45 AM	0	72	0	0	0	60	0	0	0	0	1	0	0	0	0	0	133	331
7:00 AM	0	74	0	0	0	61	0	0	12	0	21	0	0	0	0	0	168	448
7:15 AM	0	113	0	0	0	58	0	0	28	0	31	0	0	0	0	0	230	624
7:30 AM	0	92	0	0	0	62	0	0	11	0	16	0	0	0	0	0	181	712
7:45 AM	0	128	0	0	0	73	0	0	0	0	3	0	0	0	0	0	204	783
8:00 AM	0	108	0	0	0	93	0	0	2	0	1	0	0	0	0	0	204	819
8:15 AM	0	129	0	0	0	86	0	0	2	0	2	0	0	0	0	0	219	808
8:30 AM	0	120	0	0	0	69	0	0	0	0	4	0	0	0	0	0	193	820
8:45 AM	0	99	0	0	0	79	0	0	1	0	2	0	0	0	0	0	181	797

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	516	0	0	0	344	0	0	8	0	8	0	0	0	0	0	876
Heavy Trucks	0	48	0		0	8	0		0	0	0		0	0	0		56
Buses	0	20	0		0	8	0		0	0	0		0	0	0		28
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 8/22/2023 10:52 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

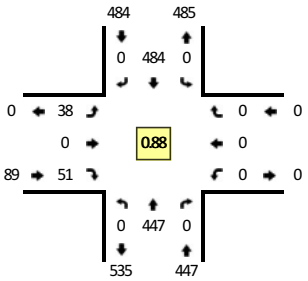
Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering

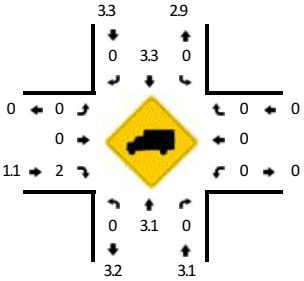
LOCATION: Rte 17 Bus -- Center Dwy
CITY/STATE: Warrenton, VA

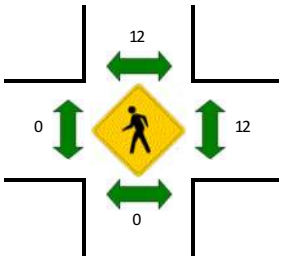
QC JOB #: 16218104
DATE: Tue, May 16 2023

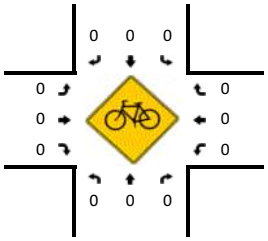
Peak-Hour: 2:00 PM -- 3:00 PM
Peak 15-Min: 2:30 PM -- 2:45 PM

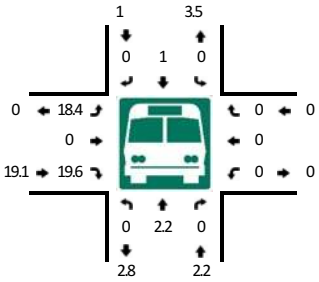


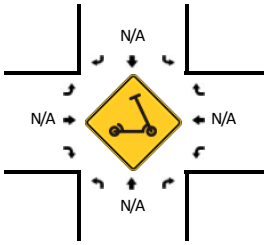
TRUE DATA TO IMPROVE MOBILITY











15-Min Count Period Beginning At	Rte 17 Bus (Northbound)				Rte 17 Bus (Southbound)				Center Dwy (Eastbound)				Center Dwy (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
2:00 PM	0	117	0	0	0	135	0	0	3	0	2	0	0	0	0	0	257	
2:15 PM	0	124	0	0	0	100	0	0	5	0	6	0	0	0	0	0	235	
2:30 PM	0	105	0	0	0	131	0	0	23	0	30	0	0	0	0	0	289	
2:45 PM	0	101	0	0	0	118	0	0	7	0	13	0	0	0	0	0	239	1020
3:00 PM	0	97	0	0	0	124	0	0	3	0	4	0	0	0	0	0	228	991
3:15 PM	0	97	0	0	0	120	0	0	2	0	3	0	0	0	0	0	222	978
3:30 PM	0	148	0	0	0	132	0	0	4	0	2	0	0	0	0	0	286	975
3:45 PM	0	97	0	0	0	101	0	0	3	0	4	0	0	0	0	0	205	941
4:00 PM	2	98	0	0	0	126	0	0	1	0	2	0	0	0	0	0	229	942
4:15 PM	0	103	0	0	0	118	0	0	0	0	6	0	0	0	0	0	227	947
4:30 PM	0	113	0	0	0	137	0	0	8	0	2	0	0	0	0	0	260	921
4:45 PM	0	96	0	0	0	133	0	0	4	0	0	0	0	0	0	0	233	949
5:00 PM	0	104	0	0	0	98	0	0	2	0	0	0	0	0	0	0	204	924
5:15 PM	0	124	0	0	0	112	1	0	1	0	1	0	0	0	0	0	239	936
5:30 PM	0	105	0	0	0	103	2	0	1	0	1	0	0	0	0	0	212	888
5:45 PM	0	83	0	0	0	75	0	0	0	0	1	0	0	0	0	0	159	814

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	420	0	0	0	524	0	0	92	0	120	0	0	0	0	0	1156
Heavy Trucks	0	8	0		0	28	0		0	0	0		0	0	0		36
Buses	0	8	0		0	8	0		8	0	20		0	0	0		44
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 8/22/2023 10:53 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

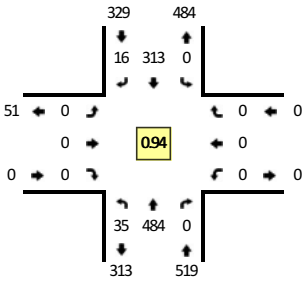
Type of peak hour being reported: Intersection Peak

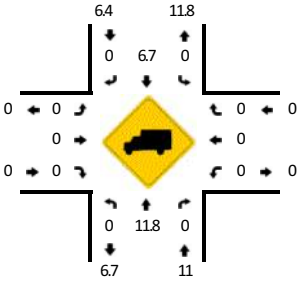
Method for determining peak hour: Total Entering

LOCATION: Rte 17 Bus -- Eastern Dwy
CITY/STATE: Warrenton, VA

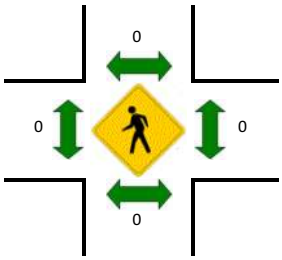
QC JOB #: 16218105
DATE: Tue, May 16 2023

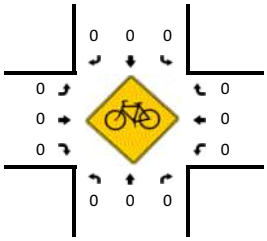
Peak-Hour: 7:45 AM -- 8:45 AM
Peak 15-Min: 8:15 AM -- 8:30 AM

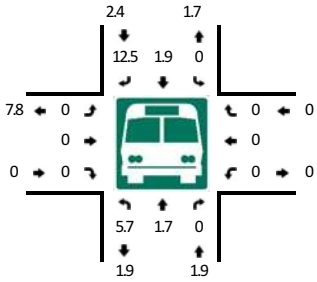


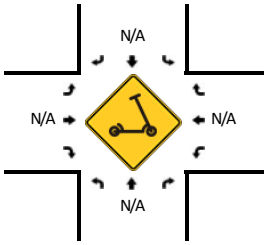


TRUE DATA TO IMPROVE MOBILITY









15-Min Count Period Beginning At	Rte 17 Bus (Northbound)				Rte 17 Bus (Southbound)				Eastern Dwy (Eastbound)				Eastern Dwy (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	0	25	0	0	0	23	3	0	0	0	0	0	0	0	0	0	51	
6:15 AM	3	25	0	0	0	26	1	0	0	0	0	0	0	0	0	0	55	
6:30 AM	2	53	0	0	0	38	1	0	0	0	0	0	0	0	0	0	94	
6:45 AM	10	71	0	0	0	58	1	0	0	0	0	0	0	0	0	0	140	340
7:00 AM	12	73	0	0	0	74	7	0	0	0	0	0	0	0	0	0	166	455
7:15 AM	6	109	0	0	0	80	9	0	0	0	0	0	0	0	0	0	204	604
7:30 AM	3	97	0	0	0	77	4	0	0	0	0	0	0	0	0	0	181	691
7:45 AM	9	125	0	0	0	70	1	0	0	0	0	0	0	0	0	0	205	756
8:00 AM	6	108	0	0	0	95	3	0	0	0	0	0	0	0	0	0	212	802
8:15 AM	8	130	0	0	0	83	4	0	0	0	0	0	0	0	0	0	225	823
8:30 AM	12	121	0	0	0	65	8	0	0	0	0	0	0	0	0	0	206	848
8:45 AM	7	99	0	0	0	75	6	0	0	0	0	0	0	0	0	0	187	830

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	32	520	0	0	0	332	16	0	0	0	0	0	0	0	0	0	900
Heavy Trucks	0	44	0		0	12	0		0	0	0		0	0	0		56
Buses	0	20	0		0	4	0		0	0	0		0	0	0		24
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 8/22/2023 10:53 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

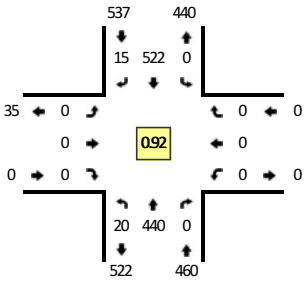
Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering

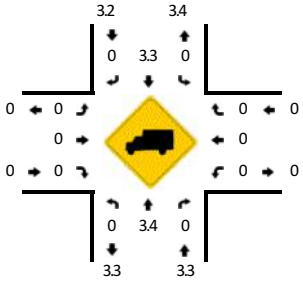
LOCATION: Rte 17 Bus -- Eastern Dwy
CITY/STATE: Warrenton, VA

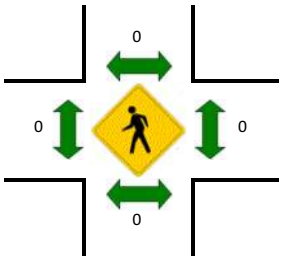
QC JOB #: 16218106
DATE: Tue, May 16 2023

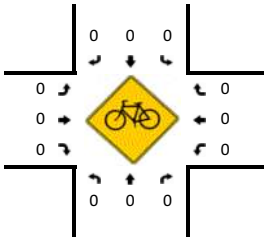
Peak-Hour: 2:00 PM -- 3:00 PM
Peak 15-Min: 2:30 PM -- 2:45 PM

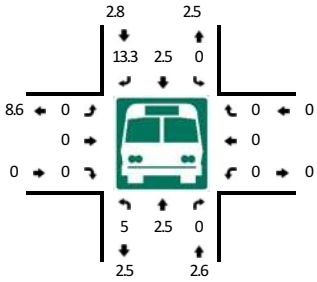


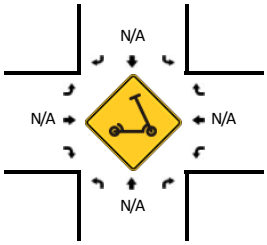
TRUE DATA TO IMPROVE MOBILITY











15-Min Count Period Beginning At	Rte 17 Bus (Northbound)				Rte 17 Bus (Southbound)				Eastern Dwy (Eastbound)				Eastern Dwy (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
2:00 PM	5	110	0	0	0	139	2	0	0	0	0	0	0	0	0	0	256	
2:15 PM	6	131	0	0	0	97	4	0	0	0	0	0	0	0	0	0	238	
2:30 PM	4	100	0	0	0	159	7	0	0	0	0	0	0	0	0	0	270	
2:45 PM	5	99	0	0	0	127	2	0	0	0	0	0	0	0	0	0	233	997
3:00 PM	0	100	0	0	0	124	3	0	0	0	0	0	0	0	0	0	227	968
3:15 PM	4	98	0	0	0	125	5	0	0	0	0	0	0	0	0	0	232	962
3:30 PM	3	147	0	0	0	128	3	0	0	0	0	0	0	0	0	0	281	973
3:45 PM	5	86	0	0	0	95	2	0	0	0	0	0	0	0	0	0	188	928
4:00 PM	2	101	0	0	0	133	2	0	0	0	0	0	0	0	0	0	238	939
4:15 PM	2	101	0	0	0	120	3	0	2	0	0	0	0	0	0	0	228	935
4:30 PM	6	113	0	0	0	135	4	0	0	0	1	0	0	0	0	0	259	913
4:45 PM	10	101	0	0	0	126	3	0	0	0	1	0	0	0	0	0	241	966
5:00 PM	3	99	0	0	0	94	5	0	0	0	0	0	0	0	0	0	201	929
5:15 PM	3	127	0	0	0	114	1	0	1	0	0	0	0	0	0	0	246	947
5:30 PM	3	106	0	0	0	104	1	0	0	0	0	0	0	0	0	0	214	902
5:45 PM	2	79	0	0	0	74	1	0	1	0	0	0	0	0	0	0	157	818

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	16	400	0	0	0	636	28	0	0	0	0	0	0	0	0	0	1080
Heavy Trucks	0	12	0		0	24	0		0	0	0		0	0	0		36
Buses	0	8	0		0	40	4		0	0	0		0	0	0		52
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 8/22/2023 10:53 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

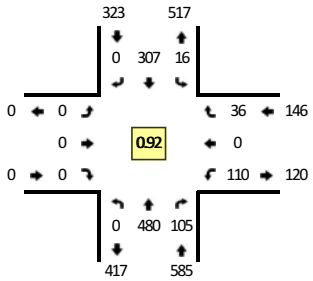
Type of peak hour being reported: Intersection Peak

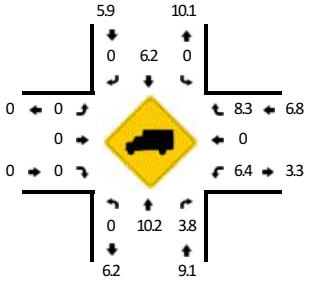
Method for determining peak hour: Total Entering

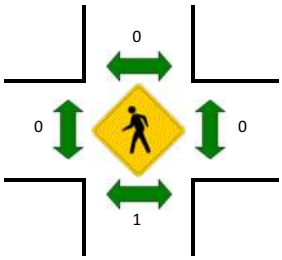
LOCATION: Rte 17 Bus -- Rte 15 Bus
CITY/STATE: Warrenton, VA

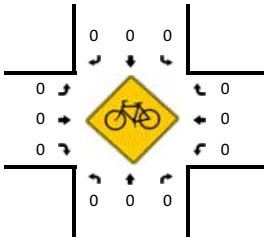
QC JOB #: 16218107
DATE: Tue, May 16 2023

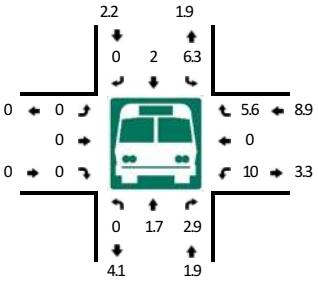
Peak-Hour: 7:45 AM -- 8:45 AM
Peak 15-Min: 8:15 AM -- 8:30 AM

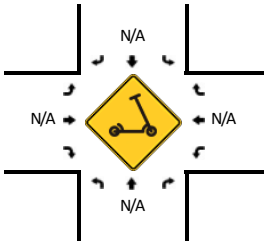












15-Min Count Period Beginning At	Rte 17 Bus (Northbound)				Rte 17 Bus (Southbound)				Rte 15 Bus (Eastbound)				Rte 15 Bus (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	0	25	4	0	1	22	0	0	0	0	0	0	6	0	0	0	58	
6:15 AM	0	24	3	1	2	22	0	0	0	0	0	0	8	0	1	0	61	
6:30 AM	0	54	10	0	1	32	0	0	0	0	0	0	4	0	2	0	103	
6:45 AM	0	72	14	0	1	55	0	0	0	0	0	0	10	0	5	0	157	379
7:00 AM	0	81	14	0	8	61	0	0	0	0	0	0	13	0	10	0	187	508
7:15 AM	0	99	14	0	11	72	0	0	0	0	0	0	10	0	13	0	219	666
7:30 AM	0	94	17	0	9	70	0	0	0	0	0	0	13	0	4	0	207	770
7:45 AM	0	124	24	0	9	63	0	0	0	0	0	0	26	0	12	0	258	871
8:00 AM	0	110	18	0	2	92	0	1	0	0	0	0	26	0	5	0	254	938
8:15 AM	0	129	30	0	1	83	0	0	0	0	0	0	36	0	6	0	285	1004
8:30 AM	0	117	33	0	3	69	0	0	0	0	0	0	22	0	13	0	257	1054
8:45 AM	0	95	15	1	12	66	0	0	0	0	0	0	15	0	6	0	210	1006

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	516	120	0	4	332	0	0	0	0	0	0	144	0	24	0	1140
Heavy Trucks	0	36	4		0	4	0		0	0	0		16	0	0		60
Buses	0	20	0		0	4	0		0	0	0		20	0	0		44
Pedestrians		4				0				0				0			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 8/22/2023 10:53 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

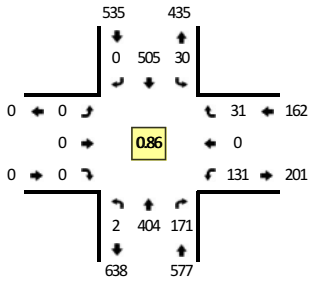
Type of peak hour being reported: Intersection Peak

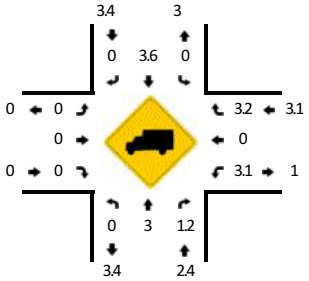
Method for determining peak hour: Total Entering

LOCATION: Rte 17 Bus -- Rte 15 Bus
CITY/STATE: Warrenton, VA

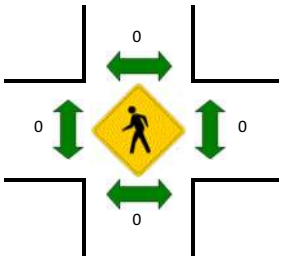
QC JOB #: 16218108
DATE: Tue, May 16 2023

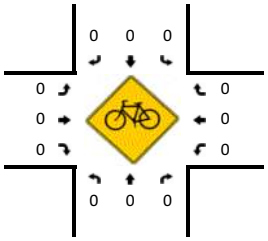
Peak-Hour: 2:45 PM -- 3:45 PM
Peak 15-Min: 3:30 PM -- 3:45 PM

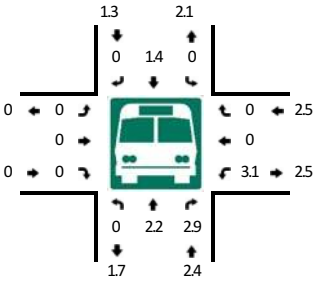


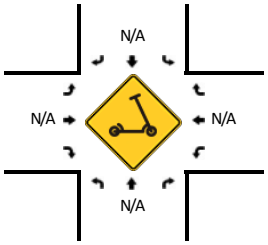


TRUE DATA TO IMPROVE MOBILITY









15-Min Count Period Beginning At	Rte 17 Bus (Northbound)				Rte 17 Bus (Southbound)				Rte 15 Bus (Eastbound)				Rte 15 Bus (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
2:00 PM	0	101	23	0	6	133	0	0	0	0	0	0	31	0	5	0	299	
2:15 PM	0	131	30	0	4	97	0	1	0	0	0	0	27	0	5	0	295	
2:30 PM	0	89	22	1	12	149	0	1	0	0	0	0	21	0	6	0	301	
2:45 PM	0	94	40	0	4	124	0	0	0	0	0	0	34	0	7	0	303	1198
3:00 PM	0	91	34	1	6	130	0	0	0	0	0	0	37	0	5	0	304	1203
3:15 PM	0	88	42	1	8	121	0	0	0	0	0	0	26	0	9	0	295	1203
3:30 PM	0	131	55	0	12	130	0	0	0	0	0	0	34	0	10	0	372	1274
3:45 PM	0	86	47	1	7	99	0	0	0	0	0	0	28	0	11	0	279	1250
4:00 PM	0	100	29	0	8	133	0	0	0	0	0	0	19	0	6	0	295	1241
4:15 PM	0	93	25	0	2	121	0	1	0	0	0	0	24	0	7	0	273	1219
4:30 PM	0	107	38	0	7	127	0	1	0	0	0	0	31	0	7	0	318	1165
4:45 PM	0	97	38	0	2	143	0	0	0	0	0	0	29	0	11	0	320	1206
5:00 PM	0	88	32	0	5	86	0	0	0	0	0	0	24	0	9	0	244	1155
5:15 PM	0	121	27	0	4	106	0	1	0	0	0	0	24	0	5	0	288	1170
5:30 PM	0	109	17	0	2	109	0	0	0	0	0	0	20	0	6	0	263	1115
5:45 PM	0	71	26	0	6	64	0	0	0	0	0	0	24	0	7	0	198	993

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	524	220	0	48	520	0	0	0	0	0	0	136	0	40	0	1488
Heavy Trucks	0	12	0		0	16	0		0	0	0		0	0	4		32
Buses	0	20	8		0	8	0		0	0	0		4	0	0		40
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 8/22/2023 10:53 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

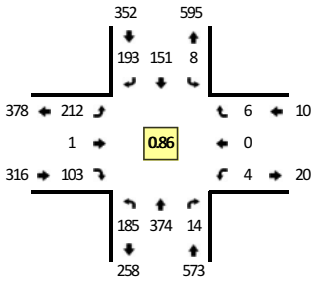
Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering

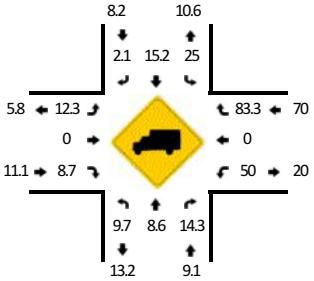
LOCATION: Rte 17 Bus -- Alwington Boulevard
CITY/STATE: Warrenton, VA

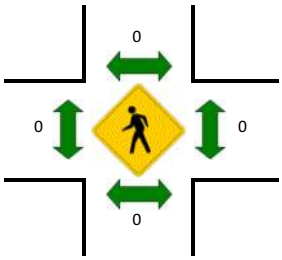
QC JOB #: 16218109
DATE: Tue, May 16 2023

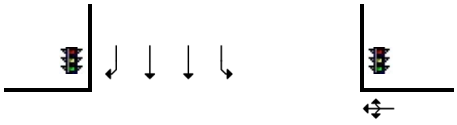
Peak-Hour: 7:45 AM -- 8:45 AM
Peak 15-Min: 8:15 AM -- 8:30 AM

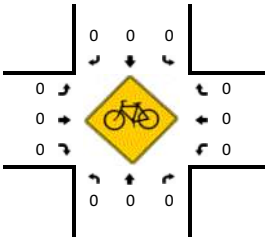


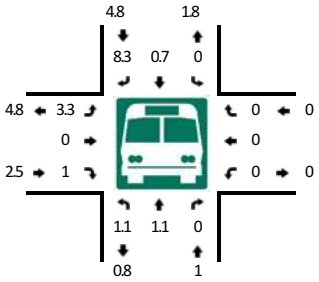
TRUE DATA TO IMPROVE MOBILITY

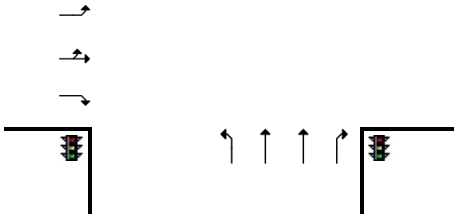


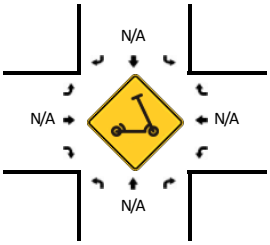












15-Min Count Period Beginning At	Rte 17 Bus (Northbound)				Rte 17 Bus (Southbound)				Alwington Boulevard (Eastbound)				Alwington Boulevard (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	12	23	3	0	1	17	6	0	3	0	9	0	3	0	2	0	79	
6:15 AM	11	28	0	0	0	19	5	0	4	0	6	0	2	0	0	0	75	
6:30 AM	17	54	0	0	0	15	13	0	12	0	11	0	2	0	0	0	124	
6:45 AM	26	96	3	0	2	25	16	0	12	1	10	0	0	0	1	0	192	470
7:00 AM	36	84	0	0	2	42	21	0	11	1	20	0	0	0	0	0	217	608
7:15 AM	37	101	1	0	1	41	26	1	18	0	15	0	0	0	0	0	241	774
7:30 AM	44	78	0	0	1	43	26	0	26	0	21	0	0	0	1	0	240	890
7:45 AM	47	131	5	0	1	32	40	0	32	0	17	0	2	0	0	0	307	1005
8:00 AM	43	86	3	0	4	40	47	1	31	0	12	0	0	0	3	0	270	1058
8:15 AM	45	88	3	0	0	41	71	2	74	0	41	0	0	0	0	0	365	1182
8:30 AM	50	69	3	0	0	38	35	0	75	1	33	0	2	0	3	0	309	1251
8:45 AM	33	74	1	0	1	34	26	1	34	0	24	0	1	0	0	0	229	1173

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	180	352	12	0	0	164	284	8	296	0	164	0	0	0	0	0	1460
Heavy Trucks	20	40	0		0	36	4		4	0	16		0	0	0		120
Buses	4	0	0		0	0	24		20	0	4		0	0	0		52
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 8/22/2023 10:53 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

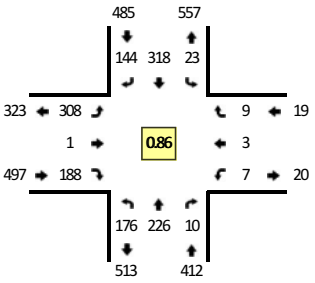
Type of peak hour being reported: Intersection Peak

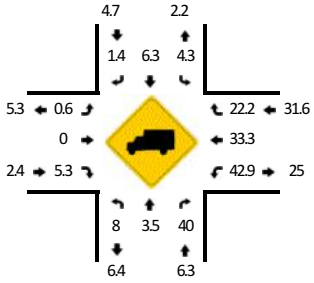
Method for determining peak hour: Total Entering

LOCATION: Rte 17 Bus -- Alwington Boulevard
CITY/STATE: Warrenton, VA

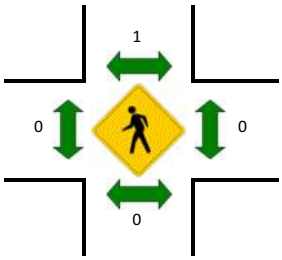
QC JOB #: 16218110
DATE: Tue, May 16 2023

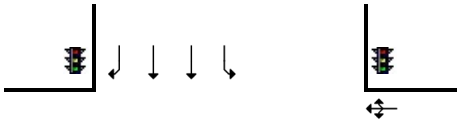
Peak-Hour: 2:45 PM -- 3:45 PM
Peak 15-Min: 3:30 PM -- 3:45 PM

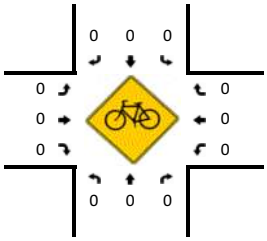


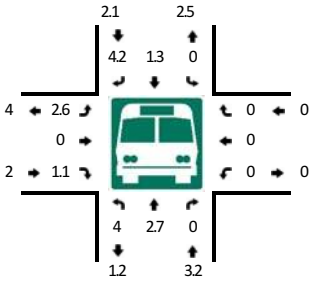


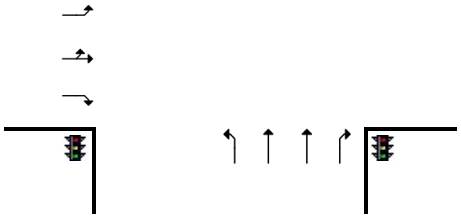
TRUE DATA TO IMPROVE MOBILITY

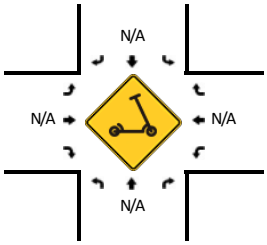












15-Min Count Period Beginning At	Rte 17 Bus (Northbound)				Rte 17 Bus (Southbound)				Alwington Boulevard (Eastbound)				Alwington Boulevard (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
2:00 PM	48	55	3	0	2	76	34	2	71	0	46	0	2	1	2	0	342	
2:15 PM	34	64	1	0	2	65	29	6	76	1	41	0	0	0	3	0	322	
2:30 PM	41	46	2	0	1	101	31	1	62	0	47	0	0	1	1	0	334	
2:45 PM	42	58	6	0	2	89	31	2	60	0	43	0	3	2	4	0	342	1340
3:00 PM	43	57	2	0	2	72	40	2	62	1	44	0	3	0	3	0	331	1329
3:15 PM	48	58	0	0	1	71	36	1	72	0	44	0	0	0	0	0	331	1338
3:30 PM	43	53	2	0	4	86	37	9	114	0	57	0	1	1	2	0	409	1413
3:45 PM	47	58	3	0	1	76	20	2	70	0	51	0	3	0	3	0	334	1405
4:00 PM	38	36	2	0	4	88	20	5	75	0	66	0	1	1	3	0	339	1413
4:15 PM	38	49	1	0	1	74	23	3	65	0	42	0	3	1	2	0	302	1384
4:30 PM	47	60	0	0	2	95	17	3	67	0	48	0	2	0	4	0	345	1320
4:45 PM	52	54	0	0	3	99	26	4	69	0	42	0	0	0	2	0	351	1337
5:00 PM	43	58	1	0	0	77	22	1	59	0	53	0	2	0	3	0	319	1317
5:15 PM	38	78	0	0	1	80	17	1	55	0	52	0	1	0	2	0	325	1340
5:30 PM	37	66	2	0	1	81	12	2	48	0	53	0	1	2	2	0	307	1302
5:45 PM	33	51	1	0	0	52	8	0	50	0	42	0	4	0	1	0	242	1193

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	172	212	8	0	16	344	148	36	456	0	228	0	4	4	8	0	1636
Heavy Trucks	24	4	4		4	16	0		4	0	4		4	0	0		64
Buses	12	4	0		0	0	12		24	0	4		0	0	0		56
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 8/22/2023 10:53 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

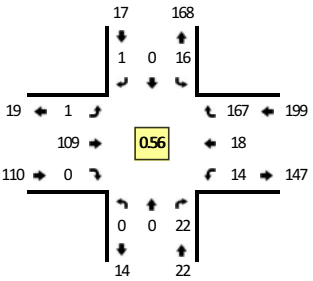
Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering

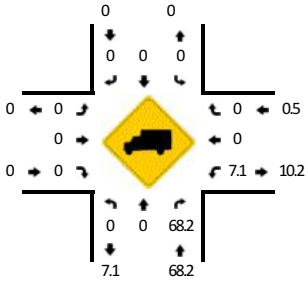
LOCATION: Elementary School Entrance -- Alwington Blvd
CITY/STATE: Warrenton, VA

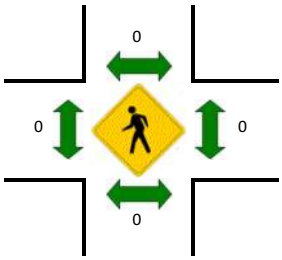
QC JOB #: 16218111
DATE: Tue, May 16 2023

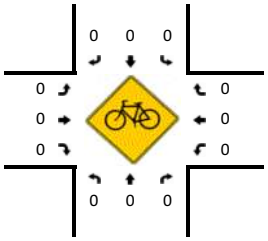
Peak-Hour: 7:45 AM -- 8:45 AM
Peak 15-Min: 8:15 AM -- 8:30 AM

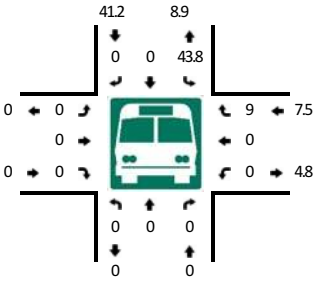


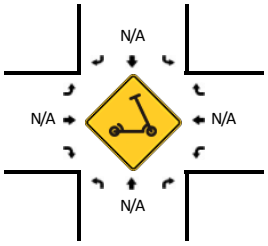
TRUE DATA TO IMPROVE MOBILITY











15-Min Count Period Beginning At	Elementary School Entrance (Northbound)				Elementary School Entrance (Southbound)				Alwington Blvd (Eastbound)				Alwington Blvd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	0	0	0	0	3	0	0	0	0	2	0	0	0	2	2	0	9	
6:15 AM	0	0	0	0	2	0	0	0	0	0	0	0	3	1	2	0	8	
6:30 AM	0	0	0	0	3	0	0	0	0	0	0	0	1	0	3	0	7	
6:45 AM	0	0	0	0	2	0	0	0	0	0	0	0	19	2	1	0	24	48
7:00 AM	0	0	1	0	1	0	0	0	0	0	0	0	21	0	11	0	34	73
7:15 AM	0	0	6	0	6	0	0	0	0	1	0	0	21	1	11	0	46	111
7:30 AM	0	0	10	0	2	0	0	0	0	2	0	0	14	8	12	0	48	152
7:45 AM	0	0	12	0	3	0	0	0	0	1	0	0	3	7	31	0	57	185
8:00 AM	0	0	6	0	2	0	0	0	0	1	0	0	7	4	34	0	54	205
8:15 AM	0	0	2	0	8	0	1	0	0	65	0	0	2	6	72	0	156	315
8:30 AM	0	0	2	0	3	0	0	0	1	42	0	0	2	1	30	0	81	348
8:45 AM	0	0	4	0	3	0	0	0	0	7	0	0	5	1	8	0	28	319

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	8	0	32	0	4	0	0	260	0	0	8	24	288	0	624
Heavy Trucks	0	0	8		0	0	0		0	0	0		0	0	0		8
Buses	0	0	0		24	0	0		0	0	0		0	0	24		48
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 8/22/2023 10:53 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

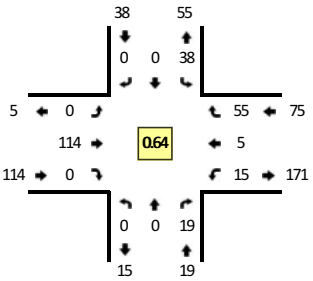
Type of peak hour being reported: Intersection Peak

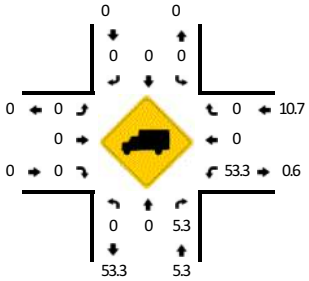
Method for determining peak hour: Total Entering

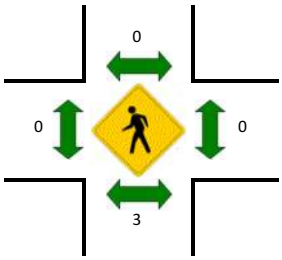
LOCATION: Elementary School Entrance -- Alwington Blvd
CITY/STATE: Warrenton, VA

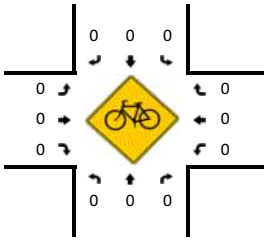
QC JOB #: 16218112
DATE: Tue, May 16 2023

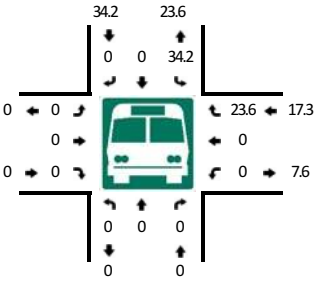
Peak-Hour: 3:15 PM -- 4:15 PM
Peak 15-Min: 3:30 PM -- 3:45 PM

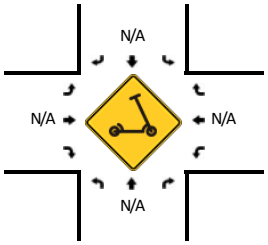












15-Min Count Period Beginning At	Elementary School Entrance (Northbound)				Elementary School Entrance (Southbound)				Alwington Blvd (Eastbound)				Alwington Blvd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
2:00 PM	0	0	2	0	5	0	0	0	0	7	0	0	3	0	3	0	20	
2:15 PM	0	0	3	0	1	0	0	0	0	3	0	0	3	2	4	0	16	
2:30 PM	0	0	0	0	0	0	0	0	0	2	0	0	3	0	11	0	16	
2:45 PM	0	0	4	0	3	0	0	0	0	2	0	0	1	1	13	0	24	76
3:00 PM	0	0	5	0	1	0	0	0	0	1	0	0	4	1	19	0	31	87
3:15 PM	0	0	4	0	4	0	0	0	0	30	0	0	3	2	28	0	71	142
3:30 PM	0	0	4	0	8	0	0	0	0	57	0	0	6	1	20	0	96	222
3:45 PM	0	0	3	0	14	0	0	0	0	13	0	0	4	1	4	0	39	237
4:00 PM	0	0	8	0	12	0	0	0	0	14	0	0	2	1	3	0	40	246
4:15 PM	0	0	6	0	5	0	0	0	0	4	0	0	4	1	3	0	23	198
4:30 PM	0	0	6	0	6	0	0	0	0	7	0	0	3	2	5	0	29	131
4:45 PM	0	0	7	0	5	0	0	0	0	3	0	0	4	1	7	0	27	119
5:00 PM	0	0	8	0	6	0	0	0	0	5	0	0	5	0	4	0	28	107
5:15 PM	0	0	6	0	3	0	0	0	0	1	0	0	2	1	1	0	14	98
5:30 PM	0	0	5	0	3	0	0	0	0	1	0	0	1	0	5	0	15	84
5:45 PM	0	0	10	0	2	0	0	0	0	0	0	0	1	0	1	0	14	71

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	0	16	0	32	0	0	0	0	228	0	0	24	4	80	0	384
Heavy Trucks	0	0	0		0	0	0		0	0	0		20	0	0		20
Buses	0	0	0		32	0	0		0	0	0		0	0	20		52
Pedestrians		4				0				0				0			4
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 8/22/2023 10:53 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

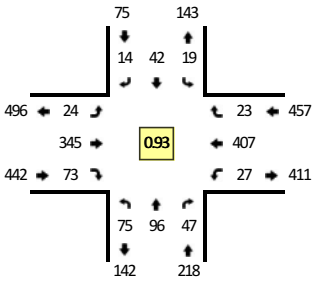
Type of peak hour being reported: Intersection Peak

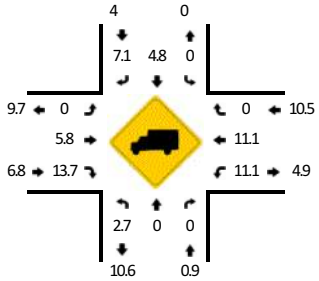
Method for determining peak hour: Total Entering

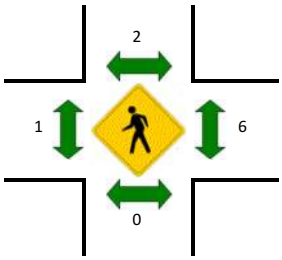
LOCATION: Culpeper St -- W Shirley Ave
CITY/STATE: Warrenton, VA

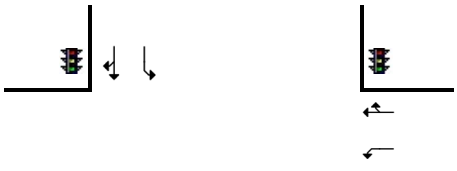
QC JOB #: 16218113
DATE: Thu, May 18 2023

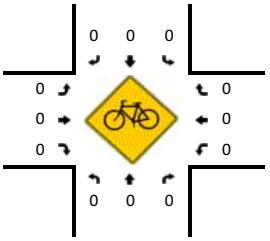
Peak-Hour: 7:45 AM -- 8:45 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

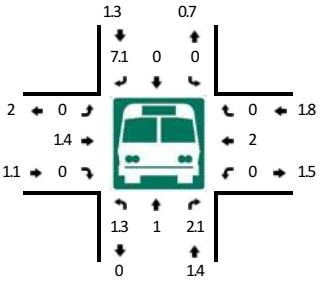


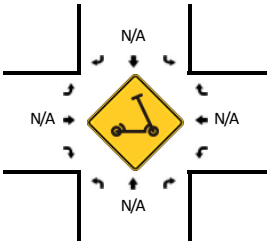












15-Min Count Period Beginning At	Culpeper St (Northbound)				Culpeper St (Southbound)				W Shirley Ave (Eastbound)				W Shirley Ave (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
6:00 AM	9	12	1	0	3	1	0	0	0	21	5	0	0	25	0	0	77	
6:15 AM	14	15	1	0	0	5	0	0	1	39	11	0	3	31	2	0	122	
6:30 AM	10	26	1	0	1	2	2	0	4	34	4	0	4	48	0	0	136	
6:45 AM	16	12	4	0	0	2	1	0	2	76	9	0	1	79	4	0	206	541
7:00 AM	17	21	9	0	4	6	4	0	5	65	11	0	1	79	2	0	224	688
7:15 AM	24	15	17	0	4	5	6	0	4	87	14	0	7	100	3	0	286	852
7:30 AM	14	21	6	0	3	4	5	0	7	69	17	0	7	94	6	0	253	969
7:45 AM	29	24	9	0	6	13	3	0	9	72	20	0	9	121	5	0	320	1083
8:00 AM	11	21	18	0	2	9	5	0	8	86	15	0	5	82	8	0	270	1129
8:15 AM	24	35	12	0	6	9	3	0	3	90	18	0	8	93	6	0	307	1150
8:30 AM	11	16	8	0	5	11	3	0	4	97	20	0	5	111	4	0	295	1192
8:45 AM	20	18	6	0	3	10	2	0	6	72	14	0	7	93	4	0	255	1127

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	116	96	36	0	24	52	12	0	36	288	80	0	36	484	20	0	1280
Heavy Trucks	4	0	0		0	4	0		0	16	4		0	64	0		92
Buses	4	0	0		0	0	0		0	4	0		0	0	0		8
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 8/22/2023 10:53 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

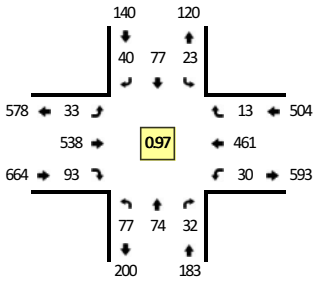
Type of peak hour being reported: Intersection Peak

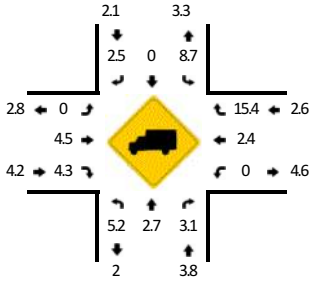
Method for determining peak hour: Total Entering

LOCATION: Culpeper St -- W Shirley Ave
CITY/STATE: Warrenton, VA

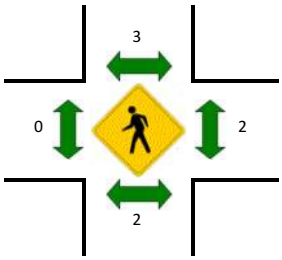
QC JOB #: 16218114
DATE: Thu, May 18 2023

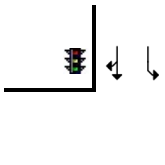
Peak-Hour: 3:00 PM -- 4:00 PM
Peak 15-Min: 3:00 PM -- 3:15 PM

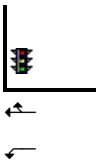


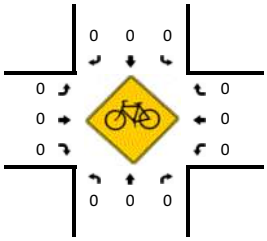


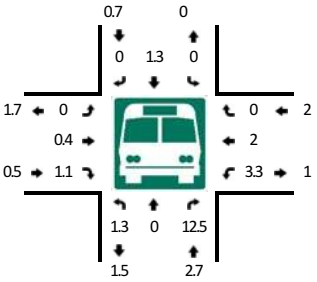
TRUE DATA TO IMPROVE MOBILITY

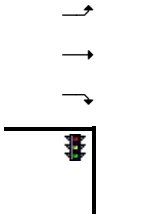


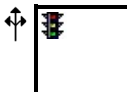


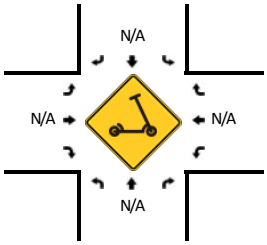












15-Min Count Period Beginning At	Culpeper St (Northbound)				Culpeper St (Southbound)				W Shirley Ave (Eastbound)				W Shirley Ave (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
2:00 PM	24	15	12	0	5	15	9	0	5	113	18	0	3	123	1	0	343	
2:15 PM	17	24	6	0	5	12	6	0	5	124	28	0	7	110	1	0	345	
2:30 PM	19	21	6	0	9	10	3	0	8	113	22	0	14	131	5	0	361	
2:45 PM	24	11	6	0	7	9	7	0	15	104	17	0	9	97	4	0	310	1359
3:00 PM	16	19	12	0	4	21	12	0	8	137	23	0	6	125	3	0	386	1402
3:15 PM	24	20	8	0	9	17	9	0	9	152	19	0	5	98	3	0	373	1430
3:30 PM	22	17	4	0	5	15	8	0	10	130	16	0	13	116	2	0	358	1427
3:45 PM	15	18	8	0	5	24	11	0	6	119	35	0	6	122	5	0	374	1491
4:00 PM	19	18	8	0	6	19	8	0	8	130	25	0	4	115	5	0	365	1470
4:15 PM	21	15	9	0	8	29	3	0	8	105	29	0	7	92	3	0	329	1426
4:30 PM	18	16	8	0	17	19	12	0	14	129	37	0	8	106	1	0	385	1453
4:45 PM	22	17	4	0	5	34	3	0	9	115	40	0	10	107	0	0	366	1445
5:00 PM	21	14	10	0	5	24	5	0	7	112	30	0	9	130	2	0	369	1449
5:15 PM	21	16	6	0	7	32	5	0	7	92	35	0	4	102	1	0	328	1448
5:30 PM	16	16	7	0	5	23	3	0	4	110	31	0	8	91	1	0	315	1378
5:45 PM	14	13	10	0	4	13	7	0	3	100	22	0	6	111	3	0	306	1318

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	64	76	48	0	16	84	48	0	32	548	92	0	24	500	12	0	1544
Heavy Trucks	0	4	0		0	0	0		0	8	4		0	16	0		32
Buses	0	0	4		0	0	0		0	4	0		0	0	0		8
Pedestrians		0				8				0				0			8
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 8/22/2023 10:53 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Appendix C
Traffic Signal Timings

15-17-29BusJames Madison&1105 Alwington

Phase Timing

9/1/2023 10:30:10 AM

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Min Green	7	12	7	7	7	12	0	0	0	0	0	0	0	0	0	0
Veh Ext	4.0	5.0	4.0	5.0	4.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Max Green 1	15	30	20	15	15	30	0	0	0	0	0	0	0	0	0	0
Max Green 2	15	30	20	15	15	30	0	0	0	0	0	0	0	0	0	0
Max Green 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Max Ext	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow	4.8	4.8	4.1	3.2	4.8	4.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red Clr	3.9	3.9	4.7	3.1	3.9	3.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Adv Flash	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	0.0	0.0
Bike MG	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ped Clr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walk2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sol DW	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	0.0	0.0
Early Wlk	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	0.0	0.0
Delay Wlk	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	0.0	0.0
Added	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	0.0	0.0
Max Initial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Min Gap	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	0.0	0.0
Reduce After	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TTReduce	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CS Min Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CS Max Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Red Revert	4.0	4.0	4.0	4.0	4.0	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Neg Ped	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	0.0	0.0
AP Disc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pmt Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pmt Walk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pmt Ped Clr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Return Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

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Phase Options

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Phases	1-8								9-16							
Min Recalls		2	3			6										
Max Recalls																
Ped Recalls																
Soft Recall																
Dual Entry																
Red Rest																
Walk Rest																
Walk Expand																
Ped Recycle																
Sim Ped Term																
PC Thru Clr																
Guar Passage																
No Simult Gap																
Yel Lock		2				6										
Red Lock																
PhaseNext Lock	1	2	3	4	5	6										
No Term Call	1	2	3	4	5	6										
Cond Serv																
CS Enable																
Cond Reserve																
Reserve																
Veh Omit							7	8								
Ped Omit																
Perm Phase																
Protect Calls																
Protect Calls 2																
Flash Entry																
Flash Exit																
Flash Exit Yel																
Flash Exit Red																
Ped Scramble																
No Min Yel																
No Min Red Rev																
Max Scramble Walk																
Flash Yellow		2				6										
Flash FYA																
CNA 1																
CNA 2																

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Phase Startup Options

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Startup Flash	0	Mode	Yel->Red
Startup All Red	0	Yellow	0.0

Phases	1-8							9-16							
Startup Phases		2				6										
Startup Yellow																
Startup Red																
Startup No Walk																
Startup Next																
Startup Yel Fls																
Startup FYA																
No Veh Call							7	8								
No Ped Call																

Phase Startup Timing

Phase	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Start Walk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Start Min Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Start Max Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Unit

Red Revert	4.0	Ped Protect	No	AdvFls in Flash	No

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Ring Sequence / Conflicting Phases

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Ringgroup 1

Ring 1	1	2	3	4	0	0	0	0	0	0	0	0	0	0	0	0
Ring 2	5	6	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Ringgroup 2

Custom Sequences

Seq 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Seq 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Seq 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Seq 4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Seq 5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Seq 6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Seq 7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Seq 8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Conflicting Phases

	1-8								9-16							
Phase 1																
Phase 2																
Phase 3																
Phase 4																
Phase 5																
Phase 6																
Phase 7																
Phase 8																
Phase 9																
Phase 10																
Phase 11																
Phase 12																
Phase 13																
Phase 14																
Phase 15																
Phase 16																

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MCE Options

9/1/2023 10:30:10 AM

Phases	1-8								9-16							
MCE Ped Protect																
MCE Veh Call		2		4		6										
MCE Ped Call																
MCE Veh Omit																
MCE Ped Omit																
MCE Veh Sync		2		4		6										
MCE Ped Sync																
MCE Halt Don't Walk																

LRV Phases	1-8							
MCE LRV Term Early								

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FYA/FRA

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FYA	1	2	3	4	5	6	7	8
Prot Phs	1	0	0	0	5	0	0	0
Opp Thru	2	0	0	0	6	0	0	0
Start Phs	0	0	0	0	0	0	0	0
Opp Ped	0	0	0	0	0	0	0	0
Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Min FYA	3.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0
Skip Prot Red	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled
Head Mode	FYA 1	FYA 1	FYA 1	FYA 1	FYA 1	FYA 1	FYA 1	FYA 1

Ped Hawk 1

Veh Phase	0		
Ped Phase	0		
Flash Yel	0.0	Dark Signal	Yes
Flash Delay	0.0	Flash Carryover	0.0
Green Mode	Normal		

Ped Hawk 2

Veh Phase	0		
Ped Phase	0		
Flash Yel	0.0	Dark Signal	Yes
Flash Delay	0.0	Flash Carryover	0.0
Green Mode	Normal		

Ped Hawk 3

Veh Phase	0		
Ped Phase	0		
Flash Yel	0.0	Dark Signal	Yes
Flash Delay	0.0	Flash Carryover	0.0
Green Mode	Normal		

Ped Hawk 4

Veh Phase	0		
Ped Phase	0		
Flash Yel	0.0	Dark Signal	Yes
Flash Delay	0.0	Flash Carryover	0.0
Green Mode	Normal		

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Overlap 2

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Min Green	0.0	Trail Green	0.0	Trail Green 2	0.0	Delay Green	0.0
Yellow	0.0	Red	0.0	Red Revert	0.0		
Walk	0	Ped Clearance	0	Solid DW	0.0	Early Wlk	0.0

Delay Wlk 0.0

Phases	1-8								9-16							
Parents			3													
Negative Green																
Start Next																
Trail Enable																
Trail Ena Next																
Trail Ena 2																
Trail Next 2																
Delay Enable																
Negative Veh																
Negative Ped																
Negative Olap																
Walk Rest																
Walk Thru																
Walk Halt																
Ped Recycle																
Overlap Start																
Overlap Ped Start																
Phase Calls																

Pmt Green	0	Walk	0	Ped Clr	0	
PP Phase	0	PP Delay	0.0			
Min FR	0.0	FR Hold	0.0	FR Delay	0.0	

LRV Start Enable

LRV Enable

Phases	1-8								9-16							
Perm Phases																
Prot Phases																
FR Ena Phases																
FR Grn Phases																
FR Ped Conf																
FR OLPed Conf																

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Coordination Options

9/1/2023 10:30:10 AM

Sync Time	00:00	RTC Set Time	00:00
Transition Mode	Best 2	Ped Adjust	None
Trans Short %	20	Trans Long %	35
Offset Reference	Crd Grp End	Short Cycles	0
Dual Entry	Normal	Overlap F/O	Disabled
Master Sync Mode	RTC	Master Sync Length	0
Adapt Thresh	0	Adapt Step	0
External Plan Max	0		
Hardwire No Match	Sched	Hardwire Sync Fail	0
Override Omit/Recall	No		

Phases	1-8	9-16
No Trans Recall		
Trans Ped Recall		
Trans Phases		

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Hardwire Plans

9/1/2023 10:30:10 AM

Hardwire	Plan Select							Pattern	Offset	Mode
Plan 1								0	0	Hardwire
Plan 2								0	0	Hardwire
Plan 3								0	0	Hardwire
Plan 4								0	0	Hardwire
Plan 5								0	0	Hardwire
Plan 6								0	0	Hardwire
Plan 7								0	0	Hardwire
Plan 8								0	0	Hardwire
Plan 9								0	0	Hardwire
Plan 10								0	0	Hardwire
Plan 11								0	0	Hardwire
Plan 12								0	0	Hardwire
Plan 13								0	0	Hardwire
Plan 14								0	0	Hardwire
Plan 15								0	0	Hardwire
Plan 16								0	0	Hardwire
Plan 17								0	0	Hardwire
Plan 18								0	0	Hardwire
Plan 19								0	0	Hardwire
Plan 20								0	0	Hardwire
Plan 21								0	0	Hardwire
Plan 22								0	0	Hardwire
Plan 23								0	0	Hardwire
Plan 24								0	0	Hardwire
Plan 25								0	0	Hardwire
Plan 26								0	0	Hardwire
Plan 27								0	0	Hardwire
Plan 28								0	0	Hardwire
Plan 29								0	0	Hardwire
Plan 30								0	0	Hardwire
Plan 31								0	0	Hardwire
Plan 32								0	0	Hardwire

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Soft Interconnect

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Mode	Slave	Remote Int Number	0
Yield Delay	0		
Yield Duration	0		
Permissive	0		
Local Hold Limit	0		

Phases	1-8	9-16
Local Control Phases		
Local Hold Phases		
Local Perm Phases		
Local Call Phases		
Remote Perm Phases		
Remote Hold Phases		

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Preempt Inputs

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Preempt Input	1	2	3	4	5	6	7	8	9	10
Delay	0	0	0	0	0	0	0	0	0	0
Checkout Limit	0	0	0	0	0	0	0	0	0	0
Locked	No	No	No	No	No	No	No	No	No	No
Interlock	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled	Disabled
Input Number	0	0	0	0	0	0	0	0	0	0
Input Priority	All	All	All	All	All	All	All	All	All	All
Delay Mode	Inp	Inp	Inp	Inp	Inp	Inp	Inp	Inp	Inp	Inp

Preempt Priority

Preempt	1	2	3	4	5	6	7	8	9	10
Priority	0	0	0	0	0	0	0	0	0	0

Remote Preemption

Remote Preempt	RM 1	RM 2	RM 3	RM 4	RM 5	RM 6	RM 7	RM 8
Int Number	0	0	0	0	0	0	0	0
PE Number	0	0	0	0	0	0	0	0
Mode	Dis	Dis	Dis	Dis	Dis	Dis	Dis	Dis
Slack	0	0	0	0	0	0	0	0
Travel Time	0	0	0	0	0	0	0	0
Alt TT 1	0	0	0	0	0	0	0	0
Alt TT 2	0	0	0	0	0	0	0	0
Alt TT 3	0	0	0	0	0	0	0	0
Alt TT 4	0	0	0	0	0	0	0	0
Alt TT 5	0	0	0	0	0	0	0	0
Alt TT 6	0	0	0	0	0	0	0	0
Alt TT 7	0	0	0	0	0	0	0	0

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Preempt 1 (Configuration)

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Enabled	No	Dwell Mode	Normal	Output Mode	All
Output2 Mode	All	Fail Action	Preempt Off	Exit Mode	Normal
Override Flash	No	Change Phasenext	Yes		

	1-8	9-16
Enable Phases		
Preempt Inputs		

	1-8		
LRV Disable		Max	0
LRV Dwell Flash			
LRV Omit		Delay	0
LRV No Yel			

Preempt 1 (Timing/Phases/Overlaps)

Phases/Overlaps	1-8	9-16
Omit Olap Grn Clr		
Phs EWlk to Grn		
TClr 1 Veh Phases		
TClr 1 Ped Phases		
TClr 1 Olap		
TClr 1 Olap Ped		
TClr 2 Veh Phases		
TClr 2 Ped Phases		
TClr 2 Olap		
TClr 2 Olap Ped		
Init Dwell Phases		
Dwell Veh Phases		
Dwell Ped Phases		
Dwell Olap		
Dwell Olap Ped		
Exit Veh Phases		
Exit Ped Phases		
Exit Olap		
Exit Olap Ped		
Zero Phase Walk		
Zero Phase Ped Clr		
Zero Phase Green		
Zero Olap Walk		
Zero Olap Ped Clr		
Zero Olap Green		
Dwell-Phase Red		
Dwell-Phase Red Flash		
Dwell-Phase Yel Flash		
Dwell-Olap Red Flash		
Dwell-Olap Yel Flash		
Dwell-Ped Dark		
Dwell-Olap Ped Dark		

Start Green	0	Start Walk	0
		Start Ped Clr	0
Track Clear 1	0	Track Clear 2	0
TC1 Extend	0	TC1 Max	0
Exit Ped Clr	0	Exit Yellow	0.0
Exit Red	0.0		
Min Dwell	0	Min Duration	0
Dwell Extend	0		
Max Dwell	0	Max Call	0
Reserve Inh Same	0		
Reserve Inh All	0		
Delay	0		

Phases/Overlaps	1-8	9-16
TClr 1 FR Olap		
TClr 2 FR Olap		
Dwell FR Olap		
TClr 1 FYA		
TClr 2 FYA		
Dwell FYA		

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Preempt 2 (Configuration)

9/1/2023 10:30:10 AM

Enabled	Yes	Dwell Mode	Normal	Output Mode	All
Output2 Mode	All	Fail Action	Preempt Off	Exit Mode	Normal
Override Flash	No	Change Phasenext	Yes		

	1-8	9-16
Enable Phases		
Preempt Inputs	2	

	1-8		
LRV Disable		Max	0
LRV Dwell Flash			
LRV Omit		Delay	0
LRV No Yel			

Preempt 2 (Timing/Phases/Overlaps)

Phases/Overlaps	1-8	9-16
Omit Olap Grn Clr		
Phs EWlk to Grn		
TClr 1 Veh Phases		
TClr 1 Ped Phases		
TClr 1 Olap		
TClr 1 Olap Ped		
TClr 2 Veh Phases		
TClr 2 Ped Phases		
TClr 2 Olap		
TClr 2 Olap Ped		
Init Dwell Phases		
Dwell Veh Phases	2, 5	
Dwell Ped Phases		
Dwell Olap		
Dwell Olap Ped		
Exit Veh Phases	2, 6	
Exit Ped Phases		
Exit Olap		
Exit Olap Ped		
Zero Phase Walk		
Zero Phase Ped Clr		
Zero Phase Green		
Zero Olap Walk		
Zero Olap Ped Clr		
Zero Olap Green		
Dwell-Phase Red		
Dwell-Phase Red Flash		
Dwell-Phase Yel Flash		
Dwell-Olap Red Flash		
Dwell-Olap Yel Flash		
Dwell-Ped Dark		
Dwell-Olap Ped Dark		

Start Green	5	Start Walk	0
		Start Ped Clr	0
Track Clear 1	0	Track Clear 2	0
TC1 Extend	0	TC1 Max	0
Exit Ped Clr	0	Exit Yellow	0.0
Exit Red	0.0		
Min Dwell	5	Min Duration	0
Dwell Extend	0		
Max Dwell	180	Max Call	0
Reserve Inh Same	0		
Reserve Inh All	0		
Delay	0		

Phases/Overlaps	1-8	9-16
TClr 1 FR Olap		
TClr 2 FR Olap		
Dwell FR Olap		
TClr 1 FYA		
TClr 2 FYA		
Dwell FYA	1	

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Preempt 3 (Configuration)

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Enabled	Yes	Dwell Mode	Normal	Output Mode	All
Output2 Mode	All	Fail Action	Preempt Off	Exit Mode	Normal
Override Flash	No	Change Phasenext	Yes		

	1-8	9-16
Enable Phases		
Preempt Inputs	3	

	1-8		
LRV Disable		Max	0
LRV Dwell Flash			
LRV Omit		Delay	0
LRV No Yel			

Preempt 3 (Timing/Phases/Overlaps)

Phases/Overlaps	1-8	9-16
Omit Olap Grn Clr		
Phs EWlk to Grn		
TClr 1 Veh Phases		
TClr 1 Ped Phases		
TClr 1 Olap		
TClr 1 Olap Ped		
TClr 2 Veh Phases		
TClr 2 Ped Phases		
TClr 2 Olap		
TClr 2 Olap Ped		
Init Dwell Phases		
Dwell Veh Phases	3	
Dwell Ped Phases		
Dwell Olap		
Dwell Olap Ped		
Exit Veh Phases	2 6	
Exit Ped Phases		
Exit Olap		
Exit Olap Ped		
Zero Phase Walk		
Zero Phase Ped Clr		
Zero Phase Green		
Zero Olap Walk		
Zero Olap Ped Clr		
Zero Olap Green		
Dwell-Phase Red		
Dwell-Phase Red Flash		
Dwell-Phase Yel Flash		
Dwell-Olap Red Flash		
Dwell-Olap Yel Flash		
Dwell-Ped Dark		
Dwell-Olap Ped Dark		

Start Green	5	Start Walk	0
		Start Ped Clr	0
Track Clear 1	0	Track Clear 2	0
TC1 Extend	0	TC1 Max	0
Exit Ped Clr	0	Exit Yellow	0.0
Exit Red	0.0		
Min Dwell	5	Min Duration	0
Dwell Extend	0		
Max Dwell	180	Max Call	0
Reserve Inh Same	0		
Reserve Inh All	0		
Delay	0		

Phases/Overlaps	1-8	9-16
TClr 1 FR Olap		
TClr 2 FR Olap		
Dwell FR Olap		
TClr 1 FYA		
TClr 2 FYA		
Dwell FYA		

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Preempt 4 (Configuration)

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Enabled	Yes	Dwell Mode	Normal	Output Mode	All
Output2 Mode	All	Fail Action	Preempt Off	Exit Mode	Normal
Override Flash	No	Change Phasenext	Yes		

	1-8	9-16
Enable Phases		
Preempt Inputs	4	

	1-8		
LRV Disable		Max	0
LRV Dwell Flash			
LRV Omit		Delay	0
LRV No Yel			

Preempt 4 (Timing/Phases/Overlaps)

Phases/Overlaps	1-8	9-16
Omit Olap Grn Clr		
Phs EWlk to Grn		
TClr 1 Veh Phases		
TClr 1 Ped Phases		
TClr 1 Olap		
TClr 1 Olap Ped		
TClr 2 Veh Phases		
TClr 2 Ped Phases		
TClr 2 Olap		
TClr 2 Olap Ped		
Init Dwell Phases		
Dwell Veh Phases	4	
Dwell Ped Phases		
Dwell Olap		
Dwell Olap Ped		
Exit Veh Phases	2 6	
Exit Ped Phases		
Exit Olap		
Exit Olap Ped		
Zero Phase Walk		
Zero Phase Ped Clr		
Zero Phase Green		
Zero Olap Walk		
Zero Olap Ped Clr		
Zero Olap Green		
Dwell-Phase Red		
Dwell-Phase Red Flash		
Dwell-Phase Yel Flash		
Dwell-Olap Red Flash		
Dwell-Olap Yel Flash		
Dwell-Ped Dark		
Dwell-Olap Ped Dark		

Start Green	5	Start Walk	0
		Start Ped Clr	0
Track Clear 1	0	Track Clear 2	0
TC1 Extend	0	TC1 Max	0
Exit Ped Clr	0	Exit Yellow	0.0
Exit Red	0.0		
Min Dwell	5	Min Duration	0
Dwell Extend	0		
Max Dwell	180	Max Call	0
Reserve Inh Same	0		
Reserve Inh All	0		
Delay	0		

Phases/Overlaps	1-8	9-16
TClr 1 FR Olap		
TClr 2 FR Olap		
Dwell FR Olap		
TClr 1 FYA		
TClr 2 FYA		
Dwell FYA		

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Preempt 5 (Configuration)

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Enabled	Yes	Dwell Mode	Normal	Output Mode	All
Output2 Mode	All	Fail Action	Preempt Off	Exit Mode	Normal
Override Flash	No	Change Phasenext	Yes		

	1-8	9-16
Enable Phases		
Preempt Inputs	5	

	1-8		
LRV Disable		Max	0
LRV Dwell Flash			
LRV Omit		Delay	0
LRV No Yel			

Preempt 5 (Timing/Phases/Overlaps)

Phases/Overlaps	1-8	9-16
Omit Olap Grn Clr		
Phs EWlk to Grn		
TClr 1 Veh Phases		
TClr 1 Ped Phases		
TClr 1 Olap		
TClr 1 Olap Ped		
TClr 2 Veh Phases		
TClr 2 Ped Phases		
TClr 2 Olap		
TClr 2 Olap Ped		
Init Dwell Phases		
Dwell Veh Phases	1 6	
Dwell Ped Phases		
Dwell Olap		
Dwell Olap Ped		
Exit Veh Phases	2 6	
Exit Ped Phases		
Exit Olap		
Exit Olap Ped		
Zero Phase Walk		
Zero Phase Ped Clr		
Zero Phase Green		
Zero Olap Walk		
Zero Olap Ped Clr		
Zero Olap Green		
Dwell-Phase Red		
Dwell-Phase Red Flash		
Dwell-Phase Yel Flash		
Dwell-Olap Red Flash		
Dwell-Olap Yel Flash		
Dwell-Ped Dark		
Dwell-Olap Ped Dark		

Start Green	5	Start Walk	0
		Start Ped Clr	0
Track Clear 1	0	Track Clear 2	0
TC1 Extend	0	TC1 Max	0
Exit Ped Clr	0	Exit Yellow	0.0
Exit Red	0.0		
Min Dwell	5	Min Duration	0
Dwell Extend	0		
Max Dwell	180	Max Call	0
Reserve Inh Same	0		
Reserve Inh All	0		
Delay	0		

Phases/Overlaps	1-8	9-16
TClr 1 FR Olap		
TClr 2 FR Olap		
Dwell FR Olap		
TClr 1 FYA		
TClr 2 FYA		
Dwell FYA	5	

15-17-29BusJames Madison&1105 Alwington

Preempt 6 (Configuration)

9/1/2023 10:30:10 AM

Enabled	No	Dwell Mode	Normal	Output Mode	All
Output2 Mode	All	Fail Action	Preempt Off	Exit Mode	Normal
Override Flash	No	Change Phasenext	Yes		

	1-8	9-16
Enable Phases		
Preempt Inputs		

	1-8		
LRV Disable		Max	0
LRV Dwell Flash			
LRV Omit		Delay	0
LRV No Yel			

Preempt 6 (Timing/Phases/Overlaps)

Phases/Overlaps	1-8	9-16
Omit Olap Grn Clr		
Phs EWlk to Grn		
TClr 1 Veh Phases		
TClr 1 Ped Phases		
TClr 1 Olap		
TClr 1 Olap Ped		
TClr 2 Veh Phases		
TClr 2 Ped Phases		
TClr 2 Olap		
TClr 2 Olap Ped		
Init Dwell Phases		
Dwell Veh Phases		
Dwell Ped Phases		
Dwell Olap		
Dwell Olap Ped		
Exit Veh Phases		
Exit Ped Phases		
Exit Olap		
Exit Olap Ped		
Zero Phase Walk		
Zero Phase Ped Clr		
Zero Phase Green		
Zero Olap Walk		
Zero Olap Ped Clr		
Zero Olap Green		
Dwell-Phase Red		
Dwell-Phase Red Flash		
Dwell-Phase Yel Flash		
Dwell-Olap Red Flash		
Dwell-Olap Yel Flash		
Dwell-Ped Dark		
Dwell-Olap Ped Dark		

Start Green	0	Start Walk	0
		Start Ped Clr	0
Track Clear 1	0	Track Clear 2	0
TC1 Extend	0	TC1 Max	0
Exit Ped Clr	0	Exit Yellow	0.0
Exit Red	0.0		
Min Dwell	0	Min Duration	0
Dwell Extend	0		
Max Dwell	0	Max Call	0
Reserve Inh Same	0		
Reserve Inh All	0		
Delay	0		

Phases/Overlaps	1-8	9-16
TClr 1 FR Olap		
TClr 2 FR Olap		
Dwell FR Olap		
TClr 1 FYA		
TClr 2 FYA		
Dwell FYA		

15-17-29BusJames Madison&1105 Alwington

Preempt 7 (Configuration)

9/1/2023 10:30:10 AM

Enabled	No	Dwell Mode	Normal	Output Mode	All
Output2 Mode	All	Fail Action	Preempt Off	Exit Mode	Normal
Override Flash	No	Change Phasenext	Yes		

	1-8	9-16
Enable Phases		
Preempt Inputs		

	1-8		
LRV Disable		Max	0
LRV Dwell Flash			
LRV Omit		Delay	0
LRV No Yel			

Preempt 7 (Timing/Phases/Overlaps)

Phases/Overlaps	1-8	9-16
Omit Olap Grn Clr		
Phs EWlk to Grn		
TClr 1 Veh Phases		
TClr 1 Ped Phases		
TClr 1 Olap		
TClr 1 Olap Ped		
TClr 2 Veh Phases		
TClr 2 Ped Phases		
TClr 2 Olap		
TClr 2 Olap Ped		
Init Dwell Phases		
Dwell Veh Phases		
Dwell Ped Phases		
Dwell Olap		
Dwell Olap Ped		
Exit Veh Phases		
Exit Ped Phases		
Exit Olap		
Exit Olap Ped		
Zero Phase Walk		
Zero Phase Ped Clr		
Zero Phase Green		
Zero Olap Walk		
Zero Olap Ped Clr		
Zero Olap Green		
Dwell-Phase Red		
Dwell-Phase Red Flash		
Dwell-Phase Yel Flash		
Dwell-Olap Red Flash		
Dwell-Olap Yel Flash		
Dwell-Ped Dark		
Dwell-Olap Ped Dark		

Start Green	0	Start Walk	0
		Start Ped Clr	0
Track Clear 1	0	Track Clear 2	0
TC1 Extend	0	TC1 Max	0
Exit Ped Clr	0	Exit Yellow	0.0
Exit Red	0.0		
Min Dwell	0	Min Duration	0
Dwell Extend	0		
Max Dwell	0	Max Call	0
Reserve Inh Same	0		
Reserve Inh All	0		
Delay	0		

Phases/Overlaps	1-8	9-16
TClr 1 FR Olap		
TClr 2 FR Olap		
Dwell FR Olap		
TClr 1 FYA		
TClr 2 FYA		
Dwell FYA		

15-17-29BusJames Madison&1105 Alwington

Preempt 8 (Configuration)

9/1/2023 10:30:10 AM

Enabled	No	Dwell Mode	Normal	Output Mode	All
Output2 Mode	All	Fail Action	Preempt Off	Exit Mode	Normal
Override Flash	No	Change Phasenext	Yes		

	1-8	9-16
Enable Phases		
Preempt Inputs		

	1-8		
LRV Disable		Max	0
LRV Dwell Flash			
LRV Omit		Delay	0
LRV No Yel			

Preempt 8 (Timing/Phases/Overlaps)

Phases/Overlaps	1-8	9-16
Omit Olap Grn Clr		
Phs EWlk to Grn		
TClr 1 Veh Phases		
TClr 1 Ped Phases		
TClr 1 Olap		
TClr 1 Olap Ped		
TClr 2 Veh Phases		
TClr 2 Ped Phases		
TClr 2 Olap		
TClr 2 Olap Ped		
Init Dwell Phases		
Dwell Veh Phases		
Dwell Ped Phases		
Dwell Olap		
Dwell Olap Ped		
Exit Veh Phases		
Exit Ped Phases		
Exit Olap		
Exit Olap Ped		
Zero Phase Walk		
Zero Phase Ped Clr		
Zero Phase Green		
Zero Olap Walk		
Zero Olap Ped Clr		
Zero Olap Green		
Dwell-Phase Red		
Dwell-Phase Red Flash		
Dwell-Phase Yel Flash		
Dwell-Olap Red Flash		
Dwell-Olap Yel Flash		
Dwell-Ped Dark		
Dwell-Olap Ped Dark		

Start Green	0	Start Walk	0
		Start Ped Clr	0
Track Clear 1	0	Track Clear 2	0
TC1 Extend	0	TC1 Max	0
Exit Ped Clr	0	Exit Yellow	0.0
Exit Red	0.0		
Min Dwell	0	Min Duration	0
Dwell Extend	0		
Max Dwell	0	Max Call	0
Reserve Inh Same	0		
Reserve Inh All	0		
Delay	0		

Phases/Overlaps	1-8	9-16
TClr 1 FR Olap		
TClr 2 FR Olap		
Dwell FR Olap		
TClr 1 FYA		
TClr 2 FYA		
Dwell FYA		

15-17-29BusJames Madison&1105 Alwington

Preempt 9 (Configuration)

9/1/2023 10:30:10 AM

Enabled	No	Dwell Mode	Normal	Output Mode	All
Output2 Mode	All	Fail Action	Preempt Off	Exit Mode	Normal
Override Flash	No	Change Phasenext	Yes		

	1-8	9-16
Enable Phases		
Preempt Inputs		

	1-8		
LRV Disable		Max	0
LRV Dwell Flash			
LRV Omit		Delay	0
LRV No Yel			

Preempt 9 (Timing/Phases/Overlaps)

Phases/Overlaps	1-8	9-16
Omit Olap Grn Clr		
Phs EWlk to Grn		
TClr 1 Veh Phases		
TClr 1 Ped Phases		
TClr 1 Olap		
TClr 1 Olap Ped		
TClr 2 Veh Phases		
TClr 2 Ped Phases		
TClr 2 Olap		
TClr 2 Olap Ped		
Init Dwell Phases		
Dwell Veh Phases		
Dwell Ped Phases		
Dwell Olap		
Dwell Olap Ped		
Exit Veh Phases		
Exit Ped Phases		
Exit Olap		
Exit Olap Ped		
Zero Phase Walk		
Zero Phase Ped Clr		
Zero Phase Green		
Zero Olap Walk		
Zero Olap Ped Clr		
Zero Olap Green		
Dwell-Phase Red		
Dwell-Phase Red Flash		
Dwell-Phase Yel Flash		
Dwell-Olap Red Flash		
Dwell-Olap Yel Flash		
Dwell-Ped Dark		
Dwell-Olap Ped Dark		

Start Green	0	Start Walk	0
		Start Ped Clr	0
Track Clear 1	0	Track Clear 2	0
TC1 Extend	0	TC1 Max	0
Exit Ped Clr	0	Exit Yellow	0.0
Exit Red	0.0		
Min Dwell	0	Min Duration	0
Dwell Extend	0		
Max Dwell	0	Max Call	0
Reserve Inh Same	0		
Reserve Inh All	0		
Delay	0		

Phases/Overlaps	1-8	9-16
TClr 1 FR Olap		
TClr 2 FR Olap		
Dwell FR Olap		
TClr 1 FYA		
TClr 2 FYA		
Dwell FYA		

15-17-29BusJames Madison&1105 Alwington

Preempt 10 (Configuration)

9/1/2023 10:30:10 AM

Enabled	No	Dwell Mode	Normal	Output Mode	All
Output2 Mode	All	Fail Action	Preempt Off	Exit Mode	Normal
Override Flash	No	Change Phasenext	Yes		

	1-8	9-16
Enable Phases		
Preempt Inputs		

	1-8		
LRV Disable		Max	0
LRV Dwell Flash			
LRV Omit		Delay	0
LRV No Yel			

Preempt 10 (Timing/Phases/Overlaps)

Phases/Overlaps	1-8	9-16
Omit Olap Grn Clr		
Phs EWlk to Grn		
TClr 1 Veh Phases		
TClr 1 Ped Phases		
TClr 1 Olap		
TClr 1 Olap Ped		
TClr 2 Veh Phases		
TClr 2 Ped Phases		
TClr 2 Olap		
TClr 2 Olap Ped		
Init Dwell Phases		
Dwell Veh Phases		
Dwell Ped Phases		
Dwell Olap		
Dwell Olap Ped		
Exit Veh Phases		
Exit Ped Phases		
Exit Olap		
Exit Olap Ped		
Zero Phase Walk		
Zero Phase Ped Clr		
Zero Phase Green		
Zero Olap Walk		
Zero Olap Ped Clr		
Zero Olap Green		
Dwell-Phase Red		
Dwell-Phase Red Flash		
Dwell-Phase Yel Flash		
Dwell-Olap Red Flash		
Dwell-Olap Yel Flash		
Dwell-Ped Dark		
Dwell-Olap Ped Dark		

Start Green	0	Start Walk	0
		Start Ped Clr	0
Track Clear 1	0	Track Clear 2	0
TC1 Extend	0	TC1 Max	0
Exit Ped Clr	0	Exit Yellow	0.0
Exit Red	0.0		
Min Dwell	0	Min Duration	0
Dwell Extend	0		
Max Dwell	0	Max Call	0
Reserve Inh Same	0		
Reserve Inh All	0		
Delay	0		

Phases/Overlaps	1-8	9-16
TClr 1 FR Olap		
TClr 2 FR Olap		
Dwell FR Olap		
TClr 1 FYA		
TClr 2 FYA		
Dwell FYA		

15-17-29BusJames Madison&1105 Alwington

Preempt 1 (Delay)

9/1/2023 10:30:10 AM

Delay Mode: Normal

Delay LRV:

TC1 End: 0

Phases/Overlaps	1-8	9-16
Delay Phases		
Delay Peds		
Delay Olaps		
Delay Olap Peds		
Guar Olaps		

Preempt 2 (Delay)

Delay Mode: Normal

Delay LRV:

TC1 End: 0

Phases/Overlaps	1-8	9-16
Delay Phases		
Delay Peds		
Delay Olaps		
Delay Olap Peds		
Guar Olaps		

Preempt 3 (Delay)

Delay Mode: Normal

Delay LRV:

TC1 End: 0

Phases/Overlaps	1-8	9-16
Delay Phases		
Delay Peds		
Delay Olaps		
Delay Olap Peds		
Guar Olaps		

15-17-29BusJames Madison&1105 Alwington

Preempt 4 (Delay)

9/1/2023 10:30:10 AM

Delay Mode: Normal

Delay LRV:

TC1 End: 0

Phases/Overlaps	1-8	9-16
Delay Phases		
Delay Peds		
Delay Olaps		
Delay Olap Peds		
Guar Olaps		

Preempt 5 (Delay)

Delay Mode: Normal

Delay LRV:

TC1 End: 0

Phases/Overlaps	1-8	9-16
Delay Phases		
Delay Peds		
Delay Olaps		
Delay Olap Peds		
Guar Olaps		

Preempt 6 (Delay)

Delay Mode: Normal

Delay LRV:

TC1 End: 0

Phases/Overlaps	1-8	9-16
Delay Phases		
Delay Peds		
Delay Olaps		
Delay Olap Peds		
Guar Olaps		

15-17-29BusJames Madison&1105 Alwington

Preempt 7 (Delay)

9/1/2023 10:30:10 AM

Delay Mode: Normal Delay LRV:

TC1 End: 0

Phases/Overlaps	1-8	9-16
Delay Phases		
Delay Peds		
Delay Olaps		
Delay Olap Peds		
Guar Olaps		

Preempt 8 (Delay)

Delay Mode: Normal Delay LRV:

TC1 End: 0

Phases/Overlaps	1-8	9-16
Delay Phases		
Delay Peds		
Delay Olaps		
Delay Olap Peds		
Guar Olaps		

Preempt 9 (Delay)

Delay Mode: Normal Delay LRV:

TC1 End: 0

Phases/Overlaps	1-8	9-16
Delay Phases		
Delay Peds		
Delay Olaps		
Delay Olap Peds		
Guar Olaps		

15-17-29BusJames Madison&1105 Alwington

Preempt 10 (Delay)

9/1/2023 10:30:10 AM

Delay Mode: Normal

Delay LRV:

TC1 End: 0

Phases/Overlaps	1-8	9-16
Delay Phases		
Delay Peds		
Delay Olaps		
Delay Olap Peds		
Guar Olaps		

15-17-29BusJames Madison&1105 Alwington

TOD Pattern Events

9/1/2023 10:30:10 AM

	Time	DOW							Holidays								Mode	Pattern	Offset
Event 1	00:00																Sched	0	0
Event 2	00:00																Sched	0	0
Event 3	00:00																Sched	0	0
Event 4	00:00																Sched	0	0
Event 5	00:00																Sched	0	0
Event 6	00:00																Sched	0	0
Event 7	00:00																Sched	0	0
Event 8	00:00																Sched	0	0
Event 9	00:00																Sched	0	0
Event 10	00:00																Sched	0	0
Event 11	00:00																Sched	0	0
Event 12	00:00																Sched	0	0
Event 13	00:00																Sched	0	0
Event 14	00:00																Sched	0	0
Event 15	00:00																Sched	0	0
Event 16	00:00																Sched	0	0
Event 17	00:00																Sched	0	0
Event 18	00:00																Sched	0	0
Event 19	00:00																Sched	0	0
Event 20	00:00																Sched	0	0
Event 21	00:00																Sched	0	0
Event 22	00:00																Sched	0	0
Event 23	00:00																Sched	0	0
Event 24	00:00																Sched	0	0
Event 25	00:00																Sched	0	0
Event 26	00:00																Sched	0	0
Event 27	00:00																Sched	0	0
Event 28	00:00																Sched	0	0
Event 29	00:00																Sched	0	0
Event 30	00:00																Sched	0	0
Event 31	00:00																Sched	0	0
Event 32	00:00																Sched	0	0

15-17-29BusJames Madison&1105 Alwington

Holidays

9/1/2023 10:30:10 AM

	Active Holidays								Month	Day	DOW							WOM
Date 1									0	0								0
Date 2									0	0								0
Date 3									0	0								0
Date 4									0	0								0
Date 5									0	0								0
Date 6									0	0								0
Date 7									0	0								0
Date 8									0	0								0
Date 9									0	0								0
Date 10									0	0								0
Date 11									0	0								0
Date 12									0	0								0
Date 13									0	0								0
Date 14									0	0								0
Date 15									0	0								0
Date 16									0	0								0
Date 17									0	0								0
Date 18									0	0								0
Date 19									0	0								0
Date 20									0	0								0
Date 21									0	0								0
Date 22									0	0								0
Date 23									0	0								0
Date 24									0	0								0
Date 25									0	0								0
Date 26									0	0								0
Date 27									0	0								0
Date 28									0	0								0
Date 29									0	0								0
Date 30									0	0								0
Date 31									0	0								0
Date 32									0	0								0

15-17-29BusJames Madison&1105 Alwington

Control / Config

9/1/2023 10:30:10 AM

Pattern Mode: Free

Manual Pattern: 0 Manual Offset: 0

Stop Time Input: Enabled

Aux Switch: None 0

DLS Mode: D4 Time Zone: Est (UTC-5) GPS Thresh: 0

Password Timeout: 5

	1-8	9-16
Maint Phs Recalls		
Maint Ped Recalls		

Serial 1 Port Configuration

Broadcast Plan/Sync: Disabled Broadcast Time: 00:00

Serial Rebroadcast: Disabled Response: None

Serial 2 Port Configuration

Broadcast Plan/Sync: Disabled Broadcast Time: 00:00

Ethernet Port Configuration

Broadcast Plan/Sync: Disabled Broadcast Time: 00:00

Serial Rebroadcast: Disabled

Peer Configuration

Peer 1: 0

Peer 2: 0

Peer 3: 0

Peer 4: 0

Peer 5: 0

Peer 6: 0

Peer 7: 0

Peer 8: 0

Programmed EPAC Data

11/23/20
2:09:23PM

Item 2.

Intersection Name: Culpeper & E.Shirley **Intersection Alias:** culesh

Access Code: 9999 Channel: 1 Address: 7 Revision: 3.33b

Access Data

Port 2 Comm :19200 Baud
Port 3 Comm :1200 Baud

Phase Data

Vehical Basic Timings

Phase	Min_Grn	Passage	Max1	Max2	Yellow	All Red
1	8	4.0	30	30	4.0	2.0
2	30	4.0	45	50	4.0	2.0
3	8	4.0	30	30	4.0	2.0
4	8	4.0	30	50	4.0	2.0
5	8	4.0	30	30	4.0	2.0
6	30	4.0	45	50	4.0	2.0

Vehical Density Timings

Added Initial	Max_Initial	Time B4 Reduction	Cars Before	Time To Reduce	Min_Gap
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	0	0	0.0
0.0	0	0	0	0	0.0
0.0	0	0	0	0	0.0

Pedestrian Timing

Phase	Walk	Ped Clear	Flashing Walk	Extended Actuated Ped Clear	Rest in Walk
1	0	0	No	0	No
2	0	0	No	0	No
3	7	12	No	0	No
4	7	12	No	0	No
5	0	0	No	0	No
6	7	12	No	0	No

General Control

Initialize	Non-Act Response	Veh Recall	Ped Recall	Recall Delay
Inactive	None	Min	None	0
Green	NonActI	Min	None	0
Inactive	None	None	None	0
Inactive	NonActII	None	None	0
Inactive	None	None	None	0
Green	NonActI	Min	None	0

Miscellaneous

Non Lock	Dual Entry	Last Car Passage	Conditional Service	No Simultaneous Gap Out
Yes	No	No	No	No
No	No	No	No	No
No	No	No	No	No
No	No	No	No	No
Yes	No	No	No	No
No	No	No	No	No

Special Sequence
Default Data

Vehical Detector Phase Assignment

Assigned Phase	Mode	Switched Phase	Extend	Delay

Default Data

Pedestrian Detector
Default Data

Special Detector Phase Assignment

Assign Phase	Mode	Switched Phase	Extend	Delay

:
Default Data

Unit Data

General Control

Startup Time: 5sec Startup State: Flash Red Revert: 4sec
Auto Ped Clear: No Stop Time Reset: No Alternate Sequence: 0
ABC connector Input Modes: 0
ABC connector Output Modes: 0
D connector Input Modes: 0
D connector Output Modes: 0

Ring	Input Respons	Output Selection
1	Ring 1	Ring 1
2	Ring 2	Ring 2
3	None	None
4	None	None

Remote Flash
Test A = Flash

Phase	Flash Entry Phase	Flash Exit Phase

Default Data - No Flash

Channel	Flash Color	Flash Alternat

Default Data - No Flash

Overlaps

Overlaps

Phase(s)	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
Trail Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trail Yellow	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Trail Red	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Plus Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minus Green	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Ring

Phase	Ring	Next Phase
1	1	2
2	1	3
3	1	4
4	1	1
5	2	6
6	2	7

Phase(s)

Concurrent Phases	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	1	2	3	4	1	1	3	3	9	10	11	12	13	14	15	16
	5	5	7	7	2	2	4	4								
	6	6	8	8	5	6	7	8								

Alternate Sequences

Alternate Sequences

No Alternate Sequences

Port 1 Data

BIU Addr	Port Status	Message 40

Default Data

Phase Pair(s)

Channel Assignment

Control	Channel	Hardware Pin Set		Control	Channel	Hardware Pin Set		Control	Channel	Hardware Pin Set	
Ph.1 Veh	1	1 - Ph.1 RYG	1	Ph.2 Veh	2	2 - Ph.2 RYG	2	Ph.3 Veh	3	3 - Ph.3 RYG	3
Ph.4 Veh	4	4 - Ph.4 RYG	4	Ph.5 Veh	5	5 - Ph.5 RYG	5	Ph.6 Veh	6	6 - Ph.6 RYG	6
Ph.7 Veh	7	7 - Ph.7 RYG	7	Ph.8 Veh	8	8 - Ph.8 RYG	8	Ph.2 Ped	9	10 - Ph.2 DPW	10
Ph.4 Ped	10	12 - Ph.4 DPW	12	Ph.6 Ped	11	14 - Ph.6 DPW	14	Ph.8 Ped	12	16 - Ph.8 DPW	16
Ph.1 OLP	13	17 - Ph.1 RYG	17	Ph.2 OLP	14	18 - Ph.2 RYG	18	Ph.3 OLP	15	19 - Ph.3 RYG	19
Ph.4 OLP	16	20 - Ph.4 RYG	20	Ph.1 Ped	17	9 - Ph.1 DPW	9	Ph.3 Ped	18	11 - Ph.3 DPW	11
Ph.5 Ped	19	13 - Ph.5 DPW	13	Ph.7 Ped	20	15 - Ph.7 DPW	15				

Coordination Data

Dial/Split Cycle

/

General Coordination Data

Operation Mode: 0=Free
Coordination Mode: 0=Permissive
Maximun Mode: 2=Max 2
Correction Mode: 0=Dwell

Offset Mode: 0=Beg Grn
Force Mode: 0=Plan
Max Dwell Time: 0
Yield Period: 0

Manual Dial: 1
Manual Split: 1
Manual Offset: 1

Split Times and Phase Mode:

Dial / Split

Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode	Ph.	Splits	Ph. Mode

Traffic Plan Data

Plan: // Offset Time: Alt. Sequence: Mode: Rg 2 Lag Time: Rg 3 Lag Time: Rg 4 Lag Time:

Local TBC Data

Start of Daylight Saving Month: 0 Week: 0 Cycle Zero Reference Hours: 0 Min: 0

End of Daylight Saving Month: 0 Week: 0

Source Day	Equate Days 1	2	3	4	5	6	7

Traffic Data

PHASE FUNCTION

Event	Day	Time :	D/S/O //	flash	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

AUX. Events

Event	Program Day	Hour	Min.	Aux Ouputs 1	2	3	Det. Diag. D1	Det. Rpt. D2	Det. Mult100 D3	Dimming	Special Function Outputs 1	2	3	4	5	6	7	8
				☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Default Data - No Special Day(s) or Week(s) Programmed

Special Functions

Function	SF1	SF2	SF3	SF4	SF5	SF6	SF7	SF8
Special Function 1	X							
Special Function 2		X						
Special Function 3			X					
Special Function 4				X				
Special Function 5					X			
Special Function 6						X		
Special Function 7							X	
Special Function 8								X

Phase Function

Phase Function Map	PF1	PF2	PF3	PF4	PF5	PF6	PF7	PF8	PF9	PF10	PF11	PF12	PF13	PF14	PF15	PF16
Phase 1 Max2	X															
Phase 2 Max2		X														
Phase 3 Max2			X													
Phase 4 Max2				X												
Phase 5 Max2					X											
Phase 6 Max2						X										
Phase 7 Max2							X									
Phase 8 Max2								X								
Phase 1 Phase Omit									X							
Phase 2 Phase Omit										X						
Phase 3 Phase Omit											X					
Phase 4 Phase Omit												X				
Phase 5 Phase Omit													X			
Phase 6 Phase Omit														X		
Phase 7 Phase Omit															X	
Phase 8 Phase Omit																X

Dimming Data

Channel	Red	Yellow	Green	Alternate
	☐	☐	☐	☐

Default Data - No Dimming Programmed

Preemption Data

General Preemption Data

Ring	Min Grn/Walk Time
1	10
2	10
3	10
4	10

Flash > Preepmt 1 | Preepmt 2 = Preempt 3 | Preepmt 4 = Preempt 5
Preepmt 1 > Preempt 2 | Preepmt 3 = Preempt 4 | Preepmt 5 = Preempt 6

Preempt Timers

Preempt	Non-Locking	Link to Preempt	Delay	Extend	Duration	MaxCall	Lock-Out	Select			Track				Dwell	Return		
								Ped Clear	Yel	Red	Grn	Ped	Yel	Red	Green	Ped Clear	Yel	Red
1	No	0	0	0	0	0	0	0	0.0	0.0	0	0	0.0	0.0	6	0	0.0	0.0
2	No	0	0	0	0	0	0	0	0.0	0.0	0	0	0.0	0.0	6	0	0.0	0.0
3	No	0	0	0	0	0	0	0	0.0	0.0	0	0	0.0	0.0	6	0	0.0	0.0
4	No	0	0	0	0	0	0	0	0.0	0.0	0	0	0.0	0.0	6	0	0.0	0.0
5	No	0	0	0	0	0	0	8	4.0	2.0	10	8	4.0	2.0	10	8	4.0	2.0
6	No	0	0	0	0	0	0	8	4.0	2.0	10	8	4.0	2.0	10	8	4.0	2.0

Preempt 1

Phase	Exit Phase	Exit Calls
1	No	Yes
2	Yes	No
6	Yes	Yes

Preempt 2

Phase	Exit Phase	Exit Calls
2	Yes	No
4	No	Yes
6	Yes	No

Preempt 3

Phase	Exit Phase	Exit Calls
2	Yes	Yes
5	No	Yes
6	Yes	No

Preempt 4

Phase	Exit Phase	Exit Calls
2	Yes	No
3	No	Yes
6	Yes	No

Preempt 5

Phase	Exit Phase	Exit Calls
1	No	Yes
2	No	Yes
3	No	Yes
4	No	Yes
5	No	Yes
6	No	Yes
7	No	Yes
8	No	Yes

Preempt 6

Phase	Exit Phase	Exit Calls
1	No	Yes
2	No	Yes
3	No	Yes
4	No	Yes
5	No	Yes
6	No	Yes
7	No	Yes
8	No	Yes

Priority Timers

Priority	Non-Locking	Delay	Extend	Duration	Dwell	Max_Call	Lock-Out	Skip Phases
1	No	0	0	0	0	0	0	0=Do not Skip Phases
2	No	0	0	0	0	0	0	0=Do not Skip Phases
3	No	0	0	0	0	0	0	0=Do not Skip Phases
4	No	0	0	0	0	0	0	0=Do not Skip Phases
5	No	0	0	0	0	0	0	0=Do not Skip Phases
6	No	0	0	0	0	0	0	0=Do not Skip Phases

Priority 1

Phase	Exit Phase	Exit Calls

Priority 2

Phase	Exit Phase	Exit Calls

Priority 3

Phase	Exit Phase	Exit Calls

Priority 4

Phase	Exit Phase	Exit Calls

Priority 5

Phase	Exit Phase	Exit Calls

Priority 6

Phase	Exit Phase	Exit Calls

Preempt 1

Vehical Phases

Ph.	Track	Dwell	Cycle
1	Red	Green	No
6	Red	Green	No

Pedestrian Phases

Ph	Track	Dwell	Cycle

Default Data

Overlaps

Ovlp	Track	Dwell	Cycle

Default Data

Preempt 2

Vehical Phases

Ph.	Track	Dwell	Cycle
4	Red	Green	No

Pedestrian Phases

Ph.	Track	Dwell	Cycle

Default Data

Overlaps

Ovlp.	Track	Dwell	Cycle

Default Data

Preempt 3

Vehical Phases

Ph.	Track	Dwell	Cycle
2	Red	Green	No
5	Red	Green	No

Pedestrian Phases

Ph.	Track	Dwell	Cycle

Default Data

Overlaps

Ovlp.	Track	Dwell	Cycle

Default Data

Preempt 4

Vehical Phases

Ph.	Track	Dwell	Cycle
3	Red	Green	No

Pedestrian Phases

Ph.	Track	Dwell	Cycle

Default Data

Overlaps

Ovlp.	Track	Dwell	Cycle

Default Data

Preempt 5

Vehical Phases

Ph.	Track	Dwell	Cycle

Default Data

Pedestrian Phases

Ph.	Track	Dwell	Cycle

Default Data

Overlaps

Ovlp.	Track	Dwell	Cycle

Default Data

Preempt 6

Vehical Phases

Ph.	Track	Dwell	Cycle

Default Data

Pedestrian Phases

Ph.	Track	Dwell	Cycle

Default Data

Overlaps

Ovlp.	Track	Dwell	Cycle

Default Data

System/Detectors Data

Local Critical Alarms

Revert to Backup: 15 1st Phone:

Local Free: No Cycle Failure: No Coord Failure: No Conflict Flash: No Remote Flash: No 2nd Phone:

Local Fash: No Cycle Fault: No Coord Fault: No Premption: No Voltage Monitor: No

Special Status 1: No Special Status 2: No Special Status 3: No Special Status 4: No Special Status 5: No Special Status 6: No

Traffic Responsive

System Detector	Detector Channel	Veh/Hr	Average Time(mins)	Occupancy Correction/10	Min Volume %	Queue 1 Detectors	System Detectors	Weight Factor	Queue 2 Detectors	System Detectors	Weight Factor

Default Data

Sample Interval:

Default Data

Queue: 1 Input Selection: 0=Average

Detector Failed Level : 0

Queue: 2 Input Selection: 0=Average

Detector Failed Level : 0

Default Data

Queue:

Level	Enter	Leave	Dial / Split / Offset
			/ /

Default Data

Vehical Detector

Diagnostic Value 0

Detector	Max Presence	No Activity	Erratic Count

Default Data - Diag 0 Values

Vehical Detector

Diagnostic Value 1

Detector	Max Presence	No Activity	Erratic Count

Default Data - No Diag 1 Values

Special Detector

Diagnostic Value 0

Detector	Max Presence	No Activity	Erratic Count

Default Data - No Diag 0 Valu

Pedestrian Detector

Diagnostic Value 0

Detector	Max Presence	No Activity	Erratic Count

Default Data - No Diag 0 Values

Pedestrian Detector

Diagnostic Value 1

Detector	Max Presence	No Activity	Erratic Count

Default Data - No Diag 1 Values

Special Detector

Diagnostic Value 1

Detector	Max Presence	No Activity	Erratic Count

Default Data - No Diag 1 Values

Speed Trap Data

Speed Trap:

Measurement:

Detector 1	Detector_2	Distance :

Default Data

Speed Trap Low Treshold	Speed Trap High Treshold

Dial/Split/Offset

//

Default Data

Volume Detector Data

Report Interval

Volume Detector Number	Controller Detector Channel

Default Data

Appendix D
Existing Analysis Worksheets

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	32	357	75	32	476	238	17	57
v/c Ratio	0.18	0.58	0.12	0.21	0.66	0.71	0.09	0.30
Control Delay	41.4	28.4	0.4	43.8	30.4	44.9	39.1	30.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.4	28.4	0.4	43.8	30.4	44.9	39.1	30.8
Queue Length 50th (ft)	17	167	0	17	246	117	9	19
Queue Length 95th (ft)	46	264	0	47	#435	#226	29	56
Internal Link Dist (ft)		1033			3084	958		736
Turn Bay Length (ft)	215			185			125	
Base Capacity (vph)	392	818	792	151	718	383	381	381
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.08	0.44	0.09	0.21	0.66	0.62	0.04	0.15

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	314	66	28	397	22	78	81	50	15	31	19
Future Volume (vph)	28	314	66	28	397	22	78	81	50	15	31	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Grade (%)		-2%			-5%			0%			4%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99			0.97		1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (prot)	1762	1702	1488	1611	1663			1678		1710	1634	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (perm)	1762	1702	1488	1611	1663			1678		1710	1634	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	32	357	75	32	451	25	89	92	57	17	35	22
RTOR Reduction (vph)	0	0	46	0	1	0	0	10	0	0	20	0
Lane Group Flow (vph)	32	357	29	32	475	0	0	228	0	17	37	0
Heavy Vehicles (%)	0%	9%	6%	11%	13%	0%	6%	2%	4%	0%	3%	5%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2									
Actuated Green, G (s)	5.1	34.4	34.4	8.1	37.4			16.9		7.1	7.1	
Effective Green, g (s)	5.1	34.4	34.4	8.1	37.4			16.9		7.1	7.1	
Actuated g/C Ratio	0.06	0.38	0.38	0.09	0.41			0.19		0.08	0.08	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0			4.0		4.0	4.0	
Lane Grp Cap (vph)	99	646	565	144	687			313		134	128	
v/s Ratio Prot	0.02	0.21		c0.02	c0.29			c0.14		0.01	c0.02	
v/s Ratio Perm			0.02									
v/c Ratio	0.32	0.55	0.05	0.22	0.69			0.73		0.13	0.29	
Uniform Delay, d1	41.0	22.0	17.7	38.3	21.8			34.6		38.8	39.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	2.6	1.3	0.1	1.1	3.2			8.8		0.6	1.7	
Delay (s)	43.6	23.3	17.8	39.3	25.0			43.4		39.4	41.0	
Level of Service	D	C	B	D	C			D		D	D	
Approach Delay (s)		23.8			25.9			43.4			40.6	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	29.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	90.5	Sum of lost time (s)	24.0
Intersection Capacity Utilization	53.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	288	37	48	432	0	0
Future Volume (Veh/h)	288	37	48	432	0	0
Sign Control	Free			Free	Stop	
Grade	-4%			2%	0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	316	41	53	475	0	0
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			357		897	316
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			357		897	316
tC, single (s)			4.2		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			95		100	100
cM capacity (veh/h)			1143		298	729

Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	316	41	53	475
Volume Left	0	0	53	0
Volume Right	0	41	0	0
cSH	1700	1700	1143	1700
Volume to Capacity	0.19	0.02	0.05	0.28
Queue Length 95th (ft)	0	0	4	0
Control Delay (s)	0.0	0.0	8.3	0.0
Lane LOS			A	
Approach Delay (s)	0.0		0.8	
Approach LOS				

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	33.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	288	0	0	439	41	51
Future Volume (Veh/h)	288	0	0	439	41	51
Sign Control	Free			Free	Stop	
Grade	1%			0%	-2%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	324	0	0	493	46	57
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		817	324
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			324		817	324
tC, single (s)			4.1		6.6	6.4
tC, 2 stage (s)						
tF (s)			2.2		3.7	3.4
p0 queue free %			100		86	92
cM capacity (veh/h)			1247		327	686

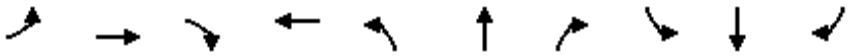
Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	324	493	46	57
Volume Left	0	0	46	0
Volume Right	0	0	0	57
cSH	1700	1700	327	686
Volume to Capacity	0.19	0.29	0.14	0.08
Queue Length 95th (ft)	0	0	12	7
Control Delay (s)	0.0	0.0	17.8	10.7
Lane LOS			C	B
Approach Delay (s)	0.0	0.0	13.9	
Approach LOS			B	

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	33.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	322	17	24	439	0	0
Future Volume (Veh/h)	322	17	24	439	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	-3%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	339	18	25	462	0	0
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			357		851	339
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			357		851	339
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		100	100
cM capacity (veh/h)			1213		327	708

Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	339	18	25	462
Volume Left	0	0	25	0
Volume Right	0	18	0	0
cSH	1700	1700	1213	1700
Volume to Capacity	0.20	0.01	0.02	0.27
Queue Length 95th (ft)	0	0	2	0
Control Delay (s)	0.0	0.0	8.0	0.0
Lane LOS			A	
Approach Delay (s)	0.0		0.4	
Approach LOS				

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	26.4%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	62	62	76	7	199	460	10	10	181	162
v/c Ratio	0.37	0.37	0.06	0.02	0.45	0.33	0.01	0.03	0.35	0.28
Control Delay	36.0	36.0	0.1	0.2	17.2	17.5	0.0	12.3	29.9	2.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.0	36.0	0.1	0.2	17.2	17.5	0.0	12.3	29.9	2.6
Queue Length 50th (ft)	27	27	0	0	53	65	0	2	37	0
Queue Length 95th (ft)	63	63	0	0	99	143	0	11	71	15
Internal Link Dist (ft)		1992		455		682			791	
Turn Bay Length (ft)	560				315		160	165		250
Base Capacity (vph)	251	251	1291	336	546	1429	837	393	876	667
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.25	0.06	0.02	0.36	0.32	0.01	0.03	0.21	0.24

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	107	0	65	2	0	4	171	396	9	2	7	156
Future Volume (vph)	107	0	65	2	0	4	171	396	9	2	7	156
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		5%			1%			-4%				4%
Total Lost time (s)	6.3	6.3	4.0		8.8		8.7	8.7	8.7		8.7	8.7
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	0.95	1.00		1.00	0.95
Frt	1.00	1.00	0.85		0.90		1.00	1.00	0.85		1.00	1.00
Flt Protected	0.95	0.95	1.00		0.99		0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1316	1316	1291		1003		1674	3409	1647		1436	3103
Flt Permitted	0.95	0.95	1.00		0.99		0.64	1.00	1.00		0.49	1.00
Satd. Flow (perm)	1316	1316	1291		1003		1123	3409	1647		736	3103
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	124	0	76	2	0	5	199	460	10	2	8	181
RTOR Reduction (vph)	0	0	0	0	6	0	0	0	6	0	0	0
Lane Group Flow (vph)	62	62	76	0	1	0	199	460	4	0	10	181
Heavy Vehicles (%)	27%	0%	22%	50%	0%	75%	10%	8%	0%	0%	29%	14%
Turn Type	Split	NA	Free	Split	NA		D.P+P	NA	Perm	D.P+P	D.P+P	NA
Protected Phases	4	4		3	3		5	2		1	1	6
Permitted Phases			Free				6		2	2	2	
Actuated Green, G (s)	9.3	9.3	79.2		7.0		30.4	29.2	29.2		30.4	19.4
Effective Green, g (s)	9.3	9.3	79.2		7.0		30.4	29.2	29.2		30.4	19.4
Actuated g/C Ratio	0.12	0.12	1.00		0.09		0.38	0.37	0.37		0.38	0.24
Clearance Time (s)	6.3	6.3			8.8		8.7	8.7	8.7		8.7	8.7
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	154	154	1291		88		507	1256	607		293	760
v/s Ratio Prot	c0.05	0.05			0.00		c0.05	c0.13			0.00	0.06
v/s Ratio Perm			c0.06				0.10		0.00		0.01	
v/c Ratio	0.40	0.40	0.06		0.01		0.39	0.37	0.01		0.03	0.24
Uniform Delay, d1	32.4	32.4	0.0		32.9		17.1	18.2	15.8		15.1	24.0
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.7	1.7	0.1		0.0		0.5	0.2	0.0		0.0	0.2
Delay (s)	34.1	34.1	0.1		33.0		17.6	18.4	15.8		15.2	24.1
Level of Service	C	C	A		C		B	B	B		B	C
Approach Delay (s)		21.2			33.0			18.1				20.6
Approach LOS		C			C			B				C

Intersection Summary			
HCM 2000 Control Delay	19.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	79.2	Sum of lost time (s)	32.5
Intersection Capacity Utilization	47.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	139
Future Volume (vph)	139
Ideal Flow (vphpl)	1900
Grade (%)	
Total Lost time (s)	6.3
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1426
Flt Permitted	1.00
Satd. Flow (perm)	1426
Peak-hour factor, PHF	0.86
Adj. Flow (vph)	162
RTOR Reduction (vph)	103
Lane Group Flow (vph)	59
Heavy Vehicles (%)	11%
Turn Type	pm+ov
Protected Phases	4
Permitted Phases	6
Actuated Green, G (s)	28.7
Effective Green, g (s)	28.7
Actuated g/C Ratio	0.36
Clearance Time (s)	6.3
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	516
v/s Ratio Prot	0.01
v/s Ratio Perm	0.03
v/c Ratio	0.11
Uniform Delay, d1	16.8
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	16.9
Level of Service	B
Approach Delay (s)	
Approach LOS	

Intersection Summary

Intersection	
Intersection Delay, s/veh	7.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	5	0	45	20	88	0	0	34	13	0	0
Future Vol, veh/h	0	5	0	45	20	88	0	0	34	13	0	0
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	0	0	0	24	0	7	0	0	65	8	0	0
Mvmt Flow	0	6	0	50	22	98	0	0	38	14	0	0
Number of Lanes	0	1	0	0	1	1	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	1
HCM Control Delay	7.3	7.8	6.9	7.8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	0%	69%	0%	100%
Vol Thru, %	0%	100%	31%	0%	0%
Vol Right, %	100%	0%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	34	5	65	88	13
LT Vol	0	0	45	0	13
Through Vol	0	5	20	0	0
RT Vol	34	0	0	88	0
Lane Flow Rate	38	6	72	98	14
Geometry Grp	2	5	7	7	2
Degree of Util (X)	0.039	0.007	0.107	0.106	0.019
Departure Headway (Hd)	3.718	4.215	5.35	3.895	4.675
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	969	840	671	920	770
Service Time	1.719	2.285	3.073	1.617	2.676
HCM Lane V/C Ratio	0.039	0.007	0.107	0.107	0.018
HCM Control Delay	6.9	7.3	8.7	7.1	7.8
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0.1	0	0.4	0.4	0.1

Intersection: 1: Culpeper Street & W Shirley Avenue/E Shirley Avenue

Movement	EB	EB	EB	WB	WB	NB	SB	SB
Directions Served	L	T	R	L	TR	LTR	L	TR
Maximum Queue (ft)	119	270	65	132	354	231	66	109
Average Queue (ft)	28	122	23	28	152	108	13	35
95th Queue (ft)	74	216	53	82	296	192	40	80
Link Distance (ft)		1077	1077		3093	989		776
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	215			185			125	
Storage Blk Time (%)	0	1		0	6			0
Queuing Penalty (veh)	0	0		0	2			0

Intersection: 2: Site Entrance #1 & E Shirley Avenue

Movement	EB	EB	WB
Directions Served	T	R	L
Maximum Queue (ft)	2	6	58
Average Queue (ft)	0	0	11
95th Queue (ft)	2	4	40
Link Distance (ft)	3093		
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		110	240
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Site Entrance #2 & E Shirley Avenue

Movement	EB	NB	NB
Directions Served	T	L	R
Maximum Queue (ft)	4	79	82
Average Queue (ft)	0	30	33
95th Queue (ft)	3	66	66
Link Distance (ft)	505	382	382
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: Site Entrance #3 & E Shirley Avenue

Movement	EB	WB
Directions Served	R	L
Maximum Queue (ft)	2	31
Average Queue (ft)	0	7
95th Queue (ft)	2	28
Link Distance (ft)		
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	140	160
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: E Shirley Avenue & Falmouth Street

Movement	EB	WB	SB
Directions Served	ULT	TR	L>
Maximum Queue (ft)	127	143	86
Average Queue (ft)	24	25	25
95th Queue (ft)	85	91	68
Link Distance (ft)	393	351	742
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: James Madison Highway/E Shirley Avenue & Alwington Boulevard

Movement	EB	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	R	LTR	L	T	T	R	UL	T	T	R
Maximum Queue (ft)	123	90	6	53	171	210	176	22	39	113	103	104
Average Queue (ft)	47	17	0	6	72	96	30	3	6	51	40	45
95th Queue (ft)	99	62	5	31	133	170	103	13	26	93	85	82
Link Distance (ft)		1974	1974	480		730	730			787	787	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	560				315			160	165			250
Storage Blk Time (%)							0			0		
Queuing Penalty (veh)							0			0		

Intersection: 7: Commercial Entrance /Elementary School Entrance & Alwington Boulevard

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	LT	R	LTR	LTR
Maximum Queue (ft)	8	75	63	87	42
Average Queue (ft)	1	36	33	32	9
95th Queue (ft)	6	66	55	76	32
Link Distance (ft)	954	1974		170	605
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			270		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 2

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	40	525	99	40	523	199	27	88
v/c Ratio	0.28	0.76	0.15	0.26	0.64	0.68	0.15	0.41
Control Delay	49.7	34.7	1.5	48.9	28.0	48.5	41.9	38.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.7	34.7	1.5	48.9	28.0	48.5	41.9	38.5
Queue Length 50th (ft)	24	281	0	24	280	110	15	38
Queue Length 95th (ft)	62	#453	11	61	#452	201	43	89
Internal Link Dist (ft)		1033			3084	958		736
Turn Bay Length (ft)	215			185			125	
Base Capacity (vph)	143	798	753	152	831	361	339	373
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.66	0.13	0.26	0.63	0.55	0.08	0.24

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	478	90	36	463	13	76	75	30	25	52	28
Future Volume (vph)	36	478	90	36	463	13	76	75	30	25	52	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Grade (%)		-2%			-5%			0%			4%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			0.98		1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (prot)	1588	1767	1488	1687	1755			1656		1583	1662	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (perm)	1588	1767	1488	1687	1755			1656		1583	1662	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	40	525	99	40	509	14	84	82	33	27	57	31
RTOR Reduction (vph)	0	0	59	0	1	0	0	7	0	0	20	0
Lane Group Flow (vph)	40	525	40	40	522	0	0	192	0	27	68	0
Heavy Vehicles (%)	11%	5%	6%	6%	7%	0%	8%	4%	7%	8%	4%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2									
Actuated Green, G (s)	4.3	38.6	38.6	8.2	42.5			15.8		8.5	8.5	
Effective Green, g (s)	4.3	38.6	38.6	8.2	42.5			15.8		8.5	8.5	
Actuated g/C Ratio	0.05	0.41	0.41	0.09	0.45			0.17		0.09	0.09	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0			4.0		4.0	4.0	
Lane Grp Cap (vph)	71	717	603	145	784			275		141	148	
v/s Ratio Prot	c0.03	c0.30		0.02	c0.30			c0.12		0.02	c0.04	
v/s Ratio Perm			0.03									
v/c Ratio	0.56	0.73	0.07	0.28	0.67			0.70		0.19	0.46	
Uniform Delay, d1	44.5	23.9	17.3	40.7	20.7			37.4		40.1	41.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	11.8	4.1	0.1	1.4	2.4			8.1		0.9	3.1	
Delay (s)	56.3	28.0	17.3	42.1	23.1			45.5		41.0	44.2	
Level of Service	E	C	B	D	C			D		D	D	
Approach Delay (s)		28.1			24.4			45.5			43.4	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	30.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	95.1	Sum of lost time (s)	24.0
Intersection Capacity Utilization	56.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	470	20	9	459	0	0
Future Volume (Veh/h)	470	20	9	459	0	0
Sign Control	Free			Free	Stop	
Grade	-4%			2%	0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	505	22	10	494	0	0
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			527		1019	505
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			527		1019	505
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		100	100
cM capacity (veh/h)			1050		262	571

Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	505	22	10	494
Volume Left	0	0	10	0
Volume Right	0	22	0	0
cSH	1700	1700	1050	1700
Volume to Capacity	0.30	0.01	0.01	0.29
Queue Length 95th (ft)	0	0	1	0
Control Delay (s)	0.0	0.0	8.5	0.0
Lane LOS			A	
Approach Delay (s)	0.0		0.2	
Approach LOS				

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	34.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	470	0	0	430	38	53
Future Volume (Veh/h)	470	0	0	430	38	53
Sign Control	Free			Free	Stop	
Grade	1%			0%	-2%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	547	0	0	500	44	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			547		1047	547
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			547		1047	547
tC, single (s)			4.1		6.5	6.4
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.5
p0 queue free %			100		82	88
cM capacity (veh/h)			1033		241	509

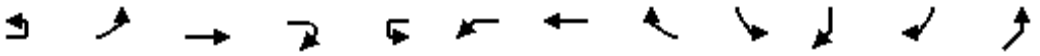
Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	547	500	44	62
Volume Left	0	0	44	0
Volume Right	0	0	0	62
cSH	1700	1700	241	509
Volume to Capacity	0.32	0.29	0.18	0.12
Queue Length 95th (ft)	0	0	16	10
Control Delay (s)	0.0	0.0	23.2	13.0
Lane LOS			C	B
Approach Delay (s)	0.0	0.0	17.3	
Approach LOS			C	

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	34.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	507	16	15	430	0	0
Future Volume (Veh/h)	507	16	15	430	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	-3%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	563	18	17	478	0	0
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			581		1075	563
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			581		1075	563
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		100	100
cM capacity (veh/h)			1003		242	530

Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	563	18	17	478
Volume Left	0	0	17	0
Volume Right	0	18	0	0
cSH	1700	1700	1003	1700
Volume to Capacity	0.33	0.01	0.02	0.28
Queue Length 95th (ft)	0	0	1	0
Control Delay (s)	0.0	0.0	8.7	0.0
Lane LOS			A	
Approach Delay (s)	0.0		0.3	
Approach LOS				

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	30.0%	ICU Level of Service	A
Analysis Period (min)	15		

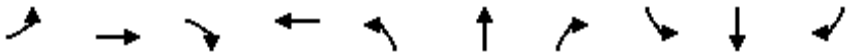


Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	SBL	SBR	SBR2	NEL
Right Turn Channelized												
Traffic Volume (veh/h)	2	26	500	0	2	0	405	126	119	0	23	0
Future Volume (veh/h)	2	26	500	0	2	0	405	126	119	0	23	0
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.92
Hourly flow rate (vph)	2	26	505	0	2	0	409	127	120	0	23	0
Approach Volume (veh/h)			533				538		143			0
Crossing Volume (veh/h)			122				28		413			655
High Capacity (veh/h)			1259				1355		1000			824
High v/c (veh/h)			0.42				0.40		0.14			0.00
Low Capacity (veh/h)			1047				1134		814			658
Low v/c (veh/h)			0.51				0.47		0.18			0.00

Intersection Summary				
Maximum v/c High	0.42			
Maximum v/c Low	0.51			
Intersection Capacity Utilization	47.1%	ICU Level of Service	A	

Movement	NER
Right Turn Channelized	
Traffic Volume (veh/h)	0
Future Volume (veh/h)	0
Peak Hour Factor	0.92
Hourly flow rate (vph)	0
Approach Volume (veh/h)	
Crossing Volume (veh/h)	
High Capacity (veh/h)	
High v/c (veh/h)	
Low Capacity (veh/h)	
Low v/c (veh/h)	

Intersection Summary



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	134	136	180	20	165	232	11	18	337	135
v/c Ratio	0.53	0.54	0.12	0.14	0.40	0.17	0.02	0.04	0.55	0.20
Control Delay	38.5	38.6	0.2	26.9	17.7	17.3	0.1	13.6	32.5	1.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.5	38.6	0.2	26.9	17.7	17.3	0.1	13.6	32.5	1.3
Queue Length 50th (ft)	60	61	0	4	46	33	0	5	75	0
Queue Length 95th (ft)	128	130	0	26	95	83	0	17	129	9
Internal Link Dist (ft)		1992		455		682			791	
Turn Bay Length (ft)	560				315		160	165		250
Base Capacity (vph)	369	370	1485	156	472	1378	632	512	889	763
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.37	0.12	0.13	0.35	0.17	0.02	0.04	0.38	0.18

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	260	2	175	3	6	11	160	225	11	11	7	327
Future Volume (vph)	260	2	175	3	6	11	160	225	11	11	7	327
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		5%			1%			-4%				4%
Total Lost time (s)	6.3	6.3	4.0		8.8		8.7	8.7	8.7		8.7	8.7
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	0.95	1.00		1.00	0.95
Frt	1.00	1.00	0.85		0.93		1.00	1.00	0.85		1.00	1.00
Flt Protected	0.95	0.95	1.00		0.99		0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1655	1661	1485		1339		1737	3474	1211		1678	3276
Flt Permitted	0.95	0.95	1.00		0.99		0.55	1.00	1.00		0.61	1.00
Satd. Flow (perm)	1655	1661	1485		1339		1003	3474	1211		1072	3276
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	268	2	180	3	6	11	165	232	11	11	7	337
RTOR Reduction (vph)	0	0	0	0	10	0	0	0	7	0	0	0
Lane Group Flow (vph)	134	136	180	0	10	0	165	232	4	0	18	337
Heavy Vehicles (%)	1%	0%	6%	33%	33%	27%	6%	6%	36%	0%	14%	8%
Turn Type	Split	NA	Free	Split	NA		D.P+P	NA	Perm	D.P+P	D.P+P	NA
Protected Phases	4	4		3	3		5	2		1	1	6
Permitted Phases			Free				6		2	2	2	
Actuated Green, G (s)	11.6	11.6	82.6		7.3		31.2	30.0	30.0		31.2	21.4
Effective Green, g (s)	11.6	11.6	82.6		7.3		31.2	30.0	30.0		31.2	21.4
Actuated g/C Ratio	0.14	0.14	1.00		0.09		0.38	0.36	0.36		0.38	0.26
Clearance Time (s)	6.3	6.3			8.8		8.7	8.7	8.7		8.7	8.7
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	232	233	1485		118		465	1261	439		413	848
v/s Ratio Prot	0.08	c0.08			0.01		c0.04	c0.07			0.00	c0.10
v/s Ratio Perm			c0.12				0.09		0.00		0.02	
v/c Ratio	0.58	0.58	0.12		0.08		0.35	0.18	0.01		0.04	0.40
Uniform Delay, d1	33.2	33.2	0.0		34.6		17.7	17.9	16.8		16.2	25.3
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	3.5	3.7	0.2		0.3		0.5	0.1	0.0		0.0	0.3
Delay (s)	36.7	36.9	0.2		34.9		18.1	18.0	16.8		16.2	25.6
Level of Service	D	D	A		C		B	B	B		B	C
Approach Delay (s)		22.1			34.9			18.0				22.5
Approach LOS		C			C			B				C

Intersection Summary			
HCM 2000 Control Delay	21.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	82.6	Sum of lost time (s)	32.5
Intersection Capacity Utilization	52.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	131
Future Volume (vph)	131
Ideal Flow (vphpl)	1900
Grade (%)	
Total Lost time (s)	6.3
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1507
Flt Permitted	1.00
Satd. Flow (perm)	1507
Peak-hour factor, PHF	0.97
Adj. Flow (vph)	135
RTOR Reduction (vph)	81
Lane Group Flow (vph)	54
Heavy Vehicles (%)	5%
Turn Type	pm+ov
Protected Phases	4
Permitted Phases	6
Actuated Green, G (s)	33.0
Effective Green, g (s)	33.0
Actuated g/C Ratio	0.40
Clearance Time (s)	6.3
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	602
v/s Ratio Prot	0.01
v/s Ratio Perm	0.02
v/c Ratio	0.09
Uniform Delay, d1	15.4
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	15.5
Level of Service	B
Approach Delay (s)	
Approach LOS	

Intersection Summary

Intersection	
Intersection Delay, s/veh	7.3
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	8	0	11	4	47	0	0	12	5	0	0
Future Vol, veh/h	0	8	0	11	4	47	0	0	12	5	0	0
Peak Hour Factor	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
Heavy Vehicles, %	0	13	0	55	2	2	0	0	33	0	0	0
Mvmt Flow	0	11	0	16	6	67	0	0	17	7	0	0
Number of Lanes	0	1	0	0	1	1	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	1
HCM Control Delay	7.4	7.4	6.6	7.4
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	0%	73%	0%	100%
Vol Thru, %	0%	100%	27%	0%	0%
Vol Right, %	100%	0%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	12	8	15	47	5
LT Vol	0	0	11	0	5
Through Vol	0	8	4	0	0
RT Vol	12	0	0	47	0
Lane Flow Rate	17	11	21	67	7
Geometry Grp	2	5	7	7	2
Degree of Util (X)	0.017	0.014	0.035	0.072	0.008
Departure Headway (Hd)	3.474	4.327	5.849	3.881	4.283
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	1019	826	615	926	829
Service Time	1.534	2.357	3.559	1.591	2.344
HCM Lane V/C Ratio	0.017	0.013	0.034	0.072	0.008
HCM Control Delay	6.6	7.4	8.8	6.9	7.4
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0.1	0	0.1	0.2	0

Intersection: 1: Culpeper Street & W Shirley Avenue/E Shirley Avenue

Movement	EB	EB	EB	WB	WB	NB	SB	SB
Directions Served	L	T	R	L	TR	LTR	L	TR
Maximum Queue (ft)	169	374	74	184	349	224	72	123
Average Queue (ft)	39	199	28	39	178	103	20	48
95th Queue (ft)	109	335	56	120	325	185	55	97
Link Distance (ft)		1077	1077		3093	989		776
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	215			185			125	
Storage Blk Time (%)	0	6		0	8		0	0
Queuing Penalty (veh)	0	2		0	3		0	0

Intersection: 2: Site Entrance #1 & E Shirley Avenue

Movement	WB
Directions Served	L
Maximum Queue (ft)	31
Average Queue (ft)	4
95th Queue (ft)	20
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	240
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Site Entrance #2 & E Shirley Avenue

Movement	EB	NB	NB
Directions Served	T	L	R
Maximum Queue (ft)	2	78	90
Average Queue (ft)	0	29	37
95th Queue (ft)	2	65	73
Link Distance (ft)	505	382	382
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: Site Entrance #3 & E Shirley Avenue

Movement	WB
Directions Served	L
Maximum Queue (ft)	35
Average Queue (ft)	5
95th Queue (ft)	23
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	160
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 5: E Shirley Avenue & Falmouth Street

Movement	EB	WB	SB
Directions Served	ULT	UTR	L>
Maximum Queue (ft)	226	125	76
Average Queue (ft)	78	18	29
95th Queue (ft)	190	74	65
Link Distance (ft)	393	351	742
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: James Madison Highway/E Shirley Avenue & Alwington Boulevard

Movement	EB	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	R	LTR	L	T	T	R	UL	T	T	R
Maximum Queue (ft)	147	109	57	64	146	133	82	39	41	142	154	85
Average Queue (ft)	85	42	4	15	69	64	14	5	9	79	83	38
95th Queue (ft)	134	93	27	47	119	118	48	23	30	128	138	70
Link Distance (ft)		1974	1974	480		730	730			787	787	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	560				315			160	165			250
Storage Blk Time (%)										0		
Queuing Penalty (veh)										0		

Intersection: 7: Commercial Entrance /Elementary School Entrance & Alwington Boulevard

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	LT	R	LTR	LTR
Maximum Queue (ft)	24	64	49	68	29
Average Queue (ft)	2	14	24	13	4
95th Queue (ft)	10	47	45	46	21
Link Distance (ft)	954	1974		170	605
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			270		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 6

Intersection	
Intersection Delay, s/veh	7.3
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	16	0	14	4	17	0	0	27	20	0	0
Future Vol, veh/h	0	16	0	14	4	17	0	0	27	20	0	0
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Heavy Vehicles, %	0	0	0	57	0	18	0	0	7	0	0	0
Mvmt Flow	0	19	0	17	5	20	0	0	32	24	0	0
Number of Lanes	0	1	0	0	1	1	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	1
HCM Control Delay	7.3	7.8	6.6	7.4
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	0%	78%	0%	100%
Vol Thru, %	0%	100%	22%	0%	0%
Vol Right, %	100%	0%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	27	16	18	17	20
LT Vol	0	0	14	0	20
Through Vol	0	16	4	0	0
RT Vol	27	0	0	17	0
Lane Flow Rate	32	19	21	20	24
Geometry Grp	2	5	7	7	2
Degree of Util (X)	0.031	0.022	0.036	0.022	0.028
Departure Headway (Hd)	3.421	4.129	5.967	3.907	4.228
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	1036	865	601	917	841
Service Time	1.476	2.164	3.688	1.628	2.28
HCM Lane V/C Ratio	0.031	0.022	0.035	0.022	0.029
HCM Control Delay	6.6	7.3	8.9	6.7	7.4
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0.1	0.1	0.1	0.1	0.1

Intersection: 1: Culpeper Street & W Shirley Avenue/E Shirley Avenue

Movement	EB	EB	EB	WB	WB	NB	SB	SB
Directions Served	L	T	R	L	TR	LTR	L	TR
Maximum Queue (ft)	214	379	71	162	382	187	97	165
Average Queue (ft)	44	211	33	34	189	86	24	76
95th Queue (ft)	131	344	58	104	333	156	68	138
Link Distance (ft)		1077	1077		3093	989		776
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	215			185			125	
Storage Blk Time (%)	0	9		0	10		0	2
Queuing Penalty (veh)	0	3		0	3		0	1

Intersection: 2: Site Entrance #1 & E Shirley Avenue

Movement	EB	WB
Directions Served	R	L
Maximum Queue (ft)	2	26
Average Queue (ft)	0	3
95th Queue (ft)	2	16
Link Distance (ft)		
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	110	240
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Site Entrance #2 & E Shirley Avenue

Movement	NB	NB
Directions Served	L	R
Maximum Queue (ft)	35	30
Average Queue (ft)	13	3
95th Queue (ft)	39	17
Link Distance (ft)	382	382
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Site Entrance #3 & E Shirley Avenue

Movement	WB
Directions Served	L
Maximum Queue (ft)	42
Average Queue (ft)	6
95th Queue (ft)	26
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	160
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 5: E Shirley Avenue & Falmouth Street

Movement	EB	WB	SB
Directions Served	ULT	TR	L>
Maximum Queue (ft)	162	133	66
Average Queue (ft)	47	15	24
95th Queue (ft)	125	72	57
Link Distance (ft)	393	351	742
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: James Madison Highway/E Shirley Avenue & Alwington Boulevard

Movement	EB	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	R	LTR	L	T	T	R	UL	T	T	R
Maximum Queue (ft)	152	107	52	57	163	150	96	18	66	164	159	77
Average Queue (ft)	81	40	4	12	77	66	15	1	10	87	90	30
95th Queue (ft)	135	93	28	38	135	123	53	12	41	138	141	64
Link Distance (ft)		1974	1974	480		730	730			787	787	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	560				315			160	165			250
Storage Blk Time (%)							0			0		
Queuing Penalty (veh)							0			0		

Intersection: 7: Commercial Entrance /Elementary School Entrance & Alwington Boulevard

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	LT	R	LTR	LTR
Maximum Queue (ft)	10	72	59	60	31
Average Queue (ft)	3	18	16	19	15
95th Queue (ft)	10	55	47	47	38
Link Distance (ft)	954	1974		170	605
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			270		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 8

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	39	477	151	33	477	184	36	143
v/c Ratio	0.23	0.80	0.25	0.20	0.66	0.64	0.15	0.55
Control Delay	44.0	41.4	5.7	43.9	32.6	45.9	36.5	43.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.0	41.4	5.7	43.9	32.6	45.9	36.5	43.4
Queue Length 50th (ft)	21	249	0	18	249	95	18	73
Queue Length 95th (ft)	57	#488	45	50	#489	179	49	140
Internal Link Dist (ft)		1033			3084	958		736
Turn Bay Length (ft)	215			185			125	
Base Capacity (vph)	348	597	608	342	724	364	356	366
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.11	0.80	0.25	0.10	0.66	0.51	0.10	0.39

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	448	142	31	445	4	82	63	28	34	109	25
Future Volume (vph)	37	448	142	31	445	4	82	63	28	34	109	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Grade (%)		-2%			-5%			0%			4%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			0.98		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (prot)	1762	1801	1531	1736	1826			1715		1710	1721	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (perm)	1762	1801	1531	1736	1826			1715		1710	1721	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	39	477	151	33	473	4	87	67	30	36	116	27
RTOR Reduction (vph)	0	0	98	0	0	0	0	7	0	0	8	0
Lane Group Flow (vph)	39	477	53	33	477	0	0	177	0	36	135	0
Heavy Vehicles (%)	0%	3%	3%	3%	3%	0%	2%	2%	4%	0%	2%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2									
Actuated Green, G (s)	5.5	33.1	33.1	8.8	36.4			15.0		13.4	13.4	
Effective Green, g (s)	5.5	33.1	33.1	8.8	36.4			15.0		13.4	13.4	
Actuated g/C Ratio	0.06	0.35	0.35	0.09	0.39			0.16		0.14	0.14	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0			4.0		4.0	4.0	
Lane Grp Cap (vph)	102	632	537	162	704			272		242	244	
v/s Ratio Prot	c0.02	c0.26		0.02	c0.26			c0.10		0.02	c0.08	
v/s Ratio Perm			0.03									
v/c Ratio	0.38	0.75	0.10	0.20	0.68			0.65		0.15	0.55	
Uniform Delay, d1	42.8	27.0	20.6	39.5	24.1			37.2		35.5	37.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	3.2	5.4	0.1	0.9	2.8			6.1		0.4	3.3	
Delay (s)	46.0	32.4	20.7	40.4	26.9			43.3		35.8	41.0	
Level of Service	D	C	C	D	C			D		D	D	
Approach Delay (s)		30.6			27.8			43.3			40.0	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	32.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	94.3	Sum of lost time (s)	24.0
Intersection Capacity Utilization	62.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	479	4	6	449	0	0
Future Volume (Veh/h)	479	4	6	449	0	0
Sign Control	Free			Free	Stop	
Grade	-4%			2%	0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	544	5	7	510	0	0
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			549		1068	544
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			549		1068	544
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		100	100
cM capacity (veh/h)			1031		246	543

Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	544	5	7	510
Volume Left	0	0	7	0
Volume Right	0	5	0	0
cSH	1700	1700	1031	1700
Volume to Capacity	0.32	0.00	0.01	0.30
Queue Length 95th (ft)	0	0	1	0
Control Delay (s)	0.0	0.0	8.5	0.0
Lane LOS			A	
Approach Delay (s)	0.0		0.1	
Approach LOS				

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	35.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	479	0	0	440	15	3
Future Volume (Veh/h)	479	0	0	440	15	3
Sign Control	Free			Free	Stop	
Grade	1%			0%	-2%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	532	0	0	489	17	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			532		1021	532
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			532		1021	532
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		94	99
cM capacity (veh/h)			1046		264	552

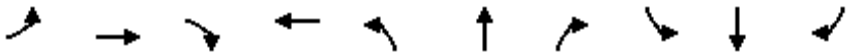
Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	532	489	17	3
Volume Left	0	0	17	0
Volume Right	0	0	0	3
cSH	1700	1700	264	552
Volume to Capacity	0.31	0.29	0.06	0.01
Queue Length 95th (ft)	0	0	5	0
Control Delay (s)	0.0	0.0	19.5	11.6
Lane LOS			C	B
Approach Delay (s)	0.0	0.0	18.4	
Approach LOS			C	

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	35.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	469	13	22	440	0	0
Future Volume (Veh/h)	469	13	22	440	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	-3%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	515	14	24	484	0	0
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			529		1047	515
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			529		1047	515
tC, single (s)			4.2		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			98		100	100
cM capacity (veh/h)			1004		249	564

Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	515	14	24	484
Volume Left	0	0	24	0
Volume Right	0	14	0	0
cSH	1700	1700	1004	1700
Volume to Capacity	0.30	0.01	0.02	0.28
Queue Length 95th (ft)	0	0	2	0
Control Delay (s)	0.0	0.0	8.7	0.0
Lane LOS			A	
Approach Delay (s)	0.0		0.4	
Approach LOS				

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	28.0%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	131	132	205	17	189	263	1	15	369	86
v/c Ratio	0.49	0.50	0.13	0.05	0.43	0.18	0.00	0.04	0.54	0.13
Control Delay	38.8	38.9	0.2	0.2	17.5	17.0	0.0	12.9	32.3	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.8	38.9	0.2	0.2	17.5	17.0	0.0	12.9	32.3	0.4
Queue Length 50th (ft)	65	65	0	0	57	40	0	4	90	0
Queue Length 95th (ft)	128	129	0	0	102	92	0	15	138	0
Internal Link Dist (ft)		1992		455		682			791	
Turn Bay Length (ft)	560				315		160	165		250
Base Capacity (vph)	325	325	1529	379	482	1472	489	409	855	719
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.41	0.13	0.04	0.39	0.18	0.00	0.04	0.43	0.12

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	250	0	195	5	0	11	180	250	1	9	6	351
Future Volume (vph)	250	0	195	5	0	11	180	250	1	9	6	351
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		5%			1%			-4%				4%
Total Lost time (s)	6.3	6.3	4.0		8.8		8.7	8.7	8.7		8.7	8.7
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	0.95	1.00		1.00	0.95
Frt	1.00	1.00	0.85		0.90		1.00	1.00	0.85		1.00	1.00
Flt Protected	0.95	0.95	1.00		0.99		0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1655	1655	1529		1502		1721	3541	824		1328	3369
Flt Permitted	0.95	0.95	1.00		0.99		0.53	1.00	1.00		0.59	1.00
Satd. Flow (perm)	1655	1655	1529		1502		964	3541	824		824	3369
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	263	0	205	5	0	12	189	263	1	9	6	369
RTOR Reduction (vph)	0	0	0	0	16	0	0	0	1	0	0	0
Lane Group Flow (vph)	131	132	205	0	1	0	189	263	0	0	15	369
Heavy Vehicles (%)	1%	0%	3%	20%	0%	9%	7%	4%	100%	0%	83%	5%
Turn Type	Split	NA	Free	Split	NA		D.P+P	NA	Perm	D.P+P	D.P+P	NA
Protected Phases	4	4		3	3		5	2		1	1	6
Permitted Phases			Free				6		2	2	2	
Actuated Green, G (s)	13.0	13.0	87.6		7.1		35.0	33.5	33.5		35.0	23.6
Effective Green, g (s)	13.0	13.0	87.6		7.1		35.0	33.5	33.5		35.0	23.6
Actuated g/C Ratio	0.15	0.15	1.00		0.08		0.40	0.38	0.38		0.40	0.27
Clearance Time (s)	6.3	6.3			8.8		8.7	8.7	8.7		8.7	8.7
Vehicle Extension (s)	5.0	5.0			4.0		4.0	5.0	5.0		4.0	5.0
Lane Grp Cap (vph)	245	245	1529		121		483	1354	315		337	907
v/s Ratio Prot	0.08	c0.08			0.00		c0.05	0.07			0.00	c0.11
v/s Ratio Perm			c0.13				0.11		0.00		0.02	
v/c Ratio	0.53	0.54	0.13		0.01		0.39	0.19	0.00		0.04	0.41
Uniform Delay, d1	34.5	34.5	0.0		37.0		17.7	18.0	16.7		16.0	26.3
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	4.1	4.1	0.2		0.1		0.7	0.1	0.0		0.1	0.6
Delay (s)	38.6	38.6	0.2		37.1		18.5	18.2	16.7		16.0	26.9
Level of Service	D	D	A		D		B	B	B		B	C
Approach Delay (s)		21.8			37.1			18.3				24.4
Approach LOS		C			D			B				C

Intersection Summary			
HCM 2000 Control Delay	21.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	87.6	Sum of lost time (s)	32.5
Intersection Capacity Utilization	53.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	82
Future Volume (vph)	82
Ideal Flow (vphpl)	1900
Grade (%)	
Total Lost time (s)	6.3
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1439
Flt Permitted	1.00
Satd. Flow (perm)	1439
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	86
RTOR Reduction (vph)	50
Lane Group Flow (vph)	36
Heavy Vehicles (%)	10%
Turn Type	pm+ov
Protected Phases	4
Permitted Phases	6
Actuated Green, G (s)	36.6
Effective Green, g (s)	36.6
Actuated g/C Ratio	0.42
Clearance Time (s)	6.3
Vehicle Extension (s)	5.0
Lane Grp Cap (vph)	601
v/s Ratio Prot	0.01
v/s Ratio Perm	0.02
v/c Ratio	0.06
Uniform Delay, d1	15.2
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	15.3
Level of Service	B
Approach Delay (s)	
Approach LOS	

Intersection Summary

MOVEMENT SUMMARY

Site: 101 [Taylor Middle School Addition - AM Peak (Site Folder: General)]

AM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: E Shirley Avenue														
1u	U	1	0.0	1	0.0	0.547	10.2	LOS B	4.5	120.3	0.28	0.12	0.28	24.3
6	T1	427	10.0	469	10.0	0.547	10.5	LOS B	4.5	120.3	0.28	0.12	0.28	23.2
16	R2	73	11.0	80	11.0	0.547	10.6	LOS B	4.5	120.3	0.28	0.12	0.28	22.6
Approach		501	10.1	551	10.1	0.547	10.5	LOS B	4.5	120.3	0.28	0.12	0.28	23.1
North: Falmouth Street														
7	L2	75	21.0	82	21.0	0.202	8.9	LOS A	1.2	34.3	0.67	0.57	0.67	23.2
14	R2	34	9.0	37	9.0	0.202	8.1	LOS A	1.2	34.3	0.67	0.57	0.67	22.3
Approach		109	17.3	120	17.3	0.202	8.7	LOS A	1.2	34.3	0.67	0.57	0.67	22.9
West: E Shirley Avenue														
5u	U	1	0.0	1	0.0	0.131	4.6	LOS A	0.8	20.5	0.33	0.17	0.33	25.4
5	L2	31	19.0	34	19.0	0.131	5.4	LOS A	0.8	20.5	0.33	0.17	0.33	24.7
2	T1	297	9.0	326	9.0	0.131	1.4	LOS A	0.8	20.5	0.09	0.05	0.09	25.5
Approach		329	9.9	362	9.9	0.131	1.8	LOS A	0.8	20.5	0.11	0.06	0.11	25.4
All Vehicles		939	10.9	1032	10.9	0.547	7.2	LOS A	4.5	120.3	0.27	0.15	0.27	23.8

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

MOVEMENT SUMMARY

Site: 101 [Taylor Middle School Addition - Commuter PM Peak (Site Folder: General)]

AM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: E Shirley Avenue														
1u	U	1	0.0	1	0.0	0.622	12.2	LOS B	6.2	175.5	0.25	0.09	0.25	23.7
6	T1	413	21.0	454	21.0	0.622	12.9	LOS B	6.2	175.5	0.25	0.09	0.25	22.6
16	R2	135	4.0	148	4.0	0.622	12.3	LOS B	6.2	175.5	0.25	0.09	0.25	22.1
Approach		549	16.8	603	16.8	0.622	12.7	LOS B	6.2	175.5	0.25	0.09	0.25	22.5
North: Falmouth Street														
7	L2	108	1.0	119	1.0	0.222	7.7	LOS A	1.4	36.7	0.69	0.57	0.69	23.3
14	R2	32	9.0	35	9.0	0.222	8.2	LOS A	1.4	36.7	0.69	0.57	0.69	22.4
Approach		140	2.8	154	2.8	0.222	7.8	LOS A	1.4	36.7	0.69	0.57	0.69	23.1
West: E Shirley Avenue														
5u	U	2	0.0	2	0.0	0.185	5.2	LOS A	1.1	29.3	0.37	0.21	0.37	25.5
5	L2	18	11.0	20	11.0	0.185	5.7	LOS A	1.1	29.3	0.37	0.21	0.37	24.8
2	T1	462	5.0	508	5.0	0.185	1.7	LOS A	1.1	29.3	0.12	0.07	0.12	25.4
Approach		482	5.2	530	5.2	0.185	1.9	LOS A	1.1	29.3	0.13	0.07	0.13	25.4
All Vehicles		1171	10.3	1287	10.3	0.622	7.7	LOS A	6.2	175.5	0.25	0.14	0.25	23.7

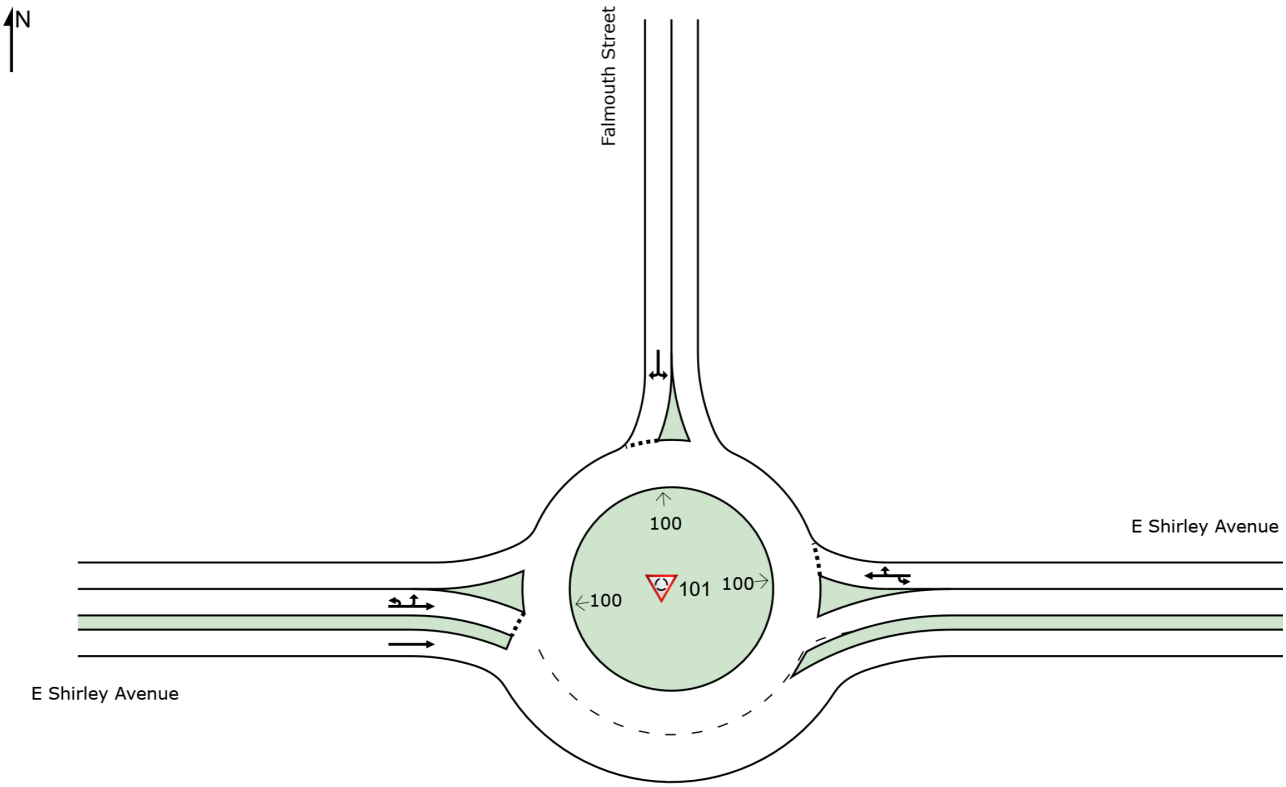
Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if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

SITE LAYOUT

Site: 101 [Taylor Middle School Addition - Commuter PM Peak (Site Folder: General)]

AM Peak
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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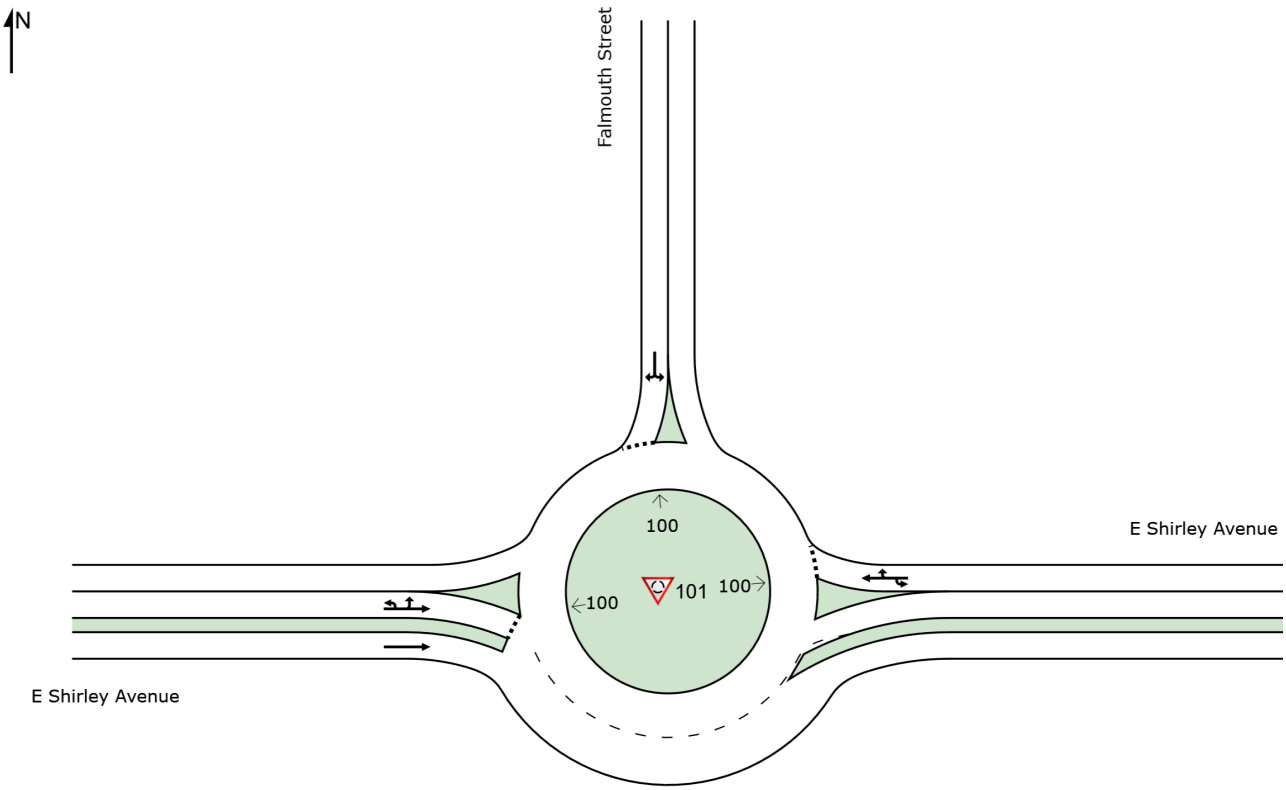
SITE LAYOUT

Site: 101 [Taylor Middle School Addition - AM Peak (Site Folder: General)]

AM Peak
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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MOVEMENT SUMMARY

Site: 101 [Taylor Middle School Addition - School PM Peak (Site Folder: General)]

School PM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: E Shirley Avenue														
1u	U	2	0.0	2	0.0	0.501	9.0	LOS A	3.9	100.3	0.23	0.09	0.23	24.6
6	T1	405	4.0	409	4.0	0.501	9.2	LOS A	3.9	100.3	0.23	0.09	0.23	23.5
16	R2	126	6.0	127	6.0	0.501	9.2	LOS A	3.9	100.3	0.23	0.09	0.23	22.9
Approach		533	4.5	538	4.5	0.501	9.2	LOS A	3.9	100.3	0.23	0.09	0.23	23.3
North: Falmouth Street														
7	L2	119	7.0	120	7.0	0.194	7.1	LOS A	1.2	30.6	0.61	0.47	0.61	23.5
14	R2	23	0.0	23	0.0	0.194	6.7	LOS A	1.2	30.6	0.61	0.47	0.61	22.5
Approach		142	5.9	143	5.9	0.194	7.0	LOS A	1.2	30.6	0.61	0.47	0.61	23.3
West: E Shirley Avenue														
5u	U	2	0.0	2	0.0	0.189	5.4	LOS A	1.1	29.8	0.39	0.23	0.39	25.4
5	L2	26	23.0	26	23.0	0.189	6.3	LOS A	1.1	29.8	0.39	0.23	0.39	24.7
2	T1	500	5.0	505	5.0	0.189	1.7	LOS A	1.1	29.8	0.11	0.07	0.11	25.4
Approach		528	5.9	533	5.9	0.189	1.9	LOS A	1.1	29.8	0.13	0.08	0.13	25.4
All Vehicles		1203	5.2	1215	5.2	0.501	5.7	LOS A	3.9	100.3	0.23	0.13	0.23	24.2

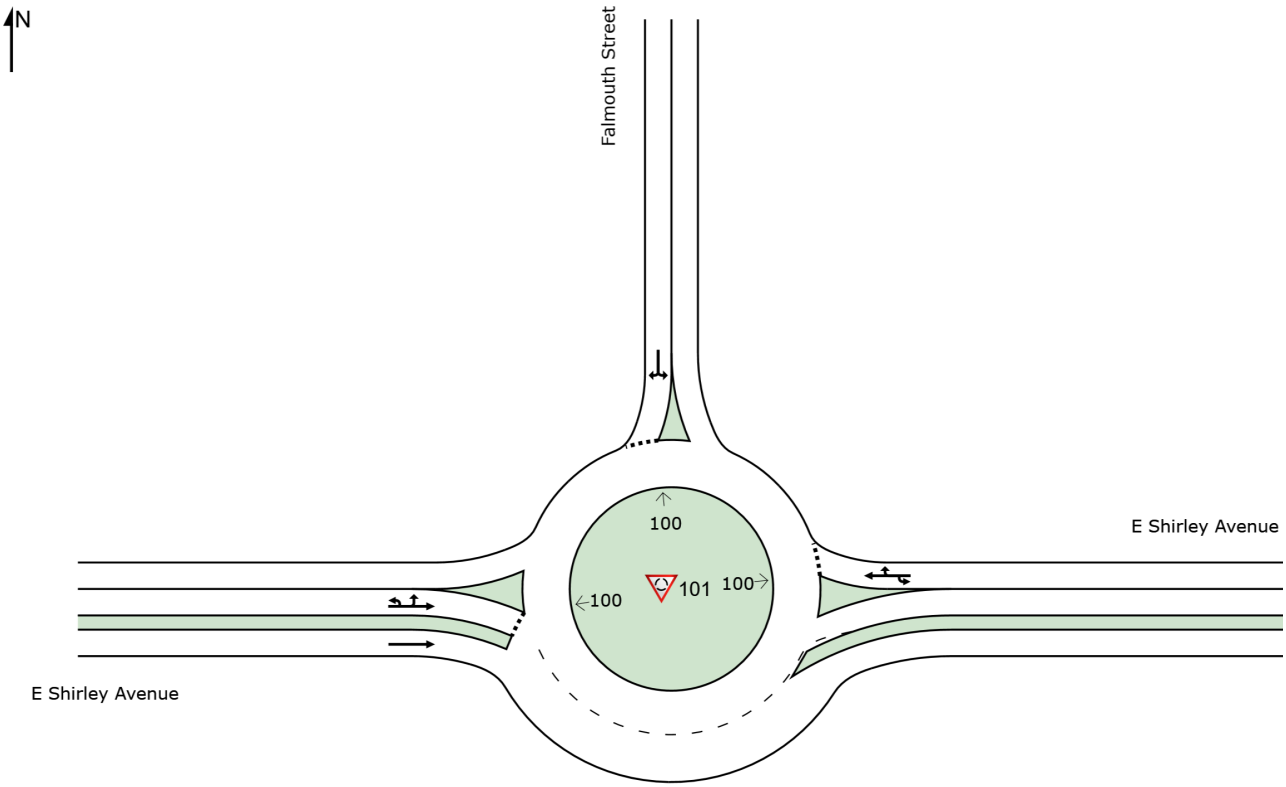
Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if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

SITE LAYOUT

Site: 101 [Taylor Middle School Addition - School PM Peak (Site Folder: General)]

School PM Peak
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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Appendix E
2026 Background Analysis Worksheets

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	32	352	74	32	470	234	16	57
v/c Ratio	0.20	0.54	0.11	0.22	0.62	0.71	0.09	0.30
Control Delay	46.0	27.0	0.3	46.7	27.2	47.0	41.8	32.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.0	27.0	0.3	46.7	27.2	47.0	41.8	32.7
Queue Length 50th (ft)	18	166	0	18	243	120	9	19
Queue Length 95th (ft)	51	270	0	51	389	#236	30	60
Internal Link Dist (ft)		1033			3084	958		736
Turn Bay Length (ft)	215			185			125	
Base Capacity (vph)	160	757	744	147	785	392	370	371
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.46	0.10	0.22	0.60	0.60	0.04	0.15

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	324	68	29	409	23	80	83	52	15	32	20
Future Volume (vph)	29	324	68	29	409	23	80	83	52	15	32	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Grade (%)		-2%			-5%			0%			4%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99			0.97		1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (prot)	1762	1702	1488	1611	1663			1677		1710	1634	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (perm)	1762	1702	1488	1611	1663			1677		1710	1634	
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)	32	352	74	32	445	25	87	90	57	16	35	22
RTOR Reduction (vph)	0	0	45	0	2	0	0	11	0	0	20	0
Lane Group Flow (vph)	32	352	29	32	468	0	0	223	0	16	37	0
Heavy Vehicles (%)	0%	9%	6%	11%	13%	0%	6%	2%	4%	0%	3%	5%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2									
Actuated Green, G (s)	4.4	37.3	37.3	8.2	41.1			17.0		7.2	7.2	
Effective Green, g (s)	4.4	37.3	37.3	8.2	41.1			17.0		7.2	7.2	
Actuated g/C Ratio	0.05	0.40	0.40	0.09	0.44			0.18		0.08	0.08	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0			4.0		4.0	4.0	
Lane Grp Cap (vph)	82	677	592	140	729			304		131	125	
v/s Ratio Prot	0.02	0.21		c0.02	c0.28			c0.13		0.01	c0.02	
v/s Ratio Perm			0.02									
v/c Ratio	0.39	0.52	0.05	0.23	0.64			0.73		0.12	0.29	
Uniform Delay, d1	43.3	21.4	17.3	39.8	20.6			36.2		40.3	40.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	4.2	0.9	0.0	1.1	2.2			9.5		0.6	1.8	
Delay (s)	47.5	22.3	17.4	40.9	22.7			45.7		40.9	42.6	
Level of Service	D	C	B	D	C			D		D	D	
Approach Delay (s)		23.3			23.9			45.7			42.2	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	28.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	93.7	Sum of lost time (s)	24.0
Intersection Capacity Utilization	53.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	298	37	48	445	0	0
Future Volume (Veh/h)	298	37	48	445	0	0
Sign Control	Free			Free	Stop	
Grade	-4%			2%	0%	
Peak Hour Factor	0.92	0.50	0.50	0.92	0.92	0.92
Hourly flow rate (vph)	324	74	96	484	0	0
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			398		1000	324
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			398		1000	324
tC, single (s)			4.2		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			91		100	100
cM capacity (veh/h)			1103		248	722

Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	324	74	96	484
Volume Left	0	0	96	0
Volume Right	0	74	0	0
cSH	1700	1700	1103	1700
Volume to Capacity	0.19	0.04	0.09	0.28
Queue Length 95th (ft)	0	0	7	0
Control Delay (s)	0.0	0.0	8.6	0.0
Lane LOS			A	
Approach Delay (s)	0.0		1.4	
Approach LOS				

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	33.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	298	0	0	452	41	51
Future Volume (Veh/h)	298	0	0	452	41	51
Sign Control	Free			Free	Stop	
Grade	1%			0%	-2%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.50	0.50
Hourly flow rate (vph)	324	0	0	491	82	102
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		815	324
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			324		815	324
tC, single (s)			4.1		6.6	6.4
tC, 2 stage (s)						
tF (s)			2.2		3.7	3.4
p0 queue free %			100		75	85
cM capacity (veh/h)			1247		328	686

Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	324	491	82	102
Volume Left	0	0	82	0
Volume Right	0	0	0	102
cSH	1700	1700	328	686
Volume to Capacity	0.19	0.29	0.25	0.15
Queue Length 95th (ft)	0	0	24	13
Control Delay (s)	0.0	0.0	19.6	11.2
Lane LOS			C	B
Approach Delay (s)	0.0	0.0	14.9	
Approach LOS			B	

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	33.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	332	17	24	452	0	0
Future Volume (Veh/h)	332	17	24	452	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	-3%	
Peak Hour Factor	0.95	0.50	0.50	0.95	0.50	0.50
Hourly flow rate (vph)	349	34	48	476	0	0
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			383		921	349
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			383		921	349
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	100
cM capacity (veh/h)			1187		291	699

Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	349	34	48	476
Volume Left	0	0	48	0
Volume Right	0	34	0	0
cSH	1700	1700	1187	1700
Volume to Capacity	0.21	0.02	0.04	0.28
Queue Length 95th (ft)	0	0	3	0
Control Delay (s)	0.0	0.0	8.2	0.0
Lane LOS			A	
Approach Delay (s)	0.0		0.7	
Approach LOS				

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	27.1%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	60	60	73	6	191	443	10	10	175	155
v/c Ratio	0.36	0.36	0.06	0.02	0.43	0.32	0.01	0.03	0.33	0.26
Control Delay	35.8	35.8	0.1	0.2	16.9	17.3	0.0	12.2	29.2	2.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.8	35.8	0.1	0.2	16.9	17.3	0.0	12.2	29.2	2.4
Queue Length 50th (ft)	26	26	0	0	50	62	0	2	35	0
Queue Length 95th (ft)	64	64	0	0	99	143	0	11	70	15
Internal Link Dist (ft)		1992		455		682			791	
Turn Bay Length (ft)	560				315		160	165		250
Base Capacity (vph)	271	271	1291	349	528	1413	830	396	841	689
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.22	0.06	0.02	0.36	0.31	0.01	0.03	0.21	0.22

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	110	0	67	2	0	4	176	408	9	2	7	161
Future Volume (vph)	110	0	67	2	0	4	176	408	9	2	7	161
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		5%			1%			-4%				4%
Total Lost time (s)	6.3	6.3	4.0		8.8		8.7	8.7	8.7		8.7	8.7
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	0.95	1.00		1.00	0.95
Frt	1.00	1.00	0.85		0.91		1.00	1.00	0.85		1.00	1.00
Flt Protected	0.95	0.95	1.00		0.98		0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1316	1316	1291		1015		1674	3409	1647		1436	3103
Flt Permitted	0.95	0.95	1.00		0.98		0.64	1.00	1.00		0.50	1.00
Satd. Flow (perm)	1316	1316	1291		1015		1130	3409	1647		749	3103
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)	120	0	73	2	0	4	191	443	10	2	8	175
RTOR Reduction (vph)	0	0	0	0	5	0	0	0	6	0	0	0
Lane Group Flow (vph)	60	60	73	0	1	0	191	443	4	0	10	175
Heavy Vehicles (%)	27%	0%	22%	50%	0%	75%	10%	8%	0%	0%	29%	14%
Turn Type	Split	NA	Free	Split	NA		D.P+P	NA	Perm	D.P+P	D.P+P	NA
Protected Phases	4	4		3	3		5	2		1	1	6
Permitted Phases			Free				6		2	2	2	
Actuated Green, G (s)	9.0	9.0	78.5		7.0		30.0	28.7	28.7		30.0	19.4
Effective Green, g (s)	9.0	9.0	78.5		7.0		30.0	28.7	28.7		30.0	19.4
Actuated g/C Ratio	0.11	0.11	1.00		0.09		0.38	0.37	0.37		0.38	0.25
Clearance Time (s)	6.3	6.3			8.8		8.7	8.7	8.7		8.7	8.7
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	150	150	1291		90		505	1246	602		297	766
v/s Ratio Prot	c0.05	0.05			0.00		c0.05	c0.13			0.00	0.06
v/s Ratio Perm			c0.06				0.09		0.00		0.01	
v/c Ratio	0.40	0.40	0.06		0.01		0.38	0.36	0.01		0.03	0.23
Uniform Delay, d1	32.2	32.2	0.0		32.6		16.9	18.2	15.8		15.1	23.6
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.7	1.7	0.1		0.0		0.5	0.2	0.0		0.0	0.2
Delay (s)	34.0	34.0	0.1		32.6		17.4	18.3	15.8		15.1	23.7
Level of Service	C	C	A		C		B	B	B		B	C
Approach Delay (s)		21.2			32.6			18.0				20.3
Approach LOS		C			C			B				C

Intersection Summary			
HCM 2000 Control Delay	19.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	78.5	Sum of lost time (s)	32.5
Intersection Capacity Utilization	47.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	143
Future Volume (vph)	143
Ideal Flow (vphpl)	1900
Grade (%)	
Total Lost time (s)	6.3
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1426
Flt Permitted	1.00
Satd. Flow (perm)	1426
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	155
RTOR Reduction (vph)	99
Lane Group Flow (vph)	56
Heavy Vehicles (%)	11%
Turn Type	pm+ov
Protected Phases	4
Permitted Phases	6
Actuated Green, G (s)	28.4
Effective Green, g (s)	28.4
Actuated g/C Ratio	0.36
Clearance Time (s)	6.3
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	515
v/s Ratio Prot	0.01
v/s Ratio Perm	0.03
v/c Ratio	0.11
Uniform Delay, d1	16.6
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	16.7
Level of Service	B
Approach Delay (s)	
Approach LOS	

Intersection Summary

Intersection	
Intersection Delay, s/veh	7.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	5	0	46	21	91	0	0	35	13	0	0
Future Vol, veh/h	0	5	0	46	21	91	0	0	35	13	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
Heavy Vehicles, %	0	0	0	24	0	7	0	0	65	8	0	0
Mvmt Flow	0	5	0	50	23	99	0	0	38	14	0	0
Number of Lanes	0	1	0	0	1	1	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	1
HCM Control Delay	7.3	7.8	6.9	7.8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	0%	69%	0%	100%
Vol Thru, %	0%	100%	31%	0%	0%
Vol Right, %	100%	0%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	35	5	67	91	13
LT Vol	0	0	46	0	13
Through Vol	0	5	21	0	0
RT Vol	35	0	0	91	0
Lane Flow Rate	38	5	73	99	14
Geometry Grp	2	5	7	7	2
Degree of Util (X)	0.039	0.006	0.108	0.107	0.018
Departure Headway (Hd)	3.719	4.216	5.347	3.895	4.677
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	969	840	672	921	770
Service Time	1.719	2.284	3.067	1.615	2.678
HCM Lane V/C Ratio	0.039	0.006	0.109	0.107	0.018
HCM Control Delay	6.9	7.3	8.7	7.1	7.8
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0.1	0	0.4	0.4	0.1

Intersection: 1: Culpeper Street & W Shirley Avenue/E Shirley Avenue

Movement	EB	EB	EB	WB	WB	NB	SB	SB
Directions Served	L	T	R	L	TR	LTR	L	TR
Maximum Queue (ft)	101	279	65	136	343	232	50	92
Average Queue (ft)	25	133	22	29	154	109	13	32
95th Queue (ft)	67	239	51	91	288	192	39	68
Link Distance (ft)		1077	1077		3093	989		776
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	215			185			125	
Storage Blk Time (%)	0	2		0	5			0
Queuing Penalty (veh)	0	0		0	2			0

Intersection: 2: Site Entrance #1 & E Shirley Avenue

Movement	EB	WB
Directions Served	R	L
Maximum Queue (ft)	6	57
Average Queue (ft)	0	13
95th Queue (ft)	6	44
Link Distance (ft)		
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	110	240
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Site Entrance #2 & E Shirley Avenue

Movement	NB	NB
Directions Served	L	R
Maximum Queue (ft)	84	78
Average Queue (ft)	28	30
95th Queue (ft)	68	65
Link Distance (ft)	382	382
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Site Entrance #3 & E Shirley Avenue

Movement	EB	WB
Directions Served	R	L
Maximum Queue (ft)	2	40
Average Queue (ft)	0	6
95th Queue (ft)	2	29
Link Distance (ft)		
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	140	160
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: E Shirley Avenue & Falmouth Street

Movement	EB	WB	B17	SB
Directions Served	ULT	TR		L>
Maximum Queue (ft)	128	144	7	81
Average Queue (ft)	29	28	0	27
95th Queue (ft)	92	98	7	69
Link Distance (ft)	393	351	787	742
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: James Madison Highway/E Shirley Avenue & Alwington Boulevard

Movement	EB	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	R	LTR	L	T	T	R	UL	T	T	R
Maximum Queue (ft)	127	93	6	52	155	200	175	19	41	110	102	107
Average Queue (ft)	51	19	0	6	73	99	35	2	6	50	40	46
95th Queue (ft)	103	62	5	31	128	166	105	11	26	91	83	85
Link Distance (ft)		1974	1974	480		730	730			787	787	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	560				315			160	165			250
Storage Blk Time (%)							0					
Queuing Penalty (veh)							0					

Intersection: 7: Commercial Entrance /Elementary School Entrance & Alwington Boulevard

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	LT	R	LTR	LTR
Maximum Queue (ft)	10	76	61	83	45
Average Queue (ft)	1	37	34	33	11
95th Queue (ft)	7	68	56	75	35
Link Distance (ft)	954	1974		170	605
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			270		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 2

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	40	535	101	40	532	203	28	91
v/c Ratio	0.28	0.78	0.15	0.26	0.65	0.69	0.15	0.42
Control Delay	50.1	35.7	1.7	49.3	28.6	49.4	42.0	39.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.1	35.7	1.7	49.3	28.6	49.4	42.0	39.3
Queue Length 50th (ft)	24	292	0	24	290	114	16	42
Queue Length 95th (ft)	62	#495	12	62	#493	#207	44	93
Internal Link Dist (ft)		1033			3084	958		736
Turn Bay Length (ft)	215			185			125	
Base Capacity (vph)	142	792	749	151	825	358	337	370
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.68	0.13	0.26	0.64	0.57	0.08	0.25

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	492	93	37	477	13	78	77	31	26	54	29
Future Volume (vph)	37	492	93	37	477	13	78	77	31	26	54	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Grade (%)		-2%			-5%			0%			4%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			0.98		1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (prot)	1588	1767	1488	1687	1756			1656		1583	1662	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (perm)	1588	1767	1488	1687	1756			1656		1583	1662	
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)	40	535	101	40	518	14	85	84	34	28	59	32
RTOR Reduction (vph)	0	0	60	0	1	0	0	7	0	0	19	0
Lane Group Flow (vph)	40	535	41	40	531	0	0	196	0	28	72	0
Heavy Vehicles (%)	11%	5%	6%	6%	7%	0%	8%	4%	7%	8%	4%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2									
Actuated Green, G (s)	4.3	38.9	38.9	8.2	42.8			16.0		8.7	8.7	
Effective Green, g (s)	4.3	38.9	38.9	8.2	42.8			16.0		8.7	8.7	
Actuated g/C Ratio	0.04	0.41	0.41	0.09	0.45			0.17		0.09	0.09	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0			4.0		4.0	4.0	
Lane Grp Cap (vph)	71	717	604	144	784			276		143	150	
v/s Ratio Prot	c0.03	c0.30		0.02	c0.30			c0.12		0.02	c0.04	
v/s Ratio Perm			0.03									
v/c Ratio	0.56	0.75	0.07	0.28	0.68			0.71		0.20	0.48	
Uniform Delay, d1	44.8	24.2	17.4	41.0	21.0			37.7		40.3	41.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	11.8	4.5	0.1	1.4	2.6			8.9		0.9	3.3	
Delay (s)	56.7	28.8	17.4	42.5	23.6			46.7		41.2	44.7	
Level of Service	E	C	B	D	C			D		D	D	
Approach Delay (s)		28.7			24.9			46.7			43.9	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	30.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	95.8	Sum of lost time (s)	24.0
Intersection Capacity Utilization	57.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	485	20	9	472	0	0
Future Volume (Veh/h)	485	20	9	472	0	0
Sign Control	Free			Free	Stop	
Grade	-4%			2%	0%	
Peak Hour Factor	0.93	0.50	0.50	0.93	0.93	0.93
Hourly flow rate (vph)	522	40	18	508	0	0
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			562		1066	522
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			562		1066	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 %			98		100	100
cM capacity (veh/h)			1019		244	559

Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	522	40	18	508
Volume Left	0	0	18	0
Volume Right	0	40	0	0
cSH	1700	1700	1019	1700
Volume to Capacity	0.31	0.02	0.02	0.30
Queue Length 95th (ft)	0	0	1	0
Control Delay (s)	0.0	0.0	8.6	0.0
Lane LOS			A	
Approach Delay (s)	0.0		0.3	
Approach LOS				

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	35.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	485	0	0	443	38	53
Future Volume (Veh/h)	485	0	0	443	38	53
Sign Control	Free			Free	Stop	
Grade	1%			0%	-2%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.50	0.50
Hourly flow rate (vph)	527	0	0	482	76	106
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			527		1009	527
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			527		1009	527
tC, single (s)			4.1		6.5	6.4
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.5
p0 queue free %			100		70	80
cM capacity (veh/h)			1050		254	523

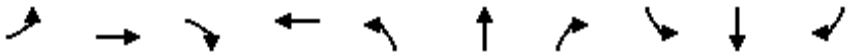
Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	527	482	76	106
Volume Left	0	0	76	0
Volume Right	0	0	0	106
cSH	1700	1700	254	523
Volume to Capacity	0.31	0.28	0.30	0.20
Queue Length 95th (ft)	0	0	30	19
Control Delay (s)	0.0	0.0	25.1	13.6
Lane LOS			D	B
Approach Delay (s)	0.0	0.0	18.4	
Approach LOS			C	

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	35.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	522	16	15	443	0	0
Future Volume (Veh/h)	522	16	15	443	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	-3%	
Peak Hour Factor	0.92	0.50	0.50	0.92	0.92	0.92
Hourly flow rate (vph)	567	32	30	482	0	0
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			599		1109	567
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			599		1109	567
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		100	100
cM capacity (veh/h)			988		227	527

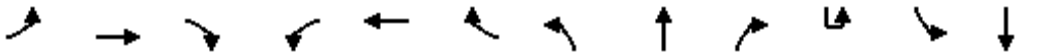
Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	567	32	30	482
Volume Left	0	0	30	0
Volume Right	0	32	0	0
cSH	1700	1700	988	1700
Volume to Capacity	0.33	0.02	0.03	0.28
Queue Length 95th (ft)	0	0	2	0
Control Delay (s)	0.0	0.0	8.8	0.0
Lane LOS			A	
Approach Delay (s)	0.0		0.5	
Approach LOS				

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	30.8%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	138	140	186	20	170	239	11	18	347	139
v/c Ratio	0.53	0.54	0.13	0.15	0.41	0.17	0.02	0.04	0.57	0.21
Control Delay	38.5	38.7	0.2	27.3	18.1	17.5	0.1	13.8	33.0	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.5	38.7	0.2	27.3	18.1	17.5	0.1	13.8	33.0	1.4
Queue Length 50th (ft)	62	63	0	4	48	34	0	5	78	0
Queue Length 95th (ft)	132	133	0	27	99	87	0	18	135	9
Internal Link Dist (ft)		1992		455		682			791	
Turn Bay Length (ft)	560				315		160	165		250
Base Capacity (vph)	388	390	1485	154	469	1380	633	500	838	780
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.36	0.13	0.13	0.36	0.17	0.02	0.04	0.41	0.18

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	268	2	180	6	3	11	165	232	11	11	7	337
Future Volume (vph)	268	2	180	6	3	11	165	232	11	11	7	337
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		5%			1%			-4%				4%
Total Lost time (s)	6.3	6.3	4.0		8.8		8.7	8.7	8.7		8.7	8.7
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	0.95	1.00		1.00	0.95
Frt	1.00	1.00	0.85		0.93		1.00	1.00	0.85		1.00	1.00
Flt Protected	0.95	0.95	1.00		0.99		0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1655	1661	1485		1329		1737	3474	1211		1678	3276
Flt Permitted	0.95	0.95	1.00		0.99		0.54	1.00	1.00		0.60	1.00
Satd. Flow (perm)	1655	1661	1485		1329		994	3474	1211		1065	3276
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	276	2	186	6	3	11	170	239	11	11	7	347
RTOR Reduction (vph)	0	0	0	0	10	0	0	0	7	0	0	0
Lane Group Flow (vph)	138	140	186	0	10	0	170	239	4	0	18	347
Heavy Vehicles (%)	1%	0%	6%	33%	33%	27%	6%	6%	36%	0%	14%	8%
Turn Type	Split	NA	Free	Split	NA		D.P+P	NA	Perm	D.P+P	D.P+P	NA
Protected Phases	4	4		3	3		5	2		1	1	6
Permitted Phases			Free				6		2	2	2	
Actuated Green, G (s)	11.9	11.9	83.2		7.3		31.5	30.3	30.3		31.5	21.6
Effective Green, g (s)	11.9	11.9	83.2		7.3		31.5	30.3	30.3		31.5	21.6
Actuated g/C Ratio	0.14	0.14	1.00		0.09		0.38	0.36	0.36		0.38	0.26
Clearance Time (s)	6.3	6.3			8.8		8.7	8.7	8.7		8.7	8.7
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	236	237	1485		116		464	1265	441		412	850
v/s Ratio Prot	0.08	c0.08			0.01		c0.04	c0.07			0.00	c0.11
v/s Ratio Perm			c0.13				0.09		0.00		0.02	
v/c Ratio	0.58	0.59	0.13		0.09		0.37	0.19	0.01		0.04	0.41
Uniform Delay, d1	33.3	33.4	0.0		34.9		17.8	18.1	16.9		16.2	25.5
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	3.7	3.9	0.2		0.3		0.5	0.1	0.0		0.0	0.3
Delay (s)	37.0	37.3	0.2		35.2		18.3	18.1	16.9		16.3	25.8
Level of Service	D	D	A		D		B	B	B		B	C
Approach Delay (s)		22.3			35.2			18.2				22.6
Approach LOS		C			D			B				C

Intersection Summary			
HCM 2000 Control Delay	21.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	83.2	Sum of lost time (s)	32.5
Intersection Capacity Utilization	53.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	135
Future Volume (vph)	135
Ideal Flow (vphpl)	1900
Grade (%)	
Total Lost time (s)	6.3
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1507
Flt Permitted	1.00
Satd. Flow (perm)	1507
Peak-hour factor, PHF	0.97
Adj. Flow (vph)	139
RTOR Reduction (vph)	83
Lane Group Flow (vph)	56
Heavy Vehicles (%)	5%
Turn Type	pm+ov
Protected Phases	4
Permitted Phases	6
Actuated Green, G (s)	33.5
Effective Green, g (s)	33.5
Actuated g/C Ratio	0.40
Clearance Time (s)	6.3
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	606
v/s Ratio Prot	0.01
v/s Ratio Perm	0.02
v/c Ratio	0.09
Uniform Delay, d1	15.4
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	15.5
Level of Service	B
Approach Delay (s)	
Approach LOS	

Intersection Summary

Intersection	
Intersection Delay, s/veh	7.2
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	8	0	11	4	48	0	0	12	5	0	0
Future Vol, veh/h	0	8	0	11	4	48	0	0	12	5	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
Heavy Vehicles, %	0	13	0	55	2	7	0	0	35	0	0	0
Mvmt Flow	0	9	0	12	4	52	0	0	13	5	0	0
Number of Lanes	0	1	0	0	1	1	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	1
HCM Control Delay	7.4	7.3	6.5	7.3
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	0%	73%	0%	100%
Vol Thru, %	0%	100%	27%	0%	0%
Vol Right, %	100%	0%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	12	8	15	48	5
LT Vol	0	0	11	0	5
Through Vol	0	8	4	0	0
RT Vol	12	0	0	48	0
Lane Flow Rate	13	9	16	52	5
Geometry Grp	2	5	7	7	2
Degree of Util (X)	0.012	0.01	0.026	0.056	0.006
Departure Headway (Hd)	3.434	4.304	5.84	3.872	4.241
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	1035	833	616	930	840
Service Time	1.479	2.323	3.543	1.575	2.285
HCM Lane V/C Ratio	0.013	0.011	0.026	0.056	0.006
HCM Control Delay	6.5	7.4	8.7	6.8	7.3
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0	0	0.1	0.2	0

Intersection: 1: Culpeper Street & W Shirley Avenue/E Shirley Avenue

Movement	EB	EB	EB	WB	WB	NB	SB	SB
Directions Served	L	T	R	L	TR	LTR	L	TR
Maximum Queue (ft)	177	404	65	177	400	228	84	131
Average Queue (ft)	45	202	27	41	190	102	22	52
95th Queue (ft)	124	330	53	120	336	186	61	101
Link Distance (ft)		1077	1077		3093	989		776
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	215			185			125	
Storage Blk Time (%)	0	6		0	8		0	1
Queuing Penalty (veh)	0	2		0	3		0	0

Intersection: 2: Site Entrance #1 & E Shirley Avenue

Movement	WB
Directions Served	L
Maximum Queue (ft)	31
Average Queue (ft)	4
95th Queue (ft)	21
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	240
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Site Entrance #2 & E Shirley Avenue

Movement	EB	NB	NB
Directions Served	T	L	R
Maximum Queue (ft)	4	83	99
Average Queue (ft)	0	26	34
95th Queue (ft)	3	63	76
Link Distance (ft)	505	382	382
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: Site Entrance #3 & E Shirley Avenue

Movement	EB	WB
Directions Served	R	L
Maximum Queue (ft)	4	35
Average Queue (ft)	0	5
95th Queue (ft)	4	25
Link Distance (ft)		
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	140	160
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: E Shirley Avenue & Falmouth Street

Movement	EB	WB	B17	SB
Directions Served	ULT	UTR	T	L>
Maximum Queue (ft)	227	166	5	81
Average Queue (ft)	77	21	0	31
95th Queue (ft)	184	93	5	68
Link Distance (ft)	393	351	787	742
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: James Madison Highway/E Shirley Avenue & Alwington Boulevard

Movement	EB	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	R	LTR	L	T	T	R	UL	T	T	R
Maximum Queue (ft)	154	114	59	65	152	161	122	48	42	163	152	91
Average Queue (ft)	82	40	5	15	70	70	16	5	11	83	84	40
95th Queue (ft)	137	96	31	49	122	125	59	26	33	137	135	72
Link Distance (ft)		1974	1974	480		730	730			787	787	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	560				315			160	165			250
Storage Blk Time (%)							0			0		
Queuing Penalty (veh)							0			0		

Intersection: 7: Commercial Entrance /Elementary School Entrance & Alwington Boulevard

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	LT	R	LTR	LTR
Maximum Queue (ft)	20	64	60	61	29
Average Queue (ft)	3	14	27	13	4
95th Queue (ft)	13	48	51	46	21
Link Distance (ft)	954	1974		170	605
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			270		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 6

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	40	491	155	34	491	189	37	147
v/c Ratio	0.27	0.76	0.24	0.23	0.63	0.68	0.15	0.58
Control Delay	50.7	36.9	4.8	50.0	29.6	50.6	39.5	47.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.7	36.9	4.8	50.0	29.6	50.6	39.5	47.0
Queue Length 50th (ft)	23	265	0	20	264	104	20	79
Queue Length 95th (ft)	63	431	42	56	428	197	53	154
Internal Link Dist (ft)		1033			3084	958		736
Turn Bay Length (ft)	215			185			125	
Base Capacity (vph)	148	758	734	146	804	349	342	351
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.65	0.21	0.23	0.61	0.54	0.11	0.42

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	462	146	32	458	4	84	65	29	35	112	26
Future Volume (vph)	38	462	146	32	458	4	84	65	29	35	112	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Grade (%)		-2%			-5%			0%			4%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			0.98		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (prot)	1762	1801	1531	1736	1826			1715		1710	1721	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (perm)	1762	1801	1531	1736	1826			1715		1710	1721	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	40	491	155	34	487	4	89	69	31	37	119	28
RTOR Reduction (vph)	0	0	96	0	0	0	0	7	0	0	8	0
Lane Group Flow (vph)	40	491	59	34	491	0	0	182	0	37	139	0
Heavy Vehicles (%)	0%	3%	3%	3%	3%	0%	2%	2%	4%	0%	2%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2									
Actuated Green, G (s)	4.4	37.4	37.4	8.1	41.1			15.4		13.8	13.8	
Effective Green, g (s)	4.4	37.4	37.4	8.1	41.1			15.4		13.8	13.8	
Actuated g/C Ratio	0.04	0.38	0.38	0.08	0.42			0.16		0.14	0.14	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0			4.0		4.0	4.0	
Lane Grp Cap (vph)	78	682	580	142	760			267		239	240	
v/s Ratio Prot	c0.02	c0.27		0.02	c0.27			c0.11		0.02	c0.08	
v/s Ratio Perm			0.04									
v/c Ratio	0.51	0.72	0.10	0.24	0.65			0.68		0.15	0.58	
Uniform Delay, d1	46.1	26.2	19.8	42.4	23.0			39.3		37.3	39.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	7.4	3.9	0.1	1.2	2.1			7.6		0.4	4.2	
Delay (s)	53.5	30.1	19.9	43.6	25.1			46.9		37.7	43.9	
Level of Service	D	C	B	D	C			D		D	D	
Approach Delay (s)		29.1			26.3			46.9			42.7	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	31.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	98.7	Sum of lost time (s)	24.0
Intersection Capacity Utilization	63.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	493	4	6	462	0	0
Future Volume (Veh/h)	493	4	6	462	0	0
Sign Control	Free			Free	Stop	
Grade	-4%			2%	0%	
Peak Hour Factor	0.92	0.50	0.50	0.92	0.92	0.92
Hourly flow rate (vph)	536	8	12	502	0	0
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			544		1062	536
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			544		1062	536
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		100	100
cM capacity (veh/h)			1035		247	549

Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	536	8	12	502
Volume Left	0	0	12	0
Volume Right	0	8	0	0
cSH	1700	1700	1035	1700
Volume to Capacity	0.32	0.00	0.01	0.30
Queue Length 95th (ft)	0	0	1	0
Control Delay (s)	0.0	0.0	8.5	0.0
Lane LOS			A	
Approach Delay (s)	0.0		0.2	
Approach LOS				

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	35.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	493	0	0	453	15	3
Future Volume (Veh/h)	493	0	0	453	15	3
Sign Control	Free			Free	Stop	
Grade	1%			0%	-2%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.50	0.92
Hourly flow rate (vph)	536	0	0	492	30	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			536		1028	536
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			536		1028	536
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		89	99
cM capacity (veh/h)			1042		262	549

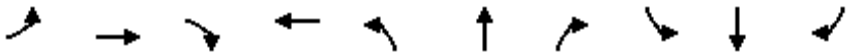
Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	536	492	30	3
Volume Left	0	0	30	0
Volume Right	0	0	0	3
cSH	1700	1700	262	549
Volume to Capacity	0.32	0.29	0.11	0.01
Queue Length 95th (ft)	0	0	10	0
Control Delay (s)	0.0	0.0	20.5	11.6
Lane LOS			C	B
Approach Delay (s)	0.0	0.0	19.7	
Approach LOS			C	

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	35.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	483	13	22	453	0	0
Future Volume (Veh/h)	483	13	22	453	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	-3%	
Peak Hour Factor	0.92	0.50	0.50	0.92	0.50	0.50
Hourly flow rate (vph)	525	26	44	492	0	0
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		1105	525
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			551		1105	525
tC, single (s)			4.2		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			96		100	100
cM capacity (veh/h)			985		225	557

Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	525	26	44	492
Volume Left	0	0	44	0
Volume Right	0	26	0	0
cSH	1700	1700	985	1700
Volume to Capacity	0.31	0.02	0.04	0.29
Queue Length 95th (ft)	0	0	4	0
Control Delay (s)	0.0	0.0	8.8	0.0
Lane LOS			A	
Approach Delay (s)	0.0		0.7	
Approach LOS				

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	28.8%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	136	136	212	17	195	272	1	15	381	88
v/c Ratio	0.56	0.56	0.14	0.05	0.47	0.19	0.00	0.04	0.59	0.14
Control Delay	40.3	40.3	0.2	0.2	18.2	16.8	0.0	12.9	32.6	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.3	40.3	0.2	0.2	18.2	16.8	0.0	12.9	32.6	0.4
Queue Length 50th (ft)	63	63	0	0	55	38	0	4	87	0
Queue Length 95th (ft)	130	130	0	0	106	93	0	15	141	0
Internal Link Dist (ft)		1992		455		682			791	
Turn Bay Length (ft)	560				315		160	165		250
Base Capacity (vph)	343	343	1529	386	464	1455	487	395	949	722
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.40	0.14	0.04	0.42	0.19	0.00	0.04	0.40	0.12

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	258	0	201	5	0	11	185	258	1	9	6	362
Future Volume (vph)	258	0	201	5	0	11	185	258	1	9	6	362
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		5%			1%			-4%				4%
Total Lost time (s)	6.3	6.3	4.0		8.8		8.7	8.7	8.7		8.7	8.7
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	0.95	1.00		1.00	0.95
Frt	1.00	1.00	0.85		0.90		1.00	1.00	0.85		1.00	1.00
Flt Protected	0.95	0.95	1.00		0.99		0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1655	1655	1529		1502		1721	3541	824		1328	3369
Flt Permitted	0.95	0.95	1.00		0.99		0.53	1.00	1.00		0.58	1.00
Satd. Flow (perm)	1655	1655	1529		1502		953	3541	824		817	3369
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	272	0	212	5	0	12	195	272	1	9	6	381
RTOR Reduction (vph)	0	0	0	0	16	0	0	0	1	0	0	0
Lane Group Flow (vph)	136	136	212	0	1	0	195	272	0	0	15	381
Heavy Vehicles (%)	1%	0%	3%	20%	0%	9%	7%	4%	100%	0%	83%	5%
Turn Type	Split	NA	Free	Split	NA		D.P+P	NA	Perm	D.P+P	D.P+P	NA
Protected Phases	4	4		3	3		5	2		1	1	6
Permitted Phases			Free				6		2	2	2	
Actuated Green, G (s)	11.3	11.3	83.3		7.1		32.4	31.2	31.2		32.4	22.0
Effective Green, g (s)	11.3	11.3	83.3		7.1		32.4	31.2	31.2		32.4	22.0
Actuated g/C Ratio	0.14	0.14	1.00		0.09		0.39	0.37	0.37		0.39	0.26
Clearance Time (s)	6.3	6.3			8.8		8.7	8.7	8.7		8.7	8.7
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	224	224	1529		128		466	1326	308		325	889
v/s Ratio Prot	c0.08	0.08			0.00		c0.05	c0.08			0.00	c0.11
v/s Ratio Perm			c0.14				0.11		0.00		0.02	
v/c Ratio	0.61	0.61	0.14		0.01		0.42	0.21	0.00		0.05	0.43
Uniform Delay, d1	33.9	33.9	0.0		34.9		17.5	17.6	16.3		15.7	25.4
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	4.6	4.6	0.2		0.0		0.6	0.1	0.0		0.1	0.3
Delay (s)	38.5	38.5	0.2		34.9		18.1	17.7	16.3		15.8	25.8
Level of Service	D	D	A		C		B	B	B		B	C
Approach Delay (s)		21.7			34.9			17.9				23.6
Approach LOS		C			C			B				C

Intersection Summary			
HCM 2000 Control Delay	21.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	83.3	Sum of lost time (s)	32.5
Intersection Capacity Utilization	53.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	84
Future Volume (vph)	84
Ideal Flow (vphpl)	1900
Grade (%)	
Total Lost time (s)	6.3
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1439
Flt Permitted	1.00
Satd. Flow (perm)	1439
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	88
RTOR Reduction (vph)	53
Lane Group Flow (vph)	35
Heavy Vehicles (%)	10%
Turn Type	pm+ov
Protected Phases	4
Permitted Phases	6
Actuated Green, G (s)	33.3
Effective Green, g (s)	33.3
Actuated g/C Ratio	0.40
Clearance Time (s)	6.3
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	575
v/s Ratio Prot	0.01
v/s Ratio Perm	0.02
v/c Ratio	0.06
Uniform Delay, d1	15.4
Progression Factor	1.00
Incremental Delay, d2	0.0
Delay (s)	15.4
Level of Service	B
Approach Delay (s)	
Approach LOS	

Intersection Summary

Intersection	
Intersection Delay, s/veh	7.3
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	16	0	14	4	18	0	0	28	21	0	0
Future Vol, veh/h	0	16	0	14	4	18	0	0	28	21	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
Heavy Vehicles, %	0	0	0	57	0	18	0	0	7	0	0	0
Mvmt Flow	0	17	0	15	4	20	0	0	30	23	0	0
Number of Lanes	0	1	0	0	1	1	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	1
HCM Control Delay	7.2	7.8	6.6	7.4
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	0%	78%	0%	100%
Vol Thru, %	0%	100%	22%	0%	0%
Vol Right, %	100%	0%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	28	16	18	18	21
LT Vol	0	0	14	0	21
Through Vol	0	16	4	0	0
RT Vol	28	0	0	18	0
Lane Flow Rate	30	17	20	20	23
Geometry Grp	2	5	7	7	2
Degree of Util (X)	0.029	0.02	0.032	0.021	0.027
Departure Headway (Hd)	3.411	4.121	5.96	3.9	4.217
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	1040	867	602	918	844
Service Time	1.462	2.154	3.681	1.621	2.265
HCM Lane V/C Ratio	0.029	0.02	0.033	0.022	0.027
HCM Control Delay	6.6	7.2	8.9	6.7	7.4
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0.1	0.1	0.1	0.1	0.1

Intersection: 1: Culpeper Street & W Shirley Avenue/E Shirley Avenue

Movement	EB	EB	EB	WB	WB	NB	SB	SB
Directions Served	L	T	R	L	TR	LTR	L	TR
Maximum Queue (ft)	190	387	82	139	343	206	106	191
Average Queue (ft)	42	195	36	29	175	94	31	85
95th Queue (ft)	122	329	65	88	296	171	77	161
Link Distance (ft)		1077	1077		3093	989		776
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	215			185			125	
Storage Blk Time (%)	0	6		0	8		0	3
Queuing Penalty (veh)	0	2		0	3		0	1

Intersection: 2: Site Entrance #1 & E Shirley Avenue

Movement	WB
Directions Served	L
Maximum Queue (ft)	32
Average Queue (ft)	3
95th Queue (ft)	17
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	240
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Site Entrance #2 & E Shirley Avenue

Movement	NB	NB
Directions Served	L	R
Maximum Queue (ft)	45	27
Average Queue (ft)	11	3
95th Queue (ft)	36	18
Link Distance (ft)	382	382
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Site Entrance #3 & E Shirley Avenue

Movement	EB	WB
Directions Served	R	L
Maximum Queue (ft)	4	48
Average Queue (ft)	0	7
95th Queue (ft)	3	31
Link Distance (ft)		
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	140	160
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: E Shirley Avenue & Falmouth Street

Movement	EB	WB	B17	SB
Directions Served	ULT	TR	T	L>
Maximum Queue (ft)	184	147	2	67
Average Queue (ft)	53	22	0	26
95th Queue (ft)	143	94	2	60
Link Distance (ft)	393	351	787	742
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: James Madison Highway/E Shirley Avenue & Alwington Boulevard

Movement	EB	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	R	LTR	L	T	T	R	UL	T	T	R
Maximum Queue (ft)	145	114	63	48	155	157	100	8	89	162	170	76
Average Queue (ft)	83	42	7	10	81	71	16	1	13	89	93	32
95th Queue (ft)	135	97	33	36	138	131	55	8	54	143	154	68
Link Distance (ft)		1974	1974	480		730	730			787	787	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	560				315			160	165			250
Storage Blk Time (%)							0		0	0		
Queuing Penalty (veh)							0		0	0		

Intersection: 7: Commercial Entrance /Elementary School Entrance & Alwington Boulevard

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	LT	R	LTR	LTR
Maximum Queue (ft)	10	69	59	56	34
Average Queue (ft)	3	18	16	18	14
95th Queue (ft)	10	55	47	46	37
Link Distance (ft)	954	1974		170	605
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			270		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 6

MOVEMENT SUMMARY

Site: 101 [2026 Background - AM Peak (Site Folder: General)]

AM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: E Shirley Avenue														
1u	U	1	0.0	1	0.0	0.558	10.4	LOS B	4.6	125.3	0.28	0.12	0.28	24.2
6	T1	440	10.0	478	10.0	0.558	10.8	LOS B	4.6	125.3	0.28	0.12	0.28	23.1
16	R2	75	11.0	82	11.0	0.558	10.8	LOS B	4.6	125.3	0.28	0.12	0.28	22.6
Approach		516	10.1	561	10.1	0.558	10.8	LOS B	4.6	125.3	0.28	0.12	0.28	23.0
North: Falmouth Street														
7	L2	77	21.0	84	21.0	0.208	9.1	LOS A	1.2	35.4	0.68	0.58	0.68	23.2
14	R2	35	9.0	38	9.0	0.208	8.2	LOS A	1.2	35.4	0.68	0.58	0.68	22.3
Approach		112	17.3	122	17.3	0.208	8.8	LOS A	1.2	35.4	0.68	0.58	0.68	22.9
West: E Shirley Avenue														
5u	U	1	0.0	1	0.0	0.134	4.7	LOS A	0.8	21.0	0.33	0.18	0.33	25.4
5	L2	32	19.0	35	19.0	0.134	5.4	LOS A	0.8	21.0	0.33	0.18	0.33	24.7
2	T1	306	9.0	333	9.0	0.134	1.4	LOS A	0.8	21.0	0.09	0.05	0.09	25.5
Approach		339	9.9	368	9.9	0.134	1.8	LOS A	0.8	21.0	0.11	0.06	0.11	25.4
All Vehicles		967	10.9	1051	10.9	0.558	7.4	LOS A	4.6	125.3	0.27	0.15	0.27	23.8

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

MOVEMENT SUMMARY

Site: 101 [2026 Background - School PM (Site Folder: General)]

School PM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: E Shirley Avenue														
1u	U	2	0.0	2	0.0	0.517	9.3	LOS A	4.1	106.5	0.24	0.09	0.24	24.5
6	T1	417	4.0	421	4.0	0.517	9.5	LOS A	4.1	106.5	0.24	0.09	0.24	23.4
16	R2	130	6.0	131	6.0	0.517	9.5	LOS A	4.1	106.5	0.24	0.09	0.24	22.8
Approach		549	4.5	555	4.5	0.517	9.5	LOS A	4.1	106.5	0.24	0.09	0.24	23.3
North: Falmouth Street														
7	L2	123	7.0	124	7.0	0.203	7.3	LOS A	1.2	32.4	0.62	0.49	0.62	23.4
14	R2	24	0.0	24	0.0	0.203	6.9	LOS A	1.2	32.4	0.62	0.49	0.62	22.5
Approach		147	5.9	148	5.9	0.203	7.2	LOS A	1.2	32.4	0.62	0.49	0.62	23.3
West: E Shirley Avenue														
5u	U	2	0.0	2	0.0	0.195	5.5	LOS A	1.2	31.0	0.40	0.23	0.40	25.4
5	L2	27	23.0	27	23.0	0.195	6.5	LOS A	1.2	31.0	0.40	0.23	0.40	24.7
2	T1	515	5.0	520	5.0	0.195	1.7	LOS A	1.2	31.0	0.12	0.07	0.12	25.4
Approach		544	5.9	549	5.9	0.195	2.0	LOS A	1.2	31.0	0.13	0.08	0.13	25.4
All Vehicles		1240	5.2	1253	5.2	0.517	5.9	LOS A	4.1	106.5	0.24	0.13	0.24	24.2

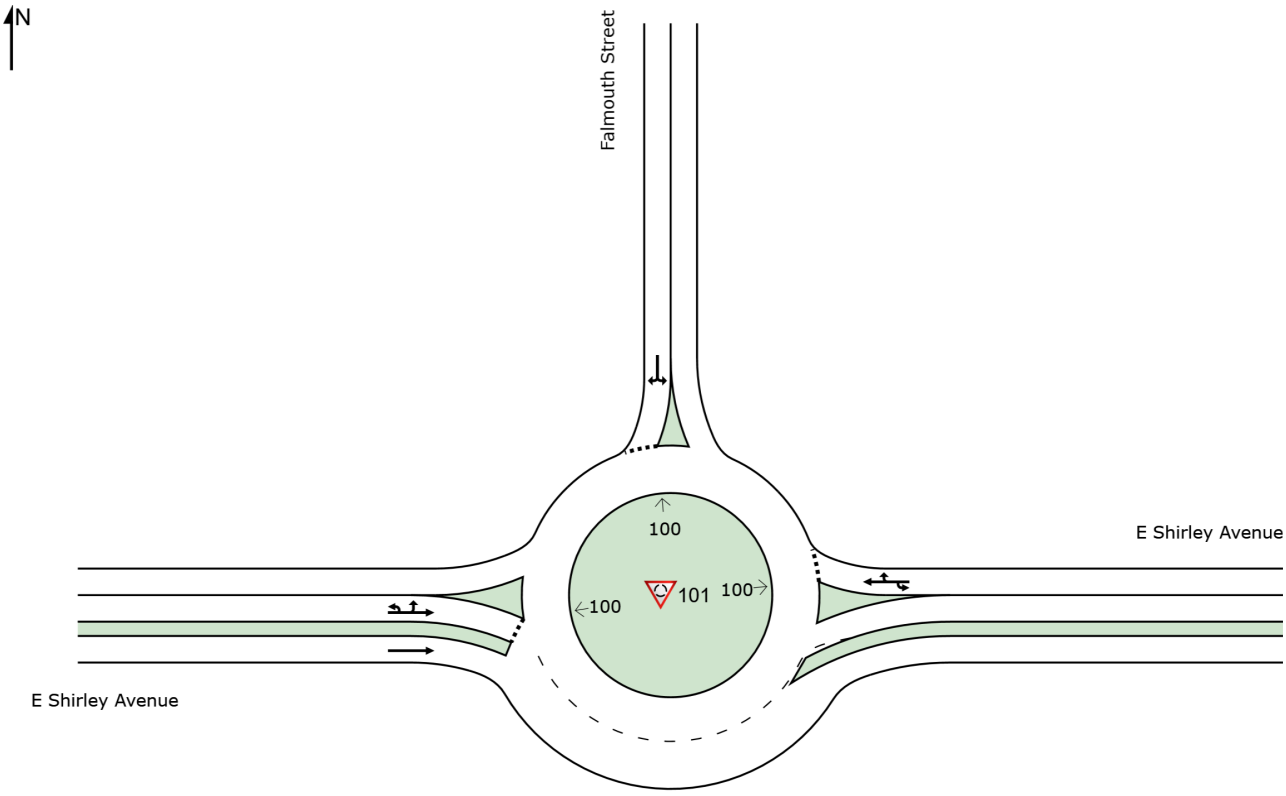
Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if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

SITE LAYOUT

Site: 101 [2026 Background - School PM (Site Folder: General)]

School PM Peak
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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MOVEMENT SUMMARY

Site: 101 [2026 Background - Commuter Peak (Site Folder: General)]

AM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: E Shirley Avenue														
1u	U	1	0.0	1	0.0	0.636	12.6	LOS B	6.5	184.8	0.27	0.10	0.27	23.6
6	T1	426	21.0	463	21.0	0.636	13.3	LOS B	6.5	184.8	0.27	0.10	0.27	22.5
16	R2	139	4.0	151	4.0	0.636	12.7	LOS B	6.5	184.8	0.27	0.10	0.27	22.0
Approach		566	16.8	615	16.8	0.636	13.1	LOS B	6.5	184.8	0.27	0.10	0.27	22.4
North: Falmouth Street														
7	L2	111	1.0	121	1.0	0.229	7.9	LOS A	1.5	38.1	0.70	0.58	0.70	23.3
14	R2	33	9.0	36	9.0	0.229	8.4	LOS A	1.5	38.1	0.70	0.58	0.70	22.3
Approach		144	2.8	157	2.8	0.229	8.0	LOS A	1.5	38.1	0.70	0.58	0.70	23.1
West: E Shirley Avenue														
5u	U	2	0.0	2	0.0	0.189	5.3	LOS A	1.1	30.0	0.38	0.21	0.38	25.5
5	L2	19	11.0	21	11.0	0.189	5.7	LOS A	1.1	30.0	0.38	0.21	0.38	24.8
2	T1	476	5.0	517	5.0	0.189	1.7	LOS A	1.1	30.0	0.12	0.07	0.12	25.4
Approach		497	5.2	540	5.2	0.189	1.9	LOS A	1.1	30.0	0.13	0.07	0.13	25.4
All Vehicles		1207	10.4	1312	10.4	0.636	7.9	LOS A	6.5	184.8	0.26	0.15	0.26	23.6

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

Appendix F
2026 Future Analysis Worksheets

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	32	393	74	32	500	234	16	57
v/c Ratio	0.20	0.59	0.11	0.22	0.65	0.73	0.09	0.30
Control Delay	46.3	27.8	0.3	47.0	27.7	49.0	42.1	32.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.3	27.8	0.3	47.0	27.7	49.0	42.1	32.9
Queue Length 50th (ft)	18	190	0	18	264	124	9	20
Queue Length 95th (ft)	51	302	0	51	415	#248	30	60
Internal Link Dist (ft)		1033			3084	958		736
Turn Bay Length (ft)	215			185			125	
Base Capacity (vph)	159	771	755	146	790	371	368	369
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.51	0.10	0.22	0.63	0.63	0.04	0.15

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	362	68	29	437	23	80	83	52	15	32	20
Future Volume (vph)	29	362	68	29	437	23	80	83	52	15	32	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Grade (%)		-2%			-5%			0%			4%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99			0.97		1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (prot)	1762	1702	1488	1611	1663			1677		1710	1634	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (perm)	1762	1702	1488	1611	1663			1677		1710	1634	
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)	32	393	74	32	475	25	87	90	57	16	35	22
RTOR Reduction (vph)	0	0	44	0	2	0	0	11	0	0	20	0
Lane Group Flow (vph)	32	393	30	32	498	0	0	223	0	16	37	0
Heavy Vehicles (%)	0%	9%	6%	11%	13%	0%	6%	2%	4%	0%	3%	5%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2									
Actuated Green, G (s)	4.4	38.2	38.2	8.2	42.0			16.7		7.2	7.2	
Effective Green, g (s)	4.4	38.2	38.2	8.2	42.0			16.7		7.2	7.2	
Actuated g/C Ratio	0.05	0.41	0.41	0.09	0.45			0.18		0.08	0.08	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0			4.0		4.0	4.0	
Lane Grp Cap (vph)	82	689	602	140	740			296		130	124	
v/s Ratio Prot	0.02	0.23		c0.02	c0.30			c0.13		0.01	c0.02	
v/s Ratio Perm			0.02									
v/c Ratio	0.39	0.57	0.05	0.23	0.67			0.75		0.12	0.30	
Uniform Delay, d1	43.6	21.7	17.0	40.1	20.7			36.9		40.6	41.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	4.2	1.4	0.0	1.1	2.7			11.0		0.6	1.8	
Delay (s)	47.8	23.1	17.1	41.2	23.4			47.9		41.2	43.0	
Level of Service	D	C	B	D	C			D		D	D	
Approach Delay (s)		23.8			24.4			47.9			42.6	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	29.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	94.3	Sum of lost time (s)	24.0
Intersection Capacity Utilization	53.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	361	12	19	473	0	0
Future Volume (Veh/h)	361	12	19	473	0	0
Sign Control	Free			Free	Stop	
Grade	-4%			2%	0%	
Peak Hour Factor	0.92	0.50	0.50	0.92	0.92	0.92
Hourly flow rate (vph)	392	24	38	514	0	0
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			416		982	392
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			416		982	392
tC, single (s)			4.2		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			97		100	100
cM capacity (veh/h)			1086		269	661

Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	392	24	38	514
Volume Left	0	0	38	0
Volume Right	0	24	0	0
cSH	1700	1700	1086	1700
Volume to Capacity	0.23	0.01	0.03	0.30
Queue Length 95th (ft)	0	0	3	0
Control Delay (s)	0.0	0.0	8.4	0.0
Lane LOS			A	
Approach Delay (s)	0.0		0.6	
Approach LOS				

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	35.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	361	0	0	480	12	19
Future Volume (Veh/h)	361	0	0	480	12	19
Sign Control	Free			Free	Stop	
Grade	1%			0%	-2%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.50	0.50
Hourly flow rate (vph)	392	0	0	522	24	38
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			392		914	392
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			392		914	392
tC, single (s)			4.1		6.6	6.4
tC, 2 stage (s)						
tF (s)			2.2		3.7	3.4
p0 queue free %			100		92	94
cM capacity (veh/h)			1178		286	627

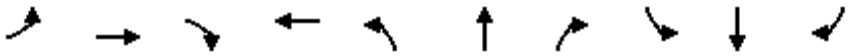
Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	392	522	24	38
Volume Left	0	0	24	0
Volume Right	0	0	0	38
cSH	1700	1700	286	627
Volume to Capacity	0.23	0.31	0.08	0.06
Queue Length 95th (ft)	0	0	7	5
Control Delay (s)	0.0	0.0	18.8	11.1
Lane LOS			C	B
Approach Delay (s)	0.0	0.0	14.1	
Approach LOS			B	

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	35.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	300	80	25	423	57	44
Future Volume (Veh/h)	300	80	25	423	57	44
Sign Control	Free			Free	Stop	
Grade	0%			0%	-3%	
Peak Hour Factor	0.95	0.50	0.50	0.95	0.50	0.50
Hourly flow rate (vph)	316	160	50	445	114	88
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			476		861	316
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			476		861	316
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		64	88
cM capacity (veh/h)			1097		314	729

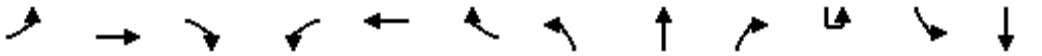
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	316	160	50	445	202
Volume Left	0	0	50	0	114
Volume Right	0	160	0	0	88
cSH	1700	1700	1097	1700	418
Volume to Capacity	0.19	0.09	0.05	0.26	0.48
Queue Length 95th (ft)	0	0	4	0	64
Control Delay (s)	0.0	0.0	8.4	0.0	21.4
Lane LOS			A		C
Approach Delay (s)	0.0		0.9		21.4
Approach LOS					C

Intersection Summary				
Average Delay	4.1			
Intersection Capacity Utilization	34.8%	ICU Level of Service		A
Analysis Period (min)	15			



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	60	60	145	6	283	403	10	10	142	155
v/c Ratio	0.38	0.38	0.11	0.01	0.57	0.28	0.01	0.02	0.28	0.24
Control Delay	38.2	38.2	0.2	0.0	18.8	16.2	0.0	11.7	30.8	0.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.2	38.2	0.2	0.0	18.8	16.2	0.0	11.7	30.8	0.9
Queue Length 50th (ft)	27	27	0	0	79	55	0	2	30	0
Queue Length 95th (ft)	68	68	0	0	146	129	0	11	63	0
Internal Link Dist (ft)		1992		455		682			791	
Turn Bay Length (ft)	560				315		160	165		250
Base Capacity (vph)	225	225	1291	429	618	1482	858	420	723	699
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.27	0.11	0.01	0.46	0.27	0.01	0.02	0.20	0.22

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	110	0	133	2	0	4	260	371	9	2	7	131
Future Volume (vph)	110	0	133	2	0	4	260	371	9	2	7	131
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		5%			1%			-4%				4%
Total Lost time (s)	6.3	6.3	4.0		8.8		8.7	8.7	8.7		8.7	8.7
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	0.95	1.00		1.00	0.95
Frt	1.00	1.00	0.85		0.91		1.00	1.00	0.85		1.00	1.00
Flt Protected	0.95	0.95	1.00		0.98		0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1316	1316	1291		1015		1674	3409	1647		1436	3103
Flt Permitted	0.95	0.95	1.00		0.98		0.66	1.00	1.00		0.51	1.00
Satd. Flow (perm)	1316	1316	1291		1015		1166	3409	1647		778	3103
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)	120	0	145	2	0	4	283	403	10	2	8	142
RTOR Reduction (vph)	0	0	0	0	5	0	0	0	6	0	0	0
Lane Group Flow (vph)	60	60	145	0	1	0	283	403	4	0	10	142
Heavy Vehicles (%)	27%	0%	22%	50%	0%	75%	10%	8%	0%	0%	29%	14%
Turn Type	Split	NA	Free	Split	NA		D.P+P	NA	Perm	D.P+P	D.P+P	NA
Protected Phases	4	4		3	3		5	2		1	1	6
Permitted Phases			Free				6		2	2	2	
Actuated Green, G (s)	9.1	9.1	81.6		7.0		33.0	31.7	31.7		33.0	19.3
Effective Green, g (s)	9.1	9.1	81.6		7.0		33.0	31.7	31.7		33.0	19.3
Actuated g/C Ratio	0.11	0.11	1.00		0.09		0.40	0.39	0.39		0.40	0.24
Clearance Time (s)	6.3	6.3			8.8		8.7	8.7	8.7		8.7	8.7
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	146	146	1291		87		556	1324	639		325	733
v/s Ratio Prot	c0.05	0.05			0.00		c0.09	0.12			0.00	0.05
v/s Ratio Perm			c0.11				c0.12		0.00		0.01	
v/c Ratio	0.41	0.41	0.11		0.01		0.51	0.30	0.01		0.03	0.19
Uniform Delay, d1	33.8	33.8	0.0		34.1		17.4	17.3	15.3		14.6	24.9
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.9	1.9	0.2		0.0		0.7	0.1	0.0		0.0	0.1
Delay (s)	35.6	35.6	0.2		34.1		18.2	17.4	15.3		14.6	25.1
Level of Service	D	D	A		C		B	B	B		B	C
Approach Delay (s)		16.2			34.1			17.7				21.2
Approach LOS		B			C			B				C

Intersection Summary			
HCM 2000 Control Delay	18.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	81.6	Sum of lost time (s)	32.5
Intersection Capacity Utilization	52.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	143
Future Volume (vph)	143
Ideal Flow (vphpl)	1900
Grade (%)	
Total Lost time (s)	6.3
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1426
Flt Permitted	1.00
Satd. Flow (perm)	1426
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	155
RTOR Reduction (vph)	101
Lane Group Flow (vph)	54
Heavy Vehicles (%)	11%
Turn Type	pm+ov
Protected Phases	4
Permitted Phases	6
Actuated Green, G (s)	28.4
Effective Green, g (s)	28.4
Actuated g/C Ratio	0.35
Clearance Time (s)	6.3
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	496
v/s Ratio Prot	0.01
v/s Ratio Perm	0.03
v/c Ratio	0.11
Uniform Delay, d1	18.0
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	18.1
Level of Service	B
Approach Delay (s)	
Approach LOS	

Intersection Summary

Intersection	
Intersection Delay, s/veh	8.2
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	5	0	46	21	175	0	0	35	79	0	0
Future Vol, veh/h	0	5	0	46	21	175	0	0	35	79	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
Heavy Vehicles, %	0	0	0	24	0	7	0	0	65	8	0	0
Mvmt Flow	0	5	0	50	23	190	0	0	38	86	0	0
Number of Lanes	0	1	0	0	1	1	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	1
HCM Control Delay	7.6	8.2	7.2	8.5
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	0%	69%	0%	100%
Vol Thru, %	0%	100%	31%	0%	0%
Vol Right, %	100%	0%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	35	5	67	175	79
LT Vol	0	0	46	0	79
Through Vol	0	5	21	0	0
RT Vol	35	0	0	175	0
Lane Flow Rate	38	5	73	190	86
Geometry Grp	2	5	7	7	2
Degree of Util (X)	0.042	0.007	0.111	0.212	0.116
Departure Headway (Hd)	3.998	4.564	5.471	4.017	4.868
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	900	787	648	879	740
Service Time	2.002	2.577	3.266	1.811	2.87
HCM Lane V/C Ratio	0.042	0.006	0.113	0.216	0.116
HCM Control Delay	7.2	7.6	9	7.9	8.5
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0.1	0	0.4	0.8	0.4

Intersection: 1: Culpeper Street & W Shirley Avenue/E Shirley Avenue

Movement	EB	EB	EB	WB	WB	NB	SB	SB
Directions Served	L	T	R	L	TR	LTR	L	TR
Maximum Queue (ft)	169	304	74	160	384	224	48	95
Average Queue (ft)	30	143	23	28	172	114	13	38
95th Queue (ft)	94	258	53	89	321	201	40	77
Link Distance (ft)		1078	1078		3094	992		778
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	215			185			125	
Storage Blk Time (%)	0	2		0	7			0
Queuing Penalty (veh)	0	1		0	2			0

Intersection: 2: Site Entrance #1 & E Shirley Avenue

Movement	EB	WB
Directions Served	T	L
Maximum Queue (ft)	2	42
Average Queue (ft)	0	5
95th Queue (ft)	2	25
Link Distance (ft)	3094	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		240
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Site Entrance #2 & E Shirley Avenue

Movement	NB	NB
Directions Served	L	R
Maximum Queue (ft)	52	64
Average Queue (ft)	12	17
95th Queue (ft)	41	51
Link Distance (ft)	383	383
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Site Entrance #3 & E Shirley Avenue

Movement	EB	WB	NB
Directions Served	R	L	LR
Maximum Queue (ft)	6	37	108
Average Queue (ft)	0	8	32
95th Queue (ft)	5	31	72
Link Distance (ft)			868
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	150	150	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: E Shirley Avenue & Falmouth Street

Movement	EB	WB	B17	B17	SB
Directions Served	ULT	TR	T		L>
Maximum Queue (ft)	116	170	29	9	84
Average Queue (ft)	23	30	2	0	25
95th Queue (ft)	77	105	27	9	65
Link Distance (ft)	392	351	787	787	742
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 6: James Madison Highway/E Shirley Avenue & Alwington Boulevard

Movement	EB	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	R	LTR	L	T	T	R	UL	T	T	R
Maximum Queue (ft)	133	96	27	61	213	166	135	19	43	103	94	113
Average Queue (ft)	54	20	1	8	103	89	28	2	5	43	34	50
95th Queue (ft)	107	65	13	36	181	154	89	11	25	82	75	91
Link Distance (ft)		1974	1974	480		730	730			787	787	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	560				315			160	165			250
Storage Blk Time (%)					0		0			0		
Queuing Penalty (veh)					0		0			0		

Intersection: 7: Commercial Entrance /Elementary School Entrance & Alwington Boulevard

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	LT	R	LTR	LTR
Maximum Queue (ft)	8	74	86	83	68
Average Queue (ft)	1	37	45	34	34
95th Queue (ft)	5	66	70	78	60
Link Distance (ft)	954	1974		170	605
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			270		
Storage Blk Time (%)					
Queuing Penalty (veh)					

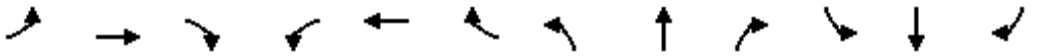
Network Summary

Network wide Queuing Penalty: 3

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	40	557	101	40	563	203	28	91
v/c Ratio	0.28	0.80	0.15	0.27	0.68	0.69	0.15	0.43
Control Delay	50.5	36.9	1.6	49.7	29.6	50.1	42.3	39.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.5	36.9	1.6	49.7	29.6	50.1	42.3	39.8
Queue Length 50th (ft)	25	310	0	25	315	118	17	43
Queue Length 95th (ft)	62	#529	12	62	#541	#207	44	93
Internal Link Dist (ft)		1033			3084	958		736
Turn Bay Length (ft)	215			185			125	
Base Capacity (vph)	141	784	743	149	825	355	334	367
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.71	0.14	0.27	0.68	0.57	0.08	0.25

Intersection Summary

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	512	93	37	505	13	78	77	31	26	54	29
Future Volume (vph)	37	512	93	37	505	13	78	77	31	26	54	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Grade (%)		-2%			-5%			0%			4%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			0.98		1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (prot)	1588	1767	1488	1687	1756			1656		1583	1662	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (perm)	1588	1767	1488	1687	1756			1656		1583	1662	
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)	40	557	101	40	549	14	85	84	34	28	59	32
RTOR Reduction (vph)	0	0	60	0	1	0	0	7	0	0	19	0
Lane Group Flow (vph)	40	557	41	40	562	0	0	196	0	28	72	0
Heavy Vehicles (%)	11%	5%	6%	6%	7%	0%	8%	4%	7%	8%	4%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2									
Actuated Green, G (s)	4.3	39.7	39.7	8.3	43.7			16.1		8.7	8.7	
Effective Green, g (s)	4.3	39.7	39.7	8.3	43.7			16.1		8.7	8.7	
Actuated g/C Ratio	0.04	0.41	0.41	0.09	0.45			0.17		0.09	0.09	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0			4.0		4.0	4.0	
Lane Grp Cap (vph)	70	724	610	144	792			275		142	149	
v/s Ratio Prot	c0.03	c0.32		0.02	c0.32			c0.12		0.02	c0.04	
v/s Ratio Perm			0.03									
v/c Ratio	0.57	0.77	0.07	0.28	0.71			0.71		0.20	0.48	
Uniform Delay, d1	45.3	24.6	17.3	41.4	21.4			38.2		40.8	41.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	12.8	5.2	0.1	1.4	3.2			9.1		0.9	3.3	
Delay (s)	58.1	29.8	17.4	42.9	24.7			47.2		41.7	45.2	
Level of Service	E	C	B	D	C			D		D	D	
Approach Delay (s)		29.7			25.9			47.2			44.4	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	31.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	96.8	Sum of lost time (s)	24.0
Intersection Capacity Utilization	57.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	513	12	19	500	0	0
Future Volume (Veh/h)	513	12	19	500	0	0
Sign Control	Free			Free	Stop	
Grade	-4%			2%	0%	
Peak Hour Factor	0.93	0.50	0.50	0.93	0.93	0.93
Hourly flow rate (vph)	552	24	38	538	0	0
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			576		1166	552
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			576		1166	552
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	100
cM capacity (veh/h)			1007		208	537

Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	552	24	38	538
Volume Left	0	0	38	0
Volume Right	0	24	0	0
cSH	1700	1700	1007	1700
Volume to Capacity	0.32	0.01	0.04	0.32
Queue Length 95th (ft)	0	0	3	0
Control Delay (s)	0.0	0.0	8.7	0.0
Lane LOS			A	
Approach Delay (s)	0.0		0.6	
Approach LOS				

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	37.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	513	0	0	507	12	19
Future Volume (Veh/h)	513	0	0	507	12	19
Sign Control	Free			Free	Stop	
Grade	1%			0%	-2%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.50	0.50
Hourly flow rate (vph)	558	0	0	551	24	38
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			558		1109	558
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			558		1109	558
tC, single (s)			4.1		6.5	6.4
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.5
p0 queue free %			100		89	92
cM capacity (veh/h)			1023		221	502

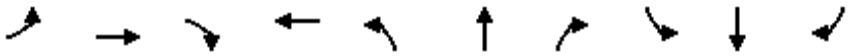
Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	558	551	24	38
Volume Left	0	0	24	0
Volume Right	0	0	0	38
cSH	1700	1700	221	502
Volume to Capacity	0.33	0.32	0.11	0.08
Queue Length 95th (ft)	0	0	9	6
Control Delay (s)	0.0	0.0	23.3	12.8
Lane LOS			C	B
Approach Delay (s)	0.0	0.0	16.8	
Approach LOS			C	

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	37.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	488	44	7	453	54	46
Future Volume (Veh/h)	488	44	7	453	54	46
Sign Control	Free			Free	Stop	
Grade	0%			0%	-3%	
Peak Hour Factor	0.92	0.50	0.50	0.92	0.50	0.50
Hourly flow rate (vph)	530	88	14	492	108	92
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			618		1050	530
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			618		1050	530
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		57	83
cM capacity (veh/h)			972		251	553

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	530	88	14	492	200
Volume Left	0	0	14	0	108
Volume Right	0	88	0	0	92
cSH	1700	1700	972	1700	335
Volume to Capacity	0.31	0.05	0.01	0.29	0.60
Queue Length 95th (ft)	0	0	1	0	91
Control Delay (s)	0.0	0.0	8.8	0.0	30.5
Lane LOS			A		D
Approach Delay (s)	0.0		0.2		30.5
Approach LOS					D

Intersection Summary			
Average Delay	4.7		
Intersection Capacity Utilization	38.2%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	138	140	255	20	199	236	11	18	315	139
v/c Ratio	0.53	0.54	0.17	0.15	0.47	0.17	0.02	0.04	0.53	0.21
Control Delay	38.3	38.5	0.3	27.1	19.1	17.5	0.1	13.9	32.9	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.3	38.5	0.3	27.1	19.1	17.5	0.1	13.9	32.9	1.4
Queue Length 50th (ft)	63	64	0	4	57	33	0	5	71	0
Queue Length 95th (ft)	130	132	0	26	115	86	0	18	123	9
Internal Link Dist (ft)		1992		455		682			791	
Turn Bay Length (ft)	560				315		160	165		250
Base Capacity (vph)	388	389	1485	154	468	1385	634	501	838	771
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.36	0.17	0.13	0.43	0.17	0.02	0.04	0.38	0.18

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	268	2	247	6	3	11	193	229	11	11	7	306
Future Volume (vph)	268	2	247	6	3	11	193	229	11	11	7	306
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		5%			1%			-4%				4%
Total Lost time (s)	6.3	6.3	4.0		8.8		8.7	8.7	8.7		8.7	8.7
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	0.95	1.00		1.00	0.95
Frt	1.00	1.00	0.85		0.93		1.00	1.00	0.85		1.00	1.00
Flt Protected	0.95	0.95	1.00		0.99		0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1655	1661	1485		1329		1737	3474	1211		1678	3276
Flt Permitted	0.95	0.95	1.00		0.99		0.56	1.00	1.00		0.60	1.00
Satd. Flow (perm)	1655	1661	1485		1329		1025	3474	1211		1068	3276
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	276	2	255	6	3	11	199	236	11	11	7	315
RTOR Reduction (vph)	0	0	0	0	10	0	0	0	7	0	0	0
Lane Group Flow (vph)	138	140	255	0	10	0	199	236	4	0	18	315
Heavy Vehicles (%)	1%	0%	6%	33%	33%	27%	6%	6%	36%	0%	14%	8%
Turn Type	Split	NA	Free	Split	NA		D.P+P	NA	Perm	D.P+P	D.P+P	NA
Protected Phases	4	4		3	3		5	2		1	1	6
Permitted Phases			Free				6		2	2	2	
Actuated Green, G (s)	11.9	11.9	83.2		7.3		31.5	30.3	30.3		31.5	21.1
Effective Green, g (s)	11.9	11.9	83.2		7.3		31.5	30.3	30.3		31.5	21.1
Actuated g/C Ratio	0.14	0.14	1.00		0.09		0.38	0.36	0.36		0.38	0.25
Clearance Time (s)	6.3	6.3			8.8		8.7	8.7	8.7		8.7	8.7
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	236	237	1485		116		477	1265	441		413	830
v/s Ratio Prot	0.08	c0.08			0.01		c0.05	0.07			0.00	0.10
v/s Ratio Perm			c0.17				c0.11		0.00		0.02	
v/c Ratio	0.58	0.59	0.17		0.09		0.42	0.19	0.01		0.04	0.38
Uniform Delay, d1	33.3	33.4	0.0		34.9		18.1	18.0	16.9		16.2	25.6
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	3.7	3.9	0.3		0.3		0.6	0.1	0.0		0.0	0.3
Delay (s)	37.0	37.3	0.3		35.2		18.7	18.1	16.9		16.3	25.9
Level of Service	D	D	A		D		B	B	B		B	C
Approach Delay (s)		19.5			35.2			18.4				22.6
Approach LOS		B			D			B				C

Intersection Summary			
HCM 2000 Control Delay	20.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	83.2	Sum of lost time (s)	32.5
Intersection Capacity Utilization	54.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	135
Future Volume (vph)	135
Ideal Flow (vphpl)	1900
Grade (%)	
Total Lost time (s)	6.3
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1507
Flt Permitted	1.00
Satd. Flow (perm)	1507
Peak-hour factor, PHF	0.97
Adj. Flow (vph)	139
RTOR Reduction (vph)	84
Lane Group Flow (vph)	55
Heavy Vehicles (%)	5%
Turn Type	pm+ov
Protected Phases	4
Permitted Phases	6
Actuated Green, G (s)	33.0
Effective Green, g (s)	33.0
Actuated g/C Ratio	0.40
Clearance Time (s)	6.3
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	597
v/s Ratio Prot	0.01
v/s Ratio Perm	0.02
v/c Ratio	0.09
Uniform Delay, d1	15.7
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	15.8
Level of Service	B
Approach Delay (s)	
Approach LOS	

Intersection Summary

Intersection	
Intersection Delay, s/veh	7.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	8	0	11	4	76	0	0	12	72	0	0
Future Vol, veh/h	0	8	0	11	4	76	0	0	12	72	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
Heavy Vehicles, %	0	13	0	55	2	7	0	0	35	0	0	0
Mvmt Flow	0	9	0	12	4	83	0	0	13	78	0	0
Number of Lanes	0	1	0	0	1	1	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	1
HCM Control Delay	7.6	7.5	6.7	7.8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	0%	73%	0%	100%
Vol Thru, %	0%	100%	27%	0%	0%
Vol Right, %	100%	0%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	12	8	15	76	72
LT Vol	0	0	11	0	72
Through Vol	0	8	4	0	0
RT Vol	12	0	0	76	0
Lane Flow Rate	13	9	16	83	78
Geometry Grp	2	5	7	7	2
Degree of Util (X)	0.013	0.011	0.027	0.092	0.093
Departure Headway (Hd)	3.542	4.457	5.969	3.999	4.292
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	993	795	598	891	827
Service Time	1.627	2.531	3.719	1.747	2.358
HCM Lane V/C Ratio	0.013	0.011	0.027	0.093	0.094
HCM Control Delay	6.7	7.6	8.9	7.2	7.8
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0	0	0.1	0.3	0.3

Intersection: 1: Culpeper Street & W Shirley Avenue/E Shirley Avenue

Movement	EB	EB	EB	WB	WB	NB	SB	SB
Directions Served	L	T	R	L	TR	LTR	L	TR
Maximum Queue (ft)	202	394	66	175	423	242	95	140
Average Queue (ft)	47	217	28	44	215	109	22	56
95th Queue (ft)	138	362	56	127	372	193	60	111
Link Distance (ft)		1078	1078		3094	992		778
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	215			185			125	
Storage Blk Time (%)	0	10		0	12		0	1
Queuing Penalty (veh)	0	4		0	4		0	0

Intersection: 2: Site Entrance #1 & E Shirley Avenue

Movement	WB
Directions Served	L
Maximum Queue (ft)	34
Average Queue (ft)	7
95th Queue (ft)	28
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	240
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Site Entrance #2 & E Shirley Avenue

Movement	EB	NB	NB
Directions Served	T	L	R
Maximum Queue (ft)	4	60	65
Average Queue (ft)	0	13	17
95th Queue (ft)	3	43	49
Link Distance (ft)	505	383	383
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: Site Entrance #3 & E Shirley Avenue

Movement	EB	WB	NB
Directions Served	R	L	LR
Maximum Queue (ft)	2	30	134
Average Queue (ft)	0	3	38
95th Queue (ft)	2	17	89
Link Distance (ft)			868
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	150	150	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: E Shirley Avenue & Falmouth Street

Movement	EB	WB	B17	B17	SB
Directions Served	ULT	UTR	T		L>
Maximum Queue (ft)	216	176	29	9	88
Average Queue (ft)	69	32	2	0	32
95th Queue (ft)	170	112	28	9	71
Link Distance (ft)	392	351	787	787	742
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 6: James Madison Highway/E Shirley Avenue & Alwington Boulevard

Movement	EB	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	R	LTR	L	T	T	R	UL	T	T	R
Maximum Queue (ft)	164	125	69	65	164	148	92	42	51	147	154	89
Average Queue (ft)	83	46	6	14	79	67	14	5	11	79	82	39
95th Queue (ft)	140	103	35	46	137	128	51	24	34	126	135	73
Link Distance (ft)		1974	1974	480		730	730			787	787	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	560				315			160	165			250
Storage Blk Time (%)										0		
Queuing Penalty (veh)										0		

Intersection: 7: Commercial Entrance /Elementary School Entrance & Alwington Boulevard

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	LT	R	LTR	LTR
Maximum Queue (ft)	23	65	68	63	50
Average Queue (ft)	3	13	31	13	28
95th Queue (ft)	12	47	56	45	45
Link Distance (ft)	954	1974		170	605
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			270		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 9

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	40	504	155	34	497	189	37	147
v/c Ratio	0.27	0.78	0.24	0.23	0.64	0.68	0.15	0.58
Control Delay	50.9	37.9	4.8	50.2	29.8	50.6	39.7	47.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.9	37.9	4.8	50.2	29.8	50.6	39.7	47.3
Queue Length 50th (ft)	24	277	0	20	270	105	20	81
Queue Length 95th (ft)	63	446	42	56	434	197	53	154
Internal Link Dist (ft)		1033			3084	958		736
Turn Bay Length (ft)	215			185			125	
Base Capacity (vph)	148	756	732	145	801	348	340	350
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.67	0.21	0.23	0.62	0.54	0.11	0.42

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	474	146	32	463	4	84	65	29	35	112	26
Future Volume (vph)	38	474	146	32	463	4	84	65	29	35	112	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Grade (%)		-2%			-5%			0%			4%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			0.98		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (prot)	1762	1801	1531	1736	1826			1715		1710	1721	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (perm)	1762	1801	1531	1736	1826			1715		1710	1721	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	40	504	155	34	493	4	89	69	31	37	119	28
RTOR Reduction (vph)	0	0	96	0	0	0	0	7	0	0	8	0
Lane Group Flow (vph)	40	504	59	34	497	0	0	182	0	37	139	0
Heavy Vehicles (%)	0%	3%	3%	3%	3%	0%	2%	2%	4%	0%	2%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2									
Actuated Green, G (s)	4.4	37.7	37.7	8.1	41.4			15.4		13.8	13.8	
Effective Green, g (s)	4.4	37.7	37.7	8.1	41.4			15.4		13.8	13.8	
Actuated g/C Ratio	0.04	0.38	0.38	0.08	0.42			0.16		0.14	0.14	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0			4.0		4.0	4.0	
Lane Grp Cap (vph)	78	685	583	142	763			266		238	239	
v/s Ratio Prot	c0.02	c0.28		0.02	c0.27			c0.11		0.02	c0.08	
v/s Ratio Perm			0.04									
v/c Ratio	0.51	0.74	0.10	0.24	0.65			0.69		0.16	0.58	
Uniform Delay, d1	46.3	26.4	19.7	42.6	23.0			39.5		37.5	39.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	7.4	4.4	0.1	1.2	2.2			7.7		0.4	4.2	
Delay (s)	53.6	30.8	19.8	43.8	25.2			47.2		37.9	44.1	
Level of Service	D	C	B	D	C			D		D	D	
Approach Delay (s)		29.6			26.4			47.2			42.9	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	32.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	99.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	63.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	509	0	0	467	0	0
Future Volume (Veh/h)	509	0	0	467	0	0
Sign Control	Free			Free	Stop	
Grade	-4%			2%	0%	
Peak Hour Factor	0.92	0.50	0.50	0.92	0.92	0.92
Hourly flow rate (vph)	553	0	0	508	0	0
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			553		1061	553
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			553		1061	553
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		100	100
cM capacity (veh/h)			1027		250	537

Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	553	0	0	508
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1700	1700	1700	1700
Volume to Capacity	0.33	0.01	0.00	0.30
Queue Length 95th (ft)	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS				
Approach Delay (s)	0.0		0.0	
Approach LOS				

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	36.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	509	0	0	467	0	0
Future Volume (Veh/h)	509	0	0	467	0	0
Sign Control	Free			Free	Stop	
Grade	1%			0%	-2%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.50	0.50
Hourly flow rate (vph)	553	0	0	508	0	0
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			553		1061	553
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			553		1061	553
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		100	100
cM capacity (veh/h)			1027		250	537

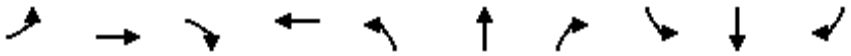
Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	553	508	0	0
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1700	1700	1700	1700
Volume to Capacity	0.33	0.30	0.08	0.06
Queue Length 95th (ft)	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS			A	A
Approach Delay (s)	0.0	0.0	0.0	
Approach LOS			A	

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	36.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	480	29	28	447	20	4
Future Volume (Veh/h)	480	29	28	447	20	4
Sign Control	Free			Free	Stop	
Grade	0%			0%	-3%	
Peak Hour Factor	0.92	0.50	0.50	0.92	0.50	0.50
Hourly flow rate (vph)	522	58	56	486	40	8
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		1120	522
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			580		1120	522
tC, single (s)			4.2		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			94		82	99
cM capacity (veh/h)			960		217	559

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	522	58	56	486	48
Volume Left	0	0	56	0	40
Volume Right	0	58	0	0	8
cSH	1700	1700	960	1700	242
Volume to Capacity	0.31	0.03	0.06	0.29	0.20
Queue Length 95th (ft)	0	0	5	0	18
Control Delay (s)	0.0	0.0	9.0	0.0	23.5
Lane LOS			A		C
Approach Delay (s)	0.0		0.9		23.5
Approach LOS					C

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	35.3%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	136	136	221	17	214	268	1	15	378	88
v/c Ratio	0.53	0.53	0.14	0.05	0.53	0.19	0.00	0.04	0.59	0.14
Control Delay	37.9	37.9	0.2	0.2	20.5	17.4	0.0	13.7	32.5	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.9	37.9	0.2	0.2	20.5	17.4	0.0	13.7	32.5	0.5
Queue Length 50th (ft)	62	62	0	0	62	38	0	4	86	0
Queue Length 95th (ft)	125	125	0	0	122	95	0	15	140	1
Internal Link Dist (ft)		1992		455		682			791	
Turn Bay Length (ft)	560				315		160	165		250
Base Capacity (vph)	417	417	1529	547	418	1415	465	388	858	767
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.33	0.14	0.03	0.51	0.19	0.00	0.04	0.44	0.11

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	258	0	210	5	0	11	203	255	1	9	6	359
Future Volume (vph)	258	0	210	5	0	11	203	255	1	9	6	359
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		5%			1%			-4%				4%
Total Lost time (s)	6.3	6.3	4.0		8.8		8.7	8.7	8.7		8.7	8.7
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	0.95	1.00		1.00	0.95
Frt	1.00	1.00	0.85		0.90		1.00	1.00	0.85		1.00	1.00
Flt Protected	0.95	0.95	1.00		0.99		0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1655	1655	1529		1502		1721	3541	824		1328	3369
Flt Permitted	0.95	0.95	1.00		0.99		0.53	1.00	1.00		0.59	1.00
Satd. Flow (perm)	1655	1655	1529		1502		955	3541	824		820	3369
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	272	0	221	5	0	12	214	268	1	9	6	378
RTOR Reduction (vph)	0	0	0	0	16	0	0	0	1	0	0	0
Lane Group Flow (vph)	136	136	221	0	1	0	214	268	0	0	15	378
Heavy Vehicles (%)	1%	0%	3%	20%	0%	9%	7%	4%	100%	0%	83%	5%
Turn Type	Split	NA	Free	Split	NA		D.P+P	NA	Perm	D.P+P	D.P+P	NA
Protected Phases	4	4		3	3		5	2		1	1	6
Permitted Phases			Free				6		2	2	2	
Actuated Green, G (s)	11.8	11.8	83.0		7.1		31.6	30.4	30.4		31.6	21.8
Effective Green, g (s)	11.8	11.8	83.0		7.1		31.6	30.4	30.4		31.6	21.8
Actuated g/C Ratio	0.14	0.14	1.00		0.09		0.38	0.37	0.37		0.38	0.26
Clearance Time (s)	6.3	6.3			8.8		8.7	8.7	8.7		8.7	8.7
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	235	235	1529		128		454	1296	301		319	884
v/s Ratio Prot	c0.08	0.08			0.00		c0.06	c0.08			0.00	0.11
v/s Ratio Perm			c0.14				c0.12		0.00		0.02	
v/c Ratio	0.58	0.58	0.14		0.01		0.47	0.21	0.00		0.05	0.43
Uniform Delay, d1	33.3	33.3	0.0		34.7		18.2	18.0	16.7		16.1	25.4
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	3.4	3.4	0.2		0.0		0.8	0.1	0.0		0.1	0.3
Delay (s)	36.7	36.7	0.2		34.8		19.0	18.1	16.7		16.2	25.8
Level of Service	D	D	A		C		B	B	B		B	C
Approach Delay (s)		20.3			34.8			18.5				23.5
Approach LOS		C			C			B				C

Intersection Summary			
HCM 2000 Control Delay	20.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	83.0	Sum of lost time (s)	32.5
Intersection Capacity Utilization	54.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	84
Future Volume (vph)	84
Ideal Flow (vphpl)	1900
Grade (%)	
Total Lost time (s)	6.3
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1439
Flt Permitted	1.00
Satd. Flow (perm)	1439
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	88
RTOR Reduction (vph)	52
Lane Group Flow (vph)	36
Heavy Vehicles (%)	10%
Turn Type	pm+ov
Protected Phases	4
Permitted Phases	6
Actuated Green, G (s)	33.6
Effective Green, g (s)	33.6
Actuated g/C Ratio	0.40
Clearance Time (s)	6.3
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	582
v/s Ratio Prot	0.01
v/s Ratio Perm	0.02
v/c Ratio	0.06
Uniform Delay, d1	15.1
Progression Factor	1.00
Incremental Delay, d2	0.0
Delay (s)	15.1
Level of Service	B
Approach Delay (s)	
Approach LOS	

Intersection Summary

Intersection	
Intersection Delay, s/veh	7.3
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	16	0	14	4	36	0	0	28	30	0	0
Future Vol, veh/h	0	16	0	14	4	36	0	0	28	30	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
Heavy Vehicles, %	0	0	0	57	0	18	0	0	7	0	0	0
Mvmt Flow	0	17	0	15	4	39	0	0	30	33	0	0
Number of Lanes	0	1	0	0	1	1	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	1
HCM Control Delay	7.3	7.5	6.6	7.5
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	0%	78%	0%	100%
Vol Thru, %	0%	100%	22%	0%	0%
Vol Right, %	100%	0%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	28	16	18	36	30
LT Vol	0	0	14	0	30
Through Vol	0	16	4	0	0
RT Vol	28	0	0	36	0
Lane Flow Rate	30	17	20	39	33
Geometry Grp	2	5	7	7	2
Degree of Util (X)	0.029	0.02	0.032	0.043	0.039
Departure Headway (Hd)	3.452	4.154	5.978	3.918	4.252
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	1025	858	600	913	836
Service Time	1.513	2.196	3.705	1.644	2.306
HCM Lane V/C Ratio	0.029	0.02	0.033	0.043	0.039
HCM Control Delay	6.6	7.3	8.9	6.8	7.5
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0.1	0.1	0.1	0.1	0.1

Intersection: 1: Culpeper Street & W Shirley Avenue/E Shirley Avenue

Movement	EB	EB	EB	WB	WB	NB	SB	SB
Directions Served	L	T	R	L	TR	LTR	L	TR
Maximum Queue (ft)	202	411	116	141	373	192	120	186
Average Queue (ft)	44	202	39	31	181	100	29	84
95th Queue (ft)	135	340	86	94	313	172	79	156
Link Distance (ft)		1078	1078		3094	992		778
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	215			185			125	
Storage Blk Time (%)	0	7		0	9		0	3
Queuing Penalty (veh)	0	3		0	3		0	1

Intersection: 2: Site Entrance #1 & E Shirley Avenue

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

Intersection: 3: Site Entrance #2 & E Shirley Avenue

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

Intersection: 4: Site Entrance #3 & E Shirley Avenue

Movement	WB	NB
Directions Served	L	LR
Maximum Queue (ft)	52	42
Average Queue (ft)	10	13
95th Queue (ft)	37	34
Link Distance (ft)		868
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	150	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: E Shirley Avenue & Falmouth Street

Movement	EB	WB	B17	SB
Directions Served	ULT	TR	T	L>
Maximum Queue (ft)	198	124	37	65
Average Queue (ft)	57	16	1	26
95th Queue (ft)	149	73	23	56
Link Distance (ft)	392	351	787	742
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: James Madison Highway/E Shirley Avenue & Alwington Boulevard

Movement	EB	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	R	LTR	L	T	T	R	UL	T	T	R
Maximum Queue (ft)	151	113	47	50	181	173	91	28	74	165	167	78
Average Queue (ft)	80	36	4	9	86	71	15	2	11	89	93	32
95th Queue (ft)	133	89	22	33	148	131	54	16	44	145	150	67
Link Distance (ft)		1974	1974	480		730	730			787	787	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	560				315			160	165			250
Storage Blk Time (%)							0			0		
Queuing Penalty (veh)							0			0		

Intersection: 7: Commercial Entrance /Elementary School Entrance & Alwington Boulevard

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	LT	R	LTR	LTR
Maximum Queue (ft)	8	75	68	56	36
Average Queue (ft)	3	22	25	19	19
95th Queue (ft)	9	62	56	45	42
Link Distance (ft)	954	1974		170	605
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			270		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 7

MOVEMENT SUMMARY

Site: 101 [2026 Future - AM Peak (Site Folder: General)]

AM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: E Shirley Avenue														
1u	U	1	0.0	1	0.0	0.524	9.8	LOS A	4.0	108.7	0.30	0.14	0.30	24.4
6	T1	403	10.0	438	10.0	0.524	10.1	LOS B	4.0	108.7	0.30	0.14	0.30	23.3
16	R2	75	11.0	82	11.0	0.524	10.2	LOS B	4.0	108.7	0.30	0.14	0.30	22.7
Approach		479	10.1	521	10.1	0.524	10.1	LOS B	4.0	108.7	0.30	0.14	0.30	23.2
North: Falmouth Street														
7	L2	77	21.0	84	21.0	0.215	8.9	LOS A	1.3	36.2	0.66	0.55	0.66	23.3
14	R2	44	9.0	48	9.0	0.215	8.1	LOS A	1.3	36.2	0.66	0.55	0.66	22.3
Approach		121	16.6	132	16.6	0.215	8.6	LOS A	1.3	36.2	0.66	0.55	0.66	22.9
West: E Shirley Avenue														
5u	U	1	0.0	1	0.0	0.125	4.6	LOS A	0.7	19.6	0.33	0.17	0.33	25.3
5	L2	39	19.0	42	19.0	0.125	5.3	LOS A	0.7	19.6	0.33	0.17	0.33	24.6
2	T1	276	9.0	300	9.0	0.125	1.2	LOS A	0.7	19.6	0.08	0.04	0.08	25.5
Approach		316	10.2	343	10.2	0.125	1.8	LOS A	0.7	19.6	0.11	0.06	0.11	25.4
All Vehicles		916	11.0	996	11.0	0.524	7.0	LOS A	4.0	108.7	0.28	0.17	0.28	23.9

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

MOVEMENT SUMMARY

Site: 101 [2026 Future - School PM (Site Folder: General)]

School PM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: E Shirley Avenue														
1u	U	2	0.0	2	0.0	0.520	9.5	LOS A	4.1	106.2	0.27	0.12	0.27	24.5
6	T1	414	4.0	418	4.0	0.520	9.6	LOS A	4.1	106.2	0.27	0.12	0.27	23.4
16	R2	130	6.0	131	6.0	0.520	9.7	LOS A	4.1	106.2	0.27	0.12	0.27	22.8
Approach		546	4.5	552	4.5	0.520	9.6	LOS A	4.1	106.2	0.27	0.12	0.27	23.2
North: Falmouth Street														
7	L2	123	7.0	124	7.0	0.210	7.4	LOS A	1.3	33.5	0.62	0.49	0.62	23.4
14	R2	29	0.0	29	0.0	0.210	7.0	LOS A	1.3	33.5	0.62	0.49	0.62	22.5
Approach		152	5.7	154	5.7	0.210	7.3	LOS A	1.3	33.5	0.62	0.49	0.62	23.2
West: E Shirley Avenue														
5u	U	2	0.0	2	0.0	0.187	5.4	LOS A	1.1	29.7	0.39	0.23	0.39	25.3
5	L2	34	23.0	34	23.0	0.187	6.4	LOS A	1.1	29.7	0.39	0.23	0.39	24.6
2	T1	484	5.0	489	5.0	0.187	1.6	LOS A	1.1	29.7	0.11	0.07	0.11	25.4
Approach		520	6.2	525	6.2	0.187	1.9	LOS A	1.1	29.7	0.13	0.08	0.13	25.4
All Vehicles		1218	5.3	1230	5.3	0.520	6.0	LOS A	4.1	106.2	0.25	0.15	0.25	24.1

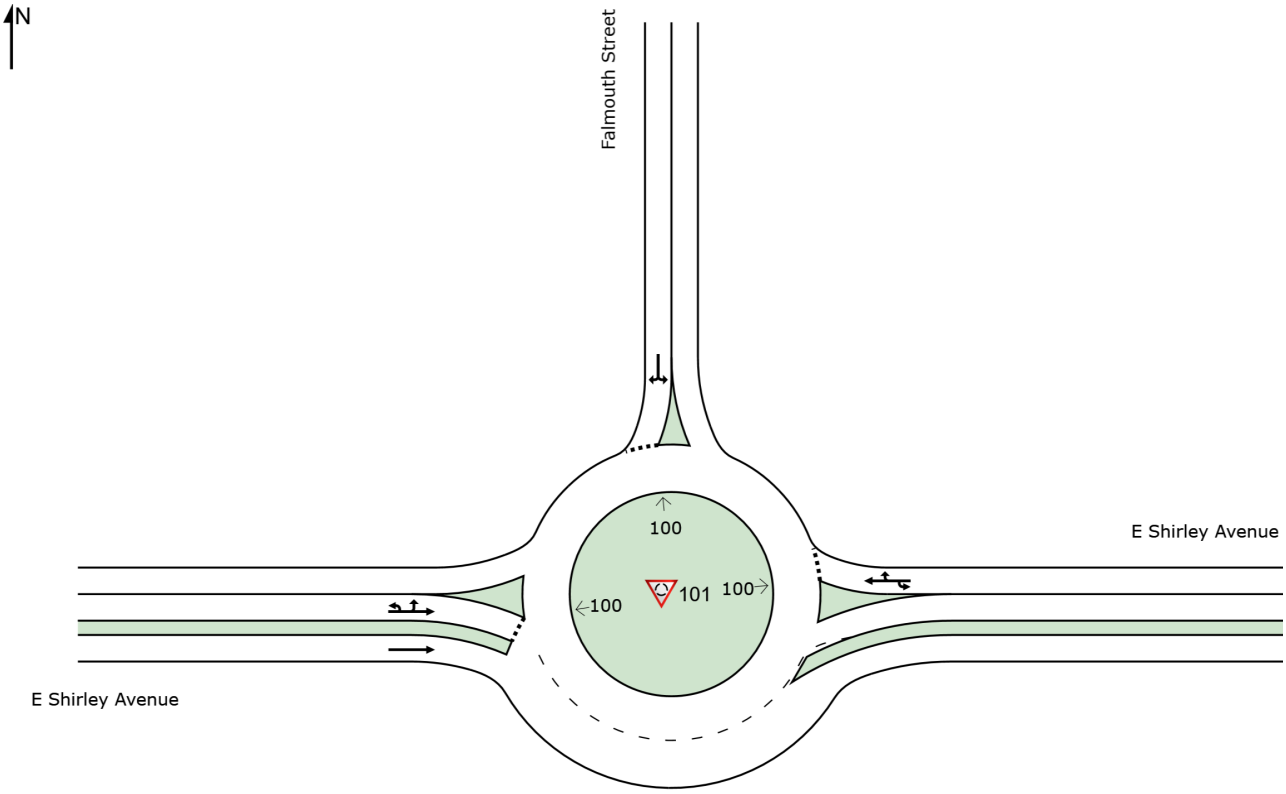
Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if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

SITE LAYOUT

Site: 101 [2026 Future - School PM (Site Folder: General)]

School PM Peak
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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MOVEMENT SUMMARY

Site: 101 [2026 Future - Commuter Peak (Site Folder: General)]

AM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: E Shirley Avenue														
1u	U	1	0.0	1	0.0	0.633	12.5	LOS B	6.4	182.4	0.27	0.10	0.27	23.6
6	T1	423	21.0	460	21.0	0.633	13.2	LOS B	6.4	182.4	0.27	0.10	0.27	22.6
16	R2	139	4.0	151	4.0	0.633	12.7	LOS B	6.4	182.4	0.27	0.10	0.27	22.0
Approach		563	16.8	612	16.8	0.633	13.1	LOS B	6.4	182.4	0.27	0.10	0.27	22.4
North: Falmouth Street														
7	L2	111	1.0	121	1.0	0.234	7.9	LOS A	1.5	38.9	0.70	0.58	0.70	23.3
14	R2	36	9.0	39	9.0	0.234	8.5	LOS A	1.5	38.9	0.70	0.58	0.70	22.3
Approach		147	3.0	160	3.0	0.234	8.1	LOS A	1.5	38.9	0.70	0.58	0.70	23.0
West: E Shirley Avenue														
5u	U	2	0.0	2	0.0	0.188	5.3	LOS A	1.1	29.9	0.38	0.21	0.38	25.5
5	L2	20	11.0	22	11.0	0.188	5.7	LOS A	1.1	29.9	0.38	0.21	0.38	24.8
2	T1	473	5.0	514	5.0	0.188	1.7	LOS A	1.1	29.9	0.12	0.07	0.12	25.4
Approach		495	5.2	538	5.2	0.188	1.9	LOS A	1.1	29.9	0.13	0.07	0.13	25.4
All Vehicles		1205	10.3	1310	10.3	0.633	7.9	LOS A	6.4	182.4	0.26	0.15	0.26	23.6

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

Appendix G
2032 Background Analysis Worksheets

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	34	391	78	34	553	249	17	60
v/c Ratio	0.22	0.58	0.12	0.24	0.71	0.76	0.10	0.32
Control Delay	47.2	27.6	0.3	48.1	30.3	52.0	42.4	33.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.2	27.6	0.3	48.1	30.3	52.0	42.4	33.6
Queue Length 50th (ft)	21	189	0	21	307	143	10	22
Queue Length 95th (ft)	53	302	0	54	#524	#272	31	62
Internal Link Dist (ft)		1033			3084	958		736
Turn Bay Length (ft)	215			185			125	
Base Capacity (vph)	157	758	745	143	777	365	362	364
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.52	0.10	0.24	0.71	0.68	0.05	0.16

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	360	72	31	485	24	85	89	55	16	34	21
Future Volume (vph)	31	360	72	31	485	24	85	89	55	16	34	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Grade (%)		-2%			-5%			0%			4%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99			0.97		1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (prot)	1762	1702	1488	1611	1663			1678		1710	1635	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (perm)	1762	1702	1488	1611	1663			1678		1710	1635	
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)	34	391	78	34	527	26	92	97	60	17	37	23
RTOR Reduction (vph)	0	0	46	0	2	0	0	11	0	0	21	0
Lane Group Flow (vph)	34	391	32	34	551	0	0	238	0	17	39	0
Heavy Vehicles (%)	0%	9%	6%	11%	13%	0%	6%	2%	4%	0%	3%	5%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2									
Actuated Green, G (s)	4.4	39.1	39.1	8.2	42.9			17.3		7.3	7.3	
Effective Green, g (s)	4.4	39.1	39.1	8.2	42.9			17.3		7.3	7.3	
Actuated g/C Ratio	0.05	0.41	0.41	0.09	0.45			0.18		0.08	0.08	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0			4.0		4.0	4.0	
Lane Grp Cap (vph)	80	693	606	137	743			302		130	124	
v/s Ratio Prot	0.02	0.23		c0.02	c0.33			c0.14		0.01	c0.02	
v/s Ratio Perm			0.02									
v/c Ratio	0.42	0.56	0.05	0.25	0.74			0.79		0.13	0.31	
Uniform Delay, d1	44.5	21.8	17.2	41.0	21.9			37.6		41.3	41.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	4.9	1.3	0.0	1.3	4.3			13.5		0.6	2.0	
Delay (s)	49.4	23.1	17.2	42.3	26.2			51.1		42.0	43.9	
Level of Service	D	C	B	D	C			D		D	D	
Approach Delay (s)		24.0			27.1			51.1			43.5	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	31.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	95.9	Sum of lost time (s)	24.0
Intersection Capacity Utilization	56.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	343	37	48	533	0	0
Future Volume (Veh/h)	343	37	48	533	0	0
Sign Control	Free			Free	Stop	
Grade	-4%			2%	0%	
Peak Hour Factor	0.92	0.50	0.50	0.92	0.92	0.92
Hourly flow rate (vph)	373	74	96	579	0	0
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			447		1144	373
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			447		1144	373
tC, single (s)			4.2		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			91		100	100
cM capacity (veh/h)			1057		203	678

Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	373	74	96	579
Volume Left	0	0	96	0
Volume Right	0	74	0	0
cSH	1700	1700	1057	1700
Volume to Capacity	0.22	0.04	0.09	0.34
Queue Length 95th (ft)	0	0	7	0
Control Delay (s)	0.0	0.0	8.7	0.0
Lane LOS			A	
Approach Delay (s)	0.0		1.2	
Approach LOS				

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	38.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	343	0	0	540	41	51
Future Volume (Veh/h)	343	0	0	540	41	51
Sign Control	Free			Free	Stop	
Grade	1%			0%	-2%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.50	0.50
Hourly flow rate (vph)	373	0	0	587	82	102
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			373		960	373
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			373		960	373
tC, single (s)			4.1		6.6	6.4
tC, 2 stage (s)						
tF (s)			2.2		3.7	3.4
p0 queue free %			100		69	84
cM capacity (veh/h)			1197		268	643

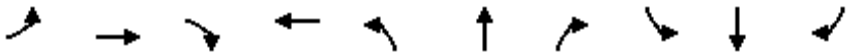
Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	373	587	82	102
Volume Left	0	0	82	0
Volume Right	0	0	0	102
cSH	1700	1700	268	643
Volume to Capacity	0.22	0.35	0.31	0.16
Queue Length 95th (ft)	0	0	31	14
Control Delay (s)	0.0	0.0	24.3	11.6
Lane LOS			C	B
Approach Delay (s)	0.0	0.0	17.3	
Approach LOS			C	

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	38.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	377	17	24	540	0	0
Future Volume (Veh/h)	377	17	24	540	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	-3%	
Peak Hour Factor	0.95	0.50	0.50	0.95	0.95	0.95
Hourly flow rate (vph)	397	34	48	568	0	0
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			431		1061	397
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			431		1061	397
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	100
cM capacity (veh/h)			1139		240	657

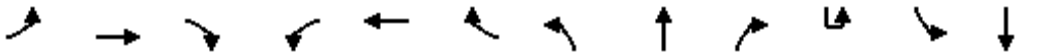
Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	397	34	48	568
Volume Left	0	0	48	0
Volume Right	0	34	0	0
cSH	1700	1700	1139	1700
Volume to Capacity	0.23	0.02	0.04	0.33
Queue Length 95th (ft)	0	0	3	0
Control Delay (s)	0.0	0.0	8.3	0.0
Lane LOS			A	
Approach Delay (s)	0.0		0.6	
Approach LOS				

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	31.8%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	85	86	84	6	205	514	11	11	204	184
v/c Ratio	0.46	0.47	0.07	0.02	0.47	0.37	0.01	0.03	0.38	0.30
Control Delay	38.8	39.0	0.1	0.2	17.9	18.2	0.0	12.7	30.5	2.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.8	39.0	0.1	0.2	17.9	18.2	0.0	12.7	30.5	2.8
Queue Length 50th (ft)	37	37	0	0	57	77	0	3	43	0
Queue Length 95th (ft)	88	88	0	0	110	172	0	12	82	20
Internal Link Dist (ft)		1992		455		682			791	
Turn Bay Length (ft)	560				315		160	165		250
Base Capacity (vph)	263	263	1291	336	515	1402	825	374	859	687
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.33	0.07	0.02	0.40	0.37	0.01	0.03	0.24	0.27

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	157	0	77	2	0	4	189	473	10	2	8	188
Future Volume (vph)	157	0	77	2	0	4	189	473	10	2	8	188
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		5%			1%			-4%				4%
Total Lost time (s)	6.3	6.3	4.0		8.8		8.7	8.7	8.7		8.7	8.7
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	0.95	1.00		1.00	0.95
Frt	1.00	1.00	0.85		0.91		1.00	1.00	0.85		1.00	1.00
Flt Protected	0.95	0.95	1.00		0.98		0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1316	1316	1291		1015		1674	3409	1647		1430	3103
Flt Permitted	0.95	0.95	1.00		0.98		0.62	1.00	1.00		0.46	1.00
Satd. Flow (perm)	1316	1316	1291		1015		1099	3409	1647		688	3103
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)	171	0	84	2	0	4	205	514	11	2	9	204
RTOR Reduction (vph)	0	0	0	0	5	0	0	0	7	0	0	0
Lane Group Flow (vph)	85	86	84	0	1	0	205	514	4	0	11	204
Heavy Vehicles (%)	27%	0%	22%	50%	0%	75%	10%	8%	0%	0%	29%	14%
Turn Type	Split	NA	Free	Split	NA		D.P+P	NA	Perm	D.P+P	D.P+P	NA
Protected Phases	4	4		3	3		5	2		1	1	6
Permitted Phases			Free				6		2	2	2	
Actuated Green, G (s)	10.3	10.3	80.8		7.0		31.0	29.8	29.8		31.0	19.9
Effective Green, g (s)	10.3	10.3	80.8		7.0		31.0	29.8	29.8		31.0	19.9
Actuated g/C Ratio	0.13	0.13	1.00		0.09		0.38	0.37	0.37		0.38	0.25
Clearance Time (s)	6.3	6.3			8.8		8.7	8.7	8.7		8.7	8.7
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	167	167	1291		87		500	1257	607		274	764
v/s Ratio Prot	0.06	c0.07			0.00		c0.06	c0.15			0.00	0.07
v/s Ratio Perm			c0.07				0.10		0.00		0.01	
v/c Ratio	0.51	0.51	0.07		0.01		0.41	0.41	0.01		0.04	0.27
Uniform Delay, d1	32.9	32.9	0.0		33.7		17.5	19.0	16.1		15.5	24.6
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	2.4	2.7	0.1		0.0		0.5	0.2	0.0		0.1	0.2
Delay (s)	35.3	35.6	0.1		33.7		18.0	19.2	16.1		15.5	24.8
Level of Service	D	D	A		C		B	B	B		B	C
Approach Delay (s)		23.8			33.7			18.8				20.8
Approach LOS		C			C			B				C

Intersection Summary			
HCM 2000 Control Delay	20.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	80.8	Sum of lost time (s)	32.5
Intersection Capacity Utilization	51.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	169
Future Volume (vph)	169
Ideal Flow (vphpl)	1900
Grade (%)	
Total Lost time (s)	6.3
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1426
Flt Permitted	1.00
Satd. Flow (perm)	1426
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	184
RTOR Reduction (vph)	115
Lane Group Flow (vph)	69
Heavy Vehicles (%)	11%
Turn Type	pm+ov
Protected Phases	4
Permitted Phases	6
Actuated Green, G (s)	30.2
Effective Green, g (s)	30.2
Actuated g/C Ratio	0.37
Clearance Time (s)	6.3
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	532
v/s Ratio Prot	0.02
v/s Ratio Perm	0.03
v/c Ratio	0.13
Uniform Delay, d1	16.6
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	16.8
Level of Service	B
Approach Delay (s)	
Approach LOS	

Intersection Summary

Intersection	
Intersection Delay, s/veh	7.8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	51	0	49	41	96	0	0	37	14	0	0
Future Vol, veh/h	0	51	0	49	41	96	0	0	37	14	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
Heavy Vehicles, %	0	0	0	24	0	7	0	0	65	8	0	0
Mvmt Flow	0	55	0	53	45	104	0	0	40	15	0	0
Number of Lanes	0	1	0	0	1	1	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	1
HCM Control Delay	7.6	8	7.1	8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	0%	54%	0%	100%
Vol Thru, %	0%	100%	46%	0%	0%
Vol Right, %	100%	0%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	37	51	90	96	14
LT Vol	0	0	49	0	14
Through Vol	0	51	41	0	0
RT Vol	37	0	0	96	0
Lane Flow Rate	40	55	98	104	15
Geometry Grp	2	5	7	7	2
Degree of Util (X)	0.044	0.065	0.144	0.114	0.021
Departure Headway (Hd)	3.9	4.243	5.307	3.925	4.862
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	923	832	675	910	740
Service Time	1.901	2.333	3.047	1.664	2.864
HCM Lane V/C Ratio	0.043	0.066	0.145	0.114	0.02
HCM Control Delay	7.1	7.6	8.9	7.2	8
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0.1	0.2	0.5	0.4	0.1

Intersection: 1: Culpeper Street & W Shirley Avenue/E Shirley Avenue

Movement	EB	EB	EB	WB	WB	NB	SB	SB
Directions Served	L	T	R	L	TR	LTR	L	TR
Maximum Queue (ft)	135	301	68	162	494	239	50	95
Average Queue (ft)	28	145	26	36	198	113	13	35
95th Queue (ft)	78	248	55	109	377	203	39	74
Link Distance (ft)		1077	1077		3093	989		776
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	215			185			125	
Storage Blk Time (%)	0	2		0	9			0
Queuing Penalty (veh)	0	1		0	3			0

Intersection: 2: Site Entrance #1 & E Shirley Avenue

Movement	EB	EB	WB
Directions Served	T	R	L
Maximum Queue (ft)	4	9	60
Average Queue (ft)	0	0	14
95th Queue (ft)	2	5	47
Link Distance (ft)	3093		
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		110	240
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: Site Entrance #2 & E Shirley Avenue

Movement	EB	NB	NB
Directions Served	T	L	R
Maximum Queue (ft)	4	93	84
Average Queue (ft)	0	29	29
95th Queue (ft)	3	72	65
Link Distance (ft)	505	382	382
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: Site Entrance #3 & E Shirley Avenue

Movement	WB
Directions Served	L
Maximum Queue (ft)	40
Average Queue (ft)	7
95th Queue (ft)	29
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	160
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 5: E Shirley Avenue & Falmouth Street

Movement	EB	WB	B17	SB
Directions Served	ULT	TR	T	L>
Maximum Queue (ft)	160	206	14	87
Average Queue (ft)	32	50	0	34
95th Queue (ft)	107	152	7	73
Link Distance (ft)	393	351	787	742
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: James Madison Highway/E Shirley Avenue & Alwington Boulevard

Movement	EB	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	R	LTR	L	T	T	R	UL	T	T	R
Maximum Queue (ft)	149	109	5	56	157	210	170	20	46	127	121	109
Average Queue (ft)	69	27	0	7	80	118	49	3	6	57	51	50
95th Queue (ft)	128	79	3	34	138	195	134	14	27	100	102	89
Link Distance (ft)		1974	1974	480		730	730			787	787	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	560				315			160	165			250
Storage Blk Time (%)							0			0		
Queuing Penalty (veh)							0			0		

Intersection: 7: Commercial Entrance /Elementary School Entrance & Alwington Boulevard

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	LT	R	LTR	LTR
Maximum Queue (ft)	20	81	73	81	54
Average Queue (ft)	6	38	36	34	13
95th Queue (ft)	15	66	59	76	40
Link Distance (ft)	954	1974		170	605
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			270		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 4

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	42	615	107	42	610	215	29	96
v/c Ratio	0.31	0.87	0.16	0.29	0.74	0.72	0.16	0.45
Control Delay	51.9	42.6	1.9	51.1	32.0	52.5	42.7	40.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.9	42.6	1.9	51.1	32.0	52.5	42.7	40.6
Queue Length 50th (ft)	26	366	0	26	362	127	17	46
Queue Length 95th (ft)	64	#621	16	64	#617	#237	45	97
Internal Link Dist (ft)		1033			3084	958		736
Turn Bay Length (ft)	215			185			125	
Base Capacity (vph)	137	763	727	145	829	345	324	358
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.81	0.15	0.29	0.74	0.62	0.09	0.27

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	566	98	39	547	14	83	82	33	27	57	31
Future Volume (vph)	39	566	98	39	547	14	83	82	33	27	57	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Grade (%)		-2%			-5%			0%			4%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			0.98		1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (prot)	1588	1767	1488	1687	1756			1656		1583	1661	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (perm)	1588	1767	1488	1687	1756			1656		1583	1661	
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)	42	615	107	42	595	15	90	89	36	29	62	34
RTOR Reduction (vph)	0	0	62	0	1	0	0	7	0	0	20	0
Lane Group Flow (vph)	42	615	45	42	609	0	0	208	0	29	76	0
Heavy Vehicles (%)	11%	5%	6%	6%	7%	0%	8%	4%	7%	8%	4%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2									
Actuated Green, G (s)	4.4	41.3	41.3	8.2	45.1			16.8		8.9	8.9	
Effective Green, g (s)	4.4	41.3	41.3	8.2	45.1			16.8		8.9	8.9	
Actuated g/C Ratio	0.04	0.42	0.42	0.08	0.45			0.17		0.09	0.09	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0			4.0		4.0	4.0	
Lane Grp Cap (vph)	70	735	619	139	798			280		142	149	
v/s Ratio Prot	c0.03	c0.35		0.02	c0.35			c0.13		0.02	c0.05	
v/s Ratio Perm			0.03									
v/c Ratio	0.60	0.84	0.07	0.30	0.76			0.74		0.20	0.51	
Uniform Delay, d1	46.5	25.9	17.4	42.8	22.6			39.2		41.9	43.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	15.2	8.6	0.1	1.7	4.6			10.9		1.0	3.7	
Delay (s)	61.7	34.5	17.5	44.5	27.2			50.0		42.8	46.8	
Level of Service	E	C	B	D	C			D		D	D	
Approach Delay (s)		33.6			28.3			50.0			45.9	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	34.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	99.2	Sum of lost time (s)	24.0
Intersection Capacity Utilization	60.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	560	20	9	540	0	0
Future Volume (Veh/h)	560	20	9	540	0	0
Sign Control	Free			Free	Stop	
Grade	-4%			2%	0%	
Peak Hour Factor	0.93	0.50	0.50	0.93	0.93	0.93
Hourly flow rate (vph)	602	40	18	581	0	0
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			642		1219	602
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			642		1219	602
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		100	100
cM capacity (veh/h)			952		197	503

Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	602	40	18	581
Volume Left	0	0	18	0
Volume Right	0	40	0	0
cSH	1700	1700	952	1700
Volume to Capacity	0.35	0.02	0.02	0.34
Queue Length 95th (ft)	0	0	1	0
Control Delay (s)	0.0	0.0	8.9	0.0
Lane LOS			A	
Approach Delay (s)	0.0		0.3	
Approach LOS				

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	39.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	560	0	0	511	38	53
Future Volume (Veh/h)	560	0	0	511	38	53
Sign Control	Free			Free	Stop	
Grade	1%			0%	-2%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.50	0.50
Hourly flow rate (vph)	609	0	0	555	76	106
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			609		1164	609
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			609		1164	609
tC, single (s)			4.1		6.5	6.4
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.5
p0 queue free %			100		63	77
cM capacity (veh/h)			979		205	469

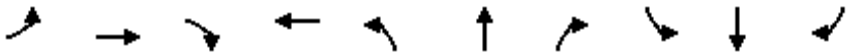
Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	609	555	76	106
Volume Left	0	0	76	0
Volume Right	0	0	0	106
cSH	1700	1700	205	469
Volume to Capacity	0.36	0.33	0.37	0.23
Queue Length 95th (ft)	0	0	40	22
Control Delay (s)	0.0	0.0	32.6	14.9
Lane LOS			D	B
Approach Delay (s)	0.0	0.0	22.3	
Approach LOS			C	

Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	39.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	597	16	15	511	0	0
Future Volume (Veh/h)	597	16	15	511	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	-3%	
Peak Hour Factor	0.92	0.50	0.50	0.92	0.92	0.92
Hourly flow rate (vph)	649	32	30	555	0	0
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			681		1264	649
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			681		1264	649
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		100	100
cM capacity (veh/h)			921		183	474

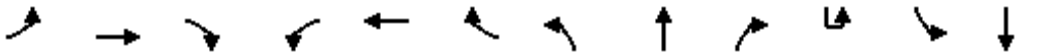
Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	649	32	30	555
Volume Left	0	0	30	0
Volume Right	0	32	0	0
cSH	1700	1700	921	1700
Volume to Capacity	0.38	0.02	0.03	0.33
Queue Length 95th (ft)	0	0	3	0
Control Delay (s)	0.0	0.0	9.0	0.0
Lane LOS			A	
Approach Delay (s)	0.0		0.5	
Approach LOS				

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	34.8%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	160	163	201	22	185	281	12	20	399	177
v/c Ratio	0.59	0.60	0.14	0.17	0.46	0.22	0.02	0.04	0.61	0.25
Control Delay	40.6	40.9	0.2	28.1	18.8	20.5	0.1	13.8	33.7	2.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.6	40.9	0.2	28.1	18.8	20.5	0.1	13.8	33.7	2.1
Queue Length 50th (ft)	76	77	0	5	54	42	0	5	94	0
Queue Length 95th (ft)	151	153	0	29	105	99	0	19	150	16
Internal Link Dist (ft)		1992		455		682			791	
Turn Bay Length (ft)	560				315		160	165		250
Base Capacity (vph)	378	380	1485	134	441	1292	608	468	902	786
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.43	0.14	0.16	0.42	0.22	0.02	0.04	0.44	0.23

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	311	2	195	7	3	12	179	273	12	12	8	387
Future Volume (vph)	311	2	195	7	3	12	179	273	12	12	8	387
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		5%			1%			-4%				4%
Total Lost time (s)	6.3	6.3	4.0		8.8		8.7	8.7	8.7		8.7	8.7
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	0.95	1.00		1.00	0.95
Frt	1.00	1.00	0.85		0.93		1.00	1.00	0.85		1.00	1.00
Flt Protected	0.95	0.95	1.00		0.98		0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1655	1661	1485		1329		1737	3474	1211		1675	3276
Flt Permitted	0.95	0.95	1.00		0.98		0.52	1.00	1.00		0.58	1.00
Satd. Flow (perm)	1655	1661	1485		1329		945	3474	1211		1021	3276
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	321	2	201	7	3	12	185	281	12	12	8	399
RTOR Reduction (vph)	0	0	0	0	11	0	0	0	8	0	0	0
Lane Group Flow (vph)	160	163	201	0	11	0	185	281	4	0	20	399
Heavy Vehicles (%)	1%	0%	6%	33%	33%	27%	6%	6%	36%	0%	14%	8%
Turn Type	Split	NA	Free	Split	NA		D.P+P	NA	Perm	D.P+P	D.P+P	NA
Protected Phases	4	4		3	3		5	2		1	1	6
Permitted Phases			Free				6		2	2	2	
Actuated Green, G (s)	12.8	12.8	83.5		7.1		31.1	28.6	28.6		31.1	21.2
Effective Green, g (s)	12.8	12.8	83.5		7.1		31.1	28.6	28.6		31.1	21.2
Actuated g/C Ratio	0.15	0.15	1.00		0.09		0.37	0.34	0.34		0.37	0.25
Clearance Time (s)	6.3	6.3			8.8		8.7	8.7	8.7		8.7	8.7
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	253	254	1485		113		445	1189	414		399	831
v/s Ratio Prot	0.10	c0.10			0.01		c0.05	c0.08			0.00	c0.12
v/s Ratio Perm			c0.14				0.11		0.00		0.02	
v/c Ratio	0.63	0.64	0.14		0.10		0.42	0.24	0.01		0.05	0.48
Uniform Delay, d1	33.1	33.2	0.0		35.2		18.4	19.6	18.1		16.6	26.5
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	5.1	5.5	0.2		0.4		0.6	0.1	0.0		0.1	0.4
Delay (s)	38.2	38.6	0.2		35.6		19.0	19.7	18.1		16.7	26.9
Level of Service	D	D	A		D		B	B	B		B	C
Approach Delay (s)		23.8			35.6			19.4				23.2
Approach LOS		C			D			B				C

Intersection Summary			
HCM 2000 Control Delay	22.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	83.5	Sum of lost time (s)	32.5
Intersection Capacity Utilization	55.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	172
Future Volume (vph)	172
Ideal Flow (vphpl)	1900
Grade (%)	
Total Lost time (s)	6.3
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1507
Flt Permitted	1.00
Satd. Flow (perm)	1507
Peak-hour factor, PHF	0.97
Adj. Flow (vph)	177
RTOR Reduction (vph)	105
Lane Group Flow (vph)	72
Heavy Vehicles (%)	5%
Turn Type	pm+ov
Protected Phases	4
Permitted Phases	6
Actuated Green, G (s)	34.0
Effective Green, g (s)	34.0
Actuated g/C Ratio	0.41
Clearance Time (s)	6.3
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	613
v/s Ratio Prot	0.02
v/s Ratio Perm	0.03
v/c Ratio	0.12
Uniform Delay, d1	15.4
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	15.5
Level of Service	B
Approach Delay (s)	
Approach LOS	

Intersection Summary

Intersection	
Intersection Delay, s/veh	7.6
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	40	0	12	37	51	0	0	13	5	0	0
Future Vol, veh/h	0	40	0	12	37	51	0	0	13	5	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
Heavy Vehicles, %	0	13	0	55	2	7	0	0	35	0	0	0
Mvmt Flow	0	43	0	13	40	55	0	0	14	5	0	0
Number of Lanes	0	1	0	0	1	1	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	1
HCM Control Delay	7.6	7.8	6.7	7.5
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	0%	24%	0%	100%
Vol Thru, %	0%	100%	76%	0%	0%
Vol Right, %	100%	0%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	13	40	49	51	5
LT Vol	0	0	12	0	5
Through Vol	0	40	37	0	0
RT Vol	13	0	0	51	0
Lane Flow Rate	14	43	53	55	5
Geometry Grp	2	5	7	7	2
Degree of Util (X)	0.014	0.052	0.083	0.06	0.007
Departure Headway (Hd)	3.668	4.334	5.615	3.89	4.477
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	982	823	640	923	804
Service Time	1.668	2.377	3.328	1.604	2.477
HCM Lane V/C Ratio	0.014	0.052	0.083	0.06	0.006
HCM Control Delay	6.7	7.6	8.8	6.9	7.5
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0	0.2	0.3	0.2	0

Intersection: 1: Culpeper Street & W Shirley Avenue/E Shirley Avenue

Movement	EB	EB	EB	WB	WB	NB	SB	SB
Directions Served	L	T	R	L	TR	LTR	L	TR
Maximum Queue (ft)	214	477	96	184	452	234	91	140
Average Queue (ft)	50	251	31	46	228	117	23	55
95th Queue (ft)	139	427	74	134	399	197	62	110
Link Distance (ft)		1077	1077		3093	989		776
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	215			185			125	
Storage Blk Time (%)	0	13		0	15		0	1
Queuing Penalty (veh)	0	5		0	6		0	0

Intersection: 2: Site Entrance #1 & E Shirley Avenue

Movement	WB
Directions Served	L
Maximum Queue (ft)	30
Average Queue (ft)	3
95th Queue (ft)	18
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	240
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Site Entrance #2 & E Shirley Avenue

Movement	EB	NB	NB
Directions Served	T	L	R
Maximum Queue (ft)	2	79	98
Average Queue (ft)	0	25	36
95th Queue (ft)	2	62	78
Link Distance (ft)	505	382	382
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: Site Entrance #3 & E Shirley Avenue

Movement	EB	WB
Directions Served	R	L
Maximum Queue (ft)	2	35
Average Queue (ft)	0	6
95th Queue (ft)	3	27
Link Distance (ft)		
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	140	160
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: E Shirley Avenue & Falmouth Street

Movement	EB	WB	B17	B17	SB
Directions Served	ULT	UTR	T		L>
Maximum Queue (ft)	295	199	6	6	92
Average Queue (ft)	107	32	0	0	38
95th Queue (ft)	242	121	6	6	80
Link Distance (ft)	393	351	787	787	742
Upstream Blk Time (%)	0				
Queuing Penalty (veh)	0				
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 6: James Madison Highway/E Shirley Avenue & Alwington Boulevard

Movement	EB	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	R	LTR	L	T	T	R	UL	T	T	R
Maximum Queue (ft)	180	143	47	68	168	177	136	47	49	166	186	105
Average Queue (ft)	96	55	5	16	81	80	22	6	10	95	102	45
95th Queue (ft)	159	120	27	50	143	144	77	27	34	147	162	83
Link Distance (ft)		1974	1974	480		730	730			787	787	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	560				315			160	165			250
Storage Blk Time (%)							0			0		
Queuing Penalty (veh)							0			0		

Intersection: 7: Commercial Entrance /Elementary School Entrance & Alwington Boulevard

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	LT	R	LTR	LTR
Maximum Queue (ft)	49	71	63	69	26
Average Queue (ft)	11	32	27	15	4
95th Queue (ft)	33	65	55	50	21
Link Distance (ft)	954	1974		170	605
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			270		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 12

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	43	607	165	36	578	202	39	156
v/c Ratio	0.31	0.90	0.25	0.26	0.72	0.72	0.16	0.61
Control Delay	53.5	48.8	5.7	52.3	33.3	54.9	40.7	50.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.5	48.8	5.7	52.3	33.3	54.9	40.7	50.1
Queue Length 50th (ft)	28	377	5	23	348	124	23	94
Queue Length 95th (ft)	67	#630	49	58	#577	210	55	164
Internal Link Dist (ft)		1033			3084	958		736
Turn Bay Length (ft)	215			185			125	
Base Capacity (vph)	140	720	705	139	799	332	325	334
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.84	0.23	0.26	0.72	0.61	0.12	0.47

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	571	155	34	540	4	90	69	31	37	119	27
Future Volume (vph)	40	571	155	34	540	4	90	69	31	37	119	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Grade (%)		-2%			-5%			0%			4%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			0.98		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (prot)	1762	1801	1531	1736	1826			1715		1710	1722	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (perm)	1762	1801	1531	1736	1826			1715		1710	1722	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	43	607	165	36	574	4	96	73	33	39	127	29
RTOR Reduction (vph)	0	0	93	0	0	0	0	7	0	0	8	0
Lane Group Flow (vph)	43	607	72	36	578	0	0	195	0	39	148	0
Heavy Vehicles (%)	0%	3%	3%	3%	3%	0%	2%	2%	4%	0%	2%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2									
Actuated Green, G (s)	4.5	40.7	40.7	8.1	44.3			16.2		14.5	14.5	
Effective Green, g (s)	4.5	40.7	40.7	8.1	44.3			16.2		14.5	14.5	
Actuated g/C Ratio	0.04	0.39	0.39	0.08	0.43			0.16		0.14	0.14	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0			4.0		4.0	4.0	
Lane Grp Cap (vph)	76	708	602	135	781			268		239	241	
v/s Ratio Prot	c0.02	c0.34		0.02	c0.32			c0.11		0.02	c0.09	
v/s Ratio Perm			0.05									
v/c Ratio	0.57	0.86	0.12	0.27	0.74			0.73		0.16	0.62	
Uniform Delay, d1	48.5	28.7	20.0	44.9	24.8			41.6		39.2	41.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	11.2	10.4	0.1	1.4	4.0			10.1		0.4	5.3	
Delay (s)	59.7	39.1	20.1	46.4	28.8			51.7		39.6	47.1	
Level of Service	E	D	C	D	C			D		D	D	
Approach Delay (s)		36.4			29.8			51.7			45.6	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	36.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	103.5	Sum of lost time (s)	24.0
Intersection Capacity Utilization	66.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	604	4	6	543	0	0
Future Volume (Veh/h)	604	4	6	543	0	0
Sign Control	Free			Free	Stop	
Grade	-4%			2%	0%	
Peak Hour Factor	0.92	0.50	0.50	0.92	0.92	0.92
Hourly flow rate (vph)	657	8	12	590	0	0
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			665		1271	657
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			665		1271	657
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		100	100
cM capacity (veh/h)			934		185	468

Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	657	8	12	590
Volume Left	0	0	12	0
Volume Right	0	8	0	0
cSH	1700	1700	934	1700
Volume to Capacity	0.39	0.00	0.01	0.35
Queue Length 95th (ft)	0	0	1	0
Control Delay (s)	0.0	0.0	8.9	0.0
Lane LOS			A	
Approach Delay (s)	0.0		0.2	
Approach LOS				

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	41.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	604	0	0	534	15	3
Future Volume (Veh/h)	604	0	0	534	15	3
Sign Control	Free			Free	Stop	
Grade	1%			0%	-2%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.50	0.50
Hourly flow rate (vph)	657	0	0	580	30	6
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			657		1237	657
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			657		1237	657
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		85	99
cM capacity (veh/h)			940		196	469

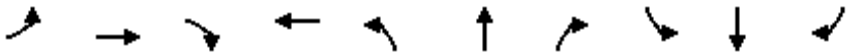
Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	657	580	30	6
Volume Left	0	0	30	0
Volume Right	0	0	0	6
cSH	1700	1700	196	469
Volume to Capacity	0.39	0.34	0.15	0.01
Queue Length 95th (ft)	0	0	13	1
Control Delay (s)	0.0	0.0	26.6	12.8
Lane LOS			D	B
Approach Delay (s)	0.0	0.0	24.3	
Approach LOS			C	

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	41.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	594	13	22	534	0	0
Future Volume (Veh/h)	594	13	22	534	0	0
Sign Control	Free			Free	Stop	
Grade	0%			0%	-3%	
Peak Hour Factor	0.92	0.50	0.50	0.92	0.92	0.92
Hourly flow rate (vph)	646	26	44	580	0	0
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			672		1314	646
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			672		1314	646
tC, single (s)			4.2		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			95		100	100
cM capacity (veh/h)			887		168	475

Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	646	26	44	580
Volume Left	0	0	44	0
Volume Right	0	26	0	0
cSH	1700	1700	887	1700
Volume to Capacity	0.38	0.02	0.05	0.34
Queue Length 95th (ft)	0	0	4	0
Control Delay (s)	0.0	0.0	9.3	0.0
Lane LOS			A	
Approach Delay (s)	0.0		0.7	
Approach LOS				

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	34.6%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	162	163	229	18	216	325	1	18	461	152
v/c Ratio	0.61	0.62	0.15	0.05	0.53	0.24	0.00	0.05	0.67	0.23
Control Delay	43.0	43.2	0.2	0.2	19.8	19.9	0.0	13.5	35.2	1.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.0	43.2	0.2	0.2	19.8	19.9	0.0	13.5	35.2	1.7
Queue Length 50th (ft)	82	83	0	0	66	50	0	5	114	0
Queue Length 95th (ft)	154	155	0	0	119	111	0	17	174	12
Internal Link Dist (ft)		1992		455		682			791	
Turn Bay Length (ft)	560				315		160	165		250
Base Capacity (vph)	349	349	1529	360	454	1359	471	372	873	740
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.47	0.15	0.05	0.48	0.24	0.00	0.05	0.53	0.21

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	309	0	218	5	0	12	205	309	1	10	7	438
Future Volume (vph)	309	0	218	5	0	12	205	309	1	10	7	438
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		5%			1%			-4%				4%
Total Lost time (s)	6.3	6.3	4.0		8.8		8.7	8.7	8.7		8.7	8.7
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	0.95	1.00		1.00	0.95
Frt	1.00	1.00	0.85		0.90		1.00	1.00	0.85		1.00	1.00
Flt Protected	0.95	0.95	1.00		0.99		0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1655	1655	1529		1502		1721	3541	824		1337	3369
Flt Permitted	0.95	0.95	1.00		0.99		0.46	1.00	1.00		0.56	1.00
Satd. Flow (perm)	1655	1655	1529		1502		834	3541	824		782	3369
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	325	0	229	5	0	13	216	325	1	11	7	461
RTOR Reduction (vph)	0	0	0	0	17	0	0	0	1	0	0	0
Lane Group Flow (vph)	162	163	229	0	1	0	216	325	0	0	18	461
Heavy Vehicles (%)	1%	0%	3%	20%	0%	9%	7%	4%	100%	0%	83%	5%
Turn Type	Split	NA	Free	Split	NA		D.P+P	NA	Perm	D.P+P	D.P+P	NA
Protected Phases	4	4		3	3		5	2		1	1	6
Permitted Phases			Free				6		2	2	2	
Actuated Green, G (s)	12.9	12.9	85.8		7.1		33.3	30.8	30.8		33.3	22.2
Effective Green, g (s)	12.9	12.9	85.8		7.1		33.3	30.8	30.8		33.3	22.2
Actuated g/C Ratio	0.15	0.15	1.00		0.08		0.39	0.36	0.36		0.39	0.26
Clearance Time (s)	6.3	6.3			8.8		8.7	8.7	8.7		8.7	8.7
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	248	248	1529		124		438	1271	295		319	871
v/s Ratio Prot	0.10	c0.10			0.00		c0.06	c0.09			0.00	c0.14
v/s Ratio Perm			c0.15				0.13		0.00		0.02	
v/c Ratio	0.65	0.66	0.15		0.01		0.49	0.26	0.00		0.06	0.53
Uniform Delay, d1	34.3	34.4	0.0		36.1		18.4	19.4	17.6		16.3	27.3
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	6.1	6.2	0.2		0.0		0.9	0.1	0.0		0.1	0.6
Delay (s)	40.4	40.5	0.2		36.2		19.3	19.5	17.6		16.4	27.9
Level of Service	D	D	A		D		B	B	B		B	C
Approach Delay (s)		23.8			36.2			19.4				24.6
Approach LOS		C			D			B				C

Intersection Summary			
HCM 2000 Control Delay	22.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	85.8	Sum of lost time (s)	32.5
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	144
Future Volume (vph)	144
Ideal Flow (vphpl)	1900
Grade (%)	
Total Lost time (s)	6.3
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1439
Flt Permitted	1.00
Satd. Flow (perm)	1439
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	152
RTOR Reduction (vph)	90
Lane Group Flow (vph)	62
Heavy Vehicles (%)	10%
Turn Type	pm+ov
Protected Phases	4
Permitted Phases	6
Actuated Green, G (s)	35.1
Effective Green, g (s)	35.1
Actuated g/C Ratio	0.41
Clearance Time (s)	6.3
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	588
v/s Ratio Prot	0.02
v/s Ratio Perm	0.03
v/c Ratio	0.11
Uniform Delay, d1	15.7
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	15.7
Level of Service	B
Approach Delay (s)	
Approach LOS	

Intersection Summary

Intersection	
Intersection Delay, s/veh	8.1
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	58	0	15	66	19	0	0	30	22	0	0
Future Vol, veh/h	0	58	0	15	66	19	0	0	30	22	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
Heavy Vehicles, %	0	0	0	57	0	18	0	0	7	0	0	0
Mvmt Flow	0	63	0	16	72	21	0	0	33	24	0	0
Number of Lanes	0	1	0	0	1	1	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	1
HCM Control Delay	7.6	8.9	6.9	7.7
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	0%	19%	0%	100%
Vol Thru, %	0%	100%	81%	0%	0%
Vol Right, %	100%	0%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	30	58	81	19	22
LT Vol	0	0	15	0	22
Through Vol	0	58	66	0	0
RT Vol	30	0	0	19	0
Lane Flow Rate	33	63	88	21	24
Geometry Grp	2	5	7	7	2
Degree of Util (X)	0.034	0.073	0.139	0.023	0.03
Departure Headway (Hd)	3.767	4.178	5.693	3.929	4.573
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	956	846	630	908	787
Service Time	1.768	2.261	3.432	1.667	2.574
HCM Lane V/C Ratio	0.035	0.074	0.14	0.023	0.03
HCM Control Delay	6.9	7.6	9.4	6.8	7.7
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0.1	0.2	0.5	0.1	0.1

Intersection: 1: Culpeper Street & W Shirley Avenue/E Shirley Avenue

Movement	EB	EB	EB	WB	WB	NB	SB	SB
Directions Served	L	T	R	L	TR	LTR	L	TR
Maximum Queue (ft)	214	454	83	161	452	208	117	197
Average Queue (ft)	52	262	39	31	227	105	33	86
95th Queue (ft)	152	412	69	95	392	183	87	155
Link Distance (ft)		1077	1077		3093	989		776
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	215			185			125	
Storage Blk Time (%)	0	15		0	15		0	3
Queuing Penalty (veh)	0	6		0	5		0	1

Intersection: 2: Site Entrance #1 & E Shirley Avenue

Movement	WB
Directions Served	L
Maximum Queue (ft)	29
Average Queue (ft)	3
95th Queue (ft)	17
Link Distance (ft)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	240
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 3: Site Entrance #2 & E Shirley Avenue

Movement	NB	NB
Directions Served	L	R
Maximum Queue (ft)	47	30
Average Queue (ft)	11	4
95th Queue (ft)	37	20
Link Distance (ft)	382	382
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Site Entrance #3 & E Shirley Avenue

Movement	EB	WB
Directions Served	R	L
Maximum Queue (ft)	2	51
Average Queue (ft)	0	8
95th Queue (ft)	2	32
Link Distance (ft)		
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	140	160
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: E Shirley Avenue & Falmouth Street

Movement	EB	WB	B17	SB
Directions Served	ULT	TR	T	L>
Maximum Queue (ft)	248	177	1	83
Average Queue (ft)	98	25	0	33
95th Queue (ft)	213	102	1	69
Link Distance (ft)	393	351	787	742
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: James Madison Highway/E Shirley Avenue & Alwington Boulevard

Movement	EB	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	R	LTR	L	T	T	R	UL	T	T	R
Maximum Queue (ft)	176	132	60	47	176	168	123	21	80	177	187	92
Average Queue (ft)	96	54	7	12	86	77	21	1	15	104	112	44
95th Queue (ft)	153	114	33	36	146	137	69	13	56	159	174	81
Link Distance (ft)		1974	1974	480		730	730			787	787	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	560				315			160	165			250
Storage Blk Time (%)							0		0	0		
Queuing Penalty (veh)							0		0	0		

Intersection: 7: Commercial Entrance /Elementary School Entrance & Alwington Boulevard

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	LT	R	LTR	LTR
Maximum Queue (ft)	29	82	57	57	31
Average Queue (ft)	8	38	15	21	15
95th Queue (ft)	18	67	46	48	38
Link Distance (ft)	954	1974		170	605
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			270		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 13

MOVEMENT SUMMARY

Site: 101 [2032 Background - AM Peak (Site Folder: General)]

AM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: E Shirley Avenue														
1u	U	1	0.0	1	0.0	0.681	14.0	LOS B	7.5	202.8	0.38	0.17	0.38	23.3
6	T1	527	10.0	573	10.0	0.681	14.3	LOS B	7.5	202.8	0.38	0.17	0.38	22.3
16	R2	100	11.0	109	11.0	0.681	14.3	LOS B	7.5	202.8	0.38	0.17	0.38	21.8
Approach		628	10.1	683	10.1	0.681	14.3	LOS B	7.5	202.8	0.38	0.17	0.38	22.2
North: Falmouth Street														
7	L2	90	21.0	98	21.0	0.266	11.1	LOS B	1.7	48.0	0.77	0.69	0.77	22.7
14	R2	37	9.0	40	9.0	0.266	10.1	LOS B	1.7	48.0	0.77	0.69	0.77	21.8
Approach		127	17.5	138	17.5	0.266	10.8	LOS B	1.7	48.0	0.77	0.69	0.77	22.4
West: E Shirley Avenue														
5u	U	1	0.0	1	0.0	0.153	5.0	LOS A	0.9	24.8	0.37	0.21	0.37	25.3
5	L2	34	19.0	37	19.0	0.153	5.8	LOS A	0.9	24.8	0.37	0.21	0.37	24.6
2	T1	350	9.0	380	9.0	0.153	1.4	LOS A	0.9	24.8	0.10	0.06	0.10	25.5
Approach		385	9.9	418	9.9	0.153	1.9	LOS A	0.9	24.8	0.13	0.07	0.13	25.4
All Vehicles		1140	10.9	1239	10.9	0.681	9.7	LOS A	7.5	202.8	0.34	0.20	0.34	23.2

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

MOVEMENT SUMMARY

Site: 101 [2032 Background - School PM (Site Folder: General)]

School PM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: E Shirley Avenue														
1u	U	2	0.0	2	0.0	0.602	11.2	LOS B	5.7	148.8	0.29	0.12	0.29	24.0
6	T1	484	4.0	489	4.0	0.602	11.3	LOS B	5.7	148.8	0.29	0.12	0.29	23.0
16	R2	152	6.0	154	6.0	0.602	11.4	LOS B	5.7	148.8	0.29	0.12	0.29	22.4
Approach		638	4.5	644	4.5	0.602	11.3	LOS B	5.7	148.8	0.29	0.12	0.29	22.8
North: Falmouth Street														
7	L2	144	7.0	145	7.0	0.250	8.4	LOS A	1.6	41.8	0.68	0.57	0.68	23.1
14	R2	25	0.0	25	0.0	0.250	7.9	LOS A	1.6	41.8	0.68	0.57	0.68	22.2
Approach		169	6.0	171	6.0	0.250	8.3	LOS A	1.6	41.8	0.68	0.57	0.68	23.0
West: E Shirley Avenue														
5u	U	2	0.0	2	0.0	0.225	6.0	LOS A	1.4	36.8	0.44	0.28	0.44	25.3
5	L2	28	23.0	28	23.0	0.225	7.0	LOS A	1.4	36.8	0.44	0.28	0.44	24.6
2	T1	590	5.0	596	5.0	0.225	1.8	LOS A	1.4	36.8	0.13	0.08	0.13	25.4
Approach		620	5.8	626	5.8	0.225	2.1	LOS A	1.4	36.8	0.14	0.09	0.14	25.4
All Vehicles		1427	5.2	1441	5.2	0.602	6.9	LOS A	5.7	148.8	0.27	0.16	0.27	23.9

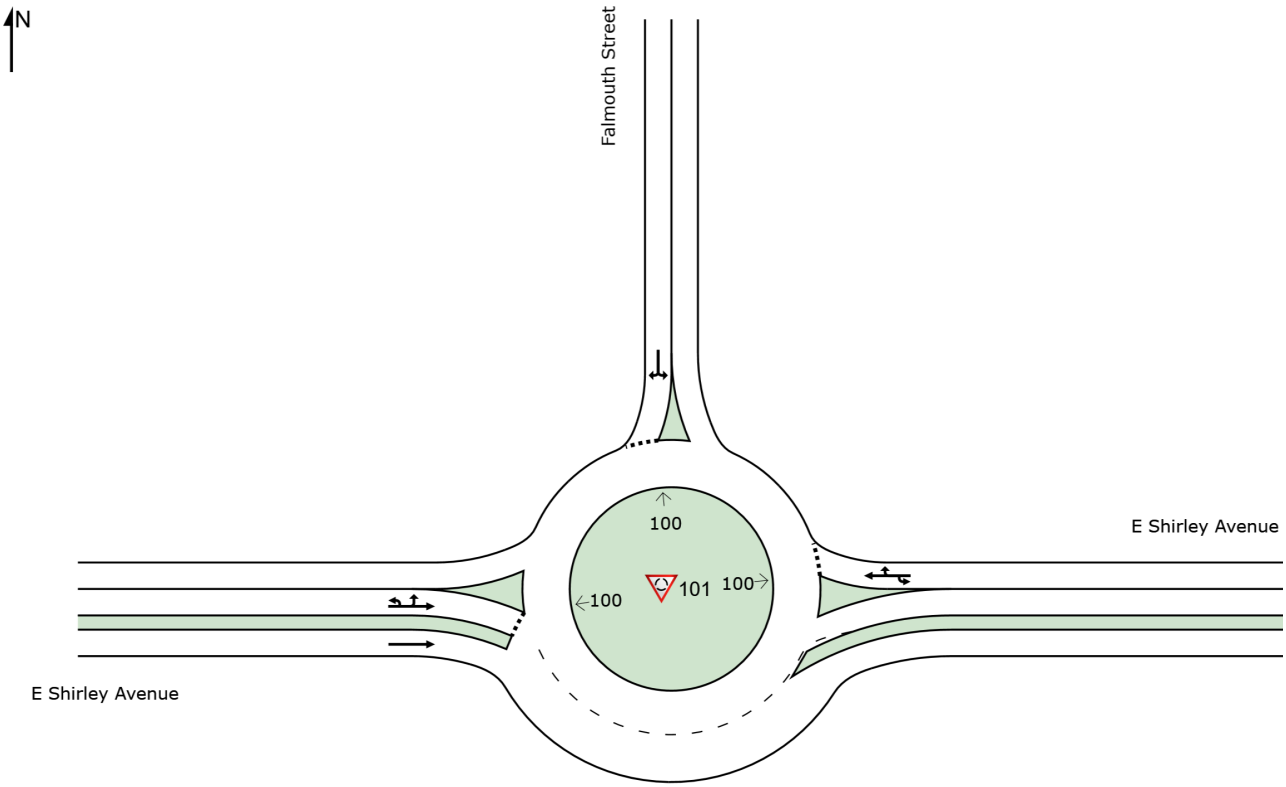
Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if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

SITE LAYOUT

Site: 101 [2032 Background - School PM (Site Folder: General)]

School PM Peak
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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MOVEMENT SUMMARY

Site: 101 [2032 Background - Commuter Peak (Site Folder: General)]

AM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: E Shirley Avenue														
1u	U	1	0.0	1	0.0	0.756	17.5	LOS B	11.2	316.5	0.38	0.15	0.38	22.4
6	T1	505	21.0	549	21.0	0.756	18.2	LOS B	11.2	316.5	0.38	0.15	0.38	21.5
16	R2	166	4.0	180	4.0	0.756	17.6	LOS B	11.2	316.5	0.38	0.15	0.38	21.0
Approach		672	16.8	730	16.8	0.756	18.1	LOS B	11.2	316.5	0.38	0.15	0.38	21.4
North: Falmouth Street														
7	L2	145	1.0	158	1.0	0.322	10.2	LOS B	2.3	58.1	0.81	0.72	0.81	22.7
14	R2	35	9.0	38	9.0	0.322	10.9	LOS B	2.3	58.1	0.81	0.72	0.81	21.8
Approach		180	2.6	196	2.6	0.322	10.4	LOS B	2.3	58.1	0.81	0.72	0.81	22.5
West: E Shirley Avenue														
5u	U	2	0.0	2	0.0	0.236	6.1	LOS A	1.5	39.3	0.45	0.29	0.45	25.3
5	L2	20	11.0	22	11.0	0.236	6.6	LOS A	1.5	39.3	0.45	0.29	0.45	24.6
2	T1	586	5.0	637	5.0	0.236	1.9	LOS A	1.5	39.3	0.14	0.09	0.14	25.4
Approach		608	5.2	661	5.2	0.236	2.1	LOS A	1.5	39.3	0.15	0.10	0.15	25.3
All Vehicles		1460	10.2	1587	10.2	0.756	10.5	LOS B	11.2	316.5	0.34	0.20	0.34	23.0

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

Appendix H
2032 Future Analysis Worksheets

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	34	433	78	34	584	249	17	60
v/c Ratio	0.22	0.65	0.12	0.24	0.75	0.76	0.10	0.32
Control Delay	47.2	29.5	0.3	48.1	32.2	52.0	42.4	33.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.2	29.5	0.3	48.1	32.2	52.0	42.4	33.6
Queue Length 50th (ft)	21	216	0	21	334	143	10	22
Queue Length 95th (ft)	53	342	0	54	#572	#272	31	62
Internal Link Dist (ft)		1033			3084	958		736
Turn Bay Length (ft)	215			185			125	
Base Capacity (vph)	157	758	745	143	777	365	362	364
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.22	0.57	0.10	0.24	0.75	0.68	0.05	0.16

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	398	72	31	513	24	85	89	55	16	34	21
Future Volume (vph)	31	398	72	31	513	24	85	89	55	16	34	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Grade (%)		-2%			-5%			0%			4%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.99			0.97		1.00	0.94	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (prot)	1762	1702	1488	1611	1663			1678		1710	1635	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (perm)	1762	1702	1488	1611	1663			1678		1710	1635	
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)	34	433	78	34	558	26	92	97	60	17	37	23
RTOR Reduction (vph)	0	0	46	0	1	0	0	11	0	0	21	0
Lane Group Flow (vph)	34	433	32	34	583	0	0	238	0	17	39	0
Heavy Vehicles (%)	0%	9%	6%	11%	13%	0%	6%	2%	4%	0%	3%	5%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2									
Actuated Green, G (s)	4.4	39.1	39.1	8.2	42.9			17.3		7.3	7.3	
Effective Green, g (s)	4.4	39.1	39.1	8.2	42.9			17.3		7.3	7.3	
Actuated g/C Ratio	0.05	0.41	0.41	0.09	0.45			0.18		0.08	0.08	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0			4.0		4.0	4.0	
Lane Grp Cap (vph)	80	693	606	137	743			302		130	124	
v/s Ratio Prot	0.02	0.25		c0.02	c0.35			c0.14		0.01	c0.02	
v/s Ratio Perm			0.02									
v/c Ratio	0.42	0.62	0.05	0.25	0.78			0.79		0.13	0.31	
Uniform Delay, d1	44.5	22.6	17.2	41.0	22.6			37.6		41.3	41.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	4.9	2.0	0.0	1.3	5.8			13.5		0.6	2.0	
Delay (s)	49.4	24.6	17.2	42.3	28.3			51.1		42.0	43.9	
Level of Service	D	C	B	D	C			D		D	D	
Approach Delay (s)		25.1			29.1			51.1			43.5	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	32.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	95.9	Sum of lost time (s)	24.0
Intersection Capacity Utilization	57.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	406	12	19	561	0	0
Future Volume (Veh/h)	406	12	19	561	0	0
Sign Control	Free			Free	Stop	
Grade	-4%			2%	0%	
Peak Hour Factor	0.92	0.50	0.50	0.92	0.92	0.92
Hourly flow rate (vph)	441	24	38	610	0	0
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			465		1127	441
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			465		1127	441
tC, single (s)			4.2		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			96		100	100
cM capacity (veh/h)			1041		220	621

Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	441	24	38	610
Volume Left	0	0	38	0
Volume Right	0	24	0	0
cSH	1700	1700	1041	1700
Volume to Capacity	0.26	0.01	0.04	0.36
Queue Length 95th (ft)	0	0	3	0
Control Delay (s)	0.0	0.0	8.6	0.0
Lane LOS			A	
Approach Delay (s)	0.0		0.5	
Approach LOS				

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	39.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	406	0	0	568	12	19
Future Volume (Veh/h)	406	0	0	568	12	19
Sign Control	Free			Free	Stop	
Grade	1%			0%	-2%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.50	0.50
Hourly flow rate (vph)	441	0	0	617	24	38
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			441		1058	441
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			441		1058	441
tC, single (s)			4.1		6.6	6.4
tC, 2 stage (s)						
tF (s)			2.2		3.7	3.4
p0 queue free %			100		90	94
cM capacity (veh/h)			1130		233	588

Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	441	617	24	38
Volume Left	0	0	24	0
Volume Right	0	0	0	38
cSH	1700	1700	233	588
Volume to Capacity	0.26	0.36	0.10	0.06
Queue Length 95th (ft)	0	0	8	5
Control Delay (s)	0.0	0.0	22.2	11.5
Lane LOS			C	B
Approach Delay (s)	0.0	0.0	15.7	
Approach LOS			C	

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	39.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	345	80	25	511	57	44
Future Volume (Veh/h)	345	80	25	511	57	44
Sign Control	Free			Free	Stop	
Grade	0%			0%	-3%	
Peak Hour Factor	0.95	0.50	0.50	0.95	0.95	0.95
Hourly flow rate (vph)	363	160	50	538	60	46
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		1001	363
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			523		1001	363
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		77	93
cM capacity (veh/h)			1054		259	687

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	363	160	50	538	106
Volume Left	0	0	50	0	60
Volume Right	0	160	0	0	46
cSH	1700	1700	1054	1700	355
Volume to Capacity	0.21	0.09	0.05	0.32	0.30
Queue Length 95th (ft)	0	0	4	0	31
Control Delay (s)	0.0	0.0	8.6	0.0	19.4
Lane LOS			A		C
Approach Delay (s)	0.0		0.7		19.4
Approach LOS					C

Intersection Summary				
Average Delay	2.0			
Intersection Capacity Utilization	39.4%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	85	86	155	6	297	474	11	11	172	184
v/c Ratio	0.48	0.48	0.12	0.01	0.60	0.33	0.01	0.03	0.35	0.28
Control Delay	41.0	41.2	0.2	0.0	20.3	17.3	0.0	12.3	32.5	1.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.0	41.2	0.2	0.0	20.3	17.3	0.0	12.3	32.5	1.2
Queue Length 50th (ft)	40	40	0	0	88	71	0	3	38	0
Queue Length 95th (ft)	90	91	0	0	160	157	0	12	75	3
Internal Link Dist (ft)		1992		455		682			791	
Turn Bay Length (ft)	560				315		160	165		250
Base Capacity (vph)	253	253	1291	418	601	1468	852	386	663	720
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.34	0.12	0.01	0.49	0.32	0.01	0.03	0.26	0.26

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	157	0	143	2	0	4	273	436	10	2	8	158
Future Volume (vph)	157	0	143	2	0	4	273	436	10	2	8	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		5%			1%			-4%				4%
Total Lost time (s)	6.3	6.3	4.0		8.8		8.7	8.7	8.7		8.7	8.7
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	0.95	1.00		1.00	0.95
Frt	1.00	1.00	0.85		0.91		1.00	1.00	0.85		1.00	1.00
Flt Protected	0.95	0.95	1.00		0.98		0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1316	1316	1291		1015		1674	3409	1647		1430	3103
Flt Permitted	0.95	0.95	1.00		0.98		0.64	1.00	1.00		0.48	1.00
Satd. Flow (perm)	1316	1316	1291		1015		1133	3409	1647		723	3103
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)	171	0	155	2	0	4	297	474	11	2	9	172
RTOR Reduction (vph)	0	0	0	0	5	0	0	0	7	0	0	0
Lane Group Flow (vph)	85	86	155	0	1	0	297	474	4	0	11	172
Heavy Vehicles (%)	27%	0%	22%	50%	0%	75%	10%	8%	0%	0%	29%	14%
Turn Type	Split	NA	Free	Split	NA		D.P+P	NA	Perm	D.P+P	D.P+P	NA
Protected Phases	4	4		3	3		5	2		1	1	6
Permitted Phases			Free				6		2	2	2	
Actuated Green, G (s)	10.4	10.4	83.7		7.1		33.7	32.5	32.5		33.7	19.4
Effective Green, g (s)	10.4	10.4	83.7		7.1		33.7	32.5	32.5		33.7	19.4
Actuated g/C Ratio	0.12	0.12	1.00		0.08		0.40	0.39	0.39		0.40	0.23
Clearance Time (s)	6.3	6.3			8.8		8.7	8.7	8.7		8.7	8.7
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	163	163	1291		86		548	1323	639		301	719
v/s Ratio Prot	0.06	c0.07			0.00		c0.09	c0.14			0.00	0.06
v/s Ratio Perm			c0.12				c0.13		0.00		0.01	
v/c Ratio	0.52	0.53	0.12		0.01		0.54	0.36	0.01		0.04	0.24
Uniform Delay, d1	34.3	34.3	0.0		35.1		18.2	18.2	15.7		15.1	26.1
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	3.0	3.1	0.2		0.0		1.1	0.2	0.0		0.0	0.2
Delay (s)	37.3	37.4	0.2		35.1		19.3	18.4	15.7		15.1	26.3
Level of Service	D	D	A		D		B	B	B		B	C
Approach Delay (s)		19.7			35.1			18.7				22.0
Approach LOS		B			D			B				C

Intersection Summary			
HCM 2000 Control Delay	19.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	83.7	Sum of lost time (s)	32.5
Intersection Capacity Utilization	55.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	169
Future Volume (vph)	169
Ideal Flow (vphpl)	1900
Grade (%)	
Total Lost time (s)	6.3
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1426
Flt Permitted	1.00
Satd. Flow (perm)	1426
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	184
RTOR Reduction (vph)	118
Lane Group Flow (vph)	66
Heavy Vehicles (%)	11%
Turn Type	pm+ov
Protected Phases	4
Permitted Phases	6
Actuated Green, G (s)	29.8
Effective Green, g (s)	29.8
Actuated g/C Ratio	0.36
Clearance Time (s)	6.3
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	507
v/s Ratio Prot	0.02
v/s Ratio Perm	0.03
v/c Ratio	0.13
Uniform Delay, d1	18.2
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	18.3
Level of Service	B
Approach Delay (s)	
Approach LOS	

Intersection Summary

Intersection	
Intersection Delay, s/veh	8.4
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	51	0	49	41	180	0	0	37	80	0	0
Future Vol, veh/h	0	51	0	49	41	180	0	0	37	80	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
Heavy Vehicles, %	0	0	0	24	0	7	0	0	65	8	0	0
Mvmt Flow	0	55	0	53	45	196	0	0	40	87	0	0
Number of Lanes	0	1	0	0	1	1	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	1
HCM Control Delay	8	8.5	7.4	8.8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	0%	54%	0%	100%
Vol Thru, %	0%	100%	46%	0%	0%
Vol Right, %	100%	0%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	37	51	90	180	80
LT Vol	0	0	49	0	80
Through Vol	0	51	41	0	0
RT Vol	37	0	0	180	0
Lane Flow Rate	40	55	98	196	87
Geometry Grp	2	5	7	7	2
Degree of Util (X)	0.047	0.071	0.151	0.226	0.122
Departure Headway (Hd)	4.183	4.615	5.541	4.156	5.05
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	856	777	649	865	711
Service Time	2.208	2.639	3.259	1.874	3.072
HCM Lane V/C Ratio	0.047	0.071	0.151	0.227	0.122
HCM Control Delay	7.4	8	9.2	8.1	8.8
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0.1	0.2	0.5	0.9	0.4

Intersection: 1: Culpeper Street & W Shirley Avenue/E Shirley Avenue

Movement	EB	EB	EB	WB	WB	NB	SB	SB
Directions Served	L	T	R	L	TR	LTR	L	TR
Maximum Queue (ft)	112	308	66	172	451	258	53	99
Average Queue (ft)	26	159	22	36	224	123	13	38
95th Queue (ft)	71	269	50	114	397	219	40	79
Link Distance (ft)		1078	1078		3094	992		778
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	215			185			125	
Storage Blk Time (%)	0	3		0	14			0
Queuing Penalty (veh)	0	1		0	4			0

Intersection: 2: Site Entrance #1 & E Shirley Avenue

Movement	EB	WB
Directions Served	T	L
Maximum Queue (ft)	5	55
Average Queue (ft)	0	5
95th Queue (ft)	5	30
Link Distance (ft)	3094	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		240
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Site Entrance #2 & E Shirley Avenue

Movement	NB	NB
Directions Served	L	R
Maximum Queue (ft)	53	56
Average Queue (ft)	10	16
95th Queue (ft)	37	48
Link Distance (ft)	383	383
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Site Entrance #3 & E Shirley Avenue

Movement	EB	EB	WB	NB
Directions Served	T	R	L	LR
Maximum Queue (ft)	11	12	43	81
Average Queue (ft)	0	0	9	34
95th Queue (ft)	8	8	33	65
Link Distance (ft)	204			384
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		150	150	
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: E Shirley Avenue & Falmouth Street

Movement	EB	WB	B17	B17	SB
Directions Served	ULT	TR	T		L>
Maximum Queue (ft)	132	216	95	9	96
Average Queue (ft)	31	50	3	0	35
95th Queue (ft)	93	150	34	7	80
Link Distance (ft)	392	351	787	787	742
Upstream Blk Time (%)		0			
Queuing Penalty (veh)		0			
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 6: James Madison Highway/E Shirley Avenue & Alwington Boulevard

Movement	EB	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	R	LTR	L	T	T	R	UL	T	T	R
Maximum Queue (ft)	155	114	36	55	208	209	147	20	45	123	115	111
Average Queue (ft)	69	32	1	6	112	102	37	3	7	52	47	55
95th Queue (ft)	128	86	15	32	188	174	103	13	29	96	96	97
Link Distance (ft)		1974	1974	480		730	730			787	787	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	560				315			160	165			250
Storage Blk Time (%)							0			0		
Queuing Penalty (veh)							0			0		

Intersection: 7: Commercial Entrance /Elementary School Entrance & Alwington Boulevard

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	LT	R	LTR	LTR
Maximum Queue (ft)	23	79	78	84	78
Average Queue (ft)	7	38	44	34	36
95th Queue (ft)	16	66	69	77	63
Link Distance (ft)	954	1974		170	605
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			270		
Storage Blk Time (%)					
Queuing Penalty (veh)					

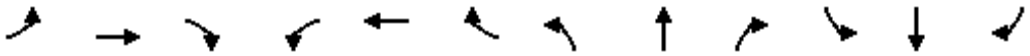
Network Summary

Network wide Queuing Penalty: 5

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	42	637	107	42	640	215	29	96
v/c Ratio	0.31	0.88	0.15	0.30	0.76	0.73	0.16	0.45
Control Delay	52.2	43.9	1.9	51.3	33.4	53.3	42.7	40.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.2	43.9	1.9	51.3	33.4	53.3	42.7	40.6
Queue Length 50th (ft)	26	387	0	26	390	127	17	46
Queue Length 95th (ft)	64	#654	16	64	#665	#237	45	97
Internal Link Dist (ft)		1033			3084	958		736
Turn Bay Length (ft)	215			185			125	
Base Capacity (vph)	134	747	715	142	838	338	318	351
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.85	0.15	0.30	0.76	0.64	0.09	0.27

Intersection Summary

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	586	98	39	575	14	83	82	33	27	57	31
Future Volume (vph)	39	586	98	39	575	14	83	82	33	27	57	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Grade (%)		-2%			-5%			0%			4%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			0.98		1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (prot)	1588	1767	1488	1687	1756			1656		1583	1661	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (perm)	1588	1767	1488	1687	1756			1656		1583	1661	
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)	42	637	107	42	625	15	90	89	36	29	62	34
RTOR Reduction (vph)	0	0	62	0	1	0	0	7	0	0	20	0
Lane Group Flow (vph)	42	637	45	42	639	0	0	208	0	29	76	0
Heavy Vehicles (%)	11%	5%	6%	6%	7%	0%	8%	4%	7%	8%	4%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2									
Actuated Green, G (s)	4.5	42.4	42.4	8.2	46.1			16.8		9.0	9.0	
Effective Green, g (s)	4.5	42.4	42.4	8.2	46.1			16.8		9.0	9.0	
Actuated g/C Ratio	0.04	0.42	0.42	0.08	0.46			0.17		0.09	0.09	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0			4.0		4.0	4.0	
Lane Grp Cap (vph)	71	746	628	137	806			277		141	148	
v/s Ratio Prot	c0.03	c0.36		0.02	c0.36			c0.13		0.02	c0.05	
v/s Ratio Perm			0.03									
v/c Ratio	0.59	0.85	0.07	0.31	0.79			0.75		0.21	0.51	
Uniform Delay, d1	47.0	26.2	17.3	43.4	23.1			39.8		42.4	43.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	14.5	9.7	0.1	1.7	5.7			11.6		1.0	4.0	
Delay (s)	61.5	35.9	17.3	45.2	28.8			51.4		43.4	47.6	
Level of Service	E	D	B	D	C			D		D	D	
Approach Delay (s)		34.8			29.8			51.4			46.6	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	35.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	100.4	Sum of lost time (s)	24.0
Intersection Capacity Utilization	60.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	588	12	19	568	0	0
Future Volume (Veh/h)	588	12	19	568	0	0
Sign Control	Free			Free	Stop	
Grade	-4%			2%	0%	
Peak Hour Factor	0.93	0.50	0.50	0.93	0.93	0.93
Hourly flow rate (vph)	632	24	38	611	0	0
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			656		1319	632
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			656		1319	632
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	100
cM capacity (veh/h)			941		168	484

Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	632	24	38	611
Volume Left	0	0	38	0
Volume Right	0	24	0	0
cSH	1700	1700	941	1700
Volume to Capacity	0.37	0.01	0.04	0.36
Queue Length 95th (ft)	0	0	3	0
Control Delay (s)	0.0	0.0	9.0	0.0
Lane LOS			A	
Approach Delay (s)	0.0		0.5	
Approach LOS				

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	40.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	588	0	0	575	12	19
Future Volume (Veh/h)	588	0	0	575	12	19
Sign Control	Free			Free	Stop	
Grade	1%			0%	-2%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.50	0.50
Hourly flow rate (vph)	639	0	0	625	24	38
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			639		1264	639
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			639		1264	639
tC, single (s)			4.1		6.5	6.4
tC, 2 stage (s)						
tF (s)			2.2		3.6	3.5
p0 queue free %			100		86	92
cM capacity (veh/h)			955		178	450

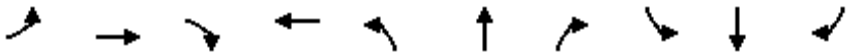
Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	639	625	24	38
Volume Left	0	0	24	0
Volume Right	0	0	0	38
cSH	1700	1700	178	450
Volume to Capacity	0.38	0.37	0.14	0.08
Queue Length 95th (ft)	0	0	11	7
Control Delay (s)	0.0	0.0	28.4	13.7
Lane LOS			D	B
Approach Delay (s)	0.0	0.0	19.4	
Approach LOS			C	

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	40.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	563	44	7	521	54	46
Future Volume (Veh/h)	563	44	7	521	54	46
Sign Control	Free			Free	Stop	
Grade	0%			0%	-3%	
Peak Hour Factor	0.92	0.50	0.50	0.92	0.92	0.92
Hourly flow rate (vph)	612	88	14	566	59	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			700		1206	612
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			700		1206	612
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		71	90
cM capacity (veh/h)			906		202	497

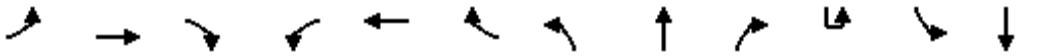
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	612	88	14	566	109
Volume Left	0	0	14	0	59
Volume Right	0	88	0	0	50
cSH	1700	1700	906	1700	278
Volume to Capacity	0.36	0.05	0.02	0.33	0.39
Queue Length 95th (ft)	0	0	1	0	45
Control Delay (s)	0.0	0.0	9.0	0.0	26.1
Lane LOS			A		D
Approach Delay (s)	0.0		0.2		26.1
Approach LOS					D

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	42.1%	ICU Level of Service	A
Analysis Period (min)	15		



Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	160	163	270	22	213	278	12	20	367	177
v/c Ratio	0.59	0.60	0.18	0.17	0.50	0.22	0.02	0.04	0.60	0.26
Control Delay	40.7	41.1	0.3	28.2	19.5	20.4	0.1	13.8	34.7	2.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.7	41.1	0.3	28.2	19.5	20.4	0.1	13.8	34.7	2.3
Queue Length 50th (ft)	76	77	0	5	64	41	0	5	87	0
Queue Length 95th (ft)	151	153	0	29	120	98	0	19	142	18
Internal Link Dist (ft)		1992		455		682			791	
Turn Bay Length (ft)	560				315		160	165		250
Base Capacity (vph)	377	378	1485	134	478	1297	610	471	814	768
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.43	0.18	0.16	0.45	0.21	0.02	0.04	0.45	0.23

Intersection Summary



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	311	2	262	7	3	12	207	270	12	12	8	356
Future Volume (vph)	311	2	262	7	3	12	207	270	12	12	8	356
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		5%			1%			-4%				4%
Total Lost time (s)	6.3	6.3	4.0		8.8		8.7	8.7	8.7		8.7	8.7
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	0.95	1.00		1.00	0.95
Frt	1.00	1.00	0.85		0.93		1.00	1.00	0.85		1.00	1.00
Flt Protected	0.95	0.95	1.00		0.98		0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1655	1661	1485		1329		1737	3474	1211		1675	3276
Flt Permitted	0.95	0.95	1.00		0.98		0.53	1.00	1.00		0.58	1.00
Satd. Flow (perm)	1655	1661	1485		1329		975	3474	1211		1024	3276
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	321	2	270	7	3	12	213	278	12	12	8	367
RTOR Reduction (vph)	0	0	0	0	11	0	0	0	8	0	0	0
Lane Group Flow (vph)	160	163	270	0	11	0	213	278	4	0	20	367
Heavy Vehicles (%)	1%	0%	6%	33%	33%	27%	6%	6%	36%	0%	14%	8%
Turn Type	Split	NA	Free	Split	NA		D.P+P	NA	Perm	D.P+P	D.P+P	NA
Protected Phases	4	4		3	3		5	2		1	1	6
Permitted Phases			Free				6		2	2	2	
Actuated Green, G (s)	12.9	12.9	83.9		7.1		31.4	28.9	28.9		31.4	20.3
Effective Green, g (s)	12.9	12.9	83.9		7.1		31.4	28.9	28.9		31.4	20.3
Actuated g/C Ratio	0.15	0.15	1.00		0.08		0.37	0.34	0.34		0.37	0.24
Clearance Time (s)	6.3	6.3			8.8		8.7	8.7	8.7		8.7	8.7
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	254	255	1485		112		465	1196	417		402	792
v/s Ratio Prot	0.10	c0.10			0.01		c0.06	0.08			0.00	c0.11
v/s Ratio Perm			c0.18				0.11		0.00		0.02	
v/c Ratio	0.63	0.64	0.18		0.10		0.46	0.23	0.01		0.05	0.46
Uniform Delay, d1	33.3	33.3	0.0		35.4		18.7	19.6	18.1		16.6	27.1
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	4.8	5.2	0.3		0.4		0.7	0.1	0.0		0.1	0.4
Delay (s)	38.1	38.5	0.3		35.8		19.4	19.7	18.1		16.7	27.6
Level of Service	D	D	A		D		B	B	B		B	C
Approach Delay (s)		21.0			35.8			19.5				23.6
Approach LOS		C			D			B				C

Intersection Summary			
HCM 2000 Control Delay	21.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	83.9	Sum of lost time (s)	32.5
Intersection Capacity Utilization	56.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	172
Future Volume (vph)	172
Ideal Flow (vphpl)	1900
Grade (%)	
Total Lost time (s)	6.3
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1507
Flt Permitted	1.00
Satd. Flow (perm)	1507
Peak-hour factor, PHF	0.97
Adj. Flow (vph)	177
RTOR Reduction (vph)	107
Lane Group Flow (vph)	70
Heavy Vehicles (%)	5%
Turn Type	pm+ov
Protected Phases	4
Permitted Phases	6
Actuated Green, G (s)	33.2
Effective Green, g (s)	33.2
Actuated g/C Ratio	0.40
Clearance Time (s)	6.3
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	596
v/s Ratio Prot	0.02
v/s Ratio Perm	0.03
v/c Ratio	0.12
Uniform Delay, d1	16.1
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	16.2
Level of Service	B
Approach Delay (s)	
Approach LOS	

Intersection Summary

Intersection	
Intersection Delay, s/veh	7.9
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	40	0	12	37	79	0	0	13	72	0	0
Future Vol, veh/h	0	40	0	12	37	79	0	0	13	72	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
Heavy Vehicles, %	0	13	0	55	2	7	0	0	35	0	0	0
Mvmt Flow	0	43	0	13	40	86	0	0	14	78	0	0
Number of Lanes	0	1	0	0	1	1	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	1
HCM Control Delay	7.9	7.9	6.9	8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	0%	24%	0%	100%
Vol Thru, %	0%	100%	76%	0%	0%
Vol Right, %	100%	0%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	13	40	49	79	72
LT Vol	0	0	12	0	72
Through Vol	0	40	37	0	0
RT Vol	13	0	0	79	0
Lane Flow Rate	14	43	53	86	78
Geometry Grp	2	5	7	7	2
Degree of Util (X)	0.015	0.055	0.085	0.096	0.099
Departure Headway (Hd)	3.821	4.589	5.746	4.019	4.547
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	941	784	619	882	792
Service Time	1.826	2.597	3.518	1.79	2.55
HCM Lane V/C Ratio	0.015	0.055	0.086	0.098	0.098
HCM Control Delay	6.9	7.9	9.1	7.2	8
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0	0.2	0.3	0.3	0.3

Intersection: 1: Culpeper Street & W Shirley Avenue/E Shirley Avenue

Movement	EB	EB	EB	WB	WB	NB	SB	SB
Directions Served	L	T	R	L	TR	LTR	L	TR
Maximum Queue (ft)	214	505	137	184	573	255	85	149
Average Queue (ft)	51	281	32	53	281	122	23	58
95th Queue (ft)	150	459	86	147	505	213	63	117
Link Distance (ft)		1078	1078		3094	992		778
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	215			185			125	
Storage Blk Time (%)	0	18		0	20		0	1
Queuing Penalty (veh)	0	7		0	8		0	0

Intersection: 2: Site Entrance #1 & E Shirley Avenue

Movement	EB	WB
Directions Served	R	L
Maximum Queue (ft)	6	48
Average Queue (ft)	0	7
95th Queue (ft)	5	31
Link Distance (ft)		
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	110	240
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: Site Entrance #2 & E Shirley Avenue

Movement	NB	NB
Directions Served	L	R
Maximum Queue (ft)	58	63
Average Queue (ft)	12	18
95th Queue (ft)	43	51
Link Distance (ft)	383	383
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Site Entrance #3 & E Shirley Avenue

Movement	EB	WB	NB
Directions Served	R	L	LR
Maximum Queue (ft)	2	30	92
Average Queue (ft)	0	3	37
95th Queue (ft)	2	17	71
Link Distance (ft)			384
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	150	150	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: E Shirley Avenue & Falmouth Street

Movement	EB	WB	B17	B17	SB
Directions Served	ULT	UTR	T		L>
Maximum Queue (ft)	258	218	71	9	97
Average Queue (ft)	102	37	4	0	40
95th Queue (ft)	219	131	40	10	82
Link Distance (ft)	392	351	787	787	742
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 6: James Madison Highway/E Shirley Avenue & Alwington Boulevard

Movement	EB	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	R	LTR	L	T	T	R	UL	T	T	R
Maximum Queue (ft)	168	134	84	74	186	172	145	46	59	174	180	103
Average Queue (ft)	92	53	13	19	92	78	22	6	10	94	96	45
95th Queue (ft)	147	109	51	55	156	140	77	27	37	150	159	83
Link Distance (ft)		1974	1974	480		730	730			787	787	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	560				315			160	165			250
Storage Blk Time (%)							0			0		
Queuing Penalty (veh)							0			0		

Intersection: 7: Commercial Entrance /Elementary School Entrance & Alwington Boulevard

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	LT	R	LTR	LTR
Maximum Queue (ft)	35	66	69	63	54
Average Queue (ft)	10	30	33	13	31
95th Queue (ft)	28	61	58	47	49
Link Distance (ft)	954	1974		170	605
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			270		
Storage Blk Time (%)					
Queuing Penalty (veh)					

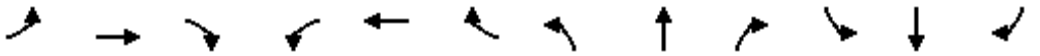
Network Summary

Network wide Queuing Penalty: 16

Lane Group	EBL	EBT	EBR	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	43	620	165	36	584	202	39	156
v/c Ratio	0.31	0.91	0.25	0.26	0.73	0.72	0.16	0.61
Control Delay	53.6	50.5	5.9	52.4	33.5	55.0	40.8	50.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.6	50.5	5.9	52.4	33.5	55.0	40.8	50.2
Queue Length 50th (ft)	28	389	6	23	353	124	23	94
Queue Length 95th (ft)	67	#650	51	58	#586	210	55	164
Internal Link Dist (ft)		1033			3084	958		736
Turn Bay Length (ft)	215			185			125	
Base Capacity (vph)	140	716	700	138	802	330	323	332
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.87	0.24	0.26	0.73	0.61	0.12	0.47

Intersection Summary

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



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	583	155	34	545	4	90	69	31	37	119	27
Future Volume (vph)	40	583	155	34	545	4	90	69	31	37	119	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Grade (%)		-2%			-5%			0%			4%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			0.98		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (prot)	1762	1801	1531	1736	1826			1715		1710	1722	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.98		0.95	1.00	
Satd. Flow (perm)	1762	1801	1531	1736	1826			1715		1710	1722	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	43	620	165	36	580	4	96	73	33	39	127	29
RTOR Reduction (vph)	0	0	91	0	0	0	0	7	0	0	8	0
Lane Group Flow (vph)	43	620	74	36	584	0	0	195	0	39	148	0
Heavy Vehicles (%)	0%	3%	3%	3%	3%	0%	2%	2%	4%	0%	2%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		3	3		4	4	
Permitted Phases			2									
Actuated Green, G (s)	4.5	41.0	41.0	8.1	44.6			16.2		14.6	14.6	
Effective Green, g (s)	4.5	41.0	41.0	8.1	44.6			16.2		14.6	14.6	
Actuated g/C Ratio	0.04	0.39	0.39	0.08	0.43			0.16		0.14	0.14	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0		6.0	6.0	
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0			4.0		4.0	4.0	
Lane Grp Cap (vph)	76	710	604	135	783			267		240	241	
v/s Ratio Prot	c0.02	c0.34		0.02	c0.32			c0.11		0.02	c0.09	
v/s Ratio Perm			0.05									
v/c Ratio	0.57	0.87	0.12	0.27	0.75			0.73		0.16	0.62	
Uniform Delay, d1	48.7	29.0	20.0	45.1	24.9			41.8		39.3	42.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	11.2	11.8	0.1	1.4	4.1			10.5		0.4	5.3	
Delay (s)	59.9	40.9	20.1	46.6	29.0			52.3		39.7	47.3	
Level of Service	E	D	C	D	C			D		D	D	
Approach Delay (s)		37.7			30.0			52.3			45.8	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	37.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	103.9	Sum of lost time (s)	24.0
Intersection Capacity Utilization	66.6%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	620	0	0	548	0	0
Future Volume (Veh/h)	620	0	0	548	0	0
Sign Control	Free			Free	Stop	
Grade	-4%			2%	0%	
Peak Hour Factor	0.92	0.50	0.50	0.92	0.92	0.92
Hourly flow rate (vph)	674	0	0	596	0	0
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			674		1270	674
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			674		1270	674
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		100	100
cM capacity (veh/h)			927		187	458

Direction, Lane #	EB 1	EB 2	WB 1	WB 2
Volume Total	674	0	0	596
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1700	1700	1700	1700
Volume to Capacity	0.40	0.01	0.00	0.35
Queue Length 95th (ft)	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS				
Approach Delay (s)	0.0		0.0	
Approach LOS				

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	42.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	620	0	0	548	0	0
Future Volume (Veh/h)	620	0	0	548	0	0
Sign Control	Free			Free	Stop	
Grade	1%			0%	-2%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.50	0.50
Hourly flow rate (vph)	674	0	0	596	0	0
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			674		1270	674
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			674		1270	674
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		100	100
cM capacity (veh/h)			927		188	458

Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total	674	596	0	0
Volume Left	0	0	0	0
Volume Right	0	0	0	0
cSH	1700	1700	1700	1700
Volume to Capacity	0.40	0.35	0.10	0.06
Queue Length 95th (ft)	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0
Lane LOS			A	A
Approach Delay (s)	0.0	0.0	0.0	
Approach LOS			A	

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	42.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	591	29	28	528	20	4
Future Volume (Veh/h)	591	29	28	528	20	4
Sign Control	Free			Free	Stop	
Grade	0%			0%	-3%	
Peak Hour Factor	0.92	0.50	0.50	0.92	0.92	0.92
Hourly flow rate (vph)	642	58	56	574	22	4
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			700		1328	642
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			700		1328	642
tC, single (s)			4.2		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.3		3.5	3.3
p0 queue free %			94		86	99
cM capacity (veh/h)			865		162	478

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	642	58	56	574	26
Volume Left	0	0	56	0	22
Volume Right	0	58	0	0	4
cSH	1700	1700	865	1700	180
Volume to Capacity	0.38	0.03	0.06	0.34	0.14
Queue Length 95th (ft)	0	0	5	0	12
Control Delay (s)	0.0	0.0	9.4	0.0	28.3
Lane LOS			A		D
Approach Delay (s)	0.0		0.8		28.3
Approach LOS					D

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	41.1%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	162	163	239	18	235	322	1	18	458	152
v/c Ratio	0.62	0.63	0.16	0.05	0.56	0.24	0.00	0.05	0.66	0.23
Control Delay	44.0	44.2	0.2	0.2	20.4	19.6	0.0	13.2	35.3	1.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.0	44.2	0.2	0.2	20.4	19.6	0.0	13.2	35.3	1.7
Queue Length 50th (ft)	83	84	0	0	72	49	0	5	115	0
Queue Length 95th (ft)	155	156	0	0	128	109	0	17	173	13
Internal Link Dist (ft)		1992		455		682			791	
Turn Bay Length (ft)	560				315		160	165		250
Base Capacity (vph)	338	338	1529	360	463	1375	474	375	873	730
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.48	0.16	0.05	0.51	0.23	0.00	0.05	0.52	0.21

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	309	0	227	5	0	12	223	306	1	10	7	435
Future Volume (vph)	309	0	227	5	0	12	223	306	1	10	7	435
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		5%			1%			-4%				4%
Total Lost time (s)	6.3	6.3	4.0		8.8		8.7	8.7	8.7		8.7	8.7
Lane Util. Factor	0.95	0.95	1.00		1.00		1.00	0.95	1.00		1.00	0.95
Frt	1.00	1.00	0.85		0.90		1.00	1.00	0.85		1.00	1.00
Flt Protected	0.95	0.95	1.00		0.99		0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1655	1655	1529		1502		1721	3541	824		1337	3369
Flt Permitted	0.95	0.95	1.00		0.99		0.46	1.00	1.00		0.56	1.00
Satd. Flow (perm)	1655	1655	1529		1502		838	3541	824		784	3369
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	325	0	239	5	0	13	235	322	1	11	7	458
RTOR Reduction (vph)	0	0	0	0	17	0	0	0	1	0	0	0
Lane Group Flow (vph)	162	163	239	0	1	0	235	322	0	0	18	458
Heavy Vehicles (%)	1%	0%	3%	20%	0%	9%	7%	4%	100%	0%	83%	5%
Turn Type	Split	NA	Free	Split	NA		D.P+P	NA	Perm	D.P+P	D.P+P	NA
Protected Phases	4	4		3	3		5	2		1	1	6
Permitted Phases			Free				6		2	2	2	
Actuated Green, G (s)	12.7	12.7	86.0		7.1		33.7	31.2	31.2		33.7	22.2
Effective Green, g (s)	12.7	12.7	86.0		7.1		33.7	31.2	31.2		33.7	22.2
Actuated g/C Ratio	0.15	0.15	1.00		0.08		0.39	0.36	0.36		0.39	0.26
Clearance Time (s)	6.3	6.3			8.8		8.7	8.7	8.7		8.7	8.7
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	244	244	1529		124		446	1284	298		323	869
v/s Ratio Prot	0.10	c0.10			0.00		c0.07	c0.09			0.00	c0.14
v/s Ratio Perm			c0.16				0.14		0.00		0.02	
v/c Ratio	0.66	0.67	0.16		0.01		0.53	0.25	0.00		0.06	0.53
Uniform Delay, d1	34.6	34.7	0.0		36.2		18.4	19.2	17.5		16.1	27.4
Progression Factor	1.00	1.00	1.00		1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	6.6	6.8	0.2		0.0		1.1	0.1	0.0		0.1	0.6
Delay (s)	41.3	41.4	0.2		36.3		19.6	19.3	17.5		16.2	28.0
Level of Service	D	D	A		D		B	B	B		B	C
Approach Delay (s)		23.9			36.3			19.4				24.7
Approach LOS		C			D			B				C

Intersection Summary			
HCM 2000 Control Delay	22.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	86.0	Sum of lost time (s)	32.5
Intersection Capacity Utilization	59.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	144
Future Volume (vph)	144
Ideal Flow (vphpl)	1900
Grade (%)	
Total Lost time (s)	6.3
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1439
Flt Permitted	1.00
Satd. Flow (perm)	1439
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	152
RTOR Reduction (vph)	90
Lane Group Flow (vph)	62
Heavy Vehicles (%)	10%
Turn Type	pm+ov
Protected Phases	4
Permitted Phases	6
Actuated Green, G (s)	34.9
Effective Green, g (s)	34.9
Actuated g/C Ratio	0.41
Clearance Time (s)	6.3
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	583
v/s Ratio Prot	0.02
v/s Ratio Perm	0.03
v/c Ratio	0.11
Uniform Delay, d1	15.9
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	15.9
Level of Service	B
Approach Delay (s)	
Approach LOS	

Intersection Summary

Intersection	
Intersection Delay, s/veh	8
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	0	58	0	15	66	37	0	0	30	31	0	0
Future Vol, veh/h	0	58	0	15	66	37	0	0	30	31	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
Heavy Vehicles, %	0	0	0	57	0	18	0	0	7	0	0	0
Mvmt Flow	0	63	0	16	72	40	0	0	33	34	0	0
Number of Lanes	0	1	0	0	1	1	0	1	0	0	1	0

Approach	EB	WB	NB	SB
Opposing Approach	WB	EB	SB	NB
Opposing Lanes	2	1	1	1
Conflicting Approach Left	SB	NB	EB	WB
Conflicting Lanes Left	1	1	1	2
Conflicting Approach Right	NB	SB	WB	EB
Conflicting Lanes Right	1	1	2	1
HCM Control Delay	7.6	8.6	7	7.8
HCM LOS	A	A	A	A

Lane	NBLn1	EBLn1	WBLn1	WBLn2	SBLn1
Vol Left, %	0%	0%	19%	0%	100%
Vol Thru, %	0%	100%	81%	0%	0%
Vol Right, %	100%	0%	0%	100%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop
Traffic Vol by Lane	30	58	81	37	31
LT Vol	0	0	15	0	31
Through Vol	0	58	66	0	0
RT Vol	30	0	0	37	0
Lane Flow Rate	33	63	88	40	34
Geometry Grp	2	5	7	7	2
Degree of Util (X)	0.035	0.074	0.14	0.044	0.043
Departure Headway (Hd)	3.817	4.21	5.711	3.947	4.611
Convergence, Y/N	Yes	Yes	Yes	Yes	Yes
Cap	943	837	626	902	781
Service Time	1.818	2.305	3.46	1.695	2.613
HCM Lane V/C Ratio	0.035	0.075	0.141	0.044	0.044
HCM Control Delay	7	7.6	9.4	6.9	7.8
HCM Lane LOS	A	A	A	A	A
HCM 95th-tile Q	0.1	0.2	0.5	0.1	0.1

Intersection: 1: Culpeper Street & W Shirley Avenue/E Shirley Avenue

Movement	EB	EB	EB	WB	WB	NB	SB	SB
Directions Served	L	T	R	L	TR	LTR	L	TR
Maximum Queue (ft)	214	590	119	184	459	237	118	190
Average Queue (ft)	55	312	41	40	243	116	34	91
95th Queue (ft)	156	519	95	128	412	201	87	163
Link Distance (ft)		1078	1078		3094	992		778
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	215			185			125	
Storage Blk Time (%)	0	24		0	19		0	4
Queuing Penalty (veh)	0	10		0	6		0	1

Intersection: 2: Site Entrance #1 & E Shirley Avenue

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

Intersection: 3: Site Entrance #2 & E Shirley Avenue

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

Intersection: 4: Site Entrance #3 & E Shirley Avenue

Movement	EB	WB	NB
Directions Served	R	L	LR
Maximum Queue (ft)	2	57	43
Average Queue (ft)	0	11	16
95th Queue (ft)	2	39	38
Link Distance (ft)			384
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	150	150	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: E Shirley Avenue & Falmouth Street

Movement	EB	WB	B17	B17	SB
Directions Served	ULT	TR	T		L>
Maximum Queue (ft)	241	187	51	10	98
Average Queue (ft)	96	24	3	0	36
95th Queue (ft)	216	98	23	11	76
Link Distance (ft)	392	351	787	787	742
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 6: James Madison Highway/E Shirley Avenue & Alwington Boulevard

Movement	EB	EB	EB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LT	R	LTR	L	T	T	R	UL	T	T	R
Maximum Queue (ft)	184	144	60	65	204	168	137	28	114	175	192	99
Average Queue (ft)	94	54	9	13	98	80	27	1	15	106	112	44
95th Queue (ft)	151	117	38	43	168	148	89	14	58	159	174	81
Link Distance (ft)		1974	1974	480		730	730			787	787	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	560				315			160	165			250
Storage Blk Time (%)							0		0	0		
Queuing Penalty (veh)							0		0	0		

Intersection: 7: Commercial Entrance /Elementary School Entrance & Alwington Boulevard

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	LT	R	LTR	LTR
Maximum Queue (ft)	29	71	64	57	35
Average Queue (ft)	8	37	25	20	19
95th Queue (ft)	17	63	57	47	42
Link Distance (ft)	954	1974		170	605
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			270		
Storage Blk Time (%)					
Queuing Penalty (veh)					

Network Summary

Network wide Queuing Penalty: 18

MOVEMENT SUMMARY

Site: 101 [2032 Future - AM Peak (Site Folder: General)]

AM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: E Shirley Avenue														
1u	U	1	0.0	1	0.0	0.649	13.0	LOS B	6.4	174.3	0.38	0.19	0.38	23.6
6	T1	490	10.0	533	10.0	0.649	13.3	LOS B	6.4	174.3	0.38	0.19	0.38	22.5
16	R2	100	11.0	109	11.0	0.649	13.4	LOS B	6.4	174.3	0.38	0.19	0.38	22.0
Approach		591	10.2	642	10.2	0.649	13.3	LOS B	6.4	174.3	0.38	0.19	0.38	22.4
North: Falmouth Street														
7	L2	90	21.0	98	21.0	0.272	10.8	LOS B	1.7	48.4	0.75	0.67	0.75	22.8
14	R2	46	9.0	50	9.0	0.272	9.8	LOS A	1.7	48.4	0.75	0.67	0.75	21.9
Approach		136	16.9	148	16.9	0.272	10.5	LOS B	1.7	48.4	0.75	0.67	0.75	22.5
West: E Shirley Avenue														
5u	U	1	0.0	1	0.0	0.145	4.9	LOS A	0.8	23.2	0.37	0.21	0.37	25.2
5	L2	41	19.0	45	19.0	0.145	5.7	LOS A	0.8	23.2	0.37	0.21	0.37	24.5
2	T1	320	9.0	348	9.0	0.145	1.3	LOS A	0.8	23.2	0.09	0.05	0.09	25.5
Approach		362	10.1	393	10.1	0.145	1.8	LOS A	0.8	23.2	0.12	0.07	0.12	25.4
All Vehicles		1089	11.0	1184	11.0	0.649	9.1	LOS A	6.4	174.3	0.34	0.21	0.34	23.3

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

MOVEMENT SUMMARY

Site: 101 [2032 Future - School PM (Site Folder: General)]

School PM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: E Shirley Avenue														
1u	U	2	0.0	2	0.0	0.606	11.4	LOS B	5.7	148.2	0.32	0.14	0.32	24.0
6	T1	481	4.0	486	4.0	0.606	11.5	LOS B	5.7	148.2	0.32	0.14	0.32	22.9
16	R2	152	6.0	154	6.0	0.606	11.6	LOS B	5.7	148.2	0.32	0.14	0.32	22.4
Approach		635	4.5	641	4.5	0.606	11.5	LOS B	5.7	148.2	0.32	0.14	0.32	22.8
North: Falmouth Street														
7	L2	144	7.0	145	7.0	0.258	8.5	LOS A	1.7	43.2	0.69	0.58	0.69	23.1
14	R2	30	0.0	30	0.0	0.258	8.0	LOS A	1.7	43.2	0.69	0.58	0.69	22.2
Approach		174	5.8	176	5.8	0.258	8.4	LOS A	1.7	43.2	0.69	0.58	0.69	23.0
West: E Shirley Avenue														
5u	U	2	0.0	2	0.0	0.217	5.9	LOS A	1.3	35.4	0.44	0.28	0.44	25.2
5	L2	35	23.0	35	23.0	0.217	7.0	LOS A	1.3	35.4	0.44	0.28	0.44	24.5
2	T1	559	5.0	565	5.0	0.217	1.7	LOS A	1.3	35.4	0.12	0.08	0.12	25.4
Approach		596	6.0	602	6.0	0.217	2.1	LOS A	1.3	35.4	0.14	0.09	0.14	25.3
All Vehicles		1405	5.3	1419	5.3	0.606	7.1	LOS A	5.7	148.2	0.29	0.17	0.29	23.8

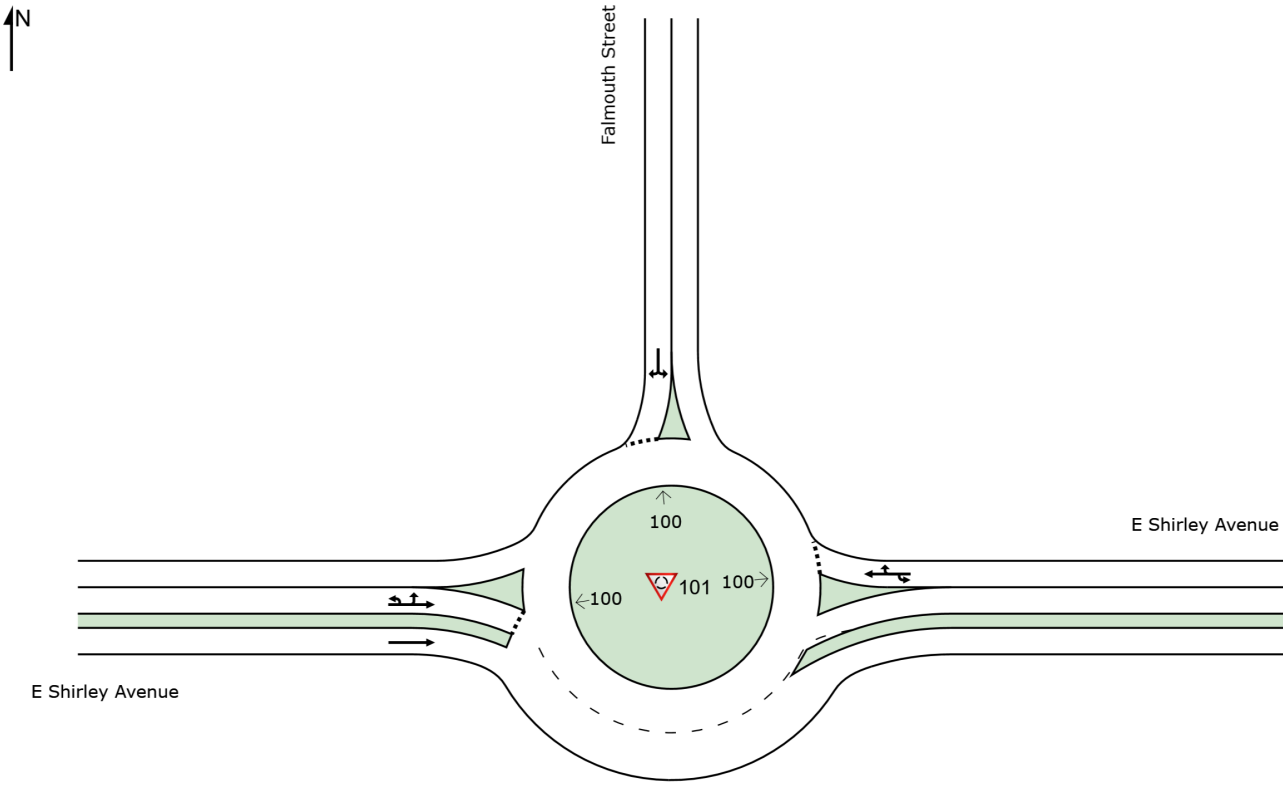
Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement.
LOS F will result if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

SITE LAYOUT

Site: 101 [2032 Future - School PM (Site Folder: General)]

School PM Peak
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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MOVEMENT SUMMARY

Site: 101 [2032 Future - Commuter Peak (Site Folder: General)]

AM Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] ft	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed mph
East: E Shirley Avenue														
1u	U	1	0.0	1	0.0	0.754	17.4	LOS B	11.0	311.5	0.39	0.15	0.39	22.4
6	T1	502	21.0	546	21.0	0.754	18.1	LOS B	11.0	311.5	0.39	0.15	0.39	21.5
16	R2	166	4.0	180	4.0	0.754	17.5	LOS B	11.0	311.5	0.39	0.15	0.39	21.0
Approach		669	16.8	727	16.8	0.754	18.0	LOS B	11.0	311.5	0.39	0.15	0.39	21.4
North: Falmouth Street														
7	L2	145	1.0	158	1.0	0.327	10.3	LOS B	2.3	59.1	0.81	0.72	0.81	22.7
14	R2	38	9.0	41	9.0	0.327	11.0	LOS B	2.3	59.1	0.81	0.72	0.81	21.8
Approach		183	2.7	199	2.7	0.327	10.4	LOS B	2.3	59.1	0.81	0.72	0.81	22.5
West: E Shirley Avenue														
5u	U	2	0.0	2	0.0	0.235	6.1	LOS A	1.5	39.2	0.45	0.29	0.45	25.3
5	L2	21	11.0	23	11.0	0.235	6.6	LOS A	1.5	39.2	0.45	0.29	0.45	24.6
2	T1	583	5.0	634	5.0	0.235	1.9	LOS A	1.5	39.2	0.14	0.09	0.14	25.4
Approach		606	5.2	659	5.2	0.235	2.1	LOS A	1.5	39.2	0.15	0.10	0.15	25.3
All Vehicles		1458	10.2	1585	10.2	0.754	10.4	LOS B	11.0	311.5	0.34	0.20	0.34	23.0

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

March 19, 2024
Planning Commission
Regular Meeting

RESOLUTION TO RECOMMEND APPROVAL SPECIAL USE PERMIT 23-04 TAYLOR MIDDLE SCHOOL EXPANSION PURSUANT TO SECTION 11-3.10 OF THE ZONING ORDINANCE OF THE TOWN OF WARRENTON (GPIN 6983-48-7973-500)

WHEREAS, Warrenton, VA (Hereinafter "the Town") is a municipal corporation located within the County of Fauquier; and

WHEREAS, Taylor Middle School, and the owner, the Fauquier County School Board, ("the Applicant"), is the requesting a Special Use Permit approval on a parcel of land containing approximately 39.18 acres, identified as GPIN 6983-48-7973-500, located at 350 E. Shirely Avenue in the Town of Warrenton and hereinafter referred to as the "Property"; and

WHEREAS, the Applicant has applied for a Special Use Permit pursuant to §3-4.9 of the Zoning Ordinance for approval to expand the existing W.C. Taylor Middle School in excess of 10,000 square feet to allow an additional of approximately 68,231 square feet, hereinafter the "Special Use Permit"; and

WHEREAS, pursuant to §11-3 of the Zoning Ordinance upon petition of the Applicant for approval of the Special Use Permit, the Planning Commission upon advertisement and notice properly given pursuant to §15.2-2204 of the Virginia Code held a Public Hearing on March 19, 2024; and

WHEREAS, the Planning Commission considered for approval of the Special Use Permit based on Conditions of Approval; and

WHEREAS, the Planning Commission finds that the Application meets the criteria for approval found in Section 11-3.10.3 in the Town of Warrenton Zoning Ordinance; and

WHEREAS, the Planning Commission, in consideration of all of the foregoing, is of the opinion that the application for the Special Use Permit is to be recommended for approval to the Town Council subject to certain conditions;

NOW, THEREFORE, BE IT RESOLVED that the Warrenton Planning Commission on this 19th day of March 2024, that SUP 23-04 be, and is hereby, recommended for approval to Town Council, subject to the Conditions of Approval.

Votes:
Ayes:
Nays:
Absent from Vote:
Absent from Meeting:

ATTEST: _____
Darine Barbour, Planning Commission Secretary

EXPERIENCE WARRENTON VIRGINIA EST. 1810

Planning Commission Public Hearing
SUP 2023-04 Taylor Middle School
March 19, 2024

PC Decision Deadline May 30,2024 Unless Applicant Defers

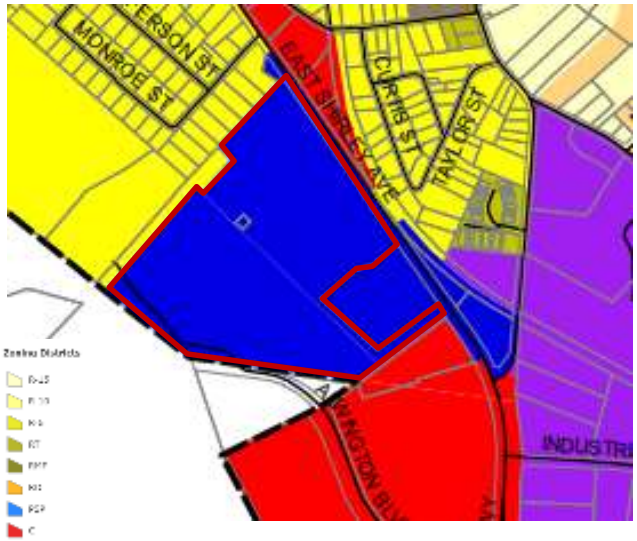
Special Use Permit Application

- GPIN **Applicant:** 6984-48-7973-500
- **Property Owner:** Fauquier County School Board
- Representative: Luke Fetcho, Timmons Group
- **Zoning:** PSP (Public/Semi Public)
- **Comprehensive Plan:** Public/Semi Public Non-Intensive
- SUP to allow for an addition in excess of 10,000 square feet (proposing additional approximate 68, 231 square feet)

Location

Adjacent Land Uses

Zoning Map



R-10 Single Family Residential

Commercial

Public/Semi Public

County Approved Future Housing

Fauquier County Arrington Rezoning

2023 Rezoning Amendment:

- Amend 2015 Approvals
  - Revised Proffer Statement, CDP & COD
- Rezone 27.65 ac from RA to PRD
  - Subject to Revised Proffer Statement, CDP & COD
- Southern 197.11 ac of RA Not Included
  - Previous Proffers, Easement Commitment, CDP & COD would not apply to this property.

Development Scenarios:

- Base: 217 du (0.93 du/ac) w/ 99.14 ac Open Space (42%)
  - Public Water & Private Sewer
- Alternative A: 211 du (1.01 du/ac) w/ 108.44 ac Open Space (52%)
  - Incorporated into Town of Warrenton / Public Water & Sewer
  - Commercial: Eating Establishment - 8,000 sf & Inn - 15 rooms
  - Unplanned Future Commercial: 25 ac
- Alternative B: 270 du (1.29 du/ac) w/ 108.88 ac Open Space (52%)
  - Incorporated into Town of Warrenton / Public Water & Sewer
  - Off-site ROW & Easements
  - Commercial: Eating Establishment - 8,000 sf & Inn - 15 rooms
  - Unplanned Future Commercial: 25 ac

Town Policies – Plan Warrenton 2040

- Walkability Audit & Complete Streets
- Transportation Map – Bike/Ped New Facility links to County Plan
- Shirley Ave = Signature Road
- T-1.4 *Maintain the capacity of Signature Streets by providing multimodal accommodations and incorporating innovative approaches.*

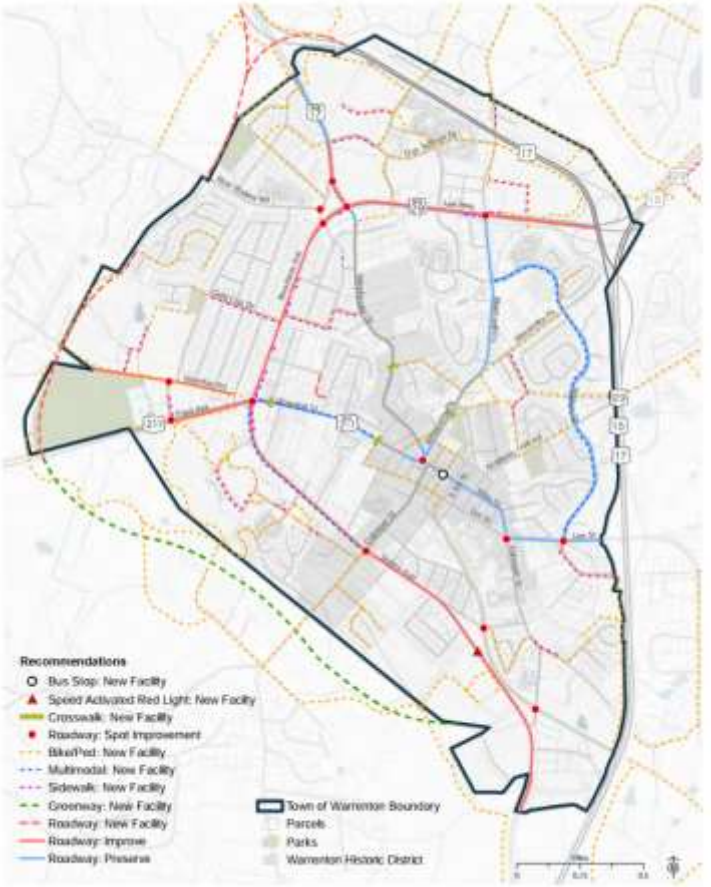


Figure 5-1: Town of Warrenton Transportation Plan map.

FEMA Map

- [x] FEMA Flood Zones
  - A -100 Year
  - AE - 100 Year BFE Determined
  - X Shaded - 500 year
  - [ ] X


E Shirley Ave


E Shirley Ave

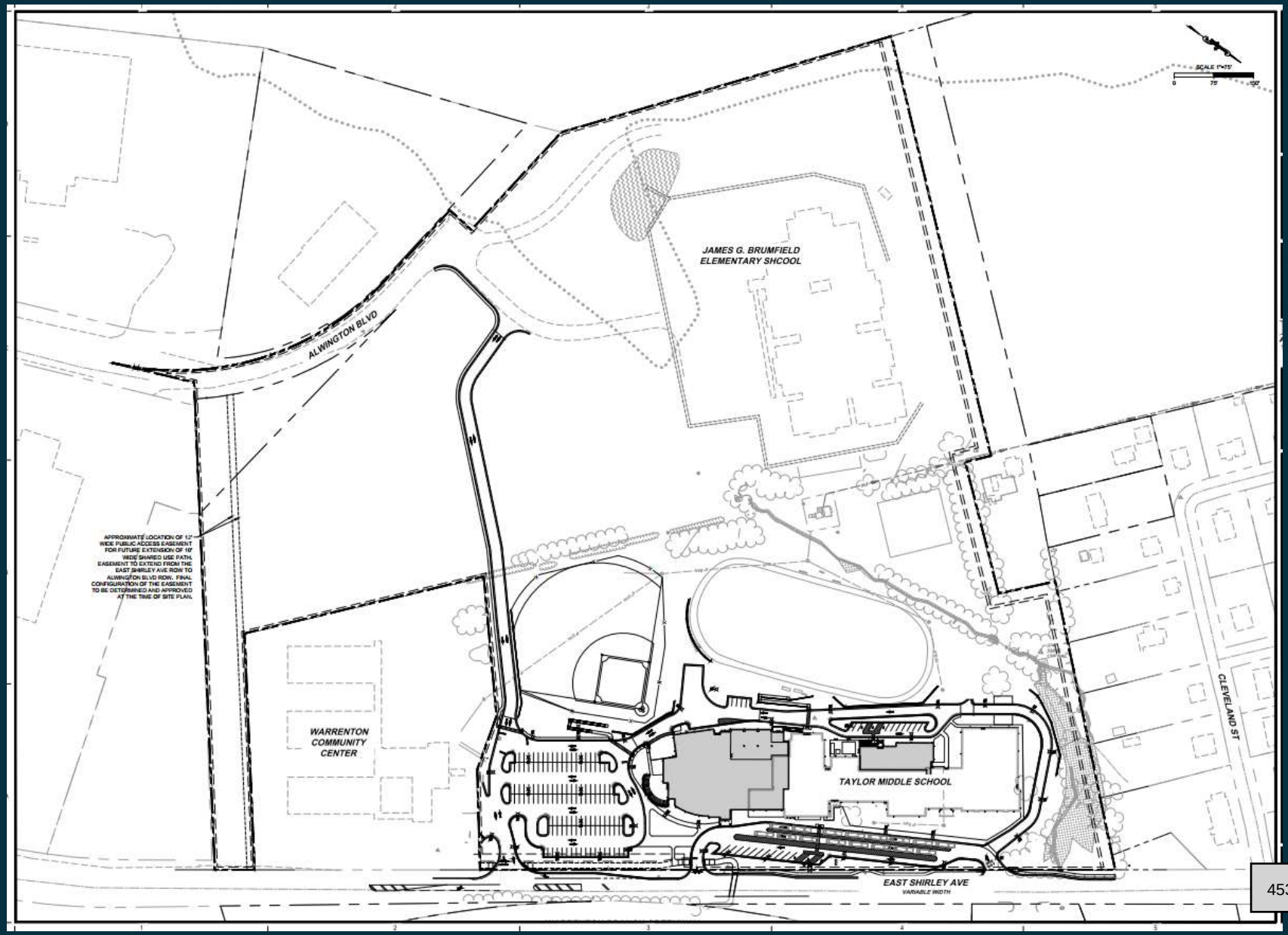

E Shirley Ave
450


US-17 BUS

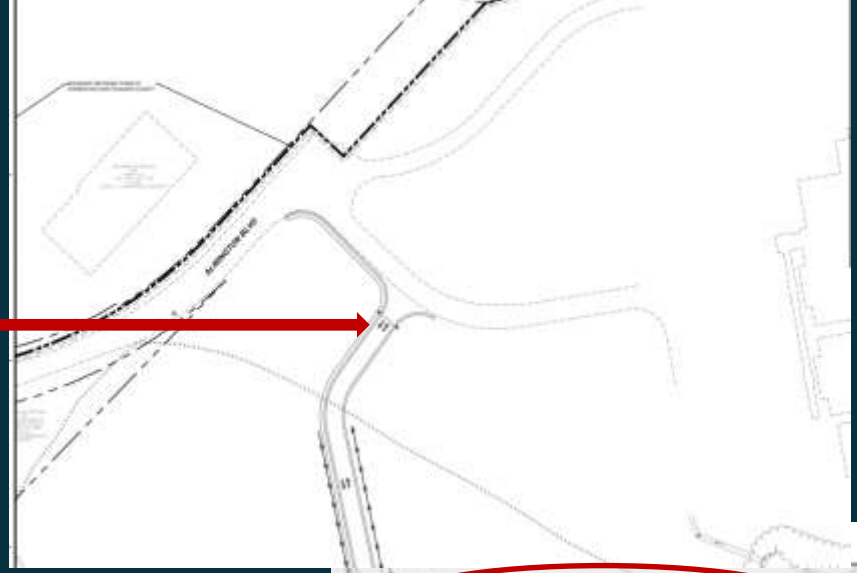

US-17 BUS


451

SUP Plan


JAMES G. BRUMFIELD
ELEMENTARY SHCOOL
ALWINGTON BLVD
APPROXIMATE LOCATION OF 12' WIDE PUBLIC ACCESS EASEMENT FOR FUTURE EXTENSION OF 10' WIDE SHARED USE PATH. EASEMENT TO EXTEND FROM THE EAST SHIRLEY AVE ROW TO ALWINGTON BLVD ROW. FINAL CONFIGURATION OF THE EASEMENT TO BE DETERMINED AND APPROVED AT THE TIME OF SITE PLAN.
WARRENTON
COMMUNITY
CENTER
TAYLOR MIDDLE SCHOOL
CLEVELAND ST
EAST SHIRLEY AVE
VARIABLE WIDTH

SUP Plan

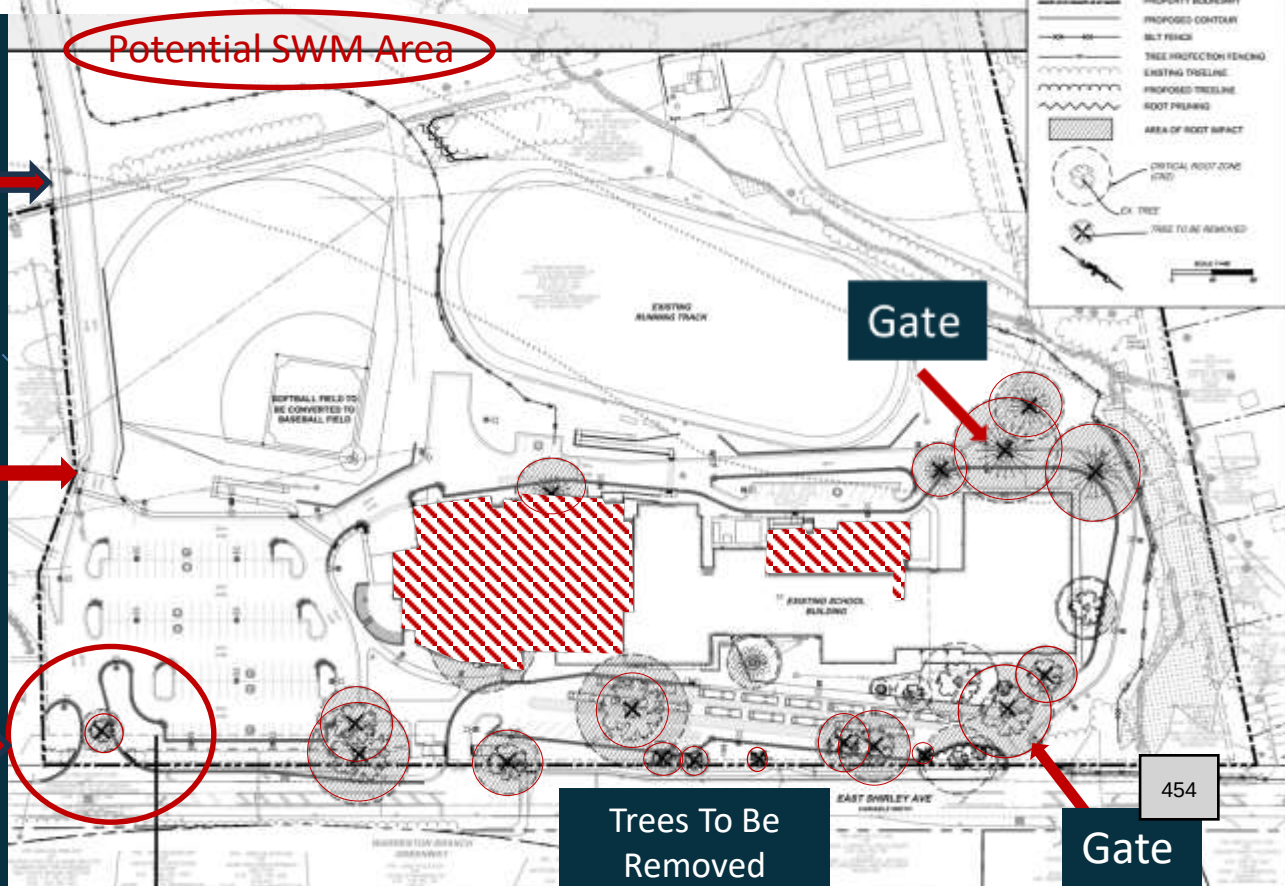


Gate

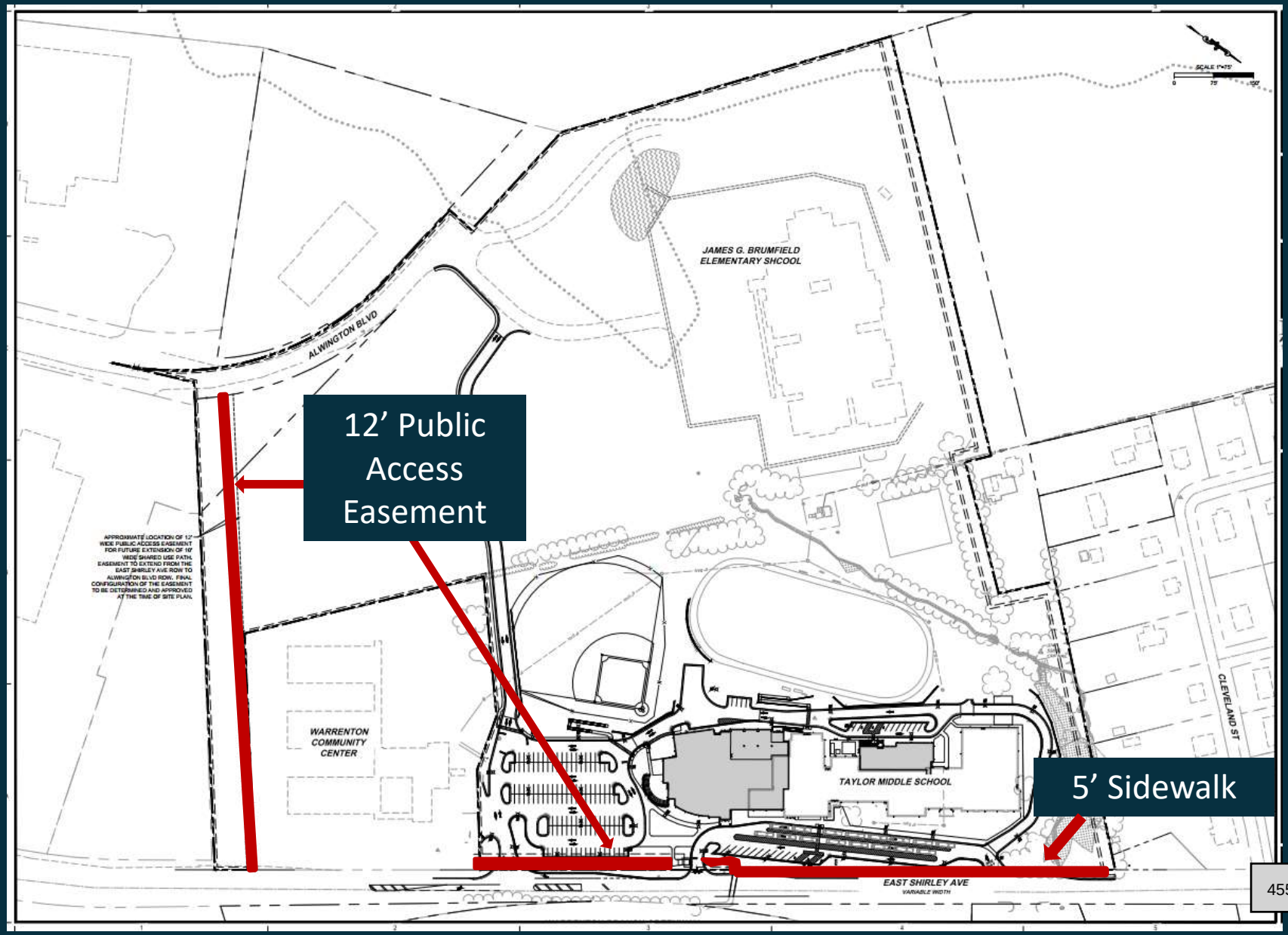
Added Sidewalk

Gate

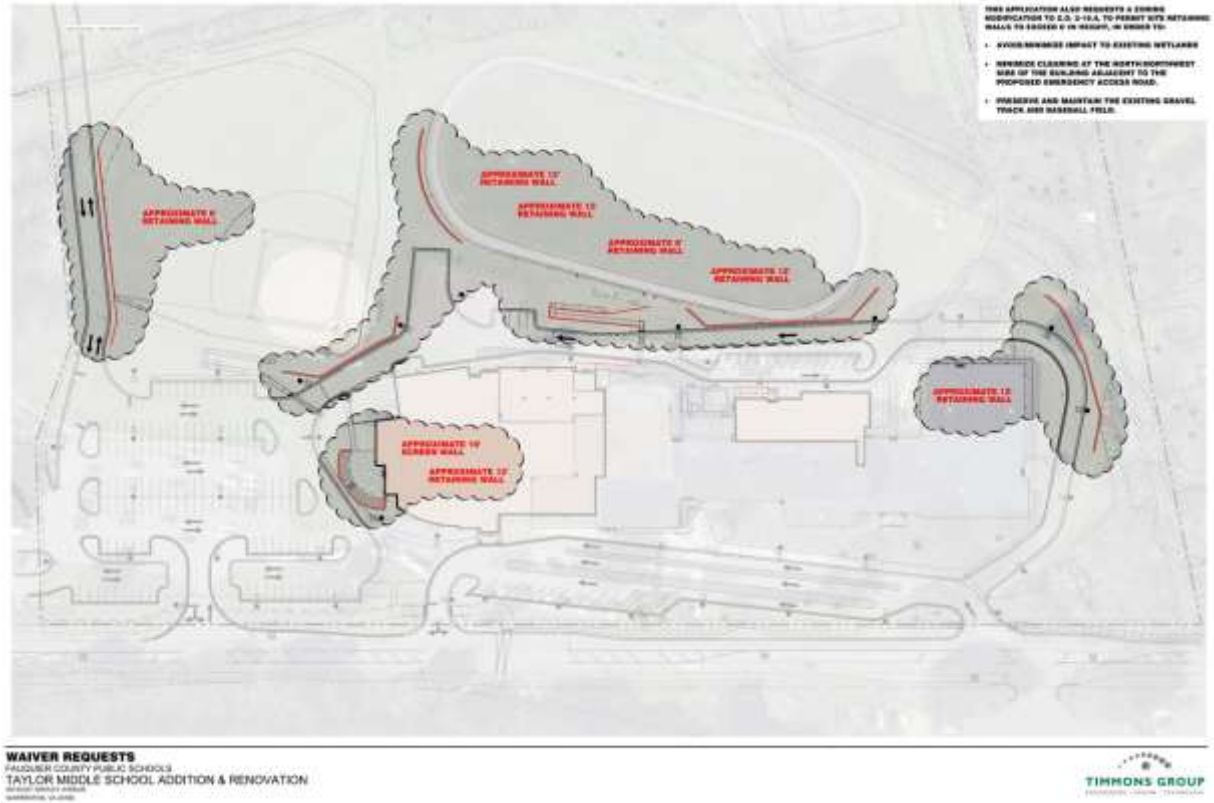
Redesigned Parking Lot Entrance



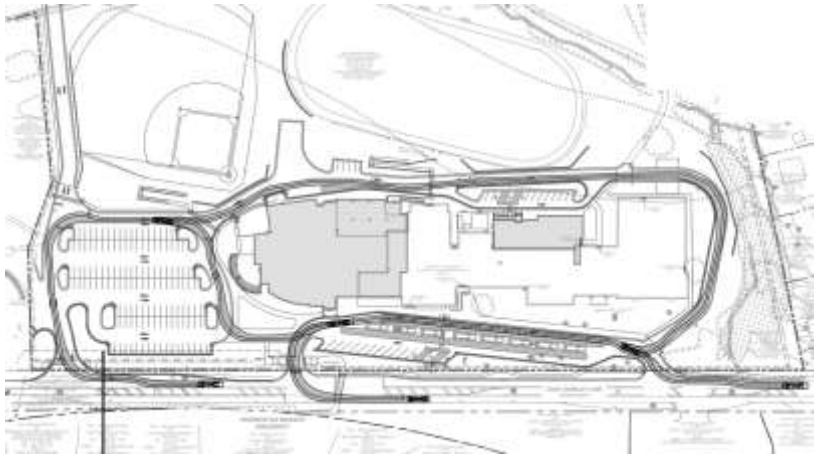
SUP Plan

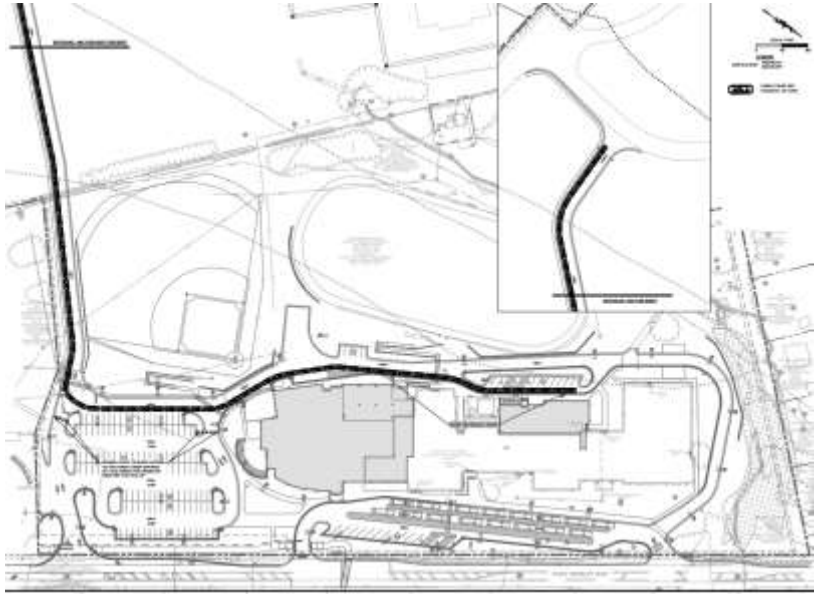

12’ Public Access Easement
5’ Sidewalk
JAMES G. BRUMFIELD ELEMENTARY SHCOOL
ALWINGTON BLVD
WARRENTON COMMUNITY CENTER
TAYLOR MIDDLE SCHOOL
CLEVELAND ST
EAST SHIRLEY AVE
VARIABLE WIDTH
APPROXIMATE LOCATION OF 12' WIDE PUBLIC ACCESS EASEMENT FOR FUTURE EXTENSION OF 10' WIDE SHARED USE PATH. EASEMENT TO EXTEND FROM THE EAST SHIRLEY AVE ROW TO ALWINGTON BLVD ROW. FINAL CONFIGURATION OF THE EASEMENT TO BE DETERMINED AND APPROVED AT THE TIME OF SITE PLAN.

Waiver Request – Article 2.19 Zoning Ordinance Exceed 6’ Retaining Walls

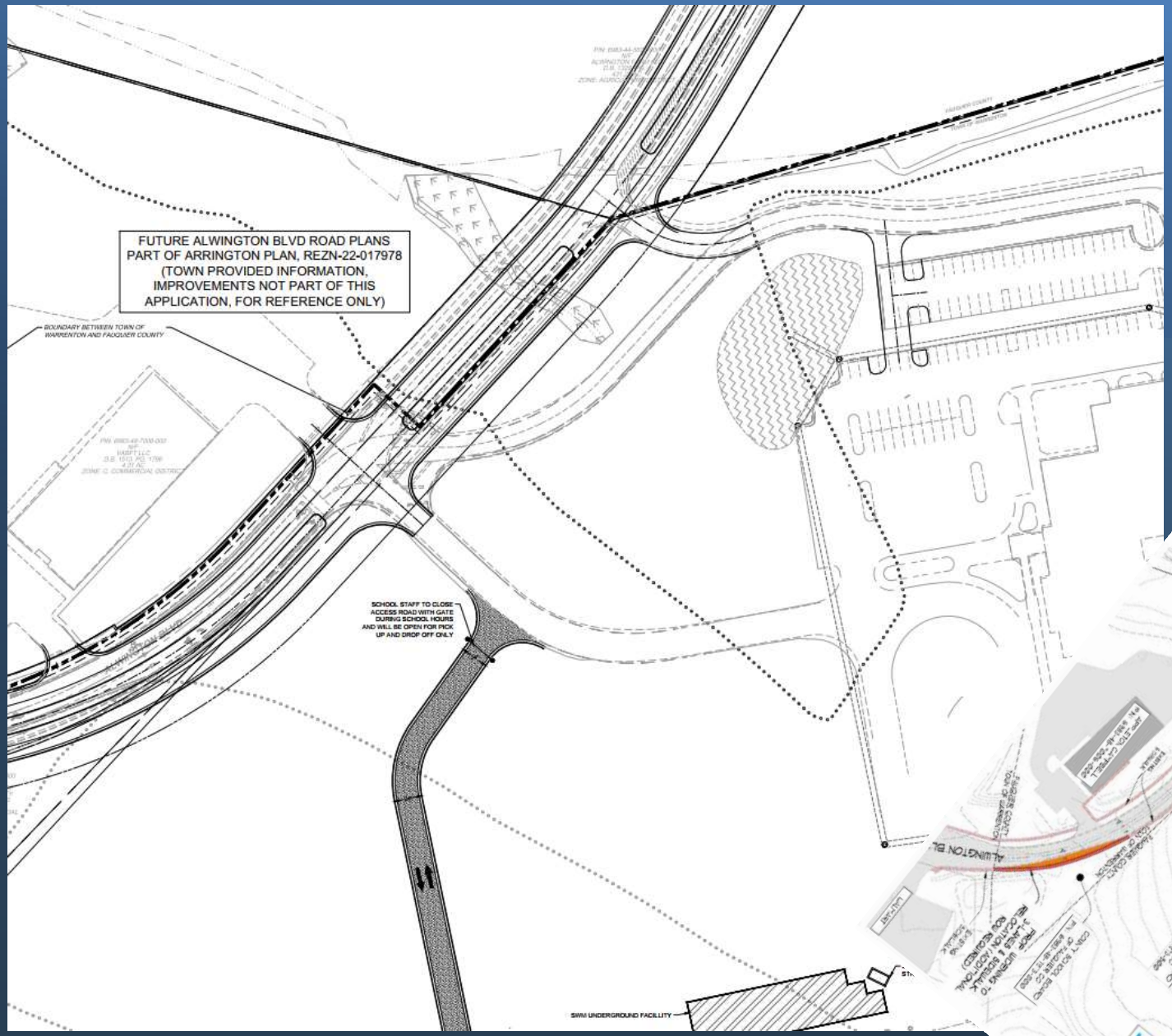


Auto Turn and Stacking

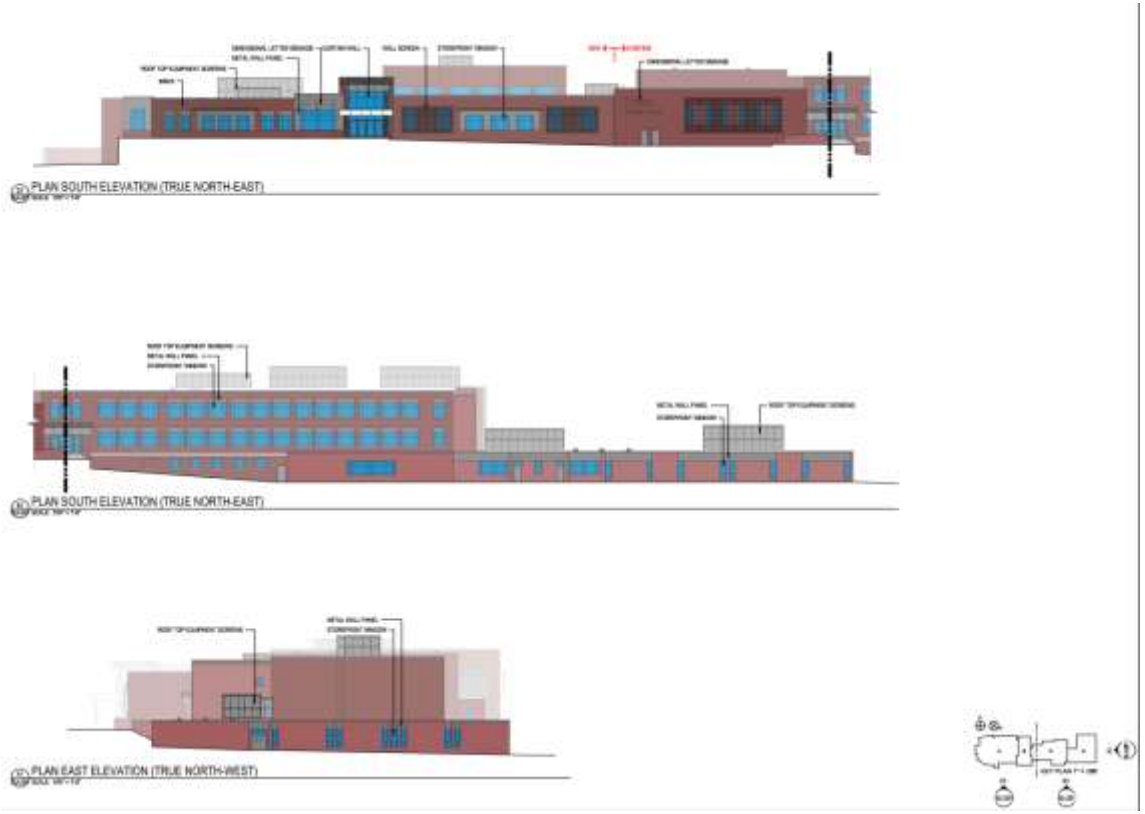




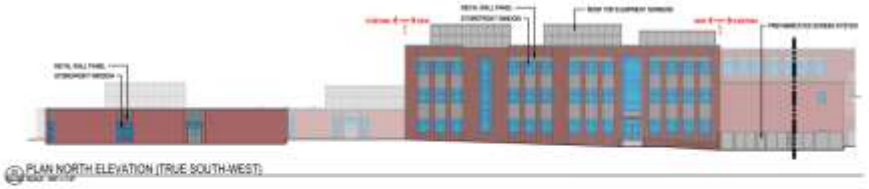
Prior to issuance of 21st occupancy permit for a residential dwelling unit.



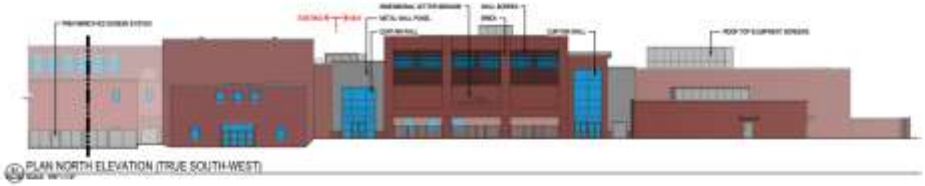
Elevations


PLAN SOUTH ELEVATION (TRUE NORTH-EAST)
PLAN SOUTH ELEVATION (TRUE NORTH-EAST)
PLAN EAST ELEVATION (TRUE NORTH-WEST)

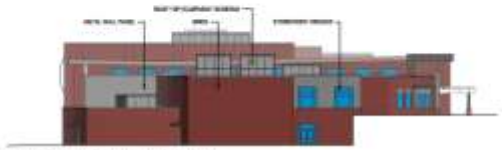
Elevations



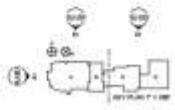
PLAN NORTH ELEVATION (TRUE SOUTH-WEST)



PLAN NORTH ELEVATION (TRUE SOUTH-WEST)



PLAN WEST ELEVATION (TRUE SOUTH-EAST)

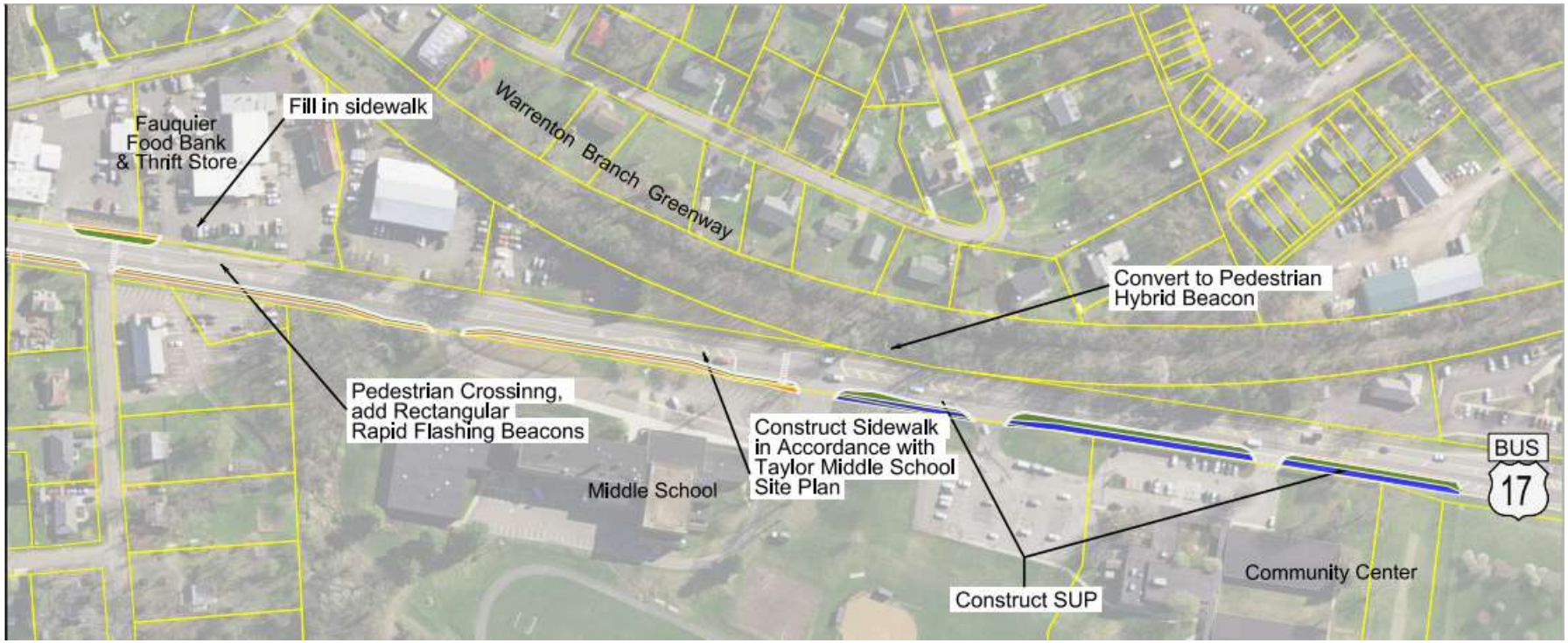


Agency Reviews

- Full site
- Transportation and Internal Circulation
- Parking Orientation
- Walkability/Bicycle Connections
- Landscaping
- Lighting
- VDOT Pipeline Study
- Fauquier County Arrington Proffers

Preliminary VDOT Pipeline

Add Sidewalk from Culpeper to Taylor MS
Construct Shared Use Path Taylor MS to Walmart



Draft Conditions of Approval

- General
  - Substantial Conformance
  - Use Parameters
  - Use Limitations
  - Zoning Ordinance: Signage, Refuse, Lighting, Landscaping
  - LED
  - Public Water and Sewer
  - Emergency Service Access

Draft Conditions of Approval

- Transportation
  - Bus Loop/Parent Drop Off
  - No Stacking in Public ROW
  - Public Access Easement Dedication Final Site Plan
  - ROW Dedication/Construction Easement Alwington Improvements Final Site Plan
  - Shirley Ave Grading Final Certificate of Occupancy

Next Steps

Hold Public Hearing

Decision Deadline May 30, 2024 – Unless Applicant Defers

STAFF REPORT

Planning Commission Meeting Date:	March 19, 2024
Agenda Title:	ZOTA-23-1 Zoning Ordinance Text Amendment to Reduce the Setback Requirement for Telecommunication Towers **(REVISED)**
Requested Action:	Hold a Work Session
Department / Agency Lead:	Community Development
Staff Lead:	Heather Jenkins, Zoning Administrator

EXECUTIVE SUMMARY

Article 9, Section 9-18 *Telecommunications Facilities*, regulates the height, location, and appearance of telecommunication towers within Town boundaries. Section 9-18.10 *Setbacks*, requires that all towers be set back a distance of at least one hundred (100) percent of the height of the tower from the boundaries of the property on which the tower is located.

Mr. James Downey, on behalf of his client Arcola Towers, LLC (the Applicant), is requesting that Ordinance Section 9-18.10 *Setbacks* be revised so that the setback requirement is reduced for telecommunication towers in all Zoning Districts. Previously, this text amendment was proposed to apply only within the Public-Semi-Public (PSP) District, however due to the recommendations provided by the Town's telecommunication consultant CityScape regarding potential claims of discrimination, the text amendment has been revised by the applicant to apply to all Zoning Districts within the Town. In order to qualify for the setback reduction, the applicant is proposing that the tower must be constructed so as to meet a lesser setback, as certified by a Virginia licensed Professional Engineer as less than the full height of the tower.

The specific site where Arcola Towers, LLC would like to establish a telecommunication tower is located within the public right-of-way area at the intersection of the Eastern Bypass, US 17 Spur, East Lee Highway and Lee Highway. However, should a text amendment to Section 9-18.10 *Setbacks* be adopted by Town Council, the setback reduction would apply to all properties located within the PSP District.

BACKGROUND

The Applicant is proposing to construct a 150-foot-tall telecommunication tower on a parcel of land leased from the Virginia Department of Transportation (VDOT), within the Eastern Bypass U.S. Route 17 Spur. The proposed location for the tower, adjacent to an existing stormwater management facility that is maintained by VDOT, will not meet the required 100-percent setback requirement that is equal to the height of the 150-foot tower. A copy of the original application documents that depict the proposed tower location have been included with this staff report as Attachment A.

Telecommunication towers are allowed in all Zoning Districts as a Permissible Use that requires the approval of a Special Use Permit by Town Council following a public hearing before both the Planning Commission and Town Council. Zoning Ordinance Section 9-18 *Telecommunications Facilities* regulates towers that are constructed within the Town boundaries, and includes both minimum standards that all towers must meet, as well as factors that must

be considered as a part of all Special Use Permits for towers. A copy of Section 9-18 of the Ordinance has been included with this staff report as Attachment B.

Zoning Ordinance Section 9-18.10 *Setbacks* requires that a tower be located no closer to any property line than the full height of the tower. This fall zone ensures that a tower collapse will be completely contained within the property boundaries. The fall zone setback required by Section 9-18.10 cannot currently be waived or modified by Town Council as a part of the Special Use Permit process. Zoning Ordinance Section 9-18.10 *Setback*s states:

Towers shall be set back a distance of at least one hundred (100) percent of the height of the tower from the boundaries of the property on which the tower is located.

Local jurisdictions in the area differ in setback requirements for telecommunications facilities, as shown in the table below. Generally speaking, about half of local jurisdictions require a setback equal to the full height of the tower without the ability to reduce the setback; about half of jurisdictions surveyed allow for a setback that is less than the full height of the tower, most often with engineering certification provided to demonstrate the actual fall zone radius.

Telecommunications Facilities – Setback Requirements
Setback reduction allowed to less than the full height of the tower.

Jurisdiction	Setback Reduction Allowed	Setback Requirements
Fairfax City	Yes	Minimum setback equal to 110% of the tower height, except for monopoles certified by an engineer where the setback is reduced to the minimum setback for the district.
Fauquier County	Yes	Towers must be set back a distance equal to the height of the tower, except where the setback is reduced to no less than the fall zone as determined by an engineering design as a part of the legislative approval process.
Culpeper County	No	Towers must be designed to collapse within the lot lines.
Town of Culpeper	No	Towers must be set back at least the minimum setback for the district, and must be designed to fall within the boundaries of the property, except where a permanent easement is obtained from an adjoining property owner. No habitable structure shall be located within the fall zone.
Prince William County	No	Setback of twice the tower height for all property lines that abut residential or agricultural properties; minimum setback of 200 feet from all public streets, with an additional setback equal to the tower height for all towers over 200 feet in height. The tower must be designed to collapse within the property boundaries.
Rappahannock County	No	For any tower over 50 feet in height, a minimum setback equal to 110% of the tower height is required, and must be contained entirely within the subject property. Within the setback, the property owner may erect structures at their own risk.
Spotsylvania County	Yes	Towers must be set back from property lines at least the minimum setback for the district. A certified engineering statement must be provided to specify the tower design, including breakpoints.

Loudoun County	Yes	Public towers must be set back equal to the height of the tower. Commercial monopoles and towers must be set back 1 foot for every 5 feet of tower height.

During the public hearing on February 20, 2024, the Planning Commission discussed the recommendations provided by the Town's telecommunications consultant CityScape, As a part of the letter provided by CityScape, the consultant advised that allowing a setback reduction in one Zoning District, but not equally in all Districts, could pose a claim of discrimination under 47 USC §332. The CityScape memo is included with this staff report as Attachment C. Following this discussion, the applicant's representative requested a deferral so that the proposed text amendment could be revised so that it would apply throughout the Town, and this deferral was granted unanimously.

Revised text amendment language and a statement of justification were submitted by the applicant's representative; these materials are included with this staff report as Attachment D. The Applicant has proposed new language for Section 9-18.10, where the tower setback from property lines shall be equal to the certified fall zone, to state:

Towers shall be set back a distance of at least one hundred (100) percent of the height of the tower from the boundaries of the property on which the tower is located. The required setback distance may be reduced to a distance of at least one hundred (100) percent of the certified fall zone, as certified by a Virginia Professional Engineer in a letter which includes the Professional Engineer's signature and seal.

A *fall zone* is the maximum distance that a tower will fall as measured from the center point of the tower, or, the largest expected radius in which a telecommunication tower could potentially collapse in the event of a failure. A *certified fall zone* is determined by a Professional Engineer, where the Engineer determines that due to the physical properties of the tower, that in the case of a failure the tower will collapse within a radius that is smaller than the full height of the tower.

The applicant has provided a copy of a fall zone certification letter prepared by an engineer as an example of the engineering certification that could be provided as a part of an application to justify a fall zone that is less than 100% of the tower height, included with this staff report as Attachment E.

AGENCY REVIEW

The specific location where the Applicant desires to construct a telecommunications tower is located on property associated with the U.S. Route 17 Spur, owned by VDOT. VDOT has reviewed the proposed tower, and approved a location adjacent to an existing stormwater management facility. The tower location as approved by VDOT will not allow the proposed 150-foot-tall telecommunications tower to meet the setback as required by Ordinance Section 9-18.10 – *Setbacks*. The proposed tower is located 75 feet away from the north-eastern property boundary, which equals a setback from the property line of 50% of the tower height. A map showing the tower location approved by VDOT overlain on aerial imagery data is included as Attachment F.

The drawings depicting the specific location where the Applicant desires to construct a telecommunications facility were provided for review to both the Town of Warrenton Public Works Department and to the VDOT Warrenton Residency Office. Responses as provided from both agencies have been included with this staff report as Attachment G.

Responses provided by the local VDOT office and the Town Public Works Department are advisory in nature, and will apply to future approvals should this text amendment be adopted by Town Council. Should the text amendment be adopted, the telecommunications facility will be required to obtain the approval of a Special Use Permit from Town Council per Ordinance Section 3-4.9.3 *Permissible Uses* and the standards found in Section 9-18 *Telecommunications Facilities*, followed by approval of a Site Development Plan per Ordinance Article 10 *Site Development Plans*, and Building, Zoning and Land Disturbing Permits to authorize construction.

The Applicant has provided a letter prepared by Alexander J. Leadore, P.E. of Morris and Ritchie Associates, Inc., dated December 11, 2023, that certifies that the proposed 150-foot-tall tower has been designed so as to fail at the midpoint of the tower, creating a certified fall zone of 75 feet from the center point of the tower. This letter, which includes a description of how the tower has been designed to break and fall in on itself, has been included with this staff report as Attachment H.

PROCESS

On February 20, 2024, the applicant's representative requested that the Planning Commission defer action on this matter. Zoning Ordinance 11-3.9.8 *Report by Planning Commission* requires that the Planning Commission make a recommendation of approval or denial to Town Council within 100 days after the first meeting of the Commission. As the first Commission meeting for this application was held on November 28, 2023, the 100-day deadline for Commission action fell on March 7, 2024. So as to satisfy Ordinance Section 11-3.9.8, the applicant's representative Mr. James Downey waived the 100-day deadline for Commission action as a part of his request for deferral.

Service Level / Collaborative Impact

None

Fiscal Impact

A fiscal impact analysis has not been conducted.

Legal Impact

Any amendment to the setback requirement found in Section 9-18.10 will apply to all properties within the Town, unless specifically restricted to the PSP District as a part of the amended ordinance language.

A reduction in the required setback to property boundaries to less than 100-percent of the tower height may impact neighboring properties and roadways that are located within the 100-percent setback area.

Telecommunication towers are listed as a Permissible Use in all zoning districts, where towers require the approval of a Special Use Permit from Town Council, according to the standards found in Ordinance Section 9-18 *Telecommunications Facilities* and Section 11-3.10 *Special Use Permits and Waivers*, to include the 32 *Evaluation Criteria* listed in Section 11-3.10.3. Should the proposed text amendment be adopted by Town Council, all applications for a telecommunication tower will require the approval of a Special Use Permit, where the details of the specific tower and location will be evaluated for suitability.

ATTACHMENTS

1. Attachment A: Original Application Documents (PSP District Only)
2. Attachment B: Zoning Ordinance Section 9-18 Telecommunications Facilities
3. Attachment C: CityScape Memo Regarding Breakpoint Regulations, December 13, 2023
4. Attachment D: **REVISED** Application Documents (All Zoning Districts)
5. Attachment E: Example Fall Zone Certification Letter
6. Attachment F: Plan Showing Tower Location Overlain on GIS Aerial Imagery
7. Attachment G: Agency Review Comments – VDOT & Public Works
8. Attachment H: Certified Fall Zone Letter, Proposed Tower Site, December 11, 2023

JD
James P. Downey, P.C.
Attorney and Counselor At Law

May 24, 2023

Rob Walton
Director of Community Development
Town of Warrenton
21 Main Street
Warrenton, Virginia 20186

Re: Arcola Towers, LLC; cell tower approval

Dear Mr. Walton:

I hereby apply for a text amendment to the Town ordinance to change the setback limits for telecommunications towers ("cell towers") in the PSP District.

A letter of justification and proposed text are attached, together with exhibits. While the proposal would affect a specific parcel, which is identified in these materials, the proposal would apply to all PSP-zoned parcels in the Town.

Very truly yours,

James P. Downey

Enclosures
cc: Jonathan L. Yates, Esq.
Hon. Heather D. Sutphin
JPD/cmh

JD
James P. Downey, P.C.
Attorney and Counselor At Law

May 24, 2023

Rob Walton
Director of Community Development
Town of Warrenton
21 Main Street
Warrenton, Virginia 20186

Re: Letter of Justification

Dear Mr. Walton:

This letter of justification is submitted in support of the proposed ordinance amendment submitted herewith on behalf of Arcola Towers, LLC, for reduction of the setback requirement for telecommunications towers in the PSP zoning district.

This proposed amendment arises from a proposal for construction of a 150-foot telecommunications tower on a parcel of land leased from the Virginia Department of Transportation boundary shown on the enclosed plat and diagram. This site is within the cloverleaf of highways known as the Bypass on the Northeast side of Town, in an area that will allow for expanded cellular coverage.

The existing setback rules would require setbacks of 150' from the property boundary. A setback requirement of 100% of the height of the tower is unduly restrictive and would prevent construction of the tower on the subject parcel. The site is not large enough to accommodate such a depth of setback. Construction and design technology that will be applied to the construction of this tower will ensure that in the rare instance of the tower falling, the certified fall zone would be sufficient protection against any segment of the tower falling outside the property boundary lines.

Engineering and construction standards and experience demonstrate that it is not necessary to have a setback of 150' for a tower of that height. A sample of the kind of letter that can be supplied, to demonstrate a certified fall zone as the satisfactory setback, is attached.

Reduction of the setback to coincide with the actual fall zone radius would be consistent with the public health, safety and welfare and would be reasonably related to the valid objective of protecting the public from the hazards of a fall of the telecommunications tower in this location.

The proposed text amendment would allow construction of the telecommunications tower in the PSP zone to a height to conform with the certified fall zone distance.

Very truly yours,

James P. Downey

Enclosures
JPD/cmh

ARCOLA TOWERS

FirstNet

AT&T

ARCOLA TOWERS
VDOT WARRENTON
RT 17 NORTH RAMP
WARRENTON, VA 20187

MONOPOLE 150'

entrex
communication services, inc.
6100 Executive Blvd., Suite 430
Rockville, MD 20852
PHONE: (202)408-8860

SUBMITTALS

DATE	DESCRIPTION	REV
08-02-22	CONCEPT PLAN REVIEW	
08-08-22	CONCEPT PLAN REVIEW	
10-20-22	CONCEPT PLAN REVIEW	
10-20-22	ARCOLA TOWERS COMMENTS	

SEAL:

ARCOLA TOWERS

PROJECT NO:	1164.014
DESIGNER:	M.A.
ENGINEER:	M.M.
SCALE:	SCALE AS NOTED

ARCOLA TOWERS SITE
VDOT WARRENTON
RT 17 NORTH RAMP
WARRENTON, VA 20187

TITLE: TITLE SHEET

SHEET NUMBER: T-1

GENERAL NOTES

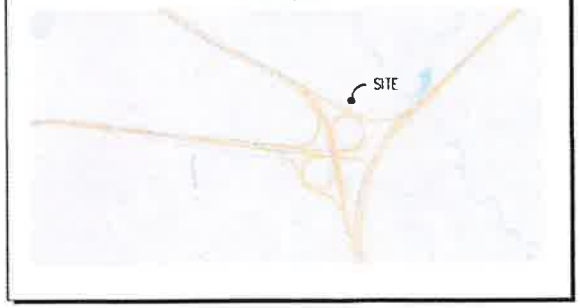
1. THE CONTRACTOR SHALL GIVE ALL NOTICES AND COMPLY WITH ALL LAWS, ORDINANCES, RULES, REGULATIONS AND LAWFUL ORDERS OF ANY PUBLIC AUTHORITY, MUNICIPAL AND UTILITY COMPANY SPECIFICATIONS, AND LOCAL AND STATE JURISDICTIONAL CODES BEARING ON THE PERFORMANCE OF THE WORK. THE WORK PERFORMED ON THE PROJECT AND THE MATERIALS INSTALLED SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, REGULATIONS AND ORDINANCES.
2. THE ARCHITECT/ENGINEER HAS MADE EVERY EFFORT TO SET FORTH IN THE CONSTRUCTION AND CONTRACT DOCUMENTS THE COMPLETE SCOPE OF WORK. THE CONTRACTOR BIDDING THE JOB IS NEVERTHELESS CAUTIONED THAT MINOR OMISSIONS OR ERRORS IN THE DRAWINGS AND OR SPECIFICATIONS SHALL NOT EXCUSE SAID CONTRACTOR FROM COMPLETING THE PROJECT AND IMPROVEMENTS IN ACCORDANCE WITH THE INTENT OF THESE DOCUMENTS.
3. THE CONTRACTOR OR BIDDER SHALL BEAR THE RESPONSIBILITY OF NOTIFYING (IN WRITING) THE CONSTRUCTION MANAGER OF ANY CONFLICTS, ERRORS, OR OMISSIONS PRIOR TO THE SUBMISSION OF CONTRACTOR'S PROPOSAL OR PERFORMANCE OF WORK. IN THE EVENT OF DISCREPANCIES THE CONTRACTOR SHALL PRICE THE MORE COSTLY OR EXTENSIVE WORK, UNLESS DIRECTED IN WRITING OTHERWISE.
4. THE SCOPE OF WORK SHALL INCLUDE FURNISHING ALL MATERIALS, EQUIPMENT, LABOR AND ALL OTHER MATERIALS AND LABOR DEEMED NECESSARY TO COMPLETE THE WORK/PROJECT AS DESCRIBED HEREIN.
5. THE CONTRACTOR SHALL VISIT THE JOB SITE PRIOR TO THE SUBMISSION OF BIDS OR PERFORMING WORK TO FAMILIARIZE HIMSELF WITH THE FIELD CONDITIONS AND TO VERIFY THAT THE PROJECT CAN BE CONSTRUCTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
6. THE CONTRACTOR SHALL OBTAIN AUTHORIZATION TO PROCEED WITH CONSTRUCTION PRIOR TO STARTING WORK ON ANY ITEM NOT CLEARLY DEFINED BY THE CONSTRUCTION DRAWING/CONTRACT DOCUMENTS.
7. THE CONTRACTOR SHALL INSTALL ALL EQUIPMENT AND MATERIALS ACCORDING TO THE MANUFACTURER'S/VENDOR'S SPECIFICATION UNLESS NOTED OTHERWISE OR WHERE LOCAL CODES OR ORDINANCES TAKE PRECEDENCE.
8. THE CONTRACTOR SHALL PROVIDE A FULL SET OF CONSTRUCTION DOCUMENTS AT THE SITE UPDATED WITH THE LATEST REVISIONS AND ADDENDA OR CLARIFICATIONS AVAILABLE FOR THE USE BY ALL PERSONNEL INVOLVED WITH THE PROJECT.
9. THE CONTRACTOR SHALL SUPERVISE AND DIRECT THE PROJECT DESCRIBED HEREIN. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES AND FOR COORDINATING ALL PORTIONS OF THE WORK UNDER THE CONTRACT.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL PERMITS AND INSPECTIONS WHICH MAY BE REQUIRED FOR THE BY THE ARCHITECT/ENGINEER, THE STATE, COUNTY OR LOCAL GOVERNMENT AUTHORITY.
11. THE CONTRACTOR SHALL MAKE NECESSARY PROVISIONS TO PROTECT EXISTING IMPROVEMENTS, EASEMENTS, PAVING, CURBING, ETC. DURING CONSTRUCTION. UPON COMPLETION OF WORK, THE CONTRACTOR SHALL REPAIR ANY DAMAGE THAT MAY HAVE OCCURRED DUE TO CONSTRUCTION ON OR ABOUT THE PROPERTY.
12. THE CONTRACTOR SHALL KEEP THE GENERAL WORK AREA CLEAN AND HAZARD FREE DURING CONSTRUCTION AND DISPOSE OF ALL DIRT, DEBRIS, RUBBISH AND REMOVE EQUIPMENT NOT SPECIFIED AS REMAINING ON THE PROPERTY. PREMISES SHALL BE LEFT IN CLEAN CONDITION AND FREE FROM PAINT SPOTS, DUST, OR SMUDGES OF ANY NATURE.
13. THE CONTRACTOR SHALL COMPLY WITH ALL OSHA REQUIREMENTS AS THEY APPLY TO THIS PROJECT.
14. THE CONTRACTOR SHALL NOTIFY THE CONSTRUCTION MANAGER WHERE A CONFLICT OCCURS ON ANY OF THE CONTRACT DOCUMENTS. THE CONTRACTOR IS NOT TO ORDER MATERIAL OR CONSTRUCT ANY PORTION OF THE WORK THAT IS IN CONFLICT UNTIL THE CONFLICT IS RESOLVED BY THE CONSTRUCTION MANAGER.
15. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, ELEVATIONS, PROPERTY LINES, ETC. ON THE PROJECT.

BUILDING CODE

2018 INTERNATIONAL BUILDING CODE

REFERENCING:
2017 NATIONAL ELECTRIC CODE WITH LOCAL AMENDMENTS
2018 INTERNATIONAL MECHANICAL CODE
TIA- 222-G (2018) STRUCTURAL STANDARDS FOR ANTENNA SUPPORTING STRUCTURES AND ANTENNAS

VICINITY MAP



SYMBOLS AND ABBREVIATIONS

ADJ	ADJUSTABLE	MECH	MECHANICAL
APPROX	APPROXIMATE	MFR	MANUFACTURER
CAB	CABINET	MGB	MAIN GROUND BAR
CLG	CEILING	MIN	MINIMUM
CONC	CONCRETE	MTL	METAL
CONT	CONTINUOUS	NIC	NOT IN CONTRACT
CJ	CONSTRUCTION JOINT	NTS	NOT TO SCALE
DIA	DIAMETER	OC	ON CENTER
DWG	DRAWING	OPP	OPPOSITE
EGB	EQUIPMENT GROUND BAR	SF	SQUARE FOOT
EA	EACH	SHT	SHEET
ELEC	ELECTRICAL	SIM	SIMILAR
EL	ELEVATION	SS	STAINLESS STEEL
EQ	EQUAL	STL	STEEL
EQUIP	EQUIPMENT	TOC	TOP OF CONCRETE
EXT	EXTERIOR	TOM	TOP OF MASONRY
FF	FINISHED FLOOR	TOS	TOP OF STEEL
GA	GAGE	TYP	TYPICAL
GALV	GALVANIZED	VIF	VERIFY IN FIELD
GB	GROUND BAR	UON	UNLESS OTHERWISE NOTED
GC	GENERAL CONTRACTOR	WWF	WELDED WIRE FABRIC
GRND	GROUND	W/	WITH
LG	LONG	&	AND
LLH	LONG LEG HORIZONTAL	@	AT
MAX	MAXIMUM		

SPOT ELEVATION
CENTERLINE
PLATE
DETAIL NUMBER / SHEET NUMBER
GROUND WIRE
ANTENNA

811 Call Before You Dig

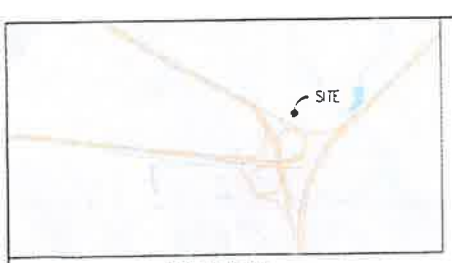
SHEET INDEX

PROJECT DESCRIPTION

SCOPE OF WORK:
1. INSTALL EROSION AND SEDIMENT CONTROLS.
2. CLEAR AND GRADE SITE TO FINAL SUBGRADE ELEVATION.
3. INSTALL MONOPOLE FOUNDATION AND (50' HIGH MONOPOLE.
4. INSTALL EQUIPMENT FRAME AND EQUIPMENT.
5. INSTALL GROUNDING, NEW CABINET BASE, UTILITY WHERWAY.
6. INSTALL ELECTRICAL AND TELEPHONE CONDUIT AND HAND HOLES.
7. INSTALL FENCE AND SITE IMPROVEMENTS.
8. INSTALL AT&T PLATFORM, CABLES AND EQUIPMENT SHELTER AND GENERATOR.

PROJECT INFORMATION

PROPERTY OWNER:	COMMONWEALTH OF VIRGINIA 1221 E BROAD ST RICHMOND, VA 23218	LATITUDE:	38° 43' 43.81" N
		LONGITUDE:	77° 48' 53.71" W
		GROUND ELEVATION:	446' AMSL
		JURISDICTION:	TOWN OF WARRENTON
		FIPS:	N/A
APPLICANT:	ARCOLA TOWERS 116 N WASHINGTON ST. #203 MIDDLEBURG, VA 20117 (571) 985 3880	CURRENT ZONING:	PSF
		USE:	COMMERCIAL
		PROPOSED USE:	COMMERCIAL/TELECOM



VICINITY MAP
SCALE: 1"=1000'
TRUE NORTH

CONCEPT PLAN NOTES

1) SITE NAME: ARCOLA TOWERS SITE: VDOT WARRENTON RT 17 NORTH RAMP

2) THIS IS NOT A BOUNDARY SURVEY AND IS NOT TO BE USED FOR THE TRANSFER OF PROPERTY.

3) THE SUBJECT PARCEL INFORMATION.

OWNER: COMMONWEALTH OF VIRGINIA
PROPERTY ADDRESS: RT 17 NORTH RAMP
WARRENTON, VA 20187

JURISDICTION: TOWN OF WARRENTON
PIN: N/A
ZONING: PSP

4) THE LOCATION OF THE PROPOSED MONOPOLE IS AS FOLLOWS. THE VALUES LISTED BELOW ARE WITHIN ±50' HORIZONTAL AND ±20' VERTICAL.

LATITUDE: 38° 42' 43.81" (GOOGLE EARTH)
LONGITUDE: 77° 46' 53.71" (GOOGLE EARTH)
ELEVATION: 1446' AT BASE (GOOGLE EARTH)

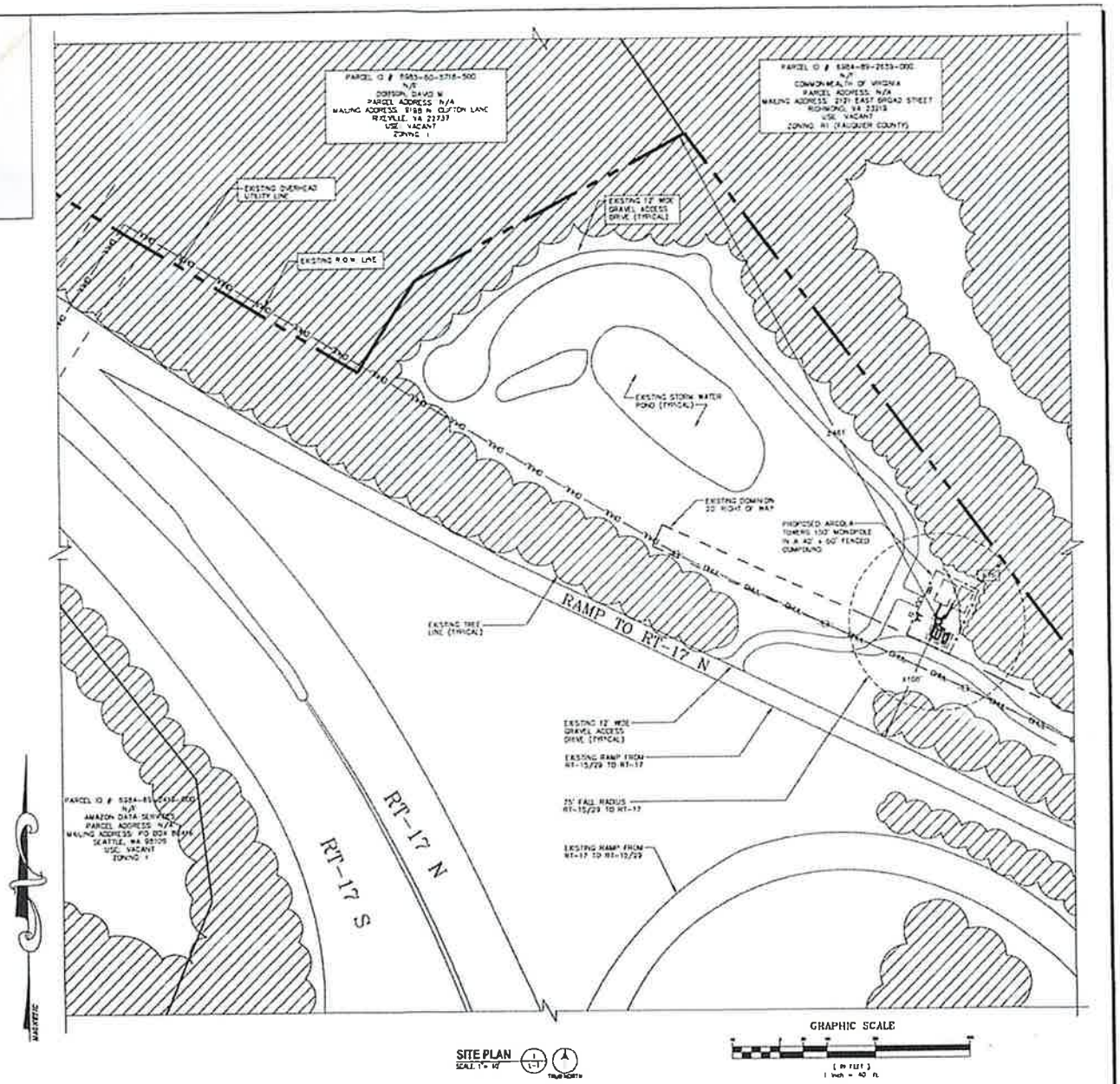
LEGEND

- FOUND PROPERTY CORNER
- BENCH MARKS
- UTILITY POLE
- SIGN
- LIGHT POLE
- TELEPHONE PEDESTAL
- PERENNIAL TREE - DECIDUOUS

LINE TYPES

- PROPERTY LINE
- RIGHT OF WAY BOUNDARY
- EDGE OF ASPHALT
- EDGE OF CONCRETE
- FENCE LINE - CHAIN
- TREE OR VEGETATION LINE

MONOPOLE SETBACKS	REQUIRED	PROPOSED
FRONT YARD (SOUTHEAST)	N/A	N/A
REAR YARD (NORTHEAST)	N/A	N/A
SIDE YARD (SOUTHWEST)	N/A	N/A
SIDE YARD (NORTHWEST)	N/A	1481'
CLOSEST HOUSE	N/A	1,142'
CLOSEST ROAD	N/A	1329'



SITE PLAN
SCALE: 1" = 40'
TRUE NORTH

GRAPHIC SCALE
(IN FEET)
1 inch = 40 ft.

entrex
communication services, inc.
8100 Executive Blvd., Suite 400
Rockville, MD 20853
PHONE: (202)408-0660

SUBMITTALS

DATE	DESCRIPTION	REV
09-01-22	CONCEPT PLAN REVIEW	
09-09-22	CONCEPT PLAN REVIEW	
10-20-22	CONCEPT PLAN REVIEW	
10-20-22	ARCOLA TOWERS COMMENTS	

SEAL

ARCOLA TOWERS

PROJECT NO	1164.014
DESIGNER	M.A.
ENGINEER	M.M.

SCALE
SCALE AS NOTED

ARCOLA TOWERS SITE
VDOT WARRENTON
RT 17 NORTH RAMP
WARRENTON, VA 20187

TITLE
SITE PLAN

SHEET NUMBER
L-1

RAMP TO RT-17 N
PARTIAL SITE PLAN
GRAPHIC SCALE
ARCOLA TOWERS SITE
VDOT WARRENTON
RT 17 NORTH RAMP
WARRENTON, VA 20187
PARTIAL SITE PLAN
L-2
SUBMITTALS
entrex
communication service, inc

COMPOUND PLAN
SCALE: 1/4" = 1'-0"
L-3
SHEET NUMBER
PARTIAL
SITE PLAN
TITLE:
ARCOLA TOWERS SITE
VDOT WARRENTON
RT 17 NORTH RAMP
WARRENTON, VA 20187
SCALE: AS NOTED
PROJECT NO 1164.014
DESIGNER C.S.
ENGINEER D.M.
SUBMITTALS
DATE DESCRIPTION REV
10-20-22 ARCOLA TOWERS COMMENTS
10-20-22 CONSTRUCTION REVIEW
09-08-22 CONSTRUCTION REVIEW
08-02-22 CONSTRUCTION REVIEW
06-22-22 CONSTRUCTION REVIEW
SCALE:
ARCOLA TOWERS
entrex
communications services, inc.
6100 Executive Blvd., Suite 410
Rockville, MD 20852
PHONE: (301)468-0960

MONOPOLE ELEVATION
VIEW LOOKING EAST
SCALE: AS NOTED
ARCOLA TOWERS SITE
VDOT WARRENTON
RT 17 NORTH RAMP
WARRENTON, VA 20187
MONOPOLE
ELEVATION
SHEET NUMBER
L-4
SUBMITTALS
entrex

PROPOSED TEXT AMENDMENT TO 9-18 TELECOMMUNICATIONS FACILITY

EXISTING LANGUAGE

9-18.10 Setbacks

Towers shall be set back a distance of at least one hundred (100) percent of the height of the tower from the boundaries of the property on which the tower is located.

PROPOSED LANGUAGE

9-18.10 Setbacks

Towers shall be set back a distance of at least one hundred (100) percent of the height of the tower from the boundaries of the property on which the tower is located. On properties located in a PSP District (Public-Semi-Public Institutional District), towers shall only be required to be setback a distance of at least one hundred (100) percent of the certified fall zone, as certified by a Virginia Professional Engineer in a letter which includes the Professional Engineer's signature and seal.

9-18 Telecommunications Facilities

9-18.1. Use Regulations for Telecommunications Towers.

The purpose of these provisions is to establish requirements for the siting of towers and antennas and to: (i) avoid the location of towers in residential areas and minimize the total number of towers and tower sites throughout the Town; (ii) encourage the joint use of new and existing tower sites; (iii) encourage users of towers and antennas to locate them, to the extent possible, in areas where the adverse impact on the community is minimal; (iv) encourage users of towers and antennas to configure or camouflage them in a way that minimizes adverse visual impact of the towers and antennas; and (v) determine adequate sites for the provision of telecommunication services with minimal negative impact on the resources of the Town.

9-18.2. Applicability.

9-18.2.1. District location and height limitations. The requirements set forth in this section shall govern the location and height of all telecommunications towers and antennas within the Town. All towers or antennas shall also comply with applicable Federal and State regulations. Amateur radio towers and antennas shall be regulated by the Town under existing State law and applicable Town regulations.

9-18.2.2. Existing structures and towers. The placement of an antenna on an existing structure such as a building, sign, light pole, water tank, or other free-standing nonresidential structure or existing municipal, utility or commercially owned tower or pole may be permitted with the approval of a special use permit so long as the height of the tower or structure is not increased and the addition of the antenna shall not add more than fifteen (15) feet in height to the structure or tower. If the use includes the placement of additional buildings or supporting equipment used in connection with the antennas, the building or equipment shall be placed within the existing structure and shall be screened from view. Existing or proposed structures shall not be altered to circumvent this provision.

9-18.3. General requirements.

9-18.3.1. Principal or accessory use. Antennas and towers may be considered either principal or accessory uses when determining area requirements on a given parcel of land. A different existing use or an existing structure on the same lot shall not preclude the installation of an antenna or tower on such lot. For purposes of determining whether the installation of a tower or antenna complies with district development regulations, and other applicable requirements, the dimensions of the entire lot shall control, even though the

antennas or towers may be located on leased areas within such lots.

9-18.3.2. Inventory of existing sites. Each applicant for an antenna and/or tower shall provide to the Zoning Administrator an inventory of its existing and potential future facilities that are either within the Town or surrounding jurisdictions or within five (5) miles of the border thereof, including specific information about the location, height, and design of each tower and/or antenna. Information submitted to the Town may be shared with other applicants applying for approvals or special exception permits under this provision or other entities seeking to locate towers or antennas within the Town. By sharing such information, the Zoning Administrator is not in any way representing or warranting that such sites are available or suitable for tower or antenna use.

9-18.3.3. A Commission Permit in accord with Section 15.2-2232 of the Code of Virginia is required for any tower or antenna prior to or in conjunction with any Special Use Permit approvals, if any, that may be required by the district regulations of this Ordinance.

9-18.4. Appearance; lighting.

The guidelines set forth in this section shall govern the appearance, location and installation of all towers and antennas governed by this Ordinance.

9-18.4.1. Towers shall either maintain a galvanized steel finish or, subject to any applicable standards of FAA, be painted a neutral color, to reduce visual appearance and obtrusiveness and to blend in with the surrounding environment. Dish antennas and covers will be of a neutral, nonreflective color with no logos or other markings.

9-18.4.2. At a facility site, the design of any buildings and related structures must use materials, colors, textures, screening, and landscaping that will blend the tower facilities to the natural setting and the surrounding environment.

9-18.4.3. If an antenna is installed on a structure other than a tower, the antenna and supporting electrical and mechanical equipment must be of a neutral color that is the same as the color of the supporting structure so as to make the antenna and related equipment visually unobtrusive and blend with the surrounding environment.

9-18.4.4. Towers shall not be artificially lighted, unless required by the FAA or other applicable governing authority. If lighting is required, the Town Council may review the available lighting alternatives in conjunction with a Special Use Permit application and approve the lighting design that would cause the least disturbance to the surrounding views and properties.

9-18.4.5. No advertising of any type may be placed on a tower or accompanying facility unless it is part of retrofitting a pre-existing, lawful sign structure.

9-18.5. Federal and state requirements.

All towers must meet or exceed current standards and regulations of the FAA, the FCC, and any other agency of the federal or state governments with the authority to regulate towers and antennas. If such standards and regulations are changed, then the owners of the towers and antennas governed by this division shall bring such towers and antennas into compliance with such revised standards as required. Failure to bring towers and antennas into compliance with such revised standards and regulations shall constitute grounds for the removal of the tower or antenna at the owner's expense. All towers and antennas constructed on property owned or leased by the federal or state government but used by non-governmental, commercial companies or operators, must comply with all requirements of the Town Zoning Ordinance.

9-18.6. Building Codes.

To ensure the structural and operating integrity of antennas and towers, the owner of an antenna or tower shall ensure that it, and any supporting buildings and structures, are constructed and maintained in compliance with standards contained in applicable federal, state and local buildings codes and regulations.

9-18.7. Information Required.

Each applicant requesting a special use permit under this section shall submit a scaled site plan and a scaled elevation view and other supporting drawings, calculations, and other documentation, signed and sealed by appropriate licensed professionals in the Commonwealth of Virginia, showing the location and dimensions of all improvements, including information concerning topography, existing vegetation, proposed clearing and grading, radio frequency coverage, tower height and antenna location requirements, setbacks, ingress/egress, parking, fencing, landscaping, adjacent uses, and other information deemed by the Town Planning Commission or Town Staff to be necessary to assess compliance with this division. Additionally the applicant shall provide actual photographs of the site from designated relevant views that include a simulated photographic image of the proposed tower and antennas. The photograph with the simulated image shall include the foreground, the mid-ground and the background of the site.

9-18.7.1. An engineering report, certifying that the proposed antenna or tower is compatible for co-location when more than one user is proposed for the same tower, must be submitted by the applicant.

9-18.7.2. The applicant shall pay all costs associated with notifying adjoining property owners and other nearby residents by certified letter concerning the project prior to public hearings before the Planning Commission and/or, on appeal, the Town Council.

9-18.7.3. The applicant shall provide copies of its co-location policy. The applicant shall provide copies of propagation maps using proposed antenna tilt demonstrating that antennas and sites for possible co-locator antennas are no higher in elevation than necessary to serve the intended area.

9-18.7.4 The applicant shall provide a report and drawings identifying its coverage area within the Town and surrounding 10-mile area.

9-18.8. Factors to be Considered in Granting Special Use Permits for New Towers and Antennas

The Town Council shall consider the following factors, in addition to others herein, in determining whether to approve a Special Use Permit:

9-18.8.1. Height of the proposed tower: No tower shall ever exceed 199 feet.

9-18.8.2. Proximity of the tower or pole to residential structures and residential district boundaries, historic structures and districts, or other manmade or unique natural areas within or adjacent to the Town

9-18.8.3. Nature of the adjacent uses and nearby properties.

9-18.8.4. Surrounding topography.

9-18.8.5. Impact on surrounding tree coverage and foliage. Impacts shall be kept to the minimum for the installation of the facility.

9-18.8.6. Design of tower or pole, with particular reference to design characteristics that have the effect of reducing or eliminating visual obtrusiveness.

9-18.8.7. Proposed ingress and egress.

9-18.8.8. Compliance with the Town's co-location policy.

9-18.8.9. Consistency with the Comprehensive Plan and the purposes of the zoning district of the facility and areas from which the antenna or tower will be visible.

9-18.8.10. Availability of suitable existing towers and other structures as provided for in Section 9-18.9 herein.

The Council may waive or modify one (1) or more of these criteria if the Council concludes that the goals of this Ordinance are better served by the facility as it is proposed by the applicant.

9-18.9. Availability of Suitable Existing Towers or Other Structures.

Co-location is the preferred solution to the need for additional antennas. No new tower shall be permitted unless the applicant demonstrates that no existing tower or structure can accommodate the applicant's proposed antenna. Evidence to be considered in determining whether existing towers or structures cannot accommodate the applicant's proposed antenna include the following:

9-18.9.1. No existing towers or structures are located within the geographic area required to meet applicant's engineering and coverage requirements under the Telecommunications Act (TCA).

9-18.9.2. Existing towers or structures are not of sufficient height to meet applicant's engineering and coverage requirements under the Telecommunications Act (TCA).

9-18.9.3. Existing towers or structures do not have sufficient structural strength to support applicant's proposed antenna and related equipment and cannot be made or reconstructed to support additional antennas.

9-18.9.4. The applicant's proposed antenna would cause electromagnetic interference with the antenna on the existing towers or structures, or the antenna on the existing tower or structures would cause interference with the applicant's proposed antenna.

A written statement of justification with supporting documentation is required from any applicant claiming that no existing facility can accommodate its antenna. The Town Council may use its own staff, it's own consultants or other independent authorities to review and verify information submitted by the applicant.

9-18.10. Setbacks.

Towers shall be set back a distance of at least one hundred (100) percent of the height of the tower from the boundaries of the property on which the tower is located.

9-18.11. Security fencing.

Towers shall be enclosed by security fencing not less than six (6) feet in height and shall be equipped with an anti-climbing device.

9-18.12. Landscaping.

The following requirements shall govern the landscaping surrounding towers.

9-18.12.1. Tower facilities shall be landscaped with a mix of deciduous and evergreen trees that effectively screens the view of the support buildings from adjacent property. The standard buffer shall consist of a landscaped strip of at least ten (10) feet wide outside the perimeter of the facility compound.

9-18.12.2. Existing mature tree growth and natural land forms on the site shall be preserved to the maximum extent possible.

9-18.13. Removal of abandoned antennas and towers.

Any antenna or tower that is not operated for a continuous period of two (2) years shall be considered abandoned, and the owner of such antenna or tower shall remove same within ninety (90) days of receipt of notice from the Zoning Administrator notifying the owner of such removal requirement. Removal includes the removal of the tower, all tower and fence footers, underground cables and support buildings.

If there are two (2) or more users of a single tower, then this provision shall not become effective until all users cease using the tower. If the tower is not removed per this section, the Town may require the landowner to have it removed.

CityScape CONSULTANTS, INC.
2423 S. Orange Avenue, #317
Orlando, FL 32806
Tel: 877.438.2851 Fax: 877.220.4593

December 13, 2023

Martin Crim, Esq.
Town Attorney
Town of Warrenton, Virginia
21 Main Street
Warrenton, VA 20186
Via email only to: mcrim@sandsanderson.com

PRIVILEGED AND CONFIDENTIAL – Attorney/Client Communications

RE: Proposed Zoning Ordinance Amendment to Modify Wireless Infrastructure Fall Zones

Dear Mr. Crim:

On behalf of our mutual client, the Town of Warrenton, VA, (the "Town"), CityScape Consultants, Inc. ("CityScape") has been asked to render to you as Town Attorney information regarding a request by Arcola Towers to amend the Town's existing Zoning Ordinance to change the current required "fall zone" for wireless communications towers in the Public-Semi Public (PSP) zoning district from a "1 to 1" fall zone (e.g. a 90 foot tower would require a 90 foot fall zone) to a calculation that takes into account a designed "breakpoint" in wireless communications towers. In the event of a catastrophic event, a "breakpoint" causes a tower to "fail" at a specific elevation, thus reducing the linear amount of infrastructure that would fall in the event of a tower failure.

Specifically, the Town's Planning Commission has requested information and opinions on the following subjects:

1. What percent of localities allow "breakpoint" technology in their zoning regulations?
2. Is it legal to allow "breakpoint" technology in one zoning district and not others where towers are allowed?
3. Breakpoint technology design parameters, specifically when and how the communications facility was to fail, including instances where a vehicle was to strike a wireless communications facility.
4. What are the typical standards/best practices that jurisdictions include in their zoning ordinances for "breakpoint" technology?
5. Generally, when, and where is "breakpoint" technology appropriate or not appropriate for wireless infrastructure?

The Town certainly can regulate wireless infrastructure based on both aesthetic concerns and physical safety issues, including but not limited to setbacks from residences and roadways, wind loading standards, etc., which is generally where regulations incorporating "breakpoint" technology are incorporated to facilitate placement of wireless infrastructure within a community

(which is required by 47 USC §332) and avoid having regulations that "prohibit or have the effect of prohibiting the provision of personal wireless services."[1]

As to the specific requests above, addressing them in numeric order:

1. Insofar as providing information on what percentage of communities incorporate "breakpoint" provisions in their zoning regulations, while it would be impossible for us to quantify that number either across Virginia or the United States as a whole, we can, however, indicate that in all communities that Cityscape provides proposed regulations for wireless infrastructure, we recommend inclusion of "breakpoint" technology provisions in all zoning regulations and that CityScape's recommendation is generally adopted. We provided "breakpoint" provisions when we were engaged for wireless communications regulations adopted by Buckingham and Fauquier counties as well as diverse municipalities across the United States such as Coconut Creek and Coral Springs, Florida; Chapel Hill, North Carolina; Sedona, Arizona; Springdale, Utah and Worcester, Massachusetts.

2. Concerning the question regarding the selective implementation of "breakpoint" regulations in one zoning district versus other zoning districts where wireless infrastructure is also permitted, again federal law constrains you somewhat as the 1996 Telecommunications Act also states local governments shall not "unreasonably discriminate among providers of functionally equivalent services".[2] Thus, if you were to permit "breakpoint" technology in one zoning district where wireless towers were allowed but not in another zoning district where wireless towers are also allowed, that *could* have the potential to discriminate between providers (depending on their deployment models). However, if such a regulation were uniformly applied to all applicants on a forward-looking basis and properly based on findings by the Town that such regulations were necessary to protect the physical safety of its residents, there is a strong basis for support of that regulation. Nevertheless, a pre-existing wireless provider who had to site their facility with significant setbacks (generally meaning leasing a larger parcel with more cost) could have the basis of a claim of "discrimination" under 47 USC §332 by allowing a competitor provider to construct a similar facility using "breakpoint" technology with smaller setbacks. While that scenario is remote, it is a possibility. CityScape recommends the Town take this opportunity to expand the Applicant's request for the text amendment in the PSP District and add the provision for "breakpoint" technology in all zoning districts, and that the Town condition its utilization of any new free-standing tower in residential districts to parcels that do not contain any residential structures (e.g. parks, public property, religious institutions, etc.)

3. Typical design parameters for "breakpoint" technology include engineering the structure to have a particular elevation that is more susceptible to failure than any other point on the structure, as better expressed in the "Definition" illustration below.

[1] 47 USC §332(c)(7)(B)(i)(II)
[2] 47 USC §332(c)(7)(B)(i)(I)

4. Typical provisions/best practices in such regulations are to include a definition, such as:

Breakpoint design technology - The engineering design of a monopole, or any applicable support structure, wherein a specified point on the monopole is designed to have stresses concentrated so that the point is at least five percent (5%) more susceptible to failure than any other point along the monopole, or any applicable support structure, so that in the event of a structural failure, the failure will occur at the breakpoint rather than at the base plate, anchor bolts or any other point on the monopole, or any applicable support structure.

After defining the term, the inclusion of language like the below in the applicable setback sections of your regulations should be included:

Setbacks. New towers shall be subject to the setbacks described below for breakpoint technology:

(a) If the proposed tower has been constructed using breakpoint design technology (see 'Definitions'), the minimum setback distance shall be equal to 110 percent (110%) of the distance from the top of the structure to the breakpoint level of the structure, or the minimum side and rear yard requirements, whichever is greater. Certification by a registered professional engineer licensed by the Commonwealth of Virginia of the breakpoint design and the design's fall radius must be provided together with the other information required herein from an applicant. (For example, on a 100-foot-tall monopole with a breakpoint at eighty (80) feet, the minimum setback distance would be twenty-two (22) feet (110 percent of twenty (20) feet, the distance from the top of the monopole to the breakpoint) plus the minimum side or rear yard setback requirements for that zoning district.).

(b) If the tower is not constructed using breakpoint design technology, the minimum setback distance shall be equal to the height of the proposed tower.

In discussions with Warrenton staff, if "breakpoint" technology is added to the Town's Code, then it was suggested that the standard setback be the breakpoint distance PLUS the applicable setback for that zoning district from a public right of way.

5. In determining when and where the inclusion of "breakpoint" technology is appropriate for particular types of wireless infrastructure, several factors come into play. First, it should be noted that "breakpoint" is generally utilized to facilitate a failure of a structure arising from external wind forces across the entire structure or flying debris striking the structure. It would not, in most instances, be an effective solution to the scenario of a vehicle crashing into the base of a wireless facility, which *could* result in the failure of the entire length of the structure, albeit an unlikely event given that the tower base is typically the strongest and most resistant point of the entire structure since it is where it is affixed to concrete base/footers in the earth. With the understanding that the "breakpoint" is best utilized as a means to prevent large pieces of tower infrastructure from falling off a tower impacted by a wind event of some kind, and reducing the overall area of falling debris, such technology is best implemented for "monopole" type design facilities since the monopole design generally presents the broadest "face" of structure to atmospheric winds pushing up against it. Other types of structures, such as lattice towers, present a much smaller "face" to the wind and thus

are less likely to suffer wind-related failure, minimizing the need for "breakpoint" technology, although it is still a useful tool to implement for that type of technology. Additionally, the location of the proposed infrastructure is a factor in utilizing "breakpoint" technology. For example, a community may want a more stringent standard for allowable setbacks employing "breakpoint" in residential districts, given the greater possibility of harm from a designed failure, than in industrial/commercial districts, where the possibility of harm from a designed failure is less given population density.

In summary, it is our opinion that the adoption of "breakpoint" technology regulations by the Town is a worthy exercise and will facilitate the Town's statutory obligation to allow the deployment of wireless services to its residents. Such regulations should, however, be tailored to accomplish the desired goal while still protecting the Town's residents from physical danger from the admittedly rare, but not impossible, failure of a wireless infrastructure facility.

We would be happy to review the above analysis and conclusions with the Planning Commission if desired via a virtual appearance.

Respectfully submitted,

Anthony T. Lepore, Esq.
CityScape Consultants, Inc.

Heather Jenkins

From: James Downey <jd@jamesdowneylaw.com>
Sent: Thursday, February 29, 2024 11:10 AM
To: Heather Jenkins
Cc: Jonathan Yates
Subject: RE: Arcola

Follow Up Flag: Follow up
Flag Status: Flagged

Statement of Justification for the amendment to Ordinance Section 9-18.10, "Setbacks" or Telecommunication Facilities.

In previous worksessions and public hearing, he proposal was for an amendment to the PSP District regulations which would govern the site where the proposed facility would be located. The proposed location was zoned PSP, which seemed to make an amendment to that district a logical way to modify the regulations, minimally, to accommodate this application and any others that would be made for a special permit for this use in that district. The applicant has been advised by the Town Attorney of issues with the federal communications act, if the amendment pertains only to the one district, instead of all zoning districts where the use would be allowed. This amendment is intended to ensure that no issues of "discrimination" among districts are presented, by making the amendment applicable to all zoning districts. Accordingly, any proposed telecommunication tower would be eligible to have its setback shortened to less than the full height of the tower, in all zoning districts, upon a demonstration of the actual "fall zone" of the tower by a certified professional engineer. Any proposed tower would remain subject to all criteria for a special permit in the location where proposed. This amendment would appear to avoid any problems of discrimination and does not imply any preference for a telecommunications tower to be located in any particular district, making the decision on a special permit fully subject to all site-specific considerations.

James P. Downey, Esq.
James P. Downey, P.C.
298 Falmouth Street
Warrenton, Virginia 20186
540-347-2424
540-349-1705 {fax}

From: Heather Jenkins <hjenkins@warrentonva.gov>
Sent: Thursday, February 29, 2024 10:36 AM
To: James Downey <jd@jamesdowneylaw.com>
Subject: RE: Arcola

Good morning, Mr. Downey. I read through your revised language. To help with the review of the new language by staff and the planning commission, could you please provide a statement of justification and/or analysis?
Thank you,
Heather

Heather E. Jenkins, PLA, CZA
Zoning Administrator
Community Development Department

21 Main Street
Warrenton, VA 20186
(540) 347-1101 x312
warrentonva.gov

From: Heather Jenkins
Sent: Wednesday, February 28, 2024 4:31 PM
To: James Downey <jd@jamesdowneylaw.com>
Subject: RE: Arcola

Received, thank you. I will let you know once the revised language has been reviewed by staff and a work session can be scheduled for the Planning Commission.

Heather E. Jenkins, PLA, CZA
Zoning Administrator
Community Development Department

21 Main Street
Warrenton, VA 20186
(540) 347-1101 x312
warrentonva.gov

From: James Downey <jd@jamesdowneylaw.com>
Sent: Wednesday, February 28, 2024 3:39 PM
To: Heather Jenkins <hjenkins@warrentonva.gov>
Subject: FW: Arcola

Heather, attached is an ordinance amendment proposed in lieu of the previous one, which I believe will avoid the "discrimination" issue cited by the Town Attorney. Of course, this should be reviewed by him as well.

James P. Downey, Esq.

James P. Downey, P.C.
298 Falmouth Street
Warrenton, Virginia 20186
540-347-2424
540-349-1705 {fax}

From: Cyndy Hildebrandt <ch@jamesdowneylaw.com>
Sent: Wednesday, February 28, 2024 3:36 PM
To: James Downey <jd@jamesdowneylaw.com>
Subject: Arcola

PROPOSED TEXT AMENDMENT TO 9-18 TELECOMMUNICATIONS FACILITY

EXISTING LANGUAGE

9-18.10 Setbacks

Towers shall be set back a distance of at least one hundred (100) percent of the height of the tower from the boundaries of the property on which the tower is located.

PROPOSED LANGUAGE

9-18.10 Setbacks

Towers shall be set back a distance of at least one hundred (100) percent of the height of the tower from the boundaries of the property on which the tower is located. On properties located in a PSP District (Public-Semi-Public Institutional District), towers shall only be required to be setback a distance of at least one hundred (100) percent of the certified fall zone, as certified by a Virginia Professional Engineer in a letter which includes the Professional Engineer's signature and seal.

entrex
communication services, inc.

6100 Executive Blvd., Suite 430 • Rockville, MD 20852 • Tel: 202.408.0960

July 25, 2022

Ms. Kristen Stelzer
Arcola Towers
PO Box 2150
Middleburg, VA 20118

Re: Proposed 195' Monopole for Mt. Jackson, VA Site

Dear Ms. Stelzer,

The monopole for this site shall be designed in accordance with the Telecommunications Industry Association Standard ANSI/TIA-222-H "Structural Standard for Antenna Supporting Structures and Antennas" by a tower manufacturer to meet a 45 ft fall radius.

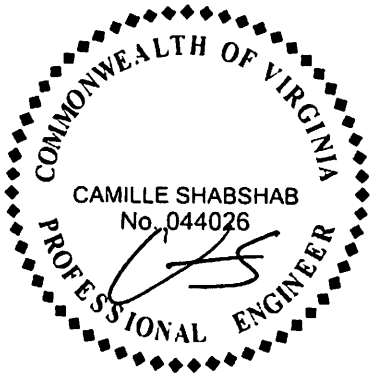
When designed according to this standard, the wind pressures and steel strength capacities include several safety factors, resulting in an overall minimum safety factor of 25%. Therefore, it is highly unlikely that the monopole will fail structurally in a wind event where the design wind speed is exceeded within the range of the built-in safety factors.

Should the wind speed increase beyond the capacity of the built-in safety factors, to the point of failure of one or more structural elements, the most likely location of the failure would be within the monopole shaft, above the base plate. Assuming that the wind pressure profile is similar to that used to design the monopole, the monopole will buckle at the location of the highest combined stress ratio within the monopole shaft, resulting in the portion of the monopole above leaning over and remaining in a permanently deformed condition. The monopole shall be designed such that the shaft section at elevation 150 ft will buckle before any other section on the monopole resulting in a fall zone of 45 ft

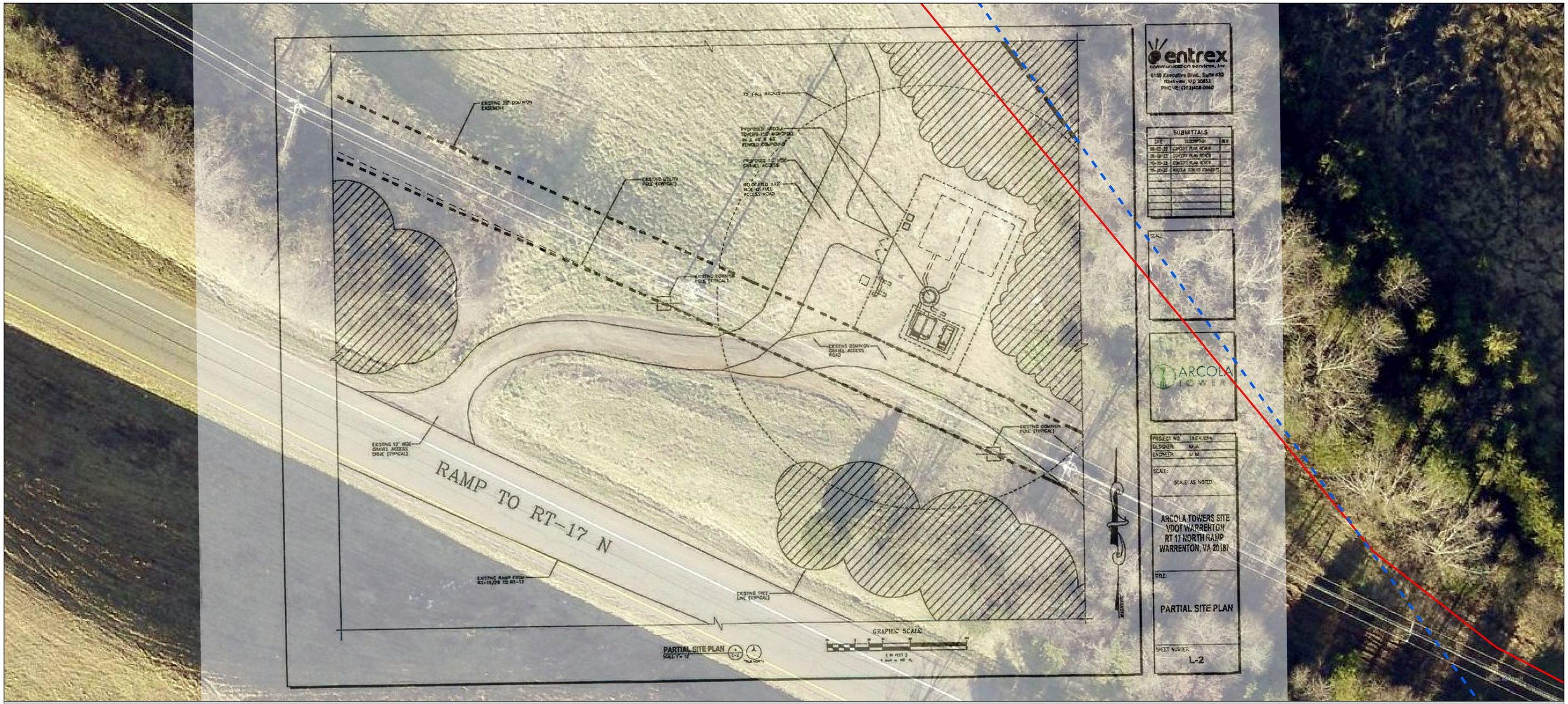
Please note that this letter only applies to the above referenced monopole.

Sincerely,

Camille Shabshab, PE
Vice President



TOWN OF WARRENTON
ARCOLA Cell Towers Plat Page 3



Legend

- Town of Warrenton Boundary
- Tax Parcel

July 21, 2023

Source: Town of Warrenton & Fauquier County

0 0.01 0.01 Miles

COMMONWEALTH of VIRGINIA
DEPARTMENT OF TRANSPORTATION
457 East Shirley Avenue
Warrenton, Virginia 20186

Stephen C. Brich, P.E.
Commissioner

Date: September 22, 2022

To: Gregory Primeau – Site-AC, Inc.

cc: Randy Norris, VDOT, Travis Estes, VDOT, Denise Harris, Town of Warrenton

Re: **Initial Feasibility Inquiry-Locality Approval-New Cellular Monopole Tower**

Dear Mr. Primeau:

The above referenced Plan of Development (POD) prepared by Piedmont Land Consulting LLC with a Cover Sheet date of June 22, 2022 and received by VDOT date of August 18, 2022 has been reviewed.

General:

1. Based on the site visit conducted by the Culpeper District Staff, location #1 and #2 per the attached sketch are not recommended based on their location to the existing storm water facility that is located on the proposed site. (VDOT)
2. Future maintenance of the principal spillway pipe (excavation and/or replacement) would be complicated by a tower site at location #1 and #2. (VDOT)
3. Location #3 per the attached sketch is VDOTs preferred location. This location appears to be with in Limited Access Right of Way and would require VDOTs Chief Engineer approval. (VDOT)
4. It will be the responsible of permittee to demonstrate that the proposed Monopole Tower will not adversely impact VDOT ROW and the existing Stormwater facility.
5. A VDOT LUP-SUWSS (Single-Use Permit – Wireless Support Structure) will be required along with all the supporting information and payment/surety. (VDOT)
6. The structure will have to have a third-party inspector in place to inspect the structure and its construction. (VDOT)
7. If the cell tower will be operated by a private entity, the Town will review the project (Commission Permit, Special Use Permit, Site Plan, Building Permit, and Land Disturbing permit if required). The applicant should review Section 9-18 of the Town's Zoning Ordinance regarding the regulations that apply to the tower. Staff doesn't feel the tower meets the setback requirements stated in Section 9-18.10. (Town of Warrenton)
8. If the tower is used for a public purpose (i.e. emergency communications), then the tower is exempt from the Town's review. (Town of Warrenton).

VDOT did not receive any comments from Fauquier County.

Please contact me at 540-229-1164 or craig.simpson@vdot.virginia.gov if there are any questions or concerns.

Sincerely,

Craig Simpson, P.E.
Area Land Use Engineer
Warrenton Residency

DESIGN FEATURES RELATING TO CONSTRUCTION OR TO REGULATION AND CONTROL OF TRAFFIC MAY BE SUBJECT TO CHANGE AS DEEMED NECESSARY BY THE DEPARTMENT

REGION	STATE	PROJECT	ROUTE	
3	VA.		17	6017 - 03

44

Y

58.84
653.04'

6-17

6-25

Vepco ±E056

Guards

°E

N 65° 02' 27" W

Const. ℄

C F

Bag Asphalt Curb & Backup Material Sta. 21+70

Prop. Limited Access Line

7-8

80.19'
+34.44

Prop. Utility Eas

2

107.15'
32.59

Existing Utility Easeme

Vepco ±E078

FE-WI Req'd.

E.C. 2 END

S 22° 01' 03" W
388.91

389.00

SWM #30011

SWM Pond 71-1
See Sheet 20

7-9

7-10

N 35° 27' 57" W
(35° 27' 57" W)

3

Prop. R/W

EXIST. R/W & Limited Access

FAUQUIER COUNTY

TOWN OF WARRENTON CORP. LIMITS

171.08'
+28.53

383.53'
+75.48

VDOT PREFERRED LOCATION FOR ARCOLA TOWERS SITE COORDINATED W/ TRAVIS ESTES.

JMM 8/17/22

08/23/94 ALIGAS

PLAN NOTE BOOK NO.

SURVEYED BY
DESIGNED BY
CADD OPERATOR
REVISED BY

A | 6017-030-F08 | 69

Land Use Permit
LUP-SUWSS

Single-Use Permit - Wireless Support Structure

June 28, 2019

The installation of wireless support structures and associated facilities on highway right-of-way is authorized under Section 24VAC30-151-350 of the Land Use Permit Regulations.

Applicant Agreement for Land Use Permit Issuance

I the undersigned hereby acknowledge that I am fully cognizant of and, in my individual capacity and as a duly authorized representative of the entity applying for this permit, agree to all of the following requirements associated with the issuance of a single use permit authorizing the installation and maintenance of a wireless support structure and associated facilities located within state maintained right-of-way:

Type or Print Clearly

Name of Applicant: _____

Applicant's Tax ID No.: _____

Applicant's Mailing Address: _____

City: _____ **State:** _____ **Zip Code:** _____

Primary Telephone No.: (_____) _____ - _____ **24-Hour Telephone No.:** (_____) _____ - _____

Fax No.: (_____) _____ - _____ **E-mail Address:** _____

Name of Agent/contractor: _____

Agent/Contractor Tax ID No.: _____

Agent's Mailing Address: _____

City: _____ **State:** _____ **Zip Code:** _____

Primary Telephone No.: (_____) _____ - _____ **24-Hour Telephone No.:** (_____) _____ - _____

Fax No.: (_____) _____ - _____ **E-mail Address:** _____

Work Description: _____

_____

_____

500

Locality: _____

Route Name & Number: _____

Nearest Intersecting Route (Name and Number): _____

Coordinates: Latitude _____ **Longitude** _____

Name of Applicant's Duly Authorized Representative: _____

Representative's Title: _____

Representative's Signature: _____

Name of Agent's/Contractor's Duly Authorized Representative: _____

Agent's Title: _____

Agent's Signature: _____

VDOT Land Use Permit Required by Law

The General Rules and Regulations of the Commonwealth Transportation Board provide that no work of any nature shall be performed on any real property under the ownership, control, or jurisdiction of VDOT until written permission has been obtained from VDOT. Written permission is granted for the above-referenced activity through the issuance of a land use permit.

By issuing a permit, VDOT is giving permission only for whatever rights it has in the right-of-way; the Permittee is solely responsible for determining all entities that may have a property interest of any kind or nature in the right-of-way and for obtaining permission from all such entities for the Permittee's use of the right-of-way and shall be solely liable for any failure to obtain from any and all entities having a property interest in the right-of-way.

The Permittee will be civilly liable to the Commonwealth for expenses and damages incurred by VDOT as a result of violation of any of the rules and regulations of **24VAC30-151**. Violators shall be guilty of a misdemeanor and, upon conviction, shall be punished as provided for in §**33.2-210** of the Code of Virginia.

Application Requirements

Application for a land use permit authorizing the installation, maintenance, and operation of wireless support structures located within state maintained right-of-way shall be made through the local residency permit office where the activity is to take place.

The permit application shall include plan/sketches showing distances from edge of pavement, existing and proposed right-of-way line, depths below and above existing and proposed grades, depths below ditch line or underground drainage structures, or other relevant features. Any existing utilities within close proximity of the applicant's work shall be shown. Location of poles, guys, pedestals, relief valves, vent pipes, etc. shall be shown. Height of wires or cables above the crown of the roadway shall also be shown.

Additionally, a Radio Frequency Emissions Compliance Report; an Intermodulation Study showing no expected impact with existing Commonwealth of Virginia, toll agency, Departments of Energy and Homeland Security, and locality equipment (if within radius of impact of such equipment); and a Structural Evaluation (including design of the support structure, all connections and splices, foundation design, and any boring logs) consistent with the

building code showing that the wireless facilities can be safely located on the support structure shall also be provided. These documents shall be stamped and sealed by an engineer licensed to practice in Virginia in accordance with regulations issued by the Virginia Department of Professional and Occupational Regulation.

The applicant shall provide a notarized affidavit certifying compliance with the registration and notification requirements outlined in § 2.2-1151.1 of the Code of Virginia, a work area protection plan (if necessary), and approval from the locality (if appropriate).

Contact Information

A list of counties with their corresponding VDOT district offices and contact information may be obtained at http://www.virginiadot.org/about/districts.asp. Contact information for residency offices is available at http://www.virginiadot.org/about_vdot/residencies.asp.

Permit Term and Fees

1. The land use permit term is 10 years, with three 5 year extensions, but may be terminated earlier for cause or by mutual agreement.

2. The land use permit application shall include payment in the amount of $110.00 for processing the request.

3. The amount of the annual wireless support structure public rights-of-way use fee shall be (check height that applies and insert square footage, if applicable):

□ 1. $270 for any wireless support structure at or below 50 feet in height with a small cell installation;
□ 2. $1,000 for any other wireless support structure at or below 50 feet in height;
□ 3. $3,000 for any wireless support structure above 50 feet and at or below 120 feet in height;
□ 4. $5,000 for any wireless support structure above 120 feet in height; and
___sqft 5. $1 per square foot for any other equipment, shelter, or associated facilities constructed on the ground.

(If the fee limiting provision of the FCC Declaratory Action of September 26, 2018, is overturned then the annual fees set out in §56-484.32 shall apply to structures at or below 50 feet with small cell installations.)

No later than June 30 of each year, the wireless services provider or wireless infrastructure provider shall remit directly to the Virginia Department of Transportation the public rights-of-way use fees for wireless support structures for any site which has a current permit.

Wireless Support Structure Use Fees paid by check or money order shall be drawn payable to the Treasurer of Virginia and shall be submitted to:

VDOT Office of Land Use
1401 East Broad Street
Richmond, Virginia 23219

A summary of the recurring structure inspection reports for each support structure permit that is covered by the submitted amount shall be provided by the permittee to the Department concurrently with the annual payment. Additionally, the emergency (24/7) contact phone number for the permittee's poles and towers shall be sent concurrently with the annual payment as verification that the posted numbers have not changed.

The annual fees shall be adjusted every five (5) years based upon the United States Average Consumer Price Index for all items, all urban consumers (CPI-U), as published by the Bureau of Labor Statistics of the U.S. Department of Labor. Upon the quinquennial adjustment, VDOT shall notify the permittee of the new user fee for the upcoming fiscal year.

Surety Requirement

A surety in the amount of ten-thousand dollars ($10,000.00) per structure is required to ensure that the right-of-way is restored in the event that work on the wireless structure is started but not completed or the right-of way is damaged. This surety may be in the form of cash or check, a LUP-SB surety bond, or an LUP-LC irrevocable letter of credit bank agreement.

Upon completion of construction, a continuous surety for the Permittee's structures must be provided or held by VDOT in the amount of ten-thousand dollars ($10,000.00) per county, and is intended to ensure that the right-of-way is restored in the event of limited facility failure. The continuous surety may be in the form of cash, check or **LUP-SB** surety bond.

Cash Surety Refund

Applicants owing the Internal Revenue Service or the Commonwealth of Virginia may not receive a refund of the cash surety provided for the issuance of a VDOT land use permit unless the amount owed is less than the amount of cash surety provided. Applicants providing cash surety for the issuance of a VDOT land use permit must provide an executed copy of the Commonwealth of Virginia's Substitute Form **W9-COV** to receive a refund of the cash surety provided for the issuance of a VDOT land use permit.

Insurance Requirements

The Permittee or their agent shall secure and maintain Commercial General Liability (CGL) insurance, per form ISO CGL 00 01 or equivalent, to protect against liability for personal injury and property damage that may arise from the activities performed under the authority of a land use permit and from the operation of the permitted activity with a policy limit of one million dollars ($ 1,000,000) each occurrence to protect the Board members and the Department's agents or employees. Permittee shall include Board members and the Department's agents or employees as additional insureds with respect to the required CGL insurance, which must be obtained prior to start of the permitted work and shall remain valid through the permit completion date. VDOT staff may require a valid certificate or letter of insurance from the issuing insurance agent or agency prior to issuing the land use permit.

General Requirements

1) Permittee acceptance and use of a Virginia Department of Transportation (VDOT) land use permit is prima facie evidence that the permittee has read, is fully cognizant of, and agrees to all required permit provisions, applicable traffic control plans and associated construction standards to be employed. All applicants to whom permits are issued shall at all times indemnify and save harmless the Commonwealth Transportation Board, members of the Board, the Commonwealth, and all Commonwealth employees, agents, and officers, from responsibility, damage, or liability arising out of claims, suits, demands, or causes of action as a result of the permit process, granted permit, construction, erection of wireless facilities, location, performance, operation, maintenance, repair, installation, replacement, removal, unintended consequences, or restoration of the wireless facility in the public right-of-way, and any other privileges granted in such permit to the extent allowed by law including any sums ordered to be paid or expended by VDOT by any governmental entity as a fine, penalty or damages for any violation of any applicable environmental law, or to remediate any hazardous or other material, including illicit discharge into VDOT maintained storm sewer systems.
2) The Permittee shall obtain all necessary federal, state, and local approvals, licenses, certificates, and permits (including building permits) prior to beginning construction at the requested site.
3) The Permittee or their agent shall adhere to the terms and conditions as stipulated in the permit assembly without exception. Any deviation may result in the temporary revocation of the land use permit for a term not less than 30 days.
4) The issuance of a single use permit is in no way to be inferred as a conveyance of any interest in real estate property or facilities owned in whole or part by the Virginia Department of Transportation.
5) The communications structure and associated facilities shall meet all applicable building code requirements of all appropriate governmental authorities.

6) The Permittee or their agent must contact (800) 552-7001 to have any/all existing underground utilities located prior to commencing with any excavation within state maintained rights-of-way.

7) The Permittee or their agent should immediately contact the nearest local residency permit office with any interpretive questions or if the permittee, their agent, and/or permittee's facility or equipment is involved in a crash at the work site.

8) The Permittee or their agent shall provide notification, including permit number, locality name, route number, latitude/longitude coordinates, and approximate construction dates, to the local residency permit office prior to initiating activities at the site and immediately after concluding activities at the site.

9) The single-use permit issued for the original installation allows the wireless services provider or wireless infrastructure provider to repair, replace, or perform routine maintenance operations to wireless cell facilities/tower located within non-limited access state maintained right-of-way without impeding traffic more than 15 minutes. A separate land use permit is required each time the wireless services or infrastructure provider desires to repair, replace, or perform routine maintenance operations on such facilities within limited access right-of-way, if site access is from the limited access highway. Application for routine maintenance operations on limited access right-of-way shall be through the submission of a **LUP-A** along with appropriate supplemental documents describing the work.

10) A copy of the VDOT land use permit shall be maintained at the work site and made readily available for inspection when requested by authorized VDOT personnel.

11) The Permittee or their agent must contact the VDOT Customer Service Center at 1-800-367-7623 a minimum of 48 hours prior to initiating any planned excavation within 1,000 feet of a signalized intersection and/or near VDOT ITS infrastructure. Excavation activities may proceed only after the VDOT regional utility location agent has notified the Permittee that the utility marking has been completed. Additional information can be found at:

    http://www.virginiadot.org/business/resources/IIM/TE-383_Request_for_Marking_VDOT_Utility_Location.pdf

    Alternately, within all localities in the Northern Virginia Construction District, including the Counties of Arlington, Fairfax, Loudoun & Prince William, the Cities of Alexandria, Fairfax, Falls Church, Manassas and Manassas Park, and the Towns of Clifton, Dumfries, Hamilton, Haymarket, Herndon, Hillsboro, Leesburg, Lovettsville, Middleburg, Occoquan, Purcellville, Quantico, Round Hill and Vienna, and on Interstate 95 in the counties of Stafford, Spotsylvania and Caroline, the permittee may request VDOT regional utility marking at: **http://www.vdotutilitymarking.virginia.gov**

    Failure to carry out this requirement may result in permit revocation.

12) Within the limits of a VDOT construction project it is the responsibility of the permit applicant to obtain the contractor's consent in writing prior to permit issuance. Information regarding current and/or planned VDOT construction and maintenance activities can be obtained at: **http://www.virginiaroads.org/**.

13) Wireless cell facilities or related equipment installed over a sidewalk shall provide at least 7 feet clearance or, if installed over a road, at least 18 feet clearance (21 feet in limited access right of way), measured vertically from the bottom of the wireless cell facility or equipment to the crown (or a line extended horizontally from the crown) of the paved surface.

14) Wireless cell facilities or related ground equipment shall be installed outside the clear zone.

15) Any and all highway signs, right-of-way markers, etc., disturbed as a result of work performed under the auspices of a land use permit shall be accurately reset by the Permittee immediately following the work in the vicinity of the disturbed facility. The services of a certified land surveyor with experience in route surveying may be required.

16) A permanent tag, label, or sign in accordance with FCC and OSHA guidance shall be attached to, or adjacent to, each installation and shall include:

a. A readily visible identifying alphanumeric code;
b. Maximum operating voltage and maximum radio frequency;
c. RF exposure warning;
d. 24 hours a day/7 days a week emergency contact phone number.

The Permittee shall update the tag, label, or sign within 10 business days of any changes.

17) The Permittee shall make provisions for lowering RF or turning off service while Department officers, agents, employees, volunteers, contractors, or permittees are performing work within the vicinity of the wireless equipment. The Department will give the Permittee three calendar days' notice if wireless radio frequency exposure must be reduced or power turned off due to planned, non-emergency work by VDOT around the structure. In the event of an emergency or unscheduled work, the Department will call the emergency contact phone number on the tag/label/sign to notify the Permittee of any action taken.

18) If any FCC, State, or other governmental license or any other governmental approval to provide communication services is ever revoked to the Permittee or any site permitted or authorized by the Department, the Permittee shall inform the Department of the revocation within 30 days of receiving notice of such revocation and provide a timeline for removal of the wireless facilities or transfer of ownership to a licensed successor who shall assume all obligations and responsibilities of the Permittee.

19) The Permittee shall provide VDOT with a copy of the "as built" plans in an electronic format acceptable to VDOT.

20) The LUP-GWG provides guidance for the permit application process, design submittal, installation requirements, and associated VDOT review of the wireless equipment facilities to be located within the Department's right-of-way.

Traffic Control & Safety

1) The Permittee shall at all time give strict attention to the safety and rights of the traveling public and all other persons on the right-of-way. Any permit may be suspended when in the opinion of the local residency permit office, the safety, use, or maintenance of the highway so requires.

2) In accordance with the Virginia Department of Transportation (VDOT) Road and Bridge Specifications, Special Provision 105.14, all activities performed under the auspices of a VDOT Land Use Permit involving the installation, maintenance and removal of work zone traffic control devices must have an individual on-site who, at a minimum, is accredited by VDOT in Basic Work Zone Traffic Control. The accredited person must have their VDOT Work Zone Traffic Control accreditation card in their possession.

3) The individual accredited in Basic Work Zone Traffic Control is responsible for the placement, maintenance and removal of work zone traffic control devices within the project limits in compliance with the permit requirements and conditions, the approved plans and specifications, the Virginia Work Area Protection Manual, and the Manual of Uniform Traffic Control Devices.

4) A person accredited by VDOT in Intermediate Work Zone Traffic Control must be on-site to provide supervision for adjustment to the approved layout or implementation of any standard Typical Traffic Control (TTC) layouts outlined in the Virginia Work Area Protection Manual.

5) All traffic control plans shall be prepared by a person accredited by VDOT in Advanced Work Zone Traffic Control.

6) Individuals responsible for implementation of work zone traffic control measures shall provide evidence of their accreditation upon request from VDOT personnel.

7) The permittee shall be exempt from the requirements of Virginia Department of Transportation (VDOT) Road and Bridge Specifications, Special Provision 105.14 if the authorized activity does not involve the installation, maintenance and removal of work zone traffic control devices and is not within the roadway (as defined in 24VAC30-151) of a state maintained highway.

8) Non-compliance with the requirements outlined in VDOT Road and Bridge Specifications, Special Provision 105.14 may result in a stop work order and / or permit suspension.

9) All activities that require the disruption (stoppage) of traffic shall utilize VDOT certified flaggers or other VDOT-approved traffic control. Flaggers shall be provided in sufficient number and locations as necessary for control and protection of vehicular and pedestrian traffic in accordance with the Virginia Work Area Protection Manual. All flaggers must have their certification card in their possession when performing flagging operations within state maintained right-of-way. Any flaggers found not in possession of their certification card shall be removed from the work site and the local residency permit office will suspend all permitted activities.

10) Any VDOT certified flagger found to be performing their duties improperly shall have their certification revoked.

11) The Permittee shall immediately correct any situation that may arise as a result of these activities that the local residency permit office deems hazardous to the traveling public, including, but not limited to, removing, relocating, or adjusting the power of permitted facilities if such facilities impact the operation of government traffic equipment or systems.

12) During authorized activities, the permittee shall furnish all necessary signs, flaggers, and other devices to provide for the protection of traffic and workers in accordance with the Virginia Work Area Protection Manual or as directed by the local residency permit office.

13) All signs shall be in accordance with the current edition of the Manual of Uniform Traffic Control Devices (MUTCD) and the Virginia Supplement to the MUTCD.

14) Traffic shall not be blocked or detoured without permission, documented in writing or electronic communication, being granted by the local residency permit office.

15) If directed by the district, requests for the implementation of temporary lane closures must be entered into the VDOT Lane Closure Advisory Management System (LCAMS) and VaTraffic a minimum of one (1) week prior to the planned execution of lane closure activities on state maintained highways. The permittee or their contractor(s) may enter their requests directly or provide written requests to the VDOT Regional Operations Center as follows:

- Lane closure requests in all the counties listed below are within the Northern Region and shall be sent to: **nrolaneclosurerequests@vdot.virginia.gov**

  Counties: Arlington, Fairfax, Loudoun, Prince William, Spotsylvania, Stafford

- Lane closure requests in all the counties listed below are within the Northwest Region and shall be sent to: **StauntonTrafficManagementCenter@vdot.virginia.gov**

  Counties: Albemarle, Alleghany, Augusta, Bath, Clarke, Culpeper, Fauquier, Fluvanna, Frederick, Greene, Highland, Louisa, Madison, Orange Page, Rappahannock, Rockbridge, Rockingham, Shenandoah, Warren

- Lane closure requests in all the counties listed below are within the Southwest Region and shall be sent to: **SalemSmartTrafficCenter@VDOT.Virginia.gov**

  Counties: Amherst, Appomattox, Bedford, Bland, Botetourt, Buchanan, Buckingham, Campbell, Carroll, Charlotte, Craig, Cumberland, Dickenson, Floyd, Franklin, Giles, Grayson, Halifax, Henry, Lee, Montgomery, Nelson, Patrick, Pittsylvania Prince Edward, Pulaski, Roanoke, Russell, Scott, Smyth, Tazewell, Washington, Wise, Wythe

- Lane closure requests in all the counties listed below are within the Eastern Region and shall be sent to: **HamptonRoadsTOCControllers@VDOT.Virginia.gov**

  Counties: Accomack, Greensville, Isle of Wight, James City, Northampton, Southampton, Surry, Sussex, York

- Lane closure requests in all the counties listed below are within the Central Region and shall be sent to: **RichmondDist.SmartTraffic@vdot.virginia.gov**

  Counties: Amelia, Brunswick, Caroline, Charles City, Chesterfield, Dinwiddie, Essex, Gloucester, Goochland, Hanover, Henrico, King and Queen, King George, King William, Lancaster, Lunenburg,

Mathews, Mecklenburg, Middlesex, New Kent, Northumberland, Nottoway, Powhatan, Prince George, Richmond, Westmoreland

Written requests for implementation of temporary lane closures must be submitted to the appropriate VDOT Regional Operations Center by close of business on the preceding Wednesday for the upcoming week's planned lane closures. All requests being directly input into LCAMS and VaTraffic must be entered no later than 2:00 pm on the preceding Thursday for the upcoming week's lane closure activities. Any conflicts with other roadway work must be resolved by close of business on Thursday the week prior to the scheduled lane closure activities with documented resolution sent to the VDOT point of contact provided by the regional traffic operation center LCAMS Administrator. Any requests received after these time limitations will not be approved and the proposed work within VDOT right of way requiring lane closures must be rescheduled.

Lane closure requestors wanting direct access to LCAMS and VaTraffic must complete **ITD-35E** & **ITD-36E** forms and return to Ms. Carlene McWhirt at **Carlene.McWhirt@VDOT.Virginia.gov.** Online training is available for LCAMS and VaTraffic and VDOT can accommodate any additional training needs. Please contact Ms. McWhirt at (571) 350-2078 to schedule training.

Environmental

1) In accordance with the Virginia Department of Transportation (VDOT) Road and Bridge Specification 107.16 (a), all contractors performing regulated land disturbing activities within VDOT right-of-way must have at least one (1) employee that has successfully completed the VDOT Erosion & Sediment Control Contractor Certification training. This person shall be on site during all land disturbance activities and will be responsible for insuring compliance with all applicable local, state and federal erosion and sediment control regulations during land disturbance activities. This person must have their certification card with them while on the project site. The land use permit will be suspended if proof of certification cannot be provided. Regulated land disturbing activities are defined as those activities that disturb greater than 2,500 square feet in locally designated Chesapeake Bay Preservation Areas in counties, cities and towns defined as "Tidewater Virginia" in the Chesapeake Bay Preservation Act (62.1-44.15:68, Code of Virginia) or 10,000 square feet or greater in all other areas of the State. The Department will require evidence of this certification with any Land Use Permit application that involves possible land disturbance. Improper installation, maintenance and removal of erosion and sediment control devices may result in revocation of VDOT Erosion & Sediment Control Contractor Certification.

2) The Permittee is responsible for pursuing and obtaining any and all environmental permits which may be required to pursue the proposed activity prior to any work beginning within state maintained right-of-way.

3) In the event hazardous materials or underground storage tanks are encountered within state maintained right-of-way during authorized activities, the Permittee shall suspend all work immediately then notify the local residency permit office and other responsible parties, i.e., the local fire department, emergency services, Department of Environmental Quality, etc. The Permittee is responsible for coordination and completion of all required remediation necessary to complete the permitted activities within the state maintained right-of-way, and shall provide evidence of such compliance to the local residency permit office prior to recommencement of permitted activities.

4) In the event cultural resources, archaeological, paleontological, and/or rare minerals are encountered within the right of way during authorized activities, the Permittee shall suspend all work immediately then notify the local residency permit office and the proper state authority charged with the responsibility for investigation and evaluation of such finds. The Permittee will meet all necessary requirements for resolving any conflicts prior to continuing with the proposed activities within the state maintained right-of-way, and shall provide evidence of such compliance to the local residency permit office.

5) Roadway drainage shall not be blocked or diverted. The shoulders, ditches, roadside, drainage facilities and pavement shall be kept in an operable condition satisfactory to the Department. Necessary precautions shall be taken by the Permittee to insure against siltation of adjacent properties, streams, etc., in accordance with

VDOT's current standards or as prescribed by the Department's Environmental Manual and the local residency permit office.

Inspection of the Work

All activities authorized under the auspices of a VDOT land use permit may be subject to inspection by authorized VDOT personnel or contractors. When warranted, any/all reasonable costs associated with said inspections shall be borne by the Permittee.

Recurring Inspection

The wireless support structure shall be inspected to determine its structural condition by the permittee at least once every four years, or more frequently if necessary based upon structure type and condition, to ensure public safety. Such inspection shall be by or under the supervision of an engineer licensed to practice in Virginia. A report setting out the results of the inspection shall be stamped and signed by the engineer in accordance with regulations issued by the Virginia Department of Professional and Occupational Regulation, and the report shall be retained by the permittee for the duration of the permit. The report(s) shall be provided to the Department within two weeks of the submission of a request. A summary of the most recent inspection shall be submitted by the permittee concurrently with the annual payment. The summary shall include:

- Structure permit number
- Date of most recent inspection
- Name of engineer who conducted or supervised the inspection
- Short, general description of the structure's condition and any major deficiencies found
- A minimum of two photographs (one showing the overall structure and the other a close-up elevation view), with additional photos of deficiencies if deficiencies are detected.

Emergency Repair

In the event of an emergency situation that requires immediate action to protect persons or property, work may proceed within the right-of-way without authorization from the local residency permit office; however, the wireless service provider or wireless infrastructure provider must contact the VDOT Emergency Operations Center as soon as reasonably possible but no later than 48 hours after the end of the emergency situation.

Permittee Notice

The preceding provisions are intentionally condensed in format and should not be loosely interpreted by the Permittee without consultation with the central office permit manager and affirmation from the **Land Use Permit Regulations**.

Termination or Relocation

This permit may be terminated by VDOT or a relocation required in accordance with **§56-484.30** of the Code of Virginia. VDOT shall provide at least 180 days' notice of termination or relocation required as a consequence of a construction project, upon termination of the permit, the Permittee shall have 30 days to remove the wireless support structure and associated facilities and restore the right-of-way to its pre-permit condition.

Heather Jenkins

From: Paul Bernard
Sent: Thursday, July 6, 2023 4:33 PM
To: Denise Harris; Heather Jenkins; Amber Heflin
Cc: Rob Walton; Grainne Mazon-Shafer; Dina Hermoso
Subject: RE: RE: ZTOA-23-1 - Arcola Towers, LLC; Cell tower - APPLICATION - for a Text Amendment to the TOW Ordinance to change setback limits for ("cell towers") in the PSP District.
Attachments: ZOTA-23-1 - Plat - location.pdf; ZOTA-23-1 - Letter of Justification.pdf

Denise/ Heather,

Although I can't read the details or words on the attached drawings, I have no real issues with this application from Public Works & Utilities perspective.

I understand that they have issues with the setback related to the potential fall zone of the proposed Tower. First, I believe this communications tower can be designed and constructed so the fall zone would be less than the 150-foot tower height. Secondly, the setback from the road access ramp appears to be around 100 feet. And all the property near this is State property.

The only other comment I have at this time is that if they do improvements on more than 10,000 square feet, they will need to incorporate Stormwater Management into their design. Since this property was set aside for SWM and Erosion Control for the interchange, this should not be a major problem.

Sincerely,

Paul A. Bernard, P.E.
Town Engineer
Town of Warrenton
540-347-1101; Ext 244

From: Grainne Mazon-Shafer <gmazonshafer@warrentonva.gov>
Sent: Wednesday, June 7, 2023 4:28 PM
To: Denise Harris <dharris@warrentonva.gov>; Paul Bernard <pbernard@warrentonva.gov>; Heather Jenkins <hjenkins@warrentonva.gov>; Amber Heflin <aheflin@warrentonva.gov>; kevin.swain@warrentonfire.org
Cc: Rob Walton <rwalton@warrentonva.gov>
Subject: RE: ZTOA-23-1 - Arcola Towers, LLC; Cell tower - APPLICATION - for a Text Amendment to the TOW Ordinance to change setback limits for ("cell towers") in the PSP District.
Importance: High

Good afternoon,

Please find attached ZTOA-23-1- Arcola Towers, LLC; Cell tower - APPLICATION - for a Text Amendment to the TOW Ordinance to change setback limits for ("cell towers") in the PSP District.
-
There is only 1 hardcopy so please review the attachments and the link below.

Comments are due to Ms. Heather Jenkins by 6/29/2023.

LINK

Have a nice day!

Very Respectfully,

Gràinne Mazon-Shafer
Permit Technician

21 Main Street
Warrenton, VA 20186
(540) 347-2405 x106
warrentonva.gov

MORRIS & RITCHIE ASSOCIATES, INC.

ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS,
AND LANDSCAPE ARCHITECTS

December 11, 2023

Mr. Ryan Foltz
Arcola Towers
116 West Washington St, Suite 203
Middleburg, Virginia 20117

Re: Site Name: VDOT Warrenton
Rt 17 North Ramp
Warrenton, Virginia 22405 (Fauquier County)
MRA Job No. 21853.012

Dear Ryan:

The purpose of this letter is to certify that the proposed 150'-0" steel monopole structure will be designed by the manufacturer to meet the requirements of the 2018 Virginia Uniform Statewide Building Code (2018 VUSBC), ASCE 7-16, and the ANSI/TIA-222-H-2017 "Structural Standard for Antenna Supporting Structures and Antennas" Standard.

Per the TIA-222-H Standard and 2018 VUSBC requirements, the monopole shall be designed under the following minimum loading conditions:

TIA-222-H: 112 mph Wind (3-second gust) + No Ice
TIA-222-H: 30 mph Wind (3-second gust) + 1" Radial Ice

Note: The monopole shall also be designed to resist seismic loading, if required, per TIA-222-H in conjunction with site specific soil parameters determined from a geotechnical investigation.

In addition to the minimum loading conditions above, we note that the monopole shall also be designed by the manufacturer such that should failure of the monopole occur under extreme weather conditions, the maximum "fall zone" radius will not exceed **75'-0"** from the center of the monopole's base. While failure is extremely rare in any kind of tower, it is especially so for monopoles. In order to minimize damage to the surroundings below, a common industry practice is to design the monopoles such that in the rare event the monopole fails, the upper portion of the pole, which is supporting all of the proposed wind loading, would collapse onto itself and therefore minimize the "fall zone" radius and damage to the surroundings below.

Manufacturers facilitate this failure method by first designing the pole per all required code parameters noted above and ensuring that both the steel pole structure and concrete foundation are adequate to support the code required loading. Once the pole and foundation are designed per code required loadings, the manufacturer establishes the "fall point" which establishes the location that the pole would "break" under extreme loading conditions beyond code requirements. Once the "fall point" is established, the portion of the steel monopole below the "fall point" is then strengthened beyond the design parameters to ensure that the ultimate failure point is located precisely as intended. In the event of loading parameters above and beyond the design code-

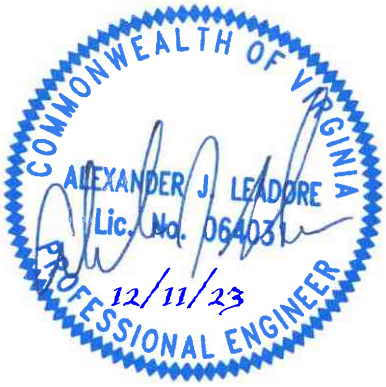
required loading, which represent the equivalent loading of a 700-year wind event, the ultimate failure method of the pole would resemble the pole folding on itself at the "fall point".

Based on the documentation made available from the manufacturer at this time, the proposed monopole shall be designed by the manufacturer such that if failure were to occur, it would occur in the upper portion of the monopole to meet the maximum "fall zone" radius requirement previously defined.

We also note that in addition to the above, the monopole will be designed to support a maximum of four (4) wireless carriers.

Monopole design documents shall be submitted from the manufacturer as part of the Building Permit submission. If you should have any questions or require any additional information, please do not hesitate to call our office.

Sincerely,
MORRIS & RITCHIE ASSOCIATES, INC.



Alexander J. Leadore, P.E.
Senior Structural Engineer

V:\bg_PROJECTS\21800-21899\21853 - Arcola Towers\21853.012 - VDOT Warrenton\Letters\VDOT Warrenton Monopole Fall Letter_AJL.doc

ZOTA-23-1 – Telecommunication Tower Setbacks

Planning Commission Work Session
March 19, 2024

Request – Zoning Ordinance Text Amendment
Reduce the setback requirement for telecommunication towers in the Public-Semi-Public (PSP) District to less than 100% of the tower height.

Zoning Ordinance Article 9, Section 9-18 - Telecommunications Facilities

- Section 9-18.10 – Setbacks

Towers shall be set back a distance of at least one hundred (100) percent of the height of the tower from the boundaries of the property on which the tower is located.

Applicant - Proposed Text Language:

Towers shall be set back a distance of at least one hundred (100) percent of the height of the tower from the boundaries of the property on which the tower is located. The required setback distance may be reduced to a distance of at least one hundred (100) percent of the certified fall zone, as certified by a Virginia Professional Engineer in a letter which includes the Professional Engineer's signature and seal.

Telecommunications Facilities – Setback Requirements

Setback reduction allowed to less than the full height of the tower.

Jurisdiction	Setback Reduction Allowed	Setback Requirements
Fairfax City	Yes	Minimum setback equal to 110% of the tower height, except for monopoles certified by an engineer where the setback is reduced to the minimum setback for the district.
Fauquier County	Yes	Towers must be set back a distance equal to the height of the tower, except where the setback is reduced to no less than the fall zone as determined by an engineering design as a part of the legislative approval process.
Culpeper County	No	Towers must be designed to collapse within the lot lines.
Town of Culpeper	No	Towers must be set back at least the minimum setback for the district, and must be designed to fall within the boundaries of the property, except where a permanent easement is obtained from an adjoining property owner. No habitable structure shall be located within the fall zone.
Prince William County	No	Setback of twice the tower height for all property lines that abut residential or agricultural properties; minimum setback of 200 feet from all public streets, with an additional setback equal to the tower height for all towers over 200 feet in height. The tower must be designed to collapse within the property boundaries.
Rappahannock County	No	For any tower over 50 feet in height, a minimum setback equal to 110% of the tower height is required, and must be contained entirely within the subject property. Within the setback, the property owner may erect structures at their own risk.
Spotsylvania County	Yes	Towers must be set back from property lines at least the minimum setback for the district. A certified engineering statement must be provided to specify the tower design, including breakpoints.
Loudoun County	Yes	Public towers must be set back equal to the height of the tower. Commercial monopoles and towers must be set back 1 foot for every 5 feet of tower height.

Fall Zone – The maximum distance that a tower could potentially collapse, as measured from the center point of a tower.

Certified Fall Zone – The maximum distance that a tower could potentially collapse, as certified by a Professional Engineer, that is generally less that the full height of the tower due to the physical properties of the tower.

Break-Point Technology – A method of designing a tower where a point of failure is chosen, and then that point is designed to be more susceptible to failure, or, the tower structure from that selected point down to the foundation is strengthened, so that in either case should the tower fail due to wind or other conditions, the tower will fold over on itself at that breaking point.

Zoning Ordinance Requirements - Communications Towers

Article 3 – Section 3-4 - *Requirements for Base Zoning Districts*

- Communications Towers are allowed in all Zoning Districts with the approval of a Special Use Permit by Town Council.
- Historic District – Certificate of Appropriateness.

Article 9 – Section 9-18 – *Telecommunications Facilities*

- Standards for lighting, screening, fencing, setbacks.

Article 11 – Section 11-3.10 – *Special Use Permits and Waivers*

- Application process, evaluation criteria.

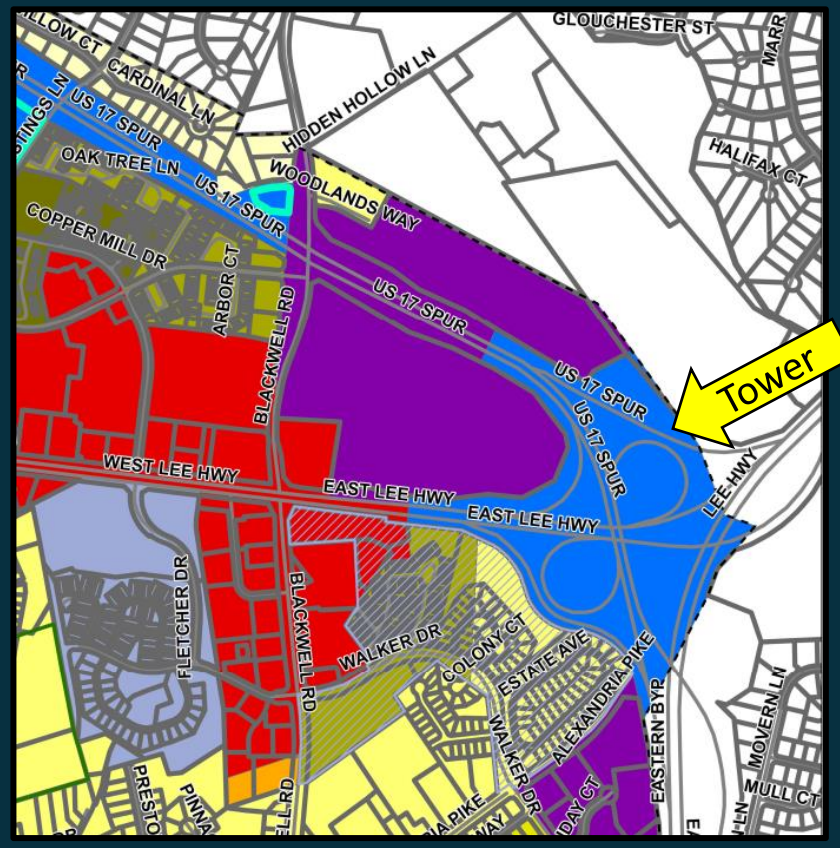
Article 10 – *Site Development Plans*

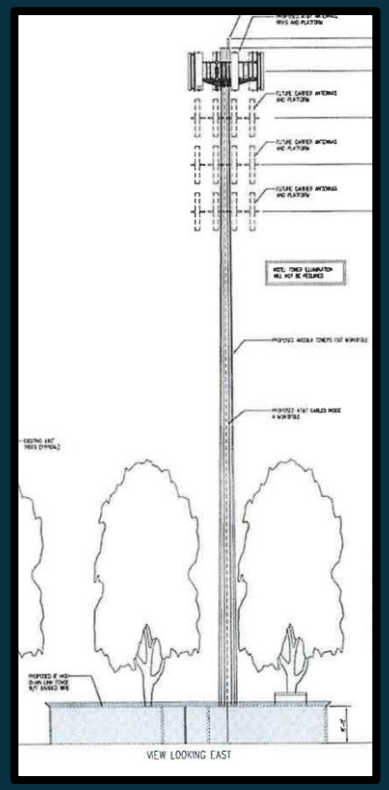
- Administrative application & approval process, minimum standards required – landscaping, screening, lighting, fencing, access, bonding.

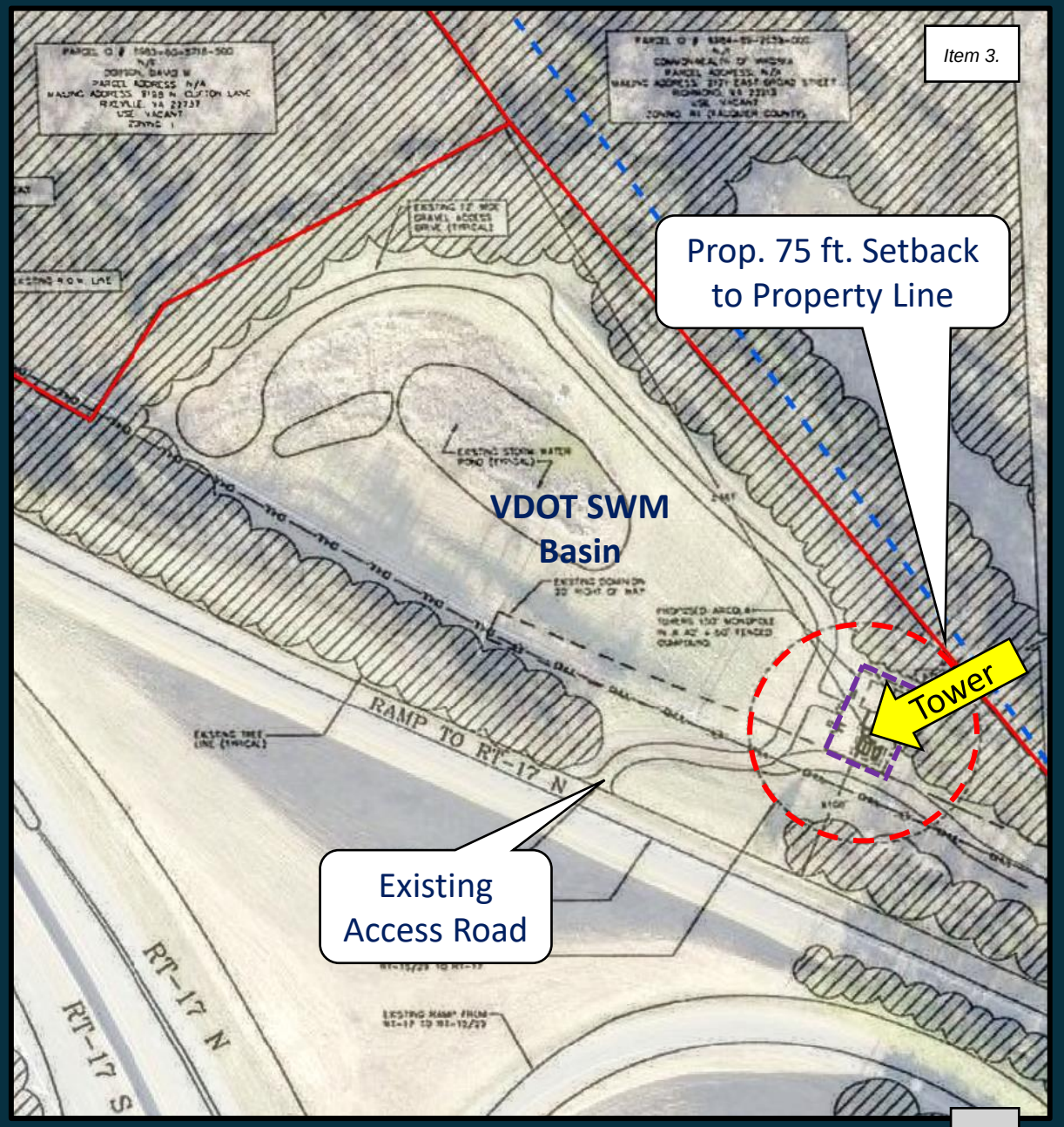
Article 11 – *Zoning, Building & Land Disturbing Permits*

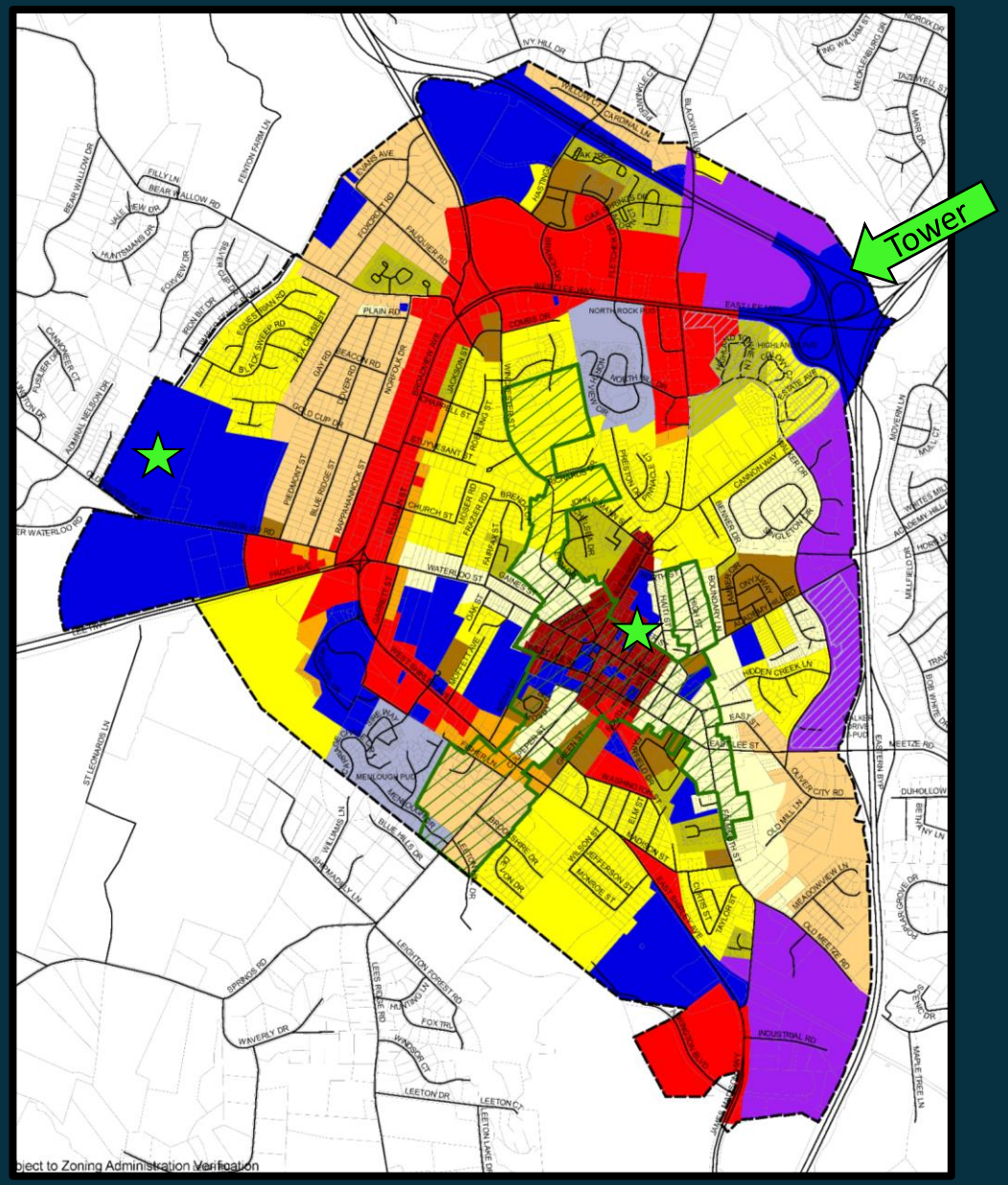
- Administrative application & approval process, standards for issuance.

Applicant: Arcola Towers, LLC
Representative: James Downey
Proposed Tower Site: 17 Spur; PSP District
Proposed Tower Height: 150 foot Monopole
Proposed Tower Setback: 75 feet









★ Existing Tower Locations

- Fauquier High School
- Horner/N. 4th Street Water Tower

Zoning Ordinance Article 9, Section 9-18 – Telecommunications Facilities

- Governs appearance, lighting, security, landscaping, setbacks, other
- Section 9-18.10 – Setbacks – requires a setback equal to the full height of the tower.

Text Amendment Process:

- Text Amendment Initiated by Citizen Request – June 7, 2023
- Planning Commission – 1st Work Session – November 28, 2023
- Planning Commission – 1st Public Hearing – December 19, 2023
  - Applicant requested Deferral until February meeting.
- Planning Commission – 2nd Public Hearing – February 20, 2024
  - Discussion of the CityScape Memo
  - Representative requested a Deferral, and waived the 100-day deadline for Commission action.
  - On February 28, 2024 the Representative submitted revised Ordinance language.
- Planning Commission – 2nd Work Session – March 19, 2024
- Town Council
  - Work Session or Public Hearing – as directed
  - Final Decision on ordinance language

EXPERIENCE WARRENTON VIRGINIA EST. 1810

ZOTA-23-1 – Telecommunication Tower Setbacks

Planning Commission Work Session
March 19, 2024

SPECIAL USE PERMIT

FOR

WARRENTON VILLAGE CENTER

LOCATION OF SITE

TOWN OF WARRENTON

FAUQUIER COUNTY, VIRGINIA 20186

PARCEL ID'S: 6985-20-7247-000, 6984-29-6753

PARCEL IDENTIFICATION TABLE

PARCEL NUMBER	OWNER	ADDRESS	AREA	CURRENT ZONE	CURRENT PLANNED LAND USE	PROPOSED PLANNED LAND USE
6985-20-7247-000	JEFFERSON ASSOCIATES LP	360 OAK SPRINGS DRIVE WARRENTON, VA 20186	6.46 ACRES	C	VACANT	MIXED USE
6984-29-6753-000	WARRENTON CENTER LLC	251 W LEE HIGHWAY WARRENTON, VA 20186	22.59 ACRES	C	RETAIL	MIXED USE
			TOTAL AREA 29.05 ACRES			

REFERENCES AND CONTACTS

REFERENCES

♦ BOUNDARY & TOPOGRAPHIC SURVEY:
ALTA/NSPS LAND TITLE SURVEY
"WARRENTON CENTER, 360 OAK SPRINGS DRIVE, CENTER DISTRICT, TOWN OF WARRENTON, VIRGINIA"
PREPARED BY: BOHLER
DATED: 11/3/21

♦ ARCHITECTURAL PLAN:
CAD FILE: 2024_0213 WARRENTON VILLAGE UNIT BLOCK OUT.DWG
PREPARED BY: DYNAMIK DESIGN
DATED: 2/13/2024
SEE GENERAL NOTES REFERENCE ON SHEET 4

GOVERNING AGENCIES

♦ TOWN OF WARRENTON
COMMUNITY DEVELOPMENT
21 MAIN STREET
WARRENTON, VA 20188-0341
CONTACT: ROB WALTON, DIRECTOR OF COMMUNITY DEVELOPMENT
PHONE: (540) 347-2405

* THE ABOVE REFERENCED DOCUMENTS ARE INCORPORATED BY REFERENCE AS PART OF THESE PLANS, HOWEVER, BOHLER ENGINEERING DOES NOT CERTIFY THE ACCURACY OF THE WORK REFERENCED OR DERIVED FROM THESE DOCUMENTS, BY OTHERS.

LOCATION MAP

SCALE: 1" = 2,000'

SHEET INDEX

OWNER

SEE PARCEL IDENTIFICATION TABLE

DEVELOPER

NEWCASTLE DEVELOPMENT GROUP
100 10TH STREET SE, SUITE 300
CHARLOTTESVILLE, VA 22902
CONTACT: JESS ACHENBACH
PHONE: (434) 260-6628

PREPARED BY

BOHLER

CONTACT: JOHN C. WRIGHT, P.E.

BOHLER
SITE CIVIL AND CONSULTING ENGINEERING
LAND SURVEYING
PROGRAM MANAGEMENT
LANDSCAPE ARCHITECTURE
SUSTAINABLE DESIGN
PERMITTING SERVICES
TRANSPORTATION SERVICES

REVISIONS

REV	DATE	COMMENT	DRAWN BY / CHECKED BY
1	6/30/2023	TOWN COMMENTS	DSH / JCW
2	2/14/2024	TOWN COMMENTS	TAL / JCW

811 Know what's below. Call before you dig.
ALWAYS CALL 811
It's fast. It's free. It's the law.

NOT APPROVED FOR CONSTRUCTION

PROJECT No.: V212141
DRAWN BY: DSH
CHECKED BY: JCW
DATE: 7/8/2022
CAD I.D.: SUPP -2

PROJECT:

SPECIAL USE PERMIT

FOR

WARRENTON VILLAGE CENTER

PROPOSED DEVELOPMENT

OAK SPRINGS DRIVE
CENTER DISTRICT
TOWN OF WARRENTON, VIRGINIA

BOHLER
28 BLACKWELL PARK LANE, SUITE 201
WARRENTON, VIRGINIA 20186
Phone: (540) 349-4500
Fax: (540) 349-0321
VA@BohlerEng.com

COMMONWEALTH OF VIRGINIA
JOHN C. WRIGHT
Lic. No. 046960
2/14/2024
PROFESSIONAL ENGINEER

SHEET TITLE:

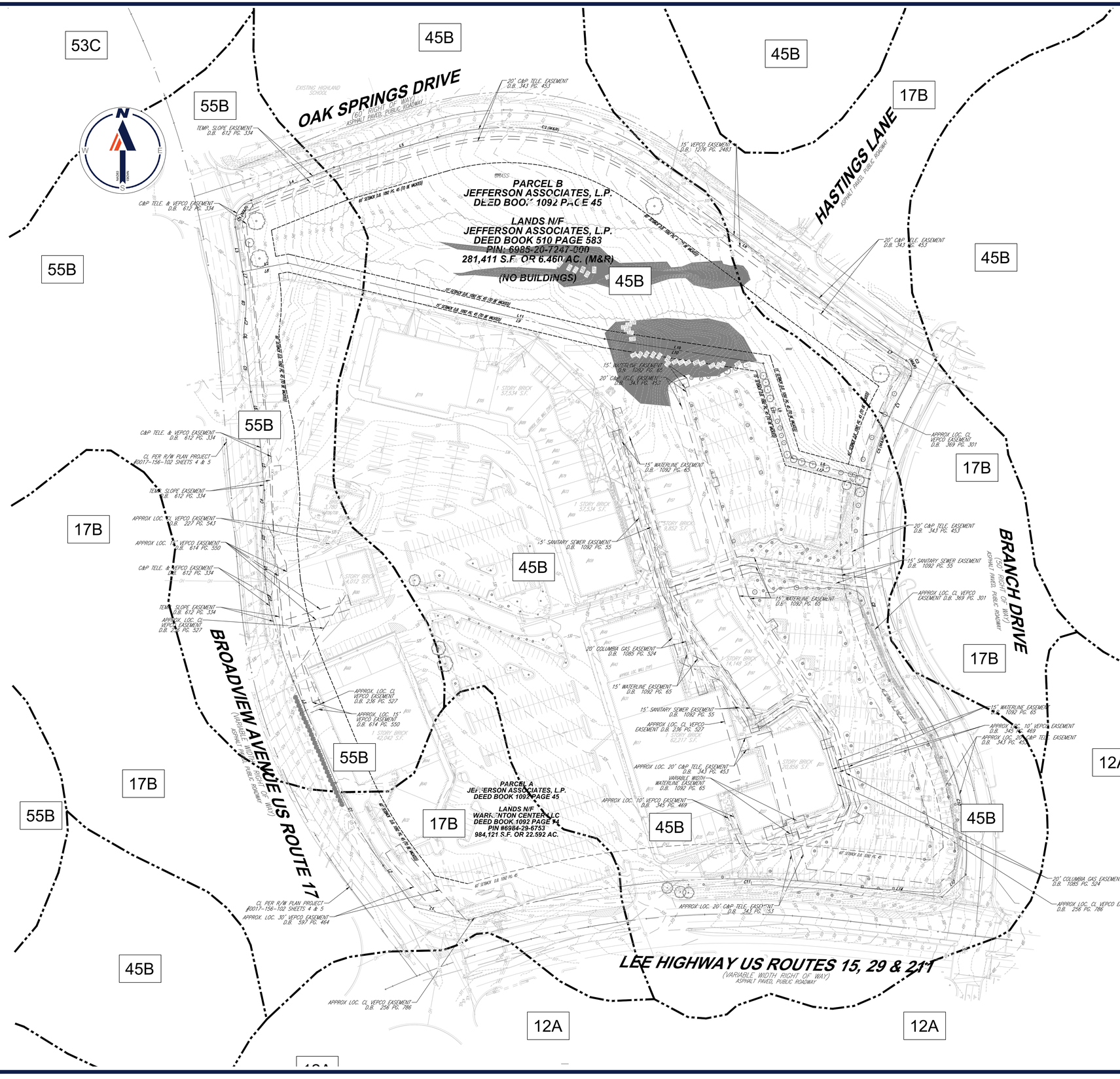
COVER SHEET

SHEET NUMBER:

1

REVISION 2 - 2/14/2024

Feb 14, 2024
H:\2012\212141\CAD\DRAWINGS\PLAN SETS\SUP\V212141 - SUPP - 1----LAYOUT 1 - COVER SHEET
CH


OAK SPRINGS DRIVE
(60' RIGHT OF WAY)
ASPHALT PAVED, PUBLIC ROADWAY
HASTINGS LANE
ASPHALT PAVED, PUBLIC ROADWAY
BROADVIEW AVENUE US ROUTE 17
(VARIABLE WIDTH RIGHT OF WAY)
ASPHALT PAVED, PUBLIC ROADWAY
BRANCH DRIVE
(50' RIGHT OF WAY)
ASPHALT PAVED, PUBLIC ROADWAY
LEE HIGHWAY US ROUTES 15, 29 & 211
(VARIABLE WIDTH RIGHT OF WAY)
ASPHALT PAVED, PUBLIC ROADWAY
EXISTING HIGHLAND SCHOOL
PARCEL B
JEFFERSON ASSOCIATES, L.P.
DEED BOOK 1092 PAGE 45
LANDS N/F
JEFFERSON ASSOCIATES, L.P.
DEED BOOK 510 PAGE 583
PIN: 6983-20-7247-000
281,411 S.F. OR 6.460 AC. (M&R)
(NO BUILDINGS)
PARCEL A
JEFFERSON ASSOCIATES, L.P.
DEED BOOK 1092 PAGE 45
LANDS N/F
WARRENTON CENTER, LLC
DEED BOOK 1092 PAGE 54
PIN #6984-29-6753
984,121 S.F. OR 22.592 AC.
20' C&P TELE. EASEMENT D.B. 343 PG. 453
15' VEPCO EASEMENT D.B. 1276 PG. 2483
TEMP. SLOPE EASEMENT D.B. 612 PG. 334
C&P TELE. & VEPCO EASEMENT D.B. 612 PG. 334
CL PER R/W PLAN PROJECT #0017-156-102 SHEETS 4 & 5
TEMP. SLOPE EASEMENT D.B. 612 PG. 334
APPROX LOC. CL VEPCO EASEMENT D.B. 227 PG. 543
APPROX. LOC. 15' VEPCO EASEMENT D.B. 614 PG. 550
C&P TELE. & VEPCO EASEMENT D.B. 612 PG. 334
TEMP. SLOPE EASEMENT D.B. 612 PG. 334
APPROX LOC. CL VEPCO EASEMENT D.B. 256 PG. 527
APPROX. LOC. CL VEPCO EASEMENT D.B. 256 PG. 527
APPROX. LOC. 15' VEPCO EASEMENT D.B. 614 PG. 550
CL PER R/W PLAN PROJECT #0017-156-102 SHEETS 4 & 5
APPROX. LOC. 30' VEPCO EASEMENT D.B. 397 PG. 464
APPROX LOC. CL VEPCO EASEMENT D.B. 256 PG. 786
15' WATERLINE EASEMENT D.B. 1092 PG. 65
15' SANITARY SEWER EASEMENT D.B. 1092 PG. 55
20' COLUMBIA GAS EASEMENT D.B. 1085 PG. 524
APPROX LOC. 20' C&P TELE. EASEMENT D.B. 343 PG. 453
APPROX LOC. CL VEPCO EASEMENT D.B. 256 PG. 527
APPROX LOC. 10' VEPCO EASEMENT D.B. 345 PG. 469
APPROX LOC. 20' C&P TELE. EASEMENT D.B. 343 PG. 453
APPROX LOC. CL VEPCO EASEMENT D.B. 369 PG. 301
APPROX LOC. CL VEPCO EASEMENT D.B. 256 PG. 786
15' WATERLINE EASEMENT D.B. 1092 PG. 65
15' SANITARY SEWER EASEMENT D.B. 1092 PG. 55
APPROX LOC. CL VEPCO EASEMENT D.B. 256 PG. 527
APPROX LOC. 20' C&P TELE. EASEMENT D.B. 343 PG. 453
VARIABLE WIDTH WATERLINE EASEMENT D.B. 1092 PG. 65
APPROX LOC. 10' VEPCO EASEMENT D.B. 345 PG. 469
15' WATERLINE EASEMENT D.B. 1092 PG. 65
20' C&P TELE. EASEMENT D.B. 343 PG. 453
APPROX LOC. 20' C&P TELE. EASEMENT D.B. 343 PG. 453
20' COLUMBIA GAS EASEMENT D.B. 1085 PG. 524
APPROX LOC. CL VEPCO EASEMENT D.B. 256 PG. 786
APPROX LOC. CL VEPCO EASEMENT D.B. 369 PG. 301
15' WATERLINE EASEMENT D.B. 1092 PG. 65
20' C&P TELE. EASEMENT D.B. 343 PG. 453
15' SANITARY SEWER EASEMENT D.B. 1092 PG. 55
15' WATERLINE EASEMENT D.B. 1092 PG. 65
20' COLUMBIA GAS EASEMENT D.B. 1085 PG. 524
APPROX LOC. CL VEPCO EASEMENT D.B. 256 PG. 786
APPROX LOC. 20' C&P TELE. EASEMENT D.B. 343 PG. 453
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C3 (M&R)
C4 (M&R)
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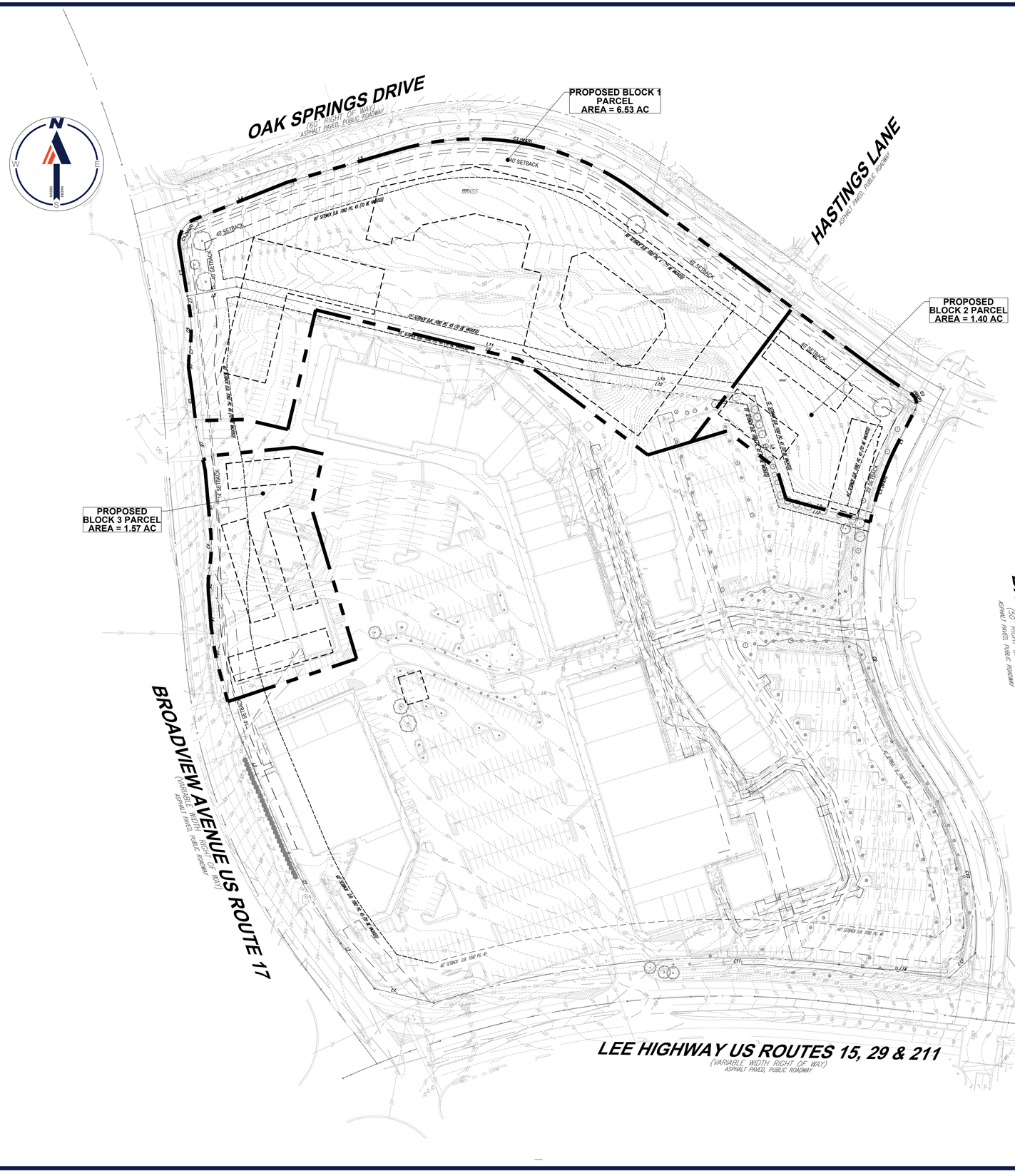

LEGEND

- PROPOSED BUILDING OUTLINE
- PROPOSED BLOCK PARCEL LINE

80 40 20 0 80
1"= 80'

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H:\21\v212141\CAD\DRAWINGS\PLAN SETS\SUP\V212141 - EXST 1 — LAYOUT 2A - PARCEL OVERVIEW PLAN
CH

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TRANSPORTATION SERVICES

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REV	DATE	COMMENT	DRAWN BY / CHECKED BY
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PROJECT No.: V212141
DRAWN BY: DSH
CHECKED BY: JCW
DATE: 7/8/2022
CAD I.D.: EXST -2

PROJECT:

SPECIAL USE PERMIT

FOR

WARRENTON VILLAGE CENTER

PROPOSED DEVELOPMENT

OAK SPRINGS DRIVE
CENTER DISTRICT
TOWN OF WARRENTON, VIRGINIA

BOHLER
28 BLACKWELL PARK LANE, SUITE 201
WARRENTON, VIRGINIA 20186
Phone: (540) 349-4500
Fax: (540) 349-0321
VA@BohlerEng.com

COMMONWEALTH OF VIRGINIA
JOHN C. WRIGHT
Lic. No. 046960
2/14/2024
PROFESSIONAL ENGINEER

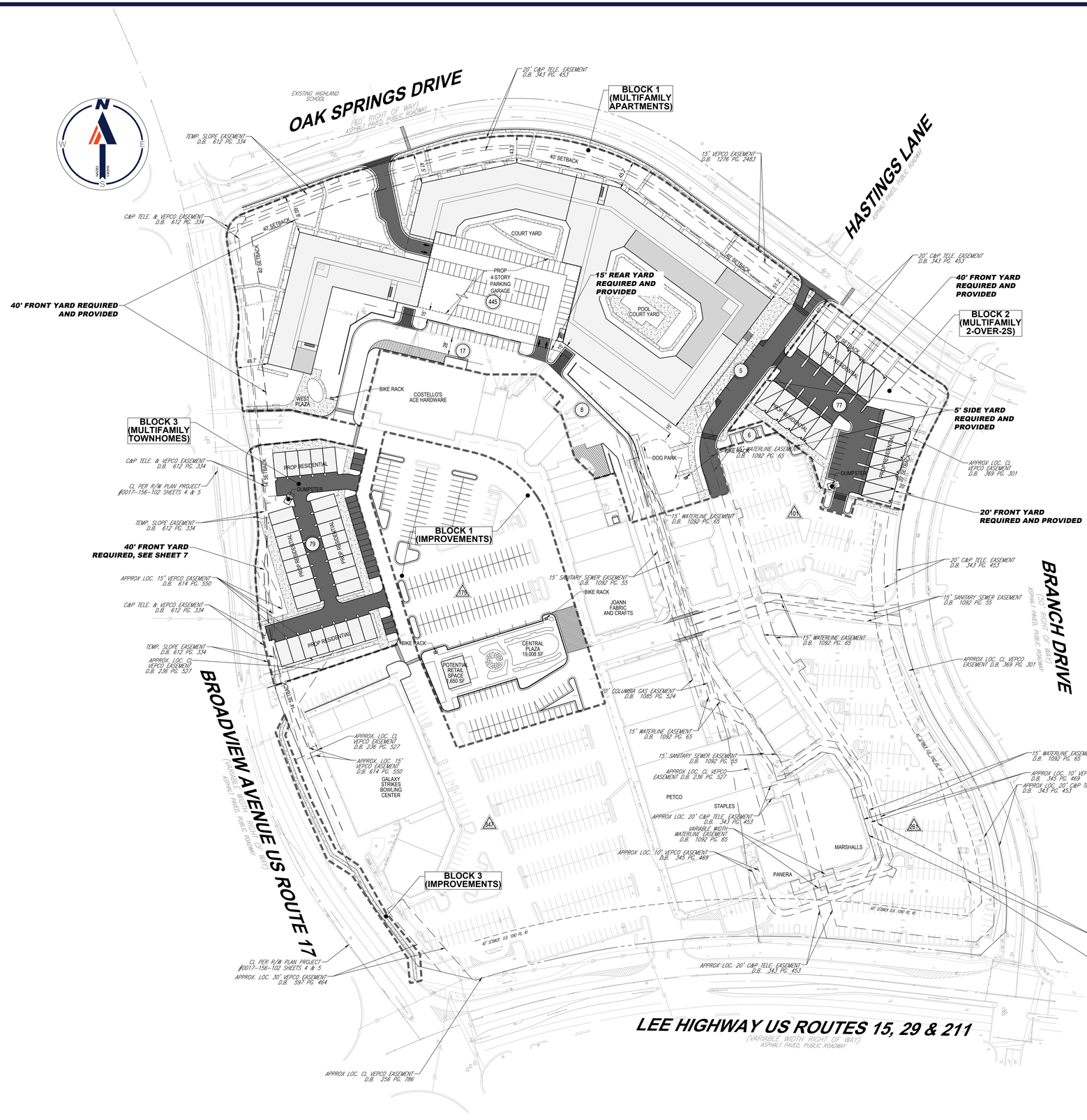
SHEET TITLE:

PARCEL OVERVIEW PLAN

SHEET NUMBER:

2A

REVISION 2 - 2/14/2024



ZONING TABULATION TABLE:

LOT SIZE AND YARD SETBACK REQUIREMENTS:

	REQUIRED	PROVIDED
MINIMUM LOT SIZE:	5 ACRES	29.05 ACRES

SETBACK REQUIREMENTS:

	REQUIRED	MIN PROVIDED
FRONT YARD (OAK SPRINGS, ROW >50')	40'*	40'±
FRONT YARD (BRANCH, ROW <50')	20'*	20'±
FRONT YARD (BROADVIEW, ROW >50')	40'*	14'±
SIDE YARD BUILDING	REQUIRED 5'	MIN PROVIDED 0'±
SIDE YARD BUILDING	REQUIRED 5'	MIN PROVIDED 48.7'±
REAR YARD BUILDING	REQUIRED 15'	MIN PROVIDED 15'±

LOT COVERAGE REQUIREMENTS

	MAX	PROVIDED
PROPOSED LOT COVERAGE: (IMPERVIOUS SURFACES)	85%	83%

*FRONT YARD MAY BE REDUCED BY 20' IF NO PARKING OR LOADING IS PROPOSED. A REDUCTION IN FRONT/REAR/SIDE SETBACKS IS BEING REQUESTED FROM TOWN COUNCIL AT CERTAIN LOCATIONS - SEE SHEET 7 FOR DETAIL.

GENERAL NOTES:

1. THIS PLAN IS BASED ON THE FOLLOWING:
   SURVEY CAD FILES PREPARED BY BOHLER DATED: 11/3/2021
   BUILDING FOOTPRINT CAD FILES PREPARED BY MV&A ARCHITECTS DATED: 2/6/2024
2. ZONING DATA:
   EXISTING ZONE: C - COMMERCIAL
   PROPOSED ZONE: COMMERCIAL WITH MIXED USE
3. USES:
   EXISTING USE: VACANT, RETAIL
   PROPOSED USE: MIXED USE
4. SITE AREA
   PIN'S : 6985-20-7247-0000 6.46 ACRES
   6984-29-6753-0000 22.59 ACRES
5. SITE WILL BE SERVICED BY TOWN WATER AND SEWER.
6. TOPOGRAPHIC INFORMATION:
   HORIZONTAL DATUM: NAD 83
   VERTICAL DATUM: NAVD 88
7. THE PROPOSED BUILDING, DIMENSIONAL ELEMENTS, AND OTHER SITE FEATURES, SUCH AS HARDSCAPE AREAS AND PLAZAS SHOWN ARE CONCEPTUAL AND SUBJECT TO CHANGE WITH FINAL ENGINEERING.
8. CURB AND PARKING MODIFICATIONS IN WARRENTON CENTER WILL OCCUR AS PART OF EACH DEVELOPMENT BLOCK.
9. A PROPERTY LINE ADJUSTMENT PLAT WILL BE COMPLETED WITH SITE PLAN.
10. A TREE SURVEY WILL BE PROVIDED AT TIME OF SITE PLAN.
11. A PHOTOMETRIC/LIGHTING PLAN WILL BE PROVIDED AT TIME OF SITE PLAN.
12. CONSTRUCTION DETAILS OF ALL SCREENING AND FENCING WILL BE ADDRESSED AT TIME OF SITE PLAN.

HATCH LEGEND

- CONCRETE
- PROP BUILDING (SEE ARCH DRAWINGS)
- DEVELOPMENT BLOCKS
- ASPHALT

80 40 20 0 80
1"= 80'

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PROJECT No.: V212141
DRAWN BY: DSH
CHECKED BY: JCW
DATE: 7/8/2022
CAD I.D.: SUPP -2

PROJECT:

SPECIAL USE PERMIT

FOR

WARRENTON VILLAGE CENTER

PROPOSED DEVELOPMENT

OAK SPRINGS DRIVE
CENTER DISTRICT
TOWN OF WARRENTON, VIRGINIA

BOHLER
28 BLACKWELL PARK LANE, SUITE 201
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COMMONWEALTH OF VIRGINIA
JOHN C. WRIGHT
Lic. No. 046960
2/14/2024
PROFESSIONAL ENGINEER

SHEET TITLE:

OVERALL SITE DEVELOPMENT PLAN

SHEET NUMBER:

3

REVISION 2 - 2/14/2024

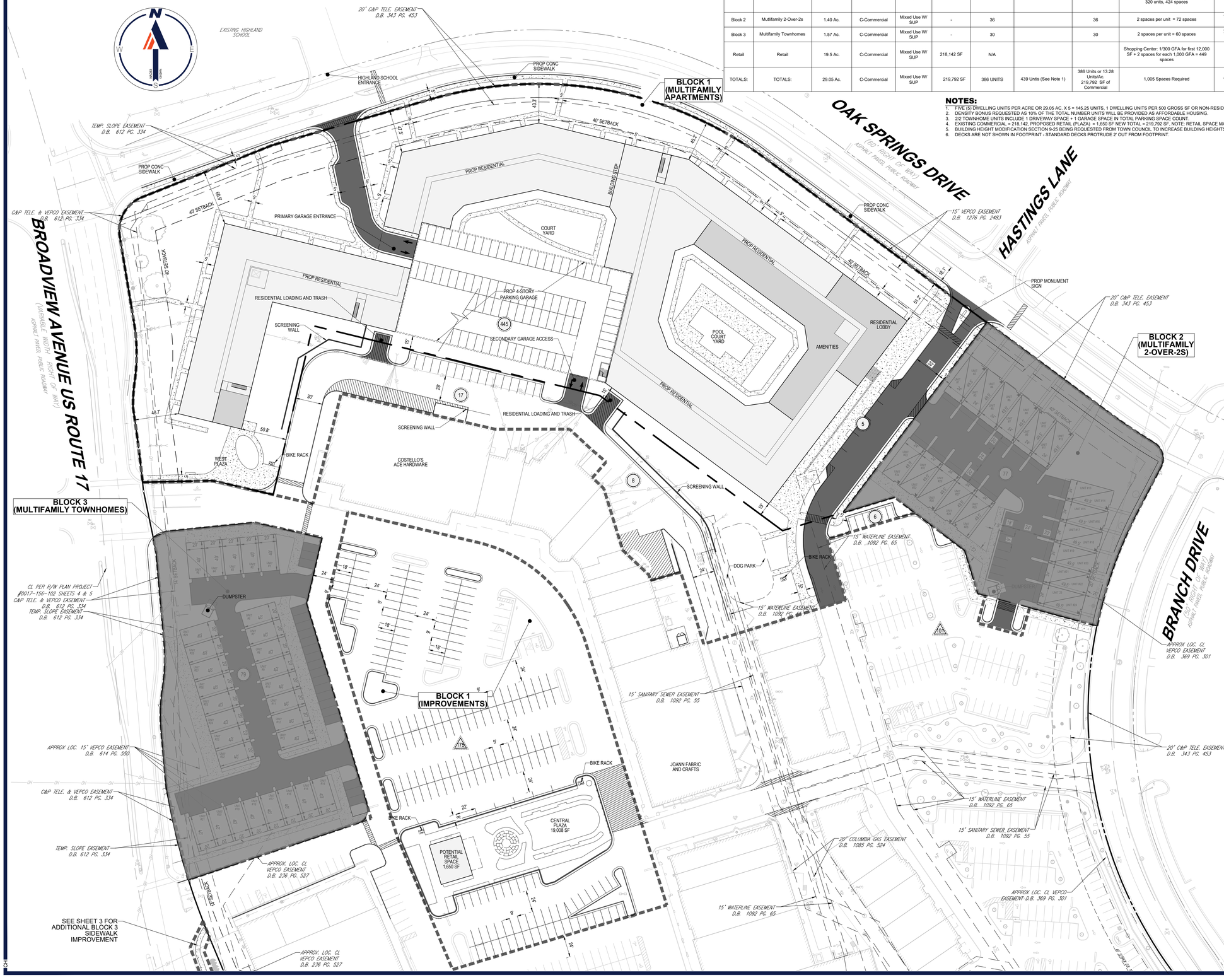
Feb 14, 2024
H:\2012141\CAD\DRAWINGS\PLAN SETS\SUPP\V212141 - SUPP -1----LAYOUT 3 - OVERALL SITE PLAN

DEVELOPMENT TABULATION

BLOCK	BLOCK USE	LAND AREA	EXISITNG ZONE	LAND USE	RETAIL	RESIDENTIAL	MAX. ALLOWABLE DENSITY	PROPOSED MAX.	REQUIRED PARKING	PARKING PROVIDED	MAX. BUILDING HEIGHT	MAX. BUILDING HEIGHT PROVIDED
Block 1	Multifamily Apartments	6.58 Ac.	C-Commercial	Mixed Use W/ SUP	1,650	320		320	±144 - 1 bed units (1 space per 1 bed unit) ±144 - 2 bed units (1.5 spaces per 2 bed unit) ±32 - 3 bed units (2 spaces per 3 bed unit) = 320 units, 424 spaces	481 Spaces (445 Garage + 36 Surface spaces)	36'	54' (Oak Springs Drive Frontage) 36' (Broadview Drive Frontage)
Block 2	Mutifamily 2-Over-2s	1.40 Ac.	C-Commercial	Mixed Use W/ SUP	-	36		36	2 spaces per unit = 72 spaces	77 Spaces (34 garage + 43 Surface spaces)	36'	45'
Block 3	Multifamily Townhomes	1.57 Ac.	C-Commercial	Mixed Use W/ SUP	-	30		30	2 spaces per unit = 60 spaces	79 Spaces (58 Garage + 21 Surface spaces)	36'	36'
Retail	Retail	19.5 Ac.	C-Commercial	Mixed Use W/ SUP	218,142 SF	N/A			Shopping Center: 1/300 GFA for first 12,000 SF + 2 spaces for each 1,000 GFA = 449 spaces	884 spaces	45'	45'
TOTALS:	TOTALS:	29.05 Ac.	C-Commercial	Mixed Use W/ SUP	219,792 SF	386 UNITS	439 Untis (See Note 1)	386 Units or 13.28 Units/Ac. 219,792 SF of Commercial	1,005 Spaces Required	1,521 Total Parking Spaces		(See Note 5)

NOTES:

1. FIVE (5) DWELLING UNITS PER ACRE OR 29.05 AC. X 5 = 145.25 UNITS, 1 DWELLING UNITS PER 500 GROSS SF OR NON-RESIDENTIAL FLOOR SPACE OR 219,792 SF/500 SF = 439 UNITS
2. DENSITY BONUS REQUESTED AS 10% OF THE TOTAL NUMBER UNITS WILL BE PROVIDED AS AFFORDABLE HOUSING.
3. 2/2 TOWNHOME UNITS INCLUDE 1 DRIVEWAY SPACE + 1 GARAGE SPACE IN TOTAL PARKING SPACE COUNT.
4. EXISTING COMMERCIAL = 218,142, PROPOSED RETAIL (PLAZA) = 1,650 SF NEW TOTAL = 219,792 SF, NOTE: RETAIL SPACE MAY INCREASE AS EXISTING SPACE IS REDEVELOPED
5. BUILDING HEIGHT MODIFICATION SECTION 9-25 BEING REQUESTED FROM TOWN COUNCIL TO INCREASE BUILDING HEIGHTS. SEE WAIVER INFORMATION ON SHEET 7.
6. DECKS ARE NOT SHOWN IN FOOTPRINT - STANDARD DECKS PROTRUDE 2' OUT FROM FOOTPRINT.



GENERAL NOTES:

1. THIS PLAN IS BASED ON THE FOLLOWING:
   SURVEY CAD FILES PREPARED BY BOHLER DATED: 11/3/2021
   BUILDING FOOTPRINT CAD FILES PREPARED BY MV+A ARCHITECTS DATED: 2/06/2024
2. ZONING DATA:
   EXISTING ZONE: C - COMMERCIAL
   PROPOSED ZONE: COMMERCIAL WITH MIXED USE
3. USES:
   EXISTING USE: VACANT, RETAIL
   PROPOSED USE: MIXED USE
4. SITE AREA
   PIN'S : 6985-20-7247-0000 6.46 ACRES
   6984-29-6753-0000 22.59 ACRES
5. SITE WILL BE SERVICED BY TOWN WATER AND SEWER.
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   HORIZONTAL DATUM: NAD 83
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8. CURB AND PARKING MODIFICATIONS IN WARRENTON CENTER WILL OCCUR IN EACH OF THE DEVELOPMENT BLOCKS, UNLESS OTHERWISE NOTED.
9. A PROPERTY LINE ADJUSTMENT PLAT WILL BE COMPLETED WITH SITE PLAN.
10. A TREE SURVEY WILL BE PROVIDED AT TIME OF SITE PLAN.
11. A PHOTOMETRIC / LIGHTING PLAN WILL BE PROVIDED AT TIME OF SITE PLAN.
12. CONSTRUCTION DETAILS OF ALL SCREENING AND FENCING WILL BE ADDRESSED AT TIME OF SITE PLAN.
13. PROPOSED SIDEWALK WIDTH IS 5' MIN. UNLESS OTHERWISE NOTED.

HATCH LEGEND

- CONCRETE
- PROP BUILDING (SEE ARCH DRAWINGS)
- PAVEMENT & ADA STRIPING
- ASPHALT
- DEVELOPMENT AREA

50 25 12.5 0 50
1"= 50'

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DRAWN BY:	DSH
CHECKED BY:	JCW
DATE:	7/8/2022
CAD I.D.:	SUPP -2

PROJECT:

SPECIAL USE PERMIT

FOR

WARRENTON VILLAGE CENTER

PROPOSED DEVELOPMENT

OAK SPRINGS DRIVE
CENTER DISTRICT
TOWN OF WARRENTON, VIRGINIA

BOHLER
28 BLACKWELL PARK LANE, SUITE 201
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VA@BohlerEng.com

COMMONWEALTH OF VIRGINIA
JOHN C. WRIGHT
Lic. No. 046960
2/14/2024
PROFESSIONAL ENGINEER

SHEET TITLE:

SITE DEVELOPMENT PLAN BLOCK 1

SHEET NUMBER:

4

REVISION 2 - 2/14/2024

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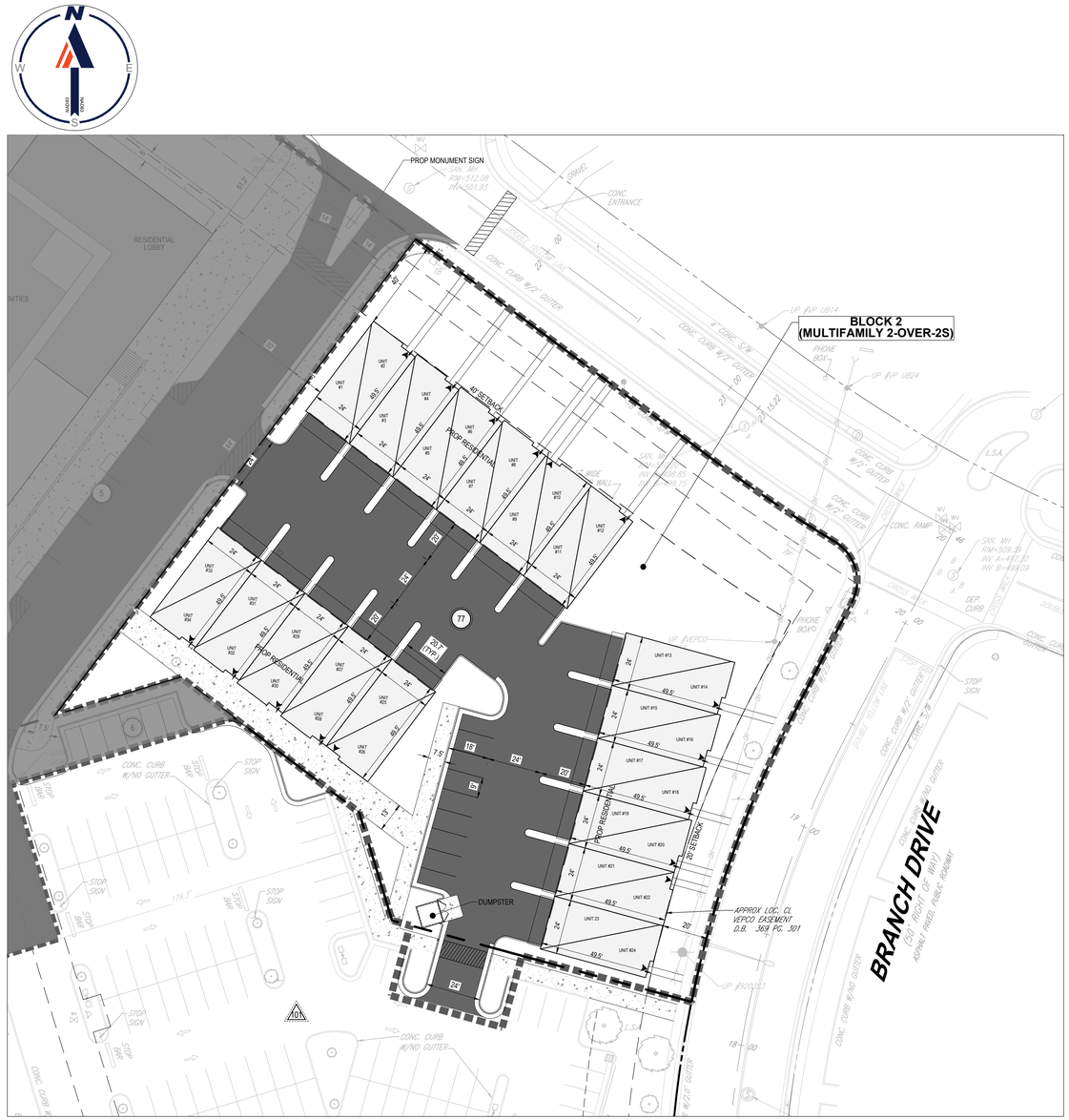
CH4



HATCH LEGEND

- CONCRETE
- PROP BUILDING (SEE ARCH DRAWINGS)
- PAVEMENT & ADA STRIPING
- ASPHALT
- DEVELOPMENT BLOCKS

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PROJECT:

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TOWN OF WARRENTON, VIRGINIA

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COMMONWEALTH OF VIRGINIA
JOHN C. WRIGHT
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PROFESSIONAL ENGINEER

SHEET TITLE:

SITE DEVELOPMENT PLAN - BLOCKS 2 AND 3

SHEET NUMBER:

5

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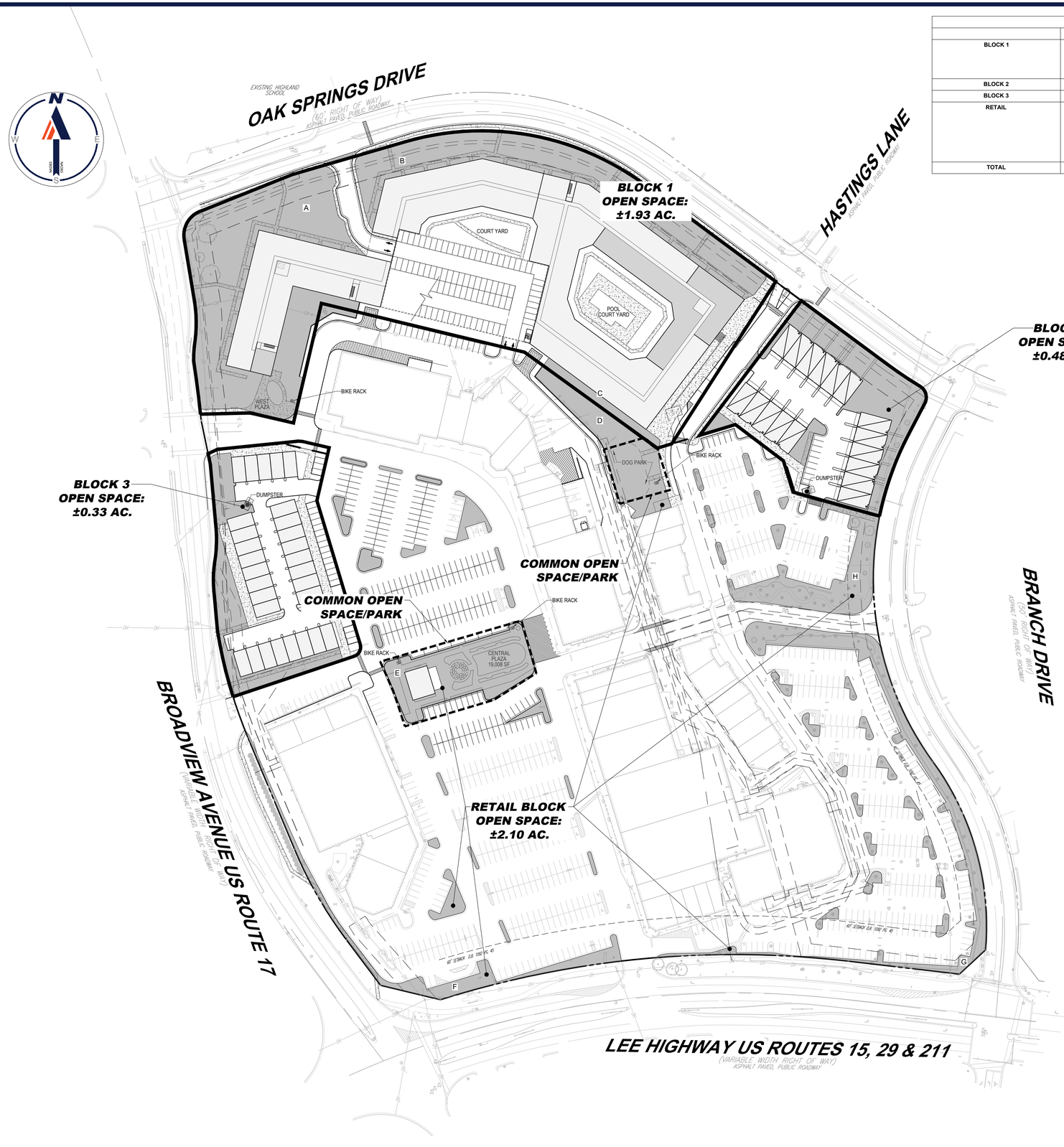

OPEN SPACE TABULATION				
	AREA	OPEN SPACE REQUIRED	OPEN SPACE PROVIDED	NEW IMPROVEMENTS
BLOCK 1	±6.58 AC.	10% - 0.66 AC. (±28,750 SF)	A: 1.21 AC. (±52,700 SF) B: 0.84 AC. (±36,590 SF) C: 0.07 AC. (±3,050 SF) TOTAL BLOCK 1: 2.12 AC. (±92,340 SF) (32.2%)	A: RESIDENTIAL PLAZA, BENCH SEATING, BIKE RACK, LANDSCAPING B: LANDSCAPING C: LANDSCAPING
BLOCK 2	±1.40 AC.	10% - 0.14 AC. (±6,100 SF)	34.3% - 0.48 AC. (±20,910 SF)	LANDSCAPING
BLOCK 3	±1.57 AC.	10% - 0.16 AC. (±6,970 SF)	20.8% - 0.33 AC. (±14,375 SF)	LANDSCAPING
RETAIL	±19.5 AC.	10% - 1.95 AC. (±84,940 SF)	D: 0.34 AC. (±14,810 SF) E: 0.38 AC. (±16,550 SF) F: 0.20 AC. (±8,710 SF) G: 0.44 AC. (±19,160 SF) H: 0.32 AC. (±13,940 SF) LANDSCAPE ISLANDS: 0.42 AC. (±18,300 SF) TOTAL BLOCK RETAIL: 2.10 AC. (±91,470 SF) (10.8%)	D: FENCED DOG PLAY AREA, PICNIC TABLES, BIKE RACK, LANDSCAPING E: BIKE RACK, SPLASH-PAD, LAWN AREA, BENCH SEATING, LANDSCAPING, COMMERCIAL PAD F, G, H: EXISTING CONDITIONS
TOTAL	±29.05 AC.	10% - 2.91 AC. (±126,760 SF)	17.3% - 5.03 AC. (±219,100 SF)	

LEGEND

- OPEN SPACE
- COMMON OPEN SPACE/PARK
- BLOCK AREA FOR OPEN SPACE TABULATION

0 20 40 80

1"= 80'

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2/14/2024
PROFESSIONAL ENGINEER

SHEET TITLE:

OPEN SPACE PLAN

SHEET NUMBER:

6

REVISION 2 - 2/14/2024

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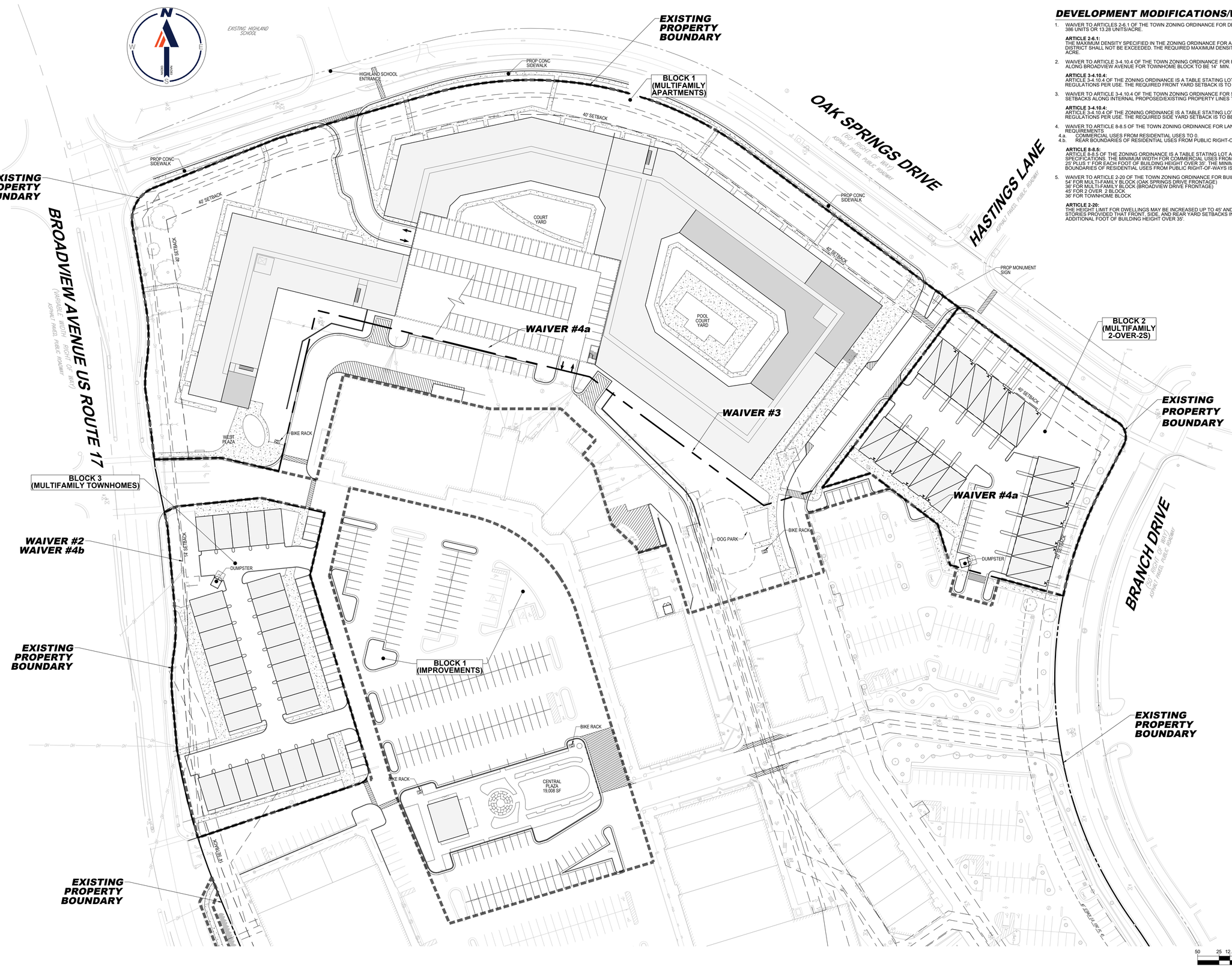

DEVELOPMENT MODIFICATIONS/WAIVERS

1. WAIVER TO ARTICLES 2-6.1 OF THE TOWN ZONING ORDINANCE FOR DENSITY INCREASE OF 386 UNITS OR 13.28 UNITS/ACRE.

   ARTICLE 2-6.1:
   THE MAXIMUM DENSITY SPECIFIED IN THE ZONING ORDINANCE FOR A GIVEN ZONING DISTRICT SHALL NOT BE EXCEEDED. THE REQUIRED MAXIMUM DENSITY IS 5 UNITS PER ACRE.

2. WAIVER TO ARTICLE 3-4.10.4 OF THE TOWN ZONING ORDINANCE FOR FRONT YARD SETBACK ALONG BROADVIEW AVENUE FOR TOWNHOME BLOCK TO BE 14' MIN.

   ARTICLE 3-4.10.4:
   ARTICLE 3-4.10.4 OF THE ZONING ORDINANCE IS A TABLE STATING LOT AND YARD REGULATIONS PER USE. THE REQUIRED FRONT YARD SETBACK IS TO BE 40' MIN.

3. WAIVER TO ARTICLE 3-4.10.4 OF THE TOWN ZONING ORDINANCE FOR SIDE/REAR YARD SETBACKS ALONG INTERNAL PROPOSED/EXISTING PROPERTY LINES TO 0.

   ARTICLE 3-4.10.4:
   ARTICLE 3-4.10.4 OF THE ZONING ORDINANCE IS A TABLE STATING LOT AND YARD REGULATIONS PER USE. THE REQUIRED SIDE YARD SETBACK IS TO BE 5' MIN.

4. WAIVER TO ARTICLE 8-8.5 OF THE TOWN ZONING ORDINANCE FOR LANDSCAPE BUFFER REQUIREMENTS
   4.a. COMMERCIAL USES FROM RESIDENTIAL USES TO 0.
   4.b. REAR BOUNDARIES OF RESIDENTIAL USES FROM PUBLIC RIGHT-OF-WAYS TO 14'.

   ARTICLE 8-8.5:
   ARTICLE 8-8.5 OF THE ZONING ORDINANCE IS A TABLE STATING LOT AND BUFFER YARD SPECIFICATIONS. THE MINIMUM WIDTH FOR COMMERCIAL USES FROM RESIDENTIAL USES IS 25' PLUS 1' FOR EACH FOOT OF BUILDING HEIGHT OVER 35'. THE MINIMUM WIDTH FOR REAR BOUNDARIES OF RESIDENTIAL USES FROM PUBLIC RIGHT-OF-WAYS IS 25'.

5. WAIVER TO ARTICLE 2-20 OF THE TOWN ZONING ORDINANCE FOR BUILDING HEIGHT:
   54' FOR MULTI-FAMILY BLOCK (OAK SPRINGS DRIVE FRONTAGE)
   36' FOR MULTI-FAMILY BLOCK (BROADVIEW DRIVE FRONTAGE)
   45' FOR 2 OVER .2 BLOCK
   36' FOR TOWNHOME BLOCK

   ARTICLE 2-20:
   THE HEIGHT LIMIT FOR DWELLINGS MAY BE INCREASED UP TO 45' AND UP TO THREE STORIES PROVIDED THAT FRONT, SIDE, AND REAR YARD SETBACKS INCREASE 1' FOR EACH ADDITIONAL FOOT OF BUILDING HEIGHT OVER 35'.

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PROJECT:

SPECIAL USE PERMIT

FOR

WARRENTON VILLAGE CENTER

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PROFESSIONAL ENGINEER

SHEET TITLE:

WAIVER INFORMATION

SHEET NUMBER:

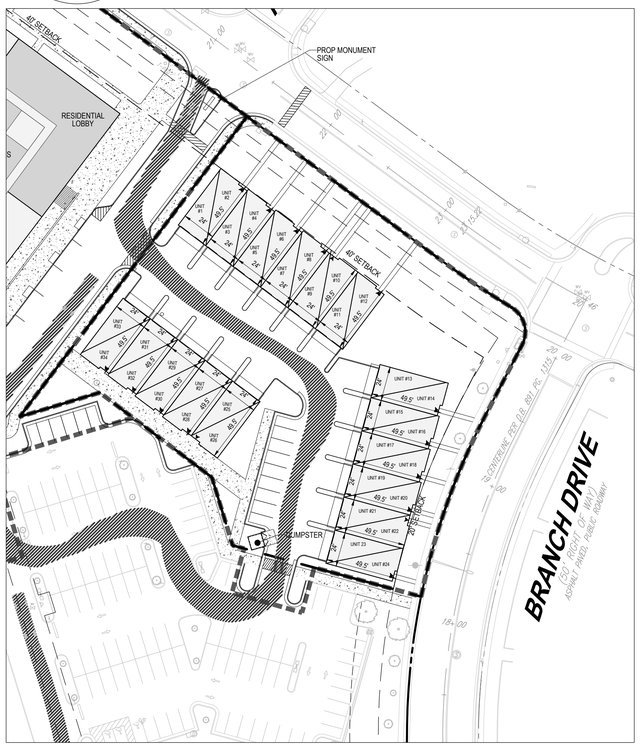
7

REVISION 2 - 2/14/2024

Feb 14, 2024
H:\2V212141\CAD\DRAWINGS\PLAN SETS\SUPPV212141 - SUPP - 1 - LAYOUT 7 - WAIVER INFORMATION
CHECKED BY: JCW

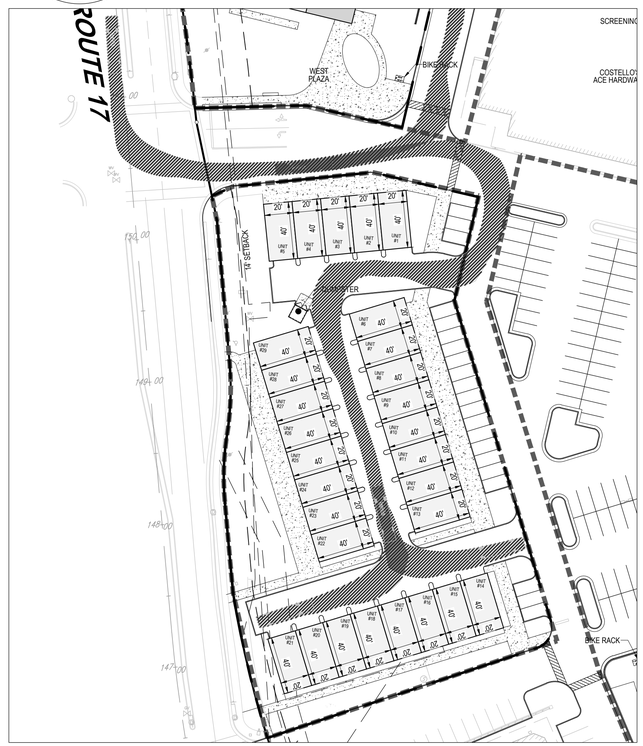
BLOCK 1

100 50 25 0 100
1"= 100'



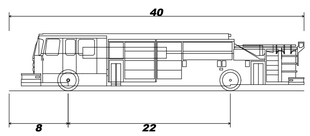
BLOCK 2 (2 OVER 2 BLOCK)

50 25 12.5 0 50
1"= 50'



BLOCK 3 (TOWNHOME BLOCK)

50 25 12.5 0 50
1"= 50'



Pumper Fire Truck	
Overall Length	**40.000ft**
Overall Width	**8.167ft**
Overall Body Height	**7.745ft**
Min Body Ground Clearance	**0.656ft**
Track Width	**8.167ft**
Lock-to-lock time	**5.00s**
Max Wheel Angle	**45.00°**

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CHECKED BY:	JCW
DATE:	7/8/2022
CAD I.D.:	SUPP -2

PROJECT:

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FOR

WARRENTON VILLAGE CENTER

PROPOSED DEVELOPMENT

OAK SPRINGS DRIVE
CENTER DISTRICT
TOWN OF WARRENTON, VIRGINIA

BOHLER
28 BLACKWELL PARK LANE, SUITE 201
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COMMONWEALTH OF VIRGINIA
JOHN C. WRIGHT
Lic. No. 046960
2/14/2024
PROFESSIONAL ENGINEER

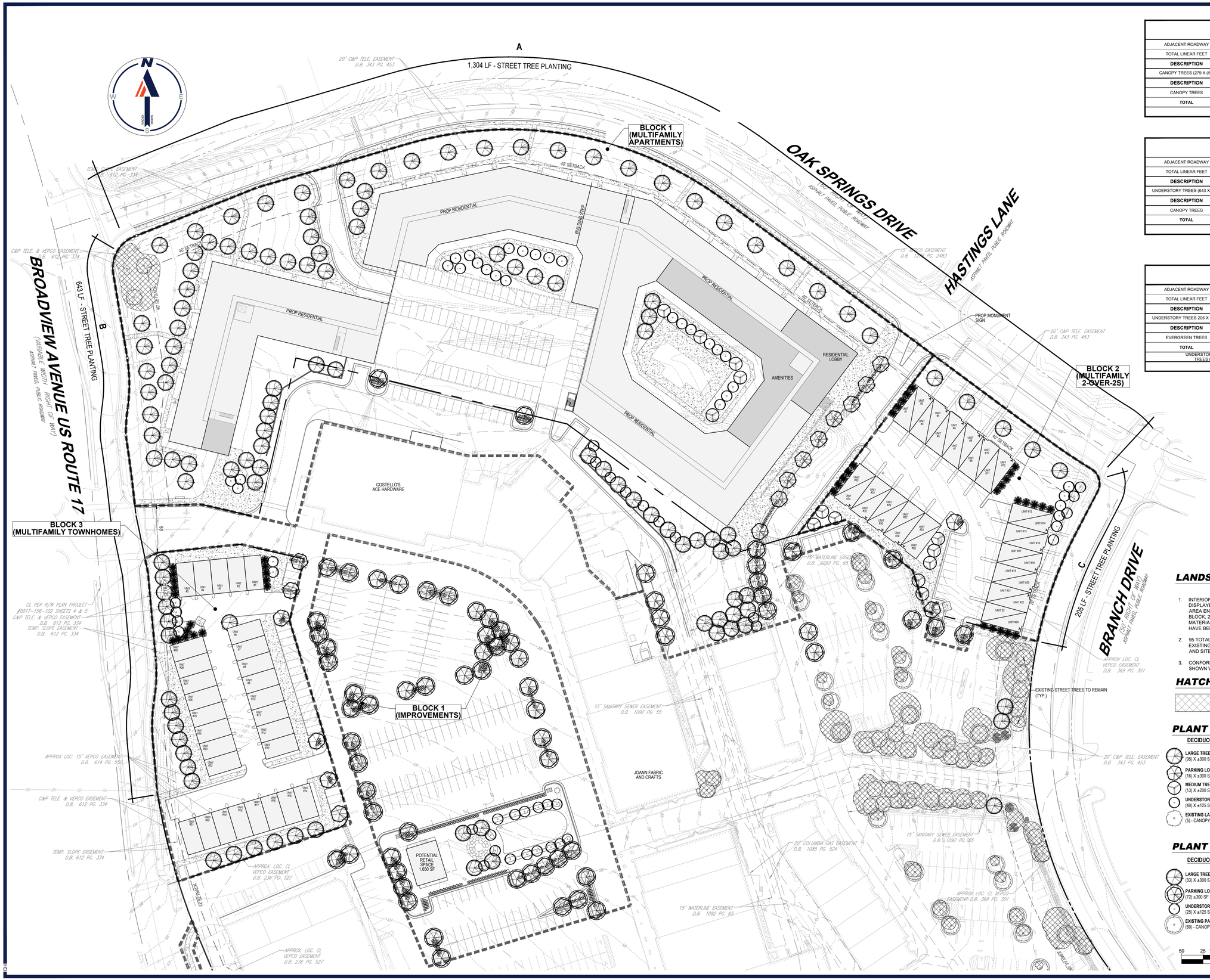
SHEET TITLE:

FIRE TRUCK MOVEMENT

SHEET NUMBER:
8

REVISION 2 - 2/14/2024

Feb 14, 2024
H:\21\V212141\CAD\DRAWINGS\PLAN SETS\SUPPV212141 - SUPP -1----LAYOUT 8 - FIRE TRUCK MOVEMENT
CH



A

STREET TREE PLANTING				
SECTION 8-5.5				
ADJACENT ROADWAY	OAK SPRINGS DRIVE			
TOTAL LINEAR FEET	1,304 LF			
DESCRIPTION	**REQUIRED**		**PROVIDED**	
CANOPY TREES (279 X //50)	27		27	
DESCRIPTION	**EXISTING**	**PROPOSED**	**TOTAL QTY**	**PERCENT**
CANOPY TREES	0	27	27	100%
TOTAL	0	27	27	100%

B

STREET TREE PLANTING				
SECTION 8-5.5				
ADJACENT ROADWAY	BROADVIEW AVE - VA ROUTE 17			
TOTAL LINEAR FEET	643 LF			
DESCRIPTION	**REQUIRED**		**PROVIDED**	
UNDERSTORY TREES (643 X 1/50)	13		13	
DESCRIPTION	**EXISTING**	**PROPOSED**	**TOTAL QTY**	**PERCENT**
CANOPY TREES	0	13	13	100%
TOTAL	0	13	13	100%

C

STREET TREE PLANTING				
SECTION 8-5.5				
ADJACENT ROADWAY	BRANCH DR			
TOTAL LINEAR FEET	205 LF			
DESCRIPTION	**REQUIRED**		**PROVIDED**	
UNDERSTORY TREES 205 X (2/50)	9		9	
DESCRIPTION	**EXISTING**	**PROPOSED**	**TOTAL QTY**	**PERCENT**
EVERGREEN TREES	0	9	9	100%
TOTAL	0	9	9	100%
UNDERSTORY TREES ARE PROPOSED IN PLACE OF CANOPY TREES DUE TO OVERHEAD LINES AT RATE OF 2 TO 1				

LANDSCAPE NOTES

1. INTERIOR PARKING LOT AND 20-YEAR TREE CANOPY ANALYSIS IS DISPLAYED FOR RESIDENTIAL BLOCK AREA. RESIDENTIAL BLOCK AREA ENCOMPASSES THE TOTAL AREA OF THE MULTIFAMILY BLOCK, 2 OVER 2 BLOCK, AND TOWNHOME BLOCK. ONLY THE MATERIAL COUNTED TOWARD THE RESIDENTIAL LANDSCAPING HAVE BEEN COUNTED FOR THE 20-YEAR TREE CANOPY.
2. 95 TOTAL TREES PROPOSED IN EXISTING PARKING LOT TO REPLACE EXISTING TREES THAT ARE TO BE REMOVED DUE TO PARKING LOT AND SITE IMPROVEMENTS.
3. CONFORMANCE WITH LANDSCAPING REQUIREMENTS WILL BE SHOWN WITH THE SITE DEVELOPMENT PLAN.

HATCH LEGEND

EXISTING TREE CANOPY TO REMAIN

PLANT LEGEND - RESIDENTIAL

DECIDUOUS

- **LARGE TREE (MIN. 15 FEET)** (95) X ±300 SF EA = 28,500 SF
- **PARKING LOT TREE (MIN. 15 FEET)** (16) X ±300 SF EA = 4,800 SF
- **MEDIUM TREE (MIN. 12 FEET)** (13) X ±200 SF EA = 2,600 SF
- **UNDERSTORY TREE (MIN. 6 FEET)** (40) X ±125 SF EA = 5,000 SF
- **EXISTING LARGE TREE** (5) - CANOPY BASED ON AERIAL IMAGERY

EVERGREEN

- **EVERGEEN TREE (MIN. 8 FEET)** (42) X ±150 SF EA = 6,300 SF
- **PARKING LOT SHRUBS** (35)

PLANT LEGEND - COMMERCIAL

DECIDUOUS

- **LARGE TREE (MIN. 15 FEET)** (33) X ±300 SF EA = 9,900 SF
- **PARKING LOT TREE (MIN. 15 FEET)** (72) ±300 SF EA = 11,100 SF
- **UNDERSTORY TREE (MIN. 6 FEET)** (25) X ±125 SF EA = 3,125 SF
- **EXISTING PARKING LOT TREE** (60) - CANOPY BASED ON AERIAL IMAGERY

EVERGREEN

- **PARKING LOT SHRUBS** (345)

50 25 12.5 0 50
1"= 50'

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COMMONWEALTH OF VIRGINIA
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SHEET TITLE:

LANDSCAPE PLAN

SHEET NUMBER:

9

REVISION 2 - 2/14/2024

LANDSCAPE NOTES

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EVERGREEN

- EVERGEEN TREE (MIN. 8 FEET) (42) X ±150 SF EA = 6,300 SF
- PARKING LOT SHRUBS (35)

HATCH LEGEND

- EXISTING TREE CANOPY TO REMAIN
- INTERIOR PARKING LOT AREA
- INTERIOR PARKING LOT LANDSCAPE AREA

100 50 25 0 100

1"= 100'

PLANT LEGEND - COMMERCIAL

DECIDUOUS

- LARGE TREE (MIN. 15 FEET) (33) X ±300 SF EA = 9,900 SF
- PARKING LOT TREE (MIN. 15 FEET) (72) ±300 SF EA = 11,100 SF
- UNDERSTORY TREE (MIN. 6 FEET) (25) X ±125 SF EA = 3,125 SF
- EXISTING PARKING LOT TREE (60) - CANOPY BASED ON AERIAL IMAGERY

EVERGREEN

- PARKING LOT SHRUBS (345)

INTERIOR PARKING LOT LANDSCAPING - COMMERCIAL

SECTION 8-6.2

PARKING LOT AREA	468,346 SF			
PARKING SPACES	887			
DESCRIPTION	**REQUIRED**		**PROVIDED**	
LANDSCAPE AREA 468,346 X 10%	46,835 SF		48,896 SF (10.69%)	
SHADE TREES 884 X (1/8)	111		132	
SHRUBS 884 X (3/8)	332		345	
DESCRIPTION	**EXISTING**	**PROPOSED**	**TOTAL QTY**	**PERCENT**
CANOPY TREES	60	72	132	100%
SHRUBS	0	345	345	100%
TOTAL	60	417	477	100%

INTERIOR PARKING LOT LANDSCAPING - MULTIFAMILY BLOCK 1

SECTION 8-6.2

PARKING LOT AREA	8,376 SF			
PARKING SPACES	5			
DESCRIPTION	**REQUIRED**		**PROVIDED**	
LANDSCAPE AREA 8,376 X 10%	838 SF		1,127 SF (14.49%)	
SHADE TREES 5 X (1/8)	1		9	
SHRUBS 5 X (3/8)	2		14	
DESCRIPTION	**EXISTING**	**PROPOSED**	**TOTAL QTY**	**PERCENT**
CANOPY TREES	0	9	9	100%
SHRUBS	0	14	14	100%
TOTAL	0	23	23	100%

INTERIOR PARKING LOT LANDSCAPING - MULTIFAMILY BLOCK 2

SECTION 8-6.2

PARKING LOT AREA	3,808 SF			
PARKING SPACES	9			
DESCRIPTION	**REQUIRED**		**PROVIDED**	
LANDSCAPE AREA 3,808 X 10%	381 SF		569 SF (14.94%)	
SHADE TREES 9 X (1/8)	2		2	
SHRUBS 9 X (3/8)	4		6	
DESCRIPTION	**EXISTING**	**PROPOSED**	**TOTAL QTY**	**PERCENT**
CANOPY TREES	0	2	2	100%
SHRUBS	0	6	6	100%
TOTAL	0	8	8	100%

INTERIOR PARKING LOT LANDSCAPING - MULTIFAMILY BLOCK 3

SECTION 8-6.2

PARKING LOT AREA	3,402 SF			
PARKING SPACES	18			
DESCRIPTION	**REQUIRED**		**PROVIDED**	
LANDSCAPE AREA 3,402X 10%	340 SF		1,446 SF (42.50%)	
SHADE TREES 18 X (1/8)	3		6	
SHRUBS 18 X (3/8)	7		15	
DESCRIPTION	**EXISTING**	**PROPOSED**	**TOTAL QTY**	**PERCENT**
CANOPY TREES	0	6	6	100%
SHRUBS	0	15	15	100%
TOTAL	0	21	21	100%

TREE CANOPY TABLE - COMMERCIAL

SECTION 8-10.3.2

SITE AREA	852,304 SF OR 19.566 AC
PROPOSED ZONE	COMMERCIAL
20 YEAR CANOPY REQUIREMENT	10%
20 YEAR CANOPY REQUIRED	85,230 SF
PROPOSED CANOPY	34,625 SF (4.06%)
EXISTING CANOPY CONSERVATION	51,087 SF (5.99%)
TOTAL 20 YEAR CANOPY PROVIDED	85,712 SF (10.06%)

TREE CANOPY TABLE - MULTIFAMILY BLOCK 1

SECTION 8-10.3.2

SITE AREA	284,592 SF OR 6.533 AC
PROPOSED ZONE	RESIDENTIAL
20 YEAR CANOPY REQUIREMENT	10% (49 UNITS PER ACRE)
20 YEAR CANOPY REQUIRED	28,459 SF
PROPOSED CANOPY	27,825 SF (9.78%)
EXISTING CANOPY CONSERVATION	3,031 SF (1.07%)
TOTAL 20 YEAR CANOPY PROVIDED	30,856 SF (10.84%)

TREE CANOPY TABLE - MULTIFAMILY BLOCK 2

SECTION 8-10.3.2

SITE AREA	60,816 SF OR 1.396 AC
PROPOSED ZONE	RESIDENTIAL
20 YEAR CANOPY REQUIREMENT	10% (25 UNITS PER ACRE)
20 YEAR CANOPY REQUIRED	6,082 SF
PROPOSED CANOPY	8,575 SF (14.10%)
EXISTING CANOPY CONSERVATION	0 SF (0.00%)
TOTAL 20 YEAR CANOPY PROVIDED	8,575 SF (14.10%)

TREE CANOPY TABLE - MULTIFAMILY BLOCK 3

SECTION 8-10.3.2

SITE AREA	67,822 SF OR 1.557 AC
PROPOSED ZONE	RESIDENTIAL
20 YEAR CANOPY REQUIREMENT	15% (19 UNITS PER ACRE)
20 YEAR CANOPY REQUIRED	10,173 SF
PROPOSED CANOPY	10,200 SF (15.04%)
EXISTING CANOPY CONSERVATION	0 SF (0.00%)
TOTAL 20 YEAR CANOPY PROVIDED	10,200 SF (15.04%)

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COMMONWEALTH OF VIRGINIA
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2/14/2024
PROFESSIONAL ENGINEER

SHEET TITLE:

LANDSCAPE PLAN

SHEET NUMBER:

10

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MULTIFAMILY FRONT ELEVATION

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SHEET TITLE:

BUILDING ELEVATIONS

SHEET NUMBER:

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MULTIFAMILY SIDE ELEVATION

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MULTIFAMILY ELEVATION- 3 STORY

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13

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CH

TOWNHOME - 3 STORY ELEVATION

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11:21 V:\212141\CAD\DRAWINGS\PLAN SETS\SUPP\V212141 - SUPP - 1---LAYOUT 14 - BUILDING ELEVATIONS 4
CHRIS

TOWNHOME - 4 STORY ELEVATION

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COMMONWEALTH OF VIRGINIA
JOHN C. WRIGHT
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2/14/2024
PROFESSIONAL ENGINEER

SHEET TITLE:

BUILDING ELEVATIONS

SHEET NUMBER:

15

REVISION 2 - 2/14/2024

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H:\21\V212141\CAD\DRAWINGS\PLAN SETS\SUPP\V212141 - SUPP - 1 - LAYOUT 15 - BUILDING ELEVATIONS.S
CH

RENDERING - WARRENTON VILLAGE CENTER

SCALE 1"=80'-0"

mv+a FEBRUARY 14, 2024

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PROJECT No.:	V212141
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PROJECT:

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FOR

WARRENTON VILLAGE CENTER

PROPOSED DEVELOPMENT

OAK SPRINGS DRIVE
CENTER DISTRICT
TOWN OF WARRENTON, VIRGINIA

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SHEET TITLE:

CONCEPTUAL PLAN RENDERING

SHEET NUMBER:

16

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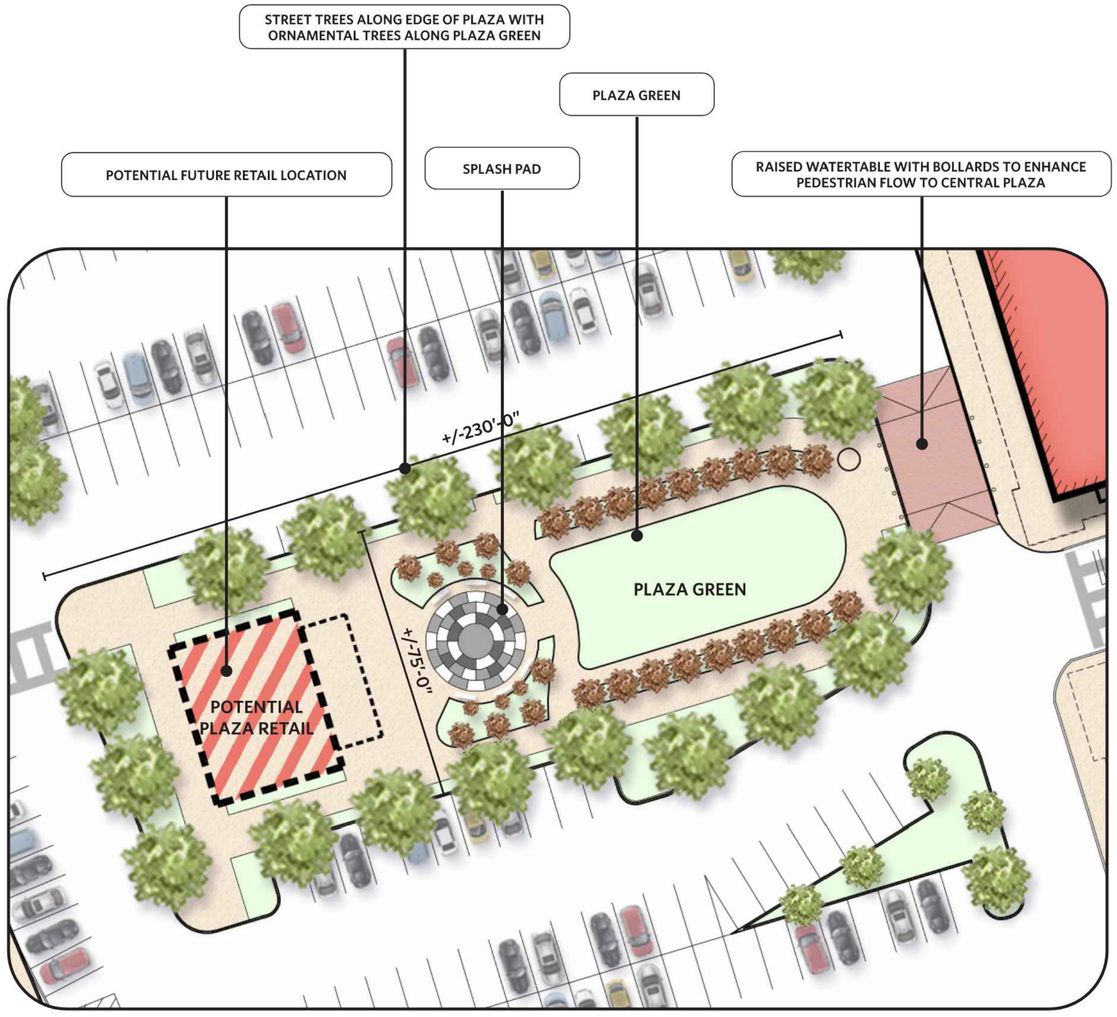

ENLARGED CONCEPTUAL CENTRAL PLAZA PLAN

SCALE 1"=20'-0"

AERIAL VIEW OF CENTRAL PLAZA

NTS

EYE LEVEL VIEW OF CENTRAL PLAZA

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NOTE: Retail building shown in Central Plaza is for conceptual future development purposes only. No retail building is proposed as part of this SUP.

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SHEET TITLE:

DETAIL - CENTRAL PLAZA

SHEET NUMBER:

17

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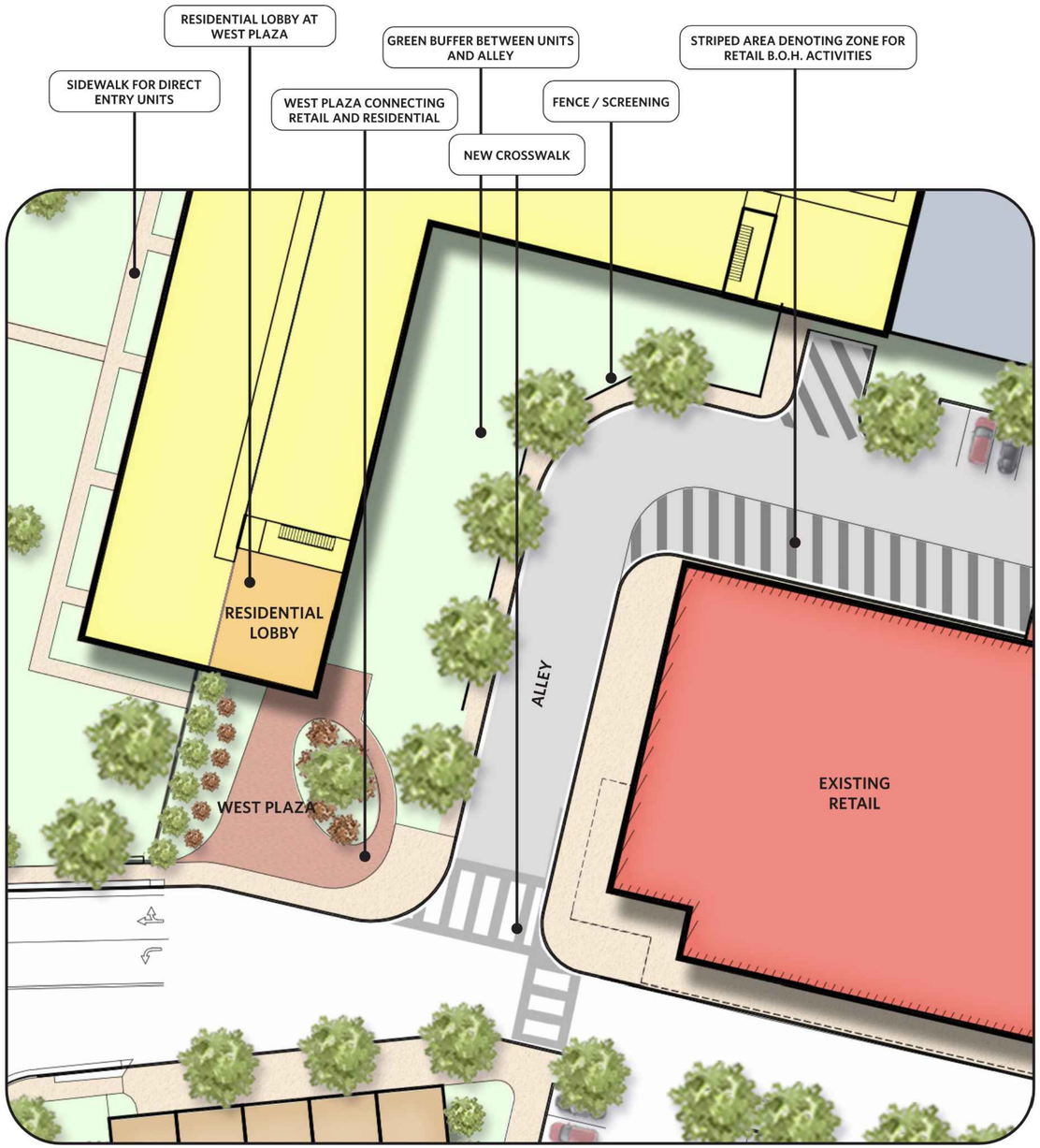

ENLARGED CONCEPTUAL WEST PLAZA PLAN

SCALE 1"=20'-0"

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GREEN BUFFER (VARIES) BETWEEN RESIDENTIAL AND ALLEY | ALLEY | SIDEWALK / RETAIL LOADING + TRASH ZONE (VARIES)

TYPICAL SECTION THROUGH ALLEY

SCALE 1/8"=1'-0"

VIEW OF WEST PLAZA AND EXISTING RETAIL BEYOND

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SHEET TITLE:

DETAIL - WEST PLAZA

SHEET NUMBER:

18

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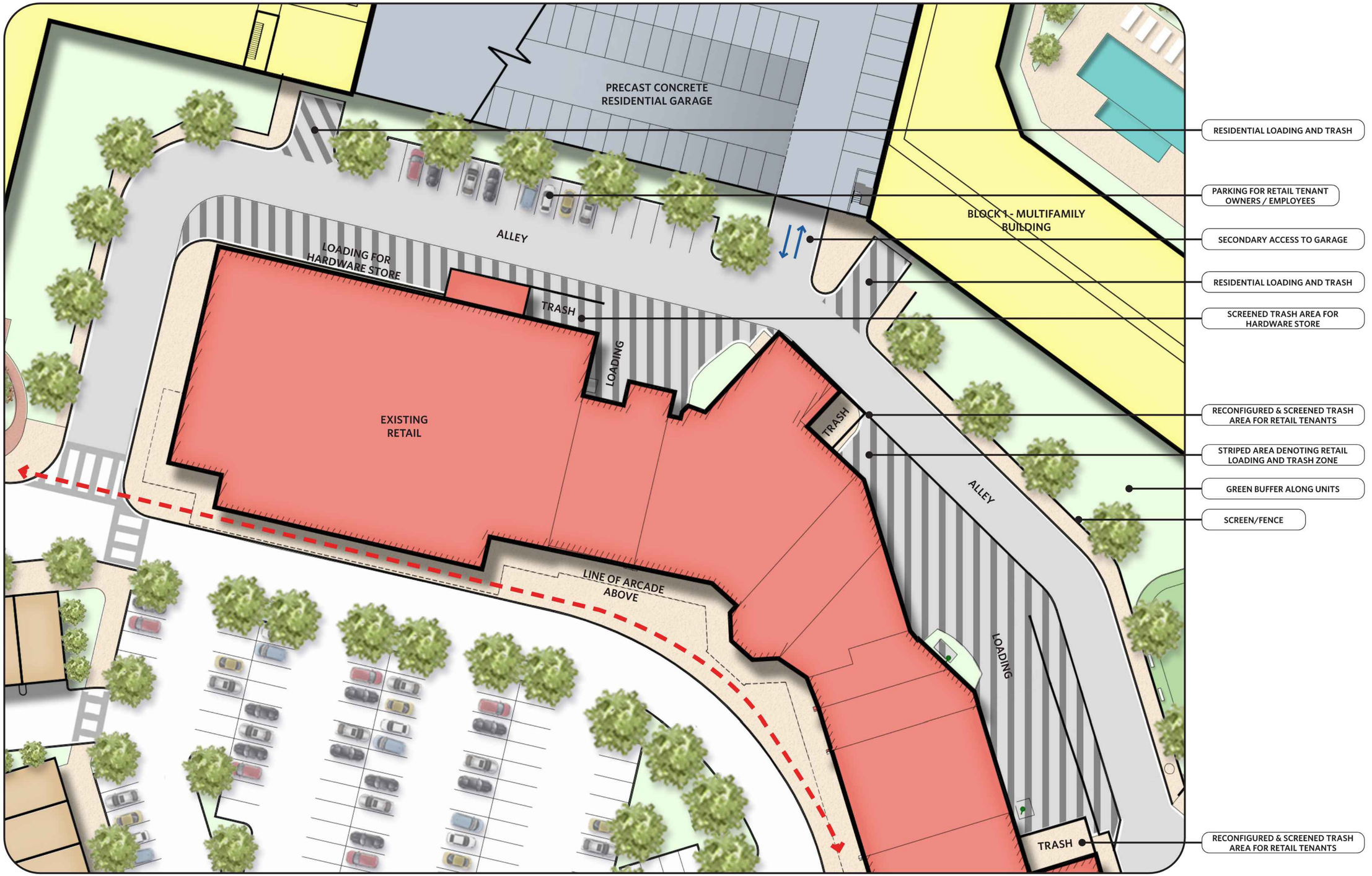

ENLARGED RETAIL AND RESIDENTIAL ALLEY PLAN

SCALE 1"=20'-0"

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SHEET TITLE:

DETAIL - ALLEY

SHEET NUMBER:

19

REVISION 2 - 2/14/2024

ENLARGED PLAN OF NEW ENTRANCE DRIVEWAY

SCALE 1"=20'-0"

VIEW OF NEW ENTRANCE STREET

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SHEET TITLE:

DETAIL - EAST PLAZA

SHEET NUMBER:

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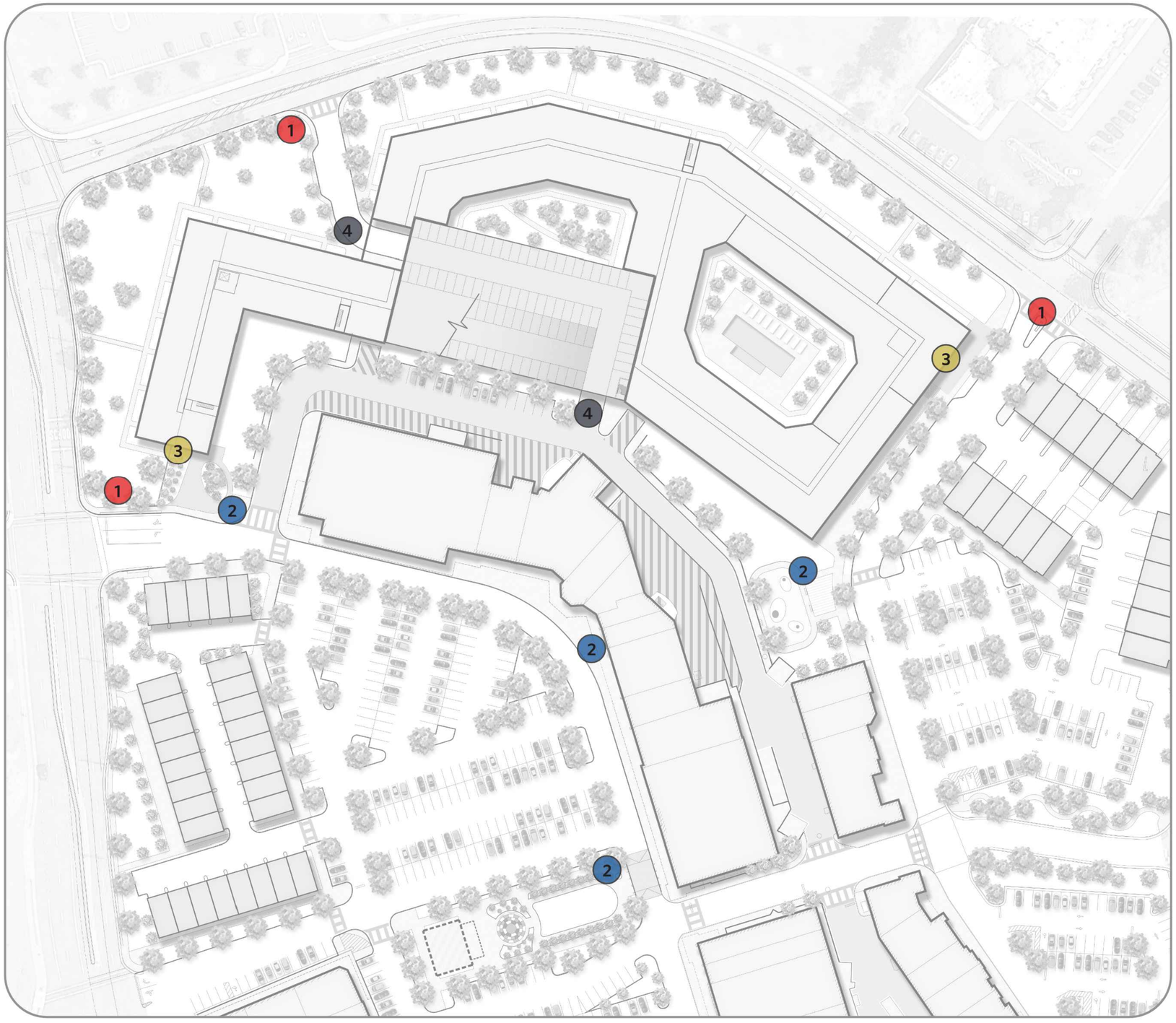

CONCEPTUAL SITE SIGNAGE PLAN

SCALE 1"=50'-0"

mv+a FEBRUARY 14, 2024

NOTE: Signage types and location shown here in this plan is conceptual and subject to change with input from stakeholders. All signs to conform to Article 6 - Signage of Zoning Ordinance

1 MONUMENT SIGNAGE

INCLUDES HORIZONTAL OR VERTICAL PYLON SIGNS , EITHER FREE STANDING OR INTEGRATED INTO THE LANDSCAPE, HIGHLIGHTING THE PROJECT/COMMUNITY NAME AND MAJOR TENANTS

2 WAYFINDING SIGNAGE

SUCH SIGNS COULD BE POST SUPPORTED OR ATTACHED TO OTHER ELEMENTS OF THE STREETSCAPE OR WITHIN LANDSCAPING AND ARE MEANT TO PROVIDE PEDESTRIANS WITH DIRECTION TO TENANTS WITHIN THE PROJECT.

3 CANOPY SIGNAGE

INCLUDES SIGNS THAT MAY BE WALL MOUNTED, CANOPY MOUNTED OR VERTICALLY MOUNTED TO THE FACADE VIA BRACKETS AND TYPICALLY ARE USED TO HIGHLIGHT THE NAME OF THE BUILDING OR THE COMMUNITY.

4 INCIDENTAL SIGNAGE

SIGNS THAT SUPPLEMENT AND PROVIDE NON-TENANT/BRAND IDENTITY INFORMATION USUALLY HIGHLIGHTING OTHER SUPPLEMENTARY PROGRAMS IN A PROJECT.

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PROJECT:

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FOR

WARRENTON VILLAGE CENTER

PROPOSED DEVELOPMENT

OAK SPRINGS DRIVE
CENTER DISTRICT
TOWN OF WARRENTON, VIRGINIA

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SHEET TITLE:

CONCEPTUAL SIGNAGE PLAN

SHEET NUMBER:

21

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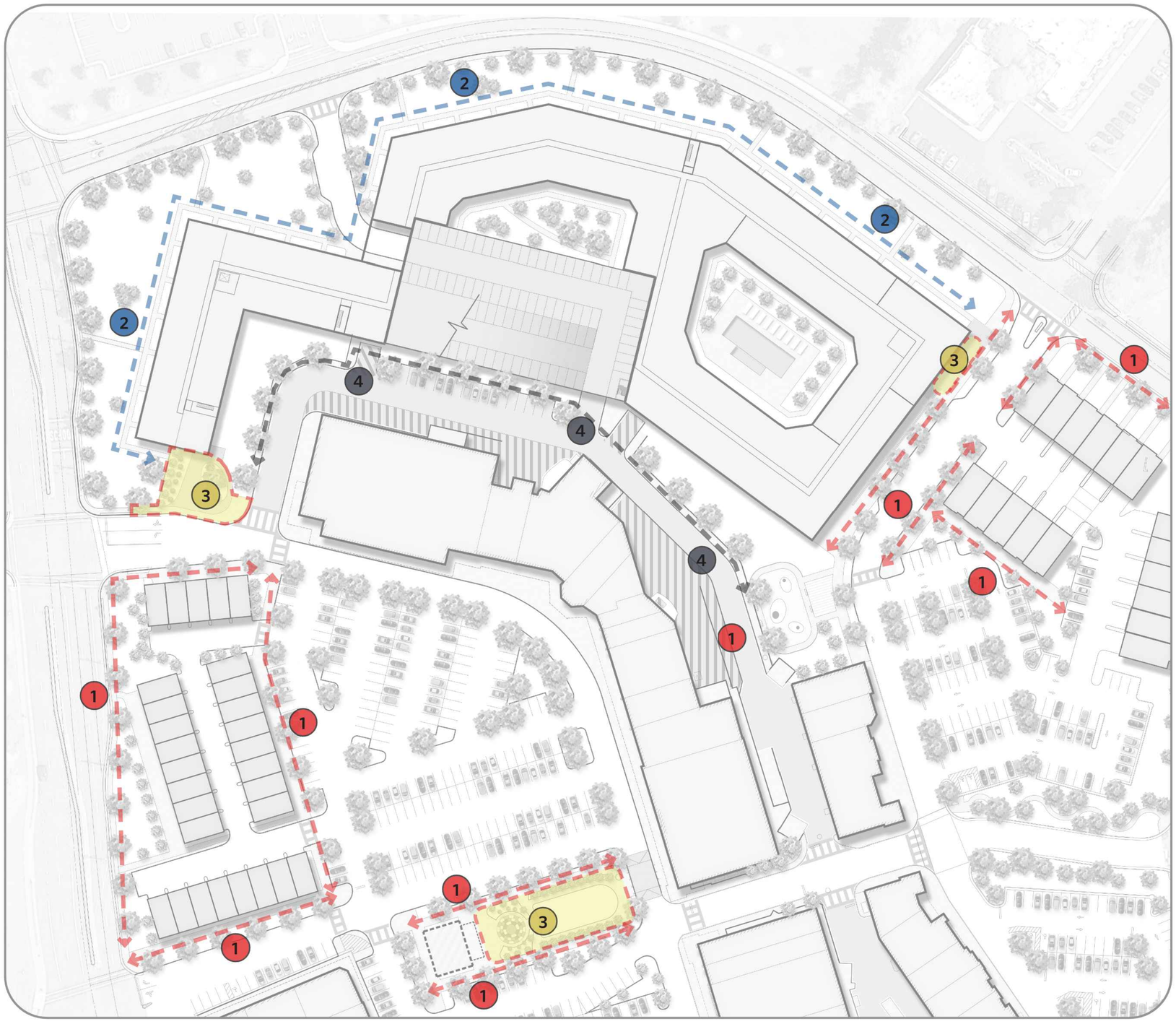


CONCEPTUAL LIGHTING PLAN

SCALE 1"=50'-0"

mv+a FEBRUARY 14, 2024

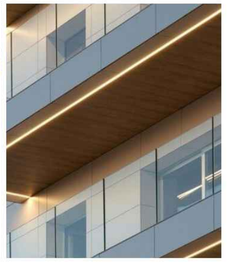
NOTE: Detailed lighting and photometric plan to be provided at site plan. All lighting to conform to Article 9 of Zoning Ordinance.

1 DECORATIVE POST LIGHTING

SUCH LIGHTING ALREADY EXISTS WITHIN SELECTIVE AREAS OF THE SITE. THIS LIGHTING TYPE IS MEANT TO PROVIDE ILLUMINATION ALONG PEDESTRIAN ROUTES/STREETS AND FORMS A NECESSARY COMPONENT OF THE ENTOURAGE THAT MAKES UP URBAN STREETSCAPES.

2 WALL SCONCE LIGHTING

ACCENT LIGHTING MOUNTED ON THE BUILDING ILLUMINATING FEATURES OF THE ARCHITECTURE AS WELL AS PROVIDING UTILITY LIGHTING FOR THE IMMEDIATE SURROUNDINGS/WALKWAYS.



3 ACCENT LIGHTING - BUILDING AND LANDSCAPE

ACCENT LIGHTING UTILIZED TO EMPHASIZE BUILDING ARCHITECTURE/ CANOPY ENTRANCES AS WELL AS LANDSCAPE FEATURES - PLANTING, FURNITURE ELEMENTS, DECORATIVE WALKING PATHS, ETC.

4 UTILITY LIGHTING

POST MOUNTED OR BUILDING MOUNTED LIGHTING THAT IS MEANT TO ILLUMINATE AREAS THAT ARE NOT USUALLY ACCESSED BY PEDESTRIANS OR PART OF THE URBAN STREETSCAPES - ALLEYS, INCIDENTAL PATHS, HIGH VEHICULAR TRAFFIC AREAS

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SHEET TITLE:

CONCEPTUAL LIGHTING PLAN

SHEET NUMBER:

22

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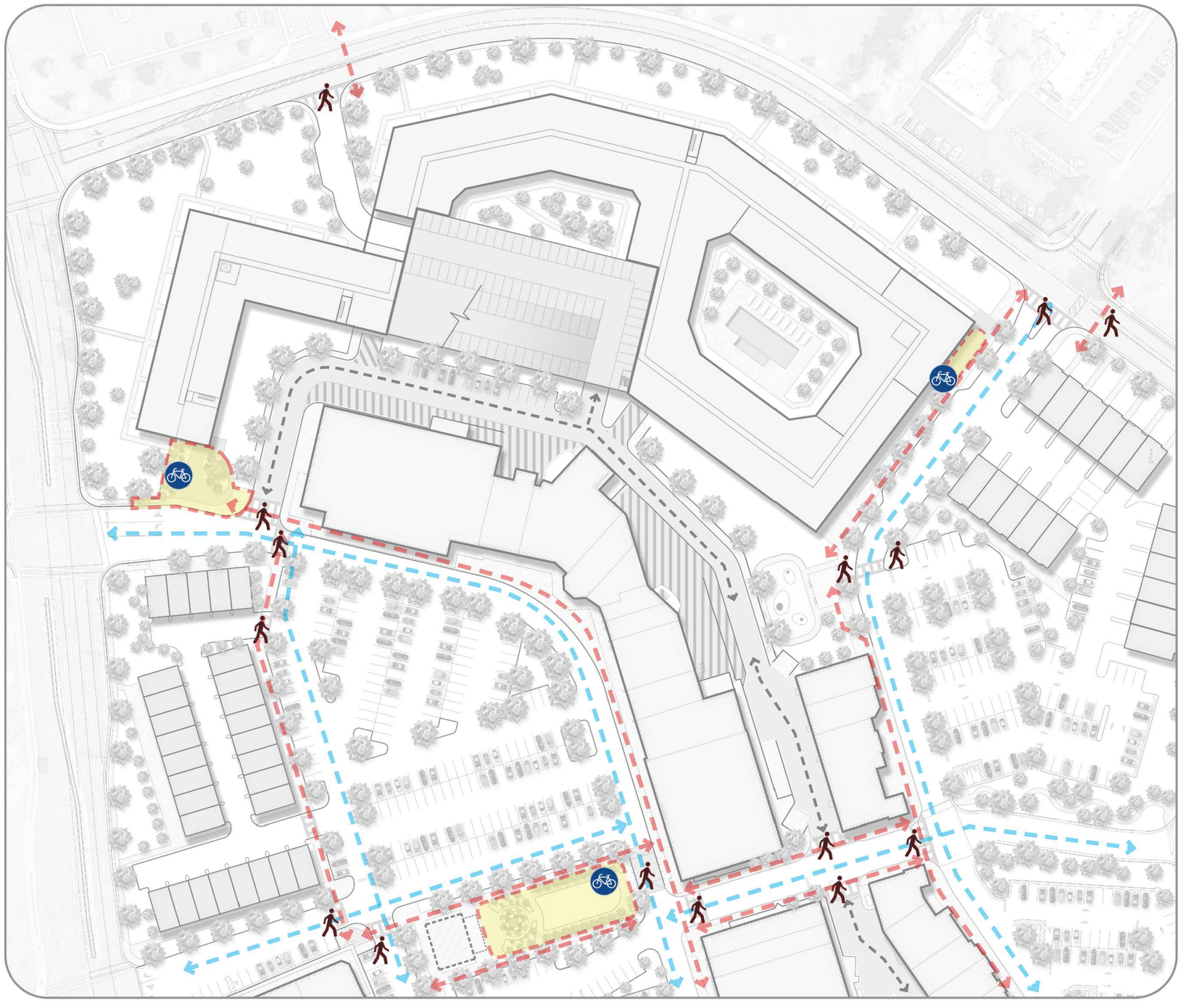

LEGEND

PLAZA / COMMUNITY AREAS

THESE COLORED REGIONS REPRESENT THE PUBLIC PLAZAS IN THE PROJECT ANCHORING BOTH RETAIL AS WELL AS RESIDENTIAL PROGRAMS.

PEDESTRIAN CIRCULATION

THIS DENOTES SOME OF THE MAJOR PEDESTRIAN CIRCULATION ROUTES WITHIN THE CENTER EFFECTIVELY CONNECTING THE NEW RESIDENTIAL PROGRAMS WITH THE EXISTING RETAIL CENTER AND COMMUNITY SPACES/ PLAZAS WITHIN THE PROJECT. CIRCULATION PATHS WILL CONSIST OF MINIMUM 5' WIDTH SIDEWALK AS REQUIRED BY ARTICLE 9-25.1 SUBSECTION G OF THE ZONING CODE.

BICYCLE AND VEHICULAR CIRCULATION

SHARED CIRCULATION CORRIDORS WITHIN THE PROJECT ON CONNECTOR STREETS - EXISTING AND PROPOSED, AS WELL AS PARKING LOTS, ALL CHARACTERISED BY LOW SPEED LIMITS. REDUCED DRIVE WIDTHS AND RAISED CROSSWALKS IN SELECTED AREAS WILL PROVIDE NECESSARY TRAFFIC CALMING AND A DETERRENT TO UNSAFE DRIVING.

SERVICE AND SECONDARY GARAGE CIRCULATION

PRIMARY USE FOR THIS CORRIDOR IS LOADING AND TRASH PICKUP FOR BOTH THE RETAIL AND RESIDENTIAL IN THE PROJECT ALONG WITH SECONDARY GARAGE ACCESS FOR BLOCK 1 - MULTIFAMILY BUILDING.

BIKE PARKING AREAS

BIKE PARKING WILL BE CLUSTERED WITHIN THE CENTRAL, EAST AND WEST PLAZAS FOR USE BY RESIDENTS OR VISITING MEMBERS OF THE COMMUNITY. ADDITIONAL BIKE PARKIING WILL BE DISPERSED ALONG THE RETAIL SIDEWALK FOR USE BY RETAIL CUSTOMERS.

CROSSWALKS

PROPOSED CROSSWALKS PROVIDE ACCESSIBLE MEANS OF CROSSING THE STREET/ALLEYS AS PEDESTRIANS MAKE THEIR WAY BETWEEN THE RESIDENTIAL AND THE RETAIL.

CONCEPTUAL CIRCULATION PLAN

SCALE 1"=50'-0"

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CONCEPTUAL CIRCULATION PLAN

SHEET NUMBER:

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VIEW OF NEW ENTRANCE ACROSS FROM HASTINGS LANE LOOKING AT BLOCK 1 AND BLOCK 2

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VIEW ALONG BLOCK 1 MULTIFAMILY APARTMENT BUILDING LOOKING TOWARDS BLOCK 3 TOWNHOMES

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2/14/2024
PROFESSIONAL ENGINEER

SHEET TITLE:

RENDERING

SHEET NUMBER:

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REVISION 2 - 2/14/2024

VIEW ALONG BLOCK 3 SIDEWALK LOOKING TOWARDS THE EXISTING RETAIL

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CENTER DISTRICT
TOWN OF WARRENTON, VIRGINIA

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WARRENTON, VIRGINIA 20186
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COMMONWEALTH OF VIRGINIA
JOHN C. WRIGHT
Lic. No. 046960
2/14/2024
PROFESSIONAL ENGINEER

SHEET TITLE:

RENDERING

SHEET NUMBER:
26

REVISION 2 - 2/14/2024

Feb 14, 2024
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AERIAL VIEW OF CENTRAL PLAZA STRETCHING BETWEEN THE RETAIL

mv+a FEBRUARY 14, 2024

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PROJECT No.:	V212141
DRAWN BY:	DSH
CHECKED BY:	JCW
DATE:	7/8/2022
CAD I.D.:	SUPP -2

PROJECT:

SPECIAL USE PERMIT

FOR

WARRENTON VILLAGE CENTER

PROPOSED DEVELOPMENT

OAK SPRINGS DRIVE
CENTER DISTRICT
TOWN OF WARRENTON, VIRGINIA

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27

REVISION 2 - 2/14/2024

AERIAL VIEW OF CENTRAL PLAZA STRETCHING ACROSS THE RETAIL

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REVISION 2 - 2/14/2024

EYE LEVEL VIEW OF CENTRAL PLAZA STRETCHING ACROSS THE RETAIL

mv+a

FEBRUARY 14, 2024

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REVISION 2 - 2/14/2024

EYE LEVEL VIEW FROM CENTRAL PLAZA GREEN LOOKING TOWARDS RETAIL AND RESIDENTIAL

mv+a FEBRUARY 14, 2024

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REVISION 2 - 2/14/2024

EYE LEVEL VIEW OF CONNECTION BETWEEN THE RETAIL AND CENTRAL PLAZA

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REVISION 2 - 2/14/2024

EYE LEVEL VIEW OF CENTRAL PLAZA AS APPROACHED FROM THE RETAIL

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REVISION 2 - 2/14/2024

VIEW FROM INTERSECTION OF BROADVIEW AVENUE AND EXISTING ENTRANCE

mv+a FEBRUARY 14, 2024

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REVISION 2 - 2/14/2024

VIEW FROM HASTINGS LANE LOOKING OUT TOWARD OAK SPRINGS

mv+a FEBRUARY 14, 2024

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REVISION 2 - 2/14/2024

VIEW FROM EXISTING DRIVE LOOKING OUT TO BROADVIEW AVENUE

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REVISION 2 - 2/14/2024

VIEW FROM INTERSECTION OF OAK SPRINGS AND BROADVIEW AVENUE

mv+a FEBRUARY 14, 2024

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WARRENTON VILLAGE CENTER

DESIGN STORY

WARRENTON, VIRGINIA | FEBRUARY 14, 2024

NEWCASTLE DEVELOPMENT GROUP

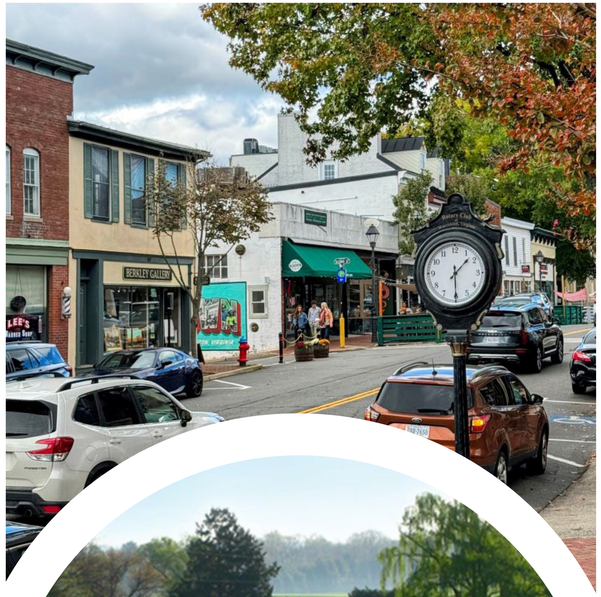
DYNAMIK INTERIORS DYNAMIK DESIG

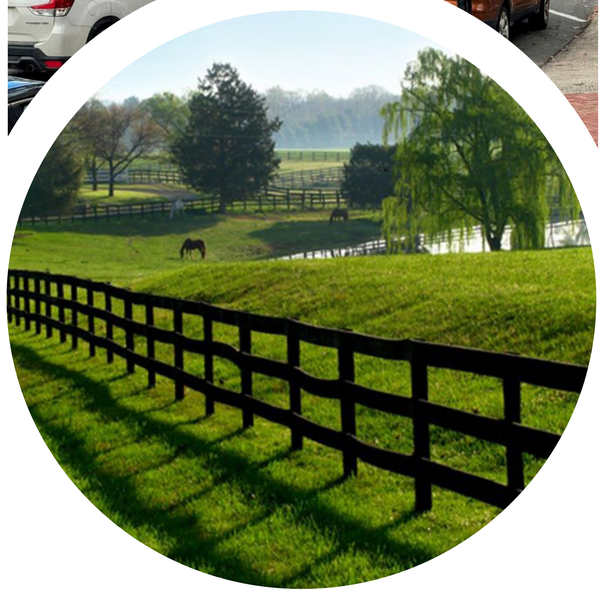
DESIGN OBJECTIVE

To transform the existing Warrenton Village retail center into a thriving, walkable, mixed-use, community destination with a sense of place that celebrates the character of Warrenton, while introducing a new, fresh, modern aesthetic.

DESIGN IMPLEMENTATION

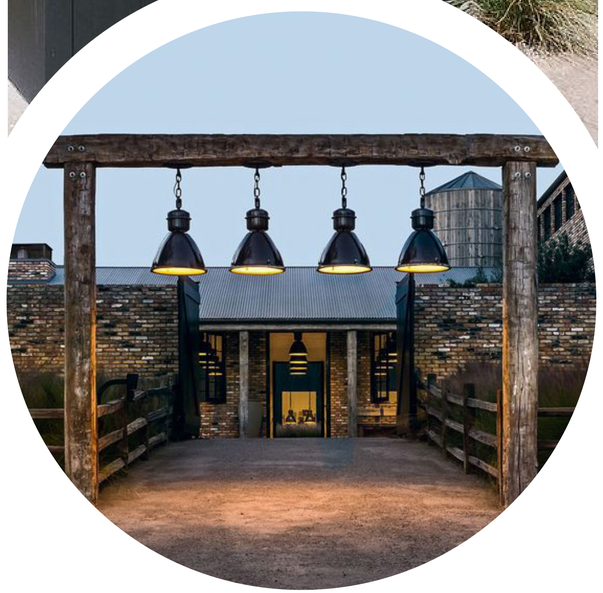
- Purposeful integration of new buildings to create a Live/Work/Play community in line with the goals of the 2040 Warrenton Plan.
- Revitalization of the existing retail with new public gathering spaces, pedestrian connectivity, reduced vehicles speeds, a new Central Plaza for village events, enhanced green spaces, and activated streetscapes.
- Fusion of a new contemporary aesthetic with the warmth of local and historical design influences.

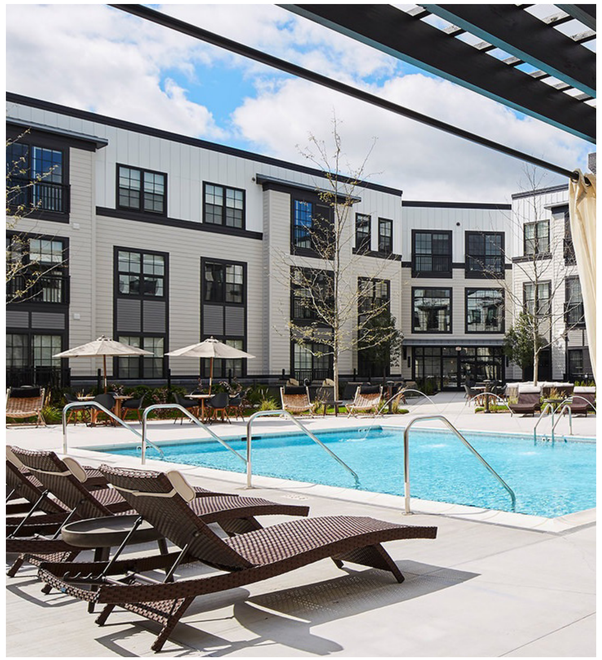




WARRENTON CONTEXT

- Historical downtown Warrenton provides inspiration with its textures of brick and stone, dark metal accents and awnings, historical lighting fixtures, traditional lap siding, classic masonry banding and detailing, large windows with dark mullions, and pedestrian friendly streetscapes.
- The greater Warrenton area has deep equine and agricultural industry roots, featuring iconic horse farms and celebrated bucolic landscapes. Inspirations include classic equestrian design features, rich colors and textures, dark metal accents, warm woods, and farmhouse inspired lap siding and stone.





DESIGN APPLICATION

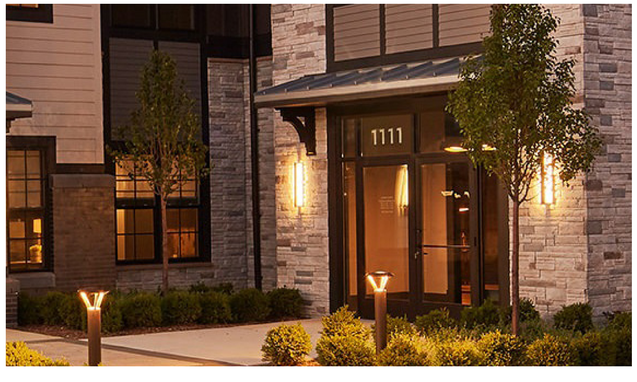
Warrenton's past becomes Warrenton's future. The rich palette of historic materials, textures, and architectural details are reclaimed with a fresh perspective and contemporary context.

RESIDENTIAL DESIGN

The three and four story massing of the residential development is designed to emulate the scale of a walkable town center. A clean, light modern aesthetic is grounded with rich masonry and architectural detailing. The street level is activated with resident access, generous sidewalks and rich landscaping. The articulated façade and generous fenestration break down the scale of the buildings and create visual interest for pedestrians.

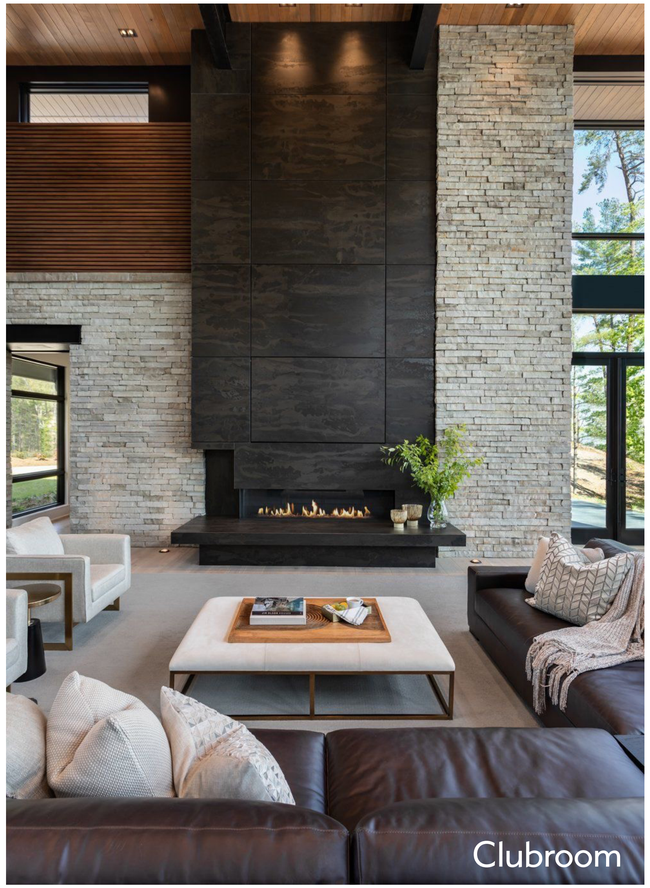
MATERIALS

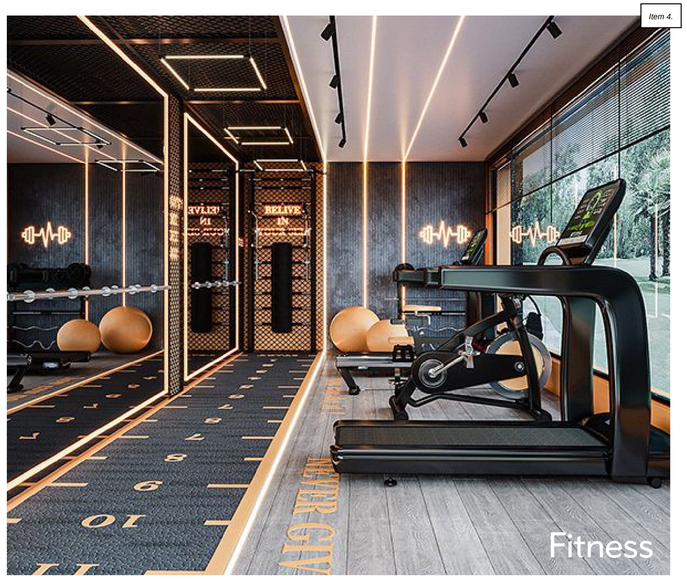
- Stacked stone
- Masonry with banding and detailing
- Exterior reveal panel system
- Classic lap siding
- Brick masonry with contemporary color palette
- Wood tones to infuse warmth

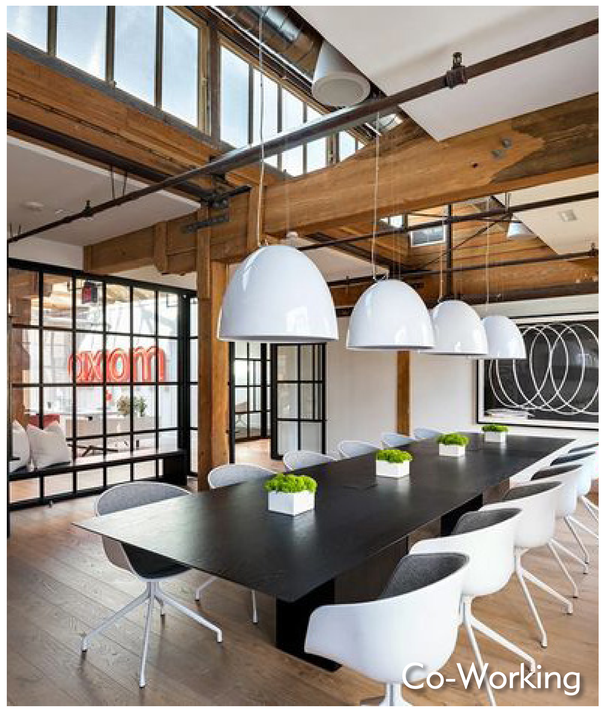


ACCENT FEATURES & STREETSCAPE

- Metal accents & awnings
- Equestrian inspired light fixtures
- Large windows with dark mullions and lintels
- Architectural detailing to provide visual interest at pedestrian level
- Residential street level entries activating the sidewalk
- Pedestrian Connectivity
- Walkable Environment

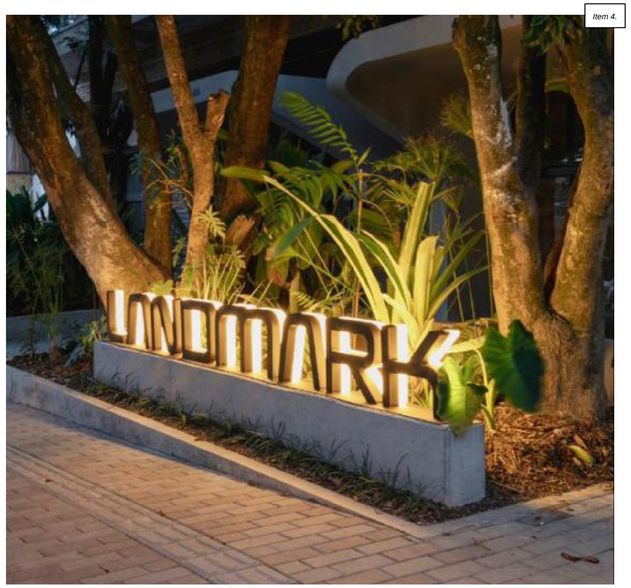






INTERIOR DESIGN CONCEPT

Urban Farmhouse aesthetic blends classic, timeless materials and natural textures with crisp, clean lines, neutral color palettes and light, open spaces. Old is blended with the new to provide spaces that are comfortable and approachable with a nod toward the trends of tomorrow.



SIGNAGE

Signage and wayfinding are designed to combine key historical elements or notable community themes with clean, sophisticated materials, fonts and applications, bridging the old and the new.

Comprehensive Plan Future Land Use Analysis

Plan Warrenton 2040 labels this parcel in the Future Land Use Map within the New Town Character District. The New Town designation notes the district "will support the revitalization of the commercial shopping malls with a walkable development pattern that includes a mix of uses." Plan Warrenton also includes the following applicable goals:

Transportation and Circulation Goals

T-1: Improve multi-modal capacity and safety that encourages trips by walking, bicycling, and transit.

T-3 Promote livability in the Town by creating great places for residents and visitors to feel welcome and safe.

Economic and Fiscal Goals

E-1 Grow a strong, diversified, and resilient economy that supports residents and businesses a like.

E-4 Support Character Districts as unique mixed-use neighborhood centers

Standard	Analysis
Whether the proposed Special Use Permit is consistent with the Comprehensive Plan.	The Applicant's proposal has been designed to advance the general goals of the Plan and the specific goals set forth for the New Town Character District, which is identified as "a location for signature office/jobs center; with greater intensity of mixed use and strong live, work and play options. A mix of uses cold be organized around an internal street network and public amenities, such as civic spaces, parks, green spaces and public gathering areas."
The compatibility of the proposed use with other existing or proposed uses in the neighborhood, and adjacent parcels.	The proposed development is surrounded by a mix of commercial, education and residential: • To the north, across Oak Springs Drive, is Highland Private School, Brookside Rehab and Nursing Center and the Cedars of Warrenton town home community. • To the east, across Branch Drive, is Safeway and other commercial businesses included within Warrenton Village Center.

	• To the south is Warrenton Village Center. • To the west, across Broadview Avenue, are standalone commercial and office uses. The proposal is compatible with these uses and proposed uses and the goals of the Comprehensive Plan.

Zoning Analysis

The legislative intent of the Commercial District is to simultaneously encourage appropriate and timely land development while assuring suitable design by prohibiting uses that would create undue impacts on the surrounding residential areas.

Standard	Analysis
The level and impact of any noise emanating from the site, including that generated by the proposed use, in relation to the uses in the immediate area.	The proposed use is a mixed-residential and retail. All non-residential uses must meet the noise standards under Article 9-14.2.
The proposed location, lighting and type of signs in relation to the proposed use, uses in the area, and the sign requirements of this Ordinance.	All signage shall be permitted in accordance with the Plan as shown and shall comply with any Zoning Ordinance regulations at that time.
The location and area footprint with dimensions (all drawn to scale), nature and height of existing or proposed buildings, structures, walls, and fences on the site and in the neighborhood.	The Applicant is seeking a minor modification to the height because it is located between Lee Highway, which allows up to six (6) stories, and Oak Springs Drive which allows up to three (3) stories. The goal of the height recommendations of Plan Warrenton 2040 is to step down towards residential zones. The proposal will achieve this goal in the Transition Zone along Oak Springs Drive. Though a fourth story is proposed by the Applicant for the apartment units, it maintains a step down in scale from the six stories permitted along Lee Highway.

	Additionally, stepping down from six stories to four stories is a more gradual approach and a better design aesthetic than the stark hierarchal contrast of a dramatic drop from six stories down to three stories. From a visual perspective along Oak Springs Drive, maintaining three stories would mean that the structures behind the residential buildings could be twice their size or more with bonus height.
The nature and extent of existing or proposed landscaping, screening and buffering on the site and in the neighborhood.	Applicant acknowledges that landscaping must meet Zoning Ordinance requirements and will be reviewed as part of the Site Development Plan.
The timing and phasing of the proposed development and the duration of the proposed use.	There is no phasing proposed.
Whether the proposed Special Use Permit at the specified location will contribute to or promote the welfare or convenience of the public.	The mixed-use development will promote the welfare of the public by reducing housing costs for renters and promoting a healthier lifestyle be encouraging outdoor activity.
Whether, in the case of existing structures proposed to be converted to uses requiring a Special Use Permit, the structures meet all code requirements of the Town of Warrenton.	No existing structures are being converted
The location, character, and size of any outdoor storage.	No outdoor storage is proposed.
The location of any major floodplain and steep slopes.	Where applicable, all paving that may interact with major floodplains or steep slopes will be done with strict compliance to the flood-proofing and related provisions contained in the Virginia Uniform Statewide Building Code and all other applicable codes and ordinances.
The location and use of any existing non-conforming uses and structures.	There are no non-conforming structures or uses on the site.
The location and type of any fuel and fuel storage.	No fuel storage areas are noted on site.

The location and use of any anticipated accessory uses and structures.	Where applicable, all accessory structure will comply with local codes and ordinances.
The area of each proposed use.	Unique housing types are proposed within each block: Block 1: multi-family Block 2: 2-over-2s Block 3: townhomes
The location and screening of parking and loading spaces and/or areas.	The Subject Parcel shall meet all parking requirements as outlines in Article 7. Should it be desired to expand the use in any of the buildings located on the Subject Property, the new proposed use shall be required to apply for approvals that meet Zoning Ordinance and additional parking requirements.
The location and nature of any proposed security features and provisions.	Not applicable.
Any anticipated odors which may be generated by uses on site.	The site must remain in compliance with Article 9-14.5 regarding the control of odors
Refuse and service areas.	The Applicant shall maintain Warrenton Village Mixed Use Center in a clean and orderly manner and shall arrange for the pickup of trash, litter and debris on a daily basis through a private refuse collection company. Additionally, trash pickup will be scheduled through the Town of Warrenton's Public Work's & Utilities – Refuse Collection.
Whether the proposed Special Use Permit will result in the preservation or destruction, loss or damage of any significant topographic or physical, natural, scenic, archaeological or historic feature.	No significant or topographic areas are located on site.
The effect of the proposed Special Use Permit on environmentally sensitive land or natural features, wildlife habitat and vegetation, water quality and air quality.	Except where given exceptions by the Special Use Permit, the proposal will comply with any federal, state, or local codes and ordinances regarding wildlife habitats, sensitive land or natural features, vegetation, water quality, and air quality.

The glare or light that may be generated by the proposed use in relation to uses in the immediate area.	A concept lighting plan has been provided. Fixture details/cut-sheets and new structures will be required to be provided and reviewed as part of the Site Development Plan submission.

Transportation and Circulation Analysis

The primary transportation and circulation goal for the Town of Warrenton is to "Promote livability in the Town by integrating multi-modal, interconnected transportation solutions with land use development in each mixed-use Character District and applying traffic calming techniques that foster and protect non-vehicular street activities in established residential neighborhoods." The Transportation and Circulation section of the Comprehensive Plan sets out policies and objectives that work to further this goal. The section includes recommendations addressing improvements for pedestrian use, new street connections, parking and sidewalks, trails, cost sharing, traffic calming techniques, safety, and signage.

Standard	Analysis
The traffic expected to be generated by the proposed use, the adequacy of access roads and the vehicular and pedestrian circulation elements (on and off-site) of the proposed use, all in relation to the public's interest in pedestrian and vehicular safety, efficient traffic movement and access in case of fire or catastrophe.	Mixed-use development of the property will assist in vehicular safety by reducing the amount that residents are required to drive; Additionally, no vehicles associated with the use shall obstruct the travel ways, fire lanes, adjoining road network or encroach upon landscaped areas as shown on the Special Use Permit Plan. No vehicles shall be located within site entranceways or otherwise impede ingress, egress, and internal circulation. Finally, access to the site is adequate as shown in site plan.
Whether the proposed use will facilitate orderly and safe road development and transportation.	

Community Facilities and Services Analysis

Public community facilities in the Town are provided by the Town, Fauquier County, and other public groups for the benefit of all residents. The availability and quality of these facilities, that include, schools, libraries, hospitals, parks, police and fire and rescue services, are evaluated when people are considering moving into the Town or nearby area. The provision of these facilities adds to the desirability of living in the Town. The Comprehensive Plan's primary community facilities and services goals for the Town of Warrenton are:

1. *Foster high-quality, equitable, and accessible community facilities that meet the Town's service requirements and support a high quality of life for the community.*

2. *Make responsible and strategic community facility investments that support the Town's vision for a live/work community, sustaining its fiscal well-being and economic resiliency.*

3. *Promote sustainability in all Town-owned facilities.*

4. *Reinforce the role of County community facilities into the Town fabric.*

5. *Promote livability through properly located Town services, schools, libraries, courts, and County administrative functions.*

6. *Support the connection of residential dwellings to public water and sewer.*

7. *Provide a high quality of life to capture economic benefits through diverse businesses, employers, and residences.*

Public services are essential to the community structure and quality of life, as well as to long-term economic vitality. They support existing and planned developments and contribute to the health, safety, education and general welfare of Warrenton residents.

Standard	Analysis
Whether the proposed Special Use Permit will be served adequately by essential public facilities, services and utilities.	The Subject Parcels shall be served by public water and sewer. The Property Owner is responsible for all improvements required in order to meet the demand of the Subject Uses associated with the Property.
The location of any existing and/or proposed adequate on and off-site infrastructure.	

Economic Resources Analysis

An economic goal of Plan Warrenton 2040 is to promote a diverse, equitable stable tax base while preserving the character of the community.

Standard	Analysis
Whether the proposed Special Use Permit use will provide desirable employment and enlarge the tax base by encouraging economic development activities consistent with the Comprehensive Plan.	Residential use will enlarge the tax base by providing increases in property taxes and increasing the local population, allowing more money to be spent at local businesses. Additional retail space will also create new

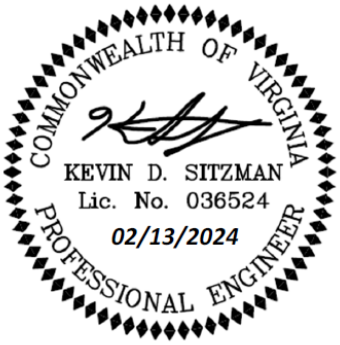
	employment opportunities for the residents of Warrenton.
The number of employees.	No changes anticipated by applicant.
The proposed day/hours of operation.	For residential use, not applicable. For retail use, this would be subject to final decisions from the retailers.

Traffic Impact Analysis

Warrenton Village Center

Town of Warrenton, Virginia

June 30, 2023
Revised February 13, 2024



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Transportation Planners and Engineers

Prepared by:

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Executive Summary

This report presents the findings of a Traffic Impact Analysis (TIA) conducted for the proposed Warrenton Village Center development (the Site / the Development / the Property) situated in the Town of Warrenton, Virginia.

This study was developed in accordance with the Virginia Department of Transportation (VDOT) and the Town of Warrenton (the Town) transportation impact analysis guidelines. The document was prepared in accordance with best professional practices and standards that assess the impact of a proposed development on the transportation system. Traffic operational analyses, as presented in this TIA, involve the evaluation of anticipated roadway conditions with and without the proposed development. The analysis assists public officials and developers to balance the interrelations between efficient traffic movements with necessary lane access. This revised TIA is based on review comments provided by VDOT and the Town.

Site Location and Study Area

The proposed development will be located primarily along the southern frontage of Oak Springs Drive (Town Route 3), east of Broadview Avenue (US Route 17 Business) and west of Branch Drive (Town Route 4) in the Town of Warrenton, Virginia. The vehicular study area includes ten existing intersections along Broadview Avenue, Lee Highway, Branch Drive, and Oak Springs Drive.

Description of Proposed Development

The development will be situated on a single parcel of vacant land (approximately 6.46 acres) and a portion of an adjacent developed parcel of land, which can be identified on Fauquier County Tax Maps with the following GPIN #s: 6985-20-7247-000, and 6984-29-6753-000, respectively. The property is currently zoned as C (Commercial District) with a Future Land Use of Mixed Use as part of the New Town Warrenton Character District (Lee Highway Urban Development Area [UDA]).

The Applicant is proposing to apply for a Special Use Permit (SUP) in order to construct approximately 386 multifamily residential dwelling units (320 multifamily apartments, 36 2-over-2 units, and 30 townhomes) and a parking deck. The site has an anticipated build-out date of 2027.

Access to the site will be provided via one full movement parking deck entry along Oak Springs Drive (Town Route 3) forming the fourth leg of the High School Driveway, one full movement driveway along Oak Springs Drive forming the fourth leg to the existing full-movement intersection of Hastings Lane, and via the existing shopping center accesses to the south.

This report analyzes the trips generated by the Warrenton Village Center Development and its impact on traffic operations on the surrounding road network.

Principal Findings and Conclusions

Discussions regarding the study assumptions and relevant background information were held with VDOT, County, and Town staff during January 2023. The scope details the study assumptions and relevant background information discussed. A copy of the scoping document is included in Appendix A.

The analysis contained herein presents the 2023 Existing Conditions, 2027 Future Conditions without Development, and 2027 Future Conditions with Development:

The analysis presented in this report supports the following assumptions and major findings:

Analysis Components

- 2023 existing volumes were derived via turning movement counts collected at intersections within the study area in February 2023.
- As determined based on review comments from VDOT and the Town, an inherent regional growth of 1.0% per year was applied to the Lee Highway mainline through movements at the intersection of Lee Highway at Broadview Avenue (US

Route 17 Business). The growth volumes were balanced along the road network by increasing the mainline through movements at subsequent study intersections along the road network where applicable for the period between 2023 and 2027 to account for 2027 conditions.

- The trip generation associated with the Site was based on the ITE Trip Generation Manual, 11th Edition publication. The Site in total is expected to generate approximately 154 new trips during the AM peak hour, 197 new trips during the PM peak hour, and 2,602 new daily trips on a typical weekday.
- Intersection capacity and queuing analyses were performed for all analysis scenarios at the study area intersections during the weekday morning (AM) and weekday afternoon (PM) peak hours. *Synchro*, version 11, was used to analyze the study intersections with results based on the Transportation Research Board's (TRB) Highway Capacity Manual (HCM) methodology and analysis guidelines provided in VDOT's Traffic Operations and Safety Analysis Manual (TOSAM) (version 2). The analysis herein includes level of service (LOS), delay, and queue length comparisons for the turning movements analyzed.
- The analysis also considers an assessment of historical crash data at all existing study intersections.
- The analysis also includes preliminary access management assessment and turn lane warrant assessments for the Site access points along Oak Springs Drive.

Analysis Results

2023 Existing Conditions

- Based on the capacity analysis of Existing Conditions, the two signalized study intersections operate at an overall level of service D or better during both the AM and PM peak hours.
- Based on the capacity analysis of Existing Conditions, three study intersections have at least one approach that operates at levels of service (LOS E or F) for at least one peak hour. The remaining intersection approaches operate at acceptable levels of service during both peak hours.
- Based on the analysis of the Synchro 95th percentile queue lengths, all turning movements have queue lengths that can be accommodated within the available storage length of the turn bays, except the southbound left turn movement at Study Intersection 1 (Broadview Avenue / Lee Highway at Winchester Street).

2027 Future Conditions without Development

- Based on the capacity analysis of 2027 Future Conditions with Development, the signalized study intersection would operate at an overall level of service D or better during both the AM and PM peak hours.
- The planned roundabout is expected to operate at an overall LOS B or better with all approaches operating at LOS D or better during the AM and PM peak hours.
- Based on the capacity analysis of 2027 Future Conditions without Development, two study intersections have at least one approach that would operate at levels of service (LOS E or F) for at least one peak hour. The remaining intersection approaches would operate at acceptable levels of service during both peak hours.
- Based on the analysis of the Synchro 95th percentile queue lengths, all turning movements have queue lengths that could be accommodated within the available storage length of the turn bays.

2027 Future Conditions with Development

- The Site is expected to generate approximately 154 new total trips during the AM peak hour, 197 new trips during the PM peak hour and 2,602 new trips during a typical weekday.

- Based on the capacity analysis of 2027 Future Conditions with Development, the signalized study intersection would operate at an overall level of service D or better during both the AM and PM peak hours.
- The planned roundabout is expected to operate at an overall LOS B with all approaches operating at LOS D or better during the AM and PM peak hours.
- Based on the capacity analysis of the 2027 Future Conditions with Development, two study intersections have at least one approach that would operate at levels of service (LOS E or F) for at least one peak hour (similar to 2027 Future Conditions without Development) during the AM and PM peak hours. The remaining intersection approaches would operate at acceptable levels of service during both peak hours.
- Based on the queuing analysis performed for the 2027 Future Conditions with Development, all turning movements have queue lengths that could be accommodated within the available storage length of the turn bays.

Overall Conclusion

Based on the capacity and queueing analysis results, the proposed Development will not have a substantial impact to the surrounding transportation and roadway network, assuming that the site is constructed as depicted on the concept plan. No improvements are warranted or recommend to accommodate the proposed Development.

Introduction

This report presents the findings of a Traffic Impact Analysis (TIA) conducted for the proposed Warrenton Village Center (the Site / the Development / the Property) along the southern frontage of Oak Springs Drive (Town Route 3), east of Broadview Avenue (US Route 17 Business) and west of Branch Drive (Town Route 4) in the Town of Warrenton, Virginia

The development will be situated on a single parcel of vacant land (approximately 6.46 acres) and a portion of an adjacent developed parcel of land, which can be identified on Fauquier County Tax Maps with the following GPIN #s: 6985-20-7247-000, and 6984-29-6753-000, respectively. The property is currently zoned as C (Commercial District) with a Future Land Use of Mixed Use as part of the New Town Warrenton Character District (Lee Highway Urban Development Area [UDA]).

The Applicant is proposing to apply for a Special Use Permit (SUP) in order to construct approximately 386 multifamily residential dwelling units (320 multifamily apartments, 36 2-over-2 units, and 30 townhomes) and a parking deck. The site has an anticipated build-out date of 2027.

Access to the site will be provided via one full movement parking deck entry along Oak Springs Drive (Town Route 3) forming the fourth leg of the High School Driveway, one full movement driveway along Oak Springs Drive forming the fourth leg to the existing full-movement intersection of Hastings Lane, and via the existing shopping center accesses to the south.

The following tasks were completed as part of this study effort:

- A scoping meeting was held on January 3, 2023 with the Virginia Department of Transportation (VDOT), Fauquier County (the County), and the Town of Warrenton (Town) staff to discuss the parameters of this study as well as any relevant background information. A copy of the scoping document is included in Appendix A.
- Review comments of the first TIA submission were provided and addressed in this study submission.
- Existing conditions were observed in the field to verify roadway geometry, pedestrian and bicycle infrastructure, and traffic flow characteristics.
- Signal timings were acquired from VDOT and are provided in Appendix E.
- In order to determine the weekday morning and afternoon peak hour turning movement traffic volumes, traffic counts were conducted in February 2023.
- The 2027 Future Conditions without Development scenario was projected based on the existing traffic volumes, an inherent growth to account for regional growth on the roadway network, two approved background developments, and roadway improvements.
- Proposed site traffic volumes were derived based on the methodology outlined in ITE's Trip Generation Manual, 11th Edition, publication and were assigned to the road network based on the agreed-upon direction of approach discussed during the aforementioned scoping meeting.
- The 2027 Future Conditions with Development scenario was projected based on the existing traffic volumes, regional growth, and the projected trips generated by the proposed development.
- Intersection capacity and queueing analyses were performed for the identified study intersections for the 2023 Existing Conditions, 2027 Future Conditions without Development, and 2027 Future Conditions with Development scenarios during the weekday morning (AM), and weekday afternoon (PM) peak hours.
- Intersection capacity and queuing analyses were performed using *Synchro*, version 11, with LOS and delay results based on the Transportation Research Board's (TRB) Highway Capacity Manual (HCM) 6 methodology and in following VDOT's Traffic Operations and Safety Manual (TOSAM) (version 2).
- The analysis also considers an assessment of historical crash data at all study intersections.

- The analysis also includes preliminary access management assessment and turn lane warrant assessments for the Site access points along Oak Springs Drive.
- The study also includes preliminary discussions on the pedestrian facilities in the study area.

Sources of data for this study include the Institute of Transportation Engineers (ITE), VDOT, the County, the Town and the office files and field reconnaissance efforts of Gorove Slade.

Background Information: Proposed Development (Site & Nearby)

Description of the Existing Site

Site Location

The proposed Development will be located primarily along the southern frontage of Oak Springs Drive (Town Route 3), east of Broadview Avenue (US Route 17 Business) and west of Branch Drive (Town Route 4) in the Town of Warrenton, Virginia. A description of the proposed Development is provided in the *Introduction* section of this report.

Location within Jurisdiction and Region

The Site is located generally on the northern portion of Warrenton approximately 0.5 miles from the north Town line an approximately 1 mile west of the US 17 and US 29 Business interchange. A regional aerial of the Site is provided in **Figure 1.**

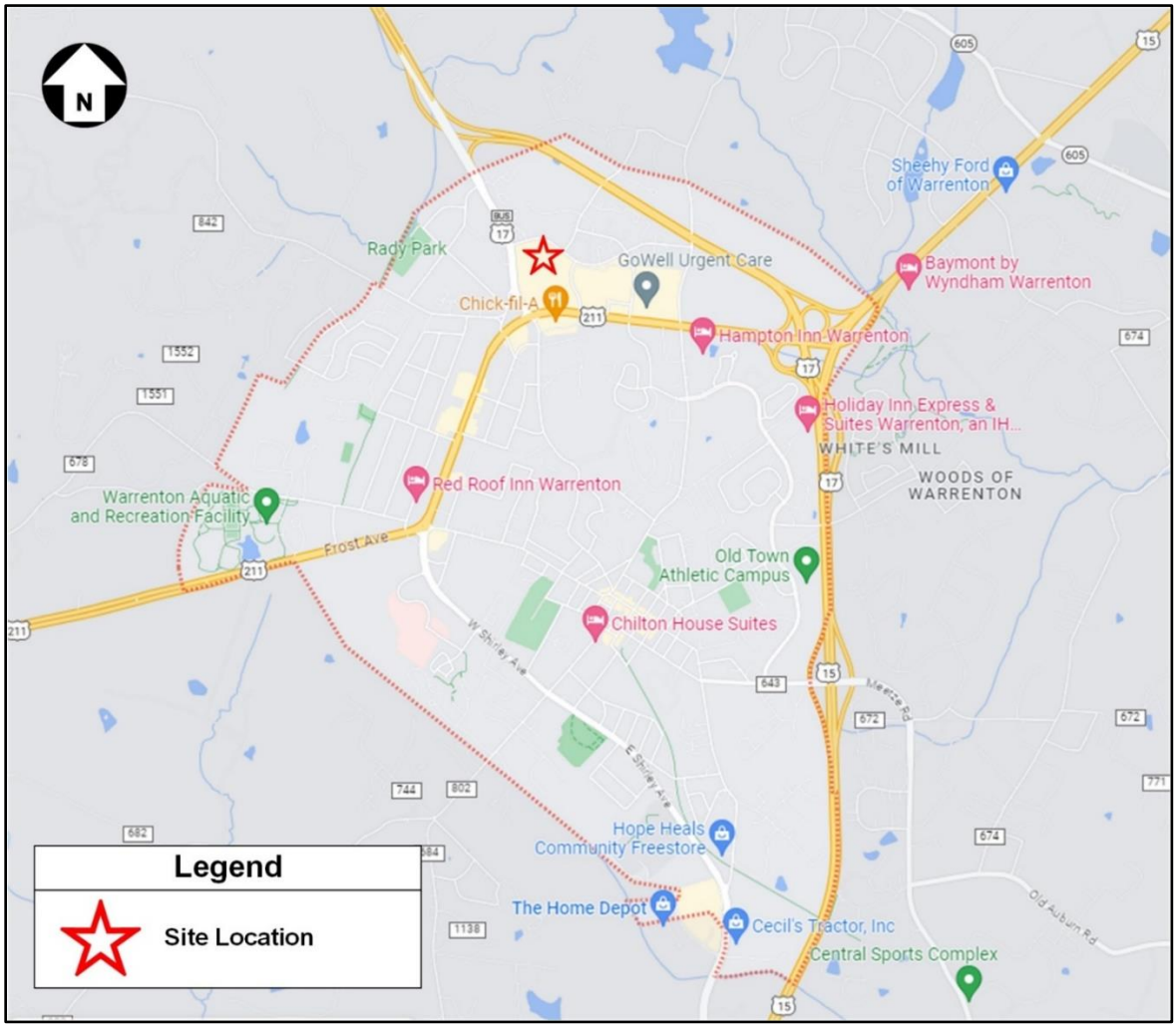


Figure 1: Regional Location

Description of the Parcel

The development will be situated on a single parcel of vacant land (approximately 6.46 acres) and a portion of an adjacent developed parcel of land, which can be identified on Fauquier County Tax Maps with the following GPIN #s: 6985-20-7247-000, and 6984-29-6753-000 as illustrated in **Figure 2.**

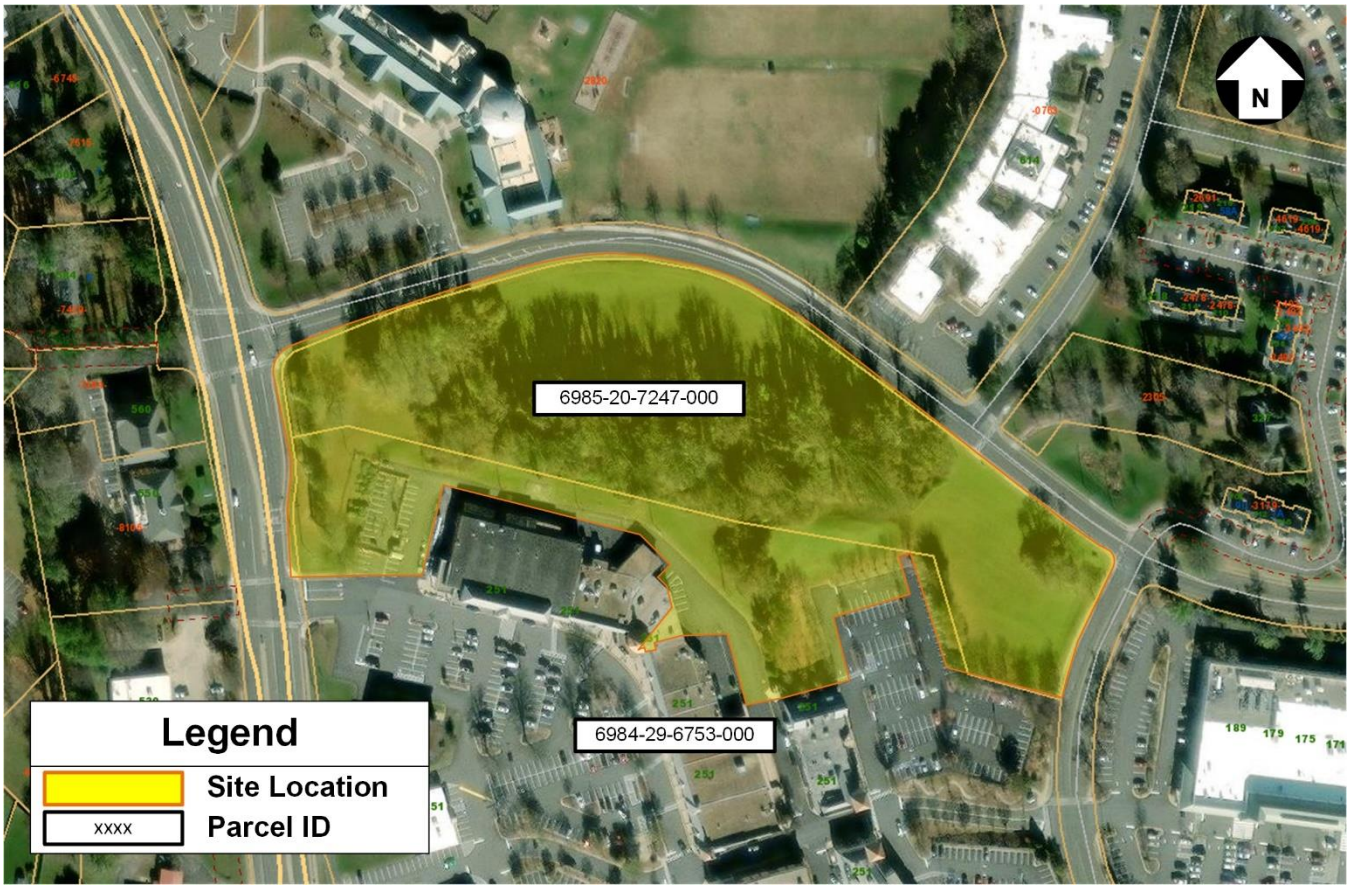


Figure 2: Parcel Map
(Source: https://fauquiergis.maps.arcgis.com/**)**

Existing Zoning and Future Land-Use

The property is currently zoned as C (Commercial District) with a Future Land Use of Mixed Use as part of the New Town Warrenton Character District (Lee Highway Urban Development Area [UDA]).

The existing zoning is presented in Error! Reference source not found.; the Town of Warrenton 2040 Comp Plan future land use is presented in **Figure 4**.

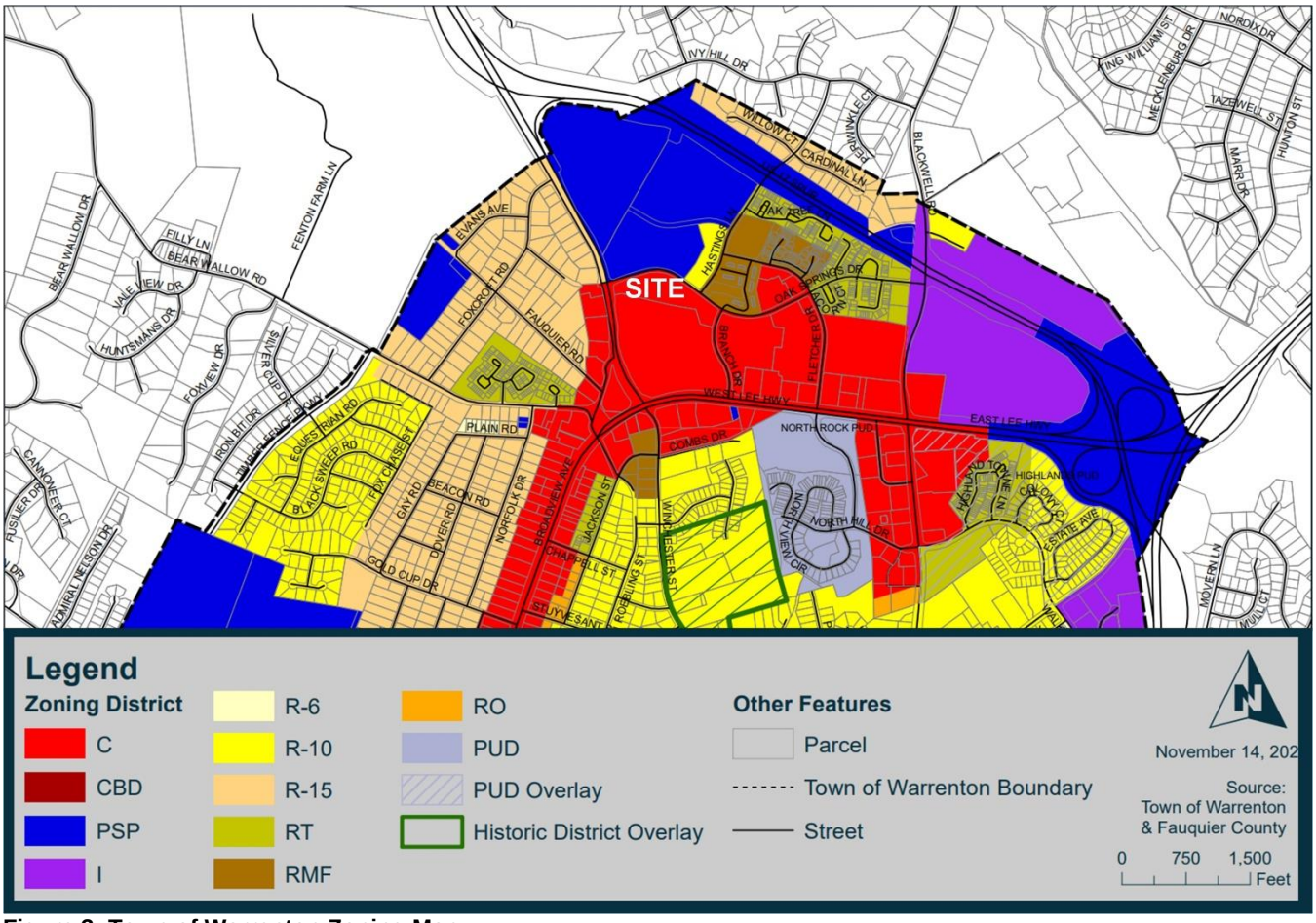


Figure 3: Town of Warrenton Zoning Map

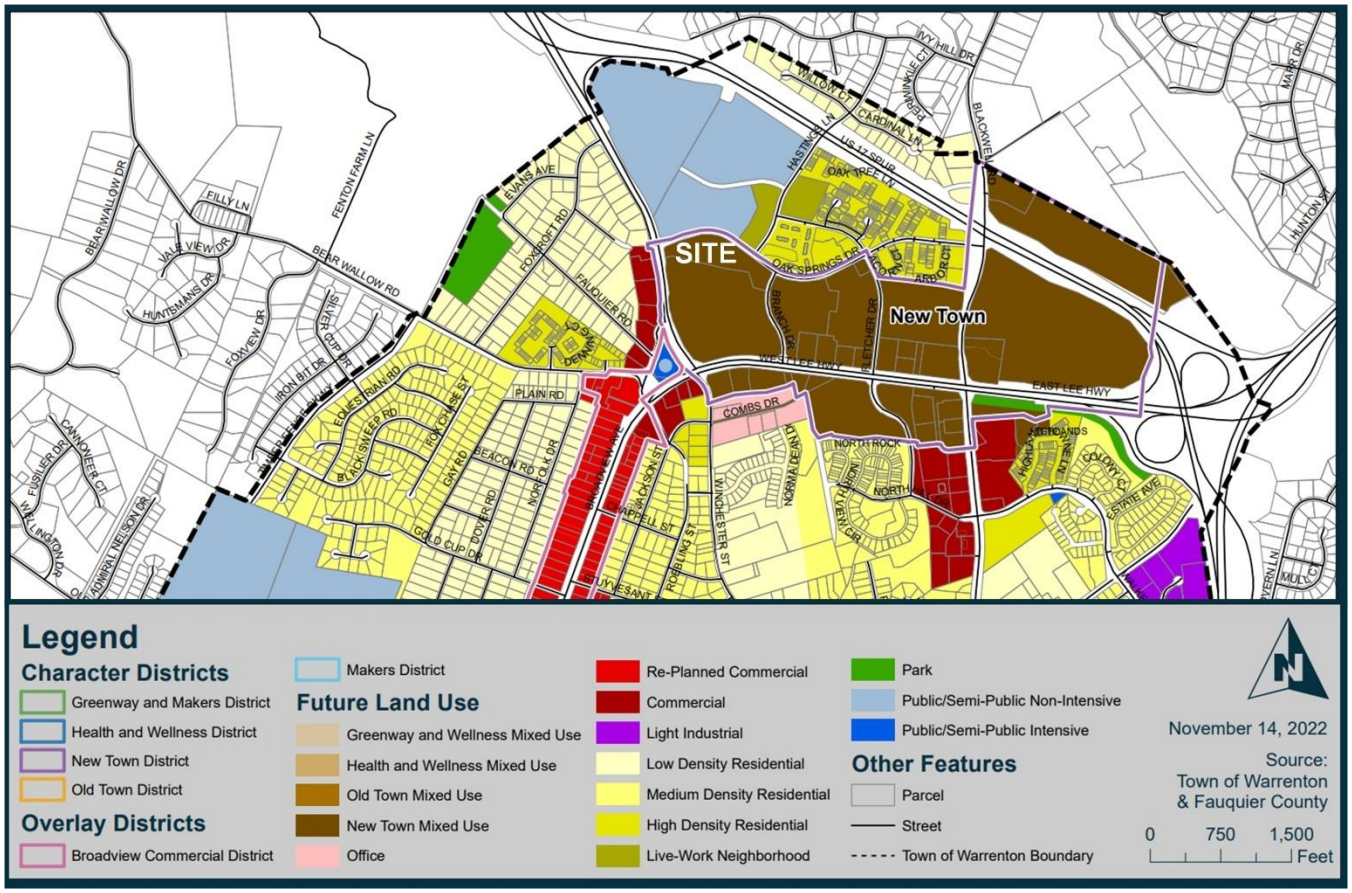


Figure 4: Town of Warrenton Future Land Use Map

Descriptions of Geographic Scope of Study and Limits of the Study Area

The geographic scope of the study area was developed in accordance with VDOT and County guidance. The vehicular study area includes ten existing study intersections. At build out of the Site, the proposed site driveways will form the fourth leg of two existing intersections.

The existing study intersections are as follows:

Intersection 1: Broadview Avenue (US Route 17) / Lee Highway at Broadview Avenue / Winchester Street [existing full-movement, signalized],

Intersection 2: Lee Highway (US Route 17) at Warrenton Village Center Driveway at Chick-fil-a Driveway [existing full-movement, unsignalized],

Intersection 3: Lee Highway (US Route 17) at Branch Drive (Town Route 4) [existing full-movement, signalized],

Intersection 4: Branch Drive (Town Route 4) at Warrenton Village Driveway / Safeway Driveway [existing full-movement, unsignalized],

Intersection 5: Oak Springs Drive (Town Route 3) at Branch Drive (Town Route 4) / Cedar Crest Drive [existing full-movement, unsignalized],

Intersection 6: Oak Springs Drive (Town Route 3) at Hastings Lane / Future Access [existing full-movement, unsignalized, future fourth leg],

Intersection 7: Oak Springs Drive (Town Route 3) at Highland School Driveway / Future Garage Access [existing full-movement, unsignalized, future fourth leg],

Intersection 8: Broadview Avenue (US Route 17 Business) at Oak Springs Drive (Town Route 3) [existing full-movement, unsignalized],

Intersection 9: Broadview Avenue (US Route 17 Business) at Warrenton Village Center South Driveway [existing full-movement, unsignalized],

Intersection 10: Broadview Avenue (US Route 17 Business) at Warrenton Village Center North Driveway [existing full-movement, unsignalized].

An aerial of the study intersections is provided in **Figure 5.**

Figure 5: Aerial of Study Boundaries (Study Intersections)

Existing Roadway Network

A description of the major roadways within the immediate vicinity of the Site is presented below in Error! Reference source not found..

Table 1: Summary of Existing Road Network

Roadway	RTE #	VDOT Classification	Legal/Design Speed Limit (mph)	Lanes	AADT (vpd)	Road Segment Between:		k-factor
Broadview Avenue	US 17 Bus	Other Principal Arterial	35	4 Div	11,000	Bus US 29 Lee Hwy	NCL Warrenton	9.7%
Oak Springs Drive	Town 3	Major Collector	25	2 Undiv	3,100	Broadview Ave	Branch Dr	10.3%
Branch Drive	Town 4	Major Collector	25	4 Undiv	4,300	Lee Highway	Oak Springs Drive	11.1%
Lee Highway	US 211/29 Bus	Other Principal Arterial	40	4 Div	26,000	US 17 Broadview	US 15 Blackwell	7.7%

Lee Highway (US Route 211/US Route 29 Business) is generally a four-lane divided Principal Arterial with a posted speed limit of 40 mph within the vicinity of the Site. The 2021 VDOT ADT on Lee Highway is 26,000 vehicles per day (vpd). For the purposes of this analysis, Lee Highway is assumed to be an east-west roadway.

Broadview Avenue (US 17 Business) is a four-lane divided Principal Arterial with a posted speed limit of 35 mph and a 2021 VDOT ADT of approximately 11,000 vpd. For the purposes of this study, Broadview Avenue is assumed to be a north-south roadway.

Branch Drive (Town Route 4) is a four-lane, undivided Major Collector with a posted speed limit of 25 mph and a 2021 VDOT ADT of approximately 4,300 vpd. For the purposes of this study, Branch Drive is assumed to be a north-south roadway.

Oak Springs Drive (Town Route 3) is a two-lane, undivided Major Collector with a posted speed limit of 25 mph and a 2021 VDOT ADT of approximately 3,100 vpd. For the purposes of this study, Oak Springs Drive is assumed to be an east-west roadway.

Analysis of 2023 Existing Conditions

Existing Roadway Safety Assessment

As agreed upon in the aforementioned scoping meeting, existing crash reports for all existing study intersections over a five-year period between May 2018 and May 2023 were provided by VDOT's Crash Analysis Tool. These reports are summarized in **Table 2** and **Table 3**.

During the five-year period, a total of 88 crashes were recorded at the ten existing study intersections as illustrated in Error! Reference source not found.. Of the 88 recorded crashes, 58 were classified as "Property Damage Only (PDO)," 30 were classified as "Injury Collision (IC), and zero fatalities occurred during the five-year period.

An aerial of the recorded crash locations is provided in **Figure 6**. The crash data by study intersection is provided in Appendix B.

The intersection crash rate was computed for the existing study intersections using the following formula and was calculated as crashes per one million entering vehicles (MEV). The approach average daily traffic volumes ($ADT_{approach}$) were derived from calculations based on the existing link ADTs.

$$Rate_{intersection} = \frac{1{,}000{,}000 * \#\ of\ Crashes}{\#\ of\ Years * 365\ \left(\frac{days}{year}\right) * ADT_{approach}}$$

It should be noted that according to the Institute of Transportation Engineers' (ITE) Transportation Impact Analysis for Site Development, a crash rate of 1.0 MEV or higher is an indication that further study may be required. A rate over 1.0 MEV does not necessarily mean there is a significant problem at an intersection, but rather it is a threshold used to identify which intersections may have an elevated crash rate due to operational, geometric, or other deficiencies. Based on the crash rates, none of the existing study intersections were considered high crash locations.

The following tables provide detailed reported crash data for all study intersections.

Table 2: Historical Crash Data Summary (May 2018 – May 2023)

	Intersection	Approximate ADT	PDO	IC	Fatality	Total	Crash Rate (Per MEV)
1	Lee Highway (US 211/US 29 BUS) at Broadview Avenue	29,125	28	12	0	40	0.75
2	Lee Highway (US 211/US 29 BUS) at Warrenton Village /	21,375	3	2	0	5	0.13
3	Lee Highway (US 211/US 29 BUS) at Branch Drive	23035	14	5	0	19	0.45
4	Branch Drive at Warrenton Village / Safeway	4485	1	1	0	2	0.24
5	Branch Drive at Oak Springs Drive	4000	2	0	0	2	0.27
6	Oak Springs Drive at Hastings Lane	No Crashes	0	0	0	0	0.00
7	Oak Springs Drive at Highland School Entrance	No Crashes	0	0	0	0	0.00
8	Broadview Avenue at Oak Springs Drive	12010	2	1	0	3	0.14
9	Broadview Avenue at Warrenton Village North	10425	2	2	0	4	0.21
10	Broadview Avenue at Warrenton Village South	13165	6	7	0	13	0.54
Total Reported Crashes Analyzed			**58**	**30**	**0**	**88**	-
Percentages			**65.9%**	**34.1%**	**0.0%**	**100.0%**	-

Based on the crash rates, none of the existing study intersections were considered high crash locations, however, Study Intersections 1 and 10 are on the Culpepper District top 100 PSI list. A pipeline study has been conducted and these locations have been identified for construction of roundabouts.

Table 3: VDOT Crash Data Summary by Type of Collision (May 2018 – May 2023)

	Intersection	Fixed Object/Single Vehicle	Head-on	Sideswipe (Same Direction)	Sideswipe (Opposite Direction)	Rear End	Angle	Backing	Pedestrian	Animal	Other	Total
1	Lee Highway (US 211/US 29 BUS) at Broadview Avenue	0	0	3	0	24	11	0	0	0	2	40
2	Lee Highway (US 211/29 BUS) at Warrenton Village /	2	0	0	0	1	2	0	0	0	0	5
3	Lee Highway (US 211/29 BUS) at Branch Drive	1	0	1	1	6	8	1	0	0	1	19
4	Branch Drive at Warrenton Village / Safeway	0	0	0	0	0	2	0	0	0	0	2
5	Branch Drive at Oak Springs Drive	0	0	0	0	0	2	0	0	0	0	2
6	Oak Springs Drive at Hastings Lane	0	0	0	0	0	0	0	0	0	0	0
7	Oak Springs Drive at Highland School Entrance	0	0	0	0	0	0	0	0	0	0	0
8	Broadview Avenue at Oak Springs Drive	0	0	0	0	0	3	0	0	0	0	3
9	Broadview Avenue at Warrenton Village North	0	0	0	0	0	3	0	0	1	0	4
10	Broadview Avenue at Warrenton Village South	0	3	1	0	1	7	0	0	0	1	13
Total Reported Crashes Analyzed		**3**	**3**	**5**	**1**	**32**	**38**	**1**	**0**	**1**	**4**	**88**
Percentages		**3.4%**	**3.4%**	**5.7%**	**1.1%**	**36.4%**	**43.2%**	**1.1%**	**0.0%**	**1.1%**	**4.5%**	**100.0%**

Approximately 43% of the crashes that occurred were classified as angle collisions and approximately 36% were classified as rear end collisions. Rear end and angle collisions are common at congested signalized intersections. Study Intersection 1 has been identified as a location for a potential roundabout.

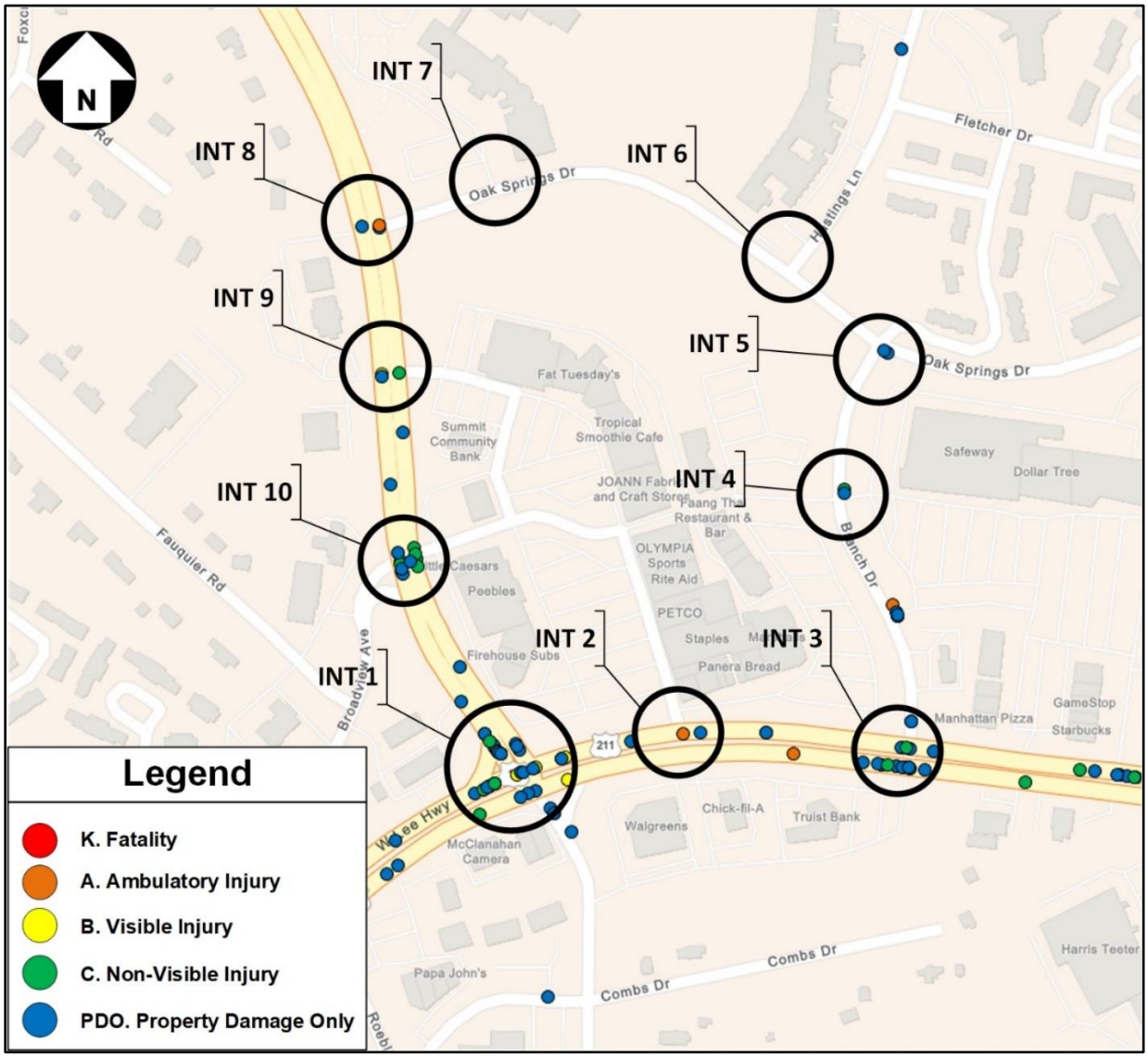


Figure 6: Recorded Crash Location Map

2023 Existing Traffic Volumes

In order to determine the weekday morning (AM) and weekday afternoon (PM) peak hour turning movement traffic volumes, turning movement counts (TMC) were collected at the study intersections in February 2023. The referenced weekday turning movement counts were collected from the hours of 6:00 AM to 9:00 AM and 4:00 PM to 7:00 PM:

- Study Intersection 1: Lee Highway (US 211/US 29 BUS) at Broadview Avenue (US 17 BUS)
- Study Intersection 2: Lee Highway (US 211/US 29 BUS) at Warrenton Village / Chick-fil-a Driveway
- Study Intersection 3: Lee Highway (US 211/US 29 BUS) at Branch Drive
- Study Intersection 4: Branch Drive at Warrenton Village / Safeway
- Study Intersection 5: Branch Drive at Oak Springs Drive
- Study Intersection 6: Oak Springs Drive at Hastings Lane
- Study Intersection 7: Oak Springs Drive at Highland School Entrance
- Study Intersection 8: Broadview Avenue at Oak Springs Drive
- Study Intersection 9: Broadview Avenue at Warrenton Village North
- Study Intersection 10: Broadview Avenue at Warrenton Village South

- From the turning movement counts, the following system peak hours were determined.
  - AM Peak Hour: 7:30 AM to 8:30 AM
  - PM Peak Hour: 4:00 PM to 5:00 PM

The 2023 existing road network configuration is presented in **Figure 7**. The existing AM and PM peak hour traffic volumes for the existing study intersections are shown in **Figure 8**. The ADT volumes, depicted in **Figure 8** and in subsequent volume graphics, were calculated based on VDOT published k-factors from 2021, if available, or assumed k-factors per approach of 0.10 and the PM peak hour volumes. The raw existing traffic count data is provided in Appendix C.

In addition to turning movement volumes, pedestrians crossing data was collected at all study intersections. The peak hour pedestrian crossing data is presented in **Figure 9**.

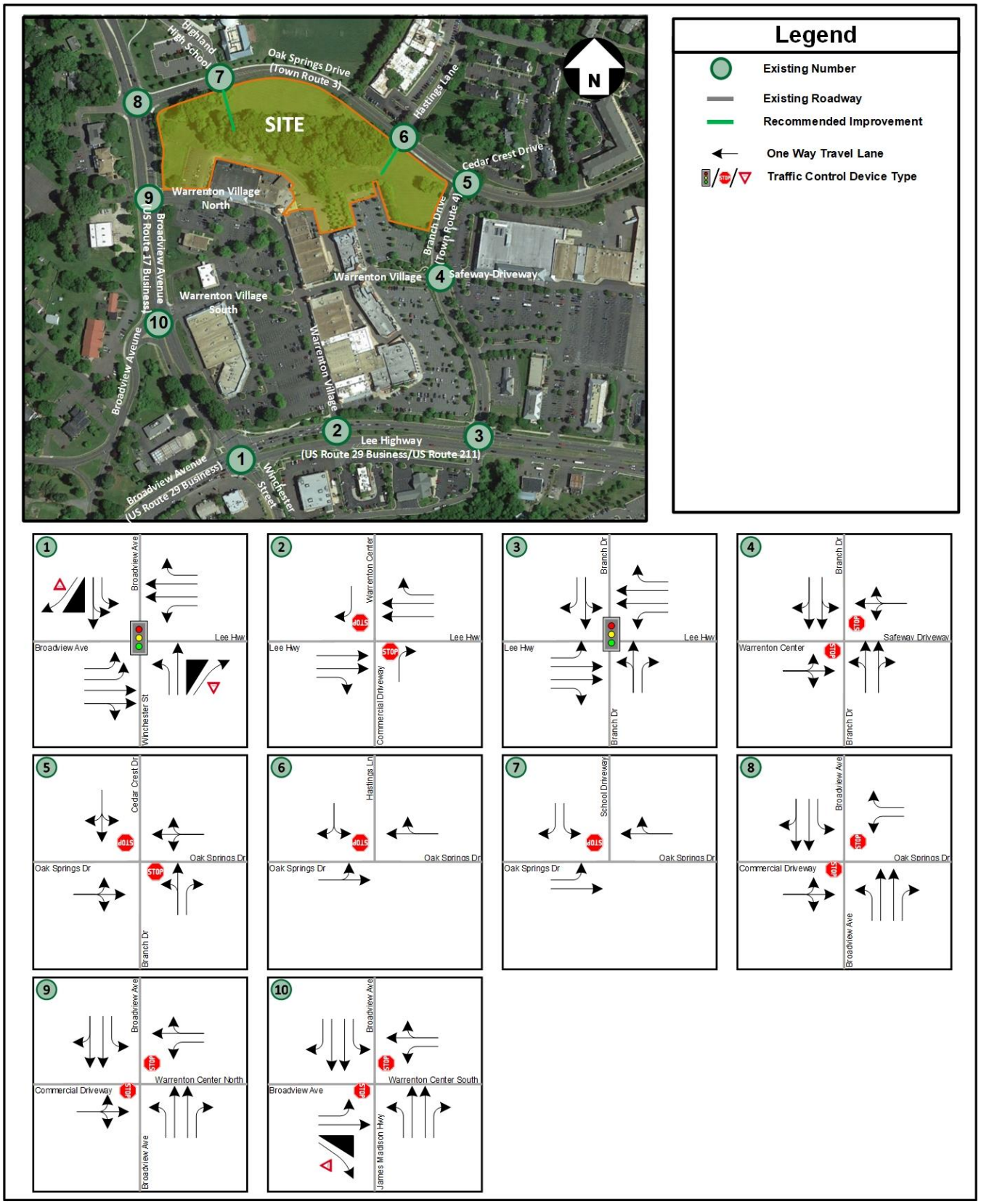


Figure 7: 2023 Existing Conditions – Roadway Network Geometric Configuration and Traffic Control Devices

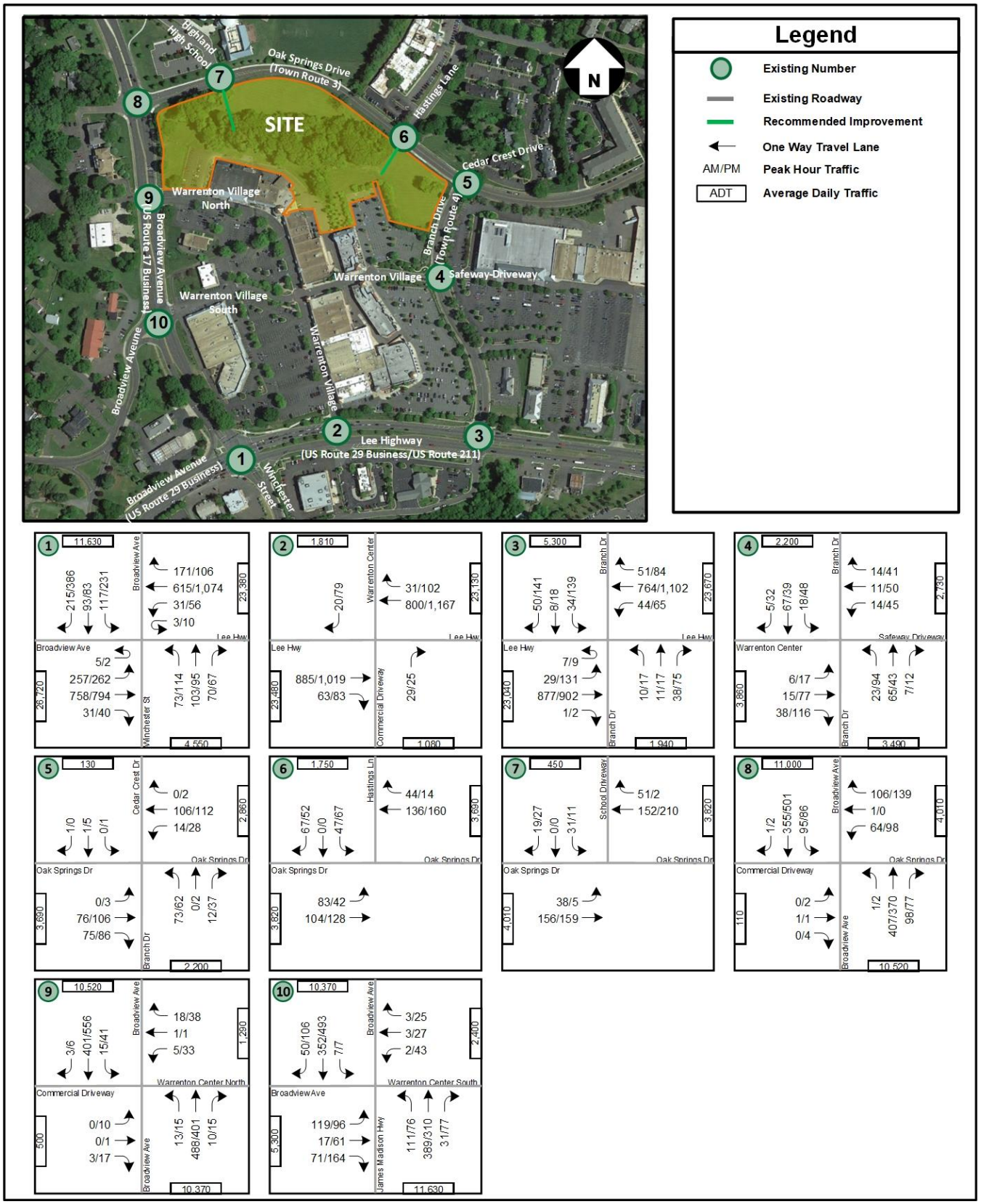


Figure 8: 2023 Existing Conditions – Vehicular Traffic Volumes

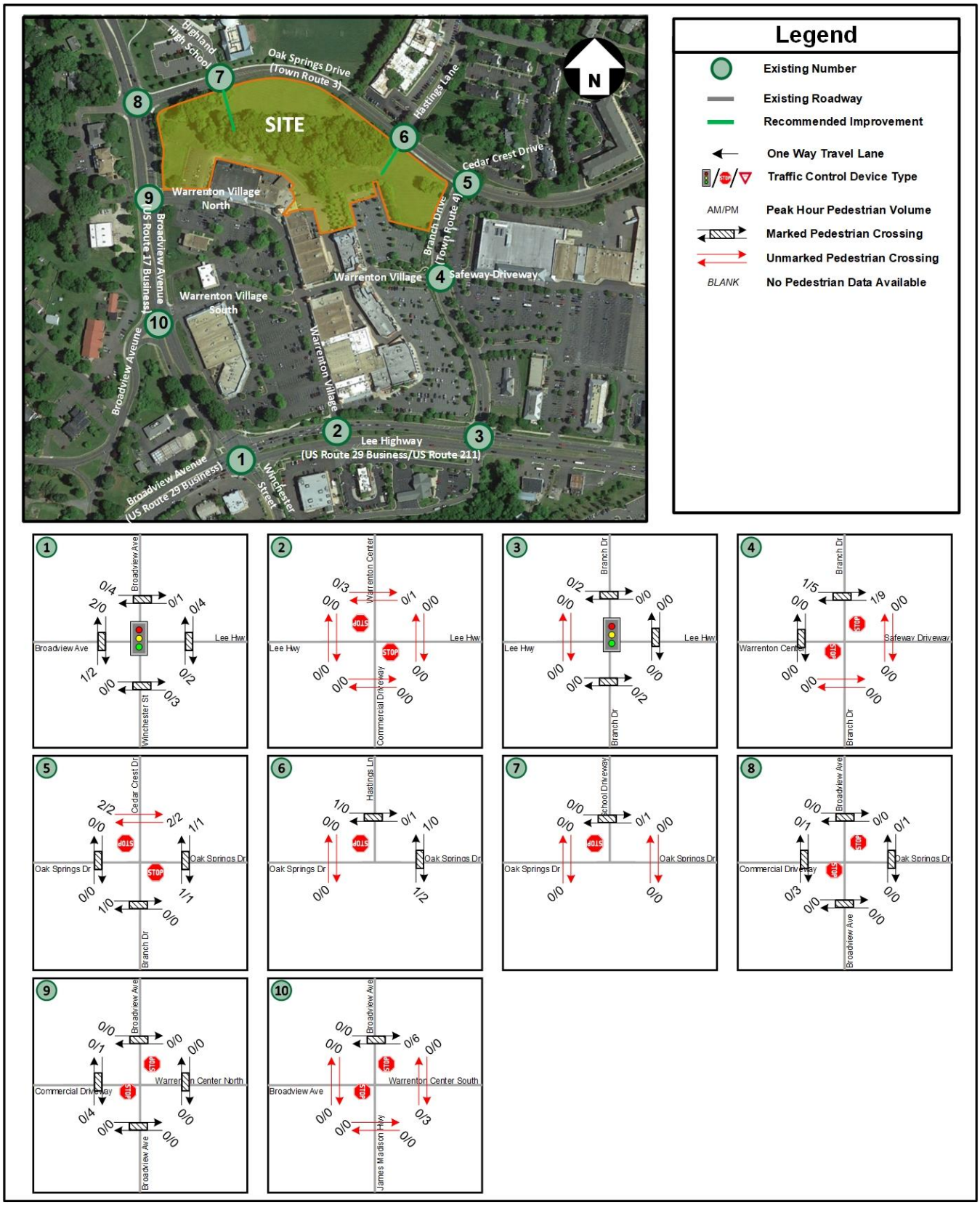


Figure 9: 2023 Existing Conditions – Pedestrian Volumes

Existing Intersection Capacity and Queueing Analysis

Intersection capacity and queuing analyses were performed for the 2023 Existing Conditions scenario at the study area intersections during AM and PM peak hours, in accordance with VDOT's *TOSAM* (version 2) guidelines. *Synchro,* version 11, was used to analyze the study intersections with results based on the Transportation Research Board's (TRB) Highway Capacity Manual (HCM) 6th edition methodology[1] and include level of service (LOS), delay, and queue length comparisons for the turning movements analyzed. Lane configurations at study intersections along the road network were field-verified, and the existing traffic volumes discussed in the aforementioned section as well as other relevant data were entered into the analysis models.

Signal timings were obtained from VDOT and were utilized as a base for the analysis models. Traffic operation conditions as well as lane configurations were field verified. The existing traffic volumes discussed in the aforementioned section as well as other relevant data were entered into the analysis models. For the purposes of this analysis, the existing peak hour factors (PHF) utilized in the analysis of existing conditions were based on the 2023 existing volumes and were modeled in the *Synchro* network on a by-intersection basis. PHF in the range of 0.85 to 1.00 were used for the existing scenario, as agreed to in the scoping document. The heavy vehicle percentages (HV%) utilized per movement were based on the existing traffic counts collected. Pedestrian crossing data utilized per crossing were based on the existing traffic counts collected. Based on *Synchro* guidance and pedestrian count data, all pedestrian calls at both signalized intersections were set to five calls per hour. Note that for analysis purposes, all turning movement counts were coded with a minimum volume of one vehicle in *Synchro*.

Per the scoping meeting with VDOT and Town staff, it would be considered acceptable and/or desirable to achieve an approach LOS D or better for traffic operations using HCM methodology. The results of the intersection capacity and queuing analyses from *Synchro* are presented in **Table 4** and graphically in **Figure 10**. The results are expressed in LOS and delay (seconds per vehicle) for overall signalized/all-way stop control intersections and per approach and lane group for all study intersections. Any overall signalized intersection or approach that operates at LOS E or F is displayed in red.

The queue lengths were reported as the 95th percentile queues from *Synchro* and are expressed in feet. The lane groups where the queue lengths exceeded the available effective storage capacity of existing turn lanes are displayed in red.

The description of different LOS and delay are included in Appendix D. The signal timing data provided by VDOT is included in Appendix E. The detailed analysis worksheets of 2023 Existing Conditions are contained in Appendix F.

[1] It should be noted that HCM 2000 methodology was used in lieu of HCM 6th if the HCM 6th methodology was not applicable. HCM 6th could not be applicable in such cases as nonstandard National Electrical Manufacturers Association (NEMA) configurations, shared lane configurations, placement of loop detectors, U-turns, etc.

Table 4: 2023 Existing Conditions – Intersection Capacity Analysis Results

No.	Intersection (Movement)	Effective Storage Length (ft.)	AM Peak Hour			PM Peak Hour		
			LOS	Delay (sec/veh)	95th % Queue (ft.) [2]	LOS	Delay (sec/veh)	95th % Queue [2]
			Synchro			Synchro		
1	**Broadview Ave (E/W) at Winchester St (N/S)**							
	Overall Intersection (Signalized)		**D**	**36.4**		**D**	**39.4**	
	Eastbound Approach		***C***	***34.2***		***D***	***40.6***	
	Eastbound Left	250	E	64.9	186	E	72.0	193
	Eastbound Thru/Right		C	24.0	428	C	30.6	428
	Westbound Approach		***C***	***25.5***		***C***	***25.9***	
	Westbound Left	130	F	89.7	78	F	93.8	m119
	Westbound Thru		B	19.8	143	C	22.7	192
	Westbound Right	200	C	33.6	46	B	16.8	m15
	Northbound Approach		***E***	***60.3***		***E***	***66.6***	
	Northbound Left	250	E	61.7	126	E	74.8	188
	Northbound Thru		E	66.5	166	E	67.3	160
	Northbound Right	125	D	49.9	0	D	51.7	17
	Southbound Approach		***D***	***49.2***		***D***	***50.9***	
	Southbound Left	215	E	63.1	167	E	59.2	251
	Southbound Left/Thru		E	62.0	171	E	59.0	257
	Southbound Right		D	36.1	95	D	44.2	417
2	**Broadview Ave (E/W) at Warrenton Village Center Dwy (Chipotle)/Walgreens Dwy (N/S)**							
	Overall Intersection (TWSC)							
	Northbound Approach		***B***	***12.6***		***B***	***13.4***	
	Northbound Right		B	12.6	5	B	13.4	5
	Southbound Approach		***B***	***10.7***		***B***	***13.3***	
	Southbound Right		B	10.7	3	B	13.3	15
3	**Broadview Ave (E/W) at Branch Dr (N/S)**							
	Overall Intersection (Signalized)		**B**	**16.2**		**C**	**31.6**	
	Eastbound Approach		***A***	***9.0***		***C***	***20.9***	
	Eastbound Left	240	F	81.5	m80	F	80.8	225
	Eastbound Thru		A	6.0	133	B	11.6	226
	Eastbound Right	330	A	9.9	m0	B	13.4	m0
	Westbound Approach		***B***	***15.8***		***C***	***28.5***	
	Westbound Left	150	E	67.4	88	E	78.5	123
	Westbound Thru		B	13.2	394	C	26.4	610
	Westbound Right	150	A	9.8	0	B	17.3	0
	Northbound Approach		***E***	***60.3***		***E***	***67.0***	
	Northbound Left/Thru		E	61.0	43	E	68.6	73
	Northbound Right	60	E	59.9	0	E	66.2	0
	Southbound Approach		***E***	***64.7***		***E***	***69.4***	
	Southbound Left/Thru		E	67.2	86	E	78.8	249
	Southbound Right		E	62.7	0	E	59.0	53
4	**Warrenton Village Center Dwy/Shopping Center Dwy (E/W) at Branch Dr (N/S)**							
	Overall Intersection (TWSC)							
	Eastbound Approach		***A***	***9.4***		***B***	***11.8***	
	Eastbound Left/Thru/Right		A	9.4	8	B	11.8	30
	Westbound Approach		***B***	***10.1***		***B***	***14.2***	
	Westbound Left/Thru/Right		B	10.1	5	B	14.2	28
	Northbound Approach							
	Northbound Left		A	7.4	3	A	7.5	5
	Southbound Approach							
	Southbound Left		A	7.4	0	A	7.4	3
5	**Oak Springs Dr (E/W) at Branch Dr (N/S)**							
	Overall Intersection (TWSC)							
	Eastbound Approach							
	Eastbound Left		A	7.5	0	A	7.5	0
	Westbound Approach							
	Westbound Left		A	7.7	0	A	7.7	3
	Northbound Approach		***B***	***11.2***		***B***	***11.4***	
	Northbound Left/Thru		B	11.6	13	B	12.6	13
	Northbound Right		A	9.0	0	A	9.4	5
	Southbound Approach		***B***	***10.0***		***B***	***10.9***	
	Southbound Left/Thru/Right		B	10.0	0	B	10.9	0

Table 4 (Continued): 2023 Existing Conditions – Intersection Capacity Analysis Results

No.	Intersection (Movement)	Effective Storage Length (ft.)	AM Peak Hour			PM Peak Hour		
			LOS	Delay (sec/veh)	95th % Queue (ft.) [2]	LOS	Delay (sec/veh)	95th % Queue [2]
			Synchro			Synchro		
6	**Oak Springs Dr (E/W) at Hastings Ln / Future Access (N/S)**							
	Overall Intersection (TWSC)							
	Eastbound Approach							
	Eastbound Left		A	7.9	5	A	7.7	3
	Southbound Approach		***B***	***11.5***		***B***	***11.3***	
	Southbound Left/Thru/Right		B	11.5	18	B	11.3	18
7	**Oak Springs Dr (E/W) at Highland School Dwy / Future Garage Access (N/S)**							
	Overall Intersection (TWSC)							
	Eastbound Approach							
	Eastbound Left	75	A	7.8	3	A	7.7	0
	Southbound Approach		***B***	***11.2***		***B***	***10.2***	
	Southbound Left/Thru		B	12.3	5	B	11.5	3
	Southbound Right		A	9.4	3	A	9.7	3
8	**Oak Springs Dr (E/W) at Broadview Ave (N/S)**							
	Overall Intersection (TWSC)							
	Eastbound Approach		***D***	***25.2***		***C***	***16.8***	
	Eastbound Left/Thru/Right		D	25.2	0	C	16.8	3
	Westbound Approach		***C***	***23.0***		***D***	***27.5***	
	Westbound Left/Thru	125	E	42.8	53	F	51.1	83
	Westbound Right		B	10.8	15	B	10.8	18
	Northbound Approach							
	Northbound Left	90	A	8.1	0	A	8.6	0
	Southbound Approach							
	Southbound Left	225	A	9.3	10	A	8.7	8
9	**Warrenton Village North Dwy (E/W) at Broadview Ave (N/S)**							
	Overall Intersection (TWSC)							
	Eastbound Approach		***A***	***9.9***		***C***	***20.3***	
	Eastbound Left/Thru/Right		A	9.9	0	C	20.3	10
	Westbound Approach		***B***	***13.8***		***C***	***18.5***	
	Westbound Left		C	22.9	3	D	27.8	18
	Westbound Thru/Right		B	11.4	3	B	10.6	5
	Northbound Approach							
	Northbound Left	150	A	8.3	0	A	8.8	3
	Southbound Approach							
	Southbound Left	110	A	8.7	3	A	8.4	3
10	**Warrenton Village South Dwy/Broadview Ave (E/W) at Broadview Ave/Winchester St (N/S)**							
	Overall Intersection (TWSC)							
	Eastbound Approach		***E***	***38.8***		***D***	***28.4***	
	Eastbound Left		F	57.3	110	F	52.1	83
	Eastbound Thru		D	29.6	10	E	36.7	40
	Eastbound Right		B	10.1	8	B	11.5	25
	Westbound Approach		***C***	***21.4***		***D***	***33.0***	
	Westbound Left		D	28.0	0	E	47.2	38
	Westbound Thru/Right		C	19.2	3	C	21.3	20
	Northbound Approach							
	Northbound Left	160	A	8.7	10	A	9.2	8
	Southbound Approach							
	Southbound Left	160	A	8.4	0	A	8.2	0

NOTES:

[1] Effective storage length is based on the storage length plus one-half of the taper length per TOSAM guidelines.

[2] m: 95th percentile volume and queues (reported from Synchro) are metered by upstream signal.

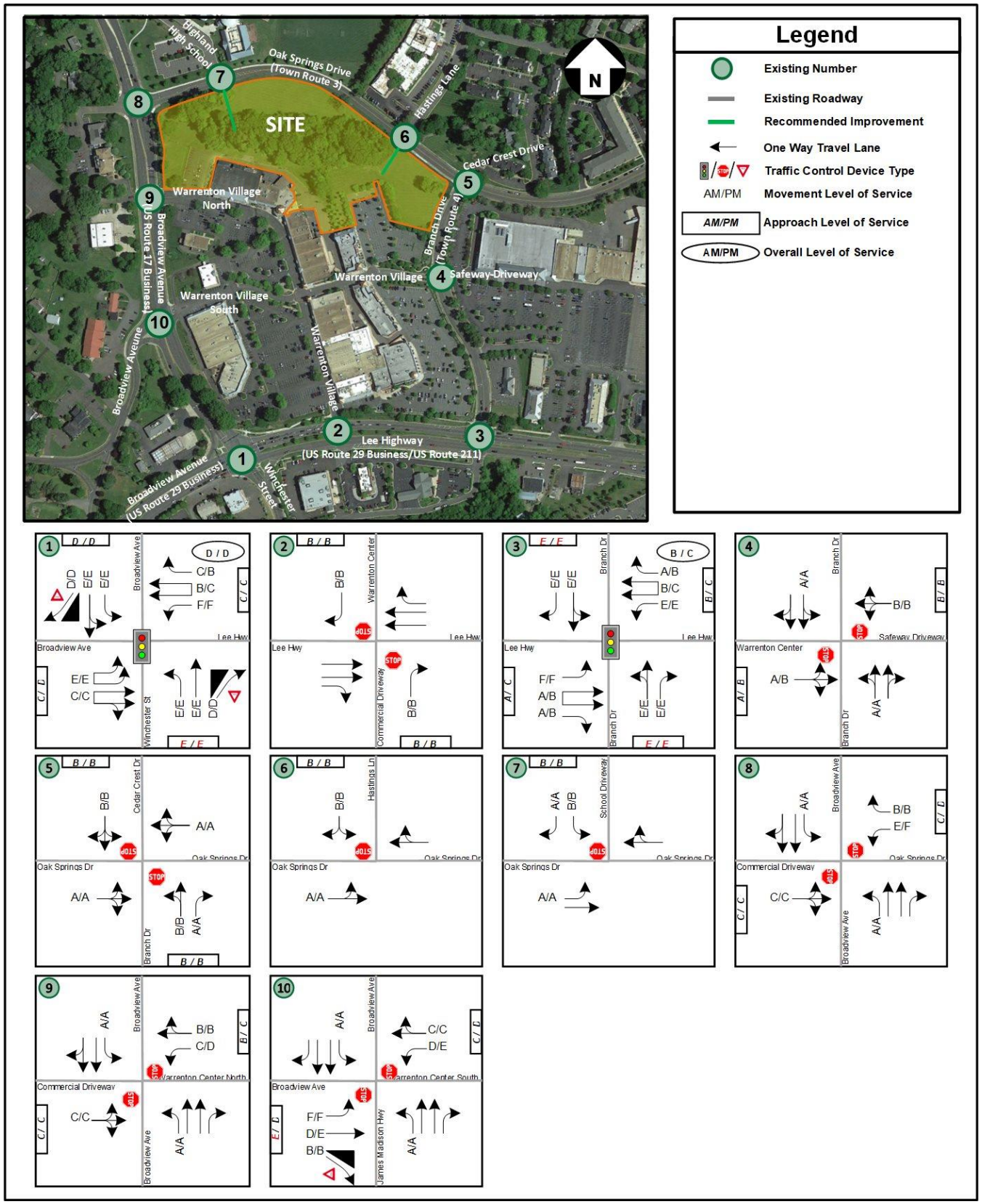


Figure 10: 2023 Existing Conditions – Level of Service Results

Based on the capacity analysis of existing conditions, the two signalized study intersections operate at overall levels of service of D or better during both the AM and PM peak hours.

Based on the capacity analysis of existing conditions, the approaches of all study intersections operate at approach levels of service of D or better during both the AM and PM peak hours, except for the following study intersections that have at least one approach that operates at levels of service E or F during at least one peak hour:

- Study Intersection 1: Lee Highway (US 211/US 29 BUS) at Broadview Avenue / Winchester Street
- Study Intersection 3: Lee Highway (US 211/US 29 BUS) at Branch Drive
- Study Intersection 10: Broadview Avenue at Warrenton Village South

Based on the queuing analysis performed for existing conditions, all turning movements at the study intersections have maximum queue lengths that are accommodated within the available storage lengths of the turn bays except for the southbound left turn movement at Study Intersection 1 (Lee Highway at Broadview Avenue / Winchester Street).

Analysis of 2027 Future Conditions Without Development

For the purposes of this study, the Development is anticipated to be constructed by 2027; this scenario analyzes the future without development conditions for the year 2027.

Future without Development Traffic Volumes

The derivation of future without development traffic volumes was based on assumptions and parameters discussed with VDOT and the County during the scoping process for this study. The future conditions include anticipated inherent regional growth, the inclusion of any potential background developments in the pipeline around the vicinity of the Site, and any anticipated roadway improvements.

Inherent Regional Growth

The Development is anticipated to be complete in 2027. In order to account for increased demand on the traffic network between 2023 and 2027, an inherent growth rate was applied to the future scenarios. This “inherent” growth was anticipated to account for regional development within the at-large area, which would ultimately result in increased roadway demand. Furthermore, the inherent growth was anticipated to account for any potential background developments unaccounted for within the vicinity of the study area.

To account for 2027 future conditions, an inherent growth rate of 1.0%, (compounded annually) over a four-year period, between 2023 to 2027 (and totaling 4.06% growth of the existing volumes) was applied to the Lee Highway mainline through movements at the intersection of Lee Highway at Broadview Avenue / Winchester Street. The growth volumes were balanced along the road network by increasing the mainline through movements at subsequent study intersections along the road network where applicable.

The inherent regional growth volumes (for the period between 2023 and 2027) are illustrated in **Figure 11.**

Potential Background Development(s)

In addition to the applied inherent regional growth reflecting increased regional traffic demand, a total of two “background” developments within the vicinity of the Site, with their locations depicted in **Figure 12**, were identified in the meeting with VDOT and Town staff for inclusion in this study. The background developments included are as follows:

1. Waterloo Junction
    - Located in the southeast quadrant of Bear Wallow Road and Norfolk Drive, the Waterloo Junction development is anticipated to include 47 townhomes, 6 apartments, and 3,600 square feet of retail space.
2. Patrick Ryan Way Homes
    - Located along Winchester Street at Patrick Ryan Way, this development is expected to consist of 60 single family homes. This development was partially built out at the time the turning movement counts were collected. For the purposes of this study, it was assumed that 40 of the 60 homes are built and occupied.

The assignment of the total combined background trips to the road network is depicted in **Figure 13**. Additional information, including the trips generated and the assignment of trips for each individual background development are included in Appendix G.

Potential Roadway Improvement(s)

As discussed during the scoping meeting, there is one roadway improvement within the vicinity of the site that is either fully funded or would be completely constructed by 2027.

- Smartscale project to construct a roundabout at the intersection of Lee Highway at Winchester Street / Broadview Avenue (Study Intersection 1)

There is one roadway improvement within the vicinity of the site that was previously identified for construction but was not selected for funding and therefore not included in the analysis:

- Smartscale project to construct a six-leg roundabout at the intersection of Broadview Avenue at Warrenton Village South (Study Intersection 10)

Relevant Smartscale excerpts and information are included in Appendix G.

The anticipated 2027 future road network (without the development) is illustrated in **Figure 14.**

Future without Development Traffic Volumes

In order to forecast future roadway traffic volumes for the year 2027, the 2023 existing traffic volumes were combined with the inherent regional growth traffic volumes and the combined background development trips. The 2027 future conditions without Development traffic volumes are illustrated in **Figure 15**.

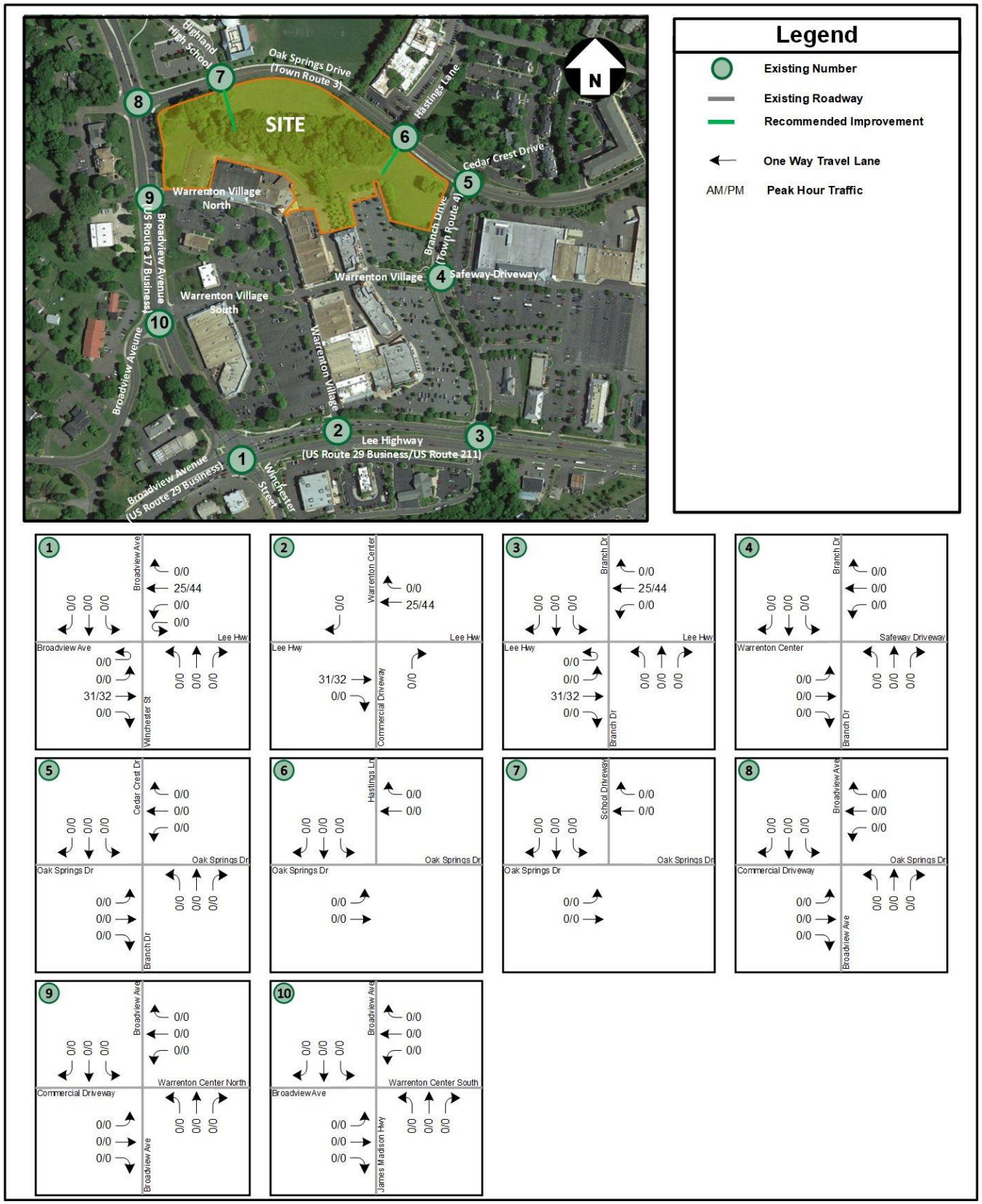


Figure 11: Projected Inherent Regional Growth Traffic Volumes (2023 to 2027)

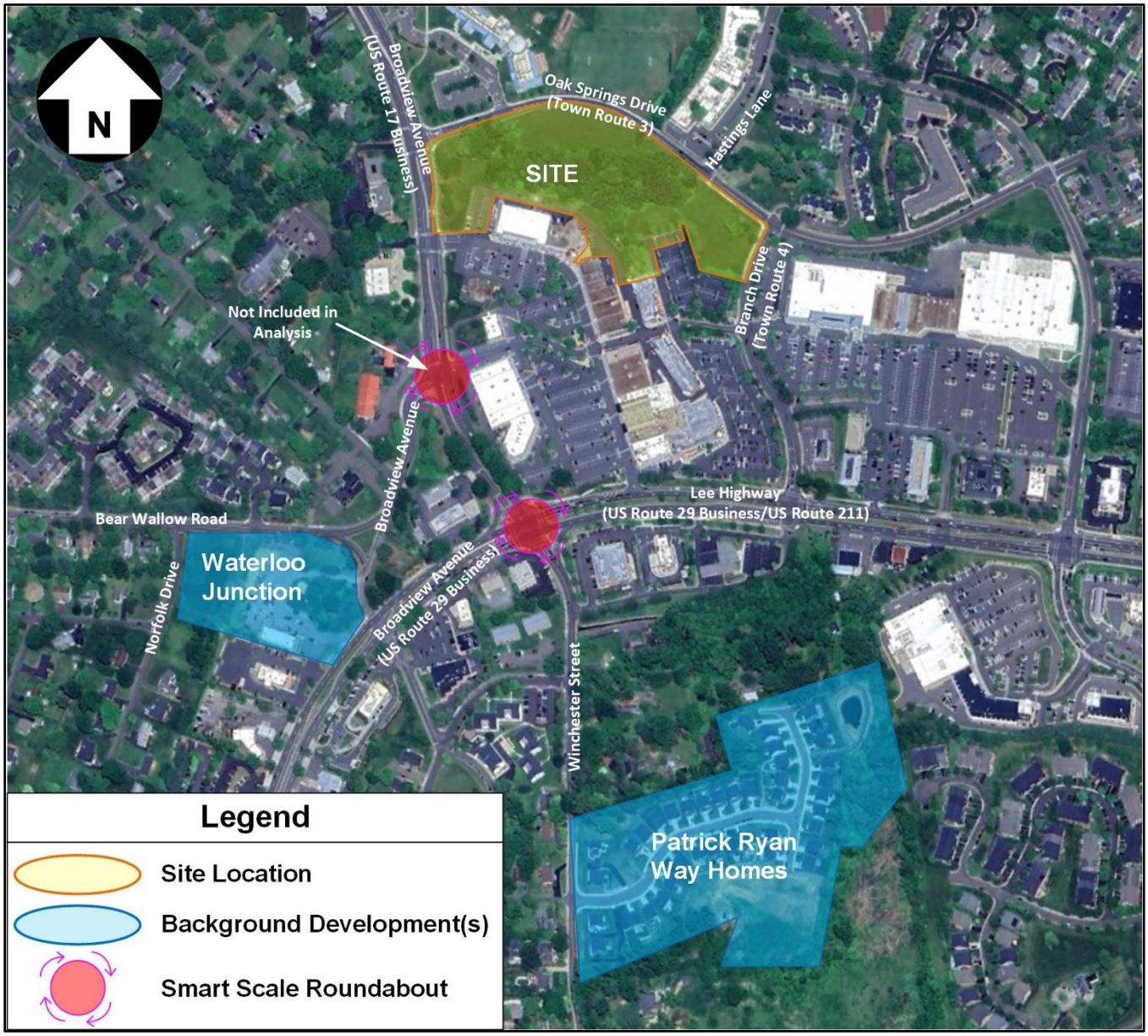


Figure 12: Background Development and Roadway Improvement Map

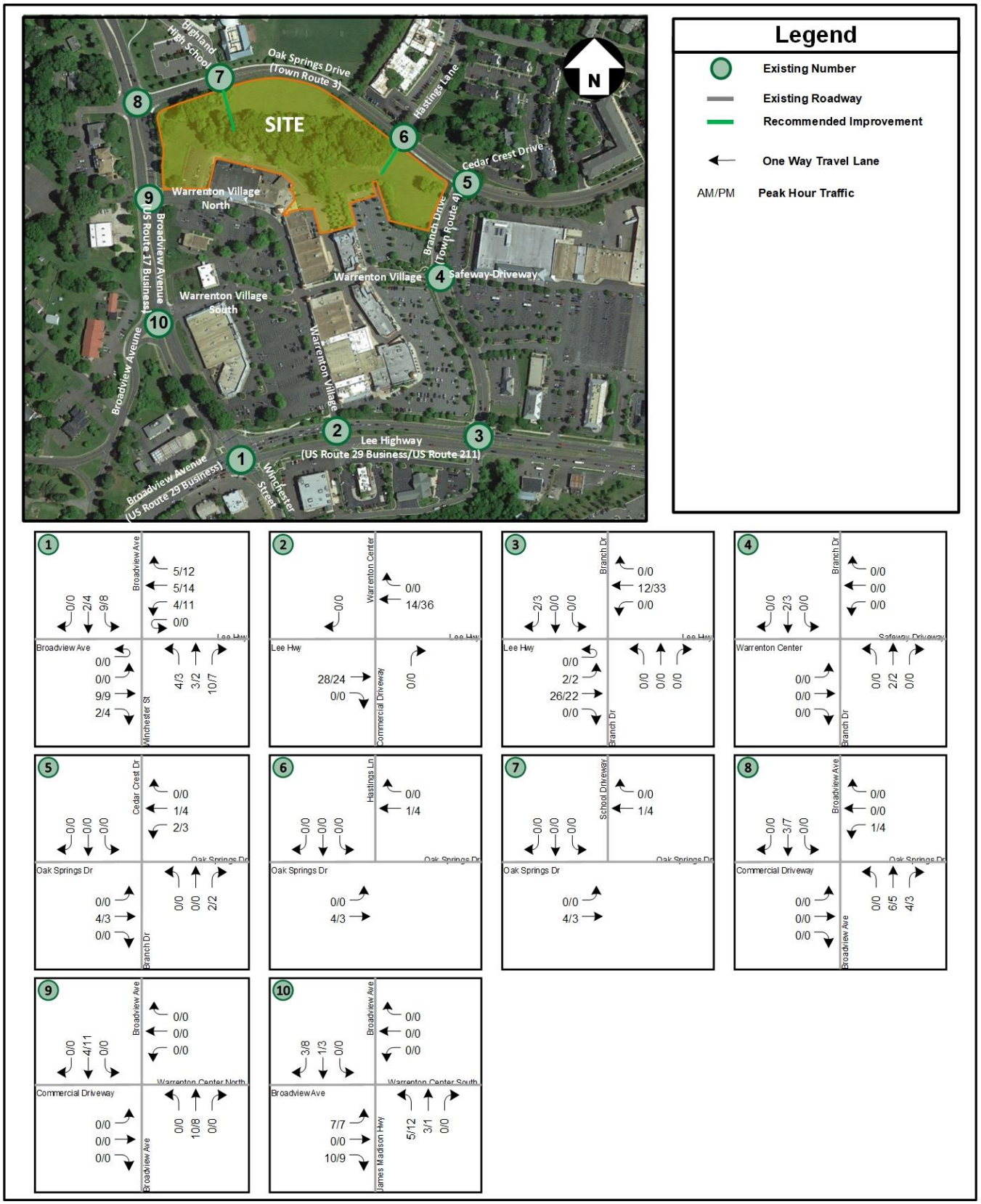


Figure 13: Total Combined Background Development Trips

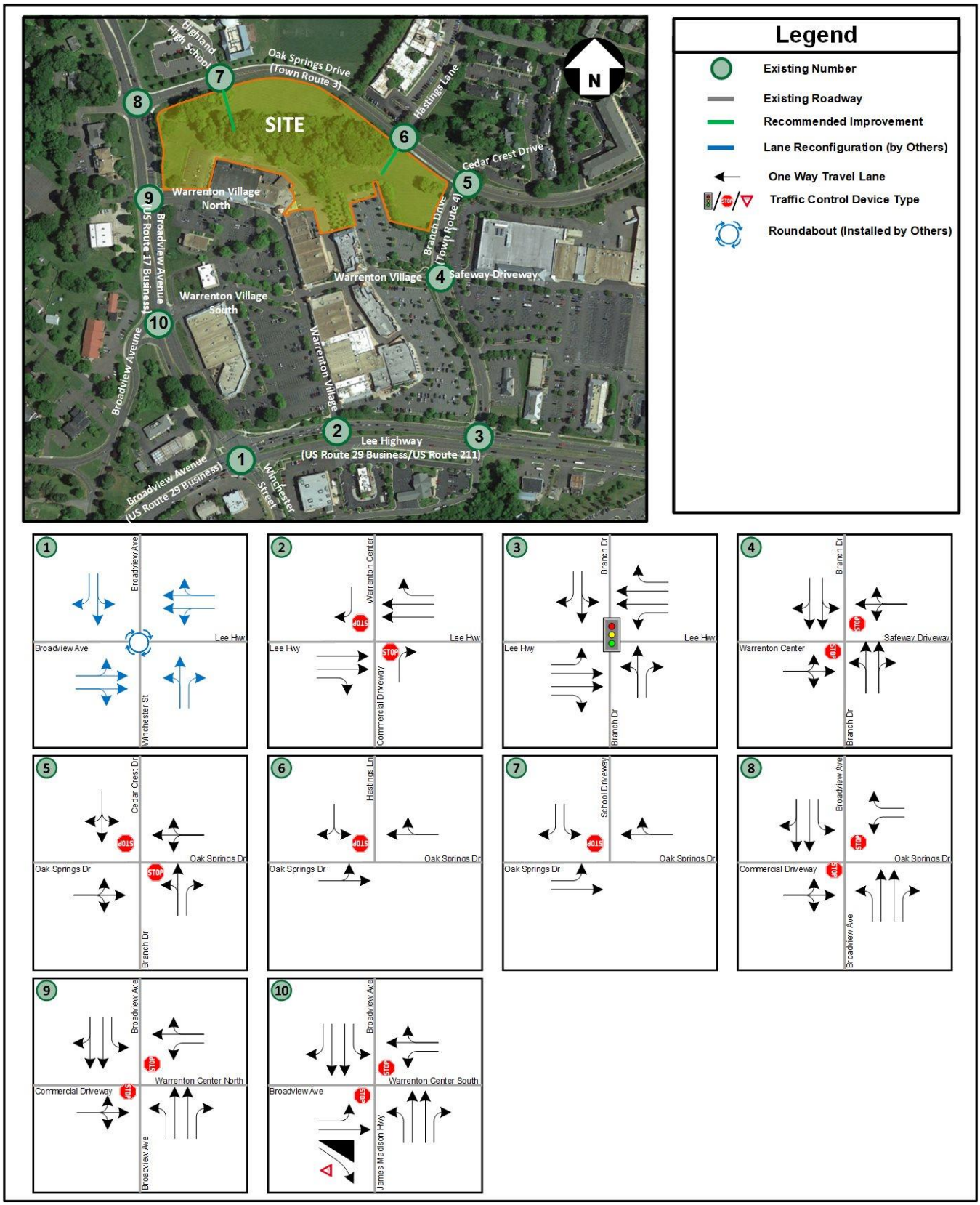


Figure 14: 2027 Future Conditions without Development – Roadway Network Geometric Configuration and Traffic Control Devices

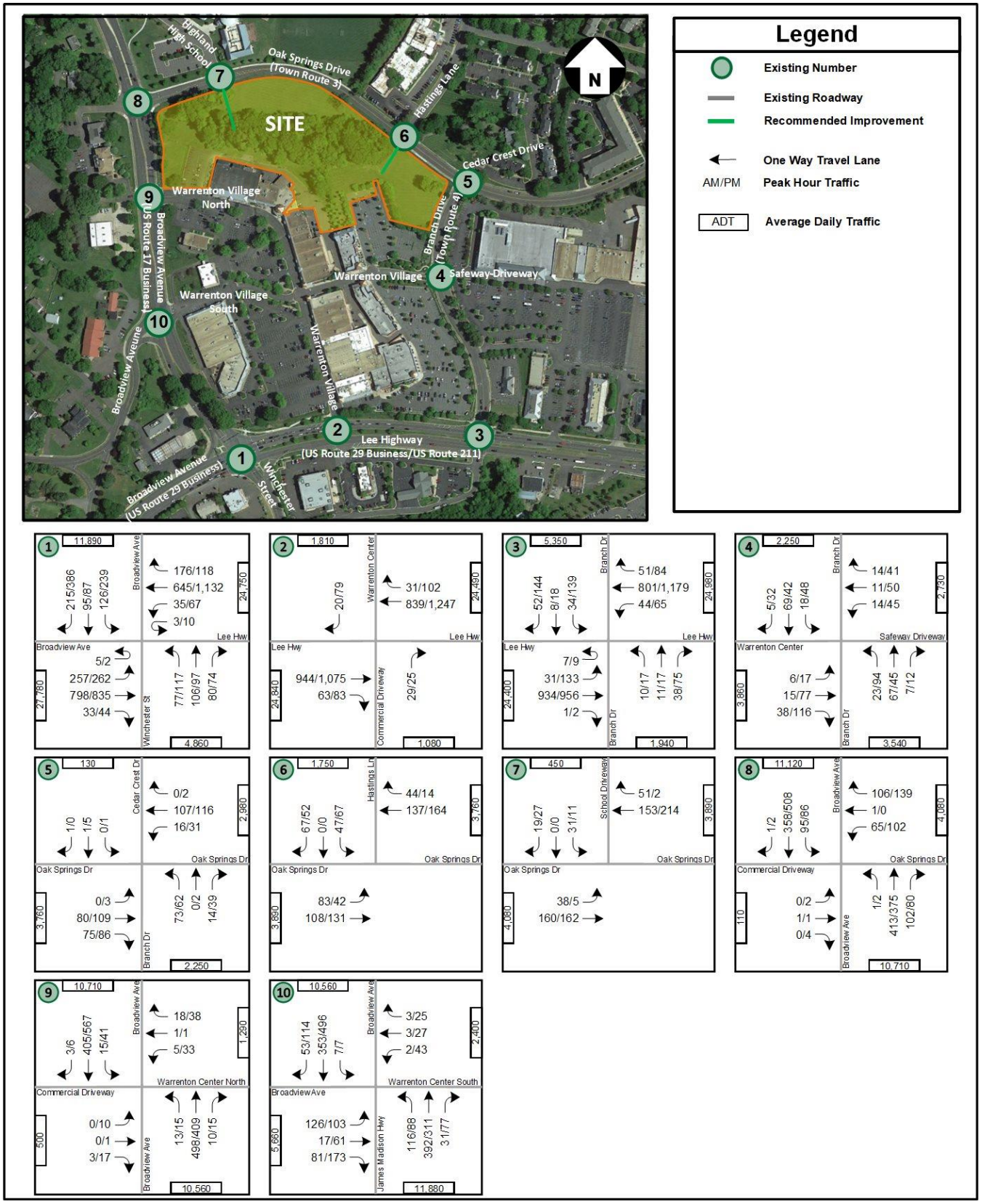


Figure 15: 2027 Future Conditions without Development – Vehicular Traffic Volumes

Future without Development Intersection Capacity and Queuing Analysis

Intersection capacity and queueing analyses were performed for the 2027 Future Conditions without Development scenario at the study area intersections during the AM and PM peak hours, in accordance with VDOT's *TOSAM* (version 2) guidelines. *Synchro,* version 11, was used to analyze the study intersections with results based on TRB's HCM 6th methodology and include LOS, delay, and queue length comparisons for the turning movements analyzed. The roundabout was analyzed using *Sidra*, version 9.

For the purposes of this analysis, the intersection PHF utilized in the analysis of future conditions was determined based on the existing traffic counts, with a minimum of 0.92 as agreed to in the scoping document. The HV% were based on the existing conditions scenario. Note that for analysis purposes, all turning movement counts were coded with a minimum volume of one vehicle in *Synchro*.

Per the scoping meeting with VDOT and County staff, it would be considered acceptable and/or desirable to achieve an approach LOS D or better for traffic operations using HCM methodology. The results of the intersection capacity and queuing analyses from *Synchro* are presented in **Table 5** and graphically in **Figure 16.** The results are expressed in LOS and delay (seconds per vehicle) for overall signalized intersections and per approach and lane group for all study intersections. Any overall signalized intersection or approach that operates at LOS E or F is displayed in red.

The queue lengths were reported as the 95th percentile queues determined from *Synchro* and are expressed in feet. The lane groups where the queue lengths exceeded the available effective storage capacity of existing turn lanes are displayed in red.

The detailed analysis worksheets of the 2027 Future Conditions without Development are contained in Appendix H.

Table 5: 2027 Future Conditions without Development – Intersection Capacity Analysis Results

No.	Intersection (Movement)	Effective Storage Length (ft.)	AM Peak Hour			PM Peak Hour		
			LOS	Delay (sec/veh)	95th % Queue (ft.)	LOS	Delay (sec/veh)	95th % Queue
			Synchro			Synchro		
1	**Broadview Ave (E/W) at Winchester St (N/S)**							
	Overall Intersection (Roundabout)		**A**	**8.1**		**B**	**17.6**	
	Eastbound Approach		***A***	***7.6***		***B***	***11.1***	
	Eastbound Left/Thru		A	8.0	80	B	11.9	158
	Eastbound Thru/Right		A	7.2	83	B	10.4	158
	Westbound Approach		***A***	***7.6***		***B***	***15.0***	
	Westbound Left/Thru		A	8.0	78	B	16.2	252
	Westbound Thru/Right		A	7.2	81	B	14.0	268
	Northbound Approach		***A***	***9.5***		***B***	***12.4***	
	Northbound Left/Thru		A	9.2	36	B	12.2	56
	Northbound Right		B	10.2	19	B	13.0	22
	Southbound Approach		***A***	***9.1***		***C***	***34.7***	
	Southbound Left/Thru		A	8.6	39	D	35.1	161
	Southbound Right		A	9.7	43	C	34.4	191
2	**Broadview Ave (E/W) at Warrenton Village Center Dwy (Chipotle)/Walgreens Dwy (N/S)**							
	Overall Intersection (TWSC)							
	Northbound Approach		***B***	***13.0***		***B***	***13.9***	
	Northbound Right		B	13.0	5	B	13.9	5
	Southbound Approach		***B***	***10.8***		***B***	***13.9***	
	Southbound Right		B	10.8	3	B	13.9	15
3	**Broadview Ave (E/W) at Branch Dr (N/S)**							
	Overall Intersection (Signalized)		**B**	**19.7**		**C**	**34.0**	
	Eastbound Approach		***B***	***16.4***		***C***	***26.4***	
	Eastbound Left	240	E	67.0	80	E	75.4	224
	Eastbound Thru		B	14.3	485	B	19.1	441
	Eastbound Right	330	A	9.7	0	B	13.4	0
	Westbound Approach		***B***	***15.7***		***C***	***29.6***	
	Westbound Left	150	E	67.4	88	E	78.5	123
	Westbound Thru		B	13.3	400	C	27.8	675
	Westbound Right	150	A	9.7	0	B	17.3	0
	Northbound Approach		***E***	***60.8***		***E***	***67.0***	
	Northbound Left/Thru		E	61.5	44	E	68.6	73
	Northbound Right	60	E	60.4	0	E	66.2	0
	Southbound Approach		***E***	***64.7***		***E***	***69.3***	
	Southbound Left/Thru		E	67.2	86	E	78.8	249
	Southbound Right		E	62.7	0	E	59.1	58
4	**Warrenton Village Center Dwy/Shopping Center Dwy (E/W) at Branch Dr (N/S)**							
	Overall Intersection (TWSC)							
	Eastbound Approach		***A***	***9.3***		***B***	***11.8***	
	Eastbound Left/Thru/Right		A	9.3	5	B	11.8	30
	Westbound Approach		***B***	***10.0***		***B***	***14.3***	
	Westbound Left/Thru/Right		B	10.0	5	B	14.3	28
	Northbound Approach							
	Northbound Left		A	7.4	3	A	7.5	5
	Southbound Approach							
	Southbound Left		A	7.4	0	A	7.4	3
5	**Oak Springs Dr (E/W) at Branch Dr (N/S)**							
	Overall Intersection (TWSC)							
	Eastbound Approach							
	Eastbound Left		A	7.4	0	A	7.5	0
	Westbound Approach							
	Westbound Left		A	7.6	0	A	7.7	3
	Northbound Approach		***B***	***11.0***		***B***	***11.4***	
	Northbound Left/Thru		B	11.4	10	B	12.6	10
	Northbound Right		A	9.0	3	A	9.4	5
	Southbound Approach		***A***	***9.9***		***B***	***11.0***	
	Southbound Left/Thru/Right		A	9.9	0	B	11.0	0

Table 5 (Continued): 2027 Future Conditions without Development – Intersection Capacity Analysis Results

No.	Intersection (Movement)	Effective Storage Length (ft.)	AM Peak Hour			PM Peak Hour		
			LOS	Delay (sec/veh)	95th % Queue (ft.)	LOS	Delay (sec/veh)	95th % Queue
			Synchro			Synchro		
6	**Oak Springs Dr (E/W) at Hastings Ln / Future Access (N/S)** **Overall Intersection (TWSC)**							
	Eastbound Approach							
	Eastbound Left		A	7.9	5	A	7.7	3
	Southbound Approach		***B***	***11.1***		***B***	***11.0***	
	Southbound Left/Right		B	11.1	15	B	11.0	15
7	**Oak Springs Dr (E/W) at Highland School Dwy / Future Garage Access (N/S)** **Overall Intersection (TWSC)**							
	Eastbound Approach							
	Eastbound Left	75	A	7.7	3	A	7.7	0
	Southbound Approach		***B***	***10.9***		***B***	***10.1***	
	Southbound Left		B	11.9	5	B	11.2	3
	Southbound Right		A	9.3	3	A	9.6	3
8	**Oak Springs Dr (E/W) at Broadview Ave (N/S)** **Overall Intersection (TWSC)**							
	Eastbound Approach		***C***	***17.8***		***C***	***16.6***	
	Eastbound Left/Thru/Right		C	17.8	0	C	16.6	3
	Westbound Approach		***C***	***19.7***		***D***	***27.9***	
	Westbound Left/Thru	125	D	34.3	40	F	51.0	85
	Westbound Right		B	10.6	13	B	10.7	18
	Northbound Approach							
	Northbound Left	90	A	8.1	0	A	8.5	0
	Southbound Approach							
	Southbound Left	225	A	9.1	8	A	8.7	8
9	**Warrenton Village North Dwy (E/W) at Broadview Ave (N/S)** **Overall Intersection (TWSC)**							
	Eastbound Approach		***C***	***15.6***		***C***	***20.0***	
	Eastbound Left/Thru/Right		C	15.6	0	C	20.0	10
	Westbound Approach		***B***	***13.2***		***C***	***18.3***	
	Westbound Left		C	21.2	3	D	27.3	15
	Westbound Thru/Right		B	11.1	3	B	10.6	5
	Northbound Approach							
	Northbound Left	150	A	8.2	0	A	8.8	3
	Southbound Approach							
	Southbound Left	110	A	8.6	0	A	8.4	3
10	**Warrenton Village South Dwy/Broadview Ave (E/W) at Broadview Ave/Winchester St (N/S)** **Overall Intersection (TWSC)**							
	Eastbound Approach		***D***	***30.7***		***D***	***31.9***	
	Eastbound Left		E	44.6	90	F	62.0	98
	Eastbound Thru		D	26.5	8	E	38.5	43
	Eastbound Right		B	10.0	10	B	11.6	25
	Westbound Approach		***C***	***19.7***		***E***	***35.5***	
	Westbound Left		D	25.4	0	F	51.8	40
	Westbound Thru/Right		C	17.8	3	C	22.1	20
	Northbound Approach							
	Northbound Left	160	A	8.6	10	A	9.3	8
	Southbound Approach							
	Southbound Left	160	A	8.3	0	A	8.2	0

NOTES:

[1] Effective storage length is based on the storage length plus one-half of the taper length per TOSAM guidelines.

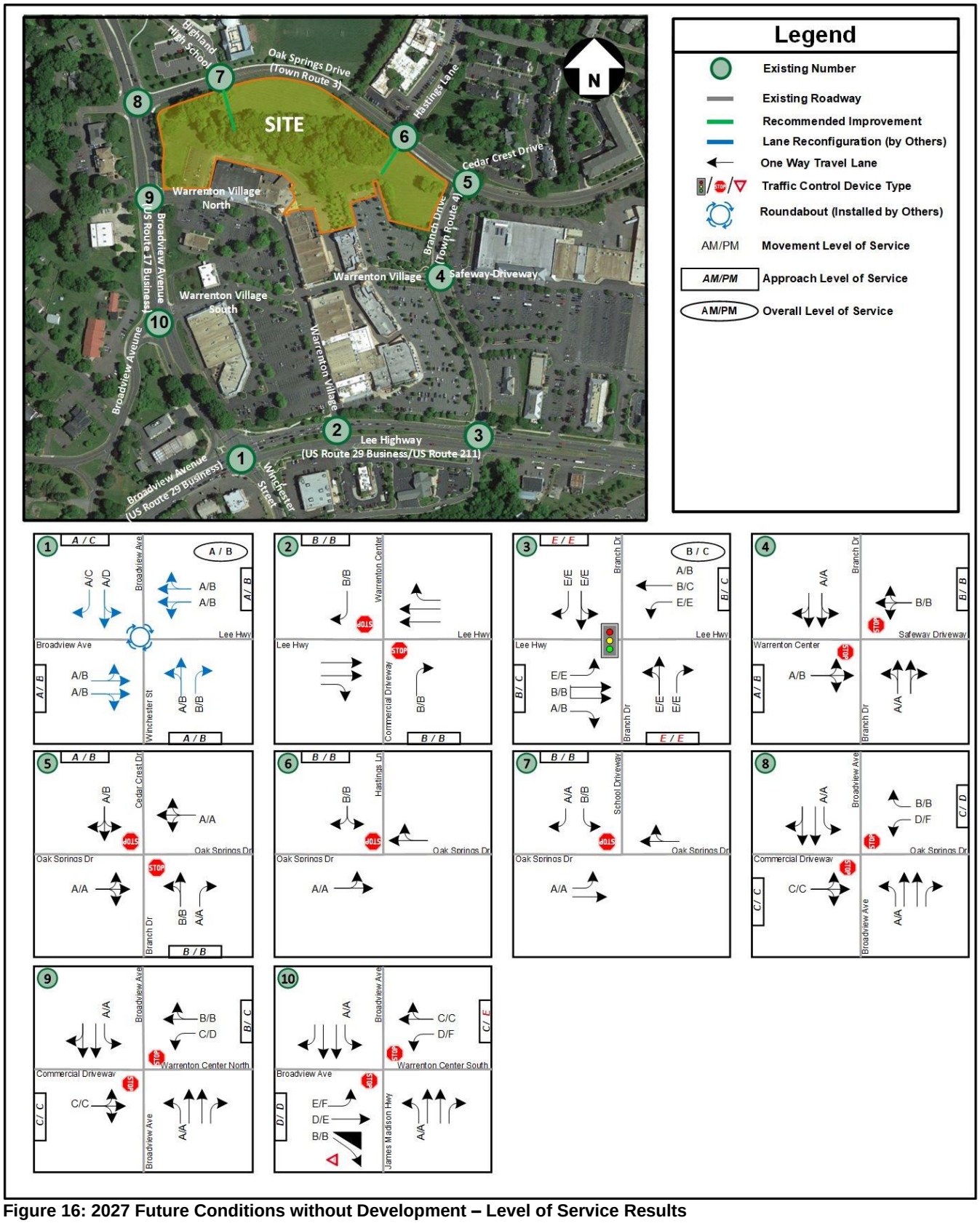


Figure 16: 2027 Future Conditions without Development – Level of Service Results

Study Intersection 1 (Lee Highway at Winchester Street / Broadview Avenue) was approved for a roundabout and received SmartScale funding. As such, this intersection was converted from a signalized intersection to a roundabout in all future conditions.

Based on the capacity analysis of 2027 Future Conditions without Development, the planned roundabout is expected to operate at overall levels of service of B or better during both the AM and PM peak hours.

Based on the capacity analysis of 2027 Future Conditions without Development, the signalized study intersection is expected to operate at overall levels of service of C or better during both the AM and PM peak hours.

Based on the capacity analysis of 2027 Future Conditions without Development, the approaches of all study intersections continue to operate at approach levels of service of D or better during both the AM and PM peak hours, except for the following study intersections that have at least one approach that would operates at level of service E of F during at least one peak hour:

- Study Intersection 3: Lee Highway (US 211/US 29 BUS) at Branch Drive
- Study Intersection 10: Broadview Avenue at Warrenton Village South

Based on the queuing analysis performed for 2027 Future Conditions without Development, all turning movements at the study intersections have maximum queue lengths that are accommodated within the available storage lengths of the turn bays.

Analysis of 2027 Future Conditions with Development

For the purposes of this study, the Development is anticipated to be constructed by 2027; this scenario analyzes the future with development conditions for the year 2027.

Site Description

The development will be situated on a single parcel of vacant land (approximately 6.46 acres) and a portion of an adjacent developed parcel of land, which can be identified on Fauquier County Tax Maps with the following GPIN #s: 6985-20-7247-000, and 6984-29-6753-000, respectively. The property is currently zoned as C (Commercial District) with a Future Land Use of Mixed Use as part of the New Town Warrenton Character District (Lee Highway Urban Development Area [UDA]).

The Applicant is proposing to apply for a Special Use Permit (SUP) in order to construct approximately 386 multifamily residential dwelling units (320 multifamily apartments, 36 2-over-2 units, and 30 townhomes) and a parking deck. The site has an anticipated build-out date of 2027.

A conceptual plan for the Site is illustrated in **Figure 17**

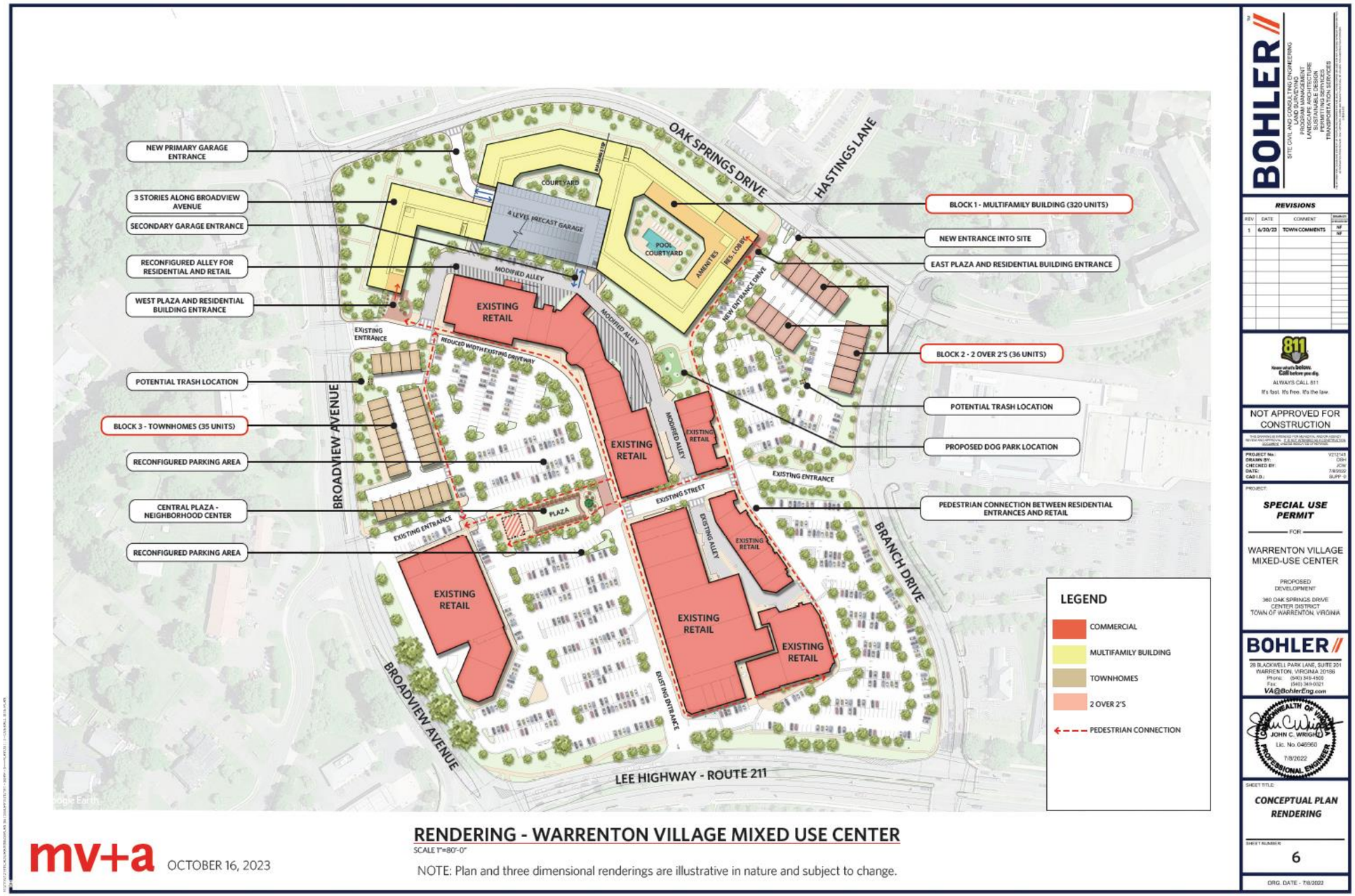


Figure 17: Conceptual Development Plan
Note: Plan provided by Bohler and is for conceptual purposes only.

Proposed Site Access

Access to the site will be provided via one full movement parking deck entry along Oak Springs Drive (Town Route 3) forming the fourth leg of the High School Driveway, one full movement driveway along Oak Springs Drive forming the fourth leg to the existing full-movement intersection of Hastings Lane, and via the existing shopping center accesses to the south.

Projected Site Trip Generation

In order to calculate the trips generated by the proposed Development, the Institute of Transportation Engineers' (ITE) Trip Generation Manual, 11th Edition, publication was used to determine the total trips going into and out of the subject study site during the AM and PM peak hours as well as the typical number of weekday daily trips. The projected trip generation for the proposed Development is depicted in **Table 6**Table 6. Of note, as agreed to in the scoping document, no internal capture or pass-by trip reductions were assumed with respect to the proposed Development, and therefore are not assumed within the table.

Table 6: Site Trip Generation (Peak Hour of the Adjacent Street; ITE 11th Ed.)

Land Use	ITE Code	Size	------ Weekday ------						
			AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	Total
Multifamily Housing	220	386 DU	37	117	154	124	73	197	2,602

As illustrated in the table above, the Site is expected to generate approximately 154 new trips during the AM peak hour, 197 new trips during the PM peak hour, and 2,602 new daily trips on a typical weekday.

Distribution and Assignment of Site Traffic

The distribution and assignment of the site generated trips were based on the existing traffic patterns, engineering judgement, the nature of the proposed Development, and with the guidance and input from the VDOT and the Town staff. The site direction of approach and trip distribution are illustrated in **Figure 18**.

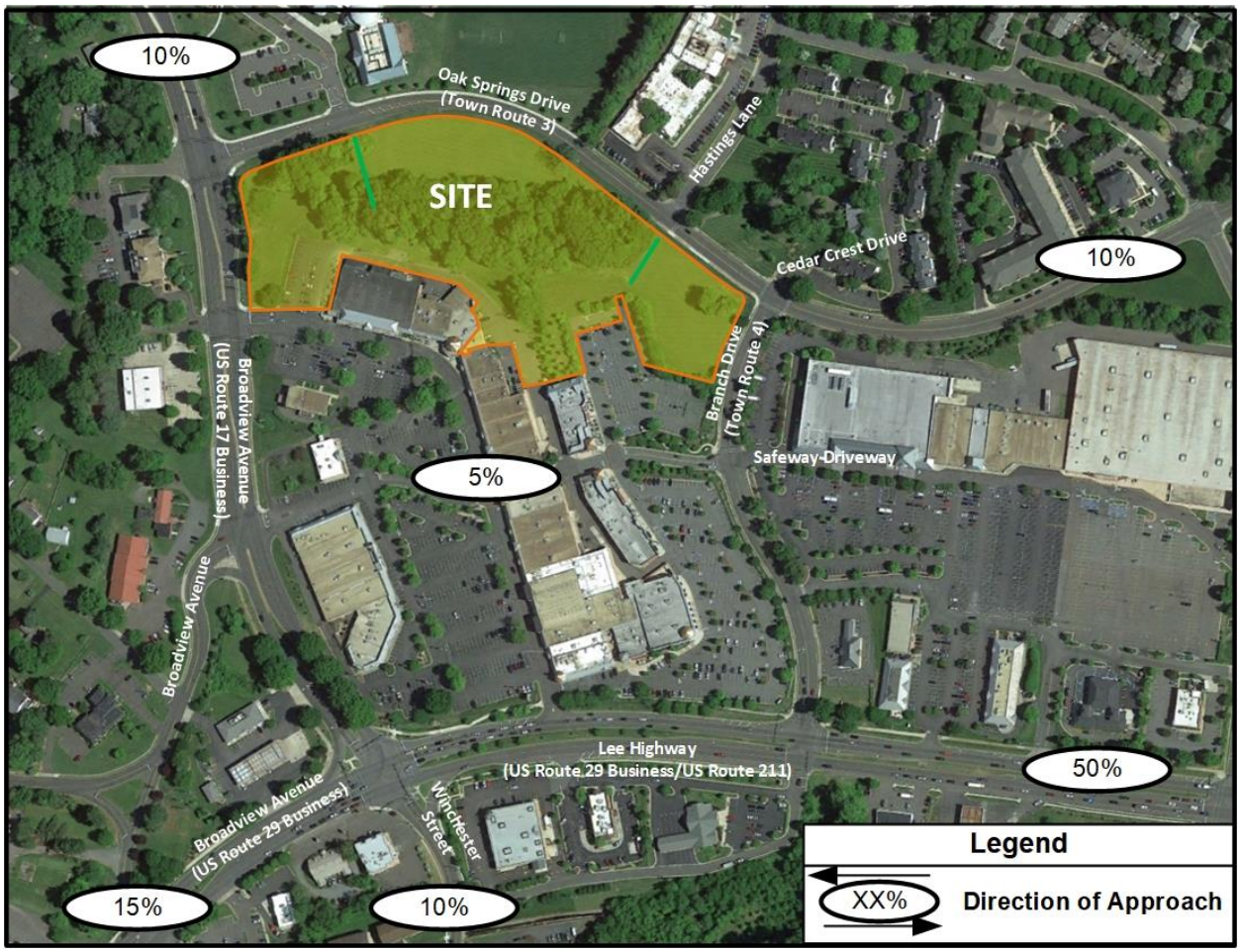


Figure 18: Global Vehicular Direction of Approach (Site Trip Distribution)

Future with Development Traffic Volumes

In order to project future traffic volumes on the roadways in the vicinity of the Development, trips generated from the Development were assigned to the road network based on the previously mentioned direction of approach. The site traffic assignment is illustrated for the AM and PM peak hours in **Figure 19.**

The future with development traffic volumes for were determined by adding the assigned site generated traffic volumes to the 2027 Future Conditions without Development traffic volumes. The 2027 Future Conditions with Development traffic volumes are depicted in **Figure 20.**

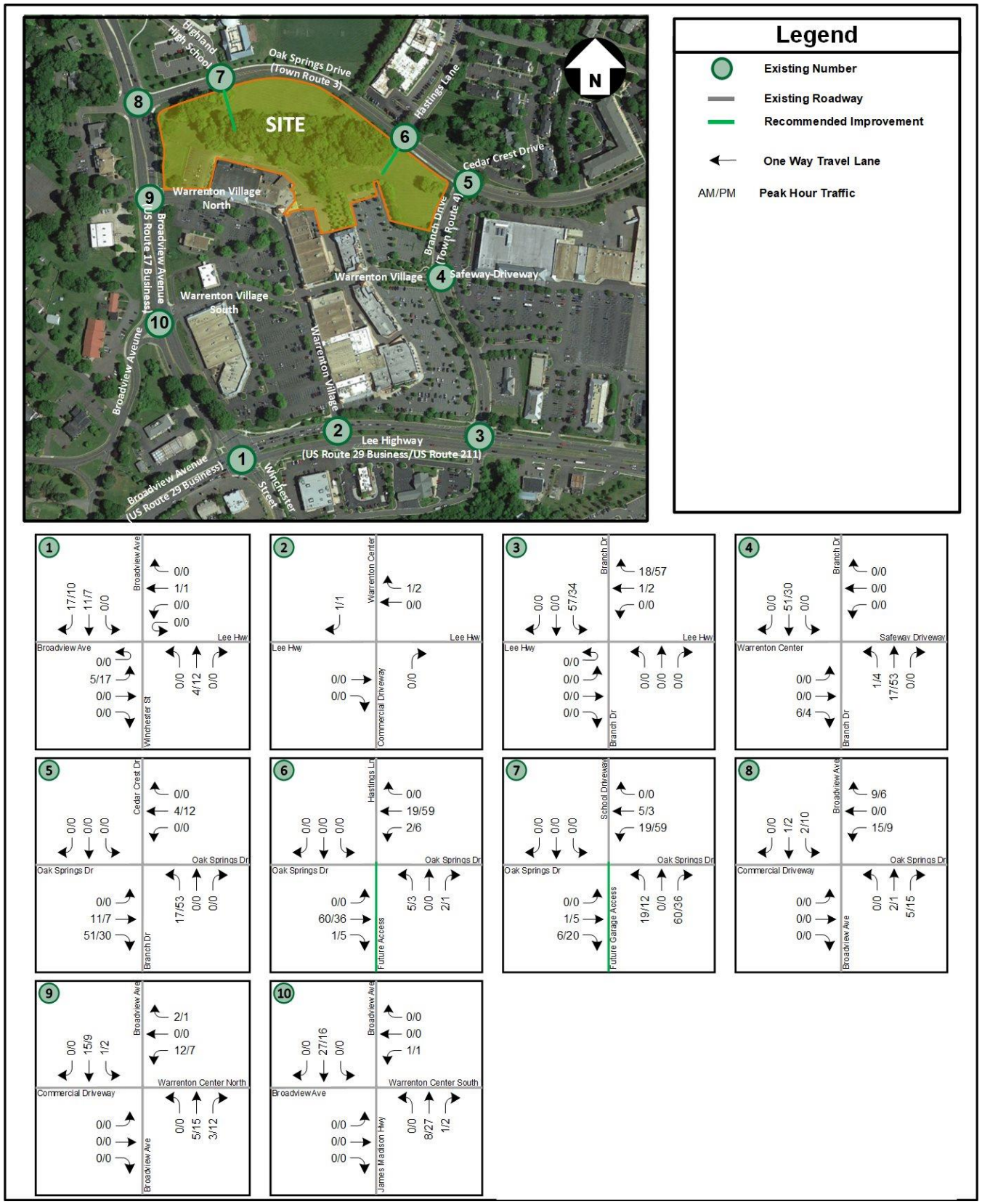


Figure 19: Site Generated Trip Assignment

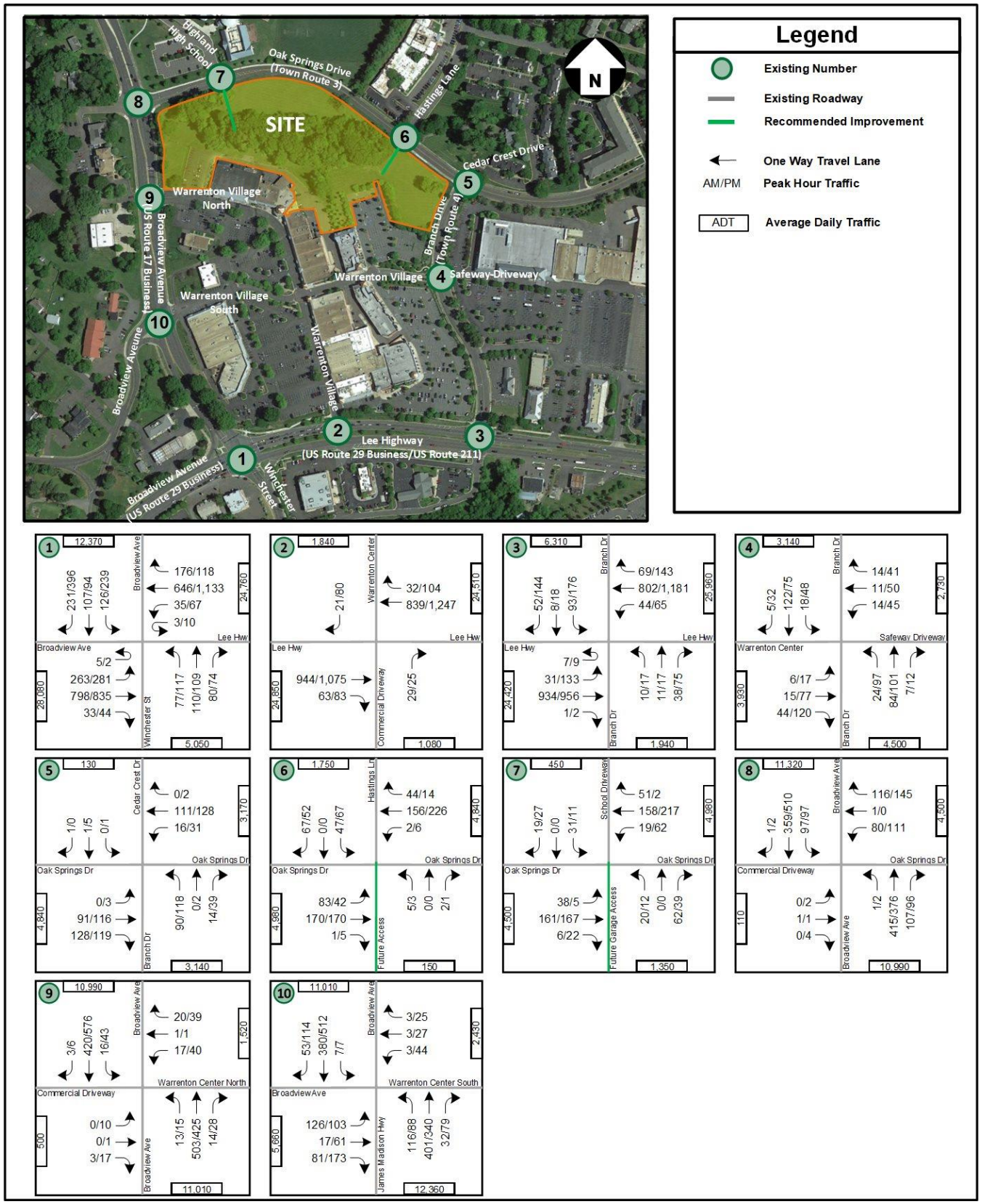


Figure 20: 2027 Future Conditions with Development

Future with Development Intersection Capacity and Queuing Analysis

Intersection capacity and queueing analyses were performed for the 2027 Future Conditions without Development scenario at the study area intersections during the AM and PM peak hours, in accordance with VDOT's *TOSAM* (version 2) guidelines. *Synchro,* version 11, was used to analyze the study intersections with results based on TRB's HCM 6th methodology and include LOS, delay, and queue length comparisons for the turning movements analyzed. Roundabouts were analyzed using *Sidra*, version 9.

For the purposes of this analysis, the intersection PHF utilized in the analysis of future conditions was determined based on the existing traffic counts, with a minimum of 0.92 as agreed to in the scoping document. The HV% were based on the existing conditions scenario, with any new approaches utilizing a default *Synchro* value of 2.0% per movement. Note that for analysis purposes, all turning movement counts were coded with a minimum volume of one vehicle in *Synchro*.

Per the scoping meeting with VDOT and the Town staff, it would be considered acceptable and/or desirable to achieve an approach LOS of D or better for traffic operations using the HCM methodology. The results of the intersection capacity and queuing analyses from *Synchro* are presented in **Table 7** and graphically in **Figure 21.** The results are expressed in LOS and delay (seconds per vehicle) for overall signalized intersections and per approach and lane group for all study intersections. The overall signalized intersections and any approaches that operate at LOS E or F are displayed in red.

The queue lengths were reported as the 95th percentile queues determined from *Synchro* and are expressed in feet. The lane groups where the queue lengths exceeded the available effective storage capacity of existing turn lanes are displayed in red.

The detailed analysis worksheets of the 2027 Future Conditions with Development scenario are contained in Appendix I.

Table 7: 2027 Future Conditions without Development – Intersection Capacity Analysis Results

No.	Intersection (Movement)	Effective Storage Length (ft.)	AM Peak Hour			PM Peak Hour		
			LOS	Delay (sec/veh)	95th % Queue (ft.) [2]	LOS	Delay (sec/veh)	95th % Queue [2]
			Synchro			Synchro		
1	**Broadview Ave (E/W) at Winchester St (N/S)**							
	Overall Intersection (Roundabout)		**B**	**10.1**		**B**	**19.3**	
	Eastbound Approach		***A***	***9.4***		***B***	***11.5***	
	Eastbound Left/Thru		A	10.0	111	B	12.4	170
	Eastbound Thru/Right		A	8.9	116	B	10.8	172
	Westbound Approach		***B***	***10.5***		***B***	***16.3***	
	Westbound Left/Thru		A	11.4	116	B	17.7	272
	Westbound Thru/Right		B	9.8	117	B	15.3	291
	Northbound Approach		***B***	***11.9***		***B***	***13.3***	
	Northbound Left/Thru		B	11.5	47	B	13.2	62
	Northbound Right		B	12.7	23	B	13.7	23
	Southbound Approach		***B***	***10.1***		***D***	***39.6***	
	Southbound Left/Thru		A	9.5	47	D	39.5	170
	Southbound Right		B	10.8	53	D	39.7	172
2	**Broadview Ave (E/W) at Warrenton Village Center Dwy (Chipotle)/Walgreens Dwy (N/S)**							
	Overall Intersection (TWSC)							
	Northbound Approach		***B***	***13.0***		***B***	***13.9***	
	Northbound Right		B	13.0	5	B	13.9	5
	Southbound Approach		***B***	***10.8***		***B***	***13.9***	
	Southbound Right		B	10.8	3	B	13.9	15
3	**Broadview Ave (E/W) at Branch Dr (N/S)**							
	Overall Intersection (Signalized)		**C**	**23.0**		**D**	**35.8**	
	Eastbound Approach		***B***	***19.0***		***C***	***28.1***	
	Eastbound Left	240	E	67.0	80	E	75.4	224
	Eastbound Thru		B	17.0	485	C	21.1	441
	Eastbound Right	330	B	11.6	0	B	14.7	0
	Westbound Approach		***B***	***18.0***		***C***	***31.6***	
	Westbound Left	150	E	67.4	88	E	78.5	123
	Westbound Thru		B	15.8	400	C	30.4	675
	Westbound Right	150	B	11.6	0	B	19.3	26
	Northbound Approach		***E***	***62.1***		***E***	***67.0***	
	Northbound Left/Thru		E	63.0	47	E	68.6	73
	Northbound Right	60	E	61.6	0	E	66.2	0
	Southbound Approach		***E***	***63.4***		***E***	***68.7***	
	Southbound Left/Thru		E	66.7	162	E	78.1	#338
	Southbound Right		E	57.2	0	E	56.4	58
4	**Warrenton Village Center Dwy/Shopping Center Dwy (E/W) at Branch Dr (N/S)**							
	Overall Intersection (TWSC)							
	Eastbound Approach		***A***	***9.5***		***B***	***12.5***	
	Eastbound Left/Thru/Right		A	9.5	8	B	12.5	35
	Westbound Approach		***B***	***10.4***		***C***	***16.0***	
	Westbound Left/Thru/Right		B	10.4	5	C	16.0	33
	Northbound Approach							
	Northbound Left		A	7.5	3	A	7.6	5
	Southbound Approach							
	Southbound Left		A	7.4	0	A	7.5	3
5	**Oak Springs Dr (E/W) at Branch Dr (N/S)**							
	Overall Intersection (TWSC)							
	Eastbound Approach							
	Eastbound Left		A	0.0	0	A	7.5	0
	Westbound Approach							
	Westbound Left		A	7.8	0	A	7.8	3
	Northbound Approach		***B***	***11.8***		***B***	***13.1***	
	Northbound Left/Thru		B	12.2	15	B	14.3	25
	Northbound Right		A	9.2	3	A	9.5	5
	Southbound Approach		***B***	***10.1***		***B***	***11.3***	
	Southbound Left/Thru/Right		B	10.1	0	B	11.3	0

Table 7 (Continued): 2027 Future Conditions without Development – Intersection Capacity Analysis Results

No.	Intersection (Movement)	Effective Storage Length (ft.)	AM Peak Hour			PM Peak Hour		
			LOS	Delay (sec/veh)	95th % Queue (ft.) [2]	LOS	Delay (sec/veh)	95th % Queue [2]
			Synchro			Synchro		
6	**Oak Springs Dr (E/W) at Hastings Ln / Future Access (N/S) Overall Intersection (TWSC)**							
	Eastbound Approach							
	Eastbound Left		A	7.9	5	A	7.9	3
	Westbound Approach							
	Westbound Left		A	7.6	0	A	7.6	0
	Northbound Approach		***B***	***13.6***		***B***	***13.1***	
	Northbound Left/Thru/Right		B	13.6	3	B	13.1	0
	Southbound Approach		***B***	***12.1***		***B***	***12.5***	
	Southbound Left/Thru/Right		B	12.1	18	B	12.5	20
7	**Oak Springs Dr (E/W) at Highland School Dwy / Future Garage Access (N/S) Overall Intersection (TWSC)**							
	Eastbound Approach							
	Eastbound Left	75	A	7.7	3	A	7.7	0
	Westbound Approach							
	Westbound Left		A	7.6	0	A	7.8	3
	Northbound Approach		***B***	***10.8***		***B***	***11.0***	
	Northbound Left/Thru/Right		B	10.8	10	B	11.0	8
	Southbound Approach		***B***	***12.6***		***B***	***11.1***	
	Southbound Left/Thru		B	14.6	8	B	14.7	3
	Southbound Right		A	9.4	3	A	9.6	3
8	**Oak Springs Dr (E/W) at Broadview Ave (N/S) Overall Intersection (TWSC)**							
	Eastbound Approach		***C***	***18.1***		***C***	***17.1***	
	Eastbound Left/Thru/Right		C	18.1	0	C	17.1	3
	Westbound Approach		***C***	***22.4***		***D***	***32.9***	
	Westbound Left/Thru	125	E	39.0	55	F	61.8	103
	Westbound Right		B	10.7	15	B	10.8	20
	Northbound Approach							
	Northbound Left	90	A	8.1	0	A	8.5	0
	Southbound Approach							
	Southbound Left	225	A	9.1	10	A	8.8	8
9	**Warrenton Village North Dwy (E/W) at Broadview Ave (N/S) Overall Intersection (TWSC)**							
	Eastbound Approach		***C***	***16.0***		***C***	***20.7***	
	Eastbound Left/Thru/Right		C	16.0	3	C	20.7	10
	Westbound Approach		***C***	***16.3***		***C***	***20.3***	
	Westbound Left		C	22.8	8	D	30.0	23
	Westbound Thru/Right		B	11.1	3	B	10.7	5
	Northbound Approach							
	Northbound Left	150	A	8.3	0	A	8.8	3
	Southbound Approach							
	Southbound Left	110	A	8.6	3	A	8.5	3
10	**Warrenton Village South Dwy/Broadview Ave (E/W) at Broadview Ave/Winchester St (N/S) Overall Intersection (TWSC)**							
	Eastbound Approach		***D***	***34.4***		***E***	***35.6***	
	Eastbound Left		F	51.0	100	F	71.7	108
	Eastbound Thru		D	27.8	8	E	42.2	45
	Eastbound Right		B	10.1	10	B	11.7	25
	Westbound Approach		***C***	***21.2***		***E***	***40.2***	
	Westbound Left		D	26.6	3	F	60.0	45
	Westbound Thru/Right		C	18.5	3	C	23.5	20
	Northbound Approach							
	Northbound Left	160	A	8.7	10	A	9.4	8
	Southbound Approach							
	Southbound Left	160	A	8.3	0	A	8.3	0

NOTES:

[1] Effective storage length is based on the storage length plus one-half of the taper length per TOSAM guidelines.

[2] #: 95th percentile queues (reported from Synchro) exceed capacity; actual queues may be longer. Queues shown are based on the maximum after two cycles.

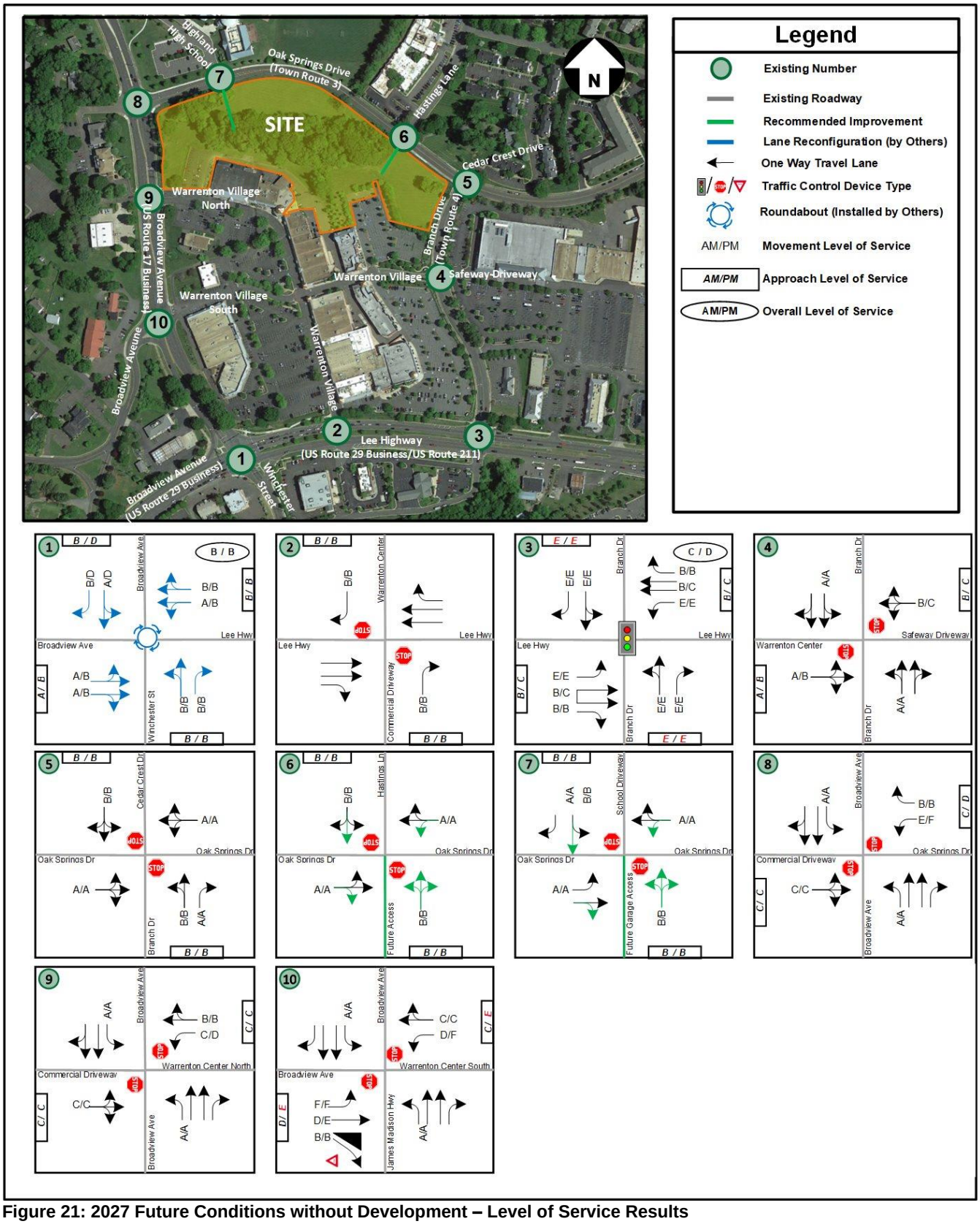


Figure 21: 2027 Future Conditions without Development – Level of Service Results

As mentioned previously, per the agreed upon scoping document, it would be considered desirable to achieve an approach LOS D or better for traffic operations using HCM methodology. Furthermore, if an overall intersection or approach was operating at an unacceptable LOS under future without development conditions, it was assumed acceptable to achieve non-degradation.

The planned roundabout is expected to operate at an overall LOS B with all approaches operating at LOS D or better during the AM and PM peak hours.

Based on the capacity analysis of 2027 Future Conditions without Development, the signalized study intersection is expected to continue to operate at overall levels of service of D or better during both the AM and PM peak hours.

Based on the capacity analysis of 2027 Future Conditions without Development, the approaches of all study intersections continue to operate at approach levels of service of D or better during both the AM and PM peak hours, except for the following study intersections that have at least one approach that would operate at level of service E of F (similar to 2027 Future Conditions without Development) during at least one peak hour:

- Study Intersection 3: Lee Highway (US 211/US 29 BUS) at Branch Drive
- Study Intersection 10: Broadview Avenue at Warrenton Village South

Based on the queuing analysis performed for 2027 Future Conditions without Development, all turning movements at the study intersections have maximum queue lengths that are accommodated within the available storage lengths of the turn bays.

Note that Study Intersection 10 (Broadview Avenue at Warrenton Village South) was previously identified by the Town for construction of a roundabout but was not selected for funding and therefore not included in the analysis. Therefore, no improvements are recommended for construction by the proposed Development.

In general, the signalized intersection would operate with longer vehicular delays for the side-streets and mainline left turning movements. These delays are a result of VDOT prioritization of through traffic on the mainline, as is typical along commuter corridors, to accommodate the largest possible volume of through traffic in the area along the mainlines and therefore have a better overall traffic operation than if all movements were prioritized equally.

No improvements are warranted or recommended as part of the proposed Development.

Preliminary Left and Right Turn Lane Warrant Assessments

Left and right turn lane warrants are based off VDOT's Road Design Manual (RDM), Appendix F. In order to determine the need for exclusive left and/or right turn lanes or tapers at the study intersections, the traffic data and anticipated development program provided in the 2027 Future Conditions with Development scenario section were utilized.

Warrants for right-turn storage lanes on two- and four-lane highways at intersections are based on Figure 3-26 and Figure 3-27 in Appendix F of VDOT's RDM. These figures provide a graphical representation for determining the necessity of a right turn lane by comparing the total volumes of a given approach with their respective right turn volumes.

Warrants for left-turn storage lanes on two-lane highways at unsignalized intersections are based on Figure 3-5 to Figure 3-21 in Appendix F of VDOT's RDM. The figures provide graphical representations for determining the necessity of a left turn lane by comparing the advancing volumes of a given approach and the respective opposing volumes with respect to the percentage of left turning vehicles of the advancing volumes and the design speed of a given roadway.

If the turn lanes and / or tapers are not provided or would not meet the minimum requirements per VDOT's RDM, turn lane waivers requests would need to be submitted as separate documentation and be approved by VDOT.

A summary of the turn lane warrant analysis is presented in **Table 8** through **Table 11**.

Table 8: Summary of Left Turn Lane Warrants at Site Entrances (2-Lane) – Build 2027

Study Scenario	Opposing Vol. (VPH)	Advancing Vol. (VPH)	Left Turn Vol. (VPH)	Left Turn %	Minimum Opposing Threshold (VPH)	VDOT RDM F Figure	Treatment
INT 6 - WBL AM - TF 2027	254	202	2	0.99%	1,208	Fig. 3-4	Not Warranted
INT 6 - WBL PM - TF 2027	217	246	6	2.44%	1,054	Fig. 3-4	Not Warranted
INT 7 - WBL AM - TF 2027	205	228	19	8.33%	841	Fig. 3-5	Not Warranted
INT 7 - WBL PM - TF 2027	194	281	62	22.06%	274	Fig. 3-8	Not Warranted

Table 9: Summary of Right Turn Lane Warrants at Site Entrances (2-Lane) - Build 2027

Study Scenario	Approach Volume	Right Turn Volume	Minimum Right Turn Taper Threshold	Minimum Right Turn Full Lane Threshold	Treatment
INT 4 - NBR - 2027 TF AM Peak	95	7	37	90	Not Warranted
INT 4 - NBR - 2027 TF PM Peak	149	12	36	90	Not Warranted
INT 4 - SBR - 2027 TF AM Peak	90	5	37	90	Not Warranted
INT 4 - SBR - 2027 TF PM Peak	119	32	36	90	Not Warranted

Table 10: Summary of Left Turn Lane Warrants at Brach Drive (Study Intersection 4) (4-Lane) - Existing 2023

Study Scenario	Opposing Vol. (VPH)	Advancing Vol. (VPH)	Left Turning Vol.	Left Turn %	Treatment
INT 4 - NBL - 2023 EX AM Peak	90	95	23	24.2%	Not Warranted
INT 4 - NBL - 2023 EX PM Peak	119	149	94	63.1%	Full-width Turn Lane and Taper Warranted (for Undivided and Divided)
INT 4 - SBL - 2023 EX AM Peak	95	90	18	20.0%	Not Warranted
INT 4 - SBL - 2023 EX PM Peak	149	119	48	40.3%	Full-width Turn Lane and Taper Warranted (for Undivided)

Table 11: Summary of Left Turn Lane Warrants at Brach Drive (Study Intersection 4) (4-Lane) – Build 2027

Study Scenario	Opposing Vol. (VPH)	Advancing Vol. (VPH)	Left Turning Vol.	Left Turn %	Treatment
INT 4 - NBL - 2027 TF AM Peak	145	115	24	20.9%	Not Warranted
INT 4 - NBL - 2027 TF PM Peak	155	210	97	46.2%	Full-width Turn Lane and Taper Warranted (for Undivided and Divided)
INT 4 - SBL - 2027 TF AM Peak	115	145	18	12.4%	Not Warranted
INT 4 - SBL - 2027 TF PM Peak	210	155	48	31.0%	Full-width Turn Lane and Taper Warranted (for Undivided)

No turn lanes are warranted at the site entrances. At the request of VDOT and the Town, turn lanes were evaluated at the Study Intersection 4 (Branch Drive at Warrenton Village Driveway / Safeway Driveway). The northbound left turn lane is warranted under Build 2027 conditions, but it is also warranted under existing conditions. Therefore, a northbound left turn

lane on Branch Drive is not recommended to be installed by the proposed Development. Graphics and information regarding the methodology used to determine the turn lane warrants are provided in Appendix J.

Preliminary Access Management Evaluation (Intersection Spacing)

The minimum spacing standards for the Commonwealth of Virginia are specified in VDOT's Road Design Manual (RDM). Appendix F of the RDM focuses primarily on access management practices. The minimum spacing standard are particularly specified in Table 2-2 through Table 2-4. Table 2-2 provides guidance on the minimum spacing standard for commercial entrances, intersections, and median crossovers, and are based on a roadway's speed limit and functional classification. Table 2-3 and 2-4 provide guidance for minimum spacing standards for the spacing between interchanges and intersections or commercial entrances.

As mentioned previously, Oak Springs Road is classified by VDOT as "Major Collector," with a posted speed limit of 25 mph. Based on the applicable intersection spacing requirements (centerline-to-centerline) per RDM Appendix F Table 2-2, **Table 12** lists the summary of the future intersections with corresponding roadway information and the appropriate distance requirements. **Figure 22** shows the approximate proposed distances between the study intersections and the corresponding required distances with the proposed intersections in place for the Site.

Table 12: Future Intersection Spacing

Functional Classification	Design Speed (See Note 2)	Minimum Spacing (Distance) in Feet			
		Type 1 (Signalized)	Type 2 (Unsignalized/ Full Crossover)	Type 3 (Full Access /Directional Crossover)	Type 4 (Partial Access)
Principal Arterial	≤ 30 mph	1,050	880	440	250
	35 to 45 mph	1,320	1,050	565	305
	≥ 50 mph	2,640	1,320	750	495
Minor Arterial	≤ 30 mph	880	660	355	200
	35 to 45 mph	1,050	660	470	250
	≥ 50 mph	1,320	1,050	555	425
Collector	≤ 30 mph	660	440	225	200
	35 to 45 mph	660	440	335	250
	≥ 50 mph	1,050	660	445	360
Local Street	See Note 1				

TABLE 2-2 MINIMUM SPACING STANDARDS FOR COMMERCIAL ACCESSES, INTERSECTIONS AND MEDIAN CROSSOVERS*

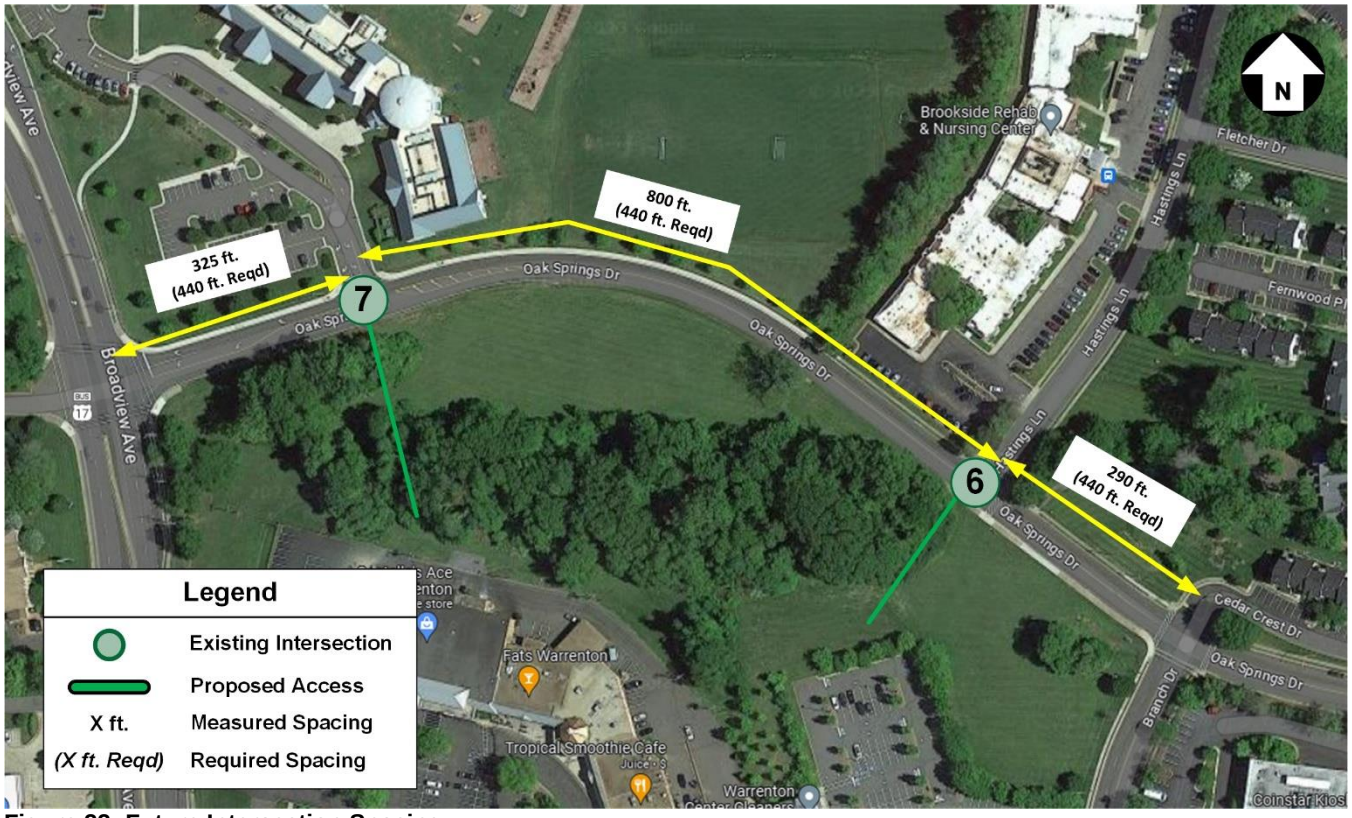


Figure 22: Future Intersection Spacing

As described in

Table 12**2** and depicted in **Figure 22,** the two proposed entrances do not meet the spacing requirements for unsignalized intersections on a 25 mph Major Collector. However, the entrances are proposed as the fourth leg to existing intersections instead of creating new entrances with offsets. However, Oak Springs Drive does not appear to be a VDOT maintained roadway, so an Access Management Exception (AM-E) request will not be submitted.

Preliminary Signal Warrant Analysis

Signal warrants are based on *Chapter 4C: Traffic Control Signal Needs Studies* of the Federal Highway Administration's (FHWA) Manual on Uniform Traffic Control Devices (MUTCD), 2009 Edition. Chapter 4C discusses nine (9) separate warrants, by which only one warrant needs to be satisfied to justify the installation of a traffic control signal. In order to provide an assessment for the possible signalization of Broadview Avenue at Oak Springs Road (Study Intersection 8) under the build 2027 traffic volumes, Warrant Two (Four-Hour Vehicular Volume) was analyzed, since the warrant usually is a significant factor signalization and is often the warrant that is most readily satisfied for typical conditions.

Portions of the MUTCD used in this analysis are provided in Appendix K.

Warrant Two: Four-Hour Vehicular Volume

Warrant Two is satisfied when the plotted points representing the vehicles per hour (vph) on the major street (total of both approaches and the corresponding vph on the high-volume minor-street approach (one direction only), for each of any four hours of an average day, all fall above either MUTCD Figure 4C-1 or Figure 4C-2 (depending on the applicability) for the future combination of approach lanes.

The traffic volumes utilized to evaluate Warrant Two, using Figure 4C-1 are shown in **Table 13** for the study intersection. It should be noted that the intersection was analyzed as being two lanes on the major approach and one lane on the minor approach. In addition, only two hourly volumes were utilized, the build 2027 AM and PM peak hour volumes, because it is not anticipated that the other hourly volumes would be any higher or more likely to satisfy the conditions than that of the two selected. Lastly, as the capacity analysis of future conditions indicated that 100% of right turners could perform right turn maneuvers on red from the side-street approaches and there are currently exclusive northbound and westbound right turn lanes, a 100% right turn on red (RTOR) reduction was applied to all approaches, as depicted below.

Table 13: Volume Projections – Broadview Avenue at Oak Springs Road (Intersection 8)

Time Period	Broadview Ave (NB/SB)	Oak Springs Dr (WBL)
7:30AM to 8:30 AM	872	80
4:00 PM to 5:00 PM	985	110

Note: 100% right turn reductions are applied on all approaches

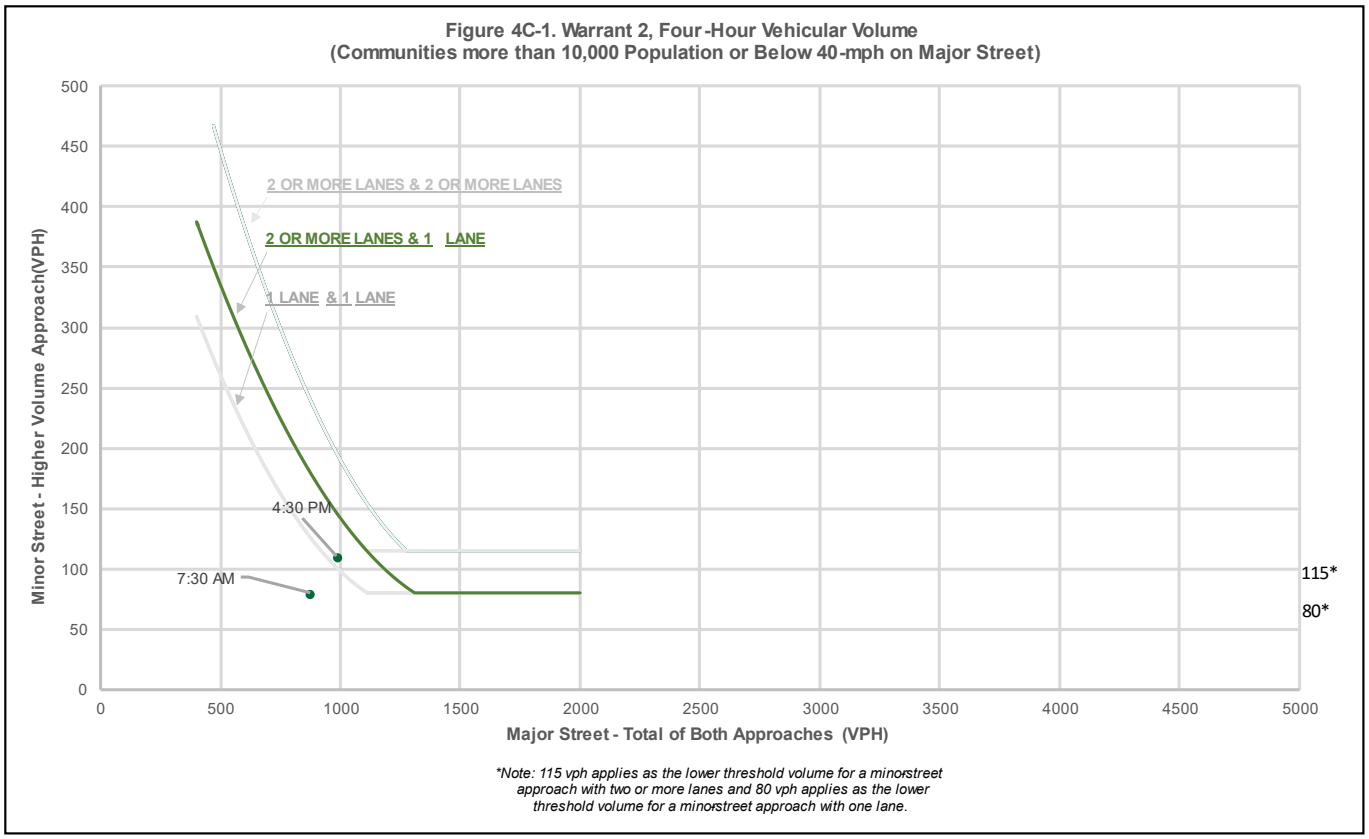


Figure 23: Four-Hour Warrant Analysis – Broadview Avenue at Oak Springs Road (Intersection 8)

As seen in the figure above, the build 2027 peak hour traffic volumes with a 100% RTOR reduction does not meet the threshold for two of the four hours required. As mentioned earlier, it is most likely that the next two hours with the highest traffic volume will generate even lower trips than the AM and PM peak hours. Therefore, based on traffic volumes, a signal would not be warranted at this intersection under this analysis.

The minor street volume is above the minimum threshold of 80 vehicles to warrant a signal; however, the major street volume is not high enough.

Additionally, the capacity analysis in the 2011 TIA shows that all reported movements at this unsignalized study intersection are anticipated to operate at LOS C or better during both AM and PM peak hours. This capacity analysis is acceptable and an indication that there is not an operational need for signalization.

Bicycle and Pedestrian Accommodations

The property currently contains a sidewalk with a buffer across the north side of the Oak Springs frontage. The existing sidewalk will be maintained with the proposed development, and sidewalk will be constructed along the south side of Oak Springs Road across the property frontage. There is at least one crosswalk at every study intersection, with the exception of Study Intersection 2 (Lee Highway at Warrenton Village / Chick-fil-a Driveway).

The school and mixed-use area create opportunities for the proposed Site to create paths and areas for multimodal connectivity. As shown on the concept plan, The Site is proposing a multitude of improvements that will increase pedestrian connectivity throughout the entire area. New sidewalks will be added along the entire perimeter of all residential blocks, including direct sidewalk connectivity to ground floor units. The extension of Hastings Lane and accompanying sidewalks will offer a new pedestrian access point from Oak Springs Drive. The proposed road that will connect the Hastings Lane extension through the existing commercial building and into the heart of the retail center via a new cut-through street that will allow maximum ease to walk from one side of the site to the other.

The unsignalized pedestrian crossings were reviewed as per TE-384.1 and will be submitted as a separate document.

Conclusions

This report presents the findings of a Traffic Impact Analysis (TIA) conducted for the proposed Warrenton Village Center (the Site / the Development / the Property) along the southern frontage of Oak Springs Drive (Town Route 3), east of Broadview Avenue (US Route 17 Business) and west of Branch Drive (Town Route 4) in the Town of Warrenton, Virginia

The development will be situated on a single parcel of vacant land (approximately 6.46 acres) and a portion of an adjacent developed parcel of land, which can be identified on Fauquier County Tax Maps with the following GPIN #s: 6985-20-7247-000, and 6984-29-6753-000, respectively. The property is currently zoned as C (Commercial District) with a Future Land Use of Mixed Use as part of the New Town Warrenton Character District (Lee Highway Urban Development Area [UDA]).

The Applicant is proposing to apply for a Special Use Permit (SUP) in order to construct approximately 386 multifamily residential dwelling units (320 multifamily apartments, 36 2-over-2 units, and 30 townhomes) and a parking deck. The site has an anticipated build-out date of 2027.

Access to the site will be provided via one full movement parking deck entry along Oak Springs Drive (Town Route 3) forming the fourth leg of the High School Driveway, one full movement driveway along Oak Springs Drive forming the fourth leg to the existing full-movement intersection of Hastings Lane, and via the existing shopping center accesses to the south.

Analysis Components

- 2023 existing volumes were derived via turning movement counts collected at intersections within the study area in February 2023.
- As determined based on review comments from VDOT and the Town, an inherent regional growth of 1.0% per year was applied to the Lee Highway mainline through movements at the intersection of Lee Highway at Broadview Avenue (US Route 17 Business). The growth volumes were balanced along the road network by increasing the mainline through movements at subsequent study intersections along the road network where applicable for the period between 2023 and 2027 to account for 2027 conditions.
- The trip generation associated with the Site was based on the ITE Trip Generation Manual, 11th Edition publication. The Site in total is expected to generate approximately 154 new trips during the AM peak hour, 197 new trips during the PM peak hour, and 2,602 new daily trips on a typical weekday.
- Intersection capacity and queuing analyses were performed for all analysis scenarios at the study area intersections during the weekday morning (AM) and weekday afternoon (PM) peak hours. *Synchro*, version 11, was used to analyze the study intersections with results based on the Transportation Research Board's (TRB) Highway Capacity Manual (HCM) methodology and analysis guidelines provided in VDOT's Traffic Operations and Safety Analysis Manual (TOSAM) (version 2). The analysis herein includes level of service (LOS), delay, and queue length comparisons for the turning movements analyzed.
- The analysis also considers an assessment of historical crash data at all existing study intersections.
- The analysis also includes preliminary access management assessment and turn lane warrant assessments for the Site access points along Oak Springs Drive.

Analysis Results

2023 Existing Conditions

- Based on the capacity analysis of Existing Conditions, the two signalized study intersections operate at an overall level of service D or better during both the AM and PM peak hours.

- Based on the capacity analysis of Existing Conditions, three study intersections have at least one approach that operates at levels of service (LOS E or F) for at least one peak hour. The remaining intersection approaches operate at acceptable levels of service during both peak hours.
- Based on the analysis of the Synchro 95th percentile queue lengths, all turning movements have queue lengths that can be accommodated within the available storage length of the turn bays, except the southbound left turn movement at Study Intersection 1 (Broadview Avenue / Lee Highway at Winchester Street).

2027 Future Conditions without Development

- Based on the capacity analysis of 2027 Future Conditions with Development, the signalized study intersection would operate at an overall level of service D or better during both the AM and PM peak hours.
- The planned roundabout is expected to operate at an overall LOS B or better with all approaches operating at LOS D or better during the AM and PM peak hours.
- Based on the capacity analysis of 2027 Future Conditions without Development, two study intersections have at least one approach that would operate at levels of service (LOS E or F) for at least one peak hour. The remaining intersection approaches would operate at acceptable levels of service during both peak hours.
- Based on the analysis of the Synchro 95th percentile queue lengths, all turning movements have queue lengths that could be accommodated within the available storage length of the turn bays.

2027 Future Conditions with Development

- The Site is expected to generate approximately 154 new total trips during the AM peak hour, 197 new trips during the PM peak hour and 2,602 new trips during a typical weekday.
- Based on the capacity analysis of 2027 Future Conditions with Development, the signalized study intersection would operate at an overall level of service D or better during both the AM and PM peak hours.
- The planned roundabout is expected to operate at an overall LOS B with all approaches operating at LOS D or better during the AM and PM peak hours.
- Based on the capacity analysis of the 2027 Future Conditions with Development, two study intersections have at least one approach that would operate at levels of service (LOS E or F) for at least one peak hour (similar to 2027 Future Conditions without Development) during the AM and PM peak hours. The remaining intersection approaches would operate at acceptable levels of service during both peak hours.
- Based on the queuing analysis performed for the 2027 Future Conditions with Development, all turning movements have queue lengths that could be accommodated within the available storage length of the turn bays.

Overall Conclusion

Based on the capacity and queueing analysis results, the proposed Development will not have a substantial impact to the surrounding transportation and roadway network, assuming that the site is constructed as depicted on the concept plan. No improvements are warranted or recommend to accommodate the proposed Development.

Transportation Technical Appendix

Warrenton Village Center

Town of Warrenton, Virginia

GOROVE SLADE
Transportation Planners and Engineers

TABLE OF CONTENTS

A. Signed Scoping Document

THIS IS NOT A CHAPTER 870 STUDY

VDOT Virginia Department of Transportation	PRE-SCOPE OF WORK MEETING FORM Information on the Project Traffic Impact Analysis Base Assumptions

The applicant is responsible for entering the relevant information and submitting the form to VDOT and the locality no less than three (3) business days prior to the meeting. If a form is not received by this deadline, the scope of work meeting may be postponed.

Contact Information			
Consultant Name: Tele: E-mail:	Kevin Sitzman, Gorove Slade Associates, Inc. 703.787.9595 kevin.sitzman@goroveslade.com		
Developer/Owner Name: Tele: E-mail:	Jess Achenbach jachenbach@castledp.com		
Project Information			
Project Name:	Warrenton Village Mixed-Use Center	Locality/County:	Town of Warrenton
Project Location: (Attach regional and site specific location map)	The proposed development will be located primarily along the southern frontage of Oak Springs Drive (Town Route 3), east of Broadview Avenue (US Route 17 Business) and west of Branch Drive (Town Route 4) in the Town of Warrenton, Virginia. **(See Figure 1).**		
Submission Type	Comp Plan ☐	REZ/SUP ☒	Site Plan ☐ / Subd Plat ☐
Project Description: (Including details on the land use, acreage, phasing, access location, etc. Attach additional sheet if necessary)	The development will be situated on a single parcel of vacant land (approximately 6.46 acres) and a portion of an adjacent developed parcel of land, which can be identified on Fauquier County Tax Maps with the following GPIN #s: 6985-20-7247-000, and 6984-29-6753-000, respectively. The property is currently zoned as C (Commercial District) with a Future Land Use of Mixed Use as part of the New Town Warrenton Character District (Lee Highway Urban Development Area [UDA]). The Applicant is proposing to apply for a Special Use Permit (SUP) in order to construct approximately 376 multifamily residential dwelling units (320 multifamily apartments, 36 2-over-2 units, and 20 townhomes) and a parking deck. The site has an anticipated build-out date of 2027. Access to the site will be provided via one full movement parking deck entry along Oak Springs Drive (Town Route 3) forming the forth leg of the High School Driveway, one full movement driveway along Oak Springs Drive forming the fourth-leg to the existing full-movement intersection of Hastings Lane, and via the existing shopping center accesses to the south.		
Proposed Use(s): (Check all that apply; attach additional pages as necessary)	Residential ☒ / Commercial ☐ / Mixed Use ☐ / Other ☐		
	Residential Uses(s) ITE LU Code(s): 220 Number of Units: 376 **Other Use(s)**	**Commercial Use(s)** ITE LU Code(s): Square Ft or Other Variable:	

It is important for the applicant to provide sufficient information to county and VDOT staff so that questions regarding geographic scope, alternate methodology, or other issues can be answered at the scoping meeting.

	ITE LU Code(s): Square Ft or Other Variable:			
Total Peak Hour Trip Projection:	Less than 100 ☐	100 – 499 ☒	500 – 999 ☐	1,000 or more ☐

Traffic Impact Analysis Assumptions

Study Period	Existing Year: 2023	Build-out Year: 2027	Design Year: N/A
Study Area Boundaries (Attach map)	North: Oak Springs Drive (Town Route 3)		South: US Route 211 / 29 Business
	West: Broadview Avenue (US Route 17 Business)		East: Branch Drive (Town Route 4)
External Factors That Could Affect Project (Planned road improvements, other nearby developments)	Waterloo Junction Single Family homes along Patrick Ryan Way Smart Scale Roundabouts 1. Broadview/Winchester/Lee 2. Roebling/Broadview		
Consistency With Comprehensive Plan (Land use, transportation plan)	Yes		
Available Traffic Data (Historical, forecasts)	2023 TMC's VDOT Historical AADT Data		
Trip Distribution **(Please refer to attached Figure 2 in Supplement)**	Road Name: (to/from the North) – N/A		Road Name: (to/from the South) – N/A
	Road Name: (to/from the West) – N/A		Road Name: (to/from the East) – N/A
Annual Vehicle Trip Growth Rate: (See Note 2.)	1.0%/yr. (2023 to 2027)	Peak Period for Study (check all that apply)	☒ AM ☒ PM ☐ SAT
		Peak Hour of the Adj. (to be used in study)	AM: 150 / PM: 192 / Daily: 2,534

Study Intersections and/or Road Segments (Attach additional sheets as necessary) **(Please refer to attached Figure 1.)**				
	1.	Broadview Avenue (US Route 17) / Lee Highway at Broadview Avenue / Winchester Street	6.	Oak Springs Drive (Town Route 3) at Hastings Lane / Future Access
	2.	Lee Highway (US Route 17) at Warrenton Village Center Driveway at Chick-fil-a Driveway	7.	Oak Springs Drive (Town Route 3) at Highland School Driveway / Future Garage Access
	3.	Lee Highway (US Route 17) at Branch Drive (Town Route 4)	8.	Broadview Avenue (US Route 17 Business) at Oak Springs Drive (Town Route 3)
	4.	Branch Drive (Town Route 4) at Warrenton Village Driveway / Safeway Driveway	9.	Broadview Avenue (US Route 17 Business) at Warrenton Village Center South Driveway
	5.	Oak Springs Drive (Town Route 3) at Branch Drive (Town Route 4) / Cedar Crest Drive	10.	Broadview Avenue (US Route 17 Business) at Warrenton Village Center North Driveway

It is important for the applicant to provide sufficient information to county and VDOT staff so that questions regarding geographic scope, alternate methodology, or other issues can be answered at the scoping meeting.

Trip Adjustment Factors	Internal allowance Reduction: ☐ Yes ☒ No	Pass-by allowance Reduction: ☐ Yes ☒ No
Software Methodology	☒ Synchro ☐ HCS (v.2000/+) ☒ SIDRA ☐ CORSIM ☐ Other _____	
Traffic Signal Proposed or Affected (Analysis software to be used, progression speed, cycle length)	Existing traffic signals that could be affected: 1. Broadview Avenue (US Route 17) / Lee Highway at Broadview Avenue / Winchester Street 2. Lee Highway (US Route 17) at Branch Drive (Town Route 4) Analysis Software: Synchro version 11 Results: HCM 6 Methodology (See Note 7) Queue Lengths to be Reported: 95th Percentile	
Improvement(s) Assumed or to be Considered	Smart Scale Roundabouts 1. Broadview/Winchester/Lee 2. Roebling/Broadview	
Background Traffic Studies Considered	Waterloo Junction Single Family homes along Patrick Ryan Way	
Plan Submission	☐ Master Development Plan (MDP) ☒ Generalized Development Plan (GDP) ☐ Preliminary/Sketch Plan ☐ Other Plan type (Final Site, Subd. Plan)	
Additional Issues to be Addressed	☒ Queuing analysis ☐ Actuation/Coordination ☐ Weaving analysis ☐ Merge analysis ☒ Bike/Ped Accommodations ☒ Intersection(s) ☐ TDM Measures ☐ Other (_____)	

It is important for the applicant to provide sufficient information to county and VDOT staff so that questions regarding geographic scope, alternate methodology, or other issues can be answered at the scoping meeting.

NOTES on ASSUMPTIONS:

1. The scenarios to be included in the study are Existing Conditions (2023), Future without Development (2027) and Future with Development (2027). The study will analyze AM and PM peak hours.
2. Existing traffic volumes will be based on 2023 traffic count data. In order to project 2027 future conditions, a regional growth of 1.0% per annum will be applied to all turning movements at all study intersections.
3. Existing peak hour factors will be based on the traffic counts and utilized on a by-intersection basis. Peak hours factors by intersection in the range of 0.85 to 1.00 will be used for existing scenario. Peak hour factors of 0.92 will be used for all future scenarios if the existing peak hour factor by intersection is less than 0.92.
4. Heavy vehicle percentages (HV%) will be based on existing counts per movement. For any new leg or intersection, the HV% will be based on a default *Synchro* value of 2.0% per movement.
5. For any approach, a level of service (LOS) D or better would be considered as acceptable/desirable traffic operation condition. For all approaches, the projected future conditions without development LOS and delay will be maintained in the future with development condition. Will show intersection, approach, and movement LOS.
6. 95th percentile queues will be provided from *Synchro*.
7. HCM 6 methodology will be utilized where applicable; HCM 2000 methodology will be utilized if HCM 6 methodology is not applicable.
8. Preliminary access management and turn lane warrant assessments will be conducted for the site entrances.
9. Crash Data obtained from VDOT's Crash Analysis Tool will be analyzed at existing intersections.

SIGNED:  DATE: 6/30/2023
Applicant or Consultant

PRINT NAME: Kevin Sitzman
Applicant or Consultant

SIGNED: _____ DATE: _____
VDOT Representative

PRINT NAME: _____
VDOT Representative

SIGNED: _____ DATE: _____
Local Government Representative

PRINT NAME: _____
Local Government Representative

Table 1: Historic Growth (Based on VDOT Traffic Data)

Road Segment:	From:	To:	Published VDOT AADT					Growth Rate			
			2015	2016	2017	2018	2019	2015 - 2019	2016 - 2019	2017 - 2019	2018 - 2019
Broadview Avenue	Bus US 29 Lee Hwy	NCL Warrenton	10,000	10,000	10,000	10,000	11,000	2%	3%	5%	10%
Oak Springs Drive	Broadview Ave	Branch Dr	3,200	3,200	3,200	3,200	3,100	-1%	-1%	-2%	-3%
Branch Drive	Lee Highway	Oak Springs Drive	3,800	4,200	4,200	4,300	4,300	3%	1%	1%	0%

Figure 1: Site Location and Study Intersections

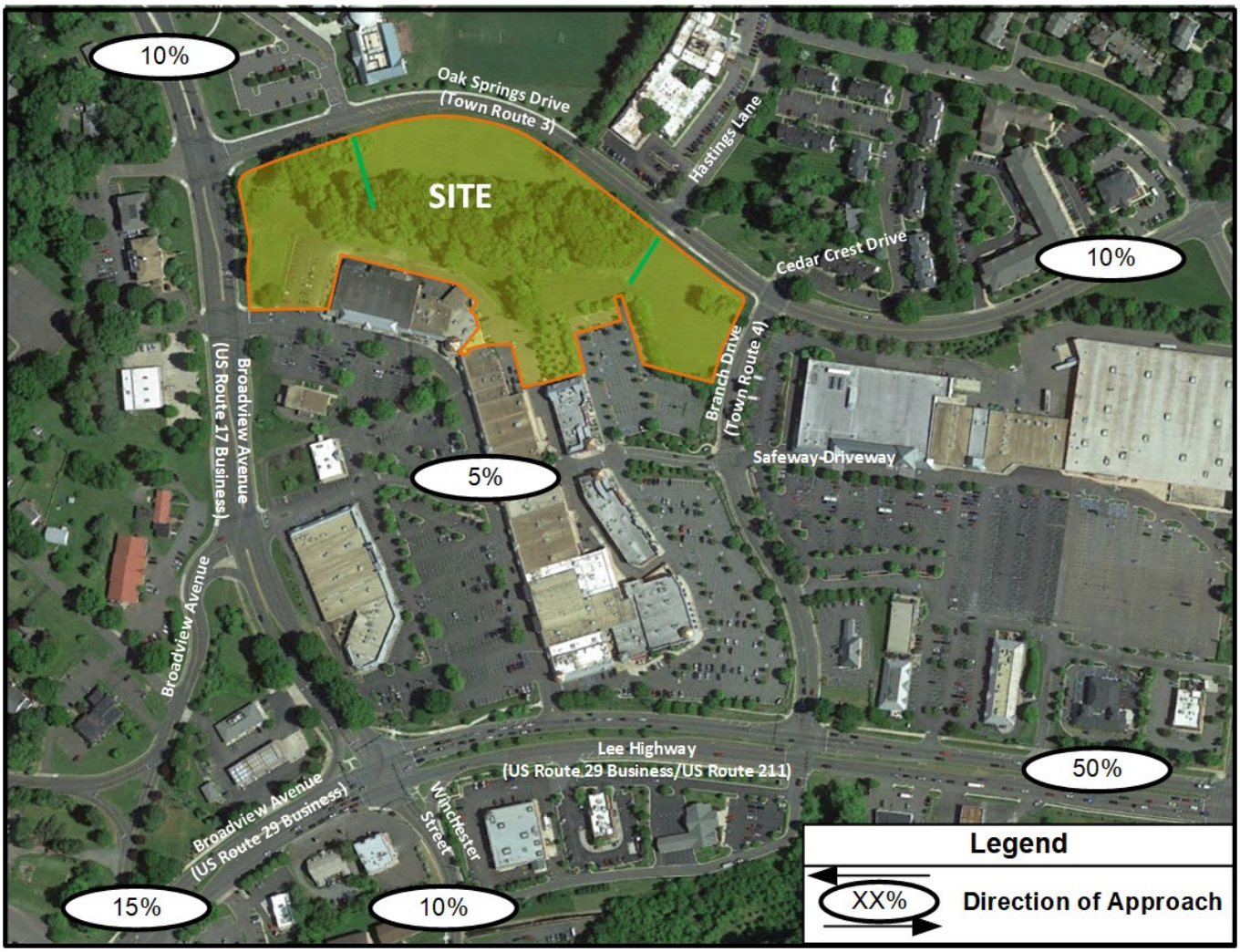


Figure 2: Direction of Approach

Table 2: Trip Generation – Peak Hour of the Adjacent Street (ITE 11th Edition) – To Be Used in Study

Land Use	ITE Code	Size	------ Weekday ------						
			AM Peak Hour			PM Peak Hour			Daily
			In	Out	Total	In	Out	Total	Total
Multifamily Housing	220	376 DU	36	114	150	121	71	192	2,534

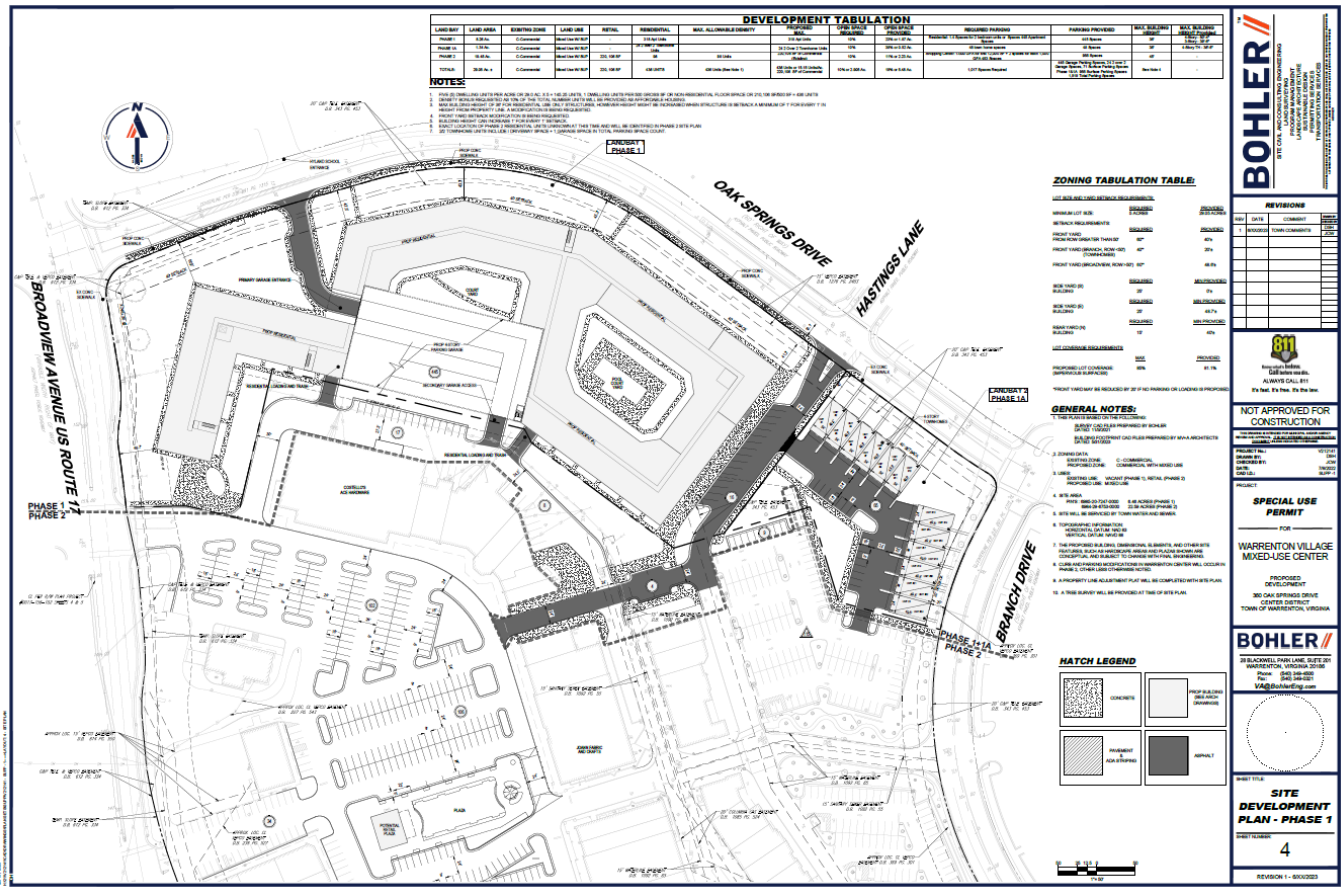


Figure 3: Illustrative Site Plan (Provided by Bohler)
Note: For conceptual purposes only.

B. Crash Data by Study Intersection

VDOT Crash Data Summary Table

Intersection Crash Analysis	Crash Data for the Intersection of Lee Highway (US 211/US 29 BUS) and Broadview Avenue (US 17 BUS) (May 2018 - April 2023)							
	2018	2019	2020	2021	2022	2023	Total	Relative Frequency
Crash Severity								
Fatal Collision (Type K)								0.00%
Injury Collision (Type A, B, and C)	2	6	1	1	2		12	30.00%
Type A	*1*						*1*	
Type B		*2*			*2*		*4*	
Type C	*1*	*4*	*1*	*1*			*7*	
Property Damage Only (Type PDO)	3	8	3	8	6		28	70.00%
TOTAL*	***5***	***14***	***4***	***9***	***8***		***40***	***100.00%***
Crash Type								
Fixed Object/ Single-Vehicle Crash								0.00%
Head-On								0.00%
Sideswipe / Same Direction		1			2		3	7.50%
Sideswipe / Opposite Direction								0.00%
Rear-End Collision	3	8	4	5	4		24	60.00%
Angle Collision	1	5		4	1		11	27.50%
Backed Into								0.00%
Pedestrian Collision								0.00%
Deer/Animal								0.00%
Other	1				1		2	5.00%
TOTAL*	***5***	***14***	***4***	***9***	***8***		***40***	***100.00%***
Other Factors								
Distracted Driver								0.00%
Alcohol**	1						1	2.50%
Work-Zone								0.00%
Inclement Weather (Non-Dry)		1			2		3	7.50%
Speeding	2						2	5.00%
Pedestrian Injury***								N/A
Time of Day								
AM Peak Period (6 - 10 AM)	*1*	*5*		*2*			*8*	*20.00%*
Off Peak - Daytime (10 AM - 3 PM)	*1*	*5*	*3*	*4*	*4*		*17*	*42.50%*
PM Peak Period (3 - 7 PM)	*2*	*3*	*1*	*3*	*2*		*11*	*27.50%*
Off Peak - Nighttime (7 PM - 6 AM)	*1*	*1*			*2*		*4*	*10.00%*
CALCULATED CRASH RATE***							***0.75***	***Crashes per MEV***

* It should be noted that an intersection radius of 300 feet was used in this analysis. Crashes also thought to be caused by the intersection may have been added based on the description of the crash and engineering judgement.

** Instances where the event was classified as "Unknown", "Not Known Whether Impaired", "Ability Not Impaired" were classified as alcohol related to provide a more conservative analysis.

*** Pedestrian injuries are based on the number of pedestrians injured and may not be directly be related to the number of crash incidences (i.e., if one crash occurred injuring two pedestrians, the table would show a "2" instead of a "1").

VDOT Crash Data Summary Table

Crash Data for the Intersection of Lee Highway (US 211/US 29 BUS) and Broadview Avenue (US 17 BUS) (May 2018 - April 2023)

Document Number	Date	Crash Severity	Collsion Type	Pedestrain Injury	Persons Injured	Fatalities	Work Zone Related	Adverse Weather Conditions	Distracted Driver
182555077	9/11/2018	A. Severe Injury	16. Other	0	1	0		no	no
181915232	7/5/2018	PDO. Property Damage Only	1. Rear End	0	0	0		no	no
181845228	6/28/2018	PDO. Property Damage Only	2. Angle	0	0	0		no	no
182415104	8/20/2018	C. Nonvisible Injury	1. Rear End	0	1	0		no	no
182885118	10/13/2018	PDO. Property Damage Only	1. Rear End	0	0	0		no	no
192075126	7/20/2019	B. Visible Injury	2. Angle	0	1	0		no	no
193445038	8/21/2019	PDO. Property Damage Only	2. Angle	0	0	0		no	no
191415326	5/15/2019	PDO. Property Damage Only	2. Angle	0	0	0		no	no
191685219	5/22/2019	PDO. Property Damage Only	2. Angle	0	0	0		no	no
190705057	3/5/2019	PDO. Property Damage Only	1. Rear End	0	0	0		no	no
190935057	4/2/2019	PDO. Property Damage Only	1. Rear End	0	0	0		no	no
192325410	8/20/2019	PDO. Property Damage Only	1. Rear End	0	0	0		no	no
191895108	7/5/2019	C. Nonvisible Injury	1. Rear End	0	5	0		no	no
193445107	10/30/2019	C. Nonvisible Injury	1. Rear End	0	1	0		no	no
193445122	11/14/2019	PDO. Property Damage Only	1. Rear End	0	0	0		no	no
193445083	10/13/2019	C. Nonvisible Injury	1. Rear End	0	1	0		no	no
193445100	10/22/2019	C. Nonvisible Injury	1. Rear End	0	3	0		yes	no
193445071	9/30/2019	PDO. Property Damage Only	4. Sideswipe - Same Direction	0	0	0		no	no
191295165	5/8/2019	B. Visible Injury	2. Angle	0	1	0		no	no
203495122	12/11/2020	PDO. Property Damage Only	1. Rear End	0	0	0		no	no
202175264	7/29/2020	PDO. Property Damage Only	1. Rear End	0	0	0		no	no
203175313	11/2/2020	C. Nonvisible Injury	1. Rear End	0	1	0		no	no
201635154	6/2/2020	PDO. Property Damage Only	1. Rear End	0	0	0		no	no
212215197	7/25/2021	PDO. Property Damage Only	1. Rear End	0	0	0		no	no
212285259	8/6/2021	PDO. Property Damage Only	2. Angle	0	0	0		no	no
211945123	7/6/2021	PDO. Property Damage Only	1. Rear End	0	0	0		no	no
211535051	5/26/2021	PDO. Property Damage Only	1. Rear End	0	0	0		no	no

VDOT Crash Data Summary Table

Crash Data for the Intersection of Lee Highway (US 211/US 29 BUS) and Broadview Avenue (US 17 BUS) (May 2018 - April 2023)

Document Number	Date	Crash Severity	Collsion Type	Pedestrain Injury	Persons Injured	Fatalities	Work Zone Related	Adverse Weather Conditions	Distracted Driver
212725106	9/20/2021	C. Nonvisible Injury	1. Rear End	0	1	0		no	no
213275307	11/17/2021	PDO. Property Damage Only	2. Angle	0	0	0		no	no
211805101	6/21/2021	PDO. Property Damage Only	1. Rear End	0	0	0		no	no
213145192	11/6/2021	PDO. Property Damage Only	2. Angle	0	0	0		no	no
210905134	3/20/2021	PDO. Property Damage Only	2. Angle	0	0	0		no	no
220205117	1/12/2022	PDO. Property Damage Only	1. Rear End	0	0	0		no	no
222345164	8/21/2022	PDO. Property Damage Only	1. Rear End	0	0	0		no	no
220975211	3/18/2022	PDO. Property Damage Only	1. Rear End	0	0	0		no	no
222795285	10/6/2022	B. Visible Injury	8. Non-Collision	0	1	0		no	no
222015106	7/14/2022	PDO. Property Damage Only	1. Rear End	0	0	0		no	no
221295161	5/7/2022	B. Visible Injury	4. Sideswipe - Same Direction	0	1	0		yes	no
220135226	1/6/2022	PDO. Property Damage Only	2. Angle	0	0	0		no	no
222165194	7/8/2022	PDO. Property Damage Only	4. Sideswipe - Same Direction	0	0	0		yes	no

VDOT Crash Data Summary Table

Intersection Crash Analysis	Crash Data for the Intersection of Lee Highway (US 211/US 29 BUS) and Warrenton Village / Chick-fil-a Driveway (May 2018 - April 2023)							
	2018	2019	2020	2021	2022	2023	Total	Relative Frequency
Crash Severity								
Fatal Collision (Type K)								0.00%
Injury Collision (Type A, B, and C)		1			1		2	40.00%
Type A		*1*			*1*		*2*	
Type B								
Type C								
Property Damage Only (Type PDO)			1		2		3	60.00%
TOTAL*		***1***	***1***		***3***		***5***	***100.00%***
Crash Type								
Fixed Object/ Single-Vehicle Crash			1		1		2	40.00%
Head-On								0.00%
Sideswipe / Same Direction								0.00%
Sideswipe / Opposite Direction								0.00%
Rear-End Collision					1		1	20.00%
Angle Collision		1			1		2	40.00%
Backed Into								0.00%
Pedestrian Collision								0.00%
Deer/Animal								0.00%
Other								0.00%
TOTAL*		***1***	***1***		***3***		***5***	***100.00%***
Other Factors								
Distracted Driver								0.00%
Alcohol**					1		1	20.00%
Work-Zone								0.00%
Inclement Weather (Non-Dry)			1				1	20.00%
Speeding					1		1	20.00%
Pedestrian Injury***								N/A
Time of Day								
AM Peak Period (6 - 10 AM)								*0.00%*
Off Peak - Daytime (10 AM - 3 PM)					*1*		*1*	*20.00%*
PM Peak Period (3 - 7 PM)		*1*			*1*		*2*	*40.00%*
Off Peak - Nighttime (7 PM - 6 AM)			*1*		*1*		*2*	*40.00%*
CALCULATED CRASH RATE***							***0.13***	***Crashes per MEV***

* It should be noted that an intersection radius of 300 feet was used in this analysis. Crashes also thought to be caused by the intersection may have been added based on the description of the crash and engineering judgement.

** Instances where the event was classified as "Unknown", "Not Known Whether Impaired", "Ability Not Impaired" were classified as alcohol related to provide a more conservative analysis.

*** Pedestrian injuries are based on the number of pedestrians injured and may not be directly be related to the number of crash incidences (i.e., if one crash occurred injuring two pedestrians, the table would show a "2" instead of a "1").

VDOT Crash Data Summary Table

Crash Data for the Intersection of Lee Highway (US 211/US 29 BUS) and Warrenton Village / Chick-fil-a Driveway (May 2018 - April 2023)

Document Number	Date	Crash Severity	Collsion Type	Pedestrain Injury	Persons Injured	Fatalities	Work Zone Related	Adverse Weather Conditions	Distracted Driver
193445020	7/26/2019	A. Severe Injury	2. Angle	0	1	0		no	no
203025223	10/25/2020	PDO. Property Damage Only	9. Fixed Object - Off Road	0	0	0		yes	no
222785213	9/17/2022	A. Severe Injury	9. Fixed Object - Off Road	0	1	0		no	no
222135133	7/28/2022	PDO. Property Damage Only	1. Rear End	0	0	0		no	no
223325320	11/1/2022	PDO. Property Damage Only	2. Angle	0	0	0		no	no

VDOT Crash Data Summary Table

Intersection Crash Analysis	Crash Data for the Intersection of Lee Highway (US 211/US 29 BUS) and Branch Drive (May 2018 - April 2023)							
	2018	2019	2020	2021	2022	2023	Total	Relative Frequency
Crash Severity								
Fatal Collision (Type K)								0.00%
Injury Collision (Type A, B, and C)	1		2	1	1		5	26.32%
Type A								
Type B								
Type C	*1*		*2*	*1*	*1*		*5*	
Property Damage Only (Type PDO)	2	1		3	8		14	73.68%
TOTAL*	***3***	***1***	***2***	***4***	***9***		***19***	***100.00%***
Crash Type								
Fixed Object/ Single-Vehicle Crash				1			1	5.26%
Head-On								0.00%
Sideswipe / Same Direction	1						1	5.26%
Sideswipe / Opposite Direction				1			1	5.26%
Rear-End Collision	2			1	3		6	31.58%
Angle Collision			2	1	5		8	42.11%
Backed Into		1					1	5.26%
Pedestrian Collision								0.00%
Deer/Animal								0.00%
Other					1		1	5.26%
TOTAL*	***3***	***1***	***2***	***4***	***9***		***19***	***100.00%***
Other Factors								
Distracted Driver								0.00%
Alcohol**								0.00%
Work-Zone								0.00%
Inclement Weather (Non-Dry)				2	1		3	15.79%
Speeding			1		1		2	10.53%
Pedestrian Injury***								N/A
Time of Day								
AM Peak Period (6 - 10 AM)	*1*			*1*	*1*		*3*	*15.79%*
Off Peak - Daytime (10 AM - 3 PM)			*2*	*2*	*2*		*6*	*31.58%*
PM Peak Period (3 - 7 PM)	*2*	*1*		*1*	*6*		*10*	*52.63%*
Off Peak - Nighttime (7 PM - 6 AM)								*0.00%*
CALCULATED CRASH RATE***							***0.45***	***Crashes per MEV***

* It should be noted that an intersection radius of 300 feet was used in this analysis. Crashes also thought to be caused by the intersection may have been added based on the description of the crash and engineering judgement.

** Instances where the event was classified as "Unknown", "Not Known Whether Impaired", "Ability Not Impaired" were classified as alcohol related to provide a more conservative analysis.

*** Pedestrian injuries are based on the number of pedestrians injured and may not be directly be related to the number of crash incidences (i.e., if one crash occurred injuring two pedestrians, the table would show a "2" instead of a "1").

VDOT Crash Data Summary Table

Crash Data for the Intersection of Lee Highway (US 211/US 29 BUS) and Branch Drive (May 2018 - April 2023)

Document Number	Date	Crash Severity	Collsion Type	Pedestrain Injury	Persons Injured	Fatalities	Work Zone Related	Adverse Weather Conditions	Distracted Driver
190035248	12/24/2018	PDO. Property Damage Only	4. Sideswipe - Same Direction	0	0	0		no	no
182955427	10/20/2018	C. Nonvisible Injury	1. Rear End	0	2	0		no	no
183655065	12/17/2018	PDO. Property Damage Only	1. Rear End	0	0	0		no	no
193445084	10/13/2019	PDO. Property Damage Only	15. Backed Into	0	0	0		no	no
201995197	7/12/2020	C. Nonvisible Injury	2. Angle	0	1	0		no	no
201275157	4/1/2020	C. Nonvisible Injury	2. Angle	0	1	0		no	no
211335075	5/10/2021	PDO. Property Damage Only	2. Angle	0	0	0		no	no
212925308	10/10/2021	PDO. Property Damage Only	9. Fixed Object - Off Road	0	0	0		yes	no
212705186	9/20/2021	PDO. Property Damage Only	1. Rear End	0	0	0		no	no
211935132	6/22/2021	C. Nonvisible Injury	5. Sideswipe - Opposite Direction	0	2	0		yes	no
222805102	10/6/2022	PDO. Property Damage Only	2. Angle	0	0	0		no	no
220825133	3/21/2022	PDO. Property Damage Only	2. Angle	0	0	0		no	no
221965176	7/9/2022	PDO. Property Damage Only	2. Angle	0	0	0		yes	no
221965175	6/29/2022	PDO. Property Damage Only	2. Angle	0	0	0		no	no
221735151	6/2/2022	PDO. Property Damage Only	1. Rear End	0	0	0		no	no
222205137	8/6/2022	PDO. Property Damage Only	2. Angle	0	0	0		no	no
222695228	9/24/2022	C. Nonvisible Injury	1. Rear End	0	1	0		no	no
220385210	2/6/2022	PDO. Property Damage Only	1. Rear End	0	0	0		no	no
222975113	10/23/2022	PDO. Property Damage Only	16. Other	0	0	0		no	no

VDOT Crash Data Summary Table

Intersection Crash Analysis	Crash Data for the Intersection of Branch Drive and Warrenton Village / Safeway (May 2018 - April 2023)							
	2018	2019	2020	2021	2022	2023	Total	Relative Frequency
Crash Severity								
Fatal Collision (Type K)								0.00%
Injury Collision (Type A, B, and C)					1		1	50.00%
Type A								
Type B								
Type C					*1*		*1*	
Property Damage Only (Type PDO)				1			1	50.00%
TOTAL*				***1***	***1***		***2***	***100.00%***
Crash Type								
Fixed Object/ Single-Vehicle Crash								0.00%
Head-On								0.00%
Sideswipe / Same Direction								0.00%
Sideswipe / Opposite Direction								0.00%
Rear-End Collision								0.00%
Angle Collision				1	1		2	100.00%
Backed Into								0.00%
Pedestrian Collision								0.00%
Deer/Animal								0.00%
Other								0.00%
TOTAL*				***1***	***1***		***2***	***100.00%***
Other Factors								
Distracted Driver								0.00%
Alcohol**				1			1	50.00%
Work-Zone								0.00%
Inclement Weather (Non-Dry)					1		1	50.00%
Speeding								0.00%
Pedestrian Injury***								N/A
Time of Day								
AM Peak Period (6 - 10 AM)					*1*		*1*	*50.00%*
Off Peak - Daytime (10 AM - 3 PM)								*0.00%*
PM Peak Period (3 - 7 PM)				*1*			*1*	*50.00%*
Off Peak - Nighttime (7 PM - 6 AM)								*0.00%*
CALCULATED CRASH RATE*							***0.24***	***Crashes per MEV***

* It should be noted that an intersection radius of 300 feet was used in this analysis. Crashes also thought to be caused by the intersection may have been added based on the description of the crash and engineering judgement.

** Instances where the event was classified as "Unknown", "Not Known Whether Impaired", "Ability Not Impaired" were classified as alcohol related to provide a more conservative analysis.

*** Pedestrian injuries are based on the number of pedestrians injured and may not be directly be related to the number of crash incidences (i.e., if one crash occurred injuring two pedestrians, the table would show a "2" instead of a "1").

VDOT Crash Data Summary Table

Crash Data for the Intersection of Branch Drive and Warrenton Village / Safeway (May 2018 - April 2023)

Document Number	Date	Crash Severity	Collsion Type	Pedestrain Injury	Persons Injured	Fatalities	Work Zone Related	Adverse Weather Conditions	Distracted Driver
213055189	10/15/2021	PDO: Property Damage Only	2. Angle	0	0	0		no	no
223255325	11/11/2022	C. Nonvisible Injury	2. Angle	0	1	0		yes	no

VDOT Crash Data Summary Table

Intersection Crash Analysis	Crash Data for the Intersection of Branch Drive and Oak Springs Drive (May 2018 - April 2023)							
	2018	2019	2020	2021	2022	2023	Total	Relative Frequency
Crash Severity								
Fatal Collision (Type K)								0.00%
Injury Collision (Type A, B, and C)								0.00%
Type A								
Type B								
Type C								
Property Damage Only (Type PDO)			1		1		2	100.00%
TOTAL*			***1***		***1***		***2***	***100.00%***
Crash Type								
Fixed Object/ Single-Vehicle Crash								0.00%
Head-On								0.00%
Sideswipe / Same Direction								0.00%
Sideswipe / Opposite Direction								0.00%
Rear-End Collision								0.00%
Angle Collision			1		1		2	100.00%
Backed Into								0.00%
Pedestrian Collision								0.00%
Deer/Animal								0.00%
Other								0.00%
TOTAL*			***1***		***1***		***2***	***100.00%***
Other Factors								
Distracted Driver								0.00%
Alcohol**								0.00%
Work-Zone								0.00%
Inclement Weather (Non-Dry)								0.00%
Speeding								0.00%
Pedestrian Injury***								N/A
Time of Day								
AM Peak Period (6 - 10 AM)								*0.00%*
Off Peak - Daytime (10 AM - 3 PM)					*1*		*1*	*50.00%*
PM Peak Period (3 - 7 PM)			*1*				*1*	*50.00%*
Off Peak - Nighttime (7 PM - 6 AM)								*0.00%*
CALCULATED CRASH RATE***							***0.27***	***Crashes per MEV***

* It should be noted that an intersection radius of 300 feet was used in this analysis. Crashes also thought to be caused by the intersection may have been added based on the description of the crash and engineering judgement.

** Instances where the event was classified as "Unknown", "Not Known Whether Impaired", "Ability Not Impaired" were classified as alcohol related to provide a more conservative analysis.

*** Pedestrian injuries are based on the number of pedestrians injured and may not be directly be related to the number of crash incidences (i.e., if one crash occurred injuring two pedestrians, the table would show a "2" instead of a "1").

VDOT Crash Data Summary Table

Crash Data for the Intersection of Branch Drive and Oak Springs Drive (May 2018 - April 2023)

Document Number	Date	Crash Severity	Collsion Type	Pedestrain Injury	Persons Injured	Fatalities	Work Zone Related	Adverse Weather Conditions	Distracted Driver
202745301	9/18/2020	PDO: Property Damage Only	2. Angle	0	0	0		no	no
220335106	1/31/2022	PDO: Property Damage Only	2. Angle	0	0	0		no	no

VDOT Crash Data Summary Table

Intersection Crash Analysis	Crash Data for the Intersection of Broadview Avenue and Oak Springs Drive (May 2018 - April 2023)							
	2018	2019	2020	2021	2022	2023	Total	Relative Frequency
Crash Severity								
Fatal Collision (Type K)								0.00%
Injury Collision (Type A, B, and C)	1						1	33.33%
Type A	*1*						*1*	
Type B								
Type C								
Property Damage Only (Type PDO)			2				2	66.67%
TOTAL*	***1***		***2***				***3***	***100.00%***
Crash Type								
Fixed Object/ Single-Vehicle Crash								0.00%
Head-On								0.00%
Sideswipe / Same Direction								0.00%
Sideswipe / Opposite Direction								0.00%
Rear-End Collision								0.00%
Angle Collision	1		2				3	100.00%
Backed Into								0.00%
Pedestrian Collision								0.00%
Deer/Animal								0.00%
Other								0.00%
TOTAL*	***1***		***2***				***3***	***100.00%***
Other Factors								
Distracted Driver								0.00%
Alcohol**								0.00%
Work-Zone								0.00%
Inclement Weather (Non-Dry)								0.00%
Speeding								0.00%
Pedestrian Injury***								N/A
Time of Day								
AM Peak Period (6 - 10 AM)								*0.00%*
Off Peak - Daytime (10 AM - 3 PM)			*1*				*1*	*33.33%*
PM Peak Period (3 - 7 PM)	*1*		*1*				*2*	*66.67%*
Off Peak - Nighttime (7 PM - 6 AM)								*0.00%*
CALCULATED CRASH RATE***							***0.14***	***Crashes per MEV***

* It should be noted that an intersection radius of 300 feet was used in this analysis. Crashes also thought to be caused by the intersection may have been added based on the description of the crash and engineering judgement.

** Instances where the event was classified as "Unknown", "Not Known Whether Impaired", "Ability Not Impaired" were classified as alcohol related to provide a more conservative analysis.

*** Pedestrian injuries are based on the number of pedestrians injured and may not be directly be related to the number of crash incidences (i.e., if one crash occurred injuring two pedestrians, the table would show a "2" instead of a "1").

VDOT Crash Data Summary Table

Crash Data for the Intersection of Broadview Avenue and Oak Springs Drive (May 2018 - April 2023)									
Document Number	Date	Crash Severity	Collsion Type	Pedestrain Injury	Persons Injured	Fatalities	Work Zone Related	Adverse Weather Conditions	Distracted Driver
182435282	8/23/2018	A. Severe Injury	2. Angle	0	1	0		no	no
202585163	2/22/2020	PDO. Property Damage Only	2. Angle	0	0	0		no	no
202115210	7/15/2020	PDO. Property Damage Only	2. Angle	0	0	0		no	no

VDOT Crash Data Summary Table

Intersection Crash Analysis	Crash Data for the Intersection of Broadview Avenue and Warrenton Village North (May 2018 - April 2023)							
	2018	2019	2020	2021	2022	2023	Total	Relative Frequency
Crash Severity								
Fatal Collision (Type K)								0.00%
Injury Collision (Type A, B, and C)			1		1		2	50.00%
Type A								
Type B			*1*				*1*	
Type C					*1*		*1*	
Property Damage Only (Type PDO)		1		1			2	50.00%
TOTAL*		***1***	***1***	***1***	***1***		***4***	***100.00%***
Crash Type								
Fixed Object/ Single-Vehicle Crash								0.00%
Head-On								0.00%
Sideswipe / Same Direction								0.00%
Sideswipe / Opposite Direction								0.00%
Rear-End Collision								0.00%
Angle Collision			1	1	1		3	75.00%
Backed Into								0.00%
Pedestrian Collision								0.00%
Deer/Animal		1					1	25.00%
Other								0.00%
TOTAL*		***1***	***1***	***1***	***1***		***4***	***100.00%***
Other Factors								
Distracted Driver								0.00%
Alcohol**					1		1	25.00%
Work-Zone								0.00%
Inclement Weather (Non-Dry)					1		1	25.00%
Speeding								0.00%
Pedestrian Injury***								N/A
Time of Day								
AM Peak Period (6 - 10 AM)		*1*					*1*	*25.00%*
Off Peak - Daytime (10 AM - 3 PM)								*0.00%*
PM Peak Period (3 - 7 PM)			*1*	*1*	*1*		*3*	*75.00%*
Off Peak - Nighttime (7 PM - 6 AM)								*0.00%*
CALCULATED CRASH RATE***							***0.21***	***Crashes per MEV***

* It should be noted that an intersection radius of 300 feet was used in this analysis. Crashes also thought to be caused by the intersection may have been added based on the description of the crash and engineering judgement.

** Instances where the event was classified as "Unknown", "Not Known Whether Impaired", "Ability Not Impaired" were classified as alcohol related to provide a more conservative analysis.

*** Pedestrian injuries are based on the number of pedestrians injured and may not be directly be related to the number of crash incidences (i.e., if one crash occurred injuring two pedestrians, the table would show a "2" instead of a "1").

VDOT Crash Data Summary Table

Crash Data for the Intersection of Broadview Avenue and Warrenton Village North (May 2018 - April 2023)

Document Number	Date	Crash Severity	Collsion Type	Pedestrain Injury	Persons Injured	Fatalities	Work Zone Related	Adverse Weather Conditions	Distracted Driver
192545226	9/11/2019	PDO. Property Damage Only	10. Deer	0	0	0		no	no
202765309	9/20/2020	B. Visible Injury	2. Angle	0	1	0		no	no
211665121	5/27/2021	PDO. Property Damage Only	2. Angle	0	0	0		no	no
223465170	12/6/2022	C. Nonvisible Injury	2. Angle	0	1	0		yes	no

VDOT Crash Data Summary Table

Intersection Crash Analysis	Crash Data for the Intersection of Broadview Avenue and Warrenton Village South (May 2018 - April 2023)							
	2018	2019	2020	2021	2022	2023	Total	Relative Frequency
Crash Severity								
Fatal Collision (Type K)								0.00%
Injury Collision (Type A, B, and C)	2			2	3		7	53.85%
Type A								
Type B								
Type C	*2*			*2*	*3*		*7*	
Property Damage Only (Type PDO)	1		2	2	1		6	46.15%
TOTAL*	***3***		***2***	***4***	***4***		***13***	***100.00%***
Crash Type								
Fixed Object/ Single-Vehicle Crash								0.00%
Head-On	1				2		3	23.08%
Sideswipe / Same Direction				1			1	7.69%
Sideswipe / Opposite Direction								0.00%
Rear-End Collision			1				1	7.69%
Angle Collision	1		1	3	2		7	53.85%
Backed Into								0.00%
Pedestrian Collision								0.00%
Deer/Animal								0.00%
Other	1						1	7.69%
TOTAL*	***3***		***2***	***4***	***4***		***13***	***100.00%***
Other Factors								
Distracted Driver								0.00%
Alcohol**	1						1	7.69%
Work-Zone								0.00%
Inclement Weather (Non-Dry)								0.00%
Speeding			1				1	7.69%
Pedestrian Injury***								N/A
Time of Day								
AM Peak Period (6 - 10 AM)					*1*		*1*	*7.69%*
Off Peak - Daytime (10 AM - 3 PM)	*1*		*2*	*2*	*2*		*7*	*53.85%*
PM Peak Period (3 - 7 PM)	*1*			*2*	*1*		*4*	*30.77%*
Off Peak - Nighttime (7 PM - 6 AM)	*1*						*1*	*7.69%*
CALCULATED CRASH RATE***							***0.54***	***Crashes per MEV***

* It should be noted that an intersection radius of 300 feet was used in this analysis. Crashes also thought to be caused by the intersection may have been added based on the description of the crash and engineering judgement.

** Instances where the event was classified as "Unknown", "Not Known Whether Impaired", "Ability Not Impaired" were classified as alcohol related to provide a more conservative analysis.

*** Pedestrian injuries are based on the number of pedestrians injured and may not be directly be related to the number of crash incidences (i.e., if one crash occurred injuring two pedestrians, the table would show a "2" instead of a "1").

VDOT Crash Data Summary Table

Crash Data for the Intersection of Broadview Avenue and Warrenton Village South (May 2018 - April 2023)

Document Number	Date	Crash Severity	Collsion Type	Pedestrain Injury	Persons Injured	Fatalities	Work Zone Related	Adverse Weather Conditions	Distracted Driver
182505243	9/5/2018	C. Nonvisible Injury	6. Fixed Object in Road	0	1	0		no	no
182835057	10/4/2018	C. Nonvisible Injury	2. Angle	0	1	0		no	no
182135102	7/31/2018	PDO. Property Damage Only	3. Head On	0	0	0		no	no
201265208	2/25/2020	PDO. Property Damage Only	1. Rear End	0	0	0		no	no
201265233	3/12/2020	PDO. Property Damage Only	2. Angle	0	0	0		no	no
213625118	12/15/2021	C. Nonvisible Injury	2. Angle	0	2	0		no	no
213145191	11/3/2021	PDO. Property Damage Only	2. Angle	0	0	0		no	no
210135154	1/6/2021	C. Nonvisible Injury	2. Angle	0	1	0		no	no
212425152	8/23/2021	PDO. Property Damage Only	4. Sideswipe - Same Direction	0	0	0		no	no
221235227	4/29/2022	C. Nonvisible Injury	3. Head On	0	1	0		no	no
221045273	3/28/2022	PDO. Property Damage Only	3. Head On	0	0	0		no	no
220945207	3/29/2022	C. Nonvisible Injury	2. Angle	0	1	0		no	no
223325319	11/23/2022	C. Nonvisible Injury	2. Angle	0	1	0		no	no

C. Turning Movement Counts Data

National Data & Surveying Services Intersection Turning Movement Count

Location: US 17/Winchester St & US 17/US 211/Broadview Ave
City: Warrenton
Control: Signalized

Project ID: 23-260020-001
Date: 2/9/2023

Data - Total

NS/EW Streets:	US 17/Winchester St				US 17/Winchester St				US 17/US 211/Broadview Ave				US 17/US 211/Broadview Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	1	1	0	1.5	0.5	1	0	2	1.5	0.5	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	5	5	2	0	28	3	15	0	18	155	2	1	2	48	21	1	306
6:15 AM	7	0	6	0	15	2	19	0	21	167	1	1	0	78	32	1	350
6:30 AM	7	9	8	0	18	1	31	0	18	179	2	0	0	90	27	0	390
6:45 AM	12	11	8	0	27	5	45	0	23	163	0	3	6	122	32	0	457
7:00 AM	13	13	10	0	27	3	97	0	46	171	1	1	7	134	41	0	564
7:15 AM	20	8	11	0	31	8	89	0	58	208	5	2	6	119	31	1	597
7:30 AM	15	25	14	0	28	9	34	0	83	220	13	1	6	154	49	0	651
7:45 AM	27	42	32	0	34	40	61	0	73	169	5	2	5	162	64	1	717
8:00 AM	14	19	12	0	22	26	61	0	57	204	7	2	9	140	29	1	603
8:15 AM	17	17	12	0	26	18	59	0	44	165	6	0	11	159	29	1	564
8:30 AM	24	11	21	0	29	13	61	0	52	159	13	2	11	125	28	3	552
8:45 AM	16	17	8	0	45	26	54	0	53	170	16	4	4	141	24	3	581
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	177	177	144	0	330	154	626	0	546	2130	71	19	67	1472	407	12	6332
APPROACH %'s :	35.54%	35.54%	28.92%	0.00%	29.73%	13.87%	56.40%	0.00%	19.74%	77.01%	2.57%	0.69%	3.42%	75.18%	20.79%	0.61%	
PEAK HR :	07:15 AM - 08:15 AM																TOTAL
PEAK HR VOL :	76	94	69	0	115	83	245	0	271	801	30	7	26	575	173	3	2568
PEAK HR FACTOR :	0.704	0.560	0.539	0.000	0.846	0.519	0.688	0.000	0.816	0.910	0.577	0.875	0.722	0.887	0.676	0.750	0.895
	0.592				0.820				0.875				0.837				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	1	1	0	1.5	0.5	1	0	2	1.5	0.5	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	29	18	21	0	72	18	94	1	51	194	14	0	7	309	23	1	852
4:15 PM	32	27	15	0	46	23	86	1	69	167	9	1	19	240	40	1	776
4:30 PM	24	28	16	0	50	23	103	0	71	223	9	1	17	261	24	4	854
4:45 PM	29	22	15	0	44	19	94	0	67	210	8	0	13	264	19	4	808
5:00 PM	12	35	13	0	47	14	63	0	68	170	13	2	14	265	23	4	743
5:15 PM	18	34	18	0	46	18	75	0	60	180	11	1	13	284	28	1	787
5:30 PM	22	29	15	0	28	19	69	0	44	183	7	4	12	218	40	1	691
5:45 PM	16	27	16	0	37	23	74	0	47	176	8	1	8	252	25	6	716
6:00 PM	32	23	15	0	42	14	44	0	54	135	12	1	19	222	23	3	639
6:15 PM	14	12	17	0	42	19	45	0	47	144	6	1	17	236	34	4	638
6:30 PM	19	16	20	0	26	13	42	0	49	137	8	0	16	185	22	4	557
6:45 PM	14	17	20	0	25	10	35	0	43	107	9	1	13	194	24	4	516
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	261	288	201	0	505	213	824	2	670	2026	114	13	168	2930	325	37	8577
APPROACH %'s :	34.80%	38.40%	26.80%	0.00%	32.71%	13.80%	53.37%	0.13%	23.73%	71.77%	4.04%	0.46%	4.86%	84.68%	9.39%	1.07%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	114	95	67	0	212	83	377	2	258	794	40	2	56	1074	106	10	3290
PEAK HR FACTOR :	0.891	0.848	0.798	0.000	0.736	0.902	0.915	0.500	0.908	0.890	0.714	0.500	0.737	0.869	0.663	0.625	0.963
	0.932				0.911				0.900				0.916				

National Data & Surveying Services Intersection Turning Movement Count

Location: US 17/Winchester St & US 17/US 211/Broadview Ave
City: Warrenton
Control: Signalized

Project ID: 23-260020-001
Date: 2/9/2023

Data - Cars

NS/EW Streets:	US 17/Winchester St				US 17/Winchester St				US 17/US 211/Broadview Ave				US 17/US 211/Broadview Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	1	1	0	1.5	0.5	1	0	2	1.5	0.5	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	5	5	2	0	27	3	14	0	16	149	2	1	2	48	21	1	296
6:15 AM	7	0	6	0	15	2	19	0	18	163	1	1	0	74	31	1	338
6:30 AM	7	9	8	0	17	1	29	0	15	171	1	0	0	87	27	0	372
6:45 AM	12	11	8	0	27	5	43	0	22	160	0	3	5	112	31	0	439
7:00 AM	12	13	10	0	26	3	92	0	39	165	1	1	7	127	40	0	536
7:15 AM	19	7	11	0	28	8	83	0	55	196	5	2	6	112	30	1	563
7:30 AM	14	25	13	0	25	9	30	0	81	213	13	1	6	146	48	0	624
7:45 AM	25	42	31	0	33	40	61	0	70	159	5	2	5	155	63	1	692
8:00 AM	12	18	12	0	22	25	61	0	54	199	6	2	9	131	27	1	579
8:15 AM	16	16	11	0	24	17	57	0	39	157	6	0	11	136	26	1	517
8:30 AM	23	9	21	0	27	13	49	0	51	155	12	2	11	108	25	3	509
8:45 AM	14	17	7	0	43	26	50	0	52	166	16	4	3	125	22	3	548
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	166	172	140	0	314	152	588	0	512	2053	68	19	65	1361	391	12	6013
APPROACH %'s :	34.73%	35.98%	29.29%	0.00%	29.79%	14.42%	55.79%	0.00%	19.31%	77.41%	2.56%	0.72%	3.55%	74.41%	21.38%	0.66%	
PEAK HR :	07:15 AM - 08:15 AM																TOTAL
PEAK HR VOL :	70	92	67	0	108	82	235	0	260	767	29	7	26	544	168	3	2458
PEAK HR FACTOR :	0.700	0.548	0.540	0.000	0.818	0.513	0.708	0.000	0.802	0.900	0.558	0.875	0.722	0.877	0.667	0.750	0.888
	0.584				0.793				0.863				0.827				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	1	1	0	1.5	0.5	1	0	2	1.5	0.5	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	29	18	21	0	72	18	90	1	50	190	14	0	7	303	23	1	837
4:15 PM	32	27	15	0	45	23	79	1	67	164	9	1	19	235	40	1	758
4:30 PM	24	27	16	0	49	23	101	0	69	220	9	1	17	251	24	4	835
4:45 PM	29	22	15	0	44	19	91	0	64	205	8	0	13	260	17	4	791
5:00 PM	12	35	13	0	47	14	61	0	67	168	13	2	13	261	23	4	733
5:15 PM	18	34	17	0	46	18	74	0	59	177	11	1	13	278	28	1	775
5:30 PM	22	29	15	0	28	18	67	0	44	181	7	4	12	214	40	1	682
5:45 PM	16	27	16	0	37	23	72	0	45	172	8	1	7	250	24	6	704
6:00 PM	31	23	15	0	42	14	44	0	53	132	12	1	19	220	23	3	632
6:15 PM	14	12	17	0	42	19	44	0	46	141	6	1	17	235	33	4	631
6:30 PM	19	16	19	0	26	13	42	0	48	137	8	0	16	179	22	4	549
6:45 PM	14	17	20	0	25	10	35	0	42	104	9	1	13	191	23	4	508
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	260	287	199	0	503	212	800	2	654	1991	114	13	166	2877	320	37	8435
APPROACH %'s :	34.85%	38.47%	26.68%	0.00%	33.16%	13.97%	52.74%	0.13%	23.59%	71.83%	4.11%	0.47%	4.88%	84.62%	9.41%	1.09%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	114	94	67	0	210	83	361	2	250	779	40	2	56	1049	104	10	3221
PEAK HR FACTOR :	0.891	0.870	0.798	0.000	0.729	0.902	0.894	0.500	0.906	0.885	0.714	0.500	0.737	0.866	0.650	0.625	0.962
	0.929				0.906				0.895				0.912				

National Data & Surveying Services Intersection Turning Movement Count

Location: US 17/Winchester St & US 17/US 211/Broadview Ave
City: Warrenton
Control: Signalized

Project ID: 23-260020-001
Date: 2/9/2023

Data - HT

NS/EW Streets:	US 17/Winchester St				US 17/Winchester St				US 17/US 211/Broadview Ave				US 17/US 211/Broadview Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	1	1	0	1.5	0.5	1	0	2	1.5	0.5	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	1	0	1	0	2	6	0	0	0	0	0	0	10
6:15 AM	0	0	0	0	0	0	0	0	3	4	0	0	0	4	1	0	12
6:30 AM	0	0	0	0	1	0	2	0	3	8	1	0	0	3	0	0	18
6:45 AM	0	0	0	0	0	0	2	0	1	3	0	0	1	10	1	0	18
7:00 AM	1	0	0	0	1	0	5	0	7	6	0	0	0	7	1	0	28
7:15 AM	1	1	0	0	3	0	6	0	3	12	0	0	0	7	1	0	34
7:30 AM	1	0	1	0	3	0	4	0	2	7	0	0	0	8	1	0	27
7:45 AM	2	0	1	0	1	0	0	0	3	10	0	0	0	7	1	0	25
8:00 AM	2	1	0	0	0	1	0	0	3	5	1	0	0	9	2	0	24
8:15 AM	1	1	1	0	2	1	2	0	5	8	0	0	0	23	3	0	47
8:30 AM	1	2	0	0	2	0	12	0	1	4	1	0	0	17	3	0	43
8:45 AM	2	0	1	0	2	0	4	0	1	4	0	0	1	16	2	0	33
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	11	5	4	0	16	2	38	0	34	77	3	0	2	111	16	0	319
APPROACH %'s :	55.00%	25.00%	20.00%	0.00%	28.57%	3.57%	67.86%	0.00%	29.82%	67.54%	2.63%	0.00%	1.55%	86.05%	12.40%	0.00%	
PEAK HR :	07:15 AM - 08:15 AM																TOTAL
PEAK HR VOL :	6	2	2	0	7	1	10	0	11	34	1	0	0	31	5	0	110
PEAK HR FACTOR :	0.750	0.500	0.500	0.000	0.583	0.250	0.417	0.000	0.917	0.708	0.250	0.000	0.000	0.861	0.625	0.000	0.809
	0.833				0.500				0.767				0.818				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	1	1	0	1.5	0.5	1	0	2	1.5	0.5	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	0	0	4	0	1	4	0	0	0	6	0	0	15
4:15 PM	0	0	0	0	1	0	7	0	2	3	0	0	0	5	0	0	18
4:30 PM	0	1	0	0	1	0	2	0	2	3	0	0	0	10	0	0	19
4:45 PM	0	0	0	0	0	0	3	0	3	5	0	0	0	4	2	0	17
5:00 PM	0	0	0	0	0	0	2	0	1	2	0	0	1	4	0	0	10
5:15 PM	0	0	1	0	0	0	1	0	1	3	0	0	0	6	0	0	12
5:30 PM	0	0	0	0	0	1	2	0	0	2	0	0	0	4	0	0	9
5:45 PM	0	0	0	0	0	0	2	0	2	4	0	0	1	2	1	0	12
6:00 PM	1	0	0	0	0	0	0	0	1	3	0	0	0	2	0	0	7
6:15 PM	0	0	0	0	0	0	1	0	1	3	0	0	0	1	1	0	7
6:30 PM	0	0	1	0	0	0	0	0	1	0	0	0	0	6	0	0	8
6:45 PM	0	0	0	0	0	0	0	0	1	3	0	0	0	3	1	0	8
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	1	1	2	0	2	1	24	0	16	35	0	0	2	53	5	0	142
APPROACH %'s :	25.00%	25.00%	50.00%	0.00%	7.41%	3.70%	88.89%	0.00%	31.37%	68.63%	0.00%	0.00%	3.33%	88.33%	8.33%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	0	1	0	0	2	0	16	0	8	15	0	0	0	25	2	0	69
PEAK HR FACTOR :	0.000	0.250	0.000	0.000	0.500	0.000	0.571	0.000	0.667	0.750	0.000	0.000	0.000	0.625	0.250	0.000	0.908
	0.250				0.563				0.719				0.675				

National Data & Surveying Services Intersection Turning Movement Count

Location: US 17/Winchester St & US 17/US 211/Broadview Ave
City: Warrenton
Control: Signalized

Project ID: 23-260020-001
Date: 2/9/2023

Data - Bikes

NS/EW Streets:	US 17/Winchester St				US 17/Winchester St				US 17/US 211/Broadview Ave				US 17/US 211/Broadview Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	1	1	0	1.5	0.5	1	0	2	1.5	0.5	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %'s :																	
PEAK HR :	07:15 AM - 08:15 AM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	1	1	0	1.5	0.5	1	0	2	1.5	0.5	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
APPROACH %'s :									0.00%	100.00%	0.00%	0.00%					
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

National Data & Surveying Services Intersection Turning Movement Count

Location: US 17/Winchester St & US 17/US 211/Broadview Ave **Project ID:** 23-260020-001
City: Warrenton **Date:** 2/9/2023

Data - Pedestrians (Crosswalks)

NS/EW Streets:	US 17/Winchester St		US 17/Winchester St		US 17/US 211/Broadview Ave		US 17/US 211/Broadview Ave		
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	1	2	3
8:30 AM	1	0	0	0	0	0	0	0	1
8:45 AM	0	1	0	0	0	0	0	0	1
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	1	1	0	0	0	0	1	2	5
APPROACH %'s :	50.00%	50.00%					33.33%	66.67%	
PEAK HR :	**07:15 AM - 08:15 AM**								TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :									

PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
4:00 PM	0	0	0	1	1	2	0	0	4
4:15 PM	1	1	0	0	1	2	0	0	5
4:30 PM	1	0	0	0	0	0	0	0	1
4:45 PM	2	0	0	2	0	0	2	0	6
5:00 PM	0	0	0	0	0	4	0	0	4
5:15 PM	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	2	0	0	0	2
5:45 PM	0	0	0	0	0	0	0	0	0
6:00 PM	2	0	0	0	3	0	0	0	5
6:15 PM	1	0	0	0	0	0	0	0	1
6:30 PM	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	1	1	0	0	0	0	2
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	7	1	1	4	7	8	2	0	30
APPROACH %'s :	87.50%	12.50%	20.00%	80.00%	46.67%	53.33%	100.00%	0.00%	
PEAK HR :	**04:00 PM - 05:00 PM**								TOTAL
PEAK HR VOL :	4	1	0	3	2	4	2	0	16
PEAK HR FACTOR :	0.500	0.250		0.375	0.500	0.500	0.250		0.667
	0.625		0.375		0.500		0.250		

Prepared by National Data & Surveying Services

US 17/Winchester St & US 17/US 211/Broadview Ave

Peak Hour Turning Movement Count

ID: 23-260020-001
City: Warrenton

Day: Thursday
Date: 2/9/2023

PEAK HOURS	COUNT PERIODS
07:15 AM - 08:15 AM	6:00 AM - 09:00 AM
NONE	NONE
04:00 PM - 05:00 PM	4:00 PM - 07:00 PM

CONTROL: Signalized

	AM	NOON	PM
TEV	2568	0	3290
PHF	0.90		0.96

SOUTHBOUND (US 17/Winchester St)

	L	T	R	U	Total	
AM	245	83	115	0	538	AM
NOON	0	0	0	0	0	NOON
PM	377	83	212	2	461	PM
	1	0.5	1.5	0		

EASTBOUND (US 17/US 211/Broadview Ave)

	AM	NOON	PM	
	903	0	1567	
0	7	0	2	
2	271	0	258	
1.5	801	0	794	
0.5	30	0	40	
	AM	NOON	PM	

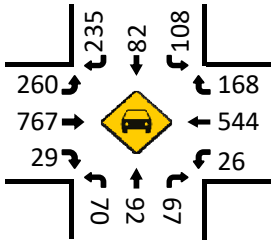
WESTBOUND (US 17/US 211/Broadview Ave)

	PM	NOON	AM	
1	106	0	173	
2	1074	0	575	
1	56	0	26	
0	10	0	3	
	1083	0	988	
	PM	NOON	AM	

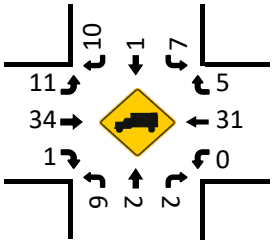
NORTHBOUND (US 17/Winchester St)

	L	T	R	U	Total	
PM	179	0	114	95	67	PM
NOON	0	0	0	0	0	NOON
AM	139	0	76	94	69	AM
	0	1	1	1		

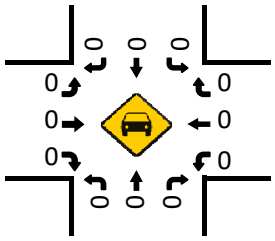
Cars (AM)



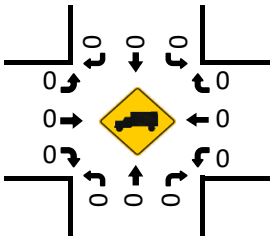
HT (AM)



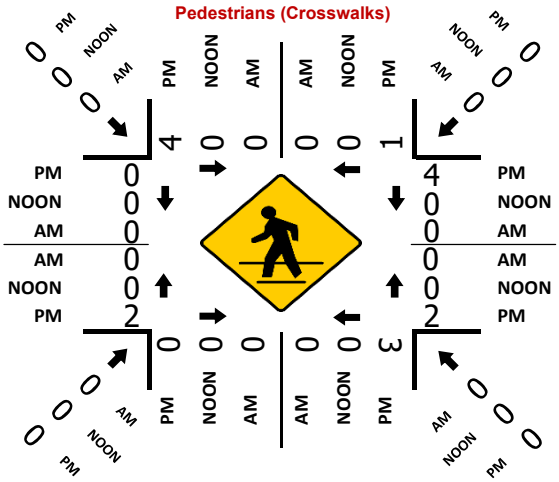
Cars (NOON)



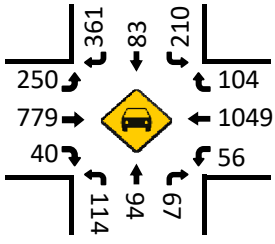
HT (NOON)



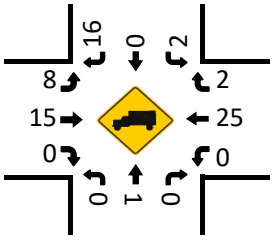
Pedestrians (Crosswalks)



Cars (PM)



HT (PM)



National Data & Surveying Services Intersection Turning Movement Count

Location: Warrenton Village Center Dwy (Chipotle)/Walgreens Dwy & US 17/US 211/Broadview Ave
City: Warrenton
Control: 1-Way Stop(SB)

Project ID: 23-260020-002
Date: 2/9/2023

Data - Total

NS/EW Streets:	Warrenton Village Center Dwy (Chipotle)/Walgreens Dwy				Warrenton Village Center Dwy (Chipotle)/Walgreens Dwy				US 17/US 211/Broadview Ave				US 17/US 211/Broadview Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	1	0	0	0	3	0	0	0	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	183	0	0	0	67	2	0	252
6:15 AM	0	0	0	0	0	0	0	0	0	192	0	0	0	115	0	0	307
6:30 AM	0	0	0	0	0	0	0	0	0	203	0	0	0	113	2	0	318
6:45 AM	0	0	0	0	0	0	2	0	0	196	0	0	0	157	1	0	356
7:00 AM	0	0	0	0	0	0	1	0	0	212	0	0	0	185	4	0	402
7:15 AM	0	0	0	0	0	0	3	0	0	244	0	0	0	164	3	0	414
7:30 AM	0	0	0	0	0	0	3	0	0	269	0	0	0	196	9	0	477
7:45 AM	0	0	0	0	0	0	8	0	0	236	0	0	0	234	9	0	487
8:00 AM	0	0	0	0	0	0	3	0	0	236	0	0	0	168	6	0	413
8:15 AM	0	0	0	0	0	0	6	0	0	207	0	0	0	196	7	0	416
8:30 AM	0	0	0	0	0	0	6	0	0	208	0	0	0	159	10	0	383
8:45 AM	0	0	0	0	0	0	7	0	0	230	0	0	0	168	23	0	428
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	39	0	0	2616	0	0	0	1922	76	0	4653
APPROACH %'s :					0.00%	0.00%	100.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	96.20%	3.80%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	20	0	0	948	0	0	0	794	31	0	1793
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.625	0.000	0.000	0.881	0.000	0.000	0.000	0.848	0.861	0.000	0.920
							0.625			0.881				0.849			

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	1	0	0	0	3	0	0	0	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	0	0	17	0	0	291	0	0	0	320	25	0	653
4:15 PM	0	0	0	0	0	0	19	0	0	227	0	0	0	284	25	0	555
4:30 PM	0	0	0	0	0	0	17	0	0	295	0	0	0	286	18	0	616
4:45 PM	0	0	0	0	0	0	26	0	0	271	0	0	0	274	34	0	605
5:00 PM	0	0	0	0	0	0	20	0	0	236	0	0	0	295	35	0	586
5:15 PM	0	0	0	0	0	0	26	0	0	245	0	0	0	302	24	0	597
5:30 PM	0	0	0	0	0	0	16	0	0	223	0	0	0	244	16	0	499
5:45 PM	0	0	0	0	0	0	20	0	0	239	0	0	0	277	38	0	574
6:00 PM	0	0	0	0	0	0	29	0	0	190	0	0	0	250	38	0	507
6:15 PM	0	0	0	0	0	0	25	0	0	212	0	0	0	248	42	0	527
6:30 PM	0	0	0	0	0	0	24	0	0	185	0	0	0	203	22	0	434
6:45 PM	0	0	0	0	0	0	21	0	0	158	0	0	0	219	22	0	420
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	260	0	0	2772	0	0	0	3202	339	0	6573
APPROACH %'s :					0.00%	0.00%	100.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	90.43%	9.57%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	79	0	0	1084	0	0	0	1164	102	0	2429
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.760	0.000	0.000	0.919	0.000	0.000	0.000	0.909	0.750	0.000	0.930
							0.760			0.919				0.917			

National Data & Surveying Services Intersection Turning Movement Count

Location: Warrenton Village Center Dwy (Chipotle)/Walgreens Dwy & US 17/US 211/Broadview Ave
City: Warrenton
Control: 1-Way Stop(SB)

Project ID: 23-260020-002
Date: 2/9/2023

Data - Cars

NS/EW Streets:	Warrenton Village Center Dwy (Chipotle)/Walgreens Dwy				Warrenton Village Center Dwy (Chipotle)/Walgreens Dwy				US 17/US 211/Broadview Ave				US 17/US 211/Broadview Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	1	0	0	0	3	0	0	0	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	176	0	0	0	67	2	0	245
6:15 AM	0	0	0	0	0	0	0	0	0	188	0	0	0	110	0	0	298
6:30 AM	0	0	0	0	0	0	0	0	0	194	0	0	0	110	2	0	306
6:45 AM	0	0	0	0	0	0	2	0	0	193	0	0	0	144	1	0	340
7:00 AM	0	0	0	0	0	0	1	0	0	205	0	0	0	178	4	0	388
7:15 AM	0	0	0	0	0	0	2	0	0	229	0	0	0	156	3	0	390
7:30 AM	0	0	0	0	0	0	3	0	0	258	0	0	0	188	9	0	458
7:45 AM	0	0	0	0	0	0	8	0	0	224	0	0	0	225	9	0	466
8:00 AM	0	0	0	0	0	0	3	0	0	231	0	0	0	156	6	0	396
8:15 AM	0	0	0	0	0	0	6	0	0	196	0	0	0	172	7	0	381
8:30 AM	0	0	0	0	0	0	6	0	0	204	0	0	0	137	10	0	357
8:45 AM	0	0	0	0	0	0	7	0	0	221	0	0	0	151	23	0	402
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	38	0	0	2519	0	0	0	1794	76	0	4427
APPROACH %'s :					0.00%	0.00%	100.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	95.94%	4.06%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	20	0	0	909	0	0	0	741	31	0	1701
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.625	0.000	0.000	0.881	0.000	0.000	0.000	0.823	0.861	0.000	0.913
							0.625			0.881				0.825			

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	1	0	0	0	3	0	0	0	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	0	0	17	0	0	286	0	0	0	314	25	0	642
4:15 PM	0	0	0	0	0	0	19	0	0	223	0	0	0	277	25	0	544
4:30 PM	0	0	0	0	0	0	17	0	0	291	0	0	0	278	18	0	604
4:45 PM	0	0	0	0	0	0	26	0	0	266	0	0	0	268	34	0	594
5:00 PM	0	0	0	0	0	0	19	0	0	234	0	0	0	291	35	0	579
5:15 PM	0	0	0	0	0	0	26	0	0	241	0	0	0	296	24	0	587
5:30 PM	0	0	0	0	0	0	15	0	0	221	0	0	0	241	16	0	493
5:45 PM	0	0	0	0	0	0	20	0	0	235	0	0	0	273	38	0	566
6:00 PM	0	0	0	0	0	0	29	0	0	187	0	0	0	248	38	0	502
6:15 PM	0	0	0	0	0	0	25	0	0	209	0	0	0	246	42	0	522
6:30 PM	0	0	0	0	0	0	24	0	0	184	0	0	0	197	22	0	427
6:45 PM	0	0	0	0	0	0	21	0	0	155	0	0	0	215	22	0	413
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	258	0	0	2732	0	0	0	3144	339	0	6473
APPROACH %'s :					0.00%	0.00%	100.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	90.27%	9.73%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	79	0	0	1066	0	0	0	1137	102	0	2384
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.760	0.000	0.000	0.916	0.000	0.000	0.000	0.905	0.750	0.000	0.928
							0.760			0.916				0.914			

National Data & Surveying Services Intersection Turning Movement Count

Location: Warrenton Village Center Dwy (Chipotle)/Walgreens Dwy & US 17/US 211/Broadview Ave
City: Warrenton
Control: 1-Way Stop(SB)

Project ID: 23-260020-002
Date: 2/9/2023

Data - HT

NS/EW Streets:	Warrenton Village Center Dwy (Chipotle)/Walgreens Dwy				Warrenton Village Center Dwy (Chipotle)/Walgreens Dwy				US 17/US 211/Broadview Ave				US 17/US 211/Broadview Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	1	0	0	0	3	0	0	0	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	7
6:15 AM	0	0	0	0	0	0	0	0	0	4	0	0	0	5	0	0	9
6:30 AM	0	0	0	0	0	0	0	0	0	9	0	0	0	3	0	0	12
6:45 AM	0	0	0	0	0	0	0	0	0	3	0	0	0	13	0	0	16
7:00 AM	0	0	0	0	0	0	0	0	0	7	0	0	0	7	0	0	14
7:15 AM	0	0	0	0	0	0	1	0	0	15	0	0	0	8	0	0	24
7:30 AM	0	0	0	0	0	0	0	0	0	11	0	0	0	8	0	0	19
7:45 AM	0	0	0	0	0	0	0	0	0	12	0	0	0	9	0	0	21
8:00 AM	0	0	0	0	0	0	0	0	0	5	0	0	0	12	0	0	17
8:15 AM	0	0	0	0	0	0	0	0	0	11	0	0	0	24	0	0	35
8:30 AM	0	0	0	0	0	0	0	0	0	4	0	0	0	22	0	0	26
8:45 AM	0	0	0	0	0	0	0	0	0	9	0	0	0	17	0	0	26
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	1	0	0	97	0	0	0	128	0	0	226
APPROACH %'s :					0.00%	0.00%	100.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	39	0	0	0	53	0	0	92
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.813	0.000	0.000	0.000	0.552	0.000	0.000	0.657
										0.813				0.552			

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	1	0	0	0	3	0	0	0	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0	5	0	0	0	6	0	0	11
4:15 PM	0	0	0	0	0	0	0	0	0	4	0	0	0	7	0	0	11
4:30 PM	0	0	0	0	0	0	0	0	0	4	0	0	0	8	0	0	12
4:45 PM	0	0	0	0	0	0	0	0	0	5	0	0	0	6	0	0	11
5:00 PM	0	0	0	0	0	0	1	0	0	2	0	0	0	4	0	0	7
5:15 PM	0	0	0	0	0	0	0	0	0	4	0	0	0	6	0	0	10
5:30 PM	0	0	0	0	0	0	1	0	0	2	0	0	0	3	0	0	6
5:45 PM	0	0	0	0	0	0	0	0	0	4	0	0	0	4	0	0	8
6:00 PM	0	0	0	0	0	0	0	0	0	3	0	0	0	2	0	0	5
6:15 PM	0	0	0	0	0	0	0	0	0	3	0	0	0	2	0	0	5
6:30 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	6	0	0	7
6:45 PM	0	0	0	0	0	0	0	0	0	3	0	0	0	4	0	0	7
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	2	0	0	40	0	0	0	58	0	0	100
APPROACH %'s :					0.00%	0.00%	100.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	18	0	0	0	27	0	0	45
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.900	0.000	0.000	0.000	0.844	0.000	0.000	0.938
										0.900				0.844			

National Data & Surveying Services Intersection Turning Movement Count

Location: Warrenton Village Center Dwy (Chipotle)/Walgreens Dwy & US 17/US 211/Broadview Ave
City: Warrenton
Control: 1-Way Stop(SB)

Project ID: 23-260020-002
Date: 2/9/2023

Data - Bikes

NS/EW Streets:	Warrenton Village Center Dwy (Chipotle)/Walgreens Dwy				Warrenton Village Center Dwy (Chipotle)/Walgreens Dwy				US 17/US 211/Broadview Ave				US 17/US 211/Broadview Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	1	0	0	0	3	0	0	0	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %'s :																	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	1	0	0	0	3	0	0	0	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
APPROACH %'s :									0.00%	100.00%	0.00%	0.00%					
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

National Data & Surveying Services Intersection Turning Movement Count

Location: Warrenton Village Center Dwy (Chipotle)/Walgreens Dwy & US 17/L **Project ID:** 23-260020-002
City: Warrenton **Date:** 2/9/2023

Data - Pedestrians (Crosswalks)

NS/EW Streets:	Warrenton Village Center Dwy (Chipotle)/Walgreens		Warrenton Village Center Dwy (Chipotle)/Walgreens		US 17/US 211/Broadview Ave		US 17/US 211/Broadview Ave		
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0
8:30 AM	1	0	0	0	0	0	0	0	1
8:45 AM	0	0	0	0	0	0	0	0	0
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	1	0	0	0	0	0	0	0	1
APPROACH %'s :	100.00%	0.00%							
PEAK HR :	07:30 AM - 08:30 AM								TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :									

PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0
4:15 PM	0	1	0	0	0	0	0	0	1
4:30 PM	1	0	0	0	0	0	0	0	1
4:45 PM	2	0	0	0	0	0	0	0	2
5:00 PM	0	2	0	0	0	0	0	0	2
5:15 PM	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0
6:00 PM	0	0	0	0	0	0	0	0	0
6:15 PM	1	0	0	0	0	0	0	0	1
6:30 PM	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	4	3	0	0	0	0	0	0	7
APPROACH %'s :	57.14%	42.86%							
PEAK HR :	04:00 PM - 05:00 PM								TOTAL
PEAK HR VOL :	3	1	0	0	0	0	0	0	4
PEAK HR FACTOR :	0.375	0.250							0.500
	0.500								

Item 4.

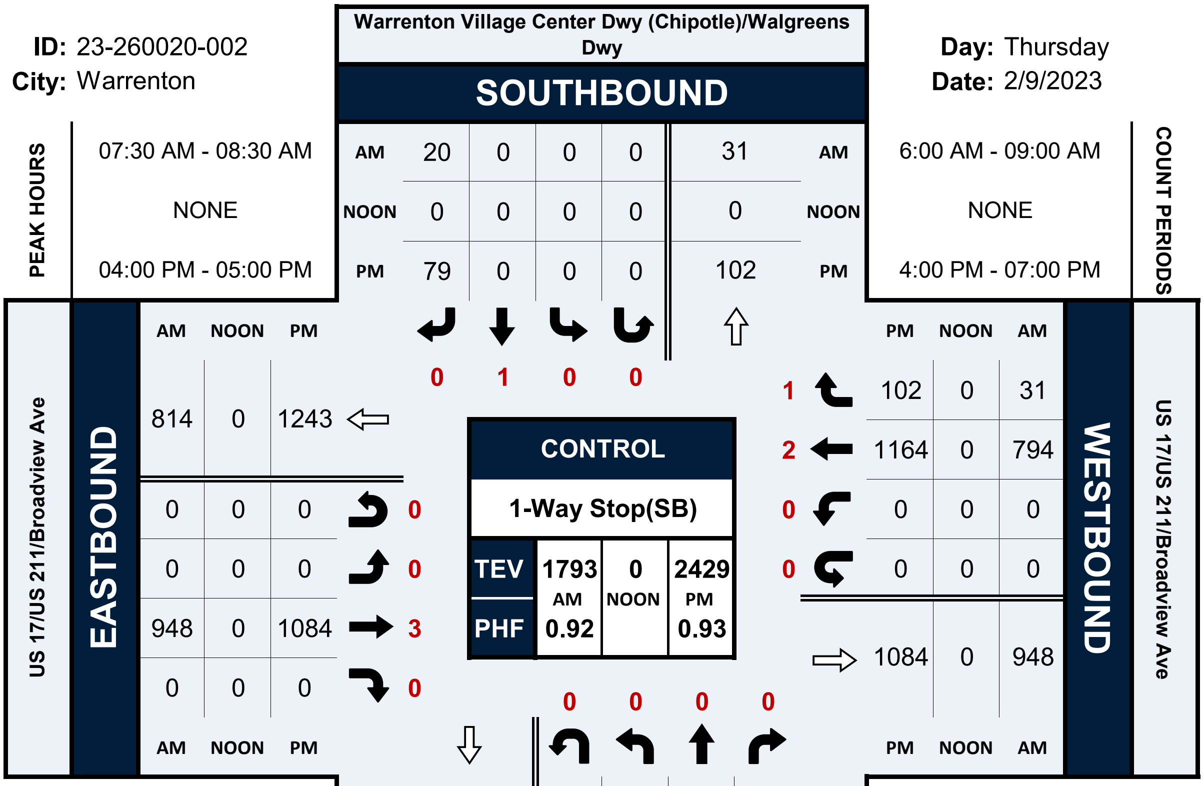
Prepared by National Data & Surveying Services

Warrenton Village Center Dwy (Chipotle)/Walgreens Dwy & US 17/US 211/Broadview Ave

Peak Hour Turning Movement Count

ID: 23-260020-002
City: Warrenton

Day: Thursday
Date: 2/9/2023



PEAK HOURS	
AM	07:30 AM - 08:30 AM
NOON	NONE
PM	04:00 PM - 05:00 PM

COUNT PERIODS	
AM	6:00 AM - 09:00 AM
NOON	NONE
PM	4:00 PM - 07:00 PM

SOUTHBOUND – Warrenton Village Center Dwy (Chipotle)/Walgreens Dwy

	↲	↓	↳	U	⇧
AM	20	0	0	0	31
NOON	0	0	0	0	0
PM	79	0	0	0	102
Lanes	0	1	0	0	

EASTBOUND – US 17/US 211/Broadview Ave

	AM	NOON	PM	Lanes
⇦	814	0	1243	
U	0	0	0	0
↰	0	0	0	0
→	948	0	1084	3
↴	0	0	0	0

WESTBOUND – US 17/US 211/Broadview Ave

	Lanes	PM	NOON	AM
↰	1	102	0	31
←	2	1164	0	794
↲	0	0	0	0
U	0	0	0	0
⇨		1084	0	948

NORTHBOUND – Warrenton Village Center Dwy (Chipotle)/Walgreens Dwy

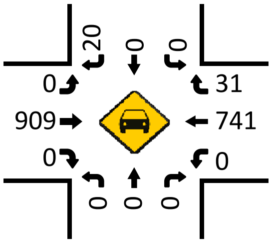
	⇩	U	↰	↑	↱
Lanes		0	0	0	0
PM	0	0	0	0	0
NOON	0	0	0	0	0
AM	0	0	0	0	0

CONTROL

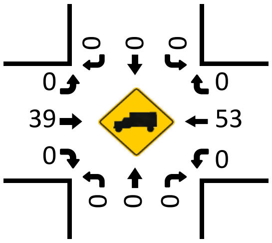
1-Way Stop(SB)

	AM	NOON	PM
TEV	1793	0	2429
PHF	0.92		0.93

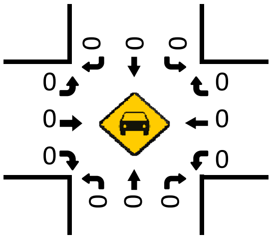
Cars (AM)



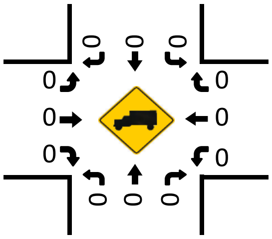
HT (AM)



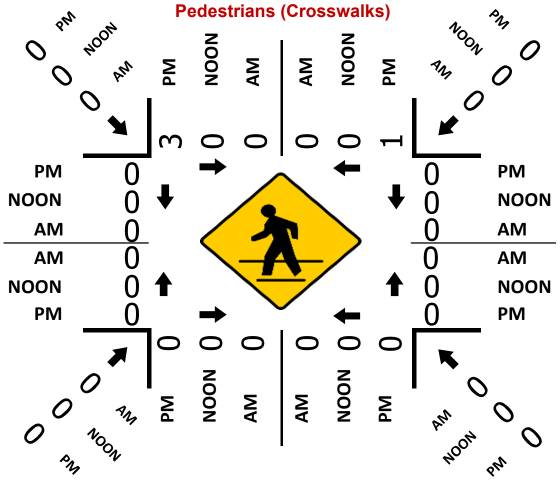
Cars (NOON)



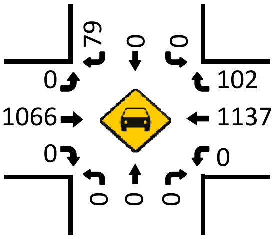
HT (NOON)



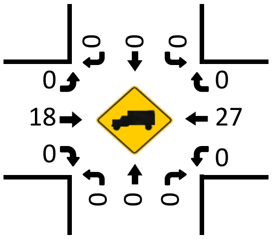
Pedestrians (Crosswalks)



Cars (PM)



HT (PM)



National Data & Surveying Services Intersection Turning Movement Count

Location: Branch Dr & US 211/Lee Hwy/Broadview Ave
City: Warrenton
Control: Signalized

Project ID: 23-260020-003
Date: 2/9/2023

Data - Total

NS/EW Streets:	Branch Dr				Branch Dr				US 211/Lee Hwy/Broadview Ave				US 211/Lee Hwy/Broadview Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0.5	0.5	1	0	0.5	0.5	1	0	1	2	1	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	1	0	4	0	3	1	1	0	0	180	0	0	3	69	3	0	265
6:15 AM	0	0	4	0	2	1	7	0	4	180	0	0	6	106	3	0	313
6:30 AM	0	0	8	0	1	1	4	0	4	190	0	0	11	114	3	0	336
6:45 AM	1	1	7	0	2	0	8	0	9	176	0	0	7	152	9	0	372
7:00 AM	3	0	6	0	1	1	12	0	5	213	1	1	11	167	4	0	425
7:15 AM	2	0	8	0	5	5	7	0	8	225	0	2	10	158	6	0	436
7:30 AM	4	4	14	0	3	1	9	0	6	245	0	2	10	192	15	0	505
7:45 AM	2	5	10	0	11	3	11	0	9	220	0	3	11	223	18	0	526
8:00 AM	1	2	8	0	10	2	4	0	7	215	0	1	11	172	12	0	445
8:15 AM	3	0	6	0	10	2	26	0	7	195	1	1	12	169	6	0	438
8:30 AM	4	3	9	0	12	5	9	0	10	187	0	2	17	156	5	2	421
8:45 AM	0	3	11	0	11	2	11	0	11	214	2	3	17	176	14	0	475
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	21	18	95	0	71	24	109	0	80	2440	4	15	126	1854	98	2	4957
APPROACH %'s :	15.67%	13.43%	70.90%	0.00%	34.80%	11.76%	53.43%	0.00%	3.15%	96.10%	0.16%	0.59%	6.06%	89.13%	4.71%	0.10%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	10	11	38	0	34	8	50	0	29	875	1	7	44	756	51	0	1914
PEAK HR FACTOR :	0.625	0.550	0.679	0.000	0.773	0.667	0.481	0.000	0.806	0.893	0.250	0.583	0.917	0.848	0.708	0.000	0.910
	0.670				0.605				0.901				0.844				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0.5	0.5	1	0	0.5	0.5	1	0	1	2	1	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	7	4	15	0	40	4	39	0	23	252	1	1	17	275	26	1	705
4:15 PM	3	4	18	0	39	4	36	0	34	208	1	3	14	272	23	0	659
4:30 PM	5	7	20	0	34	6	24	0	35	218	0	1	15	269	10	0	644
4:45 PM	2	2	22	0	26	4	42	0	39	224	0	4	18	277	25	0	685
5:00 PM	2	3	16	0	30	7	31	0	28	205	1	4	19	298	22	2	668
5:15 PM	4	8	16	0	26	6	31	0	29	203	0	3	14	266	15	2	623
5:30 PM	3	4	13	0	30	1	20	0	18	187	0	3	13	241	19	0	552
5:45 PM	5	2	17	0	31	2	21	0	25	210	0	3	22	279	19	0	636
6:00 PM	6	2	12	0	44	5	28	0	29	160	1	1	16	262	15	0	581
6:15 PM	3	5	17	0	30	4	25	0	19	160	0	6	13	247	17	1	547
6:30 PM	4	4	16	0	32	4	21	0	13	162	0	0	22	202	19	5	504
6:45 PM	1	1	9	0	27	9	20	0	17	149	0	4	10	214	11	0	472
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	45	46	191	0	389	56	338	0	309	2338	4	33	193	3102	221	11	7276
APPROACH %'s :	15.96%	16.31%	67.73%	0.00%	49.68%	7.15%	43.17%	0.00%	11.51%	87.11%	0.15%	1.23%	5.47%	87.95%	6.27%	0.31%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	17	17	75	0	139	18	141	0	131	902	2	9	64	1093	84	1	2693
PEAK HR FACTOR :	0.607	0.607	0.852	0.000	0.869	0.750	0.839	0.000	0.840	0.895	0.500	0.563	0.889	0.986	0.808	0.250	0.955
	0.852				0.898				0.942				0.970				

National Data & Surveying Services Intersection Turning Movement Count

Location: Branch Dr & US 211/Lee Hwy/Broadview Ave
City: Warrenton
Control: Signalized

Project ID: 23-260020-003
Date: 2/9/2023

Data - Cars

NS/EW Streets:	Branch Dr				Branch Dr				US 211/Lee Hwy/Broadview Ave				US 211/Lee Hwy/Broadview Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0.5	0.5	1	0	0.5	0.5	1	0	1	2	1	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	1	0	4	0	3	1	1	0	0	174	0	0	3	69	3	0	259
6:15 AM	0	0	4	0	2	1	6	0	3	176	0	0	6	102	3	0	303
6:30 AM	0	0	8	0	1	1	4	0	3	183	0	0	11	111	3	0	325
6:45 AM	1	1	6	0	1	0	5	0	9	173	0	0	6	142	9	0	353
7:00 AM	3	0	6	0	1	1	11	0	5	206	1	1	11	161	4	0	411
7:15 AM	2	0	8	0	4	5	7	0	8	210	0	2	10	150	6	0	412
7:30 AM	4	4	14	0	3	1	9	0	6	235	0	2	10	184	15	0	487
7:45 AM	2	5	10	0	11	3	11	0	9	208	0	3	11	214	18	0	505
8:00 AM	1	2	8	0	9	2	3	0	7	211	0	1	11	161	12	0	428
8:15 AM	3	0	6	0	10	2	18	0	7	184	1	0	11	154	6	0	402
8:30 AM	4	3	9	0	11	5	8	0	10	183	0	2	15	135	5	2	392
8:45 AM	0	2	11	0	10	2	10	0	11	206	2	3	17	159	14	0	447
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	21	17	94	0	66	24	93	0	78	2349	4	14	122	1742	98	2	4724
APPROACH %'s :	15.91%	12.88%	71.21%	0.00%	36.07%	13.11%	50.82%	0.00%	3.19%	96.07%	0.16%	0.57%	6.21%	88.70%	4.99%	0.10%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	10	11	38	0	33	8	41	0	29	838	1	6	43	713	51	0	1822
PEAK HR FACTOR :	0.625	0.550	0.679	0.000	0.750	0.667	0.569	0.000	0.806	0.891	0.250	0.500	0.977	0.833	0.708	0.000	0.902
	0.670				0.683				0.899				0.830				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0.5	0.5	1	0	0.5	0.5	1	0	1	2	1	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	7	4	15	0	40	4	39	0	23	247	1	1	17	269	25	1	693
4:15 PM	3	4	18	0	39	4	35	0	34	206	1	3	14	265	23	0	649
4:30 PM	5	7	20	0	33	6	24	0	35	213	0	1	15	262	10	0	631
4:45 PM	2	2	22	0	26	4	42	0	39	218	0	4	18	271	25	0	673
5:00 PM	2	3	15	0	30	7	30	0	28	203	1	4	19	295	21	2	660
5:15 PM	4	8	16	0	26	6	29	0	29	199	0	3	14	262	14	2	612
5:30 PM	3	4	13	0	29	1	20	0	18	185	0	3	13	237	19	0	545
5:45 PM	5	2	17	0	31	2	21	0	25	206	0	3	22	276	19	0	629
6:00 PM	6	2	12	0	44	5	27	0	29	158	1	1	16	261	15	0	577
6:15 PM	3	5	17	0	30	4	25	0	19	156	0	6	13	245	17	1	541
6:30 PM	4	4	16	0	32	4	21	0	13	161	0	0	22	196	19	5	497
6:45 PM	1	1	9	0	27	9	19	0	17	146	0	4	10	211	11	0	465
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	45	46	190	0	387	56	332	0	309	2298	4	33	193	3050	218	11	7172
APPROACH %'s :	16.01%	16.37%	67.62%	0.00%	49.94%	7.23%	42.84%	0.00%	11.69%	86.91%	0.15%	1.25%	5.56%	87.85%	6.28%	0.32%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	17	17	75	0	138	18	140	0	131	884	2	9	64	1067	83	1	2646
PEAK HR FACTOR :	0.607	0.607	0.852	0.000	0.863	0.750	0.833	0.000	0.840	0.895	0.500	0.563	0.889	0.984	0.830	0.250	0.955
	0.852				0.892				0.943				0.967				

National Data & Surveying Services Intersection Turning Movement Count

Location: Branch Dr & US 211/Lee Hwy/Broadview Ave
City: Warrenton
Control: Signalized

Project ID: 23-260020-003
Date: 2/9/2023

Data - HT

NS/EW Streets:	Branch Dr				Branch Dr				US 211/Lee Hwy/Broadview Ave				US 211/Lee Hwy/Broadview Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0.5	0.5	1	0	0.5	0.5	1	0	1	2	1	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	0	6
6:15 AM	0	0	0	0	0	0	1	0	1	4	0	0	0	4	0	0	10
6:30 AM	0	0	0	0	0	0	0	0	1	7	0	0	0	3	0	0	11
6:45 AM	0	0	1	0	1	0	3	0	0	3	0	0	1	10	0	0	19
7:00 AM	0	0	0	0	0	0	1	0	0	7	0	0	0	6	0	0	14
7:15 AM	0	0	0	0	1	0	0	0	0	15	0	0	0	8	0	0	24
7:30 AM	0	0	0	0	0	0	0	0	0	10	0	0	0	8	0	0	18
7:45 AM	0	0	0	0	0	0	0	0	0	12	0	0	0	9	0	0	21
8:00 AM	0	0	0	0	1	0	1	0	0	4	0	0	0	11	0	0	17
8:15 AM	0	0	0	0	0	0	8	0	0	11	0	1	1	15	0	0	36
8:30 AM	0	0	0	0	1	0	1	0	0	4	0	0	2	21	0	0	29
8:45 AM	0	1	0	0	1	0	1	0	0	8	0	0	0	17	0	0	28
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	1	1	0	5	0	16	0	2	91	0	1	4	112	0	0	233
APPROACH %'s :	0.00%	50.00%	50.00%	0.00%	23.81%	0.00%	76.19%	0.00%	2.13%	96.81%	0.00%	1.06%	3.45%	96.55%	0.00%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	0	0	0	0	1	0	9	0	0	37	0	1	1	43	0	0	92
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.250	0.000	0.281	0.000	0.000	0.771	0.000	0.250	0.250	0.717	0.000	0.000	0.639
							0.313				0.792				0.688		

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0.5	0.5	1	0	0.5	0.5	1	0	1	2	1	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0	5	0	0	0	6	1	0	12
4:15 PM	0	0	0	0	0	0	1	0	0	2	0	0	0	7	0	0	10
4:30 PM	0	0	0	0	1	0	0	0	0	5	0	0	0	7	0	0	13
4:45 PM	0	0	0	0	0	0	0	0	0	6	0	0	0	6	0	0	12
5:00 PM	0	0	1	0	0	0	1	0	0	2	0	0	0	3	1	0	8
5:15 PM	0	0	0	0	0	0	2	0	0	4	0	0	0	4	1	0	11
5:30 PM	0	0	0	0	1	0	0	0	0	2	0	0	0	4	0	0	7
5:45 PM	0	0	0	0	0	0	0	0	0	4	0	0	0	3	0	0	7
6:00 PM	0	0	0	0	0	0	1	0	0	2	0	0	0	1	0	0	4
6:15 PM	0	0	0	0	0	0	0	0	0	4	0	0	0	2	0	0	6
6:30 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	6	0	0	7
6:45 PM	0	0	0	0	0	0	1	0	0	3	0	0	0	3	0	0	7
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	1	0	2	0	6	0	0	40	0	0	0	52	3	0	104
APPROACH %'s :	0.00%	0.00%	100.00%	0.00%	25.00%	0.00%	75.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	94.55%	5.45%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	0	0	0	0	1	0	1	0	0	18	0	0	0	26	1	0	47
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.250	0.000	0.250	0.000	0.000	0.750	0.000	0.000	0.000	0.929	0.250	0.000	0.904
							0.500				0.750				0.964		

National Data & Surveying Services Intersection Turning Movement Count

Location: Branch Dr & US 211/Lee Hwy/Broadview Ave
City: Warrenton
Control: Signalized

Project ID: 23-260020-003
Date: 2/9/2023

Data - Bikes

NS/EW Streets:	Branch Dr				Branch Dr				US 211/Lee Hwy/Broadview Ave				US 211/Lee Hwy/Broadview Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0.5	0.5	1	0	0.5	0.5	1	0	1	2	1	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %'s :																	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0.5	0.5	1	0	0.5	0.5	1	0	1	2	1	0	1	2	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	1	0	0	2	0	0	0	3
APPROACH %'s :									0.00%	100.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.500	0.000	0.000	0.000	0.500
														0.500			

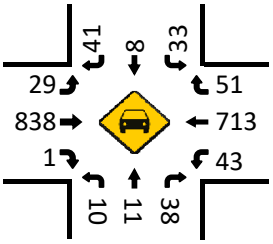
National Data & Surveying Services Intersection Turning Movement Count

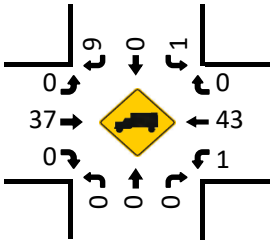
Location: Branch Dr & US 211/Lee Hwy/Broadview Ave **Project ID:** 23-260020-003
City: Warrenton **Date:** 2/9/2023

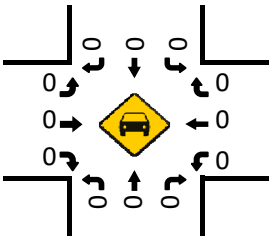
Data - Pedestrians (Crosswalks)

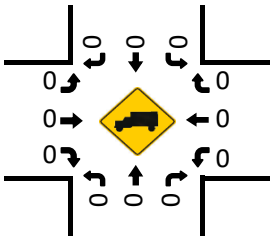
NS/EW Streets:	Branch Dr		Branch Dr		US 211/Lee Hwy/Broadview Ave		US 211/Lee Hwy/Broadview Ave		
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0
6:15 AM	2	0	0	0	0	0	0	0	2
6:30 AM	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0
8:30 AM	1	1	0	0	0	0	0	0	2
8:45 AM	0	0	0	0	0	0	0	0	0
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	3	1	0	0	0	0	0	0	4
APPROACH %'s :	75.00%	25.00%							
PEAK HR :	07:30 AM - 08:30 AM								TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :									

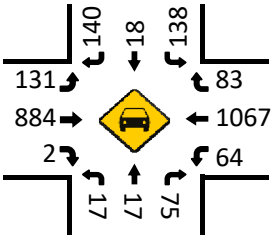
PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
4:00 PM	1	0	0	0	0	0	0	0	1
4:15 PM	0	0	0	0	0	0	0	0	0
4:30 PM	1	0	0	0	0	0	0	0	1
4:45 PM	0	0	0	2	0	0	0	0	2
5:00 PM	0	2	0	0	0	0	0	0	2
5:15 PM	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	1	0	0	0	0	0	1
6:00 PM	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	1	0	0	1
6:30 PM	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	2	2	1	2	0	1	0	0	8
APPROACH %'s :	50.00%	50.00%	33.33%	66.67%	0.00%	100.00%			
PEAK HR :	04:00 PM - 05:00 PM								TOTAL
PEAK HR VOL :	2	0	0	2	0	0	0	0	4
PEAK HR FACTOR :	0.500			0.250					0.500
	0.500			0.250					

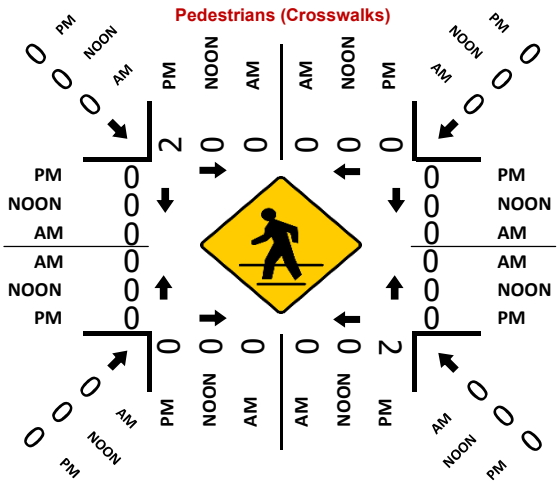












Prepared by National Data & Surveying Services

Branch Dr & US 211/Lee Hwy/Broadview Ave

Peak Hour Turning Movement Count

ID: 23-260020-003
City: Warrenton

Day: Thursday
Date: 2/9/2023

PEAK HOURS		COUNT PERIODS
07:30 AM - 08:30 AM	AM	6:00 AM - 09:00 AM
NONE	NOON	NONE
04:00 PM - 05:00 PM	PM	4:00 PM - 07:00 PM

Branch Dr — SOUTHBOUND

	↲	↓	↳	↶	⇧
AM	50	8	34	0	91
NOON	0	0	0	0	0
PM	141	18	139	0	232
	1	0.5	0.5	0	

US 211/Lee Hwy/Broadview Ave — EASTBOUND

	AM	NOON	PM	
⇦	823	0	1260	
↶	7	0	9	0
↱	29	0	131	1
→	875	0	902	2
↴	1	0	2	1

US 211/Lee Hwy/Broadview Ave — WESTBOUND

		PM	NOON	AM
1	↰	84	0	51
2	←	1093	0	756
1	↙	64	0	44
0	↷	1	0	0
	⇨	1117	0	947

Branch Dr — NORTHBOUND

	⇩	↶	↰	↑	↱
		0	0.5	0.5	1
PM	84	0	17	17	75
NOON	0	0	0	0	0
AM	53	0	10	11	38

CONTROL

Signalized

	AM	NOON	PM
TEV	1914	0	2693
PHF	0.91		0.95

Cars (AM)

	↲ / ↰ / ↱	↓ / → / ← / ↑	↳ / ↴ / ↙ / ↱
Southbound	41	8	33
Eastbound	29	838	1
Westbound	51	713	43
Northbound	10	11	38

HT (AM)

	↲ / ↰ / ↱	↓ / → / ← / ↑	↳ / ↴ / ↙ / ↱
Southbound	9	0	1
Eastbound	0	37	0
Westbound	0	43	1
Northbound	0	0	0

Cars (NOON)

	↲ / ↰ / ↱	↓ / → / ← / ↑	↳ / ↴ / ↙ / ↱
Southbound	0	0	0
Eastbound	0	0	0
Westbound	0	0	0
Northbound	0	0	0

HT (NOON)

	↲ / ↰ / ↱	↓ / → / ← / ↑	↳ / ↴ / ↙ / ↱
Southbound	0	0	0
Eastbound	0	0	0
Westbound	0	0	0
Northbound	0	0	0

Cars (PM)

	↲ / ↰ / ↱	↓ / → / ← / ↑	↳ / ↴ / ↙ / ↱
Southbound	140	18	138
Eastbound	131	884	2
Westbound	83	1067	64
Northbound	17	17	75

HT (PM)

	↲ / ↰ / ↱	↓ / → / ← / ↑	↳ / ↴ / ↙ / ↱
Southbound	1	0	1
Eastbound	0	18	0
Westbound	1	26	0
Northbound	0	0	0

Pedestrians (Crosswalks)

		AM	NOON	PM
North crosswalk	→	0	0	2
North crosswalk	←	0	0	0
South crosswalk	→	0	0	0
South crosswalk	←	0	0	2
West crosswalk	↓	0	0	0
West crosswalk	↑	0	0	0
East crosswalk	↓	0	0	0
East crosswalk	↑	0	0	0
↘		0	0	0
↙		0	0	0
↗		0	0	0
↖		0	0	0

National Data & Surveying Services Intersection Turning Movement Count

Location: Branch Dr & Warrenton Village Center Dwy/Shopping Center Dwy
City: Warrenton
Control: 2-Way Stop(EB/WB)

Project ID: 23-260020-004
Date: 2/9/2023

Data - Total

NS/EW Streets:	Branch Dr				Branch Dr				Warrenton Village Center Dwy/Shopping Center Dwy				Warrenton Village Center Dwy/Shopping Center Dwy				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	2	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	2	2	0	0	2	5	0	0	0	4	2	0	1	0	0	0	18
6:15 AM	0	1	1	0	1	2	0	0	0	1	0	0	4	2	0	0	12
6:30 AM	1	3	1	0	1	4	0	0	0	3	2	0	3	1	0	0	19
6:45 AM	7	2	0	0	3	8	0	0	0	1	0	0	2	2	0	0	25
7:00 AM	3	6	0	0	0	9	0	0	0	4	5	0	3	6	1	0	37
7:15 AM	3	6	1	0	5	8	2	0	1	5	5	0	3	3	5	0	47
7:30 AM	10	16	0	0	2	10	1	0	0	5	5	0	1	3	5	0	58
7:45 AM	5	26	3	0	5	21	1	0	4	3	9	0	3	2	3	0	85
8:00 AM	6	14	3	0	6	16	0	0	1	4	10	0	2	4	2	0	68
8:15 AM	2	9	1	0	5	20	3	0	1	3	14	0	8	2	4	0	72
8:30 AM	9	5	0	0	3	17	5	0	3	2	5	0	1	4	3	0	57
8:45 AM	8	9	1	0	2	14	4	0	1	6	7	0	3	2	0	0	57
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	56	99	11	0	35	134	16	0	11	41	64	0	34	31	23	0	555
APPROACH %'s :	33.73%	59.64%	6.63%	0.00%	18.92%	72.43%	8.65%	0.00%	9.48%	35.34%	55.17%	0.00%	38.64%	35.23%	26.14%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	23	65	7	0	18	67	5	0	6	15	38	0	14	11	14	0	283
PEAK HR FACTOR :	0.575	0.625	0.583	0.000	0.750	0.798	0.417	0.000	0.375	0.750	0.679	0.000	0.438	0.688	0.700	0.000	0.832
	0.699				0.804				0.819				0.696				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	2	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	32	10	0	0	11	13	8	0	3	22	29	0	14	12	6	0	160
4:15 PM	19	6	3	0	10	11	8	0	6	22	28	0	10	12	14	0	149
4:30 PM	15	16	5	0	13	9	10	0	2	20	33	0	7	10	12	0	152
4:45 PM	28	11	4	0	14	6	6	0	6	13	26	0	14	16	9	0	153
5:00 PM	28	9	1	0	12	13	10	0	3	12	35	0	7	12	12	0	154
5:15 PM	25	7	3	0	12	9	9	0	6	12	30	0	11	9	12	0	145
5:30 PM	27	15	4	0	6	0	10	0	11	26	32	0	6	14	10	0	161
5:45 PM	28	6	2	0	9	6	8	0	5	22	32	0	12	21	7	0	158
6:00 PM	29	9	1	0	5	6	9	0	8	22	48	0	10	17	13	0	177
6:15 PM	20	16	2	0	4	6	6	0	6	17	32	0	8	14	8	0	139
6:30 PM	18	8	2	0	3	9	4	0	4	10	25	0	10	17	4	0	114
6:45 PM	10	6	0	0	1	5	7	0	4	9	36	0	4	7	10	0	99
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	279	119	27	0	100	93	95	0	64	207	386	0	113	161	117	0	1761
APPROACH %'s :	65.65%	28.00%	6.35%	0.00%	34.72%	32.29%	32.99%	0.00%	9.74%	31.51%	58.75%	0.00%	28.90%	41.18%	29.92%	0.00%	
PEAK HR :	05:15 PM - 06:15 PM																TOTAL
PEAK HR VOL :	109	37	10	0	32	21	36	0	30	82	142	0	39	61	42	0	641
PEAK HR FACTOR :	0.940	0.617	0.625	0.000	0.667	0.583	0.900	0.000	0.682	0.788	0.740	0.000	0.813	0.726	0.808	0.000	0.905
	0.848				0.742				0.814				0.888				

National Data & Surveying Services Intersection Turning Movement Count

Location: Branch Dr & Warrenton Village Center Dwy/Shopping Center Dwy
City: Warrenton
Control: 2-Way Stop(EB/WB)

Project ID: 23-260020-004
Date: 2/9/2023

Data - Cars

NS/EW Streets:	Branch Dr				Branch Dr				Warrenton Village Center Dwy/Shopping Center Dwy				Warrenton Village Center Dwy/Shopping Center Dwy				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	2	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	2	2	0	0	2	5	0	0	0	4	2	0	1	0	0	0	18
6:15 AM	0	0	1	0	1	2	0	0	0	1	0	0	3	2	0	0	10
6:30 AM	1	3	0	0	1	4	0	0	0	3	1	0	3	1	0	0	17
6:45 AM	6	2	0	0	3	6	0	0	0	1	0	0	1	1	0	0	20
7:00 AM	3	6	0	0	0	8	0	0	0	4	5	0	3	5	1	0	35
7:15 AM	3	6	1	0	4	8	1	0	1	5	4	0	3	3	5	0	44
7:30 AM	10	16	0	0	2	10	1	0	0	5	5	0	1	3	5	0	58
7:45 AM	5	26	3	0	5	21	1	0	4	3	9	0	3	1	3	0	84
8:00 AM	6	14	3	0	6	13	0	0	1	4	10	0	2	4	2	0	65
8:15 AM	2	9	1	0	5	14	3	0	1	3	14	0	8	2	4	0	66
8:30 AM	9	5	0	0	3	16	5	0	3	2	4	0	1	3	3	0	54
8:45 AM	8	9	1	0	2	13	4	0	1	6	7	0	1	2	0	0	54
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	55	98	10	0	34	120	15	0	11	41	61	0	30	27	23	0	525
APPROACH %'s :	33.74%	60.12%	6.13%	0.00%	20.12%	71.01%	8.88%	0.00%	9.73%	36.28%	53.98%	0.00%	37.50%	33.75%	28.75%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	23	65	7	0	18	58	5	0	6	15	38	0	14	10	14	0	273
PEAK HR FACTOR :	0.575	0.625	0.583	0.000	0.750	0.690	0.417	0.000	0.375	0.750	0.679	0.000	0.438	0.625	0.700	0.000	0.813
	0.699				0.750				0.819				0.679				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	2	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	32	9	0	0	11	13	8	0	3	22	29	0	14	12	6	0	159
4:15 PM	19	6	3	0	10	10	8	0	6	22	27	0	10	11	13	0	145
4:30 PM	15	16	5	0	13	9	10	0	2	20	32	0	7	10	11	0	150
4:45 PM	28	11	4	0	14	6	6	0	6	13	26	0	14	16	9	0	153
5:00 PM	28	9	1	0	12	12	10	0	3	12	35	0	7	11	12	0	152
5:15 PM	25	7	3	0	12	7	9	0	6	12	30	0	11	9	12	0	143
5:30 PM	27	15	4	0	6	0	10	0	11	26	32	0	6	14	10	0	161
5:45 PM	28	6	2	0	9	6	8	0	5	22	32	0	12	20	7	0	157
6:00 PM	29	9	1	0	5	5	9	0	8	22	48	0	10	17	13	0	176
6:15 PM	20	16	2	0	4	6	6	0	6	17	32	0	8	14	8	0	139
6:30 PM	18	8	2	0	3	9	4	0	4	10	25	0	10	16	4	0	113
6:45 PM	10	6	0	0	1	4	7	0	4	9	36	0	3	7	10	0	97
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	279	118	27	0	100	87	95	0	64	207	384	0	112	157	115	0	1745
APPROACH %'s :	65.80%	27.83%	6.37%	0.00%	35.46%	30.85%	33.69%	0.00%	9.77%	31.60%	58.63%	0.00%	29.17%	40.89%	29.95%	0.00%	
PEAK HR :	05:15 PM - 06:15 PM																TOTAL
PEAK HR VOL :	109	37	10	0	32	18	36	0	30	82	142	0	39	60	42	0	637
PEAK HR FACTOR :	0.940	0.617	0.625	0.000	0.667	0.643	0.900	0.000	0.682	0.788	0.740	0.000	0.813	0.750	0.808	0.000	0.905
	0.848				0.768				0.814				0.881				

National Data & Surveying Services Intersection Turning Movement Count

Location: Branch Dr & Warrenton Village Center Dwy/Shopping Center Dwy
City: Warrenton
Control: 2-Way Stop(EB/WB)

Project ID: 23-260020-004
Date: 2/9/2023

Data - HT

NS/EW Streets:	Branch Dr				Branch Dr				Warrenton Village Center Dwy/Shopping Center Dwy				Warrenton Village Center Dwy/Shopping Center Dwy				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	2	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2
6:30 AM	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	2
6:45 AM	1	0	0	0	0	2	0	0	0	0	0	0	1	1	0	0	5
7:00 AM	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2
7:15 AM	0	0	0	0	1	0	1	0	0	0	1	0	0	0	0	0	3
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
8:00 AM	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	3
8:15 AM	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	6
8:30 AM	0	0	0	0	0	1	0	0	0	0	1	0	0	1	0	0	3
8:45 AM	0	0	0	0	0	1	0	0	0	0	0	0	2	0	0	0	3
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	1	1	1	0	1	14	1	0	0	0	3	0	4	4	0	0	30
APPROACH %'s :	33.33%	33.33%	33.33%	0.00%	6.25%	87.50%	6.25%	0.00%	0.00%	0.00%	100.00%	0.00%	50.00%	50.00%	0.00%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	0	0	0	0	0	9	0	0	0	0	0	0	0	1	0	0	10
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.375	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.000	0.417
						0.375								0.250			

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	2	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
4:15 PM	0	0	0	0	0	1	0	0	0	0	1	0	0	1	1	0	4
4:30 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	2
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	2
5:15 PM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
6:00 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
6:45 PM	0	0	0	0	0	1	0	0	0	0	0	0	1	0	0	0	2
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	1	0	0	0	6	0	0	0	0	2	0	1	4	2	0	16
APPROACH %'s :	0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	14.29%	57.14%	28.57%	0.00%	
PEAK HR :	05:15 PM - 06:15 PM																TOTAL
PEAK HR VOL :	0	0	0	0	0	3	0	0	0	0	0	0	0	1	0	0	4
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.375	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.000	0.500
						0.375								0.250			

National Data & Surveying Services Intersection Turning Movement Count

Location: Branch Dr & Warrenton Village Center Dwy/Shopping Center Dwy
City: Warrenton
Control: 2-Way Stop(EB/WB)

Project ID: 23-260020-004
Date: 2/9/2023

Data - Bikes

NS/EW Streets:	Branch Dr				Branch Dr				Warrenton Village Center Dwy/Shopping Center Dwy				Warrenton Village Center Dwy/Shopping Center Dwy				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	2	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %'s :																	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	2	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	2
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	0	3
APPROACH %'s :					0.00%	0.00%	100.00%	0.00%	100.00%	0.00%	0.00%	0.00%					
PEAK HR :	05:15 PM - 06:15 PM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	2
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.250
							0.250				0.250						

National Data & Surveying Services Intersection Turning Movement Count

Location: Branch Dr & Warrenton Village Center Dwy/Shopping Center Dwy **Project ID:** 23-260020-004
City: Warrenton **Date:** 2/9/2023

Data - Pedestrians (Crosswalks)

NS/EW Streets:	Branch Dr		Branch Dr		Warrenton Village Center Dwy/Shopping Center		Warrenton Village Center Dwy/Shopping Center		
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
6:00 AM	0	2	0	0	0	0	0	0	2
6:15 AM	0	0	0	0	0	0	0	0	0
6:30 AM	1	0	0	0	0	0	0	0	1
6:45 AM	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0
7:15 AM	1	0	0	0	0	0	0	0	1
7:30 AM	0	0	0	0	0	0	0	0	0
7:45 AM	1	0	0	0	0	0	0	0	1
8:00 AM	0	0	0	0	0	0	0	0	0
8:15 AM	0	1	0	0	0	0	0	0	1
8:30 AM	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	3	3	0	0	0	0	0	0	6
APPROACH %'s :	50.00%	50.00%							
PEAK HR :	07:30 AM - 08:30 AM								TOTAL
PEAK HR VOL :	1	1	0	0	0	0	0	0	2
PEAK HR FACTOR :	0.250	0.250							0.500
	0.500								

PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
4:00 PM	0	5	0	0	0	0	0	0	5
4:15 PM	1	2	0	0	1	0	0	0	4
4:30 PM	1	2	0	0	0	0	0	0	3
4:45 PM	3	0	0	0	0	1	0	0	4
5:00 PM	0	0	0	0	0	0	0	0	0
5:15 PM	2	1	0	0	0	0	0	0	3
5:30 PM	1	0	0	0	0	0	0	0	1
5:45 PM	0	0	0	0	0	0	0	0	0
6:00 PM	2	1	0	0	0	0	0	0	3
6:15 PM	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	0
6:45 PM	0	2	0	0	0	0	0	0	2
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	10	13	0	0	1	1	0	0	25
APPROACH %'s :	43.48%	56.52%			50.00%	50.00%			
PEAK HR :	05:15 PM - 06:15 PM								TOTAL
PEAK HR VOL :	5	2	0	0	0	0	0	0	7
PEAK HR FACTOR :	0.625	0.500							0.583
	0.583								

Prepared by National Data & Surveying Services

Branch Dr & Warrenton Village Center Dwy/Shopping Center Dwy

Peak Hour Turning Movement Count

ID: 23-260020-004
City: Warrenton

Day: Thursday
Date: 2/9/2023

PEAK HOURS	COUNT PERIODS
07:30 AM - 08:30 AM	6:00 AM - 09:00 AM
NONE	NONE
05:15 PM - 06:15 PM	4:00 PM - 07:00 PM

CONTROL: 2-Way Stop(EB/WB)

	AM	NOON	PM
TEV	283	0	641
PHF	0.83		0.91

SOUTHBOUND (Branch Dr)

	Left	Thru	Right	U-Turn	
AM	5	67	18	0	85
NOON	0	0	0	0	0
PM	36	21	32	0	109

EASTBOUND (Warrenton Village Center Dwy/Shopping Center Dwy)

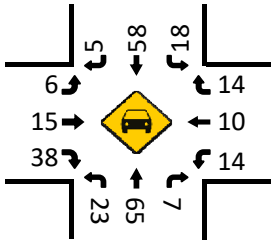
	Left	Thru	Right	U-Turn	
AM	39	0	206		
NOON	0	0	0	0	
PM	6	0	30	0	
	15	0	82	1	
	38	0	142	0	

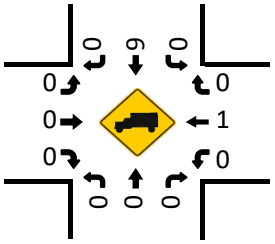
WESTBOUND (Warrenton Village Center Dwy/Shopping Center Dwy)

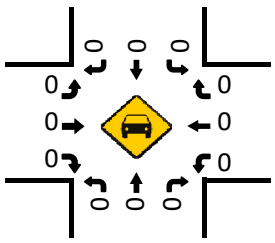
	Left	Thru	Right	U-Turn	
PM	42	0	14	0	
NOON	61	0	11	1	
AM	39	0	14	0	
	0	0	0	0	
	124	0	40		

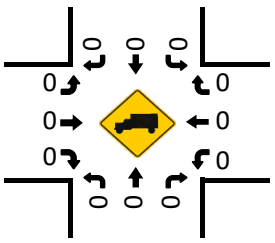
NORTHBOUND (Branch Dr)

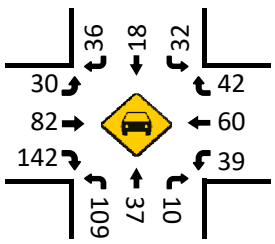
	Left	Thru	Right	U-Turn	
PM	202	0	109	37	10
NOON	0	0	0	0	0
AM	119	0	23	65	7

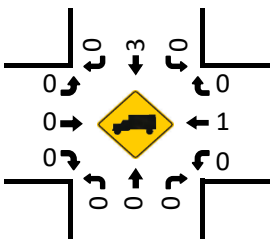


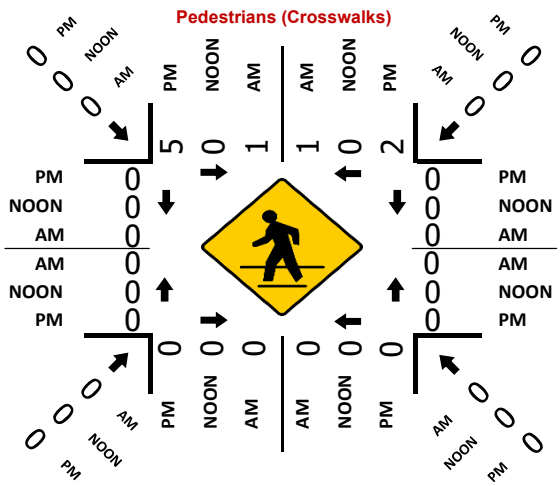












National Data & Surveying Services Intersection Turning Movement Count

Location: Branch Dr & Oak Springs Dr
City: Warrenton
Control: 2-Way Stop(NB/SB)

Project ID: 23-260020-005
Date: 2/9/2023

Data - Total

NS/EW Streets:	Branch Dr				Branch Dr				Oak Springs Dr				Oak Springs Dr				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	1	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	2	0	0	0	0	0	0	0	0	3	6	0	1	0	0	0	12
6:15 AM	0	0	1	0	0	0	0	0	0	2	3	0	0	4	0	0	10
6:30 AM	3	0	0	0	0	1	0	0	0	3	4	0	0	6	0	0	17
6:45 AM	2	0	0	0	0	0	0	0	1	3	9	0	2	6	1	0	24
7:00 AM	6	0	0	0	1	0	0	0	0	5	6	0	3	12	0	0	33
7:15 AM	12	0	1	0	0	2	0	0	0	15	9	0	4	10	0	0	53
7:30 AM	17	0	2	0	0	1	0	0	0	15	7	0	5	18	0	0	65
7:45 AM	31	0	4	0	0	0	1	0	0	20	23	0	4	49	0	0	132
8:00 AM	14	0	3	0	0	0	0	0	0	14	21	0	1	22	0	0	75
8:15 AM	11	0	3	0	0	0	0	0	0	27	24	0	4	17	0	0	86
8:30 AM	9	0	2	0	0	0	1	0	0	17	18	0	7	19	0	0	73
8:45 AM	7	0	3	0	0	2	1	0	1	26	15	0	3	19	0	0	77
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	114	0	19	0	1	6	3	0	2	150	145	0	34	182	1	0	657
APPROACH %'s :	85.71%	0.00%	14.29%	0.00%	10.00%	60.00%	30.00%	0.00%	0.67%	50.51%	48.82%	0.00%	15.67%	83.87%	0.46%	0.00%	
PEAK HR :	07:45 AM - 08:45 AM																TOTAL
PEAK HR VOL :	65	0	12	0	0	0	2	0	0	78	86	0	16	107	0	0	366
PEAK HR FACTOR :	0.524	0.000	0.750	0.000	0.000	0.000	0.500	0.000	0.000	0.722	0.896	0.000	0.571	0.546	0.000	0.000	0.693
	0.550				0.500				0.804				0.580				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	1	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	15	0	4	0	1	1	0	0	1	34	21	0	9	25	1	0	112
4:15 PM	13	2	10	1	0	2	0	0	2	21	20	0	6	25	1	0	103
4:30 PM	19	0	11	0	0	1	0	0	0	30	26	0	5	33	0	0	125
4:45 PM	14	0	12	0	0	1	0	0	0	20	19	0	8	29	0	0	103
5:00 PM	18	1	4	0	0	1	0	0	1	22	20	0	12	27	0	0	106
5:15 PM	19	1	6	0	0	3	0	0	1	12	21	0	6	29	0	0	98
5:30 PM	26	1	8	0	1	0	0	0	0	23	12	0	4	26	1	0	102
5:45 PM	12	1	6	0	0	0	0	0	0	20	15	0	8	20	2	0	84
6:00 PM	22	2	6	0	0	0	0	0	0	15	13	0	8	14	1	0	81
6:15 PM	18	1	10	0	0	0	0	0	1	16	10	0	5	5	1	0	67
6:30 PM	10	3	4	0	1	2	1	0	0	15	7	0	7	9	0	0	59
6:45 PM	13	0	6	0	0	0	0	0	0	12	5	0	8	3	1	0	48
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	199	12	87	1	3	11	1	0	6	240	189	0	86	245	8	0	1088
APPROACH %'s :	66.56%	4.01%	29.10%	0.33%	20.00%	73.33%	6.67%	0.00%	1.38%	55.17%	43.45%	0.00%	25.37%	72.27%	2.36%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	61	2	37	1	1	5	0	0	3	105	86	0	28	112	2	0	443
PEAK HR FACTOR :	0.803	0.250	0.771	0.250	0.250	0.625	0.000	0.000	0.375	0.772	0.827	0.000	0.778	0.848	0.500	0.000	0.886
	0.842				0.750				0.866				0.934				

National Data & Surveying Services Intersection Turning Movement Count

Location: Branch Dr & Oak Springs Dr
City: Warrenton
Control: 2-Way Stop(NB/SB)

Project ID: 23-260020-005
Date: 2/9/2023

Data - Cars

NS/EW Streets:	Branch Dr				Branch Dr				Oak Springs Dr				Oak Springs Dr				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	1	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	2	0	0	0	0	0	0	0	0	3	6	0	1	0	0	0	12
6:15 AM	0	0	0	0	0	0	0	0	0	2	3	0	0	4	0	0	9
6:30 AM	3	0	0	0	0	1	0	0	0	2	4	0	0	6	0	0	16
6:45 AM	2	0	0	0	0	0	0	0	1	3	8	0	1	6	1	0	22
7:00 AM	6	0	0	0	1	0	0	0	0	3	5	0	3	12	0	0	30
7:15 AM	12	0	1	0	0	2	0	0	0	15	8	0	3	10	0	0	51
7:30 AM	17	0	2	0	0	1	0	0	0	15	7	0	5	18	0	0	65
7:45 AM	31	0	4	0	0	0	1	0	0	20	23	0	4	48	0	0	131
8:00 AM	14	0	3	0	0	0	0	0	0	13	19	0	0	22	0	0	71
8:15 AM	11	0	3	0	0	0	0	0	0	27	18	0	4	17	0	0	80
8:30 AM	9	0	2	0	0	0	1	0	0	16	18	0	6	19	0	0	71
8:45 AM	7	0	3	0	0	2	1	0	1	26	14	0	3	19	0	0	76
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	114	0	18	0	1	6	3	0	2	145	133	0	30	181	1	0	634
APPROACH %'s :	86.36%	0.00%	13.64%	0.00%	10.00%	60.00%	30.00%	0.00%	0.71%	51.79%	47.50%	0.00%	14.15%	85.38%	0.47%	0.00%	
PEAK HR :	07:45 AM - 08:45 AM																TOTAL
PEAK HR VOL :	65	0	12	0	0	0	2	0	0	76	78	0	14	106	0	0	353
PEAK HR FACTOR :	0.524	0.000	0.750	0.000	0.000	0.000	0.500	0.000	0.000	0.704	0.848	0.000	0.583	0.552	0.000	0.000	0.674
	0.550				0.500				0.856				0.577				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	1	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	14	0	4	0	1	1	0	0	1	34	21	0	9	25	1	0	111
4:15 PM	13	2	9	1	0	2	0	0	2	20	20	0	5	25	1	0	100
4:30 PM	18	0	11	0	0	1	0	0	0	29	26	0	5	33	0	0	123
4:45 PM	14	0	12	0	0	1	0	0	0	19	19	0	8	28	0	0	101
5:00 PM	18	1	4	0	0	1	0	0	1	22	20	0	11	26	0	0	104
5:15 PM	19	1	6	0	0	3	0	0	1	12	20	0	5	29	0	0	96
5:30 PM	26	1	8	0	1	0	0	0	0	23	12	0	4	26	1	0	102
5:45 PM	12	1	6	0	0	0	0	0	0	20	15	0	8	20	2	0	84
6:00 PM	22	2	6	0	0	0	0	0	0	15	13	0	7	14	1	0	80
6:15 PM	18	1	10	0	0	0	0	0	1	16	10	0	5	5	1	0	67
6:30 PM	10	3	4	0	1	2	1	0	0	15	7	0	7	9	0	0	59
6:45 PM	13	0	6	0	0	0	0	0	0	12	5	0	7	3	1	0	47
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	197	12	86	1	3	11	1	0	6	237	188	0	81	243	8	0	1074
APPROACH %'s :	66.55%	4.05%	29.05%	0.34%	20.00%	73.33%	6.67%	0.00%	1.39%	54.99%	43.62%	0.00%	24.40%	73.19%	2.41%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	59	2	36	1	1	5	0	0	3	102	86	0	27	111	2	0	435
PEAK HR FACTOR :	0.819	0.250	0.750	0.250	0.250	0.625	0.000	0.000	0.375	0.750	0.827	0.000	0.750	0.841	0.500	0.000	0.884
	0.845				0.750				0.853				0.921				

National Data & Surveying Services Intersection Turning Movement Count

Location: Branch Dr & Oak Springs Dr
City: Warrenton
Control: 2-Way Stop(NB/SB)

Project ID: 23-260020-005
Date: 2/9/2023

Data - HT

NS/EW Streets:	Branch Dr				Branch Dr				Oak Springs Dr				Oak Springs Dr				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	1	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
6:30 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
6:45 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	2
7:00 AM	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	3
7:15 AM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	2
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
8:00 AM	0	0	0	0	0	0	0	0	0	1	2	0	1	0	0	0	4
8:15 AM	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	6
8:30 AM	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	2
8:45 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	1	0	0	0	0	0	0	5	12	0	4	1	0	0	23
APPROACH %'s :	0.00%	0.00%	100.00%	0.00%					0.00%	29.41%	70.59%	0.00%	80.00%	20.00%	0.00%	0.00%	
PEAK HR :	07:45 AM - 08:45 AM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	2	8	0	2	1	0	0	13
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.500	0.333	0.000	0.500	0.250	0.000	0.000	0.542
										0.417				0.750			

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	1	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
4:15 PM	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	3
4:30 PM	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2
4:45 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2
5:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	2
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	2	0	1	0	0	0	0	0	0	3	1	0	5	2	0	0	14
APPROACH %'s :	66.67%	0.00%	33.33%	0.00%					0.00%	75.00%	25.00%	0.00%	71.43%	28.57%	0.00%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	2	0	1	0	0	0	0	0	0	3	0	0	1	1	0	0	8
PEAK HR FACTOR :	0.500	0.000	0.250	0.000	0.000	0.000	0.000	0.000	0.000	0.750	0.000	0.000	0.250	0.250	0.000	0.000	0.667
			0.750							0.750				0.500			

National Data & Surveying Services Intersection Turning Movement Count

Location: Branch Dr & Oak Springs Dr
City: Warrenton
Control: 2-Way Stop(NB/SB)

Project ID: 23-260020-005
Date: 2/9/2023

Data - Bikes

NS/EW Streets:	Branch Dr				Branch Dr				Oak Springs Dr				Oak Springs Dr				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	1	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %'s :																	
PEAK HR :	07:45 AM - 08:45 AM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	2	0	0	0	1	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	3
APPROACH %'s :	0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%									
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

National Data & Surveying Services Intersection Turning Movement Count

Location: Branch Dr & Oak Springs Dr
City: Warrenton
Project ID: 23-260020-005
Date: 2/9/2023

Data - Pedestrians (Crosswalks)

NS/EW Streets:	Branch Dr		Branch Dr		Oak Springs Dr		Oak Springs Dr		
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0
6:15 AM	1	0	0	0	0	0	0	0	1
6:30 AM	0	0	0	0	0	0	0	0	0
6:45 AM	0	1	0	0	1	0	0	1	3
7:00 AM	0	0	0	0	0	0	0	0	0
7:15 AM	1	0	0	0	0	0	0	0	1
7:30 AM	0	1	0	0	0	0	0	0	1
7:45 AM	0	0	0	0	0	0	0	0	0
8:00 AM	1	1	0	0	0	0	0	0	2
8:15 AM	1	0	1	0	1	1	0	0	4
8:30 AM	2	2	0	0	1	0	0	0	5
8:45 AM	0	0	0	0	0	0	0	0	0
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	6	5	1	0	3	1	0	1	17
APPROACH %'s :	54.55%	45.45%	100.00%	0.00%	75.00%	25.00%	0.00%	100.00%	
PEAK HR :	07:45 AM - 08:45 AM								TOTAL
PEAK HR VOL :	4	3	1	0	2	1	0	0	11
PEAK HR FACTOR :	0.500	0.375	0.250		0.500	0.250			0.550
	0.438		0.250		0.375				

PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
4:00 PM	2	0	0	0	0	0	0	0	2
4:15 PM	0	0	0	0	1	0	0	0	1
4:30 PM	0	1	0	0	0	1	0	0	2
4:45 PM	0	1	0	0	0	0	0	0	1
5:00 PM	0	1	0	0	0	0	0	0	1
5:15 PM	0	1	0	0	1	0	0	0	2
5:30 PM	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	1	0	1	0	0	2
6:00 PM	3	2	0	0	1	0	0	0	6
6:15 PM	1	0	0	0	0	1	0	0	2
6:30 PM	0	1	0	0	0	0	0	0	1
6:45 PM	0	0	1	0	0	1	0	0	2
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	6	7	1	1	3	4	0	0	22
APPROACH %'s :	46.15%	53.85%	50.00%	50.00%	42.86%	57.14%			
PEAK HR :	04:00 PM - 05:00 PM								TOTAL
PEAK HR VOL :	2	2	0	0	1	1	0	0	6
PEAK HR FACTOR :	0.250	0.500			0.250	0.250			0.750
	0.500				0.500				

Prepared by National Data & Surveying Services

Branch Dr & Oak Springs Dr

Peak Hour Turning Movement Count

ID: 23-260020-005
City: Warrenton

Day: Thursday
Date: 2/9/2023

PEAK HOURS	COUNT PERIODS
07:45 AM - 08:45 AM	6:00 AM - 09:00 AM
NONE	NONE
04:00 PM - 05:00 PM	4:00 PM - 07:00 PM

CONTROL: 2-Way Stop(NB/SB)

	AM	NOON	PM
TEV	366	0	443
PHF	0.69		0.89

SOUTHBOUND (Branch Dr)

	Left	Thru	Right	Approach
AM	2	0	0	0
NOON	0	0	0	0
PM	0	5	1	0

NORTHBOUND (Branch Dr)

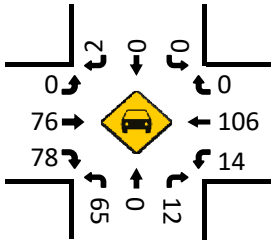
	Left	Thru	Right	Approach
PM	120	1	61	2	37
NOON	0	0	0	0	0
AM	102	0	65	0	12

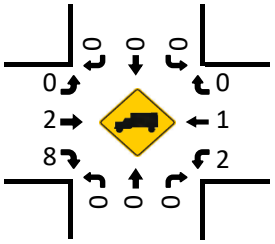
EASTBOUND (Oak Springs Dr)

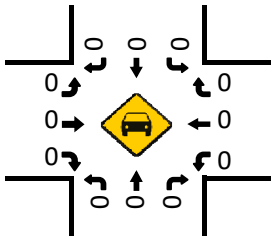
	Left	Thru	Right	Approach
AM	174	0	173	0
NOON	0	0	0	0
PM	78	0	105	1
	86	0	86	0

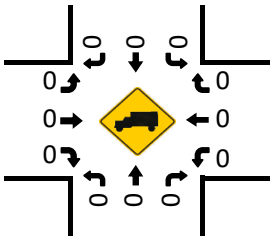
WESTBOUND (Oak Springs Dr)

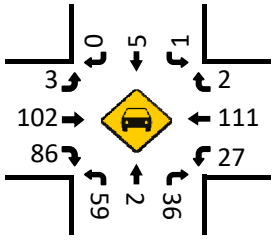
	Left	Thru	Right	Approach
PM	2	0	0	0
NOON	112	0	107	1
AM	28	0	16	0
	0	0	0	0
	143	0	90	0

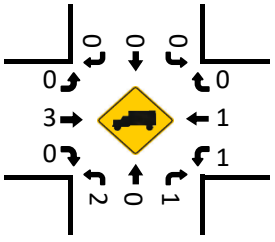


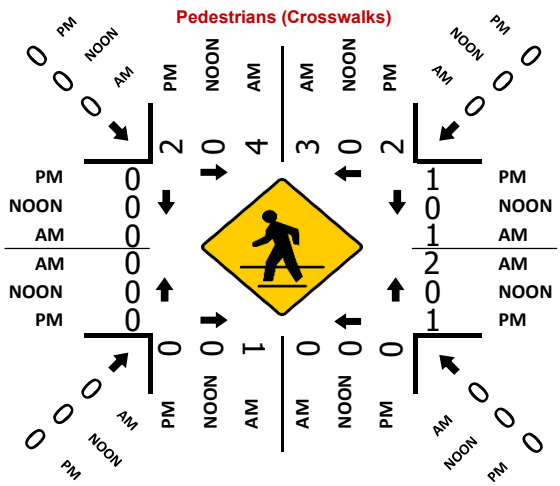












National Data & Surveying Services Intersection Turning Movement Count

Location: Hastings Ln & Oak Springs Dr
City: Warrenton
Control: 1-Way Stop(SB)

Project ID: 23-260020-006
Date: 2/9/2023

Data - Total

NS/EW Streets:	Hastings Ln				Hastings Ln				Oak Springs Dr				Oak Springs Dr				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	4	0	0	0	1	5	0	0	0	1	1	0	12
6:15 AM	0	0	0	0	3	0	3	0	1	2	0	0	0	4	0	0	13
6:30 AM	0	0	0	0	2	0	5	0	3	5	0	0	0	6	3	0	24
6:45 AM	0	0	0	0	4	0	8	0	6	9	0	0	0	7	1	0	35
7:00 AM	0	0	0	0	5	0	5	0	7	7	0	0	0	14	4	0	42
7:15 AM	0	0	0	0	5	0	16	0	11	18	0	0	0	16	6	0	72
7:30 AM	0	0	0	0	2	0	13	0	17	20	0	0	0	24	10	0	86
7:45 AM	0	0	0	0	5	0	6	0	18	39	0	0	0	68	12	0	148
8:00 AM	0	0	0	0	14	0	20	0	24	20	0	0	0	27	10	0	115
8:15 AM	0	0	0	0	26	0	28	0	24	25	0	0	0	17	12	0	132
8:30 AM	0	0	0	0	16	0	20	0	8	19	0	0	0	21	7	0	91
8:45 AM	0	0	0	0	2	0	7	0	9	41	0	0	0	21	7	0	87
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	88	0	131	0	129	210	0	0	0	226	73	0	857
APPROACH %'s :					40.18%	0.00%	59.82%	0.00%	38.05%	61.95%	0.00%	0.00%	0.00%	75.59%	24.41%	0.00%	
PEAK HR :	07:45 AM - 08:45 AM																TOTAL
PEAK HR VOL :	0	0	0	0	61	0	74	0	74	103	0	0	0	133	41	0	486
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.587	0.000	0.661	0.000	0.771	0.660	0.000	0.000	0.000	0.489	0.854	0.000	0.821
					0.625				0.776				0.544				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	24	0	12	0	7	32	0	0	0	39	1	0	115
4:15 PM	0	0	0	0	15	0	9	0	12	29	0	0	0	35	3	0	103
4:30 PM	0	0	0	0	21	0	14	0	12	36	0	0	0	46	6	0	135
4:45 PM	0	0	0	0	7	0	17	0	11	31	0	0	0	40	2	0	108
5:00 PM	0	0	0	0	13	0	2	0	16	30	0	0	0	43	3	0	107
5:15 PM	0	0	0	0	11	0	10	0	12	23	0	0	0	40	8	0	104
5:30 PM	0	0	0	0	2	0	11	0	14	32	0	0	0	43	8	0	110
5:45 PM	0	0	0	0	7	0	10	0	6	28	0	0	0	28	5	0	84
6:00 PM	0	0	0	0	15	0	6	0	8	14	0	0	0	31	5	0	79
6:15 PM	0	0	0	0	8	0	6	0	6	18	0	0	0	15	7	0	60
6:30 PM	0	0	0	0	5	0	4	0	4	18	0	0	0	16	5	0	52
6:45 PM	0	0	0	0	4	0	5	0	4	12	0	0	0	8	8	0	41
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	132	0	106	0	112	303	0	0	0	384	61	0	1098
APPROACH %'s :					55.46%	0.00%	44.54%	0.00%	26.99%	73.01%	0.00%	0.00%	0.00%	86.29%	13.71%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	0	0	0	0	67	0	52	0	42	128	0	0	0	160	12	0	461
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.698	0.000	0.765	0.000	0.875	0.889	0.000	0.000	0.000	0.870	0.500	0.000	0.854
					0.826				0.885				0.827				

National Data & Surveying Services Intersection Turning Movement Count

Location: Hastings Ln & Oak Springs Dr
City: Warrenton
Control: 1-Way Stop(SB)

Project ID: 23-260020-006
Date: 2/9/2023

Data - Cars

NS/EW Streets:	Hastings Ln				Hastings Ln				Oak Springs Dr				Oak Springs Dr				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	4	0	0	0	1	5	0	0	0	1	1	0	12
6:15 AM	0	0	0	0	3	0	3	0	1	2	0	0	0	4	0	0	13
6:30 AM	0	0	0	0	2	0	5	0	2	4	0	0	0	6	3	0	22
6:45 AM	0	0	0	0	3	0	8	0	5	9	0	0	0	7	1	0	33
7:00 AM	0	0	0	0	4	0	5	0	7	5	0	0	0	14	4	0	39
7:15 AM	0	0	0	0	5	0	16	0	11	17	0	0	0	16	6	0	71
7:30 AM	0	0	0	0	2	0	13	0	17	20	0	0	0	24	10	0	86
7:45 AM	0	0	0	0	5	0	6	0	15	39	0	0	0	67	12	0	144
8:00 AM	0	0	0	0	12	0	20	0	22	19	0	0	0	27	10	0	110
8:15 AM	0	0	0	0	20	0	28	0	24	25	0	0	0	17	12	0	126
8:30 AM	0	0	0	0	16	0	20	0	8	18	0	0	0	21	7	0	90
8:45 AM	0	0	0	0	2	0	7	0	9	40	0	0	0	21	7	0	86
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	78	0	131	0	122	203	0	0	0	225	73	0	832
APPROACH %'s :					37.32%	0.00%	62.68%	0.00%	37.54%	62.46%	0.00%	0.00%	0.00%	75.50%	24.50%	0.00%	
PEAK HR :	07:45 AM - 08:45 AM																TOTAL
PEAK HR VOL :	0	0	0	0	53	0	74	0	69	101	0	0	0	132	41	0	470
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.663	0.000	0.661	0.000	0.719	0.647	0.000	0.000	0.000	0.493	0.854	0.000	0.816
							0.661				0.787				0.547		

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	24	0	12	0	7	32	0	0	0	38	1	0	114
4:15 PM	0	0	0	0	15	0	8	0	11	28	0	0	0	35	3	0	100
4:30 PM	0	0	0	0	21	0	14	0	12	35	0	0	0	45	6	0	133
4:45 PM	0	0	0	0	7	0	17	0	11	30	0	0	0	39	2	0	106
5:00 PM	0	0	0	0	12	0	2	0	15	30	0	0	0	42	3	0	104
5:15 PM	0	0	0	0	11	0	10	0	12	23	0	0	0	40	8	0	104
5:30 PM	0	0	0	0	2	0	11	0	14	32	0	0	0	43	8	0	110
5:45 PM	0	0	0	0	7	0	10	0	5	28	0	0	0	28	5	0	83
6:00 PM	0	0	0	0	15	0	6	0	8	14	0	0	0	31	5	0	79
6:15 PM	0	0	0	0	8	0	6	0	6	18	0	0	0	15	7	0	60
6:30 PM	0	0	0	0	5	0	4	0	3	18	0	0	0	16	5	0	51
6:45 PM	0	0	0	0	4	0	5	0	4	12	0	0	0	8	8	0	41
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	131	0	105	0	108	300	0	0	0	380	61	0	1085
APPROACH %'s :					55.51%	0.00%	44.49%	0.00%	26.47%	73.53%	0.00%	0.00%	0.00%	86.17%	13.83%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	0	0	0	0	67	0	51	0	41	125	0	0	0	157	12	0	453
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.698	0.000	0.750	0.000	0.854	0.893	0.000	0.000	0.000	0.872	0.500	0.000	0.852
							0.819				0.883				0.828		

National Data & Surveying Services Intersection Turning Movement Count

Location: Hastings Ln & Oak Springs Dr
City: Warrenton
Control: 1-Way Stop(SB)

Project ID: 23-260020-006
Date: 2/9/2023

Data - HT

NS/EW Streets:	Hastings Ln				Hastings Ln				Oak Springs Dr				Oak Springs Dr				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	2
6:45 AM	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	2
7:00 AM	0	0	0	0	1	0	0	0	0	2	0	0	0	0	0	0	3
7:15 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	3	0	0	0	0	1	0	0	4
8:00 AM	0	0	0	0	2	0	0	0	2	1	0	0	0	0	0	0	5
8:15 AM	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	6
8:30 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
8:45 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	10	0	0	0	7	7	0	0	0	1	0	0	25
APPROACH %'s :					100.00%	0.00%	0.00%	0.00%	50.00%	50.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	
PEAK HR :	07:45 AM - 08:45 AM																TOTAL
PEAK HR VOL :	0	0	0	0	8	0	0	0	5	2	0	0	0	1	0	0	16
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.333	0.000	0.000	0.000	0.417	0.500	0.000	0.000	0.000	0.250	0.000	0.000	0.667
					0.333				0.583				0.250				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
4:15 PM	0	0	0	0	0	0	1	0	1	1	0	0	0	0	0	0	3
4:30 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2
4:45 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2
5:00 PM	0	0	0	0	1	0	0	0	1	0	0	0	0	1	0	0	3
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	1	0	1	0	4	3	0	0	0	4	0	0	13
APPROACH %'s :					50.00%	0.00%	50.00%	0.00%	57.14%	42.86%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	1	0	1	3	0	0	0	3	0	0	8
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.250	0.750	0.000	0.000	0.000	0.750	0.000	0.000	0.667
					0.250				0.500				0.750				

National Data & Surveying Services Intersection Turning Movement Count

Location: Hastings Ln & Oak Springs Dr
City: Warrenton
Control: 1-Way Stop(SB)

Project ID: 23-260020-006
Date: 2/9/2023

Data - Bikes

NS/EW Streets:	Hastings Ln				Hastings Ln				Oak Springs Dr				Oak Springs Dr				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %'s :																	
PEAK HR :	07:45 AM - 08:45 AM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	0	1	0	0	0	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %'s :																	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

National Data & Surveying Services Intersection Turning Movement Count

Location: Hastings Ln & Oak Springs Dr
City: Warrenton
Project ID: 23-260020-006
Date: 2/9/2023

Data - Pedestrians (Crosswalks)

NS/EW Streets:	Hastings Ln		Hastings Ln		Oak Springs Dr		Oak Springs Dr		
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0
6:45 AM	1	0	0	0	0	0	0	0	1
7:00 AM	1	2	0	0	0	1	0	0	4
7:15 AM	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	1	0	0	1
8:15 AM	1	0	0	0	1	0	0	0	2
8:30 AM	0	1	0	0	0	0	0	0	1
8:45 AM	1	0	0	0	0	0	0	0	1
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	4	3	0	0	1	2	0	0	10
APPROACH %'s :	57.14%	42.86%			33.33%	66.67%			
PEAK HR :	07:45 AM - 08:45 AM								TOTAL
PEAK HR VOL :	1	1	0	0	1	1	0	0	4
PEAK HR FACTOR :	0.250	0.250			0.250	0.250			0.500
	0.500				0.500				

PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
4:00 PM	0	0	0	0	2	0	0	0	2
4:15 PM	0	0	0	0	0	0	0	0	0
4:30 PM	0	1	0	0	0	0	0	0	1
4:45 PM	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0
5:15 PM	0	1	0	0	0	0	0	0	1
5:30 PM	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0
6:00 PM	2	0	0	0	0	0	0	0	2
6:15 PM	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	1	0	0	1
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	2	2	0	0	2	1	0	0	7
APPROACH %'s :	50.00%	50.00%			66.67%	33.33%			
PEAK HR :	04:00 PM - 05:00 PM								TOTAL
PEAK HR VOL :	0	1	0	0	2	0	0	0	3
PEAK HR FACTOR :		0.250			0.250				0.375
	0.250				0.250				

Prepared by National Data & Surveying Services

Hastings Ln & Oak Springs Dr

Peak Hour Turning Movement Count

ID: 23-260020-006
City: Warrenton

Day: Thursday
Date: 2/9/2023

PEAK HOURS	COUNT PERIODS
07:45 AM - 08:45 AM	6:00 AM - 09:00 AM
NONE	NONE
04:00 PM - 05:00 PM	4:00 PM - 07:00 PM

SOUTHBOUND (Hastings Ln)

AM	74	0	61	0	115	AM
NOON	0	0	0	0	0	NOON
PM	52	0	67	0	54	PM

EASTBOUND (Oak Springs Dr)

AM	NOON	PM	
207	0	212	
0	0	0	0
74	0	42	0
103	0	128	1
0	0	0	0

WESTBOUND (Oak Springs Dr)

	PM	NOON	AM
0	12	0	41
1	160	0	133
0	0	0	0
0	0	0	0
	195	0	164

NORTHBOUND (Hastings Ln)

PM	0	0	0	0	0	PM
NOON	0	0	0	0	0	NOON
AM	0	0	0	0	0	AM

	0	0	0	0

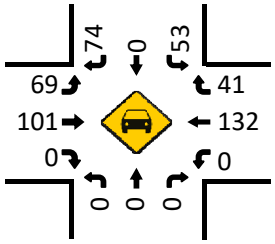
	0	1	0	0

CONTROL

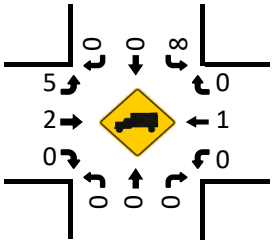
1-Way Stop(SB)

TEV	486	0	461
	AM	NOON	PM
PHF	0.82		0.85

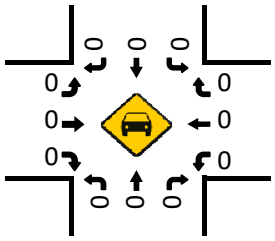
Cars (AM)



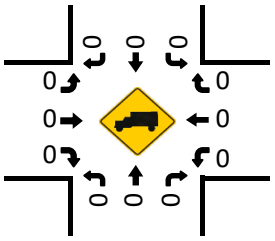
HT (AM)



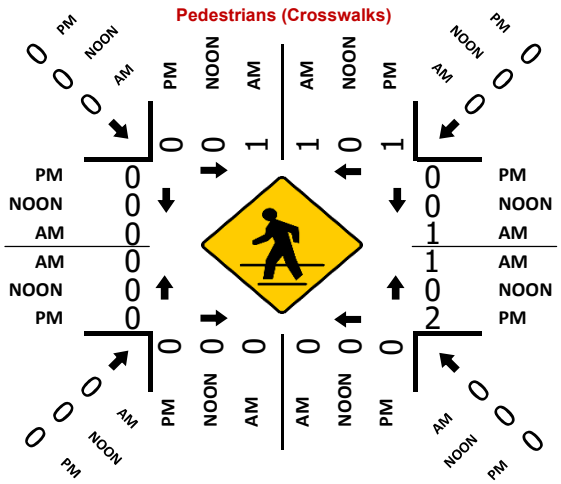
Cars (NOON)



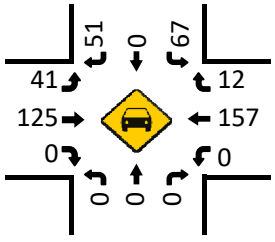
HT (NOON)



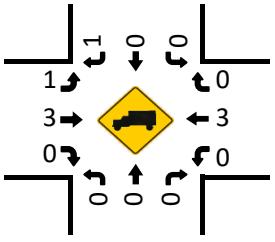
Pedestrians (Crosswalks)



Cars (PM)



HT (PM)



National Data & Surveying Services Intersection Turning Movement Count

Location: Highland School Dwy & Oak Springs Dr
City: Warrenton
Control: 1-Way Stop(SB)

Project ID: 23-260020-007
Date: 2/9/2023

Data - Total

NS/EW Streets:	Highland School Dwy				Highland School Dwy				Oak Springs Dr				Oak Springs Dr				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	1	0	1	0	1	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	6	0	0	0	1	0	0	7
6:15 AM	0	0	0	0	0	0	0	0	0	4	0	0	0	7	0	0	11
6:30 AM	0	0	0	0	0	0	0	0	0	7	0	0	0	11	0	0	18
6:45 AM	0	0	0	0	0	0	0	0	0	15	0	0	0	14	0	0	29
7:00 AM	0	0	0	0	0	0	0	0	2	15	0	0	0	16	4	0	37
7:15 AM	0	0	0	0	0	0	2	0	1	28	0	0	0	30	2	0	63
7:30 AM	0	0	0	0	3	0	4	0	13	34	0	0	0	25	10	0	89
7:45 AM	0	0	0	0	25	0	8	0	19	32	0	0	0	43	33	0	160
8:00 AM	0	0	0	0	2	0	6	0	5	43	0	0	0	42	5	0	103
8:15 AM	0	0	0	0	1	0	1	0	1	47	0	0	0	42	3	0	95
8:30 AM	0	0	0	0	0	0	3	0	5	28	0	0	0	32	7	0	75
8:45 AM	0	0	0	0	19	0	14	0	20	30	0	0	0	17	13	0	113
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	50	0	38	0	66	289	0	0	0	280	77	0	800
APPROACH %'s :					56.82%	0.00%	43.18%	0.00%	18.59%	81.41%	0.00%	0.00%	0.00%	78.43%	21.57%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	0	0	0	0	31	0	19	0	38	156	0	0	0	152	51	0	447
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.310	0.000	0.594	0.000	0.500	0.830	0.000	0.000	0.000	0.884	0.386	0.000	0.698
					0.379				0.951				0.668				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	1	0	1	0	1	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	2	0	1	0	2	35	0	0	0	50	1	0	91
4:15 PM	0	0	0	0	2	0	6	0	2	39	0	0	0	44	0	0	93
4:30 PM	0	0	0	0	4	0	17	0	1	44	0	0	0	59	1	0	126
4:45 PM	0	0	0	0	1	0	3	0	0	41	0	0	0	57	0	0	102
5:00 PM	0	0	0	0	0	0	0	0	0	46	0	0	0	44	1	0	91
5:15 PM	0	0	0	0	1	0	0	0	0	34	0	0	0	49	1	0	85
5:30 PM	0	0	0	0	0	0	0	0	1	47	0	0	0	54	0	0	102
5:45 PM	0	0	0	0	0	0	2	0	0	33	0	0	0	37	0	0	72
6:00 PM	0	0	0	0	0	0	0	0	0	22	0	0	0	38	0	0	60
6:15 PM	0	0	0	0	1	0	0	0	0	23	0	0	0	21	0	0	45
6:30 PM	0	0	0	0	0	0	1	0	0	22	0	0	0	20	0	0	43
6:45 PM	0	0	0	0	0	0	0	0	0	16	0	0	0	13	0	0	29
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	11	0	30	0	6	402	0	0	0	486	4	0	939
APPROACH %'s :					26.83%	0.00%	73.17%	0.00%	1.47%	98.53%	0.00%	0.00%	0.00%	99.18%	0.82%	0.00%	
PEAK HR :	04:15 PM - 05:15 PM																TOTAL
PEAK HR VOL :	0	0	0	0	7	0	26	0	3	170	0	0	0	204	2	0	412
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.438	0.000	0.382	0.000	0.375	0.924	0.000	0.000	0.000	0.864	0.500	0.000	0.817
					0.393				0.940				0.858				

National Data & Surveying Services Intersection Turning Movement Count

Location: Highland School Dwy & Oak Springs Dr
City: Warrenton
Control: 1-Way Stop(SB)

Project ID: 23-260020-007
Date: 2/9/2023

Data - Cars

NS/EW Streets:	Highland School Dwy				Highland School Dwy				Oak Springs Dr				Oak Springs Dr				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	1	0	1	0	1	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	6	0	0	0	1	0	0	7
6:15 AM	0	0	0	0	0	0	0	0	0	4	0	0	0	7	0	0	11
6:30 AM	0	0	0	0	0	0	0	0	0	5	0	0	0	11	0	0	16
6:45 AM	0	0	0	0	0	0	0	0	0	14	0	0	0	14	0	0	28
7:00 AM	0	0	0	0	0	0	0	0	2	13	0	0	0	16	4	0	35
7:15 AM	0	0	0	0	0	0	2	0	1	27	0	0	0	30	2	0	62
7:30 AM	0	0	0	0	3	0	4	0	13	34	0	0	0	25	10	0	89
7:45 AM	0	0	0	0	25	0	8	0	19	29	0	0	0	42	33	0	156
8:00 AM	0	0	0	0	2	0	6	0	5	40	0	0	0	42	5	0	100
8:15 AM	0	0	0	0	1	0	1	0	1	47	0	0	0	42	3	0	95
8:30 AM	0	0	0	0	0	0	3	0	5	27	0	0	0	32	7	0	74
8:45 AM	0	0	0	0	19	0	14	0	20	29	0	0	0	17	13	0	112
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	50	0	38	0	66	275	0	0	0	279	77	0	785
APPROACH %'s :					56.82%	0.00%	43.18%	0.00%	19.35%	80.65%	0.00%	0.00%	0.00%	78.37%	21.63%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	0	0	0	0	31	0	19	0	38	150	0	0	0	151	51	0	440
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.310	0.000	0.594	0.000	0.500	0.798	0.000	0.000	0.000	0.899	0.386	0.000	0.705
					0.379				0.979				0.673				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	1	0	1	0	1	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	2	0	1	0	2	35	0	0	0	49	1	0	90
4:15 PM	0	0	0	0	2	0	6	0	2	37	0	0	0	43	0	0	90
4:30 PM	0	0	0	0	4	0	17	0	1	43	0	0	0	58	1	0	124
4:45 PM	0	0	0	0	1	0	3	0	0	40	0	0	0	56	0	0	100
5:00 PM	0	0	0	0	0	0	0	0	0	45	0	0	0	43	1	0	89
5:15 PM	0	0	0	0	1	0	0	0	0	34	0	0	0	49	1	0	85
5:30 PM	0	0	0	0	0	0	0	0	1	47	0	0	0	54	0	0	102
5:45 PM	0	0	0	0	0	0	2	0	0	32	0	0	0	37	0	0	71
6:00 PM	0	0	0	0	0	0	0	0	0	22	0	0	0	38	0	0	60
6:15 PM	0	0	0	0	1	0	0	0	0	23	0	0	0	21	0	0	45
6:30 PM	0	0	0	0	0	0	1	0	0	21	0	0	0	20	0	0	42
6:45 PM	0	0	0	0	0	0	0	0	0	16	0	0	0	13	0	0	29
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	11	0	30	0	6	395	0	0	0	481	4	0	927
APPROACH %'s :					26.83%	0.00%	73.17%	0.00%	1.50%	98.50%	0.00%	0.00%	0.00%	99.18%	0.82%	0.00%	
PEAK HR :	04:15 PM - 05:15 PM																TOTAL
PEAK HR VOL :	0	0	0	0	7	0	26	0	3	165	0	0	0	200	2	0	403
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.438	0.000	0.382	0.000	0.375	0.917	0.000	0.000	0.000	0.862	0.500	0.000	0.813
					0.393				0.933				0.856				

National Data & Surveying Services Intersection Turning Movement Count

Location: Highland School Dwy & Oak Springs Dr
City: Warrenton
Control: 1-Way Stop(SB)

Project ID: 23-260020-007
Date: 2/9/2023

Data - HT

NS/EW Streets:	Highland School Dwy				Highland School Dwy				Oak Springs Dr				Oak Springs Dr				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	1	0	1	0	1	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
6:45 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
7:00 AM	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2
7:15 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	3	0	0	0	1	0	0	4
8:00 AM	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	3
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
8:45 AM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	14	0	0	0	1	0	0	15
APPROACH %'s :									0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	6	0	0	0	1	0	0	7
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.500	0.000	0.000	0.000	0.250	0.000	0.000	0.438
										0.500				0.250			

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	1	0	1	0	1	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
4:15 PM	0	0	0	0	0	0	0	0	0	2	0	0	0	1	0	0	3
4:30 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2
4:45 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2
5:00 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	2
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	7	0	0	0	5	0	0	12
APPROACH %'s :									0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	
PEAK HR :	04:15 PM - 05:15 PM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	5	0	0	0	4	0	0	9
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.625	0.000	0.000	0.000	1.000	0.000	0.000	0.750
										0.625				1.000			

National Data & Surveying Services Intersection Turning Movement Count

Location: Highland School Dwy & Oak Springs Dr
City: Warrenton
Control: 1-Way Stop(SB)

Project ID: 23-260020-007
Date: 2/9/2023

Data - Bikes

NS/EW Streets:	Highland School Dwy				Highland School Dwy				Oak Springs Dr				Oak Springs Dr				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	1	0	1	0	1	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %'s :																	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	0	0	0	0	1	0	1	0	1	1	0	0	0	1	0	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %'s :																	
PEAK HR :	04:15 PM - 05:15 PM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

National Data & Surveying Services Intersection Turning Movement Count

Location: Highland School Dwy & Oak Springs Dr
City: Warrenton
Project ID: 23-260020-007
Date: 2/9/2023

Data - Pedestrians (Crosswalks)

NS/EW Streets:	Highland School Dwy		Highland School Dwy		Oak Springs Dr		Oak Springs Dr		
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0
8:45 AM	1	0	0	0	0	0	0	0	1
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	1	0	0	0	0	0	0	0	1
APPROACH %'s :	100.00%	0.00%							
PEAK HR :	07:30 AM - 08:30 AM								TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :									

PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0
4:30 PM	0	1	0	0	0	0	0	0	1
4:45 PM	0	0	0	0	0	0	0	0	0
5:00 PM	0	1	0	0	0	0	0	0	1
5:15 PM	0	1	0	0	0	0	0	0	1
5:30 PM	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0
6:00 PM	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	0	3	0	0	0	0	0	0	3
APPROACH %'s :	0.00%	100.00%							
PEAK HR :	04:15 PM - 05:15 PM								TOTAL
PEAK HR VOL :	0	2	0	0	0	0	0	0	2
PEAK HR FACTOR :		0.500							0.500
	0.500								

Prepared by National Data & Surveying Services

Highland School Dwy & Oak Springs Dr

Peak Hour Turning Movement Count

ID: 23-260020-007
City: Warrenton

Day: Thursday
Date: 2/9/2023

PEAK HOURS	
AM	07:30 AM - 08:30 AM
NOON	NONE
PM	04:15 PM - 05:15 PM

COUNT PERIODS	
AM	6:00 AM - 09:00 AM
NOON	NONE
PM	4:00 PM - 07:00 PM

SOUTHBOUND (Highland School Dwy)

AM	19	0	31	0	89	AM
NOON	0	0	0	0	0	NOON
PM	26	0	7	0	5	PM

EASTBOUND (Oak Springs Dr)

AM	NOON	PM	
171	0	230	
0	0	0	0
38	0	3	1
156	0	170	1
0	0	0	0

WESTBOUND (Oak Springs Dr)

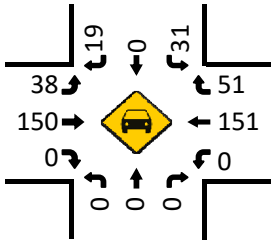
PM	NOON	AM	
2	0	51	0
204	0	152	1
0	0	0	0
0	0	0	0
177	0	187	

NORTHBOUND (Highland School Dwy)

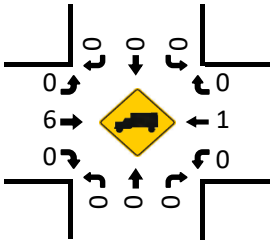
PM	0	0	0	0	0	PM
NOON	0	0	0	0	0	NOON
AM	0	0	0	0	0	AM

CONTROL			
1-Way stop(SB)			
TEV	447 AM	0 NOON	412 PM
PHF	0.70		0.82

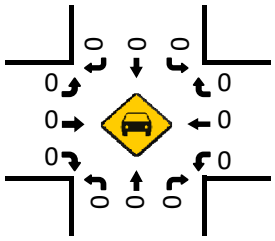
Cars (AM)



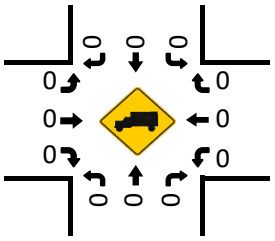
HT (AM)



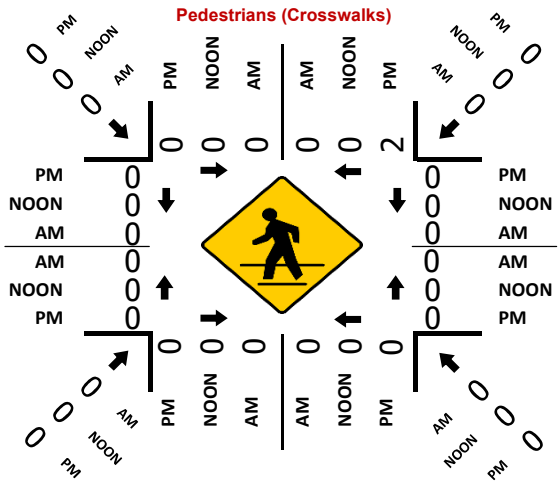
Cars (NOON)



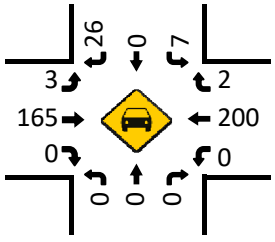
HT (NOON)



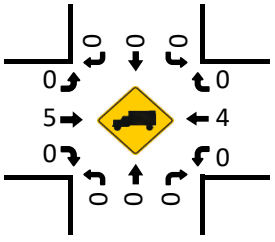
Pedestrians (Crosswalks)



Cars (PM)



HT (PM)



National Data & Surveying Services Intersection Turning Movement Count

Location: US 17/US 211/Broadview Ave & Oak Springs Dr
City: Warrenton
Control: 2-Way Stop(EB/WB)

Project ID: 23-260020-008
Date: 2/9/2023

Data - Total

NS/EW Streets:	US 17/US 211/Broadview Ave				US 17/US 211/Broadview Ave				Oak Springs Dr				Oak Springs Dr				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	0	0	0	1	0	0	1	0	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	38	1	0	5	29	0	0	0	0	0	0	0	0	1	0	74
6:15 AM	0	38	2	0	2	28	0	0	0	0	0	0	3	0	3	0	76
6:30 AM	0	49	3	0	4	38	0	0	0	0	0	0	6	0	6	0	106
6:45 AM	0	48	5	0	10	59	0	0	0	0	0	0	6	0	7	0	135
7:00 AM	1	65	13	0	5	113	1	0	0	0	0	0	13	0	4	0	215
7:15 AM	0	71	15	0	13	88	0	0	0	0	1	0	18	0	14	0	220
7:30 AM	1	121	29	0	17	79	1	0	0	1	0	0	9	0	18	0	276
7:45 AM	0	152	27	0	24	108	0	0	0	0	0	0	12	0	41	0	364
8:00 AM	0	73	21	0	28	90	0	0	0	0	0	0	20	0	26	0	258
8:15 AM	0	59	21	0	26	78	0	0	0	0	0	0	22	1	20	0	227
8:30 AM	0	60	18	0	19	74	1	0	0	0	0	0	23	1	12	0	208
8:45 AM	1	61	31	1	15	93	2	0	0	0	0	0	22	0	10	0	236
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	3	835	186	1	168	877	5	0	0	1	1	0	154	2	162	0	2395
APPROACH %'s :	0.29%	81.46%	18.15%	0.10%	16.00%	83.52%	0.48%	0.00%	0.00%	50.00%	50.00%	0.00%	48.43%	0.63%	50.94%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	1	405	98	0	95	355	1	0	0	1	0	0	63	1	105	0	1125
PEAK HR FACTOR :	0.250	0.666	0.845	0.000	0.848	0.822	0.250	0.000	0.000	0.250	0.000	0.000	0.716	0.250	0.640	0.000	0.773
	0.704				0.854				0.250				0.797				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	0	0	0	1	0	0	1	0	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	1	81	19	0	19	128	0	0	1	0	1	0	20	0	32	0	302
4:15 PM	0	95	24	0	16	142	0	0	1	0	0	0	13	0	34	0	325
4:30 PM	0	119	16	0	30	108	0	0	0	0	2	0	40	0	39	0	354
4:45 PM	1	75	18	0	21	119	2	0	0	1	1	0	24	0	34	0	296
5:00 PM	1	94	19	0	27	107	0	0	0	1	1	0	13	0	33	0	296
5:15 PM	0	85	14	0	19	116	0	0	0	0	1	0	18	0	31	0	284
5:30 PM	1	68	21	0	26	93	0	0	0	1	0	0	25	0	28	0	263
5:45 PM	0	83	9	0	24	106	1	0	0	0	0	0	22	0	18	0	263
6:00 PM	0	66	11	0	13	64	0	0	0	0	1	0	13	0	23	0	191
6:15 PM	0	66	11	0	10	87	0	0	0	0	0	0	8	0	14	0	196
6:30 PM	0	56	12	0	10	54	0	0	1	0	1	0	9	0	13	0	156
6:45 PM	0	52	8	0	8	53	0	0	0	0	0	0	3	1	8	0	133
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	4	940	182	0	223	1177	3	0	3	3	8	0	208	1	307	0	3059
APPROACH %'s :	0.36%	83.48%	16.16%	0.00%	15.89%	83.89%	0.21%	0.00%	21.43%	21.43%	57.14%	0.00%	40.31%	0.19%	59.50%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	2	370	77	0	86	497	2	0	2	1	4	0	97	0	139	0	1277
PEAK HR FACTOR :	0.500	0.777	0.802	0.000	0.717	0.875	0.250	0.000	0.500	0.250	0.500	0.000	0.606	0.000	0.891	0.000	0.902
	0.831				0.926				0.875				0.747				

National Data & Surveying Services Intersection Turning Movement Count

Location: US 17/US 211/Broadview Ave & Oak Springs Dr
City: Warrenton
Control: 2-Way Stop(EB/WB)

Project ID: 23-260020-008
Date: 2/9/2023

Data - Cars

NS/EW Streets:	US 17/US 211/Broadview Ave				US 17/US 211/Broadview Ave				Oak Springs Dr				Oak Springs Dr				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	0	0	0	1	0	0	1	0	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	35	1	0	5	28	0	0	0	0	0	0	0	0	1	0	70
6:15 AM	0	35	2	0	2	28	0	0	0	0	0	0	3	0	3	0	73
6:30 AM	0	47	2	0	3	36	0	0	0	0	0	0	6	0	6	0	100
6:45 AM	0	45	5	0	9	56	0	0	0	0	0	0	6	0	7	0	128
7:00 AM	1	57	11	0	5	106	0	0	0	0	0	0	13	0	4	0	197
7:15 AM	0	67	15	0	12	81	0	0	0	0	1	0	18	0	14	0	208
7:30 AM	1	117	29	0	17	71	1	0	0	1	0	0	9	0	18	0	264
7:45 AM	0	146	26	0	22	107	0	0	0	0	0	0	12	0	40	0	353
8:00 AM	0	67	21	0	25	89	0	0	0	0	0	0	20	0	26	0	248
8:15 AM	0	52	21	0	26	72	0	0	0	0	0	0	22	1	20	0	214
8:30 AM	0	56	17	0	19	59	1	0	0	0	0	0	23	1	12	0	188
8:45 AM	1	58	31	1	14	88	2	0	0	0	0	0	22	0	10	0	227
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	3	782	181	1	159	821	4	0	0	1	1	0	154	2	161	0	2270
APPROACH %'s :	0.31%	80.87%	18.72%	0.10%	16.16%	83.43%	0.41%	0.00%	0.00%	50.00%	50.00%	0.00%	48.58%	0.63%	50.79%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	1	382	97	0	90	339	1	0	0	1	0	0	63	1	104	0	1079
PEAK HR FACTOR :	0.250	0.654	0.836	0.000	0.865	0.792	0.250	0.000	0.000	0.250	0.000	0.000	0.716	0.250	0.650	0.000	0.764
		0.698				0.833				0.250				0.808			

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	0	0	0	1	0	0	1	0	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	1	80	19	0	19	124	0	0	1	0	1	0	20	0	31	0	296
4:15 PM	0	93	22	0	16	134	0	0	1	0	0	0	12	0	34	0	312
4:30 PM	0	115	15	0	30	105	0	0	0	0	2	0	40	0	38	0	345
4:45 PM	1	71	18	0	20	116	2	0	0	1	1	0	24	0	33	0	287
5:00 PM	1	93	18	0	27	105	0	0	0	1	1	0	13	0	32	0	291
5:15 PM	0	83	14	0	19	115	0	0	0	0	1	0	18	0	31	0	281
5:30 PM	1	68	21	0	26	92	0	0	0	1	0	0	25	0	28	0	262
5:45 PM	0	82	8	0	24	105	1	0	0	0	0	0	22	0	18	0	260
6:00 PM	0	65	11	0	13	64	0	0	0	0	1	0	13	0	23	0	190
6:15 PM	0	66	11	0	10	86	0	0	0	0	0	0	8	0	14	0	195
6:30 PM	0	56	11	0	10	53	0	0	1	0	1	0	9	0	13	0	154
6:45 PM	0	51	8	0	8	52	0	0	0	0	0	0	3	1	8	0	131
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	4	923	176	0	222	1151	3	0	3	3	8	0	207	1	303	0	3004
APPROACH %'s :	0.36%	83.68%	15.96%	0.00%	16.13%	83.65%	0.22%	0.00%	21.43%	21.43%	57.14%	0.00%	40.51%	0.20%	59.30%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	2	359	74	0	85	479	2	0	2	1	4	0	96	0	136	0	1240
PEAK HR FACTOR :	0.500	0.780	0.841	0.000	0.708	0.894	0.250	0.000	0.500	0.250	0.500	0.000	0.600	0.000	0.895	0.000	0.899
		0.837				0.943				0.875				0.744			

National Data & Surveying Services Intersection Turning Movement Count

Location: US 17/US 211/Broadview Ave & Oak Springs Dr
City: Warrenton
Control: 2-Way Stop(EB/WB)

Project ID: 23-260020-008
Date: 2/9/2023

Data - HT

NS/EW Streets:	US 17/US 211/Broadview Ave				US 17/US 211/Broadview Ave				Oak Springs Dr				Oak Springs Dr				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	0	0	0	1	0	0	1	0	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	3	0	0	0	1	0	0	0	0	0	0	0	0	0	0	4
6:15 AM	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
6:30 AM	0	2	1	0	1	2	0	0	0	0	0	0	0	0	0	0	6
6:45 AM	0	3	0	0	1	3	0	0	0	0	0	0	0	0	0	0	7
7:00 AM	0	8	2	0	0	7	1	0	0	0	0	0	0	0	0	0	18
7:15 AM	0	4	0	0	1	7	0	0	0	0	0	0	0	0	0	0	12
7:30 AM	0	4	0	0	0	8	0	0	0	0	0	0	0	0	0	0	12
7:45 AM	0	6	1	0	2	1	0	0	0	0	0	0	0	0	1	0	11
8:00 AM	0	6	0	0	3	1	0	0	0	0	0	0	0	0	0	0	10
8:15 AM	0	7	0	0	0	6	0	0	0	0	0	0	0	0	0	0	13
8:30 AM	0	4	1	0	0	15	0	0	0	0	0	0	0	0	0	0	20
8:45 AM	0	3	0	0	1	5	0	0	0	0	0	0	0	0	0	0	9
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	53	5	0	9	56	1	0	0	0	0	0	0	0	1	0	125
APPROACH %'s :	0.00%	91.38%	8.62%	0.00%	13.64%	84.85%	1.52%	0.00%					0.00%	0.00%	100.00%	0.00%	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	0	23	1	0	5	16	0	0	0	0	0	0	0	0	1	0	46
PEAK HR FACTOR :	0.000	0.821	0.250	0.000	0.417	0.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.885
		0.857				0.656								0.250			

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	0	0	0	1	0	0	1	0	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	1	0	0	0	4	0	0	0	0	0	0	0	0	1	0	6
4:15 PM	0	2	2	0	0	8	0	0	0	0	0	0	1	0	0	0	13
4:30 PM	0	4	1	0	0	3	0	0	0	0	0	0	0	0	1	0	9
4:45 PM	0	4	0	0	1	3	0	0	0	0	0	0	0	0	1	0	9
5:00 PM	0	1	1	0	0	2	0	0	0	0	0	0	0	0	1	0	5
5:15 PM	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	3
5:30 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
5:45 PM	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	3
6:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
6:15 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
6:30 PM	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	2
6:45 PM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	17	6	0	1	26	0	0	0	0	0	0	1	0	4	0	55
APPROACH %'s :	0.00%	73.91%	26.09%	0.00%	3.70%	96.30%	0.00%	0.00%					20.00%	0.00%	80.00%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	0	11	3	0	1	18	0	0	0	0	0	0	1	0	3	0	37
PEAK HR FACTOR :	0.000	0.688	0.375	0.000	0.250	0.563	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.750	0.000	0.712
		0.700				0.594								1.000			

National Data & Surveying Services Intersection Turning Movement Count

Location: US 17/US 211/Broadview Ave & Oak Springs Dr
City: Warrenton
Control: 2-Way Stop(EB/WB)

Project ID: 23-260020-008
Date: 2/9/2023

Data - Bikes

NS/EW Streets:	US 17/US 211/Broadview Ave				US 17/US 211/Broadview Ave				Oak Springs Dr				Oak Springs Dr				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	0	0	0	1	0	0	1	0	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %'s :																	
PEAK HR :	07:30 AM - 08:30 AM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	0	0	0	1	0	0	1	0	1	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %'s :																	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

National Data & Surveying Services Intersection Turning Movement Count

Location: US 17/US 211/Broadview Ave & Oak Springs Dr **Project ID:** 23-260020-008
City: Warrenton **Date:** 2/9/2023

Data - Pedestrians (Crosswalks)

NS/EW Streets:	US 17/US 211/Broadview Ave		US 17/US 211/Broadview Ave		Oak Springs Dr		Oak Springs Dr		
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	1	0	1
7:00 AM	0	0	0	0	0	0	0	1	1
7:15 AM	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	1	0	0	0	1
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	0	0	0	0	1	0	1	1	3
APPROACH %'s :					100.00%	0.00%	50.00%	50.00%	
PEAK HR :	07:30 AM - 08:30 AM								TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :									

PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	1	1	2
4:30 PM	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	1	2	0	3
5:00 PM	0	1	0	0	0	0	0	1	2
5:15 PM	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	1	0	1
5:45 PM	0	0	0	0	0	0	1	0	1
6:00 PM	0	0	0	0	3	0	0	0	3
6:15 PM	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	0	1	0	0	3	1	5	2	12
APPROACH %'s :	0.00%	100.00%			75.00%	25.00%	71.43%	28.57%	
PEAK HR :	04:00 PM - 05:00 PM								TOTAL
PEAK HR VOL :	0	0	0	0	0	1	3	1	5
PEAK HR FACTOR :						0.250	0.375	0.250	0.417
					0.250		0.500		

Prepared by National Data & Surveying Services

US 17/US 211/Broadview Ave & Oak Springs Dr

Peak Hour Turning Movement Count

ID: 23-260020-008
City: Warrenton

Day: Thursday
Date: 2/9/2023

PEAK HOURS	COUNT PERIODS
07:30 AM - 08:30 AM	6:00 AM - 09:00 AM
NONE	NONE
04:00 PM - 05:00 PM	4:00 PM - 07:00 PM

SOUTHBOUND (US 17/US 211/Broadview Ave)

AM	1	355	95	0	510	AM
NOON	0	0	0	0	0	NOON
PM	2	497	86	0	511	PM

EASTBOUND (Oak Springs Dr)

AM	NOON	PM	
3	0	4	
0	0	0	0
0	0	2	0
1	0	1	1
0	0	4	0
AM	NOON	PM	

WESTBOUND (Oak Springs Dr)

PM	NOON	AM	
139	0	105	1
0	0	1	0
97	0	63	1
0	0	0	0
164	0	194	
PM	NOON	AM	

CONTROL

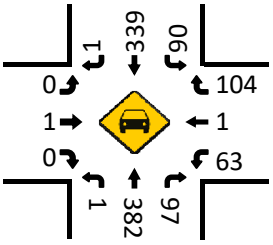
2-Way Stop(EB/WB)

TEV	1125 AM	0 NOON	1277 PM
PHF	0.77		0.90

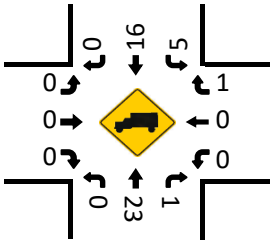
NORTHBOUND (US 17/US 211/Broadview Ave)

PM	598	0	2	370	77	PM
NOON	0	0	0	0	0	NOON
AM	418	0	1	405	98	AM

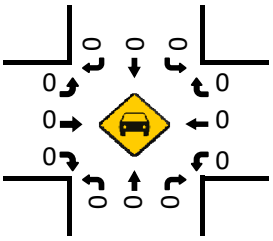
Cars (AM)



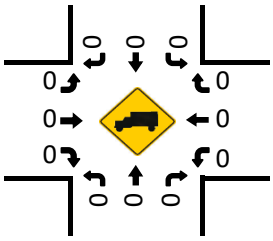
HT (AM)



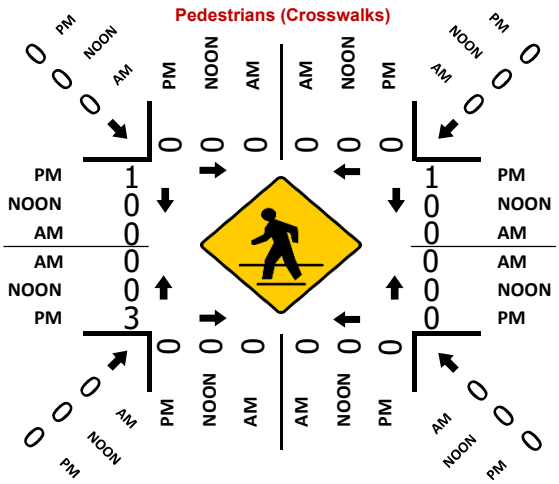
Cars (NOON)



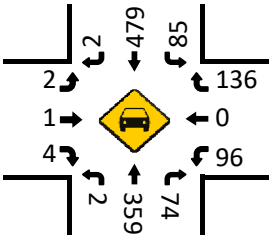
HT (NOON)



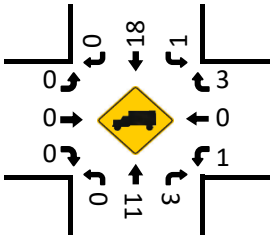
Pedestrians (Crosswalks)



Cars (PM)



HT (PM)



National Data & Surveying Services Intersection Turning Movement Count

Location: US 17/US 211/Broadview Ave & Warrenton Village North Dwy
City: Warrenton
Control: 1-Way stop(WB)

Project ID: 23-260020-009
Date: 2/9/2023

Data - Total

AM

NS/EW Streets:	US 17/US 211/Broadview Ave				US 17/US 211/Broadview Ave				Warrenton Village North Dwy				Warrenton Village North Dwy				
	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	0	0	0	1	0	0	1	0.5	0.5	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	38	1	0	0	28	1	0	0	0	1	0	1	0	0	0	70
6:15 AM	0	41	0	0	0	31	0	0	0	0	0	0	0	0	0	0	72
6:30 AM	0	51	0	0	1	43	0	0	0	0	0	0	0	0	0	0	95
6:45 AM	0	52	0	0	1	64	0	0	0	0	0	0	0	0	1	0	118
7:00 AM	6	78	0	0	2	123	0	0	0	0	1	0	2	0	2	0	214
7:15 AM	1	84	1	0	0	107	0	0	0	0	1	0	0	0	1	0	195
7:30 AM	2	153	1	0	3	82	0	0	0	0	0	0	0	1	0	0	242
7:45 AM	7	169	2	0	4	118	1	0	0	0	0	0	1	0	8	0	310
8:00 AM	3	89	5	0	4	106	1	0	0	0	0	0	3	0	5	0	216
8:15 AM	1	77	2	0	4	95	1	0	0	0	3	0	1	0	5	0	189
8:30 AM	4	75	4	0	3	92	1	0	0	0	2	0	2	0	5	0	188
8:45 AM	8	83	1	0	1	116	0	0	2	0	4	0	4	0	5	0	224
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	32	990	17	0	23	1005	5	0	2	0	12	0	14	1	32	0	2133
APPROACH %'s :	3.08%	95.28%	1.64%	0.00%	2.23%	97.29%	0.48%	0.00%	14.29%	0.00%	85.71%	0.00%	29.79%	2.13%	68.09%	0.00%	
PEAK HR :	07:15 AM - 08:15 AM																TOTAL
PEAK HR VOL :	13	495	9	0	11	413	2	0	0	0	1	0	4	1	14	0	963
PEAK HR FACTOR :	0.464	0.732	0.450	0.000	0.688	0.875	0.500	0.000	0.000	0.000	0.250	0.000	0.333	0.250	0.438	0.000	0.777
	0.726				0.866				0.250				0.528				

PM

	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	0	0	0	1	0	0	1	0.5	0.5	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	3	87	6	0	17	131	2	0	2	0	4	0	11	1	11	0	275
4:15 PM	5	104	1	1	8	146	1	0	2	0	3	0	3	0	13	0	287
4:30 PM	2	124	8	1	8	140	1	0	4	1	5	0	10	0	8	0	312
4:45 PM	3	85	0	0	7	135	2	1	2	0	5	0	9	0	5	0	254
5:00 PM	5	102	2	0	9	108	4	0	3	1	6	0	6	0	9	0	255
5:15 PM	8	91	1	0	12	121	1	0	1	1	6	0	9	0	7	0	258
5:30 PM	5	83	3	0	5	114	0	0	0	1	3	0	8	0	8	0	230
5:45 PM	2	81	3	0	13	113	1	0	0	0	1	0	2	0	10	0	226
6:00 PM	5	70	3	0	10	68	1	0	2	1	5	0	2	0	5	0	172
6:15 PM	1	62	0	0	7	88	0	0	0	0	2	0	9	0	15	0	184
6:30 PM	0	60	3	0	4	59	1	0	1	0	2	0	9	0	7	0	146
6:45 PM	3	59	1	0	8	48	0	0	0	0	5	0	3	1	1	0	129
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	42	1008	31	2	108	1271	14	1	17	5	47	0	81	2	99	0	2728
APPROACH %'s :	3.88%	93.07%	2.86%	0.18%	7.75%	91.18%	1.00%	0.07%	24.64%	7.25%	68.12%	0.00%	44.51%	1.10%	54.40%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	13	400	15	2	40	552	6	1	10	1	17	0	33	1	37	0	1128
PEAK HR FACTOR :	0.650	0.806	0.469	0.500	0.588	0.945	0.750	0.250	0.625	0.250	0.850	0.000	0.750	0.250	0.712	0.000	0.904
	0.796				0.966				0.700				0.772				

National Data & Surveying Services Intersection Turning Movement Count

Location: US 17/US 211/Broadview Ave & Warrenton Village North Dwy
City: Warrenton
Control: 1-Way stop(WB)

Project ID: 23-260020-009
Date: 2/9/2023

Data - Cars

NS/EW Streets:	US 17/US 211/Broadview Ave				US 17/US 211/Broadview Ave				Warrenton Village North Dwy				Warrenton Village North Dwy				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	0	0	0	1	0	0	1	0.5	0.5	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	35	1	0	0	28	0	0	0	0	0	0	1	0	0	0	65
6:15 AM	0	38	0	0	0	31	0	0	0	0	0	0	0	0	0	0	69
6:30 AM	0	48	0	0	1	41	0	0	0	0	0	0	0	0	0	0	90
6:45 AM	0	50	0	0	0	62	0	0	0	0	0	0	0	0	0	0	112
7:00 AM	6	68	0	0	2	117	0	0	0	0	0	0	2	0	2	0	197
7:15 AM	1	80	1	0	0	99	0	0	0	0	1	0	0	0	1	0	183
7:30 AM	2	149	1	0	3	74	0	0	0	0	0	0	0	1	0	0	230
7:45 AM	7	163	2	0	4	117	1	0	0	0	0	0	1	0	7	0	302
8:00 AM	3	83	5	0	4	105	1	0	0	0	0	0	3	0	5	0	209
8:15 AM	1	70	2	0	4	89	1	0	0	0	3	0	1	0	5	0	176
8:30 AM	4	71	2	0	3	77	1	0	0	0	2	0	2	0	4	0	166
8:45 AM	8	81	1	0	1	111	0	0	2	0	4	0	4	0	4	0	216
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	32	936	15	0	22	951	4	0	2	0	10	0	14	1	28	0	2015
APPROACH %'s :	3.26%	95.22%	1.53%	0.00%	2.25%	97.34%	0.41%	0.00%	16.67%	0.00%	83.33%	0.00%	32.56%	2.33%	65.12%	0.00%	
PEAK HR :	07:15 AM - 08:15 AM																TOTAL
PEAK HR VOL :	13	475	9	0	11	395	2	0	0	0	1	0	4	1	13	0	924
PEAK HR FACTOR :	0.464	0.729	0.450	0.000	0.688	0.844	0.500	0.000	0.000	0.000	0.250	0.000	0.333	0.250	0.464	0.000	0.765
	0.722				0.836				0.250				0.563				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	0	0	0	1	0	0	1	0.5	0.5	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	3	86	6	0	17	127	2	0	2	0	4	0	11	1	11	0	270
4:15 PM	5	102	1	1	8	137	1	0	2	0	3	0	3	0	11	0	274
4:30 PM	2	119	8	1	8	137	1	0	4	1	5	0	10	0	8	0	304
4:45 PM	3	81	0	0	7	132	2	1	2	0	5	0	9	0	5	0	247
5:00 PM	5	101	2	0	9	106	4	0	3	1	6	0	6	0	8	0	251
5:15 PM	8	89	1	0	12	120	1	0	1	1	6	0	9	0	7	0	255
5:30 PM	4	83	3	0	5	113	0	0	0	1	2	0	8	0	8	0	227
5:45 PM	2	80	3	0	13	112	1	0	0	0	1	0	2	0	9	0	223
6:00 PM	4	69	3	0	10	68	1	0	2	1	5	0	2	0	5	0	170
6:15 PM	1	62	0	0	7	87	0	0	0	0	2	0	9	0	15	0	183
6:30 PM	0	60	3	0	3	59	1	0	1	0	2	0	9	0	6	0	144
6:45 PM	3	58	1	0	8	47	0	0	0	0	5	0	3	1	1	0	127
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	40	990	31	2	107	1245	14	1	17	5	46	0	81	2	94	0	2675
APPROACH %'s :	3.76%	93.13%	2.92%	0.19%	7.83%	91.08%	1.02%	0.07%	25.00%	7.35%	67.65%	0.00%	45.76%	1.13%	53.11%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	13	388	15	2	40	533	6	1	10	1	17	0	33	1	35	0	1095
PEAK HR FACTOR :	0.650	0.815	0.469	0.500	0.588	0.973	0.750	0.250	0.625	0.250	0.850	0.000	0.750	0.250	0.795	0.000	0.900
	0.804				0.993				0.700				0.750				

National Data & Surveying Services Intersection Turning Movement Count

Location: US 17/US 211/Broadview Ave & Warrenton Village North Dwy
City: Warrenton
Control: 1-Way stop(WB)

Project ID: 23-260020-009
Date: 2/9/2023

Data - HT

NS/EW Streets:	US 17/US 211/Broadview Ave				US 17/US 211/Broadview Ave				Warrenton Village North Dwy				Warrenton Village North Dwy				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	0	0	0	1	0	0	1	0.5	0.5	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	3	0	0	0	0	1	0	0	0	1	0	0	0	0	0	5
6:15 AM	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3
6:30 AM	0	3	0	0	0	2	0	0	0	0	0	0	0	0	0	0	5
6:45 AM	0	2	0	0	1	2	0	0	0	0	0	0	0	0	1	0	6
7:00 AM	0	10	0	0	0	6	0	0	0	0	1	0	0	0	0	0	17
7:15 AM	0	4	0	0	0	8	0	0	0	0	0	0	0	0	0	0	12
7:30 AM	0	4	0	0	0	8	0	0	0	0	0	0	0	0	0	0	12
7:45 AM	0	6	0	0	0	1	0	0	0	0	0	0	0	0	1	0	8
8:00 AM	0	6	0	0	0	1	0	0	0	0	0	0	0	0	0	0	7
8:15 AM	0	7	0	0	0	6	0	0	0	0	0	0	0	0	0	0	13
8:30 AM	0	4	2	0	0	15	0	0	0	0	0	0	0	0	1	0	22
8:45 AM	0	2	0	0	0	5	0	0	0	0	0	0	0	0	1	0	8
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	54	2	0	1	54	1	0	0	0	2	0	0	0	4	0	118
APPROACH %'s :	0.00%	96.43%	3.57%	0.00%	1.79%	96.43%	1.79%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	
PEAK HR :	07:15 AM - 08:15 AM																TOTAL
PEAK HR VOL :	0	20	0	0	0	18	0	0	0	0	0	0	0	0	1	0	39
PEAK HR FACTOR :	0.000	0.833	0.000	0.000	0.000	0.563	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.813
		0.833				0.563								0.250			

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	0	0	0	1	0	0	1	0.5	0.5	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	1	0	0	0	4	0	0	0	0	0	0	0	0	0	0	5
4:15 PM	0	2	0	0	0	9	0	0	0	0	0	0	0	0	2	0	13
4:30 PM	0	5	0	0	0	3	0	0	0	0	0	0	0	0	0	0	8
4:45 PM	0	4	0	0	0	3	0	0	0	0	0	0	0	0	0	0	7
5:00 PM	0	1	0	0	0	2	0	0	0	0	0	0	0	0	1	0	4
5:15 PM	0	2	0	0	0	1	0	0	0	0	0	0	0	0	0	0	3
5:30 PM	1	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0	3
5:45 PM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	3
6:00 PM	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
6:15 PM	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
6:30 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	2
6:45 PM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	2	18	0	0	1	26	0	0	0	0	1	0	0	0	5	0	53
APPROACH %'s :	10.00%	90.00%	0.00%	0.00%	3.70%	96.30%	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	0	12	0	0	0	19	0	0	0	0	0	0	0	0	2	0	33
PEAK HR FACTOR :	0.000	0.600	0.000	0.000	0.000	0.528	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.000	0.635
		0.600				0.528								0.250			

National Data & Surveying Services Intersection Turning Movement Count

Location: US 17/US 211/Broadview Ave & Warrenton Village North Dwy
City: Warrenton
Control: 1-Way stop(WB)

Project ID: 23-260020-009
Date: 2/9/2023

Data - Bikes

NS/EW Streets:	US 17/US 211/Broadview Ave				US 17/US 211/Broadview Ave				Warrenton Village North Dwy				Warrenton Village North Dwy				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	0	0	0	1	0	0	1	0.5	0.5	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %'s :																	
PEAK HR :	07:15 AM - 08:15 AM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	0	0	0	1	0	0	1	0.5	0.5	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %'s :																	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

National Data & Surveying Services Intersection Turning Movement Count

Location: US 17/US 211/Broadview Ave & Warrenton Village North Dwy **Project ID:** 23-260020-009
City: Warrenton **Date:** 2/9/2023

Data - Pedestrians (Crosswalks)

NS/EW Streets:	US 17/US 211/Broadview Ave		US 17/US 211/Broadview Ave		Warrenton Village North Dwy		Warrenton Village North Dwy		
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	1	0	1
7:00 AM	0	0	0	0	0	0	0	1	1
7:15 AM	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0
8:45 AM	1	0	0	0	0	0	0	0	1
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	1	0	0	0	0	0	1	1	3
APPROACH %'s :	100.00%	0.00%					50.00%	50.00%	
PEAK HR :	07:15 AM - 08:15 AM								TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :									

PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	1	1	2
4:30 PM	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	3	0	3
5:00 PM	0	0	2	0	0	0	0	1	3
5:15 PM	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0
6:00 PM	0	0	0	0	2	0	0	0	2
6:15 PM	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	0	0	2	0	2	0	4	2	10
APPROACH %'s :			100.00%	0.00%	100.00%	0.00%	66.67%	33.33%	
PEAK HR :	04:00 PM - 05:00 PM								TOTAL
PEAK HR VOL :	0	0	0	0	0	0	4	1	5
PEAK HR FACTOR :							0.333	0.250	0.417
							0.417		

Prepared by National Data & Surveying Services

US 17/US 211/Broadview Ave & Warrenton Village North Dwy

Peak Hour Turning Movement Count

ID: 23-260020-009
City: Warrenton

Day: Thursday
Date: 2/9/2023

PEAK HOURS	COUNT PERIODS
07:15 AM - 08:15 AM	6:00 AM - 09:00 AM
NONE	NONE
04:00 PM - 05:00 PM	4:00 PM - 07:00 PM

SOUTHBOUND — US 17/US 211/Broadview Ave

AM	2	413	11	0	509	AM
NOON	0	0	0	0	0	NOON
PM	6	552	40	1	448	PM

EASTBOUND — Warrenton Village North Dwy

AM	NOON	PM	
16	0	20	
0	0	0	0
0	0	10	0
0	0	1	1
1	0	17	0
AM	NOON	PM	

WESTBOUND — Warrenton Village North Dwy

PM	NOON	AM	
37	0	14	0.5
1	0	1	0.5
33	0	4	1
0	0	0	0
56	0	20	
PM	NOON	AM	

NORTHBOUND — US 17/US 211/Broadview Ave

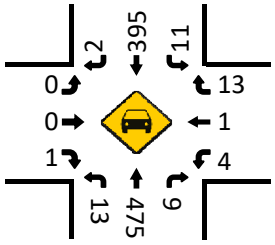
PM	604	2	13	400	15	PM
NOON	0	0	0	0	0	NOON
AM	418	0	13	495	9	AM

CONTROL

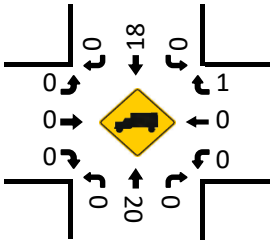
1-Way stop(WB)

TEV	963 AM	0 NOON	1128 PM
PHF	0.78		0.90

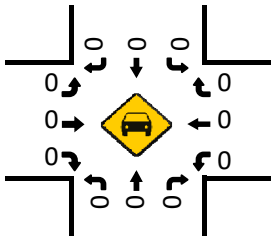
Cars (AM)



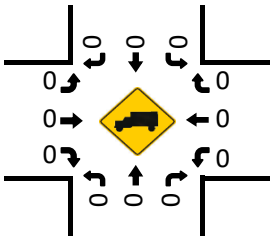
HT (AM)



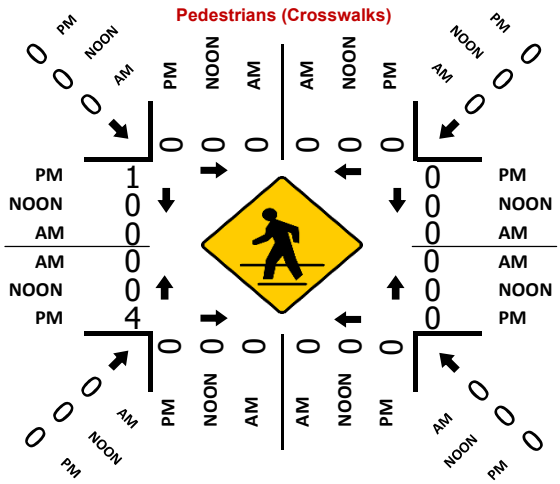
Cars (NOON)



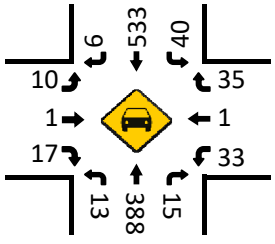
HT (NOON)



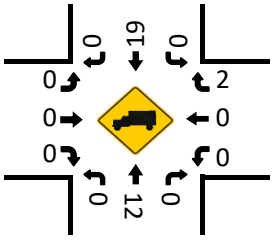
Pedestrians (Crosswalks)



Cars (PM)



HT (PM)



National Data & Surveying Services Intersection Turning Movement Count

Location: US 17/US 211/Broadview Ave/Winchester St & Warrenton Village South Dwy/Broadview Ave
City: Warrenton
Control: 2-Way Stop(EB/WB)

Project ID: 23-260020-010
Date: 2/9/2023

Data - Total

NS/EW Streets:	US 17/US 211/Broadview Ave/Winchester St				US 17/US 211/Broadview Ave/Winchester St				Warrenton Village South Dwy/Broadview Ave				Warrenton Village South Dwy/Broadview Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	1	0	1	1	1	0	1	0.5	0.5	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	25	17	2	0	0	20	8	0	22	4	24	0	0	1	0	0	123
6:15 AM	29	21	2	0	0	26	7	0	20	1	13	0	0	2	0	0	121
6:30 AM	27	26	1	1	0	35	8	0	26	2	12	0	0	3	0	0	141
6:45 AM	32	31	3	0	0	57	7	0	20	2	21	0	0	2	0	0	175
7:00 AM	32	58	7	1	1	117	7	0	24	5	16	0	3	1	2	0	274
7:15 AM	26	66	6	0	0	98	11	0	26	8	19	0	1	0	0	0	261
7:30 AM	30	120	8	0	4	59	19	0	30	5	13	0	0	3	3	0	294
7:45 AM	34	136	7	0	1	106	11	0	39	4	25	0	1	0	0	0	364
8:00 AM	20	78	9	0	1	98	11	0	22	4	20	0	0	0	0	0	263
8:15 AM	26	55	7	1	1	89	7	0	23	4	13	0	1	0	0	0	227
8:30 AM	20	65	7	0	0	91	7	0	17	1	16	0	0	5	0	0	229
8:45 AM	14	71	9	0	0	108	15	0	20	8	19	0	0	1	2	0	267
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	315	744	68	3	8	904	118	0	289	48	211	0	6	18	7	0	2739
APPROACH %'s :	27.88%	65.84%	6.02%	0.27%	0.78%	87.77%	11.46%	0.00%	52.74%	8.76%	38.50%	0.00%	19.35%	58.06%	22.58%	0.00%	
PEAK HR :	07:00 AM - 08:00 AM																TOTAL
PEAK HR VOL :	122	380	28	1	6	380	48	0	119	22	73	0	5	4	5	0	1193
PEAK HR FACTOR :	0.897	0.699	0.875	0.250	0.375	0.812	0.632	0.000	0.763	0.688	0.730	0.000	0.417	0.333	0.417	0.000	0.819
	0.750				0.868				0.787				0.583				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	1	0	1	1	1	0	1	0.5	0.5	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	15	66	12	0	3	124	21	0	21	10	46	0	14	7	9	0	348
4:15 PM	28	93	18	0	2	124	27	0	20	12	39	0	6	3	2	0	374
4:30 PM	14	87	20	0	0	121	33	0	34	27	44	0	9	7	10	0	406
4:45 PM	19	64	27	0	2	124	25	0	21	12	35	0	14	10	4	0	357
5:00 PM	17	86	18	0	6	88	26	0	18	11	23	0	9	15	4	0	321
5:15 PM	17	77	32	1	4	100	31	0	13	10	30	0	13	10	10	0	348
5:30 PM	34	54	23	0	2	96	28	0	32	16	16	0	10	11	6	0	328
5:45 PM	16	64	21	0	5	97	14	0	10	9	27	0	7	9	12	0	291
6:00 PM	14	57	27	0	1	60	13	0	15	14	35	0	10	14	7	0	267
6:15 PM	20	49	25	1	7	72	21	0	8	16	22	0	8	7	5	0	261
6:30 PM	15	46	22	3	2	55	13	0	9	11	16	0	8	11	7	0	218
6:45 PM	21	37	27	0	2	48	6	0	17	11	10	0	14	4	9	0	206
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	230	780	272	5	36	1109	258	0	218	159	343	0	122	108	85	0	3725
APPROACH %'s :	17.87%	60.61%	21.13%	0.39%	2.57%	79.04%	18.39%	0.00%	30.28%	22.08%	47.64%	0.00%	38.73%	34.29%	26.98%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	76	310	77	0	7	493	106	0	96	61	164	0	43	27	25	0	1485
PEAK HR FACTOR :	0.679	0.833	0.713	0.000	0.583	0.994	0.803	0.000	0.706	0.565	0.891	0.000	0.768	0.675	0.625	0.000	0.914
	0.833				0.984				0.764				0.792				

National Data & Surveying Services Intersection Turning Movement Count

Location: US 17/US 211/Broadview Ave/Winchester St & Warrenton Village South Dwy/Broadview Ave
City: Warrenton
Control: 2-Way Stop(EB/WB)

Project ID: 23-260020-010
Date: 2/9/2023

Data - Cars

NS/EW Streets:	US 17/US 211/Broadview Ave/Winchester St				US 17/US 211/Broadview Ave/Winchester St				Warrenton Village South Dwy/Broadview Ave				Warrenton Village South Dwy/Broadview Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	1	0	1	1	1	0	1	0.5	0.5	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	25	15	2	0	0	19	8	0	21	4	23	0	0	1	0	0	118
6:15 AM	29	18	1	0	0	26	7	0	20	1	13	0	0	2	0	0	117
6:30 AM	27	23	1	1	0	33	8	0	26	2	11	0	0	3	0	0	135
6:45 AM	32	29	3	0	0	55	7	0	20	2	21	0	0	2	0	0	171
7:00 AM	32	50	7	1	1	111	6	0	23	5	15	0	3	1	1	0	256
7:15 AM	25	62	6	0	0	91	10	0	26	8	19	0	0	0	0	0	247
7:30 AM	30	117	8	0	4	53	17	0	30	5	12	0	0	3	2	0	281
7:45 AM	34	132	7	0	1	106	10	0	37	4	24	0	1	0	0	0	356
8:00 AM	20	72	9	0	1	97	11	0	22	4	20	0	0	0	0	0	256
8:15 AM	25	48	7	1	1	84	6	0	23	4	13	0	1	0	0	0	213
8:30 AM	19	59	7	0	0	77	6	0	17	1	15	0	0	5	0	0	206
8:45 AM	13	69	9	0	0	104	14	0	20	8	18	0	0	1	2	0	258
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	311	694	67	3	8	856	110	0	285	48	204	0	5	18	5	0	2614
APPROACH %'s :	28.93%	64.56%	6.23%	0.28%	0.82%	87.89%	11.29%	0.00%	53.07%	8.94%	37.99%	0.00%	17.86%	64.29%	17.86%	0.00%	
PEAK HR :	07:00 AM - 08:00 AM																TOTAL
PEAK HR VOL :	121	361	28	1	6	361	43	0	116	22	70	0	4	4	3	0	1140
PEAK HR FACTOR :	0.890	0.684	0.875	0.250	0.375	0.813	0.632	0.000	0.784	0.688	0.729	0.000	0.333	0.333	0.375	0.000	0.801
	0.738				0.869				0.800				0.550				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	1	0	1	1	1	0	1	0.5	0.5	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	15	65	12	0	3	120	21	0	21	10	46	0	14	7	9	0	343
4:15 PM	28	91	18	0	2	116	26	0	20	12	39	0	6	3	2	0	363
4:30 PM	14	84	20	0	0	118	33	0	32	27	43	0	9	7	10	0	397
4:45 PM	18	60	27	0	2	121	25	0	21	12	35	0	14	10	4	0	349
5:00 PM	17	85	18	0	6	86	26	0	18	11	23	0	9	14	4	0	317
5:15 PM	17	76	32	1	4	99	31	0	13	10	30	0	13	10	9	0	345
5:30 PM	34	54	23	0	2	94	28	0	31	16	16	0	9	11	6	0	324
5:45 PM	16	62	20	0	5	96	14	0	10	9	27	0	7	9	12	0	287
6:00 PM	14	56	27	0	1	60	13	0	15	14	35	0	10	14	7	0	266
6:15 PM	19	49	24	1	7	71	21	0	8	16	22	0	8	7	5	0	258
6:30 PM	15	46	21	3	2	55	13	0	9	11	16	0	8	11	7	0	217
6:45 PM	21	36	26	0	2	47	6	0	17	11	10	0	14	4	9	0	203
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	228	764	268	5	36	1083	257	0	215	159	342	0	121	107	84	0	3669
APPROACH %'s :	18.02%	60.40%	21.19%	0.40%	2.62%	78.71%	18.68%	0.00%	30.03%	22.21%	47.77%	0.00%	38.78%	34.29%	26.92%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	75	300	77	0	7	475	105	0	94	61	163	0	43	27	25	0	1452
PEAK HR FACTOR :	0.670	0.824	0.713	0.000	0.583	0.981	0.795	0.000	0.734	0.565	0.886	0.000	0.768	0.675	0.625	0.000	0.914
	0.825				0.972				0.779				0.792				

National Data & Surveying Services Intersection Turning Movement Count

Location: US 17/US 211/Broadview Ave/Winchester St & Warrenton Village South Dwy/Broadview Ave
City: Warrenton
Control: 2-Way Stop(EB/WB)

Project ID: 23-260020-010
Date: 2/9/2023

Data - HT

NS/EW Streets:	US 17/US 211/Broadview Ave/Winchester St				US 17/US 211/Broadview Ave/Winchester St				Warrenton Village South Dwy/Broadview Ave				Warrenton Village South Dwy/Broadview Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	1	0	1	1	1	0	1	0.5	0.5	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	2	0	0	0	1	0	0	1	0	1	0	0	0	0	0	5
6:15 AM	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	4
6:30 AM	0	3	0	0	0	2	0	0	0	0	1	0	0	0	0	0	6
6:45 AM	0	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	4
7:00 AM	0	8	0	0	0	6	1	0	1	0	1	0	0	0	1	0	18
7:15 AM	1	4	0	0	0	7	1	0	0	0	0	0	1	0	0	0	14
7:30 AM	0	3	0	0	0	6	2	0	0	0	1	0	0	0	1	0	13
7:45 AM	0	4	0	0	0	0	1	0	2	0	1	0	0	0	0	0	8
8:00 AM	0	6	0	0	0	1	0	0	0	0	0	0	0	0	0	0	7
8:15 AM	1	7	0	0	0	5	1	0	0	0	0	0	0	0	0	0	14
8:30 AM	1	6	0	0	0	14	1	0	0	0	1	0	0	0	0	0	23
8:45 AM	1	2	0	0	0	4	1	0	0	0	1	0	0	0	0	0	9
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	4	50	1	0	0	48	8	0	4	0	7	0	1	0	2	0	125
APPROACH %'s :	7.27%	90.91%	1.82%	0.00%	0.00%	85.71%	14.29%	0.00%	36.36%	0.00%	63.64%	0.00%	33.33%	0.00%	66.67%	0.00%	
PEAK HR :	07:00 AM - 08:00 AM																TOTAL
PEAK HR VOL :	1	19	0	0	0	19	5	0	3	0	3	0	1	0	2	0	53
PEAK HR FACTOR :	0.250	0.594	0.000	0.000	0.000	0.679	0.625	0.000	0.375	0.000	0.750	0.000	0.250	0.000	0.500	0.000	0.736
	0.625				0.750				0.500				0.750				

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	1	0	1	1	1	0	1	0.5	0.5	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	1	0	0	0	4	0	0	0	0	0	0	0	0	0	0	5
4:15 PM	0	2	0	0	0	8	1	0	0	0	0	0	0	0	0	0	11
4:30 PM	0	3	0	0	0	3	0	0	2	0	1	0	0	0	0	0	9
4:45 PM	1	4	0	0	0	3	0	0	0	0	0	0	0	0	0	0	8
5:00 PM	0	1	0	0	0	2	0	0	0	0	0	0	0	1	0	0	4
5:15 PM	0	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	3
5:30 PM	0	0	0	0	0	2	0	0	1	0	0	0	1	0	0	0	4
5:45 PM	0	2	1	0	0	1	0	0	0	0	0	0	0	0	0	0	4
6:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
6:15 PM	1	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	3
6:30 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
6:45 PM	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0	3
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	2	16	4	0	0	26	1	0	3	0	1	0	1	1	1	0	56
APPROACH %'s :	9.09%	72.73%	18.18%	0.00%	0.00%	96.30%	3.70%	0.00%	75.00%	0.00%	25.00%	0.00%	33.33%	33.33%	33.33%	0.00%	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	1	10	0	0	0	18	1	0	2	0	1	0	0	0	0	0	33
PEAK HR FACTOR :	0.250	0.625	0.000	0.000	0.000	0.563	0.250	0.000	0.250	0.000	0.250	0.000	0.000	0.000	0.000	0.000	0.750
	0.550				0.528				0.250								

National Data & Surveying Services Intersection Turning Movement Count

Location: US 17/US 211/Broadview Ave/Winchester St & Warrenton Village South Dwy/Broadview Ave
City: Warrenton
Control: 2-Way Stop(EB/WB)

Project ID: 23-260020-010
Date: 2/9/2023

Data - Bikes

NS/EW Streets:	US 17/US 211/Broadview Ave/Winchester St				US 17/US 211/Broadview Ave/Winchester St				Warrenton Village South Dwy/Broadview Ave				Warrenton Village South Dwy/Broadview Ave				
AM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	1	0	1	1	1	0	1	0.5	0.5	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %'s :																	
PEAK HR :	07:00 AM - 08:00 AM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

PM	NORTHBOUND				SOUTHBOUND				EASTBOUND				WESTBOUND				
	1	2	1	0	1	2	1	0	1	1	1	0	1	0.5	0.5	0	
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	NL	NT	NR	NU	SL	ST	SR	SU	EL	ET	ER	EU	WL	WT	WR	WU	TOTAL
TOTAL VOLUMES :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
APPROACH %'s :																	
PEAK HR :	04:00 PM - 05:00 PM																TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	

National Data & Surveying Services Intersection Turning Movement Count

Location: US 17/US 211/Broadview Ave/Winchester St & Warrenton Village Sc **Project ID:** 23-260020-010
City: Warrenton **Date:** 2/9/2023

Data - Pedestrians (Crosswalks)

NS/EW Streets:	US 17/US 211/Broadview Ave/Winchester St		US 17/US 211/Broadview Ave/Winchester St		Warrenton Village South Dwy/Broadview Ave		Warrenton Village South Dwy/Broadview Ave		
AM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
6:00 AM	0	0	0	0	0	2	0	0	2
6:15 AM	0	0	0	0	0	0	0	0	0
6:30 AM	0	1	0	0	0	0	0	0	1
6:45 AM	0	0	0	0	0	0	0	0	0
7:00 AM	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	0	0	0	0	0	0
8:30 AM	0	0	0	0	0	0	0	0	0
8:45 AM	0	0	0	0	0	0	0	0	0
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	0	1	0	0	0	2	0	0	3
APPROACH %'s :	0.00%	100.00%			0.00%	100.00%			
PEAK HR :	07:00 AM - 08:00 AM								TOTAL
PEAK HR VOL :	0	0	0	0	0	0	0	0	0
PEAK HR FACTOR :									

PM	NORTH LEG		SOUTH LEG		EAST LEG		WEST LEG		
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
4:00 PM	0	1	0	0	0	0	0	0	1
4:15 PM	0	4	0	0	3	0	0	0	7
4:30 PM	0	1	0	0	0	0	0	0	1
4:45 PM	0	0	0	0	0	0	0	0	0
5:00 PM	0	0	0	0	0	0	0	0	0
5:15 PM	0	0	0	0	0	0	0	0	0
5:30 PM	0	0	0	0	0	0	0	0	0
5:45 PM	0	0	0	0	0	0	0	0	0
6:00 PM	0	0	0	0	0	0	0	0	0
6:15 PM	0	0	0	0	0	0	0	0	0
6:30 PM	0	0	0	0	0	0	0	0	0
6:45 PM	0	0	0	0	0	0	0	0	0
	EB	WB	EB	WB	NB	SB	NB	SB	TOTAL
TOTAL VOLUMES :	0	6	0	0	3	0	0	0	9
APPROACH %'s :	0.00%	100.00%			100.00%	0.00%			
PEAK HR :	04:00 PM - 05:00 PM								TOTAL
PEAK HR VOL :	0	6	0	0	3	0	0	0	9
PEAK HR FACTOR :		0.375			0.250				0.321
	0.375				0.250				

Prepared by National Data & Surveying Services

US 17/US 211/Broadview Ave/Winchester St & Warrenton Village South Dwy/Broadview Ave

Peak Hour Turning Movement Count

ID: 23-260020-010
City: Warrenton

Day: Thursday
Date: 2/9/2023

PEAK HOURS	COUNT PERIODS
07:00 AM - 08:00 AM	6:00 AM - 09:00 AM
NONE	NONE
04:00 PM - 05:00 PM	4:00 PM - 07:00 PM

SOUTHBOUND — US 17/US 211/Broadview Ave/Winchester St

AM	48	380	6	0	504	AM
NOON	0	0	0	0	0	NOON
PM	106	493	7	0	431	PM
	1	2	1	0		

EASTBOUND — Warrenton Village South Dwy/Broadview Ave

AM	NOON	PM	
174	0	209	
0	0	0	0
119	0	96	1
22	0	61	1
73	0	164	1
AM	NOON	PM	

WESTBOUND — Warrenton Village South Dwy/Broadview Ave

PM	NOON	AM	
25	0	5	0.5
27	0	4	0.5
43	0	5	1
0	0	0	0
145	0	56	
PM	NOON	AM	

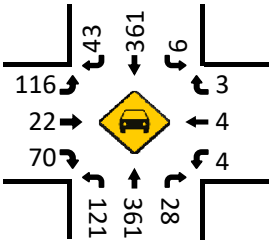
CONTROL: 2-Way Stop(EB/WB)

TEV	1193 AM	0 NOON	1485 PM
PHF	0.82		0.91

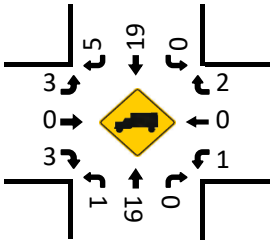
NORTHBOUND — US 17/US 211/Broadview Ave/Winchester St

PM	700	0	76	310	77	PM
NOON	0	0	0	0	0	NOON
AM	459	1	122	380	28	AM
		0	1	2	1	

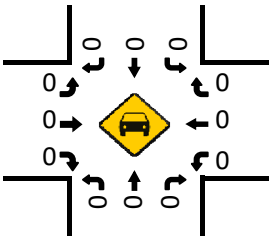
Cars (AM)



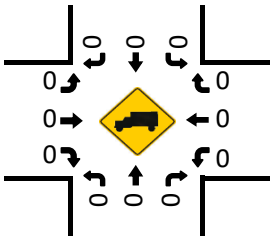
HT (AM)



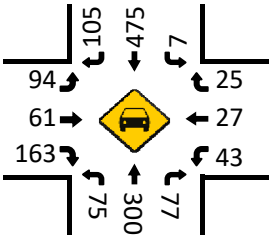
Cars (NOON)



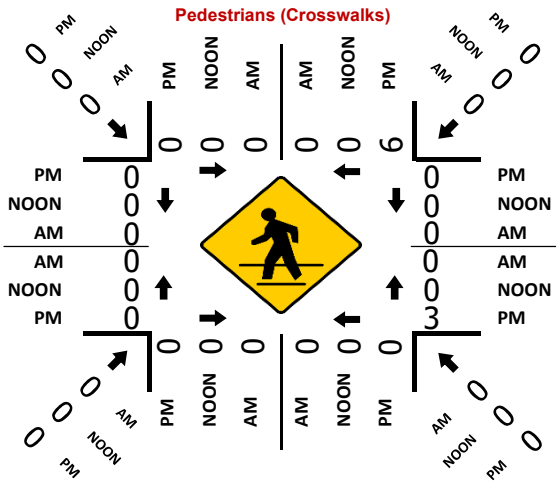
HT (NOON)



Cars (PM)



Pedestrians (Crosswalks)


PM
NOON
AM
0
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0
0
0
0

D. HCM Level of Service Definitions

GOROVE SLADE
Transportation Planners and Engineers

TECHNICAL MEMORANDUM

Subject: Level of Service Definitions

Introduction

The purpose of this memorandum is to define the level of service (LOS) metric that commonly used as a measure of effectiveness (MOE) for traffic operations.

All capacity analyses are based on the procedures specified by the Transportation Research Board's (TRB) Highway Capacity Manual (HCM), which is currently on its sixth edition. Level of service ranges from A to F. A brief description of each level of service for signalized and unsignalized intersections is provided below.

Signalized Intersections

Level of service is based upon the traffic volume present in each lane on the roadway, the capacity of each lane at the intersection and the delay associated with each directional movement. The levels of service for signalized intersections are defined below:

- **Level of Service A** describes operations with very low average delay per vehicle, i.e., less than 10.0 seconds. This occurs when progression is extremely favorable, and most vehicles arrive during the green phase. Most vehicles do not stop. Short signal cycle lengths may also contribute to low delay.
- **Level of Service B** describes operations with average delay in the range of 10.1 to 20.0 seconds per vehicle. This generally occurs with good progression and/or short cycle lengths. More vehicles stop than for LOS A, causing higher levels of average delay.
- **Level of Service C** describes operations with delay in the range of 20.1 to 35.0 seconds per vehicle. These higher delays may result from fair progression and/or longer cycle lengths. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant at this level although many still pass through the intersection without stopping. This is generally considered the lower end of the range of the acceptable level of service in rural areas.
- **Level of Service D** describes operations with delay in the range of 35.1 to 55.0 seconds per vehicle. At LOS D, the influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, and/or high traffic volumes as compared to the roadway capacity. Many vehicles are required to stop and the number of vehicles that do not have to stop declines. Individual signal cycle failures, where all waiting vehicles do not clear the intersection during a single green time, are noticeable. This is generally considered the lower end of the range of the acceptable level of service in urban areas.
- **Level of Service E** describes operations with delay in the range of 55.1 to 80.0 seconds per vehicle. These higher delay values generally indicate poor progression, long cycle lengths, and high traffic volumes. Individual cycle failures are frequent occurrences. LOS E has been set as the limit of acceptable conditions.
- **Level of Service F** describes operations with average delay in excess of 80.0 seconds per vehicle. This is considered to be unacceptable to most drivers. This condition often occurs with over-saturation, i.e., when traffic arrives at a flow rate that exceeds the capacity of the intersection. It may also occur at high volumes with many individual cycle failures. Poor progression and long cycle lengths may also contribute to such delays.

4114 Legato Road / Suite 650 / Fairfax, VA 22033 / T 703.787.9595 goroveslade.com

Unsignalized Intersections

At an unsignalized intersection, the major street through traffic and right-turns are assumed to operate unimpeded and therefore receive no level of service rating. The level of service for the minor street and the major street left-turn traffic is dependent on the volume and capacity of the available lanes, and, the number and frequency of acceptable gaps in the major street traffic to make a conflicting turn. The level of service grade is provided for each conflicting movement at an unsignalized intersection and is based on the total average delay experienced by each vehicle. The delay includes the time it takes a vehicle to move from the back of a queue through the intersection.

The unsignalized intersection level of service analysis does not account for variations in driver behavior or the effects of nearby traffic signals. Therefore, the results from this analysis usually indicate worse levels of service than may be experienced in the field. The unsignalized intersection level of service descriptions are provided below:

- **Level of Service A** describes operations where there is very little to no conflicting traffic for a minor side street movement, i.e., an average total delay of less than 10.0 seconds per vehicle.
- **Level of Service B** describes operations with average total delay in the range of 10.1 to 15.0 seconds per vehicle.
- **Level of Service C** describes operations with average total delay in the range of 15.1 to 25.0 second per vehicle.
- **Level of Service D** describes operations with average total delay in the range of 25.1 to 35.0 seconds per vehicle.
- **Level of Service E** describes operations with average total delay in the range of 35.1 to 50.0 seconds per vehicle.
- **Level of Service F** describes operations with average total delay of 50 seconds per vehicle. LOS F exists when there are insufficient gaps of suitable size to allow a side street demand to cross safely through or enter a major street traffic stream. This level of service is generally evident from extremely long total delays experienced by side street traffic and by queuing on the minor approaches. It is important to note that LOS F may not always result in long queues but may result in adjustments to normal driver behavior.

E. VDOT Signal Timings

Plan 1

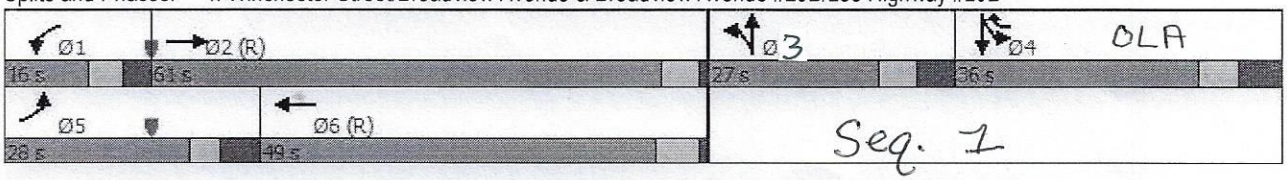
Timing Report, Sorted By Phase
4: Winchester Street/Broadview Avenue & Broadview Avenue #29B/Lee Highway #29B 01/02/2020

Phase Number	1	2	4	5	6	3
Movement	WBL	EBT	SBTL	EBL	WBT	NBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize						
Recall Mode	None	C-Min	None	None	C-Min	None
Maximum Split (s)	16	61	36	28	49	27
Maximum Split (%)	11.4%	43.6%	25.7%	20.0%	35.0%	19.3%
Minimum Split (s)	12.9	27.2	15.4	13.8	32.8	14.2
Yellow Time (s)	3.8	4.2	4.5	3.4	4.8	4.1
All-Red Time (s)	3.1	1	4.9	4.4	1	4.2
Minimum Initial (s)	6	15	6	6	15	6
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		15	24		20	29
Dual Entry	No	Yes	No	No	Yes	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	112	128	76	112	0	49
End Time (s)	128	49	112	0	49	76
Yield/Force Off (s)	121.1	43.8	102.6	132.2	43.2	67.7
Yield/Force Off 170(s)	121.1	28.8	78.6	132.2	23.2	39.7
Local Start Time (s)	124	0	88	124	12	61
Local Yield (s)	133.1	55.8	114.6	4.2	55.2	79.7
Local Yield 170(s)	133.1	40.8	90.6	4.2	35.2	51.7
MAX 1	40	40	25	25	40	25

Intersection Summary	
Cycle Length	140
Control Type	Actuated-Coordinated
Natural Cycle	80

Offset: 128 (91%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green

Splits and Phases: 4: Winchester Street/Broadview Avenue & Broadview Avenue #29B/Lee Highway #29B



OLA + 4

Plan 2

Timing Report, Sorted By Phase

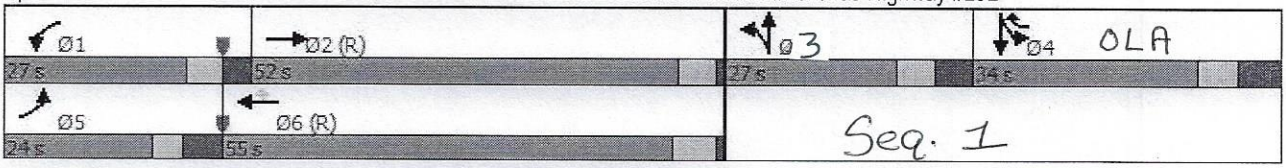
4: Winchester Street/Broadview Avenue & Broadview Avenue #29B/Lee Highway #29B 01/02/2020

Phase Number	1	2	4	5	6	3
Movement	WBL	EBT	SBTL	EBL	WBT	NBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize						
Recall Mode	None	C-Min	None	None	C-Min	None
Maximum Split (s)	27	52	34	24	55	27
Maximum Split (%)	19.3%	37.1%	24.3%	17.1%	39.3%	19.3%
Minimum Split (s)	12.9	27.2	15.4	13.8	32.8	14.3
Yellow Time (s)	3.8	4.2	4.5	3.4	4.8	4.1
All-Red Time (s)	3.1	1	4.9	4.4	1	4.2
Minimum Initial (s)	6	15	6	6	15	6
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		15	24		20	29
Dual Entry	No	Yes	No	No	Yes	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	121	8	87	121	5	60
End Time (s)	8	60	121	5	60	87
Yield/Force Off (s)	1.1	54.8	111.6	137.2	54.2	78.7
Yield/Force Off 170(s)	1.1	39.8	87.6	137.2	34.2	50.7
Local Start Time (s)	116	3	82	116	0	55
Local Yield (s)	136.1	49.8	106.6	132.2	49.2	73.7
Local Yield 170(s)	136.1	34.8	82.6	132.2	29.2	45.7
MAX 1	40	40	25	25	40	25

Intersection Summary	
Cycle Length	140
Control Type	Actuated-Coordinated
Natural Cycle	80

Offset: 5 (4%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green

Splits and Phases: 4: Winchester Street/Broadview Avenue & Broadview Avenue #29B/Lee Highway #29B



OLA + 4

Timing Report, Sorted By Phase

Plan 3

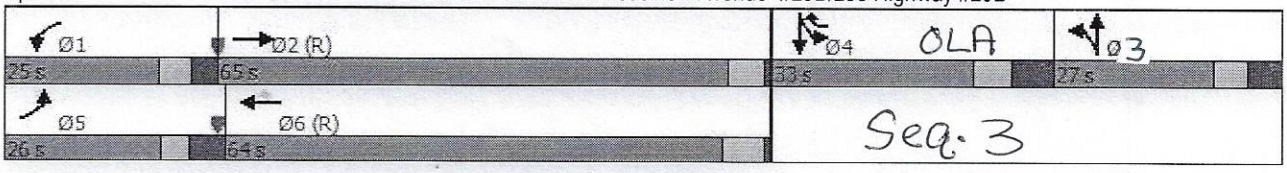
4: Winchester Street/Broadview Avenue & Broadview Avenue #29B/Lee Highway #29B 01/03/2020

Phase Number	1	2	4	5	6	3
Movement	WBL	EBT	SBTL	EBL	WBT	NBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize						
Recall Mode	None	C-Min	None	None	C-Min	None
Maximum Split (s)	25	65	33	26	64	27
Maximum Split (%)	16.7%	43.3%	22.0%	17.3%	42.7%	18.0%
Minimum Split (s)	14.9	27.2	15.4	13.8	32.8	14.3
Yellow Time (s)	3.8	4.2	4.5	3.4	4.8	4.1
All-Red Time (s)	3.1	1	4.9	4.4	1	4.2
Minimum Initial (s)	6	15	6	6	15	6
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		15	24		20	29
Dual Entry	No	Yes	No	No	Yes	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	31	56	121	31	57	4
End Time (s)	56	121	4	57	121	31
Yield/Force Off (s)	49.1	115.8	144.6	49.2	115.2	22.7
Yield/Force Off 170(s)	49.1	100.8	120.6	49.2	95.2	144.7
Local Start Time (s)	125	0	65	125	1	98
Local Yield (s)	143.1	59.8	88.6	143.2	59.2	116.7
Local Yield 170(s)	143.1	44.8	64.6	143.2	39.2	88.7
MAX 1	40	46	25	25	48	25

Intersection Summary	
Cycle Length	150
Control Type	Actuated-Coordinated
Natural Cycle	90

Offset: 56 (37%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green

Splits and Phases: 4: Winchester Street/Broadview Avenue & Broadview Avenue #29B/Lee Highway #29B



OLA + 4

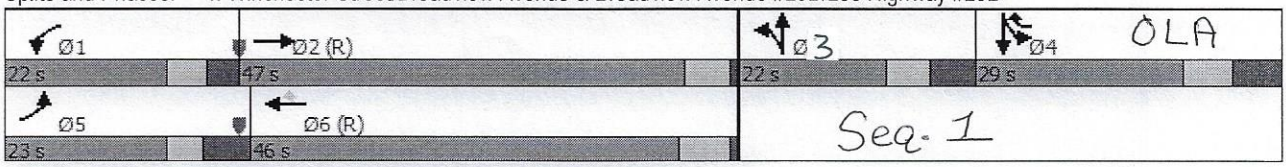
Plan 4

Timing Report, Sorted By Phase
4: Winchester Street/Broadview Avenue & Broadview Avenue #29B/Lee Highway #29B 01/03/2020

Phase Number	1	2	4	5	6	3
Movement	WBL	EBT	SBTL	EBL	WBT	NBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize						
Recall Mode	None	C-Min	None	None	C-Min	None
Maximum Split (s)	22	47	29	23	46	22
Maximum Split (%)	18.3%	39.2%	24.2%	19.2%	38.3%	18.3%
Minimum Split (s)	12.9	27.2	15.4	13.8	32.8	14.3
Yellow Time (s)	3.8	4.2	4.5	3.4	4.8	4.1
All-Red Time (s)	3.1	1	4.9	4.4	1	4.2
Minimum Initial (s)	6	15	6	6	15	6
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		7	7		7	7
Flash Dont Walk (s)		15	24		20	29
Dual Entry	No	Yes	No	No	Yes	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	115	17	86	115	18	64
End Time (s)	17	64	115	18	64	86
Yield/Force Off (s)	10.1	58.8	105.6	10.2	58.2	77.7
Yield/Force Off 170(s)	10.1	43.8	81.6	10.2	38.2	49.7
Local Start Time (s)	98	0	69	98	1	47
Local Yield (s)	113.1	41.8	88.6	113.2	41.2	60.7
Local Yield 170(s)	113.1	26.8	64.6	113.2	21.2	32.7
MAX 1	40	40	25	25	40	25

Intersection Summary						
Cycle Length			120			
Control Type	Actuated-Coordinated					
Natural Cycle			80			
Offset: 17 (14%), Referenced to phase 2:EBT and 6:WBT, Start of 1st Green						

Splits and Phases: 4: Winchester Street/Broadview Avenue & Broadview Avenue #29B/Lee Highway #29B



OLA +4

Timing Report, Sorted By Phase
3: Branch Drive & Lee Highway #29B

Plan 1

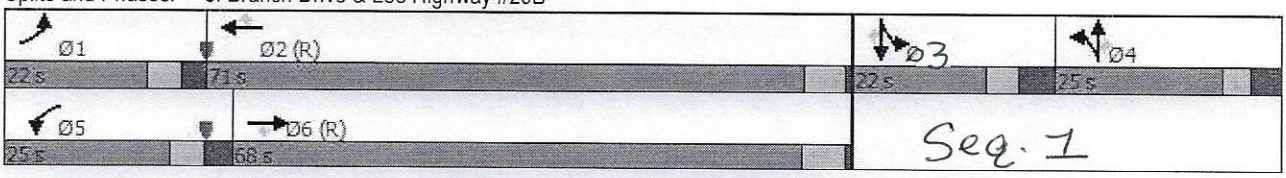
01/02/2020

Phase Number	1	2	4	5	6	3
Movement	EBL	WBT	NBTL	WBL	EBT	SBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize						
Recall Mode	None	C-Min	None	None	C-Min	None
Maximum Split (s)	22	71	25	25	68	22
Maximum Split (%)	15.7%	50.7%	17.9%	17.9%	48.6%	15.7%
Minimum Split (s)	12.4	27.6	12.6	12.8	27.7	13.5
Yellow Time (s)	3.7	4.6	3	3.7	4.7	3.5
All-Red Time (s)	2.7	1	3	3.1	1	4
Minimum Initial (s)	6	15	6	6	15	6
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		7	7		7	
Flash Dont Walk (s)		17	27		12	
Dual Entry	No	Yes	No	No	Yes	No
Inhibit Max	yes	yes	yes	yes	yes	yes
Start Time (s)	119	1	94	119	4	72
End Time (s)	1	72	119	4	72	94
Yield/Force Off (s)	134.6	66.4	112.4	137.2	66.3	86.5
Yield/Force Off 170(s)	134.6	51.4	84.4	137.2	51.3	86.5
Local Start Time (s)	118	0	93	118	3	71
Local Yield (s)	133.6	65.4	111.4	136.2	65.3	85.5
Local Yield 170(s)	133.6	50.4	83.4	136.2	50.3	85.5
MAX 1	18	45	35	18	45	35

Intersection Summary	
Cycle Length	140
Control Type	Actuated-Coordinated
Natural Cycle	70

Offset: 1 (1%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green

Splits and Phases: 3: Branch Drive & Lee Highway #29B



Timing Report, Sorted By Phase
3: Branch Drive & Lee Highway #29B

Plan 2

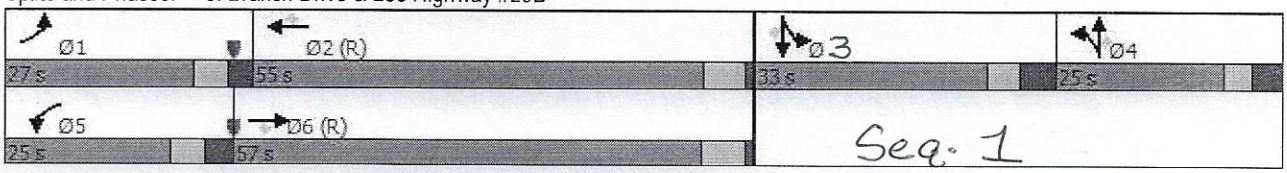
01/02/2020

Phase Number	1	2	4	5	6	3
Movement	EBL	WBT	NBTL	WBL	EBT	SBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize						
Recall Mode	None	C-Min	None	None	C-Min	None
Maximum Split (s)	27	55	25	25	57	33
Maximum Split (%)	19.3%	39.3%	17.9%	17.9%	40.7%	23.6%
Minimum Split (s)	12.4	27.6	12.6	12.8	27.7	13.5
Yellow Time (s)	3.7	4.6	3	3.7	4.7	3.5
All-Red Time (s)	2.7	1	3.6	3.1	1	4
Minimum Initial (s)	6	15	6	6	15	6
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		7	7		7	
Flash Dont Walk (s)		17	27		12	
Dual Entry	No	Yes	No	No	Yes	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	125	12	100	125	10	67
End Time (s)	12	67	125	10	67	100
Yield/Force Off (s)	5.6	61.4	118.4	3.2	61.3	92.5
Yield/Force Off 170(s)	5.6	46.4	90.4	3.2	46.3	92.5
Local Start Time (s)	115	2	90	115	0	57
Local Yield (s)	135.6	51.4	108.4	133.2	51.3	82.5
Local Yield 170(s)	135.6	36.4	80.4	133.2	36.3	82.5
MAX 1	18	45	35	18	45	35

Intersection Summary	
Cycle Length	140
Control Type	Actuated-Coordinated
Natural Cycle	80

Offset: 10 (7%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green

Splits and Phases: 3: Branch Drive & Lee Highway #29B



Timing Report, Sorted By Phase
3: Branch Drive & Lee Highway #29B

Plan 3

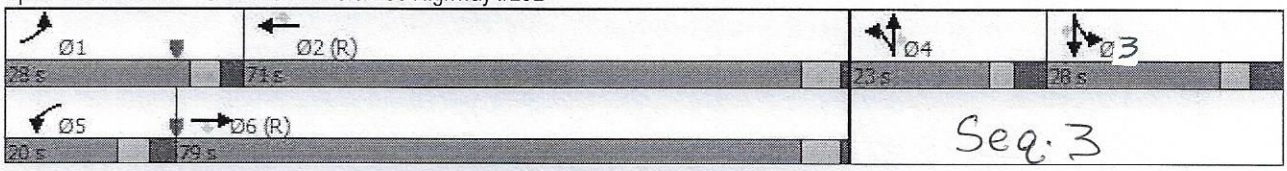
01/03/2020

Phase Number	1	2	4	5	6	3
Movement	EBL	WBT	NBTL	WBL	EBT	SBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize						
Recall Mode	None	C-Min	None	None	C-Min	None
Maximum Split (s)	28	71	23	20	79	28
Maximum Split (%)	18.7%	47.3%	15.3%	13.3%	52.7%	18.7%
Minimum Split (s)	12.4	27.6	12.6	12.8	27.7	13.5
Yellow Time (s)	3.7	4.6	3	3.7	4.7	3.5
All-Red Time (s)	2.7	1	3.6	3.1	1	4
Minimum Initial (s)	6	15	6	6	15	6
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		7	7		7	
Flash Dont Walk (s)		17	27		12	
Dual Entry	No	Yes	No	No	Yes	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes	Yes
Start Time (s)	26	54	125	26	46	148
End Time (s)	54	125	148	46	125	26
Yield/Force Off (s)	47.6	119.4	141.4	39.2	119.3	18.5
Yield/Force Off 170(s)	47.6	104.4	113.4	39.2	104.3	18.5
Local Start Time (s)	130	8	79	130	0	102
Local Yield (s)	1.6	73.4	95.4	143.2	73.3	122.5
Local Yield 170(s)	1.6	58.4	67.4	143.2	58.3	122.5
MAX I	18	45	35	18	45	35

Intersection Summary	
Cycle Length	150
Control Type	Actuated-Coordinated
Natural Cycle	80

Offset: 46 (31%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green

Splits and Phases: 3: Branch Drive & Lee Highway #29B



Timing Report, Sorted By Phase
3: Branch Drive & Lee Highway #29B

Plan 4

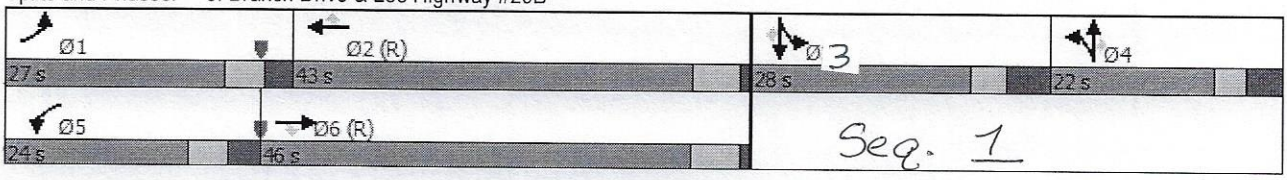
01/03/2020

Phase Number	1	2	4	5	6	3
Movement	EBL	WBT	NBTL	WBL	EBT	SBTL
Lead/Lag	Lead	Lag		Lead	Lag	
Lead-Lag Optimize						
Recall Mode	None	C-Min	None	None	C-Min	None
Maximum Split (s)	27	43	22	24	46	28
Maximum Split (%)	22.5%	35.8%	18.3%	20.0%	38.3%	23.3%
Minimum Split (s)	12.4	27.6	12.6	12.8	27.7	13.5
Yellow Time (s)	3.7	4.6	3	3.7	4.7	3.5
All-Red Time (s)	2.7	1	3.6	3.1	1	4
Minimum Initial (s)	6	15	6	6	15	6
Vehicle Extension (s)	3	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0	0
Walk Time (s)		7	7		7	
Flash Dont Walk (s)		17	27		12	
Dual Entry	No	Yes	No	No	Yes	No
Inhibit Max	yes	yes	yes	yes	yes	yes
Start Time (s)	100	7	78	100	4	50
End Time (s)	7	50	100	4	50	78
Yield/Force Off (s)	0.6	44.4	93.4	117.2	44.3	70.5
Yield/Force Off 170(s)	0.6	29.4	65.4	117.2	29.3	70.5
Local Start Time (s)	96	3	74	96	0	46
Local Yield (s)	116.6	40.4	89.4	113.2	40.3	66.5
Local Yield 170(s)	116.6	25.4	61.4	113.2	25.3	66.5
MAX 1	18	45	35	18	45	35

Intersection Summary	
Cycle Length	120
Control Type	Actuated-Coordinated
Natural Cycle	75

Offset: 4 (3%), Referenced to phase 2:WBT and 6:EBT, Start of 1st Green

Splits and Phases: 3: Branch Drive & Lee Highway #29B



F. 2023 Existing Conditions – Capacity Analysis Worksheets

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	298	896	38	699	194	83	117	80	117	122	244
v/c Ratio	0.72	0.51	0.37	0.48	0.21	0.49	0.62	0.21	0.59	0.58	0.41
Control Delay	69.1	26.2	96.7	21.6	3.5	68.2	73.8	1.2	69.4	67.7	11.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.1	26.2	96.7	21.6	3.5	68.2	73.8	1.2	69.4	67.7	11.1
Queue Length 50th (ft)	141	287	38	249	32	76	108	0	112	116	41
Queue Length 95th (ft)	186	428	78	143	46	126	166	0	167	171	95
Internal Link Dist (ft)		1315		334			509			538	
Turn Bay Length (ft)	250		130		200	250		125	215		
Base Capacity (vph)	481	1758	118	1450	1006	224	249	447	313	335	621
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.51	0.32	0.48	0.19	0.37	0.47	0.18	0.37	0.36	0.39

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	5	257	758	31	3	31	615	171	73	103	70	117
Future Volume (vph)	5	257	758	31	3	31	615	171	73	103	70	117
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)			0%				-1%			2%		
Total Lost time (s)		7.8	5.2			6.9	5.8	9.4	8.3	8.3	6.9	9.4
Lane Util. Factor		0.97	0.95			1.00	0.95	1.00	1.00	1.00	1.00	0.95
Frpb, ped/bikes		1.00	1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes		1.00	1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.99			1.00	1.00	0.85	1.00	1.00	0.85	1.00
Flt Protected		0.95	1.00			0.95	1.00	1.00	0.95	1.00	1.00	0.95
Satd. Flow (prot)		3338	3452			1814	3359	1561	1655	1844	1537	1649
Flt Permitted		0.95	1.00			0.95	1.00	1.00	0.95	1.00	1.00	0.95
Satd. Flow (perm)		3338	3452			1814	3359	1561	1655	1844	1537	1649
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	6	292	861	35	3	35	699	194	83	117	80	133
RTOR Reduction (vph)	0	0	1	0	0	0	0	87	0	0	67	0
Lane Group Flow (vph)	0	298	895	0	0	38	699	107	83	117	13	117
Confl. Peds. (#/hr)												
Heavy Vehicles (%)	0%	5%	4%	3%	0%	0%	8%	4%	8%	2%	4%	5%
Turn Type	Prot	Prot	NA		Prot	Prot	NA	pm+ov	Split	NA	custom	Split
Protected Phases	5	5	2		1	1	6	4	3	3		4
Permitted Phases								6			1 3	
Actuated Green, G (s)		17.4	71.0			8.1	60.2	77.0	14.3	14.3	22.4	16.8
Effective Green, g (s)		17.4	71.0			8.1	60.2	77.0	14.3	14.3	22.4	16.8
Actuated g/C Ratio		0.12	0.51			0.06	0.43	0.55	0.10	0.10	0.16	0.12
Clearance Time (s)		7.8	5.2			6.9	5.8	9.4	8.3	8.3		9.4
Vehicle Extension (s)		3.0	3.0			3.0	3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)		414	1750			104	1444	858	169	188	245	197
v/s Ratio Prot		c0.09	c0.26			0.02	0.21	0.01	0.05	c0.06		c0.07
v/s Ratio Perm								0.05			0.01	
v/c Ratio		0.72	0.51			0.37	0.48	0.12	0.49	0.62	0.05	0.59
Uniform Delay, d1		59.0	23.0			63.5	28.7	15.2	59.4	60.3	49.8	58.4
Progression Factor		1.00	1.00			1.38	0.65	2.21	1.00	1.00	1.00	1.00
Incremental Delay, d2		5.9	1.1			2.1	1.1	0.1	2.2	6.3	0.1	4.7
Delay (s)		64.9	24.0			89.7	19.8	33.6	61.7	66.5	49.9	63.1
Level of Service		E	C			F	B	C	E	E	D	E
Approach Delay (s)			34.2				25.5			60.3		
Approach LOS			C				C			E		

Intersection Summary			
HCM 2000 Control Delay	36.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	31.3
Intersection Capacity Utilization	70.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	93	215
Future Volume (vph)	93	215
Ideal Flow (vphpl)	1900	1900
Grade (%)	-2%	
Total Lost time (s)	9.4	9.4
Lane Util. Factor	0.95	1.00
Frpb, ped/bikes	1.00	0.98
Flpb, ped/bikes	1.00	1.00
Frt	1.00	0.85
Flt Protected	0.99	1.00
Satd. Flow (prot)	1769	1558
Flt Permitted	0.99	1.00
Satd. Flow (perm)	1769	1558
Peak-hour factor, PHF	0.88	0.88
Adj. Flow (vph)	106	244
RTOR Reduction (vph)	0	127
Lane Group Flow (vph)	122	117
Confl. Peds. (#/hr)		3
Heavy Vehicles (%)	2%	3%
Turn Type	NA	custom
Protected Phases	4	
Permitted Phases		4 5
Actuated Green, G (s)	16.8	43.6
Effective Green, g (s)	16.8	43.6
Actuated g/C Ratio	0.12	0.31
Clearance Time (s)	9.4	
Vehicle Extension (s)	3.0	
Lane Grp Cap (vph)	212	485
v/s Ratio Prot	0.07	
v/s Ratio Perm		0.07
v/c Ratio	0.58	0.24
Uniform Delay, d1	58.2	35.9
Progression Factor	1.00	1.00
Incremental Delay, d2	3.7	0.3
Delay (s)	62.0	36.1
Level of Service	E	D
Approach Delay (s)	49.2	
Approach LOS	D	

Intersection Summary

HCM 6th Edition methodology expects strict NEMA phasing.

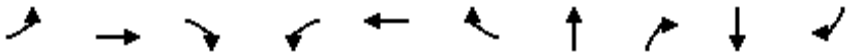
Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱		↑↑	↱			↱			↱
Traffic Vol, veh/h	0	885	63	0	800	31	0	0	29	0	0	20
Future Vol, veh/h	0	885	63	0	800	31	0	0	29	0	0	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	110	-	-	300	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	1	-	-	3	-	-	3	-	-	-11	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	4	3	0	7	0	0	0	3	0	0	0
Mvmt Flow	0	962	68	0	870	34	0	0	32	0	0	22

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	-	-	0	-	-	481	-	-	435
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	-	-	-	7.26	-	-	5.8
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	-	-	-	3.33	-	-	3.3
Pot Cap-1 Maneuver	0	-	-	0	-	-	0	0	508	0	0	656
Stage 1	0	-	-	0	-	-	0	0	-	0	0	-
Stage 2	0	-	-	0	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	-	-	-	-	-	-	-	-	508	-	-	656
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	12.6	10.7
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT	WBR	SBLn1
Capacity (veh/h)	508	-	-	-	-	656
HCM Lane V/C Ratio	0.062	-	-	-	-	0.033
HCM Control Delay (s)	12.6	-	-	-	-	10.7
HCM Lane LOS	B	-	-	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	-	0.1



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	40	964	1	48	840	56	23	42	46	55
v/c Ratio	0.36	0.41	0.00	0.41	0.37	0.05	0.15	0.16	0.40	0.28
Control Delay	84.6	7.2	0.0	72.4	16.2	0.1	56.4	1.4	71.9	3.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	84.6	7.2	0.0	72.4	16.2	0.1	56.4	1.4	71.9	3.4
Queue Length 50th (ft)	40	127	0	44	188	0	21	0	43	0
Queue Length 95th (ft)	m80	133	m0	88	394	0	43	0	86	0
Internal Link Dist (ft)		457			1504		131		565	
Turn Bay Length (ft)	240		330	150		150		60		
Base Capacity (vph)	199	2364	1143	227	2284	1125	286	358	185	248
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.41	0.00	0.21	0.37	0.05	0.08	0.12	0.25	0.22

Intersection Summary

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

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	7	29	877	1	44	764	51	10	11	38	34	8
Future Volume (vph)	7	29	877	1	44	764	51	10	11	38	34	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)			-4%			2%			0%			-1%
Total Lost time (s)		6.4	5.7	5.7	6.8	5.6	5.6		6.0	6.0		7.5
Lane Util. Factor		1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00
Frt		1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.98	1.00		0.96
Satd. Flow (prot)		1791	3541	1647	1752	3372	1599		1856	1615		1792
Flt Permitted		0.95	1.00	1.00	0.95	1.00	1.00		0.98	1.00		0.96
Satd. Flow (perm)		1791	3541	1647	1752	3372	1599		1856	1615		1792
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	8	32	964	1	48	840	56	11	12	42	37	9
RTOR Reduction (vph)	0	0	0	0	0	0	21	0	0	39	0	0
Lane Group Flow (vph)	0	40	964	1	48	840	35	0	23	3	0	46
Heavy Vehicles (%)	14%	0%	4%	0%	2%	6%	0%	0%	0%	0%	3%	0%
Turn Type	Prot	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Perm	Split	NA
Protected Phases	1	1	6		5	2		4	4		3	3
Permitted Phases				6			2			4		
Actuated Green, G (s)		7.5	87.3	87.3	8.1	88.4	88.4		10.7	10.7		7.9
Effective Green, g (s)		7.5	87.3	87.3	8.1	88.4	88.4		10.7	10.7		7.9
Actuated g/C Ratio		0.05	0.62	0.62	0.06	0.63	0.63		0.08	0.08		0.06
Clearance Time (s)		6.4	5.7	5.7	6.8	5.6	5.6		6.0	6.0		7.5
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0
Lane Grp Cap (vph)		95	2208	1027	101	2129	1009		141	123		101
v/s Ratio Prot		0.02	c0.27		c0.03	0.25			c0.01			c0.03
v/s Ratio Perm				0.00			0.02			0.00		
v/c Ratio		0.42	0.44	0.00	0.48	0.39	0.04		0.16	0.03		0.46
Uniform Delay, d1		64.1	13.6	9.9	63.9	12.7	9.7		60.5	59.8		64.0
Progression Factor		1.23	0.40	1.00	1.00	1.00	1.00		1.00	1.00		1.00
Incremental Delay, d2		2.7	0.6	0.0	3.5	0.5	0.1		0.5	0.1		3.2
Delay (s)		81.5	6.0	9.9	67.4	13.2	9.8		61.0	59.9		67.2
Level of Service		F	A	A	E	B	A		E	E		E
Approach Delay (s)			9.0			15.8			60.3			64.7
Approach LOS			A			B			E			E

Intersection Summary			
HCM 2000 Control Delay	16.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	26.0
Intersection Capacity Utilization	57.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	50
Future Volume (vph)	50
Ideal Flow (vphpl)	1900
Grade (%)	
Total Lost time (s)	7.5
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1375
Flt Permitted	1.00
Satd. Flow (perm)	1375
Peak-hour factor, PHF	0.91
Adj. Flow (vph)	55
RTOR Reduction (vph)	52
Lane Group Flow (vph)	3
Heavy Vehicles (%)	18%
Turn Type	Perm
Protected Phases	
Permitted Phases	3
Actuated Green, G (s)	7.9
Effective Green, g (s)	7.9
Actuated g/C Ratio	0.06
Clearance Time (s)	7.5
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	77
v/s Ratio Prot	
v/s Ratio Perm	0.00
v/c Ratio	0.04
Uniform Delay, d1	62.5
Progression Factor	1.00
Incremental Delay, d2	0.2
Delay (s)	62.7
Level of Service	E
Approach Delay (s)	
Approach LOS	

Intersection Summary

HCM 6th Edition methodology expects strict NEMA phasing.

Intersection	
Int Delay, s/veh	4.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	6	15	38	14	11	14	23	65	7	18	67	5
Future Vol, veh/h	6	15	38	14	11	14	23	65	7	18	67	5
Conflicting Peds, #/hr	0	0	2	2	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-8	-	-	-2	-	-	1	-	-	-1	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	0	0	0	0	9	0	0	0	0	0	13	0
Mvmt Flow	7	18	45	16	13	16	27	76	8	21	79	6

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	223	262	45	227	261	42	85	0	0	84	0	0
Stage 1	124	124	-	134	134	-	-	-	-	-	-	-
Stage 2	99	138	-	93	127	-	-	-	-	-	-	-
Critical Hdwy	5.9	4.9	6.1	7.1	6.28	6.7	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	4.9	3.9	-	6.1	5.28	-	-	-	-	-	-	-
Critical Hdwy Stg 2	4.9	3.9	-	6.1	5.28	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4.09	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	794	726	1032	733	645	1028	1524	-	-	1526	-	-
Stage 1	922	842	-	874	780	-	-	-	-	-	-	-
Stage 2	943	836	-	919	785	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	750	702	1030	669	624	1028	1524	-	-	1526	-	-
Mov Cap-2 Maneuver	750	702	-	669	624	-	-	-	-	-	-	-
Stage 1	904	830	-	857	765	-	-	-	-	-	-	-
Stage 2	895	820	-	847	774	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.4	10.1	1.8	1.5
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1524	-	-	890	748	1526	-	-
HCM Lane V/C Ratio	0.018	-	-	0.078	0.061	0.014	-	-
HCM Control Delay (s)	7.4	0	-	9.4	10.1	7.4	0	-
HCM Lane LOS	A	A	-	A	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.3	0.2	0	-	-

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↰	↗		↕	
Traffic Vol, veh/h	1	76	75	14	106	1	73	1	12	1	1	1
Future Vol, veh/h	1	76	75	14	106	1	73	1	12	1	1	1
Conflicting Peds, #/hr	4	0	1	1	0	4	0	0	2	2	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	1	-	-	2	-	-	-5	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	0	1	11	7	1	0	0	0	0	0	0	0
Mvmt Flow	1	89	88	16	125	1	86	1	14	1	1	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	130	0	0	178	0	0	295	298	136	307	342	130
Stage 1	-	-	-	-	-	-	136	136	-	162	162	-
Stage 2	-	-	-	-	-	-	159	162	-	145	180	-
Critical Hdwy	4.1	-	-	4.17	-	-	7.5	6.9	6.4	6.1	5.5	5.7
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.9	-	5.1	4.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.9	-	5.1	4.5	-
Follow-up Hdwy	2.2	-	-	2.263	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1468	-	-	1368	-	-	640	597	911	707	642	942
Stage 1	-	-	-	-	-	-	859	776	-	884	803	-
Stage 2	-	-	-	-	-	-	833	754	-	898	793	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1463	-	-	1367	-	-	631	586	909	684	630	939
Mov Cap-2 Maneuver	-	-	-	-	-	-	631	586	-	684	630	-
Stage 1	-	-	-	-	-	-	857	774	-	880	790	-
Stage 2	-	-	-	-	-	-	820	742	-	880	791	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.9	11.2	10
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	630	909	1463	-	-	1367	-	-	729
HCM Lane V/C Ratio	0.138	0.016	0.001	-	-	0.012	-	-	0.005
HCM Control Delay (s)	11.6	9	7.5	0	-	7.7	0	-	10
HCM Lane LOS	B	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.5	0	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	4.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	83	104	136	44	47	67
Future Vol, veh/h	83	104	136	44	47	67
Conflicting Peds, #/hr	1	0	0	1	0	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	-3	1	-	-5	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	6	1	1	0	17	0
Mvmt Flow	98	122	160	52	55	79

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	213	0	-	0	505	189
Stage 1	-	-	-	-	187	-
Stage 2	-	-	-	-	318	-
Critical Hdwy	4.16	-	-	-	5.57	5.7
Critical Hdwy Stg 1	-	-	-	-	4.57	-
Critical Hdwy Stg 2	-	-	-	-	4.57	-
Follow-up Hdwy	2.254	-	-	-	3.653	3.3
Pot Cap-1 Maneuver	1334	-	-	-	577	881
Stage 1	-	-	-	-	853	-
Stage 2	-	-	-	-	770	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1333	-	-	-	530	879
Mov Cap-2 Maneuver	-	-	-	-	530	-
Stage 1	-	-	-	-	785	-
Stage 2	-	-	-	-	769	-

Approach	EB	WB	SB
HCM Control Delay, s	3.5	0	11.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1333	-	-	-	691
HCM Lane V/C Ratio	0.073	-	-	-	0.194
HCM Control Delay (s)	7.9	-	-	-	11.5
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.7

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	38	156	152	51	31	19
Future Vol, veh/h	38	156	152	51	31	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	75	-	-	-	0	50
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	-5	3	-	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	4	1	0	0	0
Mvmt Flow	45	184	179	60	36	22

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	239	0	-	0	483	209
Stage 1	-	-	-	-	209	-
Stage 2	-	-	-	-	274	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1340	-	-	-	546	836
Stage 1	-	-	-	-	831	-
Stage 2	-	-	-	-	777	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1340	-	-	-	527	836
Mov Cap-2 Maneuver	-	-	-	-	527	-
Stage 1	-	-	-	-	803	-
Stage 2	-	-	-	-	777	-

Approach	EB	WB	SB
HCM Control Delay, s	1.5	0	11.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1340	-	-	-	527	836
HCM Lane V/C Ratio	0.033	-	-	-	0.069	0.027
HCM Control Delay (s)	7.8	-	-	-	12.3	9.4
HCM Lane LOS	A	-	-	-	B	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2	0.1

Intersection	
Int Delay, s/veh	4.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	1	1	64	1	106	1	407	98	95	355	1
Future Vol, veh/h	1	1	1	64	1	106	1	407	98	95	355	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	100	-	0	90	-	130	225	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-2	-	-	4	-	-	2	-	-	3	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	0	0	0	0	0	1	0	6	1	5	5	0
Mvmt Flow	1	1	1	75	1	125	1	479	115	112	418	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	885	1239	210	915	1124	240	419	0	0	594	0	0
Stage 1	643	643	-	481	481	-	-	-	-	-	-	-
Stage 2	242	596	-	434	643	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.1	6.7	8.3	7.3	7.32	4.1	-	-	4.2	-	-
Critical Hdwy Stg 1	6.1	5.1	-	7.3	6.3	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.1	-	7.3	6.3	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.31	2.2	-	-	2.25	-	-
Pot Cap-1 Maneuver	268	203	811	188	161	744	1151	-	-	958	-	-
Stage 1	465	506	-	486	501	-	-	-	-	-	-	-
Stage 2	766	529	-	523	409	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	202	179	811	170	142	744	1151	-	-	958	-	-
Mov Cap-2 Maneuver	202	179	-	170	142	-	-	-	-	-	-	-
Stage 1	465	447	-	486	500	-	-	-	-	-	-	-
Stage 2	636	528	-	460	361	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	19.3	23	0	1.9
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1151	-	-	255	169	744	958	-	-
HCM Lane V/C Ratio	0.001	-	-	0.014	0.452	0.168	0.117	-	-
HCM Control Delay (s)	8.1	-	-	19.3	42.8	10.8	9.3	-	-
HCM Lane LOS	A	-	-	C	E	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	2.1	0.6	0.4	-	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	1	3	5	1	18	13	488	10	15	401	3
Future Vol, veh/h	1	1	3	5	1	18	13	488	10	15	401	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	150	-	135	110	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	5	-	-	3	-	-	4	-	-	-2	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	0	0	0	0	0	6	0	5	0	0	4	0
Mvmt Flow	1	1	4	6	1	21	15	574	12	18	472	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	828	1126	238	877	1116	287	476	0	0	586	0	0
Stage 1	510	510	-	604	604	-	-	-	-	-	-	-
Stage 2	318	616	-	273	512	-	-	-	-	-	-	-
Critical Hdwy	8.5	7.5	7.4	8.1	7.1	7.32	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	7.5	6.5	-	7.1	6.1	-	-	-	-	-	-	-
Critical Hdwy Stg 2	7.5	6.5	-	7.1	6.1	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.36	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	212	151	744	212	174	681	1097	-	-	999	-	-
Stage 1	451	469	-	413	444	-	-	-	-	-	-	-
Stage 2	616	409	-	684	496	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	199	146	744	205	168	681	1097	-	-	999	-	-
Mov Cap-2 Maneuver	199	146	-	205	168	-	-	-	-	-	-	-
Stage 1	445	461	-	407	438	-	-	-	-	-	-	-
Stage 2	587	403	-	667	487	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	16.7	13.8	0.2	0.3
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1097	-	-	314	205	587	999	-	-
HCM Lane V/C Ratio	0.014	-	-	0.019	0.029	0.038	0.018	-	-
HCM Control Delay (s)	8.3	-	-	16.7	23.1	11.4	8.7	-	-
HCM Lane LOS	A	-	-	C	C	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0.1	0.1	-	-

Intersection	
Int Delay, s/veh	8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	119	17	71	2	3	3	111	389	31	7	352	50
Future Vol, veh/h	119	17	71	2	3	3	111	389	31	7	352	50
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	None	-	-	None	-	-	None
Storage Length	100	-	230	0	-	-	160	-	175	160	-	125
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	3	-	-	-3	-
Peak Hour Factor	85	85	85	85	85	85	85	85	85	85	85	85
Heavy Vehicles, %	2	0	3	0	0	33	1	5	0	0	3	8
Mvmt Flow	140	20	84	2	4	4	131	458	36	8	414	59

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	923	1186	207	953	1209	229	473	0	0	494	0	0
Stage 1	430	430	-	720	720	-	-	-	-	-	-	-
Stage 2	493	756	-	233	489	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.5	6.96	7.5	6.5	7.56	4.12	-	-	4.1	-	-
Critical Hdwy Stg 1	6.54	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4	3.33	3.5	4	3.63	2.21	-	-	2.2	-	-
Pot Cap-1 Maneuver	225	190	796	217	184	687	1092	-	-	1080	-	-
Stage 1	574	587	-	390	435	-	-	-	-	-	-	-
Stage 2	526	419	-	755	553	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	199	166	796	159	161	687	1092	-	-	1080	-	-
Mov Cap-2 Maneuver	199	166	-	159	161	-	-	-	-	-	-	-
Stage 1	505	583	-	343	383	-	-	-	-	-	-	-
Stage 2	456	369	-	648	549	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	38.8	21.4	1.8	0.1
HCM LOS	E	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1092	-	-	199	166	796	159	261	1080	-	-
HCM Lane V/C Ratio	0.12	-	-	0.704	0.12	0.105	0.015	0.027	0.008	-	-
HCM Control Delay (s)	8.7	-	-	57.3	29.6	10.1	28	19.2	8.4	-	-
HCM Lane LOS	A	-	-	F	D	B	D	C	A	-	-
HCM 95th %tile Q(veh)	0.4	-	-	4.4	0.4	0.3	0	0.1	0	-	-

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	275	869	68	1119	110	119	99	70	161	166	402
v/c Ratio	0.74	0.54	0.51	0.77	0.12	0.67	0.54	0.19	0.55	0.55	0.70
Control Delay	76.6	31.9	101.5	23.6	3.3	83.1	74.3	3.8	64.7	64.4	40.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	76.6	31.9	101.5	23.6	3.3	83.1	74.3	3.8	64.7	64.4	40.0
Queue Length 50th (ft)	140	356	58	582	38	119	97	0	152	156	257
Queue Length 95th (ft)	193	428	m119	192	m15	188	160	17	251	257	417
Internal Link Dist (ft)		1315		334			509			538	
Turn Bay Length (ft)	250		130		200	250		125	215		
Base Capacity (vph)	412	1607	218	1486	922	222	232	465	301	311	581
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.54	0.31	0.75	0.12	0.54	0.43	0.15	0.53	0.53	0.69

Intersection Summary

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

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	2	262	794	40	10	56	1074	106	114	95	67	231
Future Volume (vph)	2	262	794	40	10	56	1074	106	114	95	67	231
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)			0%				-1%			2%		
Total Lost time (s)		7.8	5.2			6.9	5.8	9.4	8.3	8.3	6.9	9.4
Lane Util. Factor		0.97	0.95			1.00	0.95	1.00	1.00	1.00	1.00	0.95
Frpb, ped/bikes		1.00	1.00			1.00	1.00	0.99	1.00	1.00	0.98	1.00
Flpb, ped/bikes		1.00	1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		1.00	0.99			1.00	1.00	0.85	1.00	1.00	0.85	1.00
Flt Protected		0.95	1.00			0.95	1.00	1.00	0.95	1.00	1.00	0.95
Satd. Flow (prot)		3400	3512			1814	3557	1570	1787	1862	1563	1715
Flt Permitted		0.95	1.00			0.95	1.00	1.00	0.95	1.00	1.00	0.95
Satd. Flow (perm)		3400	3512			1814	3557	1570	1787	1862	1563	1715
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	2	273	827	42	10	58	1119	110	119	99	70	241
RTOR Reduction (vph)	0	0	2	0	0	0	0	37	0	0	58	0
Lane Group Flow (vph)	0	275	867	0	0	68	1119	73	119	99	12	161
Confl. Peds. (#/hr)				3				5	2		6	6
Heavy Vehicles (%)	0%	3%	2%	0%	0%	0%	2%	2%	0%	1%	0%	1%
Turn Type	Prot	Prot	NA		Prot	Prot	NA	pm+ov	Split	NA	custom	Split
Protected Phases	5	5	2		1	1	6	4	3	3		4
Permitted Phases								6			1 3	
Actuated Green, G (s)		16.5	68.6			11.1	61.7	87.3	14.9	14.9	26.0	25.6
Effective Green, g (s)		16.5	68.6			11.1	61.7	87.3	14.9	14.9	26.0	25.6
Actuated g/C Ratio		0.11	0.46			0.07	0.41	0.58	0.10	0.10	0.17	0.17
Clearance Time (s)		7.8	5.2			6.9	5.8	9.4	8.3	8.3		9.4
Vehicle Extension (s)		3.0	3.0			3.0	3.0	3.0	3.0	3.0		3.0
Lane Grp Cap (vph)		374	1606			134	1463	913	177	184	270	292
v/s Ratio Prot		0.08	c0.25			0.04	c0.31	0.01	c0.07	0.05		0.09
v/s Ratio Perm								0.03			0.01	
v/c Ratio		0.74	0.54			0.51	0.76	0.08	0.67	0.54	0.04	0.55
Uniform Delay, d1		64.6	29.3			66.8	37.9	13.7	65.2	64.3	51.7	56.9
Progression Factor		1.00	1.00			1.36	0.51	1.22	1.00	1.00	1.00	1.00
Incremental Delay, d2		7.3	1.3			2.6	3.3	0.0	9.6	3.0	0.1	2.2
Delay (s)		72.0	30.6			93.8	22.7	16.8	74.8	67.3	51.7	59.2
Level of Service		E	C			F	C	B	E	E	D	E
Approach Delay (s)			40.6				25.9			66.6		
Approach LOS			D				C			E		

Intersection Summary			
HCM 2000 Control Delay	39.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	31.3
Intersection Capacity Utilization	98.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	83	386
Future Volume (vph)	83	386
Ideal Flow (vphpl)	1900	1900
Grade (%)	-2%	
Total Lost time (s)	9.4	9.4
Lane Util. Factor	0.95	1.00
Frpb, ped/bikes	1.00	0.99
Flpb, ped/bikes	1.00	1.00
Frt	1.00	0.85
Flt Protected	0.98	1.00
Satd. Flow (prot)	1772	1545
Flt Permitted	0.98	1.00
Satd. Flow (perm)	1772	1545
Peak-hour factor, PHF	0.96	0.96
Adj. Flow (vph)	86	402
RTOR Reduction (vph)	0	60
Lane Group Flow (vph)	166	342
Confl. Peds. (#/hr)		2
Heavy Vehicles (%)	0%	4%
Turn Type	NA	custom
Protected Phases	4	
Permitted Phases		4 5
Actuated Green, G (s)	25.6	51.5
Effective Green, g (s)	25.6	51.5
Actuated g/C Ratio	0.17	0.34
Clearance Time (s)	9.4	
Vehicle Extension (s)	3.0	
Lane Grp Cap (vph)	302	530
v/s Ratio Prot	0.09	
v/s Ratio Perm		c0.22
v/c Ratio	0.55	0.64
Uniform Delay, d1	56.9	41.5
Progression Factor	1.00	1.00
Incremental Delay, d2	2.0	2.7
Delay (s)	59.0	44.2
Level of Service	E	D
Approach Delay (s)	50.9	
Approach LOS	D	

Intersection Summary

HCM 6th Edition methodology expects strict NEMA phasing.

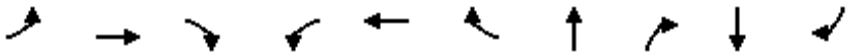
Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱		↑↑	↱			↱			↱
Traffic Vol, veh/h	0	1019	83	0	1167	102	0	0	25	0	0	79
Future Vol, veh/h	0	1019	83	0	1167	102	0	0	25	0	0	79
Conflicting Peds, #/hr	0	0	0	0	0	4	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	110	-	-	300	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	1	-	-	3	-	-	3	-	-	-11	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	2	0	0	2	0	0	0	4	0	0	0
Mvmt Flow	0	1096	89	0	1255	110	0	0	27	0	0	85

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	-	-	0	-	-	548	-	-	632
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	-	-	-	7.28	-	-	5.8
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	-	-	-	3.34	-	-	3.3
Pot Cap-1 Maneuver	0	-	-	0	-	-	0	0	454	0	0	519
Stage 1	0	-	-	0	-	-	0	0	-	0	0	-
Stage 2	0	-	-	0	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	-	-	-	-	-	-	-	-	454	-	-	517
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	13.4	13.3
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT	WBR	SBLn1
Capacity (veh/h)	454	-	-	-	-	517
HCM Lane V/C Ratio	0.059	-	-	-	-	0.164
HCM Control Delay (s)	13.4	-	-	-	-	13.3
HCM Lane LOS	B	-	-	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	-	0.6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	147	949	2	68	1160	88	36	79	165	148
v/c Ratio	0.72	0.44	0.00	0.54	0.63	0.10	0.31	0.30	0.76	0.44
Control Delay	87.4	12.5	0.0	82.0	28.6	0.2	72.2	3.0	85.8	10.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	87.4	12.5	0.0	82.0	28.6	0.2	72.2	3.0	85.8	10.0
Queue Length 50th (ft)	157	212	0	68	427	0	36	0	164	0
Queue Length 95th (ft)	225	226	m0	123	610	0	73	0	249	53
Internal Link Dist (ft)		457			1504		131		565	
Turn Bay Length (ft)	240		330	150		150		60		
Base Capacity (vph)	260	2159	993	157	1853	907	202	327	250	363
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.57	0.44	0.00	0.43	0.63	0.10	0.18	0.24	0.66	0.41

Intersection Summary

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

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	9	131	902	2	65	1102	84	17	17	75	139	18
Future Volume (vph)	9	131	902	2	65	1102	84	17	17	75	139	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)			-4%			2%			0%			-1%
Total Lost time (s)		6.4	5.7	5.7	6.8	5.6	5.6		6.6	6.6		7.5
Lane Util. Factor		1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00
Frpb, ped/bikes		1.00	1.00	0.97	1.00	1.00	0.98		1.00	1.00		1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00
Frt		1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.98	1.00		0.96
Satd. Flow (prot)		1807	3682	1602	1787	3504	1558		1854	1615		1813
Flt Permitted		0.95	1.00	1.00	0.95	1.00	1.00		0.98	1.00		0.96
Satd. Flow (perm)		1807	3682	1602	1787	3504	1558		1854	1615		1813
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	9	138	949	2	68	1160	88	18	18	79	146	19
RTOR Reduction (vph)	0	0	0	1	0	0	41	0	0	74	0	0
Lane Group Flow (vph)	0	147	949	1	68	1160	47	0	36	5	0	165
Confl. Peds. (#/hr)				2			2					
Heavy Vehicles (%)	0%	2%	0%	0%	0%	2%	1%	0%	0%	0%	1%	0%
Turn Type	Prot	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Perm	Split	NA
Protected Phases	1	1	6		5	2		4	4		3	3
Permitted Phases				6			2			4		
Actuated Green, G (s)		17.1	86.7	86.7	9.3	79.4	79.4		9.5	9.5		17.9
Effective Green, g (s)		17.1	86.7	86.7	9.3	79.4	79.4		9.5	9.5		17.9
Actuated g/C Ratio		0.11	0.58	0.58	0.06	0.53	0.53		0.06	0.06		0.12
Clearance Time (s)		6.4	5.7	5.7	6.8	5.6	5.6		6.6	6.6		7.5
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0
Lane Grp Cap (vph)		205	2128	925	110	1854	824		117	102		216
v/s Ratio Prot		c0.08	0.26		0.04	c0.33			c0.02			c0.09
v/s Ratio Perm				0.00			0.03			0.00		
v/c Ratio		0.72	0.45	0.00	0.62	0.63	0.06		0.31	0.05		0.76
Uniform Delay, d1		64.1	18.0	13.4	68.6	24.8	17.1		67.1	66.0		64.0
Progression Factor		1.10	0.61	1.00	1.00	1.00	1.00		1.00	1.00		1.00
Incremental Delay, d2		10.2	0.6	0.0	9.9	1.6	0.1		1.5	0.2		14.8
Delay (s)		80.8	11.6	13.4	78.5	26.4	17.3		68.6	66.2		78.8
Level of Service		F	B	B	E	C	B		E	E		E
Approach Delay (s)			20.9			28.5			67.0			69.4
Approach LOS			C			C			E			E

Intersection Summary			
HCM 2000 Control Delay	31.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	26.6
Intersection Capacity Utilization	73.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	141
Future Volume (vph)	141
Ideal Flow (vphpl)	1900
Grade (%)	
Total Lost time (s)	7.5
Lane Util. Factor	1.00
Frpb, ped/bikes	1.00
Flpb, ped/bikes	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1607
Flt Permitted	1.00
Satd. Flow (perm)	1607
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	148
RTOR Reduction (vph)	130
Lane Group Flow (vph)	18
Confl. Peds. (#/hr)	
Heavy Vehicles (%)	1%
Turn Type	Perm
Protected Phases	
Permitted Phases	3
Actuated Green, G (s)	17.9
Effective Green, g (s)	17.9
Actuated g/C Ratio	0.12
Clearance Time (s)	7.5
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	191
v/s Ratio Prot	
v/s Ratio Perm	0.01
v/c Ratio	0.09
Uniform Delay, d1	58.8
Progression Factor	1.00
Incremental Delay, d2	0.2
Delay (s)	59.0
Level of Service	E
Approach Delay (s)	
Approach LOS	

Intersection Summary

HCM 6th Edition methodology expects strict NEMA phasing.

Intersection	
Int Delay, s/veh	8.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	17	77	116	45	50	41	94	43	12	48	39	32
Future Vol, veh/h	17	77	116	45	50	41	94	43	12	48	39	32
Conflicting Peds, #/hr	0	0	14	14	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-8	-	-	-2	-	-	1	-	-	-1	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	0	0	2	0	2	5	0	2	0	0	3	0
Mvmt Flow	18	80	121	47	52	43	98	45	13	50	41	33

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	403	412	51	423	422	29	74	0	0	58	0	0
Stage 1	158	158	-	248	248	-	-	-	-	-	-	-
Stage 2	245	254	-	175	174	-	-	-	-	-	-	-
Critical Hdwy	5.9	4.9	6.14	7.1	6.14	6.8	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	4.9	3.9	-	6.1	5.14	-	-	-	-	-	-	-
Critical Hdwy Stg 2	4.9	3.9	-	6.1	5.14	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.32	3.5	4.02	3.35	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	642	640	1018	545	547	1031	1538	-	-	1559	-	-
Stage 1	895	827	-	760	720	-	-	-	-	-	-	-
Stage 2	828	784	-	832	769	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	524	577	1006	392	493	1031	1538	-	-	1559	-	-
Mov Cap-2 Maneuver	524	577	-	392	493	-	-	-	-	-	-	-
Stage 1	836	799	-	710	672	-	-	-	-	-	-	-
Stage 2	684	732	-	629	743	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.8	14.2	4.7	3
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1538	-	-	747	531	1559	-	-
HCM Lane V/C Ratio	0.064	-	-	0.293	0.267	0.032	-	-
HCM Control Delay (s)	7.5	0	-	11.8	14.2	7.4	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	1.2	1.1	0.1	-	-

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↰	↱		↕	
Traffic Vol, veh/h	3	106	86	28	112	2	62	2	37	1	5	1
Future Vol, veh/h	3	106	86	28	112	2	62	2	37	1	5	1
Conflicting Peds, #/hr	4	0	0	0	0	4	0	0	2	2	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	1	-	-	2	-	-	-5	-
Peak Hour Factor	89	89	89	89	89	89	89	89	89	89	89	89
Heavy Vehicles, %	0	3	0	4	1	0	3	0	3	0	0	0
Mvmt Flow	3	119	97	31	126	2	70	2	42	1	6	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	132	0	0	216	0	0	367	368	170	391	415	131
Stage 1	-	-	-	-	-	-	174	174	-	193	193	-
Stage 2	-	-	-	-	-	-	193	194	-	198	222	-
Critical Hdwy	4.1	-	-	4.14	-	-	7.53	6.9	6.43	6.1	5.5	5.7
Critical Hdwy Stg 1	-	-	-	-	-	-	6.53	5.9	-	5.1	4.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.53	5.9	-	5.1	4.5	-
Follow-up Hdwy	2.2	-	-	2.236	-	-	3.527	4	3.327	3.5	4	3.3
Pot Cap-1 Maneuver	1466	-	-	1342	-	-	564	542	863	637	596	941
Stage 1	-	-	-	-	-	-	810	744	-	858	786	-
Stage 2	-	-	-	-	-	-	789	728	-	854	769	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1461	-	-	1342	-	-	548	526	862	589	578	938
Mov Cap-2 Maneuver	-	-	-	-	-	-	548	526	-	589	578	-
Stage 1	-	-	-	-	-	-	808	743	-	854	764	-
Stage 2	-	-	-	-	-	-	763	708	-	807	767	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	1.5	11.4	10.9
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	547	862	1461	-	-	1342	-	-	613
HCM Lane V/C Ratio	0.131	0.048	0.002	-	-	0.023	-	-	0.013
HCM Control Delay (s)	12.6	9.4	7.5	0	-	7.7	0	-	10.9
HCM Lane LOS	B	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.5	0.2	0	-	-	0.1	-	-	0

Intersection	
Int Delay, s/veh	3.6

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	42	128	160	14	67	52
Future Vol, veh/h	42	128	160	14	67	52
Conflicting Peds, #/hr	1	0	0	1	2	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	-3	1	-	-5	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	2	2	2	0	0	2
Mvmt Flow	49	151	188	16	79	61

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	205	0	-	0	448	197
Stage 1	-	-	-	-	197	-
Stage 2	-	-	-	-	251	-
Critical Hdwy	4.12	-	-	-	5.4	5.72
Critical Hdwy Stg 1	-	-	-	-	4.4	-
Critical Hdwy Stg 2	-	-	-	-	4.4	-
Follow-up Hdwy	2.218	-	-	-	3.5	3.318
Pot Cap-1 Maneuver	1366	-	-	-	648	868
Stage 1	-	-	-	-	888	-
Stage 2	-	-	-	-	853	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1365	-	-	-	621	867
Mov Cap-2 Maneuver	-	-	-	-	621	-
Stage 1	-	-	-	-	852	-
Stage 2	-	-	-	-	852	-

Approach	EB	WB	SB
HCM Control Delay, s	1.9	0	11.3
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1365	-	-	-	709
HCM Lane V/C Ratio	0.036	-	-	-	0.197
HCM Control Delay (s)	7.7	-	-	-	11.3
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.7

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	159	210	2	11	27
Future Vol, veh/h	5	159	210	2	11	27
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	75	-	-	-	0	50
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	-5	3	-	0	-
Peak Hour Factor	85	85	85	85	85	85
Heavy Vehicles, %	0	3	2	0	0	0
Mvmt Flow	6	187	247	2	13	32

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	250	0	-	0	448	249
Stage 1	-	-	-	-	249	-
Stage 2	-	-	-	-	199	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1327	-	-	-	572	795
Stage 1	-	-	-	-	797	-
Stage 2	-	-	-	-	839	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1326	-	-	-	568	794
Mov Cap-2 Maneuver	-	-	-	-	568	-
Stage 1	-	-	-	-	792	-
Stage 2	-	-	-	-	838	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	10.2
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1326	-	-	-	568	794
HCM Lane V/C Ratio	0.004	-	-	-	0.023	0.04
HCM Control Delay (s)	7.7	-	-	-	11.5	9.7
HCM Lane LOS	A	-	-	-	B	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1	0.1

Intersection	
Int Delay, s/veh	5.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	1	4	98	1	139	2	370	77	86	501	2
Future Vol, veh/h	2	1	4	98	1	139	2	370	77	86	501	2
Conflicting Peds, #/hr	0	0	0	0	0	0	4	0	1	1	0	4
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	100	-	0	90	-	130	225	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-2	-	-	4	-	-	2	-	-	3	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	1	0	2	0	3	4	1	4	0
Mvmt Flow	2	1	4	109	1	154	2	411	86	96	557	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	964	1256	284	887	1171	207	563	0	0	498	0	0
Stage 1	754	754	-	416	416	-	-	-	-	-	-	-
Stage 2	210	502	-	471	755	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.1	6.7	8.32	7.3	7.34	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.1	-	7.32	6.3	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.1	-	7.32	6.3	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.51	4	3.32	2.2	-	-	2.21	-	-
Pot Cap-1 Maneuver	237	199	730	197	150	781	1019	-	-	1069	-	-
Stage 1	404	457	-	535	543	-	-	-	-	-	-	-
Stage 2	797	577	-	491	355	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	175	180	728	181	136	780	1016	-	-	1068	-	-
Mov Cap-2 Maneuver	175	180	-	181	136	-	-	-	-	-	-	-
Stage 1	402	414	-	533	541	-	-	-	-	-	-	-
Stage 2	637	575	-	443	322	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	16.9	28	0	1.3
HCM LOS	C	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1016	-	-	311	180	780	1068	-	-
HCM Lane V/C Ratio	0.002	-	-	0.025	0.611	0.198	0.089	-	-
HCM Control Delay (s)	8.6	-	-	16.9	52.2	10.8	8.7	-	-
HCM Lane LOS	A	-	-	C	F	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	3.4	0.7	0.3	-	-

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	1	17	33	1	38	15	401	15	41	556	6
Future Vol, veh/h	10	1	17	33	1	38	15	401	15	41	556	6
Conflicting Peds, #/hr	0	0	0	0	0	0	5	0	0	0	0	5
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	150	-	135	110	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	5	-	-	3	-	-	4	-	-	-2	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	0	0	0	0	0	5	0	3	0	0	3	0
Mvmt Flow	11	1	19	37	1	42	17	446	17	46	618	7

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	977	1216	318	882	1202	223	630	0	0	463	0	0
Stage 1	719	719	-	480	480	-	-	-	-	-	-	-
Stage 2	258	497	-	402	722	-	-	-	-	-	-	-
Critical Hdwy	8.5	7.5	7.4	8.1	7.1	7.3	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	7.5	6.5	-	7.1	6.1	-	-	-	-	-	-	-
Critical Hdwy Stg 2	7.5	6.5	-	7.1	6.1	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.35	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	159	130	654	211	152	757	962	-	-	1109	-	-
Stage 1	320	357	-	499	515	-	-	-	-	-	-	-
Stage 2	679	477	-	562	385	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	142	122	651	194	143	757	958	-	-	1109	-	-
Mov Cap-2 Maneuver	142	122	-	194	143	-	-	-	-	-	-	-
Stage 1	313	341	-	490	506	-	-	-	-	-	-	-
Stage 2	628	468	-	521	368	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	20.3	18.5	0.3	0.6
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	958	-	-	267	194	682	1109	-	-
HCM Lane V/C Ratio	0.017	-	-	0.117	0.189	0.064	0.041	-	-
HCM Control Delay (s)	8.8	-	-	20.3	27.8	10.6	8.4	-	-
HCM Lane LOS	A	-	-	C	D	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.4	0.7	0.2	0.1	-	-

Intersection	
Int Delay, s/veh	8.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	96	61	164	43	27	25	76	310	77	7	493	106
Future Vol, veh/h	96	61	164	43	27	25	76	310	77	7	493	106
Conflicting Peds, #/hr	6	0	0	0	0	6	0	0	3	3	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	None	-	-	None	-	-	None
Storage Length	100	-	230	0	-	-	160	-	175	160	-	125
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	3	-	-	-3	-
Peak Hour Factor	91	91	91	91	91	91	91	91	91	91	91	91
Heavy Vehicles, %	2	0	1	0	0	0	1	3	0	0	4	1
Mvmt Flow	105	67	180	47	30	27	84	341	85	8	542	116

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	918	1155	271	833	1186	180	658	0	0	429	0	0
Stage 1	558	558	-	512	512	-	-	-	-	-	-	-
Stage 2	360	597	-	321	674	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.5	6.92	7.5	6.5	6.9	4.12	-	-	4.1	-	-
Critical Hdwy Stg 1	6.54	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4	3.31	3.5	4	3.3	2.21	-	-	2.2	-	-
Pot Cap-1 Maneuver	227	199	730	265	190	838	932	-	-	1141	-	-
Stage 1	482	515	-	518	540	-	-	-	-	-	-	-
Stage 2	631	495	-	671	457	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	176	179	730	131	171	832	932	-	-	1138	-	-
Mov Cap-2 Maneuver	176	179	-	131	171	-	-	-	-	-	-	-
Stage 1	439	511	-	470	490	-	-	-	-	-	-	-
Stage 2	519	449	-	436	454	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	28.4	33	1.5	0.1
HCM LOS	D	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	932	-	-	176	179	730	131	277	1138	-	-
HCM Lane V/C Ratio	0.09	-	-	0.599	0.374	0.247	0.361	0.206	0.007	-	-
HCM Control Delay (s)	9.2	-	-	52.1	36.7	11.5	47.2	21.3	8.2	-	-
HCM Lane LOS	A	-	-	F	E	B	E	C	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	3.3	1.6	1	1.5	0.8	0	-	-

G. Background Development and Roadway Improvement Excerpts

TOWN OF WARRENTON
CAPITAL IMPROVEMENT PROGRAM

2023 - 2028

Adopted June 16, 2022

TABLE OF CONTENTS

Mission Statement

In Cooperation With, And For Our Citizens...

...The Mayor, Town Council and the Staff of Warrenton are dedicated to providing public safety, economic opportunity, and quality public services in an attractive, well-planned community with historic character for the benefit, enjoyment and accessibility of all.

Affirmed by Town Council
August 28, 2018

Vision and Value Statement

To Achieve Our Mission, We Strive To...

...

Provide high level services in a cost-effective manner; display honesty, respectfulness, and fairness in all relationships; support the health and economic well-being of our citizens and businesses; preserve our historic small-town character; encourage opportunities, services and infrastructure that allow people of all means to live, work and visit here; and address public concerns and opportunities promptly and effectively.

We recognize our Mission can be achieved only by the exchange of information and that through teamwork we can maintain an environment in which we can maximize our potential.

Affirmed by Town Council August 28, 2018

INTRODUCTION

The Capital Improvement Program (CIP) provides for an orderly implementation of short and long-range plans for construction of Capital Improvement Projects and Land Acquisition. It further provides for the scheduling of the associated expenditures over a period of many years. The first year of the program represents the proposed Capital Budget for the Fiscal Year. In addition, consideration is given to the project's relations to other improvements and plans, and the Town's current and anticipated financial capabilities. The CIP is updated annually, at which time the schedule and the projects reevaluated, new or deferred projects are added, and the time frame is extended by one additional fiscal year.

The Town of Warrenton continues to enhance the structure of the budget and provide a greater understanding of funding commitments. Projects are presented under topical categories to help the community understand the investments that are being proposed and the tie in to priorities of the Town. Next, a Capital Asset Replacement Program (CARP) includes projects that cover standard operating and maintenance items. Unlike items listed in the capital project and acquisition program, these are items necessary for the ongoing operations of the Town and its facilities. Finally, the Town created dedicated Utilities and Stormwater Funds. These modifications to the CIP help move it towards a clearer document that works in conjunction with the budget and stated needs of the community.

POLICY

The following policies guide the development of the CIP:

1. The CIP should be realistic relative to the projected source of revenue.
2. A reserve fund should be established, as required, to reduce the fiscal impact of major projects in a single year.
3. Projects undertaken in the Enterprise Fund and Stormwater Fund are to be considered separate from the general Fund.

BENEFITS

A carefully planned CIP will enable the Town to realize several benefits:

1. Major improvements can be anticipated in advance, rather than addressed at the time the need arises.
2. The implementation strategy of the Comprehensive Plan is used as a guide for future needs and investments.
3. The Town Council and Planning Commission are better able to evaluate the needs of the entire community, instead of special projects.
4. Projects can be scheduled when revenue is available and when the community's anticipated ability to finance is determined.
5. Capital programming improves the Town's ability to vitalize state and federal aid. Applications can be timed to fit the development schedule.

DEFINING CAPITAL IMPROVEMENT PROJECTS

A capital improvement is defined as a major expenditure, beyond maintenance and operating costs, for the acquisition or construction of a needed facility. Salaries, supplies and other overhead expenditures are considered maintenance and operating costs, not provided for the CIP. Capital improvements include such things as utility systems, public buildings, land acquisitions, streets and sidewalks. The improvements are items that will have a significant impact on the community and are too expensive to be financed in the annual operating budget. Cost and frequency are two criteria that will be used to distinguish between a capital expenditure and a capital asset.

1. COST - A capital improvement project shall be $10,000 or more.
2. FREQUENCY - Capital improvement projects should be non-recurring. An interval of three years between expenditures is recommended.

DEFINING CAPITAL ASSET REPLACEMENT PROGRAM (CARP)

Capital assets, which include property, plant, equipment, and infrastructure assets, are assets with an individual cost of more than $5,000 and a useful life of more than one year. Infrastructure assets capitalized have an original cost of $25,000 or more. Such assets are recorded at historical cost or estimated historical cost if purchased or constructed. Donated capital assets are recorded at acquisition value at the date of donation. The costs of normal maintenance and repairs that do not add to the value of the asset or materially extend asset lives are not capitalized.

* *Development of planning and regulatory documents are typically captured in a budget's operating expense; however, Warrenton recognizes these types of documents here as they do not occur annually and can have a substantial impact on the budget.*

CATEGORIES

Starting the FY22, CIP projects are being classified around stated priorities of the Town. Projects are numbered under specific topical areas. The CIP further states how projects meet the Comprehensive Plan goals and objectives within the individual project sheets. Below is a general description of the categories.

The CIP programs are coded using the following information:

Economic Development and Tourism (E) – Economic development and tourism projects position Warrenton to leverage and promote the location of jobs, revenue-generating businesses, and attracting tourism through complementary place-based economic development that encourages local economic growth.

General Government (G) – General government projects relate to ensuring the efficiency and needs to run a government that meets the needs of its citizens in a responsive, safe, and transparent fashion.

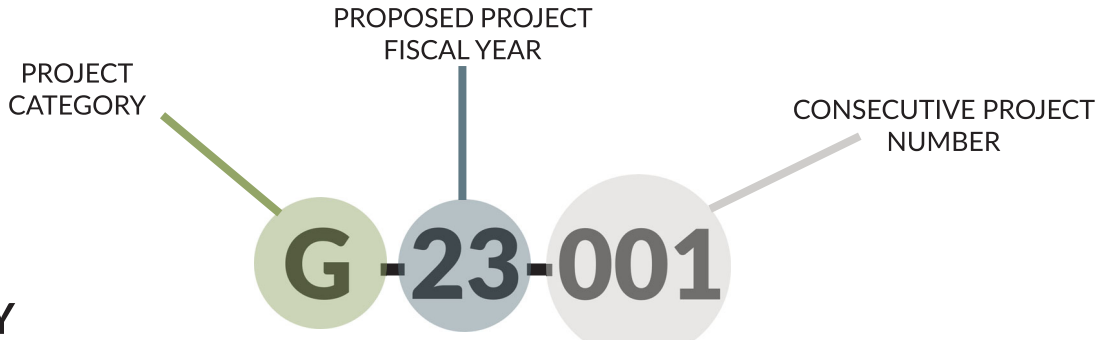
Public Safety (P) - Public safety projects relate to the Town of Warrenton's Police Department and Warrenton Volunteer Fire Company needs to ensure the ongoing safety and security of the community.

Recreation and Quality of Life (R) – Recreation and quality of life projects are recognized as opportunities for additional cultural, arts, and recreational activities in the Town. These type of investments are an important factor for long term economic sustainability.

Transportation and Walkability (T) – Transportation and walkability projects provide for improved multimodal safety by enacting access management strategies, incorporating pedestrian and bike friendly strategies, and deconflicting through-travel and local traffic movements.

Utilities and Stormwater (U) – Utilities and stormwater projects locate, maintain, and build community facilities to ensure the service needs of the Town and Federal and state mandates are met.

EXAMPLE PROJECT NUMBER



SUMMARY

The CIP is a planning and scheduling document. It does not represent authorization to expend Town funds. It does provide an orderly implementation of proposed short and long range plans for land acquisition and construction. Projects are authorized for implementation only after Town Council adopts and appropriates the Capital Budget. The impact of FY23 capital projects, for both improvement and asset projects, on the Town of Warrenton General Fund is $1,281,289. The impact of FY23 capital projects, for both improvement and asset projects, on the Town of Warrenton Water and Sewer Fund is $4,111,102. The impact of the FY23 capital projects on the Stormwater Utility Fund is $94,918. The Town is also using $976,500 in ARPA funds on projects in FY23. The CIP is an annual process and requires close review by both the Planning Commission and the Town Council.

CAPITAL IMPROVEMENT PROJECTS

PROJECT SHEETS

TRANSPORTATION & WALKABILITY

PROJECT NUMBER: T-28-003 **PROJECT TITLE:** Inters. Improv.: Broadview/W. Lee Hwy/Winchester

CATEGORY (check one):

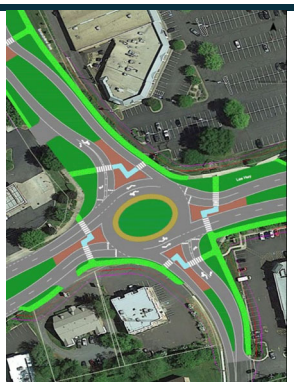
- ☐ Economic Development & Tourism (E)
- ☐ General Government (G)
- ☐ Public Safety (P)
- ☐ Recreation & Quality of Life (R)
- ☐ Stormwater & Utilities (U)
- ☑ Transportation & Walkability (T)

PROGRAM TYPE (check one):

- ☐ CARP
- ☑ CIP

PROGRAM DESCRIPTION

The Town of Warrenton is interested in creating an improvement plan for this important transportation connection between two key arterial corridors. It is also key to the economic development potential of the surrounding area. Therefore, the Town is working with VDOT on a "pipeline project" for the Lee Highway corridor. This project will be updated upon completion of the study in spring 2022.



GOAL ADDRESSED

Plan Warrenton 2040 Transportation and Circulation Near Turn Recommendations page 38.

ESTIMATED COSTS	FY23 2022-23	FY24 2023-24	FY25 2024-25	FY26 2025-26	FY27 2026-27	FY28 & Beyond	Total
Land Acquisition						$2,325,000	**$2,325,000**
Architecture/Engineering						$1,299,486	**$1,299,486**
Construction/Purchase						$3,641,809	**$3,641,809**
Other							**$0**
TOTAL	**$0**	**$0**	**$0**	**$0**	**$0**	**$7,266,295**	**$7,266,295**

FUNDING SOURCES							
General Fund						$7,266,295	**$7,266,295**
Water and Sewer Fund							**$0**
Stormwater Fund							**$0**
ARPA							**$0**
Grant- Federal							**$0**
Proffer							**$0**
Other							**$0**
TOTAL	**$0**	**$0**	**$0**	**$0**	**$0**	**$7,266,295**	**$7,266,295**

OPERATING IMPACT							
Ongoing maintenance							**$0**
Other							**$0**
TOTAL	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

PROJECT NUMBER: T-28-004 **PROJECT TITLE:** Route 17 (Broadview) Roebling Roundabout

CATEGORY (check one):

- ☐ Economic Development & Tourism (E)
- ☐ General Government (G)
- ☐ Public Safety (P)
- ☐ Recreation & Quality of Life (R)
- ☐ Stormwater & Utilities (U)
- ☑ Transportation & Walkability (T)

PROGRAM TYPE (check one):

- ☐ CARP
- ☑ CIP

PROGRAM DESCRIPTION

The intersection at Route 17 (Broadview Avenue) and Roebling Street is subjected to safety issues. As the area around it redevelops, the intersection will need improvements. In 2020 the Town applied for an unsuccessful VDOT Smartscale grant. This application included an assessment of costs associated with a roundabout included below. Therefore, the Town is working with VDOT on a "pipeline project" for the Lee Higway corridor. This project will be updated upon completion of the study in spring of 2022.

GOAL ADDRESSED

Plan Warrenton 2040 Transportation and Circulation Near Turn Recommendations page 38.

ESTIMATED COSTS	FY23 2022-23	FY24 2023-24	FY25 2024-25	FY26 2025-26	FY27 2026-27	FY28 & Beyond	Total
Land Acquisition						$1,987,500	**$1,987,500**
Architecture/Engineering						$1,291,020	**$1,291,020**
Construction/Purchase						$3,921,045	**$3,921,045**
Other							**$0**
TOTAL	**$0**	**$0**	**$0**	**$0**	**$0**	**$7,199,565**	**$7,199,565**

FUNDING SOURCES							
General Fund						$7,199,565	**$7,199,565**
Water and Sewer Fund							**$0**
Stormwater Fund							**$0**
ARPA							**$0**
Grant- Commonwealth							**$0**
Proffer							**$0**
Other							**$0**
TOTAL	**$0**	**$0**	**$0**	**$0**	**$0**	**$7,199,565**	**$7,199,565**

OPERATING IMPACT							
Ongoing maintenance							**$0**
Other							**$0**
TOTAL	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

PROJECT NUMBER: T-28-005 **PROJECT TITLE:** Bear Wallow Road/ Roebling Intersection

CATEGORY (check one):

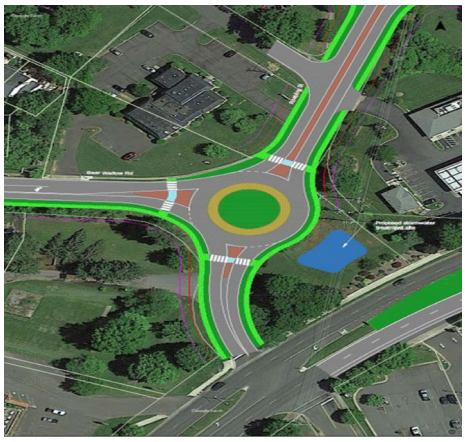
- ☐ Economic Development & Tourism (E)
- ☐ General Government (G)
- ☐ Public Safety (P)
- ☐ Recreation & Quality of Life (R)
- ☐ Stormwater & Utilities (U)
- ☑ Transportation & Walkability (T)

PROGRAM TYPE (check one):

- ☐ CARP
- ☑ CIP

PROGRAM DESCRIPTION

The intersection at Bear Wallow Road and Roebling Street is subjected to safety issues and an awkward configuration. As the area around it redevelops, the intersection will need improvements. In 2020 the Town applied for an unsuccessful VDOT Smartscale grant. This application included an assessment of costs associated with a roundabout included below.



GOAL ADDRESSED

Plan Warrenton 2040 Transportation and Circulation Near Turn Recommendations page 38.

ESTIMATED COSTS	FY23 2022-23	FY24 2023-24	FY25 2024-25	FY26 2025-26	FY27 2026-27	FY28 & Beyond	Total
Land Acquisition						$1,200,000	$1,200,000
Architecture/Engineering						$1,200,000	$1,200,000
Construction/Purchase						$3,600,000	$3,600,000
Other							$0
TOTAL	$0	$0	$0	$0	$0	$6,000,000	$6,000,000
FUNDING SOURCES							
General Fund						$6,000,000	$6,000,000
Water and Sewer Fund							$0
Stormwater Fund							$0
ARPA							$0
Grant- Commonwealth							$0
Proffer							$0
Other							$0
TOTAL	$0	$0	$0	$0	$0	$6,000,000	$6,000,000
OPERATING IMPACT							
Ongoing maintenance							$0
Other							$0
TOTAL	$0	$0	$0	$0	$0	$0	$0

https://www.fauquiernow.com/news/business/warrenton-town-council-greenlights-mixed-use-development-next-to-obriens-pub/article_5e6c8aca-611c-11ed-8421-2751bb1fb016.html

FEATURED

Warrenton Town Council greenlights mixed-use development next to O'Brien's Pub

James Jarvis, jjarvis@FauquierNow.com
Nov 10, 2022

Rendering of a proposed mixed-use development, dubbed Waterloo Junction, that would be built between Broadview Avenue and Bear Wallow Road.

Farrish Properties & Acquisitions LLC

The Warrenton Town Council voted unanimously Wednesday to approve the construction of a mixed-use development -- including 47 townhomes, six apartments, one retail building and a small park -- on the corner of Lee Highway and Broadview Avenue.

The 4.81-acre development, dubbed Waterloo Junction, will consist of 47 1,800-square-foot townhomes, 3,600 square feet of new retail space, six apartments, parking and a small park with a community play area and benches. One townhome and five apartments – 10% of the proposed units – will be designated as affordable housing for individuals or families whose gross annual income does not exceed 80% of the current Fauquier County area median family income.

Rendering of proposed 47 townhomes that could be built as part of the Waterloo Junction development. Each townhome would be 1,800 square-feet and 45 feet high.

Dan Ryan Builders

According to the application, the townhomes will not exceed the town's zoning ordinance of 45 feet. They'll be priced somewhere between $400,000 and $500,000.

For the project to move forward, the council had to approve a zoning map amendment, special-use permit and Comprehensive Plan amendment.

The Warrenton Planning Commission previously voted 5-1 recommending t council approve the project. Commissioner Ali Zarabi cast the only dissenting vote, noting concerns about traffic mitigation, among other issues.

During the council meeting, Ward 2 representative William Semple urged his colleagues to delay the project. Semple said that while he supported the creation of more affordable housing, he argued it may create a "precedent" in which other developers would be incentivized to propose similar projects along Broadview Avenue that do not align with the 2040 Comprehensive Plan guidelines which the council approved in April 2021.

"I think that we should consider those issues before we adopt this one, because this is going to be what I call the lead horse in a variety of potential development down the road," Semple said.

The Comprehensive Plan states the Experience Broadview District "will allow for mixed-use residential at lower density, but nodal development with mixed-use anchors and improved edges to adjacent single-family neighborhoods. Current commercial uses will be maintained."

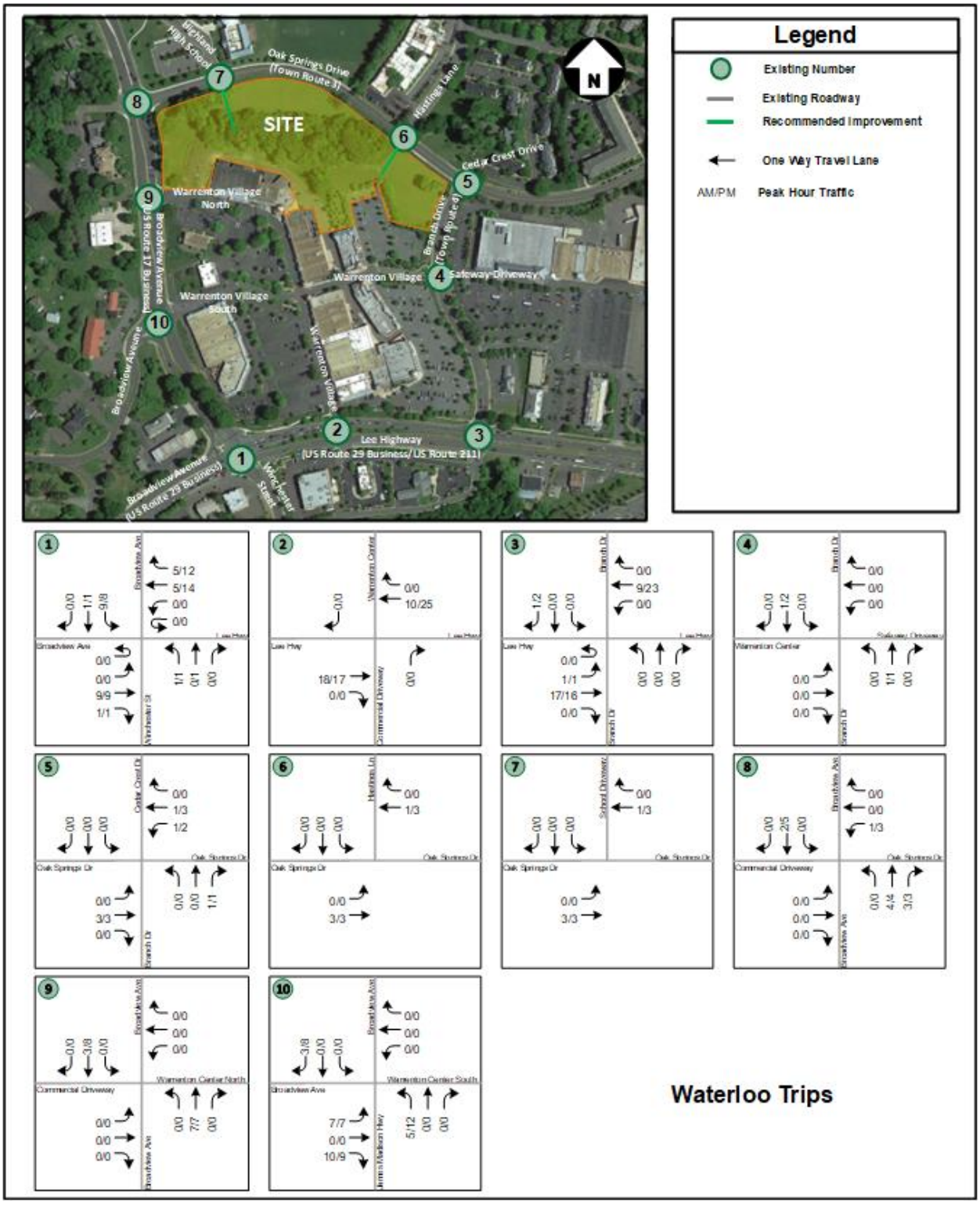
Semple moved to table the project, but it was rejected 6-1, with Semple casting the only supporting vote.

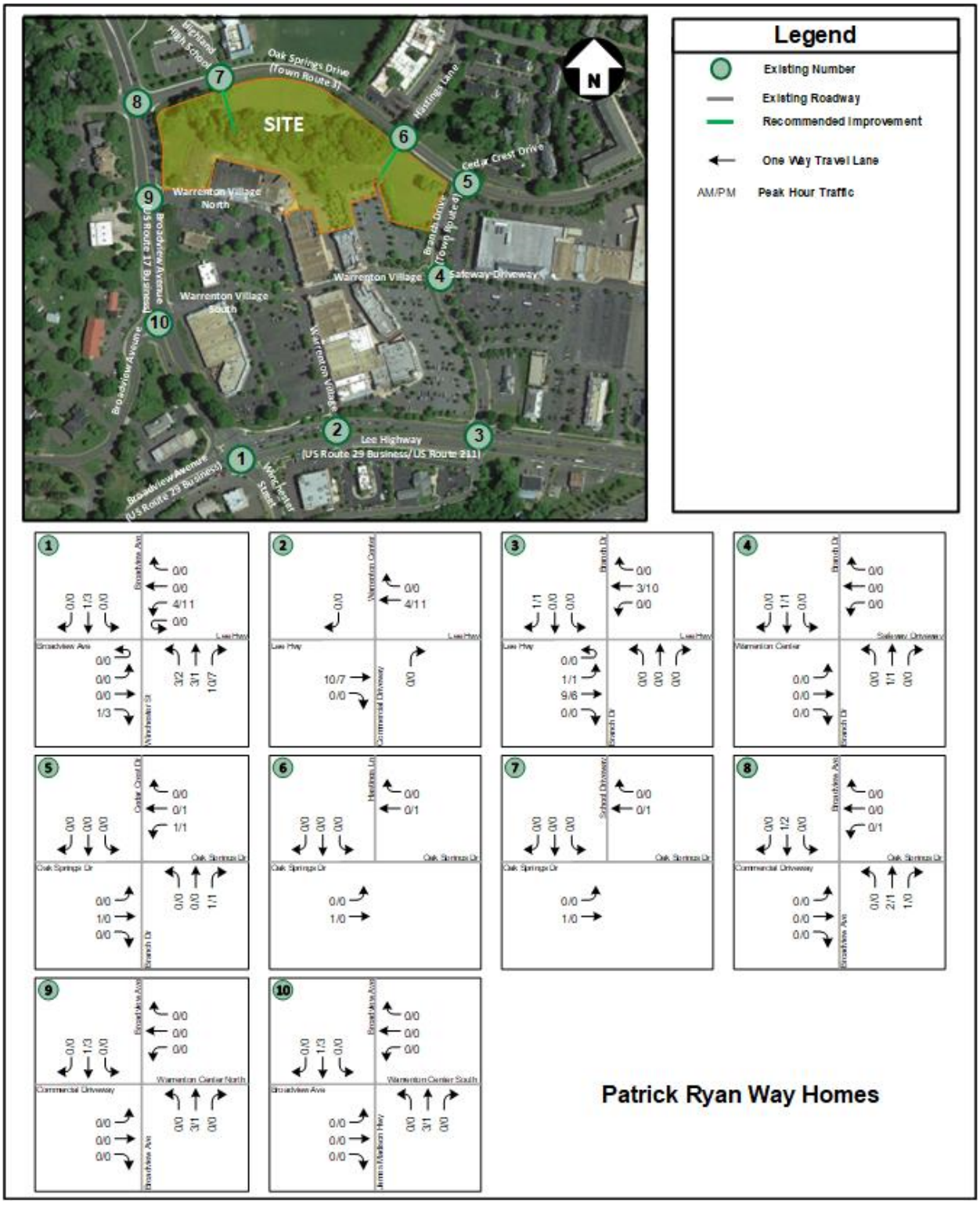
The rest of the council, including Mayor Carter Nevill, praised the project, saying it will be a positive addition to the town.

"I think this has been pointed out that the importance of ... bringing people into residential spaces that are close to commercial and entertainment spaces ... it recreates the same sense of community that you see in downtown, where you have people ... walking to restaurants, walking to shops, and I think the more we are able to bring that closer to our neighborhoods, the better we create our built environment to better serve the well-being of our residents," Nevill said.

The renovation of O'Brien's and the apartments above the restaurant – currently vacant – is estimated to take four months. The townhome construction could be completed within 18 months.

James Jarvis


Legend
Existing Number
Existing Roadway
Recommended Improvement
One Way Travel Lane
AM/PM Peak Hour Traffic
N
SITE
Oak Springs Drive (Town Route 1)
Hastings Lane
Cedar Crest Drive
Branch Drive (Town Route 6)
Broadview Avenue (US Route 29 Business)
Warrenton Village North
Warrenton Village South
Warrenton Village
Safeway Driveway
Warrenton Center
Lee Highway (US Route 29 Business/ US Route 211)
Winchester Street
Waterloo Trips


Legend
Existing Number
Existing Roadway
Recommended Improvement
One Way Travel Lane
AM/PM Peak Hour Traffic
SITE
N
Oak Springs Drive (Town Route 1)
Hastings Lane
Cedar Crest Drive
Branch Drive (Town Route 6)
Warrenton Village North
Warrenton Village South
Warrenton Village
Safeway Driveway
Broadview Avenue
Broadview Avenue (US Route 29 Business)
Lee Highway (US Route 29 Business/ US Route 211)
Winchester Street
Warrenton Center
Patrick Ryan Way Homes

H. 2027 Future Conditions without Development – Capacity Analysis Worksheet

LANE LEVEL OF SERVICE

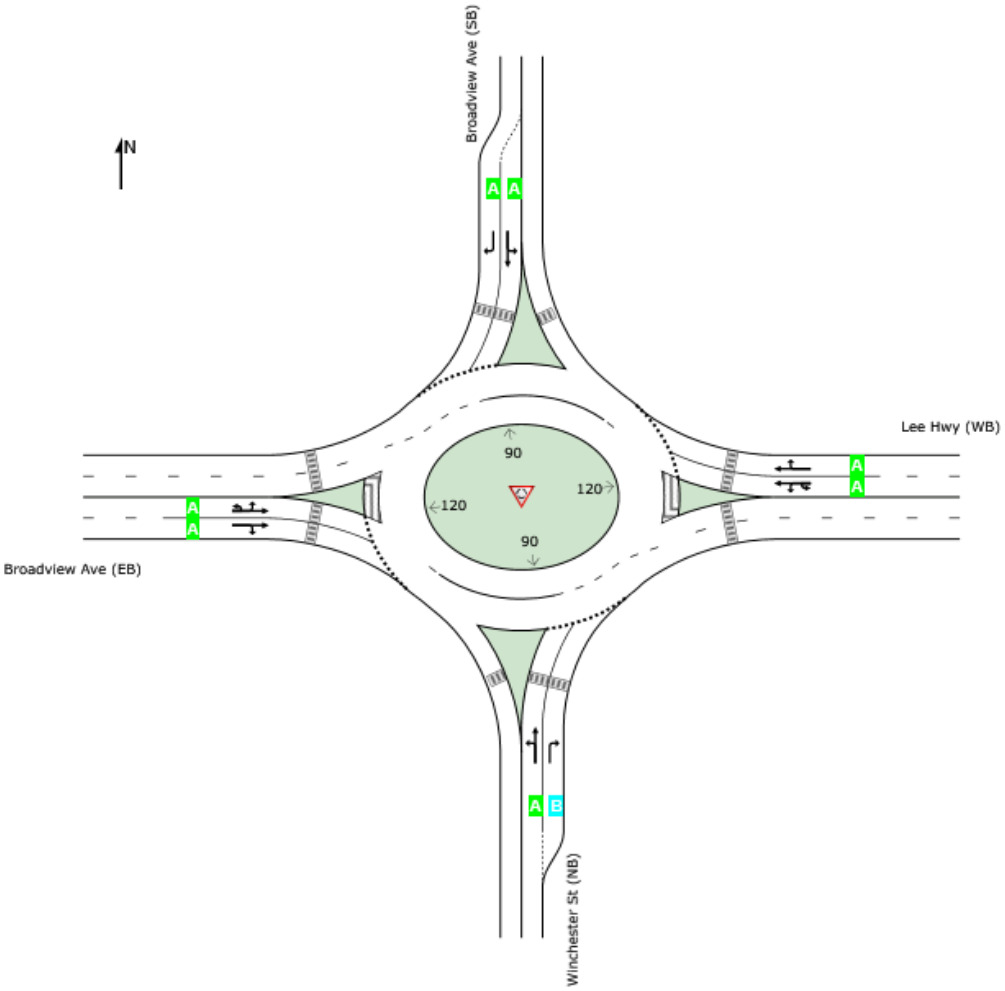
Lane Level of Service

Site: 101 [Broadview/Winchester/Lee - 2027 FB AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

Warrenton Village Center
2027 Future Background Condtions
AM Peak Hour
Site Category: (None)
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	A	A	A	A	A



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

Organisation: GOROVE SLADE | Licence: PLUS / 1PC | Processed: Monday, February 12, 2024 2:04:14 AM
Project: U:\3243\001. Warrenton Village Center\Analysis\Sidra\2nd Submission\2027 TF.sip9

LANE SUMMARY

Site: 101 [Broadview/Winchester/Lee - 2027 FB AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

Warrenton Village Center
2027 Future Background Condtions
AM Peak Hour
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Winchester St (NB)															
Lane 1[d]	199	4.5	199	4.5	664	0.300	100	9.2	LOS A	1.4	35.5	Full	1600	0.0	0.0
Lane 2	87	4.0	87	4.0	475	0.183	100	10.2	LOS B	0.7	18.8	Short	250	0.0	NA
Approach	286	4.4	286	4.4		0.300		9.5	LOS A	1.4	35.5				
East: Lee Hwy (WB)															
Lane 1	430	7.2	430	7.2	1024	0.420	100	8.0	LOS A	3.0	78.4	Full	1600	0.0	0.0
Lane 2[d]	504	6.5	504	6.5	1201	0.420	100	7.2	LOS A	3.1	80.8	Full	1600	0.0	0.0
Approach	934	6.8	934	6.8		0.420		7.6	LOS A	3.1	80.8				
North: Broadview Ave (SB)															
Lane 1[d]	240	3.7	240	3.7	750	0.320	100	8.6	LOS A	1.5	39.3	Short	215	0.0	NA
Lane 2	234	3.0	234	3.0	682	0.343	100	9.7	LOS A	1.7	42.6	Full	1600	0.0	0.0
Approach	474	3.4	474	3.4		0.343		9.1	LOS A	1.7	42.6				
West: Broadview Ave (EB)															
Lane 1	448	4.1	448	4.1	1048	0.427	100	8.0	LOS A	3.1	79.7	Full	1600	0.0	0.0
Lane 2[d]	523	3.9	523	3.9	1224	0.427	100	7.2	LOS A	3.2	82.8	Full	1600	0.0	0.0
Approach	971	4.0	971	4.0		0.427		7.6	LOS A	3.2	82.8				
All Vehicles	2664	4.9	2664	4.9		0.427		8.1	LOS A	3.2	82.8				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Winchester St (NB)

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	84	115	-	199	4.5		664	0.300	100	NA	NA
Lane 2	-	-	87	87	4.0		475	0.183	100	0.0	1
Approach	84	115	87	286	4.4			0.300			
East: Lee Hwy (WB)											
Mov. From E To Exit:	U E	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	3	38	389	-	430	7.2	1024	0.420	100	NA	NA
Lane 2	-	-	313	191	504	6.5	1201	0.420	100	NA	NA
Approach	3	38	701	191	934	6.8		0.420			
North: Broadview Ave (SB)											
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	137	103	-	240	3.7		750	0.320	100	0.0	2
Lane 2	-	-	234	234	3.0		682	0.343	100	NA	NA
Approach	137	103	234	474	3.4			0.343			
West: Broadview Ave (EB)											
Mov. From W To Exit:	U W	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	5	62	380	-	448	4.1	1048	0.427	100	NA	NA
Lane 2	-	-	487	36	523	3.9	1224	0.427	100	NA	NA
Approach	5	62	867	36	971	4.0		0.427			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	2664	4.9	0.427

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Winchester St (NB)				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
East: Lee Hwy (WB)				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
North: Broadview Ave (SB)				
Lane 1	0.0	0.0	0.0	0.0

Lane 2	0.0	0.0	0.0	0.0
West: Broadview Ave (EB)				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0

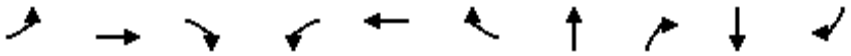
Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱		↑↑	↱			↱			↱
Traffic Vol, veh/h	0	944	63	0	839	31	0	0	29	0	0	20
Future Vol, veh/h	0	944	63	0	839	31	0	0	29	0	0	20
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	110	-	-	300	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	1	-	-	3	-	-	3	-	-	-11	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	4	3	0	7	0	0	0	3	0	0	0
Mvmt Flow	0	1026	68	0	912	34	0	0	32	0	0	22

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	-	-	0	-	-	513	-	-	456
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	-	-	-	7.26	-	-	5.8
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	-	-	-	3.33	-	-	3.3
Pot Cap-1 Maneuver	0	-	-	0	-	-	0	0	483	0	0	640
Stage 1	0	-	-	0	-	-	0	0	-	0	0	-
Stage 2	0	-	-	0	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	-	-	-	-	-	-	-	-	483	-	-	640
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	13	10.8
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT	WBR	SBLn1
Capacity (veh/h)	483	-	-	-	-	640
HCM Lane V/C Ratio	0.065	-	-	-	-	0.034
HCM Control Delay (s)	13	-	-	-	-	10.8
HCM Lane LOS	B	-	-	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	-	0.1



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	42	1015	1	48	871	55	23	41	46	57
v/c Ratio	0.37	0.43	0.00	0.41	0.39	0.05	0.15	0.16	0.40	0.29
Control Delay	71.3	17.3	0.0	72.4	16.0	0.1	57.5	1.4	71.9	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	71.3	17.3	0.0	72.4	16.0	0.1	57.5	1.4	71.9	3.6
Queue Length 50th (ft)	39	246	0	44	198	0	21	0	43	0
Queue Length 95th (ft)	80	485	0	88	400	0	44	0	86	0
Internal Link Dist (ft)		457			1504		131		565	
Turn Bay Length (ft)	240		330	150		150		60		
Base Capacity (vph)	199	2364	1143	227	2281	1124	279	352	185	248
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.43	0.00	0.21	0.38	0.05	0.08	0.12	0.25	0.23

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	7	31	934	1	44	801	51	10	11	38	34	8
Future Volume (vph)	7	31	934	1	44	801	51	10	11	38	34	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)			-4%			2%			0%			-1%
Total Lost time (s)		6.4	5.7	5.7	6.8	5.6	5.6		6.0	6.0		7.5
Lane Util. Factor		1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00
Frt		1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.98	1.00		0.96
Satd. Flow (prot)		1793	3541	1647	1752	3372	1599		1856	1615		1792
Flt Permitted		0.95	1.00	1.00	0.95	1.00	1.00		0.98	1.00		0.96
Satd. Flow (perm)		1793	3541	1647	1752	3372	1599		1856	1615		1792
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)	8	34	1015	1	48	871	55	11	12	41	37	9
RTOR Reduction (vph)	0	0	0	0	0	0	20	0	0	38	0	0
Lane Group Flow (vph)	0	42	1015	1	48	871	35	0	23	3	0	46
Heavy Vehicles (%)	14%	0%	4%	0%	2%	6%	0%	0%	0%	0%	3%	0%
Turn Type	Prot	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Perm	Split	NA
Protected Phases	1	1	6		5	2		4	4		3	3
Permitted Phases				6			2			4		
Actuated Green, G (s)		7.7	87.8	87.8	8.1	88.7	88.7		10.2	10.2		7.9
Effective Green, g (s)		7.7	87.8	87.8	8.1	88.7	88.7		10.2	10.2		7.9
Actuated g/C Ratio		0.06	0.63	0.63	0.06	0.63	0.63		0.07	0.07		0.06
Clearance Time (s)		6.4	5.7	5.7	6.8	5.6	5.6		6.0	6.0		7.5
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0
Lane Grp Cap (vph)		98	2220	1032	101	2136	1013		135	117		101
v/s Ratio Prot		0.02	c0.29		c0.03	0.26			c0.01			c0.03
v/s Ratio Perm				0.00			0.02			0.00		
v/c Ratio		0.43	0.46	0.00	0.48	0.41	0.03		0.17	0.03		0.46
Uniform Delay, d1		64.0	13.6	9.7	63.9	12.7	9.6		60.9	60.3		64.0
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00
Incremental Delay, d2		3.0	0.7	0.0	3.5	0.6	0.1		0.6	0.1		3.2
Delay (s)		67.0	14.3	9.7	67.4	13.3	9.7		61.5	60.4		67.2
Level of Service		E	B	A	E	B	A		E	E		E
Approach Delay (s)			16.4			15.7			60.8			64.7
Approach LOS			B			B			E			E

Intersection Summary			
HCM 2000 Control Delay	19.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	26.0
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	52
Future Volume (vph)	52
Ideal Flow (vphpl)	1900
Grade (%)	
Total Lost time (s)	7.5
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1375
Flt Permitted	1.00
Satd. Flow (perm)	1375
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	57
RTOR Reduction (vph)	54
Lane Group Flow (vph)	3
Heavy Vehicles (%)	18%
Turn Type	Perm
Protected Phases	
Permitted Phases	3
Actuated Green, G (s)	7.9
Effective Green, g (s)	7.9
Actuated g/C Ratio	0.06
Clearance Time (s)	7.5
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	77
v/s Ratio Prot	
v/s Ratio Perm	0.00
v/c Ratio	0.04
Uniform Delay, d1	62.5
Progression Factor	1.00
Incremental Delay, d2	0.2
Delay (s)	62.7
Level of Service	E
Approach Delay (s)	
Approach LOS	

Intersection Summary

HCM 6th Edition methodology expects strict NEMA phasing.

Intersection	
Int Delay, s/veh	4.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	6	15	38	14	11	14	23	67	7	18	69	5
Future Vol, veh/h	6	15	38	14	11	14	23	67	7	18	69	5
Conflicting Peds, #/hr	0	0	2	2	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-8	-	-	-2	-	-	1	-	-	-1	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	9	0	0	0	0	0	13	0
Mvmt Flow	7	16	41	15	12	15	25	73	8	20	75	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	211	249	42	215	247	41	80	0	0	81	0	0
Stage 1	118	118	-	127	127	-	-	-	-	-	-	-
Stage 2	93	131	-	88	120	-	-	-	-	-	-	-
Critical Hdwy	5.9	4.9	6.1	7.1	6.28	6.7	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	4.9	3.9	-	6.1	5.28	-	-	-	-	-	-	-
Critical Hdwy Stg 2	4.9	3.9	-	6.1	5.28	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4.09	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	805	734	1036	746	656	1030	1531	-	-	1529	-	-
Stage 1	927	845	-	882	785	-	-	-	-	-	-	-
Stage 2	948	839	-	925	790	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	763	711	1034	686	636	1030	1531	-	-	1529	-	-
Mov Cap-2 Maneuver	763	711	-	686	636	-	-	-	-	-	-	-
Stage 1	911	833	-	867	772	-	-	-	-	-	-	-
Stage 2	904	825	-	857	779	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.3	10	1.8	1.4
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1531	-	-	898	760	1529	-	-
HCM Lane V/C Ratio	0.016	-	-	0.071	0.056	0.013	-	-
HCM Control Delay (s)	7.4	0	-	9.3	10	7.4	0	-
HCM Lane LOS	A	A	-	A	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.2	0	-	-

Intersection	
Int Delay, s/veh	3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↰	↗		↕	
Traffic Vol, veh/h	1	80	75	16	107	1	73	1	14	1	1	1
Future Vol, veh/h	1	80	75	16	107	1	73	1	14	1	1	1
Conflicting Peds, #/hr	4	0	1	1	0	4	0	0	2	2	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	1	-	-	2	-	-	-5	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	1	11	7	1	0	0	0	0	0	0	0
Mvmt Flow	1	87	82	17	116	1	79	1	15	1	1	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	121	0	0	170	0	0	283	286	131	295	327	121
Stage 1	-	-	-	-	-	-	131	131	-	155	155	-
Stage 2	-	-	-	-	-	-	152	155	-	140	172	-
Critical Hdwy	4.1	-	-	4.17	-	-	7.5	6.9	6.4	6.1	5.5	5.7
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.9	-	5.1	4.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.9	-	5.1	4.5	-
Follow-up Hdwy	2.2	-	-	2.263	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1479	-	-	1378	-	-	652	607	917	718	651	952
Stage 1	-	-	-	-	-	-	865	780	-	890	807	-
Stage 2	-	-	-	-	-	-	841	760	-	902	797	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1474	-	-	1377	-	-	643	596	915	694	639	949
Mov Cap-2 Maneuver	-	-	-	-	-	-	643	596	-	694	639	-
Stage 1	-	-	-	-	-	-	863	778	-	886	794	-
Stage 2	-	-	-	-	-	-	828	748	-	883	795	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1	11	9.9
HCM LOS			B	A

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	642	915	1474	-	-	1377	-	-	739
HCM Lane V/C Ratio	0.125	0.017	0.001	-	-	0.013	-	-	0.004
HCM Control Delay (s)	11.4	9	7.4	0	-	7.6	0	-	9.9
HCM Lane LOS	B	A	A	A	-	A	A	-	A
HCM 95th %tile Q(veh)	0.4	0.1	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	3.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	83	108	137	44	47	67
Future Vol, veh/h	83	108	137	44	47	67
Conflicting Peds, #/hr	1	0	0	1	0	2
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	-3	1	-	-5	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	6	1	1	0	17	0
Mvmt Flow	90	117	149	48	51	73

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	198	0	-	0	471	176
Stage 1	-	-	-	-	174	-
Stage 2	-	-	-	-	297	-
Critical Hdwy	4.16	-	-	-	5.57	5.7
Critical Hdwy Stg 1	-	-	-	-	4.57	-
Critical Hdwy Stg 2	-	-	-	-	4.57	-
Follow-up Hdwy	2.254	-	-	-	3.653	3.3
Pot Cap-1 Maneuver	1351	-	-	-	598	894
Stage 1	-	-	-	-	862	-
Stage 2	-	-	-	-	783	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1350	-	-	-	554	892
Mov Cap-2 Maneuver	-	-	-	-	554	-
Stage 1	-	-	-	-	800	-
Stage 2	-	-	-	-	782	-

Approach	EB	WB	SB
HCM Control Delay, s	3.4	0	11.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1350	-	-	-	713
HCM Lane V/C Ratio	0.067	-	-	-	0.174
HCM Control Delay (s)	7.9	-	-	-	11.1
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	0.6

Intersection	
Int Delay, s/veh	1.9

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	38	160	153	51	31	19
Future Vol, veh/h	38	160	153	51	31	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	75	-	-	-	0	50
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	-5	3	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	4	1	0	0	0
Mvmt Flow	41	174	166	55	34	21

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	221	0	-	0	450	194
Stage 1	-	-	-	-	194	-
Stage 2	-	-	-	-	256	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1360	-	-	-	571	853
Stage 1	-	-	-	-	844	-
Stage 2	-	-	-	-	791	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1360	-	-	-	554	853
Mov Cap-2 Maneuver	-	-	-	-	554	-
Stage 1	-	-	-	-	819	-
Stage 2	-	-	-	-	791	-

Approach	EB	WB	SB
HCM Control Delay, s	1.5	0	10.9
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1360	-	-	-	554	853
HCM Lane V/C Ratio	0.03	-	-	-	0.061	0.024
HCM Control Delay (s)	7.7	-	-	-	11.9	9.3
HCM Lane LOS	A	-	-	-	B	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.2	0.1

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	1	1	65	1	106	1	413	102	95	358	1
Future Vol, veh/h	1	1	1	65	1	106	1	413	102	95	358	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	100	-	0	90	-	130	225	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-2	-	-	4	-	-	2	-	-	3	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	1	0	6	1	5	5	0
Mvmt Flow	1	1	1	71	1	115	1	449	111	103	389	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	823	1158	195	852	1047	225	390	0	0	560	0	0
Stage 1	596	596	-	451	451	-	-	-	-	-	-	-
Stage 2	227	562	-	401	596	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.1	6.7	8.3	7.3	7.32	4.1	-	-	4.2	-	-
Critical Hdwy Stg 1	6.1	5.1	-	7.3	6.3	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.1	-	7.3	6.3	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.31	2.2	-	-	2.25	-	-
Pot Cap-1 Maneuver	295	225	829	212	182	762	1180	-	-	987	-	-
Stage 1	494	529	-	509	520	-	-	-	-	-	-	-
Stage 2	780	546	-	551	434	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	229	201	829	194	163	762	1180	-	-	987	-	-
Mov Cap-2 Maneuver	229	201	-	194	163	-	-	-	-	-	-	-
Stage 1	494	474	-	508	519	-	-	-	-	-	-	-
Stage 2	660	545	-	492	389	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	17.8	19.7	0	1.9
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1180	-	-	284	193	762	987	-	-
HCM Lane V/C Ratio	0.001	-	-	0.011	0.372	0.151	0.105	-	-
HCM Control Delay (s)	8.1	-	-	17.8	34.3	10.6	9.1	-	-
HCM Lane LOS	A	-	-	C	D	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	1.6	0.5	0.3	-	-

Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	1	3	5	1	18	13	498	10	15	405	3
Future Vol, veh/h	1	1	3	5	1	18	13	498	10	15	405	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	150	-	135	110	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	5	-	-	3	-	-	4	-	-	-2	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	6	0	5	0	0	4	0
Mvmt Flow	1	1	3	5	1	20	14	541	11	16	440	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	773	1054	222	822	1044	271	443	0	0	552	0	0
Stage 1	474	474	-	569	569	-	-	-	-	-	-	-
Stage 2	299	580	-	253	475	-	-	-	-	-	-	-
Critical Hdwy	8.5	7.5	7.4	8.1	7.1	7.32	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	7.5	6.5	-	7.1	6.1	-	-	-	-	-	-	-
Critical Hdwy Stg 2	7.5	6.5	-	7.1	6.1	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.36	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	236	170	764	235	194	699	1128	-	-	1028	-	-
Stage 1	478	492	-	436	463	-	-	-	-	-	-	-
Stage 2	636	428	-	704	518	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	223	165	764	228	189	699	1128	-	-	1028	-	-
Mov Cap-2 Maneuver	223	165	-	228	189	-	-	-	-	-	-	-
Stage 1	472	484	-	431	457	-	-	-	-	-	-	-
Stage 2	609	423	-	689	510	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.6	13.2	0.2	0.3
HCM LOS	C	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1128	-	-	346	228	612	1028	-	-
HCM Lane V/C Ratio	0.013	-	-	0.016	0.024	0.034	0.016	-	-
HCM Control Delay (s)	8.2	-	-	15.6	21.2	11.1	8.6	-	-
HCM Lane LOS	A	-	-	C	C	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0.1	0.1	0	-	-

Intersection	
Int Delay, s/veh	6.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	126	17	81	2	3	3	116	392	31	7	353	53
Future Vol, veh/h	126	17	81	2	3	3	116	392	31	7	353	53
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	None	-	-	None	-	-	None
Storage Length	100	-	230	0	-	-	160	-	175	160	-	125
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	3	-	-	-3	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	0	3	0	0	33	1	5	0	0	3	8
Mvmt Flow	137	18	88	2	3	3	126	426	34	8	384	58

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	867	1112	192	895	1136	213	442	0	0	460	0	0
Stage 1	400	400	-	678	678	-	-	-	-	-	-	-
Stage 2	467	712	-	217	458	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.5	6.96	7.5	6.5	7.56	4.12	-	-	4.1	-	-
Critical Hdwy Stg 1	6.54	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4	3.33	3.5	4	3.63	2.21	-	-	2.2	-	-
Pot Cap-1 Maneuver	247	211	814	239	204	705	1122	-	-	1112	-	-
Stage 1	597	605	-	413	455	-	-	-	-	-	-	-
Stage 2	545	439	-	771	570	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	221	186	814	179	180	705	1122	-	-	1112	-	-
Mov Cap-2 Maneuver	221	186	-	179	180	-	-	-	-	-	-	-
Stage 1	530	601	-	367	404	-	-	-	-	-	-	-
Stage 2	478	390	-	662	566	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	30.7	19.7	1.9	0.1
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1122	-	-	221	186	814	179	287	1112	-	-
HCM Lane V/C Ratio	0.112	-	-	0.62	0.099	0.108	0.012	0.023	0.007	-	-
HCM Control Delay (s)	8.6	-	-	44.6	26.5	10	25.4	17.8	8.3	-	-
HCM Lane LOS	A	-	-	E	D	B	D	C	A	-	-
HCM 95th %tile Q(veh)	0.4	-	-	3.6	0.3	0.4	0	0.1	0	-	-

LANE SUMMARY

Site: 101 [Broadview/Winchester/Lee - 2027 FB PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

Warrenton Village Center
2027 Future Background Conditions
PM Peak Hour
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Winchester St (NB)															
Lane 1[d]	223	0.5	223	0.5	570	0.391	100	12.2	LOS B	2.2	55.7	Full	1600	0.0	0.0
Lane 2	77	0.0	77	0.0	376	0.205	100	13.0	LOS B	0.9	22.4	Short	250	0.0	NA
Approach	300	0.3	300	0.3		0.391		12.4	LOS B	2.2	55.7				
East: Lee Hwy (WB)															
Lane 1	625	1.7	625	1.7	888	0.703	100	16.2	LOS B	10.0	252.3	Full	1600	0.0	0.0
Lane 2[d]	758	2.0	758	2.0	1078	0.703	100	14.0	LOS B	10.5	267.5	Full	1600	0.0	0.0
Approach	1382	1.9	1382	1.9		0.703		15.0	LOS B	10.5	267.5				
North: Broadview Ave (SB)															
Lane 1	340	0.7	340	0.7	435	0.780	100	35.1	LOS D	6.4	161.1	Short	215	0.0	NA
Lane 2[d]	402	4.0	402	4.0	498	0.808	100	34.4	LOS C	7.4	190.7	Full	1600	0.0	0.0
Approach	742	2.5	742	2.5		0.808		34.7	LOS C	7.4	190.7				
West: Broadview Ave (EB)															
Lane 1	538	2.5	538	2.5	923	0.583	100	11.9	LOS B	6.2	158.2	Full	1600	0.0	0.0
Lane 2[d]	652	1.9	652	1.9	1118	0.583	100	10.4	LOS B	6.2	158.3	Full	1600	0.0	0.0
Approach	1191	2.1	1191	2.1		0.583		11.1	LOS B	6.2	158.3				
All Vehicles	3615	2.0	3615	2.0		0.808		17.6	LOS B	10.5	267.5				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Winchester St (NB)

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	122	101	-	223	0.5		570	0.391	100	NA	NA
Lane 2	-	-	77	77	0.0		376	0.205	100	0.0	1
Approach	122	101	77	300	0.3			0.391			
East: Lee Hwy (WB)											
Mov. From E To Exit:	U E	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	10	70	544	-	625	1.7	888	0.703	100	NA	NA
Lane 2	-	-	635	123	758	2.0	1078	0.703	100	NA	NA
Approach	10	70	1179	123	1382	1.9		0.703			
North: Broadview Ave (SB)											
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	249	91	-	340	0.7		435	0.780	100	0.0	2
Lane 2	-	-	402	402	4.0		498	0.808	100	NA	NA
Approach	249	91	402	742	2.5			0.808			
West: Broadview Ave (EB)											
Mov. From W To Exit:	U W	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	2	273	263	-	538	2.5	923	0.583	100	NA	NA
Lane 2	-	-	606	46	652	1.9	1118	0.583	100	NA	NA
Approach	2	273	870	46	1191	2.1		0.583			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	3615	2.0	0.808

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Winchester St (NB)				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
East: Lee Hwy (WB)				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
North: Broadview Ave (SB)				
Lane 1	0.0	0.0	0.0	0.0

Lane 2	0.0	0.0	0.0	0.0
West: Broadview Ave (EB)				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0

LANE LEVEL OF SERVICE

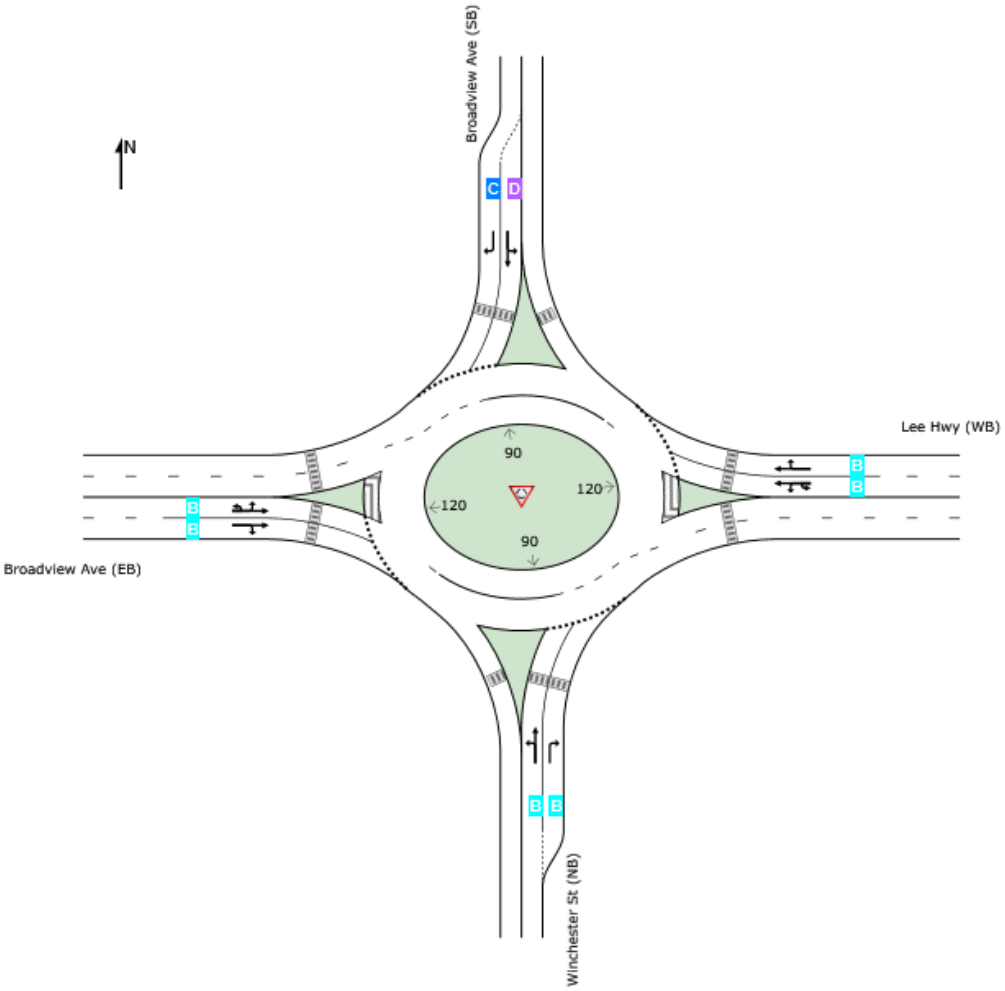
Lane Level of Service

Site: 101 [Broadview/Winchester/Lee - 2027 FB PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

Warrenton Village Center
2027 Future Background Conditions
PM Peak Hour
Site Category: (None)
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	B	B	C	B	B



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

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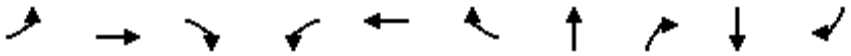
Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱		↑↑	↱			↱			↱
Traffic Vol, veh/h	0	1075	83	0	1247	102	0	0	25	0	0	79
Future Vol, veh/h	0	1075	83	0	1247	102	0	0	25	0	0	79
Conflicting Peds, #/hr	0	0	0	0	0	4	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	110	-	-	300	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	1	-	-	3	-	-	3	-	-	-11	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	2	0	0	2	0	0	0	4	0	0	0
Mvmt Flow	0	1156	89	0	1341	110	0	0	27	0	0	85

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	-	-	0	-	-	578	-	-	675
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	-	-	-	7.28	-	-	5.8
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	-	-	-	3.34	-	-	3.3
Pot Cap-1 Maneuver	0	-	-	0	-	-	0	0	433	0	0	493
Stage 1	0	-	-	0	-	-	0	0	-	0	0	-
Stage 2	0	-	-	0	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	-	-	-	-	-	-	-	-	433	-	-	491
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	13.9	13.9
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT	WBR	SBLn1
Capacity (veh/h)	433	-	-	-	-	491
HCM Lane V/C Ratio	0.062	-	-	-	-	0.173
HCM Control Delay (s)	13.9	-	-	-	-	13.9
HCM Lane LOS	B	-	-	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	-	0.6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	149	1006	2	68	1241	88	36	79	165	152
v/c Ratio	0.72	0.47	0.00	0.54	0.67	0.10	0.31	0.30	0.76	0.45
Control Delay	82.8	20.6	0.0	82.0	30.0	0.2	72.2	3.0	85.8	10.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	82.8	20.6	0.0	82.0	30.0	0.2	72.2	3.0	85.8	10.8
Queue Length 50th (ft)	148	310	0	68	475	0	36	0	164	0
Queue Length 95th (ft)	224	441	0	123	675	0	73	0	249	58
Internal Link Dist (ft)		457			1504		131		565	
Turn Bay Length (ft)	240		330	150		150		60		
Base Capacity (vph)	260	2159	993	157	1850	906	202	327	250	363
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.57	0.47	0.00	0.43	0.67	0.10	0.18	0.24	0.66	0.42

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	9	133	956	2	65	1179	84	17	17	75	139	18
Future Volume (vph)	9	133	956	2	65	1179	84	17	17	75	139	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)			-4%			2%			0%			-1%
Total Lost time (s)		6.4	5.7	5.7	6.8	5.6	5.6		6.6	6.6		7.5
Lane Util. Factor		1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00
Frpb, ped/bikes		1.00	1.00	0.97	1.00	1.00	0.98		1.00	1.00		1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00
Frt		1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.98	1.00		0.96
Satd. Flow (prot)		1807	3682	1602	1787	3504	1558		1854	1615		1813
Flt Permitted		0.95	1.00	1.00	0.95	1.00	1.00		0.98	1.00		0.96
Satd. Flow (perm)		1807	3682	1602	1787	3504	1558		1854	1615		1813
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	9	140	1006	2	68	1241	88	18	18	79	146	19
RTOR Reduction (vph)	0	0	0	1	0	0	41	0	0	74	0	0
Lane Group Flow (vph)	0	149	1006	1	68	1241	47	0	36	5	0	165
Confl. Peds. (#/hr)				2			2					
Heavy Vehicles (%)	0%	2%	0%	0%	0%	2%	1%	0%	0%	0%	1%	0%
Turn Type	Prot	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Perm	Split	NA
Protected Phases	1	1	6		5	2		4	4		3	3
Permitted Phases				6			2			4		
Actuated Green, G (s)		17.2	86.7	86.7	9.3	79.3	79.3		9.5	9.5		17.9
Effective Green, g (s)		17.2	86.7	86.7	9.3	79.3	79.3		9.5	9.5		17.9
Actuated g/C Ratio		0.11	0.58	0.58	0.06	0.53	0.53		0.06	0.06		0.12
Clearance Time (s)		6.4	5.7	5.7	6.8	5.6	5.6		6.6	6.6		7.5
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0
Lane Grp Cap (vph)		207	2128	925	110	1852	823		117	102		216
v/s Ratio Prot		c0.08	0.27		0.04	c0.35			c0.02			c0.09
v/s Ratio Perm				0.00			0.03			0.00		
v/c Ratio		0.72	0.47	0.00	0.62	0.67	0.06		0.31	0.05		0.76
Uniform Delay, d1		64.1	18.4	13.4	68.6	25.8	17.2		67.1	66.0		64.0
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00
Incremental Delay, d2		11.4	0.8	0.0	9.9	1.9	0.1		1.5	0.2		14.8
Delay (s)		75.4	19.1	13.4	78.5	27.8	17.3		68.6	66.2		78.8
Level of Service		E	B	B	E	C	B		E	E		E
Approach Delay (s)			26.4			29.6			67.0			69.3
Approach LOS			C			C			E			E

Intersection Summary			
HCM 2000 Control Delay	34.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	26.6
Intersection Capacity Utilization	76.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	144
Future Volume (vph)	144
Ideal Flow (vphpl)	1900
Grade (%)	
Total Lost time (s)	7.5
Lane Util. Factor	1.00
Frpb, ped/bikes	1.00
Flpb, ped/bikes	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1607
Flt Permitted	1.00
Satd. Flow (perm)	1607
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	152
RTOR Reduction (vph)	134
Lane Group Flow (vph)	18
Confl. Peds. (#/hr)	
Heavy Vehicles (%)	1%
Turn Type	Perm
Protected Phases	
Permitted Phases	3
Actuated Green, G (s)	17.9
Effective Green, g (s)	17.9
Actuated g/C Ratio	0.12
Clearance Time (s)	7.5
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	191
v/s Ratio Prot	
v/s Ratio Perm	0.01
v/c Ratio	0.09
Uniform Delay, d1	58.8
Progression Factor	1.00
Incremental Delay, d2	0.2
Delay (s)	59.1
Level of Service	E
Approach Delay (s)	
Approach LOS	

Intersection Summary

HCM 6th Edition methodology expects strict NEMA phasing.

Intersection	
Int Delay, s/veh	8.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	17	77	116	45	50	41	94	45	12	48	42	32
Future Vol, veh/h	17	77	116	45	50	41	94	45	12	48	42	32
Conflicting Peds, #/hr	0	0	14	14	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-8	-	-	-2	-	-	1	-	-	-1	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	0	0	2	0	2	5	0	2	0	0	3	0
Mvmt Flow	18	80	121	47	52	43	98	47	13	50	44	33

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	407	417	53	426	427	30	77	0	0	60	0	0
Stage 1	161	161	-	250	250	-	-	-	-	-	-	-
Stage 2	246	256	-	176	177	-	-	-	-	-	-	-
Critical Hdwy	5.9	4.9	6.14	7.1	6.14	6.8	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	4.9	3.9	-	6.1	5.14	-	-	-	-	-	-	-
Critical Hdwy Stg 2	4.9	3.9	-	6.1	5.14	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.32	3.5	4.02	3.35	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	639	637	1015	542	544	1030	1535	-	-	1556	-	-
Stage 1	893	826	-	759	718	-	-	-	-	-	-	-
Stage 2	827	784	-	831	767	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	521	575	1003	390	491	1030	1535	-	-	1556	-	-
Mov Cap-2 Maneuver	521	575	-	390	491	-	-	-	-	-	-	-
Stage 1	834	798	-	709	671	-	-	-	-	-	-	-
Stage 2	683	732	-	628	741	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	11.8	14.3	4.7	2.9
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1535	-	-	744	529	1556	-	-
HCM Lane V/C Ratio	0.064	-	-	0.294	0.268	0.032	-	-
HCM Control Delay (s)	7.5	0	-	11.8	14.3	7.4	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	1.2	1.1	0.1	-	-

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↰	↱		↕	
Traffic Vol, veh/h	3	109	86	31	116	2	62	2	39	1	5	1
Future Vol, veh/h	3	109	86	31	116	2	62	2	39	1	5	1
Conflicting Peds, #/hr	4	0	0	0	0	4	0	0	2	2	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	1	-	-	2	-	-	-5	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	3	0	4	1	0	3	0	3	0	0	0
Mvmt Flow	3	118	93	34	126	2	67	2	42	1	5	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	132	0	0	211	0	0	369	371	167	394	416	131
Stage 1	-	-	-	-	-	-	171	171	-	199	199	-
Stage 2	-	-	-	-	-	-	198	200	-	195	217	-
Critical Hdwy	4.1	-	-	4.14	-	-	7.53	6.9	6.43	6.1	5.5	5.7
Critical Hdwy Stg 1	-	-	-	-	-	-	6.53	5.9	-	5.1	4.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.53	5.9	-	5.1	4.5	-
Follow-up Hdwy	2.2	-	-	2.236	-	-	3.527	4	3.327	3.5	4	3.3
Pot Cap-1 Maneuver	1466	-	-	1348	-	-	562	539	867	635	595	941
Stage 1	-	-	-	-	-	-	813	747	-	853	782	-
Stage 2	-	-	-	-	-	-	784	723	-	857	772	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1461	-	-	1348	-	-	545	522	866	585	576	938
Mov Cap-2 Maneuver	-	-	-	-	-	-	545	522	-	585	576	-
Stage 1	-	-	-	-	-	-	811	746	-	849	759	-
Stage 2	-	-	-	-	-	-	756	701	-	810	770	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	1.6	11.4	11
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	544	866	1461	-	-	1348	-	-	611
HCM Lane V/C Ratio	0.128	0.049	0.002	-	-	0.025	-	-	0.012
HCM Control Delay (s)	12.6	9.4	7.5	0	-	7.7	0	-	11
HCM Lane LOS	B	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.4	0.2	0	-	-	0.1	-	-	0

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	42	131	164	14	67	52
Future Vol, veh/h	42	131	164	14	67	52
Conflicting Peds, #/hr	1	0	0	1	2	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	-3	1	-	-5	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	0	0	2
Mvmt Flow	46	142	178	15	73	57

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	194	0	-	0	423	187
Stage 1	-	-	-	-	187	-
Stage 2	-	-	-	-	236	-
Critical Hdwy	4.12	-	-	-	5.4	5.72
Critical Hdwy Stg 1	-	-	-	-	4.4	-
Critical Hdwy Stg 2	-	-	-	-	4.4	-
Follow-up Hdwy	2.218	-	-	-	3.5	3.318
Pot Cap-1 Maneuver	1379	-	-	-	665	878
Stage 1	-	-	-	-	895	-
Stage 2	-	-	-	-	863	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1378	-	-	-	640	877
Mov Cap-2 Maneuver	-	-	-	-	640	-
Stage 1	-	-	-	-	862	-
Stage 2	-	-	-	-	862	-

Approach	EB	WB	SB
HCM Control Delay, s	1.9	0	11
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1378	-	-	-	726
HCM Lane V/C Ratio	0.033	-	-	-	0.178
HCM Control Delay (s)	7.7	-	-	-	11
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0.1	-	-	-	0.6

Intersection	
Int Delay, s/veh	1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	5	162	214	2	11	27
Future Vol, veh/h	5	162	214	2	11	27
Conflicting Peds, #/hr	1	0	0	1	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	75	-	-	-	0	50
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	-5	3	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	0	3	2	0	0	0
Mvmt Flow	5	176	233	2	12	29

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	236	0	-	0	421	235
Stage 1	-	-	-	-	235	-
Stage 2	-	-	-	-	186	-
Critical Hdwy	4.1	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	2.2	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	1343	-	-	-	593	809
Stage 1	-	-	-	-	809	-
Stage 2	-	-	-	-	851	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1342	-	-	-	589	808
Mov Cap-2 Maneuver	-	-	-	-	589	-
Stage 1	-	-	-	-	805	-
Stage 2	-	-	-	-	850	-

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	10.1
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	1342	-	-	-	589	808
HCM Lane V/C Ratio	0.004	-	-	-	0.02	0.036
HCM Control Delay (s)	7.7	-	-	-	11.2	9.6
HCM Lane LOS	A	-	-	-	B	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1	0.1

Intersection	
Int Delay, s/veh	5.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	1	4	102	1	139	2	375	80	86	508	2
Future Vol, veh/h	2	1	4	102	1	139	2	375	80	86	508	2
Conflicting Peds, #/hr	0	0	0	0	0	0	4	0	1	1	0	4
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	100	-	0	90	-	130	225	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-2	-	-	4	-	-	2	-	-	3	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	1	0	2	0	3	4	1	4	0
Mvmt Flow	2	1	4	111	1	151	2	408	87	93	552	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	952	1243	281	876	1157	205	558	0	0	496	0	0
Stage 1	743	743	-	413	413	-	-	-	-	-	-	-
Stage 2	209	500	-	463	744	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.1	6.7	8.32	7.3	7.34	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.1	-	7.32	6.3	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.1	-	7.32	6.3	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.51	4	3.32	2.2	-	-	2.21	-	-
Pot Cap-1 Maneuver	241	202	733	201	153	784	1023	-	-	1071	-	-
Stage 1	410	461	-	538	545	-	-	-	-	-	-	-
Stage 2	798	578	-	497	360	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	180	183	731	185	139	783	1020	-	-	1070	-	-
Mov Cap-2 Maneuver	180	183	-	185	139	-	-	-	-	-	-	-
Stage 1	408	420	-	536	543	-	-	-	-	-	-	-
Stage 2	641	576	-	450	328	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	16.6	27.9	0	1.3
HCM LOS	C	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1020	-	-	317	184	783	1070	-	-
HCM Lane V/C Ratio	0.002	-	-	0.024	0.608	0.193	0.087	-	-
HCM Control Delay (s)	8.5	-	-	16.6	51	10.7	8.7	-	-
HCM Lane LOS	A	-	-	C	F	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	3.4	0.7	0.3	-	-

Intersection	
Int Delay, s/veh	2.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	1	17	33	1	38	15	409	15	41	567	6
Future Vol, veh/h	10	1	17	33	1	38	15	409	15	41	567	6
Conflicting Peds, #/hr	0	0	0	0	0	0	5	0	0	0	0	5
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	150	-	135	110	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	5	-	-	3	-	-	4	-	-	-2	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	5	0	3	0	0	3	0
Mvmt Flow	11	1	18	36	1	41	16	445	16	45	616	7

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	970	1208	317	876	1195	223	628	0	0	461	0	0
Stage 1	715	715	-	477	477	-	-	-	-	-	-	-
Stage 2	255	493	-	399	718	-	-	-	-	-	-	-
Critical Hdwy	8.5	7.5	7.4	8.1	7.1	7.3	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	7.5	6.5	-	7.1	6.1	-	-	-	-	-	-	-
Critical Hdwy Stg 2	7.5	6.5	-	7.1	6.1	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.35	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	161	132	655	213	154	757	964	-	-	1111	-	-
Stage 1	322	359	-	502	517	-	-	-	-	-	-	-
Stage 2	683	480	-	565	387	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	144	124	652	197	145	757	960	-	-	1111	-	-
Mov Cap-2 Maneuver	144	124	-	197	145	-	-	-	-	-	-	-
Stage 1	315	343	-	493	508	-	-	-	-	-	-	-
Stage 2	634	472	-	525	370	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	20	18.3	0.3	0.6
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	960	-	-	270	197	683	1111	-	-
HCM Lane V/C Ratio	0.017	-	-	0.113	0.182	0.062	0.04	-	-
HCM Control Delay (s)	8.8	-	-	20	27.3	10.6	8.4	-	-
HCM Lane LOS	A	-	-	C	D	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.4	0.6	0.2	0.1	-	-

Intersection	
Int Delay, s/veh	9.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	103	61	173	43	27	25	88	311	77	7	496	114
Future Vol, veh/h	103	61	173	43	27	25	88	311	77	7	496	114
Conflicting Peds, #/hr	6	0	0	0	0	6	0	0	3	3	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	None	-	-	None	-	-	None
Storage Length	100	-	230	0	-	-	160	-	175	160	-	125
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	3	-	-	-3	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	0	1	0	0	0	1	3	0	0	4	1
Mvmt Flow	112	66	188	47	29	27	96	338	84	8	539	124

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	937	1172	270	852	1212	178	663	0	0	425	0	0
Stage 1	555	555	-	533	533	-	-	-	-	-	-	-
Stage 2	382	617	-	319	679	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.5	6.92	7.5	6.5	6.9	4.12	-	-	4.1	-	-
Critical Hdwy Stg 1	6.54	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4	3.31	3.5	4	3.3	2.21	-	-	2.2	-	-
Pot Cap-1 Maneuver	219	194	731	256	184	841	928	-	-	1145	-	-
Stage 1	484	516	-	503	528	-	-	-	-	-	-	-
Stage 2	612	484	-	673	454	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	167	172	731	122	164	835	928	-	-	1142	-	-
Mov Cap-2 Maneuver	167	172	-	122	164	-	-	-	-	-	-	-
Stage 1	434	512	-	450	473	-	-	-	-	-	-	-
Stage 2	495	433	-	432	451	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	31.9	35.5	1.7	0.1
HCM LOS	D	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	928	-	-	167	172	731	122	267	1142	-	-
HCM Lane V/C Ratio	0.103	-	-	0.67	0.385	0.257	0.383	0.212	0.007	-	-
HCM Control Delay (s)	9.3	-	-	62	38.5	11.6	51.8	22.1	8.2	-	-
HCM Lane LOS	A	-	-	F	E	B	F	C	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	3.9	1.7	1	1.6	0.8	0	-	-

I. 2027 Future Conditions with Development – Capacity Analysis Worksheets

LANE SUMMARY

Site: 101 [Broadview/Winchester/Lee - 2027 TF AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

Warrenton Village Center
2027 Future with Development
AM Peak Hour
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Winchester St (NB)															
Lane 1[d]	203	4.5	203	4.5	569	0.357	100	11.5	LOS B	1.8	46.7	Full	1600	0.0	0.0
Lane 2	87	4.0	87	4.0	397	0.219	100	12.7	LOS B	0.9	22.9	Short	250	0.0	NA
Approach	290	4.3	290	4.3		0.357		11.9	LOS B	1.8	46.7				
East: Lee Hwy (WB)															
Lane 1	418	7.2	418	7.2	813	0.514	100	11.4	LOS B	4.4	115.6	Full	1600	0.0	0.0
Lane 2[d]	517	6.5	517	6.5	1005	0.514	100	9.8	LOS A	4.5	117.1	Full	1600	0.0	0.0
Approach	935	6.8	935	6.8		0.514		10.5	LOS B	4.5	117.1				
North: Broadview Ave (SB)															
Lane 1[d]	253	3.6	253	3.6	717	0.353	100	9.5	LOS A	1.8	47.0	Short	215	0.0	NA
Lane 2	251	3.0	251	3.0	653	0.385	100	10.8	LOS B	2.1	52.8	Full	1600	0.0	0.0
Approach	504	3.3	504	3.3		0.385		10.1	LOS B	2.1	52.8				
West: Broadview Ave (EB)															
Lane 1	549	4.5	549	4.5	1025	0.535	100	10.0	LOS A	4.3	111.1	Full	1600	0.0	0.0
Lane 2[d]	646	3.9	646	3.9	1207	0.535	100	8.9	LOS A	4.5	115.6	Full	1600	0.0	0.0
Approach	1195	4.2	1195	4.2		0.535		9.4	LOS A	4.5	115.6				
All Vehicles	2924	4.9	2924	4.9		0.535		10.1	LOS B	4.5	117.1				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Winchester St (NB)

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	84	120	-	203	4.5		569	0.357	100	NA	NA
Lane 2	-	-	87	87	4.0		397	0.219	100	0.0	1
Approach	84	120	87	290	4.3			0.357			
East: Lee Hwy (WB)											
Mov. From E To Exit:	U E	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	3	38	377	-	418	7.2	813	0.514	100	NA	NA
Lane 2	-	-	326	191	517	6.5	1005	0.514	100	NA	NA
Approach	3	38	702	191	935	6.8		0.514			
North: Broadview Ave (SB)											
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	137	116	-	253	3.6		717	0.353	100	0.0	2
Lane 2	-	-	251	251	3.0		653	0.385	100	NA	NA
Approach	137	116	251	504	3.3			0.385			
West: Broadview Ave (EB)											
Mov. From W To Exit:	U W	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	5	286	257	-	549	4.5	1025	0.535	100	NA	NA
Lane 2	-	-	610	36	646	3.9	1207	0.535	100	NA	NA
Approach	5	286	867	36	1195	4.2		0.535			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	2924	4.9	0.535

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Winchester St (NB)				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
East: Lee Hwy (WB)				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
North: Broadview Ave (SB)				
Lane 1	0.0	0.0	0.0	0.0

Lane 2	0.0	0.0	0.0	0.0
West: Broadview Ave (EB)				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0

LANE LEVEL OF SERVICE

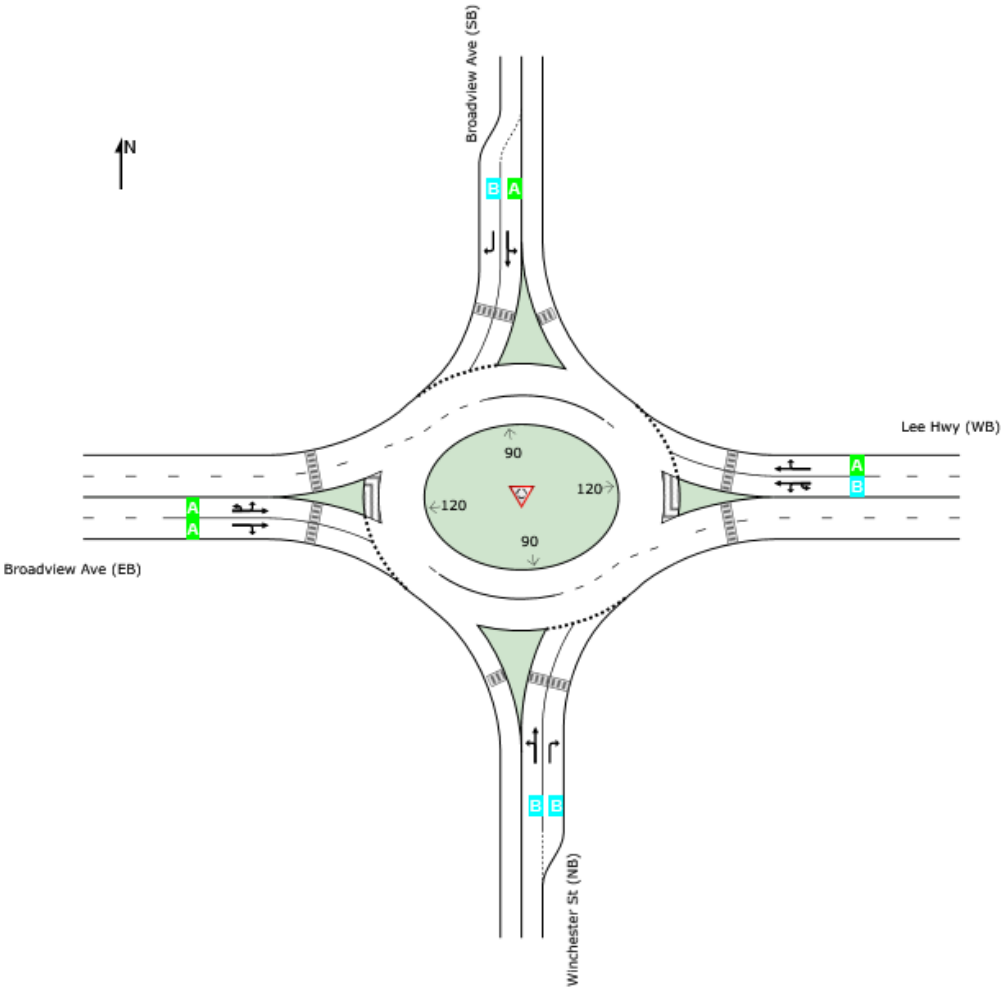
Lane Level of Service

Site: 101 [Broadview/Winchester/Lee - 2027 TF AM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

Warrenton Village Center
2027 Future with Development
AM Peak Hour
Site Category: (None)
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	B	B	B	A	B



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

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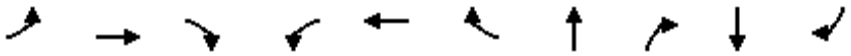
Intersection	
Int Delay, s/veh	0.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱		↑↑	↱			↱			↱
Traffic Vol, veh/h	0	944	63	0	839	32	0	0	29	0	0	21
Future Vol, veh/h	0	944	63	0	839	32	0	0	29	0	0	21
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	110	-	-	300	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	1	-	-	3	-	-	3	-	-	-11	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	4	3	0	7	0	0	0	3	0	0	0
Mvmt Flow	0	1026	68	0	912	35	0	0	32	0	0	23

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	-	-	0	-	-	513	-	-	456
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	-	-	-	7.26	-	-	5.8
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	-	-	-	3.33	-	-	3.3
Pot Cap-1 Maneuver	0	-	-	0	-	-	0	0	483	0	0	640
Stage 1	0	-	-	0	-	-	0	0	-	0	0	-
Stage 2	0	-	-	0	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	-	-	-	-	-	-	-	-	483	-	-	640
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	13	10.8
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT	WBR	SBLn1
Capacity (veh/h)	483	-	-	-	-	640
HCM Lane V/C Ratio	0.065	-	-	-	-	0.036
HCM Control Delay (s)	13	-	-	-	-	10.8
HCM Lane LOS	B	-	-	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	-	0.1



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	42	1015	1	48	872	75	23	41	110	57
v/c Ratio	0.37	0.47	0.00	0.41	0.42	0.07	0.17	0.17	0.62	0.23
Control Delay	71.3	19.4	0.0	72.4	18.1	0.1	60.7	1.6	74.9	2.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	71.3	19.4	0.0	72.4	18.1	0.1	60.7	1.6	74.9	2.2
Queue Length 50th (ft)	39	273	0	44	221	0	21	0	102	0
Queue Length 95th (ft)	80	485	0	88	400	0	47	0	163	0
Internal Link Dist (ft)		457			1504		131		565	
Turn Bay Length (ft)	240		330	150		150		60		
Base Capacity (vph)	199	2178	1063	227	2104	1047	261	338	200	259
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.47	0.00	0.21	0.41	0.07	0.09	0.12	0.55	0.22

Intersection Summary

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	7	31	934	1	44	802	69	10	11	38	93	8
Future Volume (vph)	7	31	934	1	44	802	69	10	11	38	93	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)			-4%			2%			0%			-1%
Total Lost time (s)		6.4	5.7	5.7	6.8	5.6	5.6		6.0	6.0		7.5
Lane Util. Factor		1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00
Frt		1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.98	1.00		0.96
Satd. Flow (prot)		1793	3541	1647	1752	3372	1599		1856	1615		1777
Flt Permitted		0.95	1.00	1.00	0.95	1.00	1.00		0.98	1.00		0.96
Satd. Flow (perm)		1793	3541	1647	1752	3372	1599		1856	1615		1777
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)	8	34	1015	1	48	872	75	11	12	41	101	9
RTOR Reduction (vph)	0	0	0	0	0	0	30	0	0	38	0	0
Lane Group Flow (vph)	0	42	1015	1	48	872	45	0	23	3	0	110
Heavy Vehicles (%)	14%	0%	4%	0%	2%	6%	0%	0%	0%	0%	3%	0%
Turn Type	Prot	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Perm	Split	NA
Protected Phases	1	1	6		5	2		4	4		3	3
Permitted Phases				6			2			4		
Actuated Green, G (s)		7.7	83.0	83.0	8.1	83.9	83.9		8.9	8.9		14.0
Effective Green, g (s)		7.7	83.0	83.0	8.1	83.9	83.9		8.9	8.9		14.0
Actuated g/C Ratio		0.06	0.59	0.59	0.06	0.60	0.60		0.06	0.06		0.10
Clearance Time (s)		6.4	5.7	5.7	6.8	5.6	5.6		6.0	6.0		7.5
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0
Lane Grp Cap (vph)		98	2099	976	101	2020	958		117	102		177
v/s Ratio Prot		0.02	c0.29		c0.03	0.26			c0.01			c0.06
v/s Ratio Perm				0.00			0.03			0.00		
v/c Ratio		0.43	0.48	0.00	0.48	0.43	0.05		0.20	0.03		0.62
Uniform Delay, d1		64.0	16.3	11.6	63.9	15.2	11.6		62.2	61.5		60.5
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00
Incremental Delay, d2		3.0	0.8	0.0	3.5	0.7	0.1		0.8	0.1		6.6
Delay (s)		67.0	17.1	11.6	67.4	15.8	11.7		63.0	61.6		67.1
Level of Service		E	B	B	E	B	B		E	E		E
Approach Delay (s)			19.0			18.0			62.1			63.7
Approach LOS			B			B			E			E

Intersection Summary			
HCM 2000 Control Delay	23.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	26.0
Intersection Capacity Utilization	59.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	52
Future Volume (vph)	52
Ideal Flow (vphpl)	1900
Grade (%)	
Total Lost time (s)	7.5
Lane Util. Factor	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1375
Flt Permitted	1.00
Satd. Flow (perm)	1375
Peak-hour factor, PHF	0.92
Adj. Flow (vph)	57
RTOR Reduction (vph)	51
Lane Group Flow (vph)	6
Heavy Vehicles (%)	18%
Turn Type	Perm
Protected Phases	
Permitted Phases	3
Actuated Green, G (s)	14.0
Effective Green, g (s)	14.0
Actuated g/C Ratio	0.10
Clearance Time (s)	7.5
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	137
v/s Ratio Prot	
v/s Ratio Perm	0.00
v/c Ratio	0.04
Uniform Delay, d1	56.9
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	57.1
Level of Service	E
Approach Delay (s)	
Approach LOS	

Intersection Summary

HCM 6th Edition methodology expects strict NEMA phasing.

Intersection	
Int Delay, s/veh	3.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	6	15	44	14	11	14	24	84	7	18	122	5
Future Vol, veh/h	6	15	44	14	11	14	24	84	7	18	122	5
Conflicting Peds, #/hr	0	0	2	2	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-8	-	-	-2	-	-	1	-	-	-1	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	9	0	0	0	0	0	13	0
Mvmt Flow	7	16	48	15	12	15	26	91	8	20	133	5

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	280	327	71	264	325	50	138	0	0	99	0	0
Stage 1	176	176	-	147	147	-	-	-	-	-	-	-
Stage 2	104	151	-	117	178	-	-	-	-	-	-	-
Critical Hdwy	5.9	4.9	6.1	7.1	6.28	6.7	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	4.9	3.9	-	6.1	5.28	-	-	-	-	-	-	-
Critical Hdwy Stg 2	4.9	3.9	-	6.1	5.28	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4.09	3.3	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	743	688	999	693	597	1017	1458	-	-	1507	-	-
Stage 1	881	819	-	860	770	-	-	-	-	-	-	-
Stage 2	939	830	-	892	749	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	702	665	997	630	577	1017	1458	-	-	1507	-	-
Mov Cap-2 Maneuver	702	665	-	630	577	-	-	-	-	-	-	-
Stage 1	864	808	-	844	755	-	-	-	-	-	-	-
Stage 2	893	814	-	819	739	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	9.5	10.4	1.6	0.9
HCM LOS	A	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1458	-	-	864	708	1507	-	-
HCM Lane V/C Ratio	0.018	-	-	0.082	0.06	0.013	-	-
HCM Control Delay (s)	7.5	0	-	9.5	10.4	7.4	0	-
HCM Lane LOS	A	A	-	A	B	A	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.3	0.2	0	-	-

Intersection	
Int Delay, s/veh	3.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↰	↗		↕	
Traffic Vol, veh/h	1	91	128	16	111	1	90	1	14	1	1	1
Future Vol, veh/h	1	91	128	16	111	1	90	1	14	1	1	1
Conflicting Peds, #/hr	4	0	1	1	0	4	0	0	2	2	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	1	-	-	2	-	-	-5	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	1	11	7	1	0	0	0	0	0	0	0
Mvmt Flow	1	99	139	17	121	1	98	1	15	1	1	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	126	0	0	239	0	0	329	332	172	341	401	126
Stage 1	-	-	-	-	-	-	172	172	-	160	160	-
Stage 2	-	-	-	-	-	-	157	160	-	181	241	-
Critical Hdwy	4.1	-	-	4.17	-	-	7.5	6.9	6.4	6.1	5.5	5.7
Critical Hdwy Stg 1	-	-	-	-	-	-	6.5	5.9	-	5.1	4.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.5	5.9	-	5.1	4.5	-
Follow-up Hdwy	2.2	-	-	2.263	-	-	3.5	4	3.3	3.5	4	3.3
Pot Cap-1 Maneuver	1473	-	-	1299	-	-	606	570	869	678	604	946
Stage 1	-	-	-	-	-	-	819	746	-	885	804	-
Stage 2	-	-	-	-	-	-	835	756	-	868	759	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1468	-	-	1298	-	-	597	559	867	654	593	943
Mov Cap-2 Maneuver	-	-	-	-	-	-	597	559	-	654	593	-
Stage 1	-	-	-	-	-	-	817	745	-	881	790	-
Stage 2	-	-	-	-	-	-	821	743	-	849	757	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	1	11.8	10.2
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	597	867	1468	-	-	1298	-	-	702
HCM Lane V/C Ratio	0.166	0.018	0.001	-	-	0.013	-	-	0.005
HCM Control Delay (s)	12.2	9.2	7.5	0	-	7.8	0	-	10.2
HCM Lane LOS	B	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.6	0.1	0	-	-	0	-	-	0

Intersection	
Int Delay, s/veh	3.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	83	170	1	2	156	44	5	1	2	47	1	67
Future Vol, veh/h	83	170	1	2	156	44	5	1	2	47	1	67
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	0	0	0	2
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-3	-	-	1	-	-	0	-	-	-5	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	6	1	2	2	1	0	2	2	2	17	2	0
Mvmt Flow	90	185	1	2	170	48	5	1	2	51	1	73

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	219	0	0	186	0	0	603	589	186	566	565	197
Stage 1	-	-	-	-	-	-	366	366	-	199	199	-
Stage 2	-	-	-	-	-	-	237	223	-	367	366	-
Critical Hdwy	4.16	-	-	4.12	-	-	7.12	6.52	6.22	6.27	5.52	5.7
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	5.27	4.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	5.27	4.52	-
Follow-up Hdwy	2.254	-	-	2.218	-	-	3.518	4.018	3.318	3.653	4.018	3.3
Pot Cap-1 Maneuver	1327	-	-	1388	-	-	411	421	856	483	508	873
Stage 1	-	-	-	-	-	-	653	623	-	813	778	-
Stage 2	-	-	-	-	-	-	766	719	-	690	689	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1326	-	-	1388	-	-	353	388	856	452	468	871
Mov Cap-2 Maneuver	-	-	-	-	-	-	353	388	-	452	468	-
Stage 1	-	-	-	-	-	-	603	576	-	750	776	-
Stage 2	-	-	-	-	-	-	698	717	-	635	637	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.6	0.1	13.8	12.2
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	419	1326	-	-	1388	-	-	628
HCM Lane V/C Ratio	0.021	0.068	-	-	0.002	-	-	0.199
HCM Control Delay (s)	13.8	7.9	0	-	7.6	0	-	12.2
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0.1	0.2	-	-	0	-	-	0.7

Intersection	
Int Delay, s/veh	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	38	161	6	19	158	51	20	1	62	31	1	19
Future Vol, veh/h	38	161	6	19	158	51	20	1	62	31	1	19
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	75	-	-	-	-	-	-	-	-	-	-	50
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-5	-	-	3	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	4	2	2	1	0	2	2	2	0	2	0
Mvmt Flow	41	175	7	21	172	55	22	1	67	34	1	21

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	227	0	0	182	0	0	514	530	179	537	506	200
Stage 1	-	-	-	-	-	-	261	261	-	242	242	-
Stage 2	-	-	-	-	-	-	253	269	-	295	264	-
Critical Hdwy	4.1	-	-	4.12	-	-	7.12	6.52	6.22	7.1	6.52	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.1	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.1	5.52	-
Follow-up Hdwy	2.2	-	-	2.218	-	-	3.518	4.018	3.318	3.5	4.018	3.3
Pot Cap-1 Maneuver	1353	-	-	1393	-	-	471	455	864	458	469	846
Stage 1	-	-	-	-	-	-	744	692	-	766	705	-
Stage 2	-	-	-	-	-	-	751	687	-	718	690	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1353	-	-	1393	-	-	442	434	864	406	447	846
Mov Cap-2 Maneuver	-	-	-	-	-	-	442	434	-	406	447	-
Stage 1	-	-	-	-	-	-	722	671	-	743	693	-
Stage 2	-	-	-	-	-	-	719	675	-	641	669	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.4	0.6	10.9	12.7
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	696	1353	-	-	1393	-	-	407	846
HCM Lane V/C Ratio	0.13	0.031	-	-	0.015	-	-	0.085	0.024
HCM Control Delay (s)	10.9	7.7	-	-	7.6	0	-	14.7	9.4
HCM Lane LOS	B	A	-	-	A	A	-	B	A
HCM 95th %tile Q(veh)	0.4	0.1	-	-	0	-	-	0.3	0.1

Intersection	
Int Delay, s/veh	4.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	1	1	80	1	116	1	415	107	97	359	1
Future Vol, veh/h	1	1	1	80	1	116	1	415	107	97	359	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	100	-	0	90	-	130	225	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-2	-	-	4	-	-	2	-	-	3	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	1	0	6	1	5	5	0
Mvmt Flow	1	1	1	87	1	126	1	451	116	105	390	1

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	829	1170	196	859	1054	226	391	0	0	567	0	0
Stage 1	601	601	-	453	453	-	-	-	-	-	-	-
Stage 2	228	569	-	406	601	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.1	6.7	8.3	7.3	7.32	4.1	-	-	4.2	-	-
Critical Hdwy Stg 1	6.1	5.1	-	7.3	6.3	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.1	-	7.3	6.3	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.31	2.2	-	-	2.25	-	-
Pot Cap-1 Maneuver	292	222	828	209	180	761	1179	-	-	981	-	-
Stage 1	491	527	-	507	518	-	-	-	-	-	-	-
Stage 2	779	542	-	546	431	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	223	198	828	191	161	761	1179	-	-	981	-	-
Mov Cap-2 Maneuver	223	198	-	191	161	-	-	-	-	-	-	-
Stage 1	491	471	-	506	517	-	-	-	-	-	-	-
Stage 2	648	541	-	486	385	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	18.1	22.3	0	1.9
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1179	-	-	279	191	761	981	-	-
HCM Lane V/C Ratio	0.001	-	-	0.012	0.461	0.166	0.107	-	-
HCM Control Delay (s)	8.1	-	-	18.1	39	10.7	9.1	-	-
HCM Lane LOS	A	-	-	C	E	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	2.2	0.6	0.4	-	-

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	1	1	3	17	1	20	13	503	14	16	420	3
Future Vol, veh/h	1	1	3	17	1	20	13	503	14	16	420	3
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	150	-	135	110	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	5	-	-	3	-	-	4	-	-	-2	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	6	0	5	0	0	4	0
Mvmt Flow	1	1	3	18	1	22	14	547	15	17	457	3

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	795	1083	230	838	1069	274	460	0	0	562	0	0
Stage 1	493	493	-	575	575	-	-	-	-	-	-	-
Stage 2	302	590	-	263	494	-	-	-	-	-	-	-
Critical Hdwy	8.5	7.5	7.4	8.1	7.1	7.32	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	7.5	6.5	-	7.1	6.1	-	-	-	-	-	-	-
Critical Hdwy Stg 2	7.5	6.5	-	7.1	6.1	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.36	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	226	162	754	228	187	696	1112	-	-	1019	-	-
Stage 1	464	480	-	432	460	-	-	-	-	-	-	-
Stage 2	633	423	-	694	506	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	213	157	754	221	181	696	1112	-	-	1019	-	-
Mov Cap-2 Maneuver	213	157	-	221	181	-	-	-	-	-	-	-
Stage 1	458	472	-	426	454	-	-	-	-	-	-	-
Stage 2	604	418	-	678	497	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	16	16.3	0.2	0.3
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1112	-	-	332	221	613	1019	-	-
HCM Lane V/C Ratio	0.013	-	-	0.016	0.084	0.037	0.017	-	-
HCM Control Delay (s)	8.3	-	-	16	22.8	11.1	8.6	-	-
HCM Lane LOS	A	-	-	C	C	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.3	0.1	0.1	-	-

Intersection	
Int Delay, s/veh	7.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	126	17	81	3	3	3	116	401	32	7	380	53
Future Vol, veh/h	126	17	81	3	3	3	116	401	32	7	380	53
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	None	-	-	None	-	-	None
Storage Length	100	-	230	0	-	-	160	-	175	160	-	125
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	3	-	-	-3	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	0	3	0	0	33	1	5	0	0	3	8
Mvmt Flow	137	18	88	3	3	3	126	436	35	8	413	58

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	901	1152	207	920	1175	218	471	0	0	471	0	0
Stage 1	429	429	-	688	688	-	-	-	-	-	-	-
Stage 2	472	723	-	232	487	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.5	6.96	7.5	6.5	7.56	4.12	-	-	4.1	-	-
Critical Hdwy Stg 1	6.54	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4	3.33	3.5	4	3.63	2.21	-	-	2.2	-	-
Pot Cap-1 Maneuver	233	199	796	229	193	699	1094	-	-	1101	-	-
Stage 1	574	587	-	407	450	-	-	-	-	-	-	-
Stage 2	542	434	-	756	554	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	207	175	796	170	170	699	1094	-	-	1101	-	-
Mov Cap-2 Maneuver	207	175	-	170	170	-	-	-	-	-	-	-
Stage 1	508	583	-	360	398	-	-	-	-	-	-	-
Stage 2	473	384	-	646	550	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	34.5	21.2	1.8	0.1
HCM LOS	D	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1094	-	-	207	175	796	170	273	1101	-	-
HCM Lane V/C Ratio	0.115	-	-	0.662	0.106	0.111	0.019	0.024	0.007	-	-
HCM Control Delay (s)	8.7	-	-	51	28	10.1	26.6	18.5	8.3	-	-
HCM Lane LOS	A	-	-	F	D	B	D	C	A	-	-
HCM 95th %tile Q(veh)	0.4	-	-	4	0.3	0.4	0.1	0.1	0	-	-

LANE LEVEL OF SERVICE

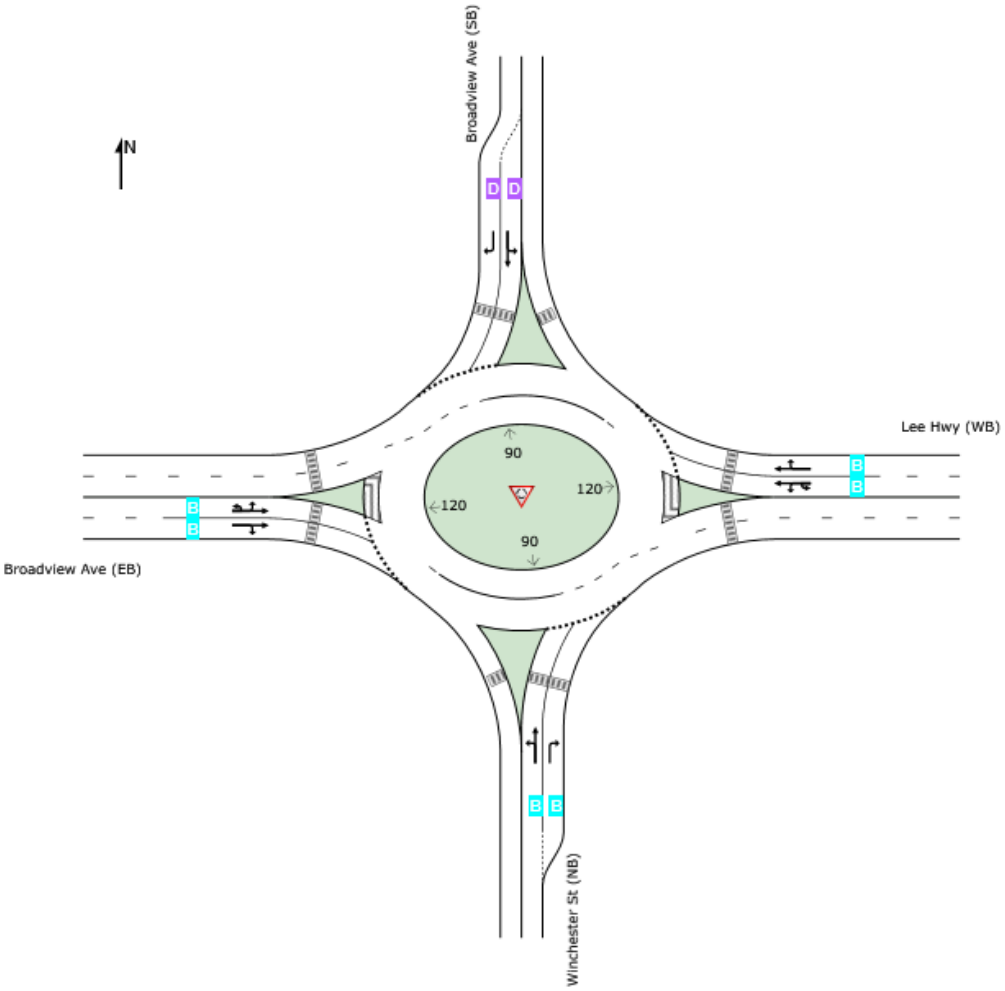
Lane Level of Service

Site: 101 [Broadview/Winchester/Lee - 2027 TF PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

Warrenton Village Center
2027 Future with Development
PM Peak Hour
Site Category: (None)
Roundabout

	Approaches				Intersection
	South	East	North	West	
LOS	B	B	D	B	B



Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).

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LANE SUMMARY

Site: 101 [Broadview/Winchester/Lee - 2027 TF PM (Site Folder: General)]

Output produced by SIDRA INTERSECTION Version: 9.1.2.202

Warrenton Village Center
2027 Future with Development
PM Peak Hour
Site Category: (None)
Roundabout

Lane Use and Performance

	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: Winchester St (NB)															
Lane 1[d]	235	0.5	235	0.5	556	0.423	100	13.2	LOS B	2.5	62.1	Full	1600	0.0	0.0
Lane 2	77	0.0	77	0.0	361	0.214	100	13.7	LOS B	0.9	23.2	Short	250	0.0	NA
Approach	313	0.4	313	0.4		0.423		13.3	LOS B	2.5	62.1				
East: Lee Hwy (WB)															
Lane 1	623	1.7	623	1.7	857	0.726	100	17.7	LOS B	10.7	271.5	Full	1600	0.0	0.0
Lane 2[d]	761	2.0	761	2.0	1047	0.726	100	15.3	LOS B	11.5	291.4	Full	1600	0.0	0.0
Approach	1383	1.9	1383	1.9		0.726		16.3	LOS B	11.5	291.4				
North: Broadview Ave (SB)															
Lane 1	347	0.7	347	0.7	426	0.815	100	39.5	LOS D	7.1	177.8	Short	215	0.0	NA
Lane 2[d]	413	4.0	413	4.0	487	0.848	100	39.7	LOS D	8.4	216.0	Full	1600	0.0	0.0
Approach	759	2.5	759	2.5		0.848		39.6	LOS D	8.4	216.0				
West: Broadview Ave (EB)															
Lane 1	547	2.5	547	2.5	913	0.599	100	12.4	LOS B	6.7	169.7	Full	1600	0.0	0.0
Lane 2[d]	664	1.9	664	1.9	1108	0.599	100	10.8	LOS B	6.8	171.5	Full	1600	0.0	0.0
Approach	1210	2.2	1210	2.2		0.599		11.5	LOS B	6.8	171.5				
All Vehicles	3666	2.0	3666	2.0		0.848		19.3	LOS B	11.5	291.4				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA HCM.
Delay Model: HCM Delay Formula (Stopline Delay: Geometric Delay is not included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: Winchester St (NB)

Mov. From S To Exit:	L2 W	T1 N	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	122	114	-	235	0.5		556	0.423	100	NA	NA
Lane 2	-	-	77	77	0.0		361	0.214	100	0.0	1
Approach	122	114	77	313	0.4			0.423			
East: Lee Hwy (WB)											
Mov. From E To Exit:	U	L2 S	T1 W	R2 N	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	10	70	543	-	623	1.7	857	0.726	100	NA	NA
Lane 2	-	-	638	123	761	2.0	1047	0.726	100	NA	NA
Approach	10	70	1180	123	1383	1.9		0.726			
North: Broadview Ave (SB)											
Mov. From N To Exit:	L2 E	T1 S	R2 W	Total	%HV		Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	249	98	-	347	0.7		426	0.815	100	0.0	2
Lane 2	-	-	413	413	4.0		487	0.848	100	NA	NA
Approach	249	98	413	759	2.5			0.848			
West: Broadview Ave (EB)											
Mov. From W To Exit:	U W	L2 N	T1 E	R2 S	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	2	293	252	-	547	2.5	913	0.599	100	NA	NA
Lane 2	-	-	618	46	664	1.9	1108	0.599	100	NA	NA
Approach	2	293	870	46	1210	2.2		0.599			

	Total	%HV	Deg.Satn (v/c)
All Vehicles	3666	2.0	0.848

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
There are no Exit Short Lanes for Merge Analysis at this Site.												

Variable Demand Analysis

	Initial Queued Demand veh	Residual Queued Demand veh	Time for Residual Demand to Clear sec	Duration of Oversatn sec
South: Winchester St (NB)				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
East: Lee Hwy (WB)				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0
North: Broadview Ave (SB)				
Lane 1	0.0	0.0	0.0	0.0

Lane 2	0.0	0.0	0.0	0.0
West: Broadview Ave (EB)				
Lane 1	0.0	0.0	0.0	0.0
Lane 2	0.0	0.0	0.0	0.0

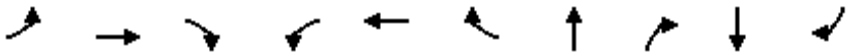
Intersection	
Int Delay, s/veh	0.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↱		↑↑	↱			↱			↱
Traffic Vol, veh/h	0	1075	83	0	1247	104	0	0	25	0	0	80
Future Vol, veh/h	0	1075	83	0	1247	104	0	0	25	0	0	80
Conflicting Peds, #/hr	0	0	0	0	0	4	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	110	-	-	300	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	1	-	-	3	-	-	3	-	-	-11	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	0	2	0	0	2	0	0	0	4	0	0	0
Mvmt Flow	0	1156	89	0	1341	112	0	0	27	0	0	86

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	-	0	0	-	-	0	-	-	578	-	-	675
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	-	-	-	-	-	-	-	-	7.28	-	-	5.8
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	-	-	-	-	-	-	-	-	3.34	-	-	3.3
Pot Cap-1 Maneuver	0	-	-	0	-	-	0	0	433	0	0	493
Stage 1	0	-	-	0	-	-	0	0	-	0	0	-
Stage 2	0	-	-	0	-	-	0	0	-	0	0	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	-	-	-	-	-	-	-	-	433	-	-	491
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0	13.9	13.9
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT	WBR	SBLn1
Capacity (veh/h)	433	-	-	-	-	491
HCM Lane V/C Ratio	0.062	-	-	-	-	0.175
HCM Control Delay (s)	13.9	-	-	-	-	13.9
HCM Lane LOS	B	-	-	-	-	B
HCM 95th %tile Q(veh)	0.2	-	-	-	-	0.6



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	149	1006	2	68	1243	151	36	79	204	152
v/c Ratio	0.72	0.48	0.00	0.54	0.70	0.17	0.31	0.30	0.80	0.41
Control Delay	82.8	22.5	0.0	82.0	32.7	2.3	72.2	3.0	83.9	9.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	82.8	22.5	0.0	82.0	32.7	2.3	72.2	3.0	83.9	9.8
Queue Length 50th (ft)	148	333	0	68	508	0	36	0	201	0
Queue Length 95th (ft)	224	441	0	123	675	28	73	0	#344	58
Internal Link Dist (ft)		457			1504		131		565	
Turn Bay Length (ft)	240		330	150		150		60		
Base Capacity (vph)	260	2078	960	157	1773	876	202	327	268	377
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.57	0.48	0.00	0.43	0.70	0.17	0.18	0.24	0.76	0.40

Intersection Summary

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

Movement	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	9	133	956	2	65	1181	143	17	17	75	176	18
Future Volume (vph)	9	133	956	2	65	1181	143	17	17	75	176	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)			-4%			2%			0%			-1%
Total Lost time (s)		6.4	5.7	5.7	6.8	5.6	5.6		6.6	6.6		7.5
Lane Util. Factor		1.00	0.95	1.00	1.00	0.95	1.00		1.00	1.00		1.00
Frpb, ped/bikes		1.00	1.00	0.97	1.00	1.00	0.98		1.00	1.00		1.00
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00
Frt		1.00	1.00	0.85	1.00	1.00	0.85		1.00	0.85		1.00
Flt Protected		0.95	1.00	1.00	0.95	1.00	1.00		0.98	1.00		0.96
Satd. Flow (prot)		1807	3682	1602	1787	3504	1558		1854	1615		1810
Flt Permitted		0.95	1.00	1.00	0.95	1.00	1.00		0.98	1.00		0.96
Satd. Flow (perm)		1807	3682	1602	1787	3504	1558		1854	1615		1810
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	9	140	1006	2	68	1243	151	18	18	79	185	19
RTOR Reduction (vph)	0	0	0	1	0	0	74	0	0	74	0	0
Lane Group Flow (vph)	0	149	1006	1	68	1243	77	0	36	5	0	204
Confl. Peds. (#/hr)				2			2					
Heavy Vehicles (%)	0%	2%	0%	0%	0%	2%	1%	0%	0%	0%	1%	0%
Turn Type	Prot	Prot	NA	Perm	Prot	NA	Perm	Split	NA	Perm	Split	NA
Protected Phases	1	1	6		5	2		4	4		3	3
Permitted Phases				6			2			4		
Actuated Green, G (s)		17.2	83.4	83.4	9.3	76.0	76.0		9.5	9.5		21.2
Effective Green, g (s)		17.2	83.4	83.4	9.3	76.0	76.0		9.5	9.5		21.2
Actuated g/C Ratio		0.11	0.56	0.56	0.06	0.51	0.51		0.06	0.06		0.14
Clearance Time (s)		6.4	5.7	5.7	6.8	5.6	5.6		6.6	6.6		7.5
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0
Lane Grp Cap (vph)		207	2047	890	110	1775	789		117	102		255
v/s Ratio Prot		c0.08	0.27		0.04	c0.35			c0.02			c0.11
v/s Ratio Perm				0.00			0.05			0.00		
v/c Ratio		0.72	0.49	0.00	0.62	0.70	0.10		0.31	0.05		0.80
Uniform Delay, d1		64.1	20.3	14.8	68.6	28.3	19.2		67.1	66.0		62.3
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00
Incremental Delay, d2		11.4	0.8	0.0	9.9	2.3	0.2		1.5	0.2		16.3
Delay (s)		75.4	21.2	14.8	78.5	30.6	19.4		68.6	66.2		78.6
Level of Service		E	C	B	E	C	B		E	E		E
Approach Delay (s)			28.2			31.7			67.0			69.1
Approach LOS			C			C			E			E

Intersection Summary			
HCM 2000 Control Delay	36.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	26.6
Intersection Capacity Utilization	76.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	144
Future Volume (vph)	144
Ideal Flow (vphpl)	1900
Grade (%)	
Total Lost time (s)	7.5
Lane Util. Factor	1.00
Frpb, ped/bikes	1.00
Flpb, ped/bikes	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1607
Flt Permitted	1.00
Satd. Flow (perm)	1607
Peak-hour factor, PHF	0.95
Adj. Flow (vph)	152
RTOR Reduction (vph)	131
Lane Group Flow (vph)	21
Confl. Peds. (#/hr)	
Heavy Vehicles (%)	1%
Turn Type	Perm
Protected Phases	
Permitted Phases	3
Actuated Green, G (s)	21.2
Effective Green, g (s)	21.2
Actuated g/C Ratio	0.14
Clearance Time (s)	7.5
Vehicle Extension (s)	3.0
Lane Grp Cap (vph)	227
v/s Ratio Prot	
v/s Ratio Perm	0.01
v/c Ratio	0.09
Uniform Delay, d1	56.0
Progression Factor	1.00
Incremental Delay, d2	0.2
Delay (s)	56.2
Level of Service	E
Approach Delay (s)	
Approach LOS	

Intersection Summary

HCM 6th Edition methodology expects strict NEMA phasing.

Intersection	
Int Delay, s/veh	8.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	17	77	120	45	50	41	97	101	12	48	75	32
Future Vol, veh/h	17	77	120	45	50	41	97	101	12	48	75	32
Conflicting Peds, #/hr	0	0	14	14	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-8	-	-	-2	-	-	1	-	-	-1	-
Peak Hour Factor	96	96	96	96	96	96	96	96	96	96	96	96
Heavy Vehicles, %	0	0	2	0	2	5	0	2	0	0	3	0
Mvmt Flow	18	80	125	47	52	43	101	105	13	50	78	33

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	476	515	70	507	525	59	111	0	0	118	0	0
Stage 1	195	195	-	314	314	-	-	-	-	-	-	-
Stage 2	281	320	-	193	211	-	-	-	-	-	-	-
Critical Hdwy	5.9	4.9	6.14	7.1	6.14	6.8	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	4.9	3.9	-	6.1	5.14	-	-	-	-	-	-	-
Critical Hdwy Stg 2	4.9	3.9	-	6.1	5.14	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.32	3.5	4.02	3.35	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	589	586	994	479	483	988	1492	-	-	1483	-	-
Stage 1	866	810	-	701	678	-	-	-	-	-	-	-
Stage 2	802	756	-	813	744	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	471	524	982	336	432	988	1492	-	-	1483	-	-
Mov Cap-2 Maneuver	471	524	-	336	432	-	-	-	-	-	-	-
Stage 1	803	781	-	650	629	-	-	-	-	-	-	-
Stage 2	652	701	-	607	717	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.5	16	3.6	2.4
HCM LOS	B	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1492	-	-	701	467	1483	-	-
HCM Lane V/C Ratio	0.068	-	-	0.318	0.303	0.034	-	-
HCM Control Delay (s)	7.6	0.1	-	12.5	16	7.5	0.1	-
HCM Lane LOS	A	A	-	B	C	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	1.4	1.3	0.1	-	-

Intersection	
Int Delay, s/veh	4.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↰	↱		↕	
Traffic Vol, veh/h	3	116	119	31	128	2	118	2	39	1	5	1
Future Vol, veh/h	3	116	119	31	128	2	118	2	39	1	5	1
Conflicting Peds, #/hr	4	0	0	0	0	4	0	0	2	2	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	0	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	1	-	-	2	-	-	-5	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	3	0	4	1	0	3	0	3	0	0	0
Mvmt Flow	3	126	129	34	139	2	128	2	42	1	5	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	145	0	0	255	0	0	408	410	193	433	473	144
Stage 1	-	-	-	-	-	-	197	197	-	212	212	-
Stage 2	-	-	-	-	-	-	211	213	-	221	261	-
Critical Hdwy	4.1	-	-	4.14	-	-	7.53	6.9	6.43	6.1	5.5	5.7
Critical Hdwy Stg 1	-	-	-	-	-	-	6.53	5.9	-	5.1	4.5	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.53	5.9	-	5.1	4.5	-
Follow-up Hdwy	2.2	-	-	2.236	-	-	3.527	4	3.327	3.5	4	3.3
Pot Cap-1 Maneuver	1450	-	-	1298	-	-	527	511	837	605	562	927
Stage 1	-	-	-	-	-	-	785	726	-	843	775	-
Stage 2	-	-	-	-	-	-	771	713	-	836	748	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1445	-	-	1298	-	-	511	494	836	557	543	924
Mov Cap-2 Maneuver	-	-	-	-	-	-	511	494	-	557	543	-
Stage 1	-	-	-	-	-	-	783	725	-	839	751	-
Stage 2	-	-	-	-	-	-	743	691	-	788	747	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	1.5	13.2	11.3
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	511	836	1445	-	-	1298	-	-	579
HCM Lane V/C Ratio	0.255	0.051	0.002	-	-	0.026	-	-	0.013
HCM Control Delay (s)	14.4	9.5	7.5	0	-	7.8	0	-	11.3
HCM Lane LOS	B	A	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	1	0.2	0	-	-	0.1	-	-	0

Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	42	170	5	6	226	14	3	1	1	67	1	52
Future Vol, veh/h	42	170	5	6	226	14	3	1	1	67	1	52
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	0	2	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-3	-	-	1	-	-	0	-	-	-5	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	0	2	2	2	0	2	2
Mvmt Flow	46	185	5	7	246	15	3	1	1	73	1	57

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	262	0	0	190	0	0	577	556	190	552	551	255
Stage 1	-	-	-	-	-	-	280	280	-	269	269	-
Stage 2	-	-	-	-	-	-	297	276	-	283	282	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	6.1	5.52	5.72
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	5.1	4.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	5.1	4.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.5	4.018	3.318
Pot Cap-1 Maneuver	1302	-	-	1384	-	-	428	439	852	522	515	812
Stage 1	-	-	-	-	-	-	727	679	-	799	740	-
Stage 2	-	-	-	-	-	-	712	682	-	788	733	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1301	-	-	1384	-	-	383	418	851	501	491	811
Mov Cap-2 Maneuver	-	-	-	-	-	-	383	418	-	501	491	-
Stage 1	-	-	-	-	-	-	698	652	-	766	735	-
Stage 2	-	-	-	-	-	-	657	677	-	753	704	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.5	0.2	13.3	12.7
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	439	1301	-	-	1384	-	-	600
HCM Lane V/C Ratio	0.012	0.035	-	-	0.005	-	-	0.217
HCM Control Delay (s)	13.3	7.9	0	-	7.6	0	-	12.7
HCM Lane LOS	B	A	A	-	A	A	-	B
HCM 95th %tile Q(veh)	0	0.1	-	-	0	-	-	0.8

Intersection	
Int Delay, s/veh	2.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	5	167	22	62	217	2	12	1	39	11	1	27
Future Vol, veh/h	5	167	22	62	217	2	12	1	39	11	1	27
Conflicting Peds, #/hr	1	0	0	0	0	1	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	75	-	-	-	-	-	-	-	-	-	-	50
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-5	-	-	3	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	3	2	2	2	0	2	2	2	0	2	0
Mvmt Flow	5	182	24	67	236	2	13	1	42	12	1	29

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	239	0	0	206	0	0	590	577	194	598	588	238
Stage 1	-	-	-	-	-	-	204	204	-	372	372	-
Stage 2	-	-	-	-	-	-	386	373	-	226	216	-
Critical Hdwy	4.1	-	-	4.12	-	-	7.12	6.52	6.22	7.1	6.52	6.2
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.1	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.1	5.52	-
Follow-up Hdwy	2.2	-	-	2.218	-	-	3.518	4.018	3.318	3.5	4.018	3.3
Pot Cap-1 Maneuver	1340	-	-	1365	-	-	419	427	847	417	421	806
Stage 1	-	-	-	-	-	-	798	733	-	653	619	-
Stage 2	-	-	-	-	-	-	637	618	-	781	724	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1339	-	-	1365	-	-	384	401	847	377	395	805
Mov Cap-2 Maneuver	-	-	-	-	-	-	384	401	-	377	395	-
Stage 1	-	-	-	-	-	-	795	730	-	650	583	-
Stage 2	-	-	-	-	-	-	578	582	-	738	721	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.2	1.7	11	11.2
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	652	1339	-	-	1365	-	-	378	805
HCM Lane V/C Ratio	0.087	0.004	-	-	0.049	-	-	0.035	0.036
HCM Control Delay (s)	11	7.7	-	-	7.8	0	-	14.9	9.6
HCM Lane LOS	B	A	-	-	A	A	-	B	A
HCM 95th %tile Q(veh)	0.3	0	-	-	0.2	-	-	0.1	0.1

Intersection	
Int Delay, s/veh	7.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	1	4	111	1	145	2	376	96	97	510	2
Future Vol, veh/h	2	1	4	111	1	145	2	376	96	97	510	2
Conflicting Peds, #/hr	0	0	0	0	0	0	4	0	1	1	0	4
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	100	-	0	90	-	130	225	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-2	-	-	4	-	-	2	-	-	3	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	1	0	2	0	3	4	1	4	0
Mvmt Flow	2	1	4	121	1	158	2	409	104	105	554	2

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	978	1287	282	902	1184	206	560	0	0	514	0	0
Stage 1	769	769	-	414	414	-	-	-	-	-	-	-
Stage 2	209	518	-	488	770	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.1	6.7	8.32	7.3	7.34	4.1	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.1	-	7.32	6.3	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.1	-	7.32	6.3	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.51	4	3.32	2.2	-	-	2.21	-	-
Pot Cap-1 Maneuver	232	191	732	192	147	782	1021	-	-	1055	-	-
Stage 1	397	450	-	537	544	-	-	-	-	-	-	-
Stage 2	798	568	-	478	348	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	169	171	730	175	132	781	1018	-	-	1054	-	-
Mov Cap-2 Maneuver	169	171	-	175	132	-	-	-	-	-	-	-
Stage 1	395	404	-	535	542	-	-	-	-	-	-	-
Stage 2	634	566	-	427	312	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	17.2	33.7	0	1.4
HCM LOS	C	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	1018	-	-	302	174	781	1054	-	-
HCM Lane V/C Ratio	0.002	-	-	0.025	0.7	0.202	0.1	-	-
HCM Control Delay (s)	8.5	-	-	17.2	63.4	10.8	8.8	-	-
HCM Lane LOS	A	-	-	C	F	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	4.2	0.8	0.3	-	-

Intersection	
Int Delay, s/veh	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	10	1	17	40	1	39	15	425	28	43	576	6
Future Vol, veh/h	10	1	17	40	1	39	15	425	28	43	576	6
Conflicting Peds, #/hr	0	0	0	0	0	0	5	0	0	0	0	5
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	0	-	-	150	-	135	110	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	5	-	-	3	-	-	4	-	-	-2	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	0	0	5	0	3	0	0	3	0
Mvmt Flow	11	1	18	43	1	42	16	462	30	47	626	7

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	993	1253	322	902	1226	231	638	0	0	492	0	0
Stage 1	729	729	-	494	494	-	-	-	-	-	-	-
Stage 2	264	524	-	408	732	-	-	-	-	-	-	-
Critical Hdwy	8.5	7.5	7.4	8.1	7.1	7.3	4.1	-	-	4.1	-	-
Critical Hdwy Stg 1	7.5	6.5	-	7.1	6.1	-	-	-	-	-	-	-
Critical Hdwy Stg 2	7.5	6.5	-	7.1	6.1	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.5	4	3.35	2.2	-	-	2.2	-	-
Pot Cap-1 Maneuver	154	123	650	203	147	748	956	-	-	1082	-	-
Stage 1	314	352	-	489	506	-	-	-	-	-	-	-
Stage 2	673	461	-	557	380	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	137	115	647	187	138	748	952	-	-	1082	-	-
Mov Cap-2 Maneuver	137	115	-	187	138	-	-	-	-	-	-	-
Stage 1	307	335	-	481	497	-	-	-	-	-	-	-
Stage 2	623	453	-	516	362	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	20.7	20.3	0.3	0.6
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	952	-	-	259	187	674	1082	-	-
HCM Lane V/C Ratio	0.017	-	-	0.118	0.233	0.065	0.043	-	-
HCM Control Delay (s)	8.8	-	-	20.7	30	10.7	8.5	-	-
HCM Lane LOS	A	-	-	C	D	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.4	0.9	0.2	0.1	-	-

Intersection	
Int Delay, s/veh	10.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	103	61	173	44	27	25	88	340	79	7	512	114
Future Vol, veh/h	103	61	173	44	27	25	88	340	79	7	512	114
Conflicting Peds, #/hr	6	0	0	0	0	6	0	0	3	3	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	Yield	-	-	None	-	-	None	-	-	None
Storage Length	100	-	230	0	-	-	160	-	175	160	-	125
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	3	-	-	-3	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	0	1	0	0	0	1	3	0	0	4	1
Mvmt Flow	112	66	188	48	29	27	96	370	86	8	557	124

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	971	1224	279	893	1262	194	681	0	0	459	0	0
Stage 1	573	573	-	565	565	-	-	-	-	-	-	-
Stage 2	398	651	-	328	697	-	-	-	-	-	-	-
Critical Hdwy	7.54	6.5	6.92	7.5	6.5	6.9	4.12	-	-	4.1	-	-
Critical Hdwy Stg 1	6.54	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.54	5.5	-	6.5	5.5	-	-	-	-	-	-	-
Follow-up Hdwy	3.52	4	3.31	3.5	4	3.3	2.21	-	-	2.2	-	-
Pot Cap-1 Maneuver	207	181	721	239	171	821	914	-	-	1113	-	-
Stage 1	472	507	-	482	511	-	-	-	-	-	-	-
Stage 2	599	468	-	664	446	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	155	161	721	110	152	815	914	-	-	1110	-	-
Mov Cap-2 Maneuver	155	161	-	110	152	-	-	-	-	-	-	-
Stage 1	422	503	-	430	456	-	-	-	-	-	-	-
Stage 2	482	418	-	423	443	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	35.9	40.7	1.6	0.1
HCM LOS	E	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	914	-	-	155	161	721	110	250	1110	-	-
HCM Lane V/C Ratio	0.105	-	-	0.722	0.412	0.261	0.435	0.226	0.007	-	-
HCM Control Delay (s)	9.4	-	-	72.8	42.2	11.7	60.8	23.6	8.3	-	-
HCM Lane LOS	A	-	-	F	E	B	F	C	A	-	-
HCM 95th %tile Q(veh)	0.3	-	-	4.3	1.8	1	1.9	0.8	0	-	-

J. Turn Lane Warrant Tables and Charts

Left Turn Lane Warrant Assessment

Two-Lane Highways

Based on AASHTO / VDOT RDM Appendix F

Background:

Warrants for left-turn storage lanes on two-lane highways at unsignalized intersections are based on Figure 3-4 to Figure 3-21 in Appendix F of the Virginia Department of Transportation's (VDOT) ***Road Design Manual*** (RDM). The figures provide a graphical representation for determining the necessity of a left turn lane by comparing the advancing volumes of a given approach and the respective opposing volumes and are differentiated by design speed and percent left turning volume.

Project Information:

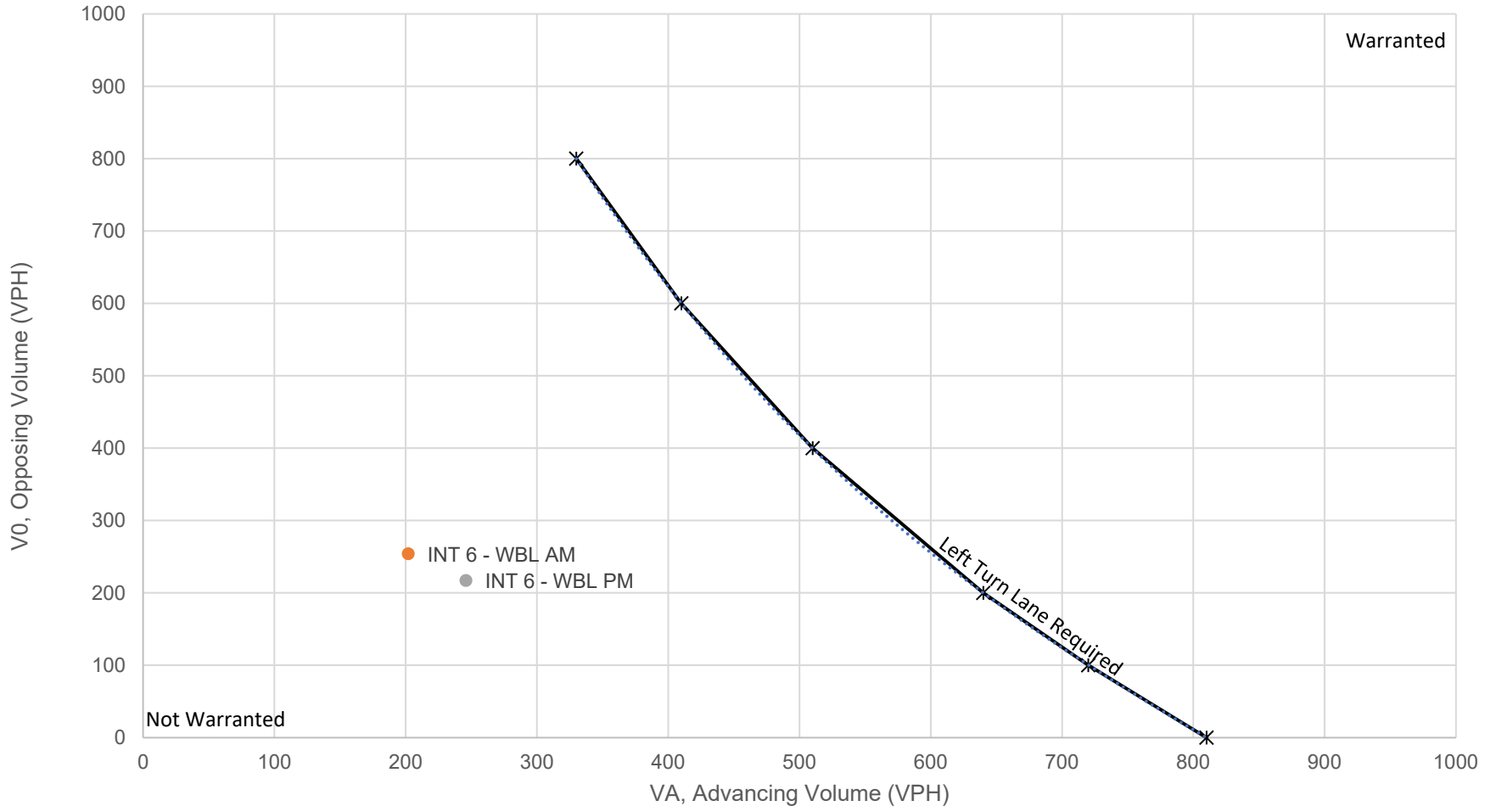
Project:	Warrenton Village
Project ID:	
Intersection(s) and Movement(s):	6 - Oak Springs Drive at Hastings Lane / Future Access (WB) 7 - Oak Springs Drive at High School Driveway / Future Garage Access (WB)
Scenario:	2027 Future Conditions with Development
Analysis:	Gorove Slade

Design Speed (mph):	**40**	**(40, 50, or 60?)**

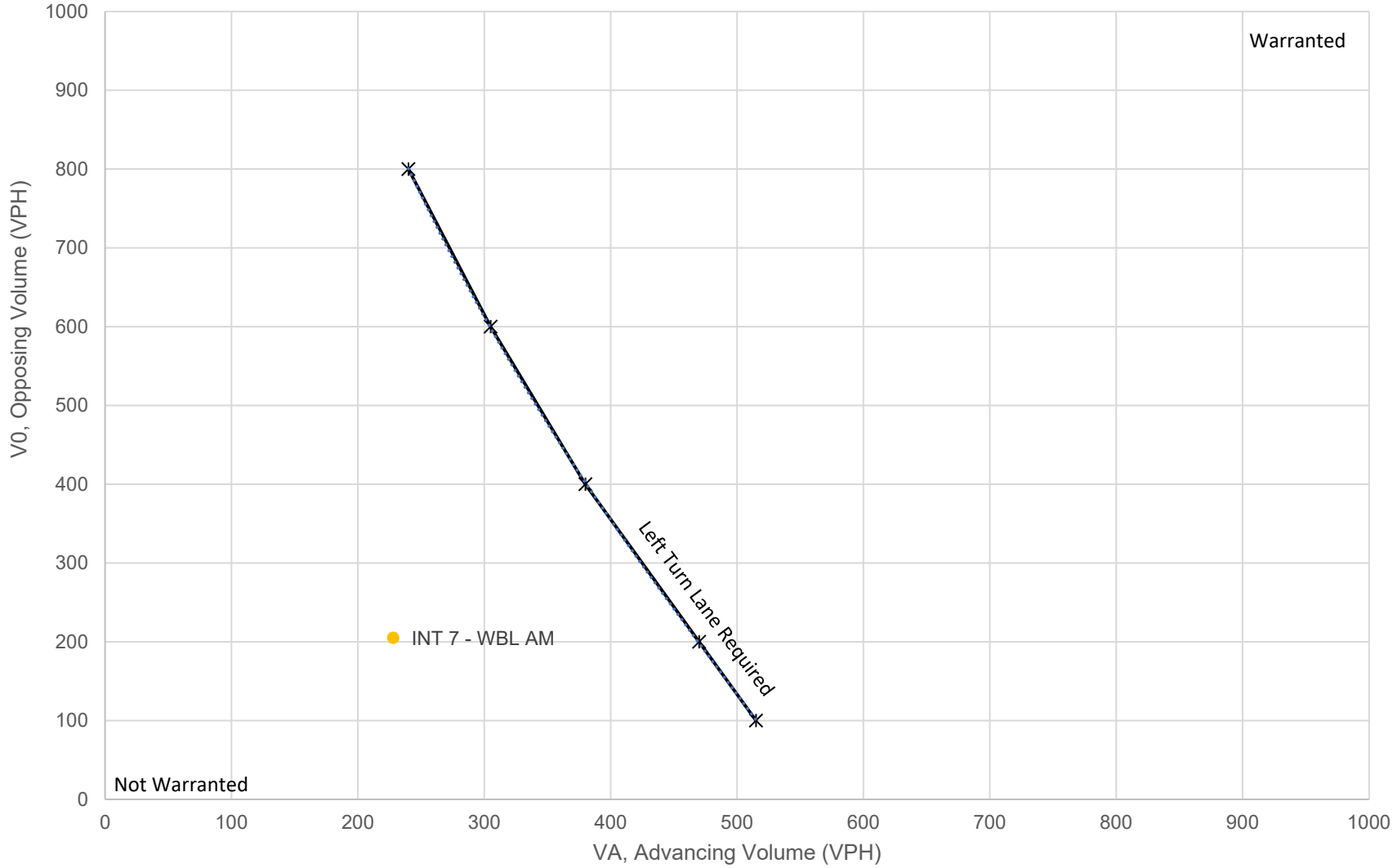
Assessment Summary:

Input				VDOT Calculated Thesholds			
Study Scenario	**Opposing Vol. (VPH)**	**Advancing Vol. (VPH)**	**Left Turn Vol. (VPH)**	**Left Turn %**	**Minimum Opposing Threshold (VPH)**	**VDOT RDM F Figure**	**Treatment**
INT 6 - WBL AM	254	202	2	0.99%	1,208	Fig. 3-4	Not Warranted
INT 6 - WBL PM	217	246	6	2.44%	1,054	Fig. 3-4	Not Warranted
INT 7 - WBL AM	205	228	19	8.33%	841	Fig. 3-5	Not Warranted
INT 7 - WBL PM	194	281	62	22.06%	274	Fig. 3-8	Not Warranted

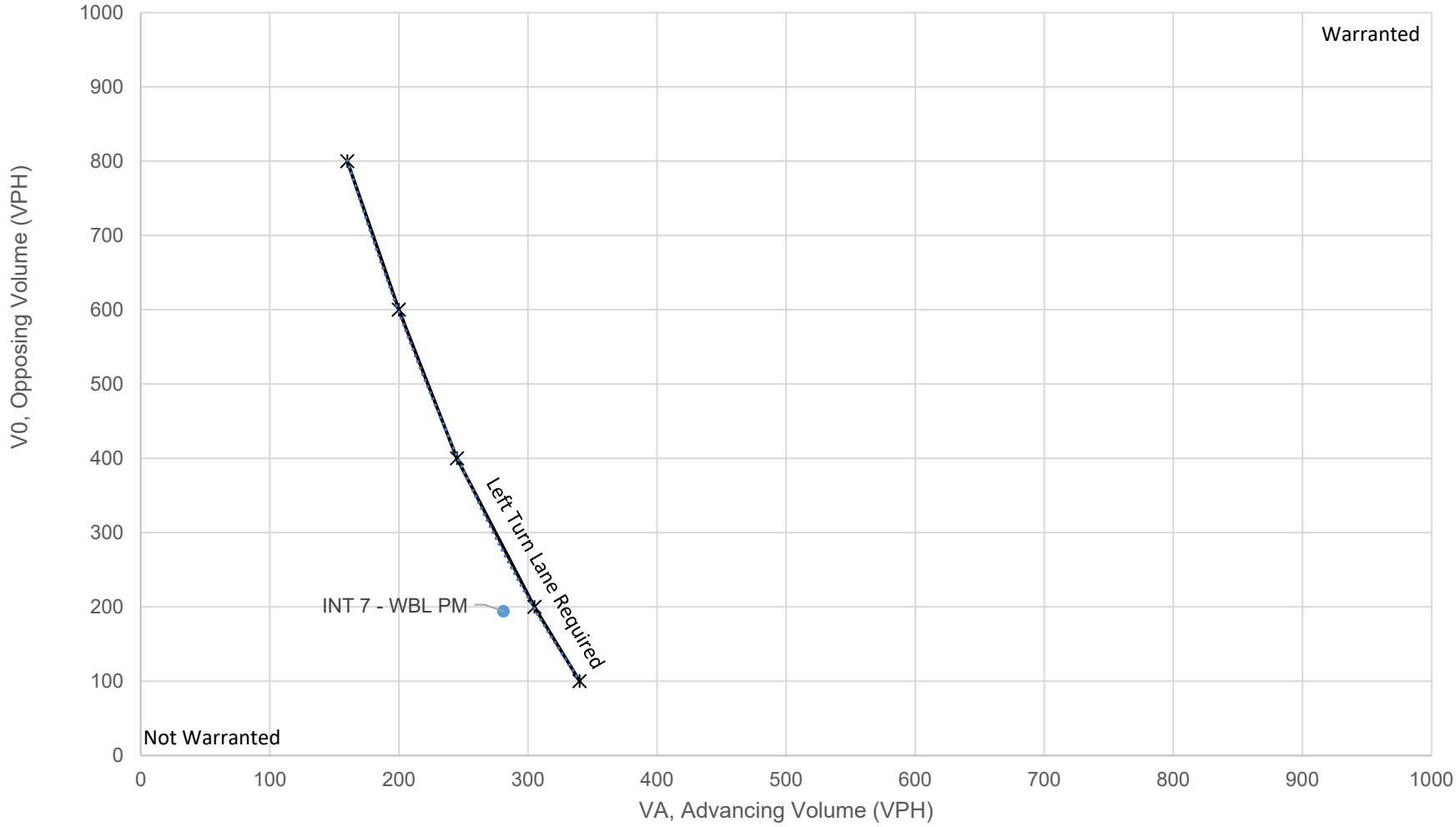
VDOT RDM-F Figure 3-4
Warrant for Left Turn Storage Lanes on 2-Lane Highways at 40-mph & 5% Left Turns



VDOT RDM-F Figure 3-5
Warrant for Left Turn Storage Lanes on 2-Lane Highways at 40-mph & 10% Left Turns



VDOT RDM-F Figure 3-8
Warrant for Left Turn Storage Lanes on 2-Lane Highways at 40-mph & 30% Left Turns



Left Turn Lane Warrant Assessment
Four-Lane Highways

Background:

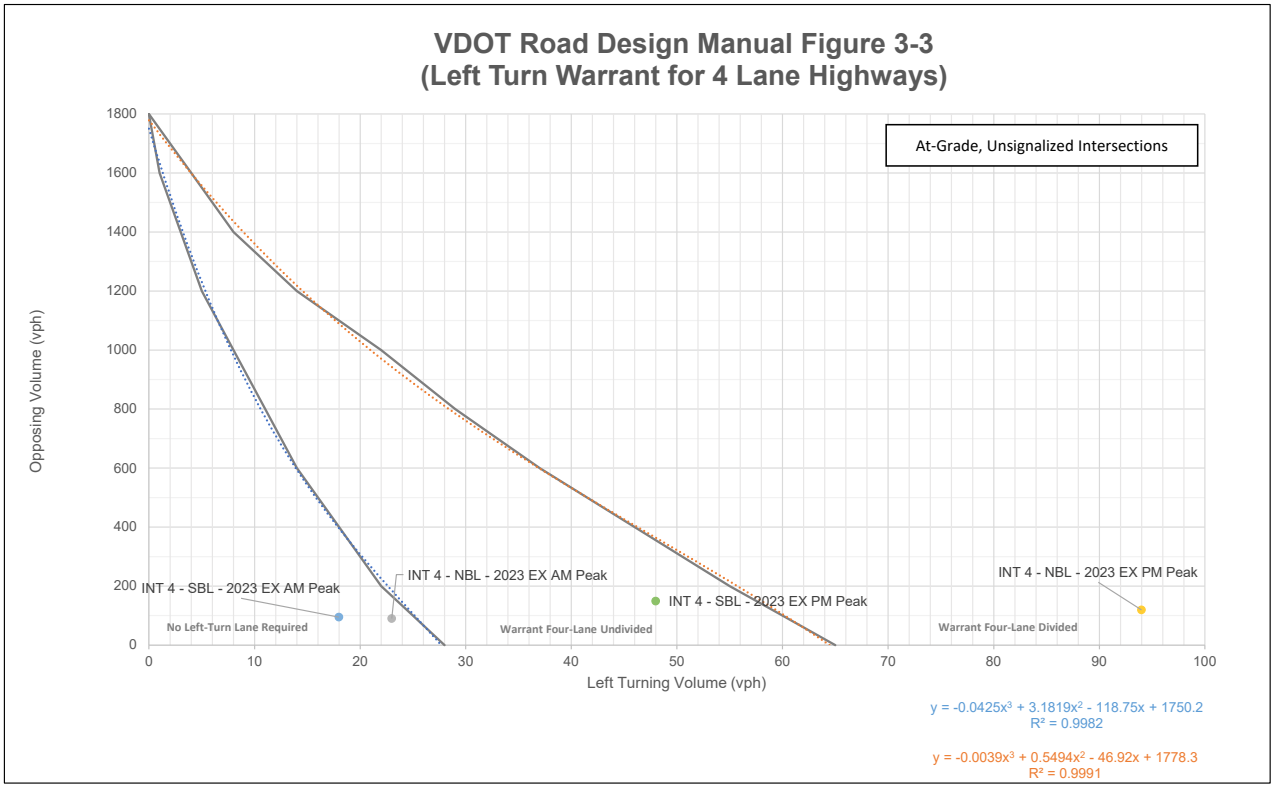
Warrants for left-turn storage lanes on four-lane highways at unsignalized intersections are based on Figure 3-3 in Appendix F of the Virginia Department of Transportation's (VDOT) ***Road Design Manual*** (RDM). The figure provides a graphical representation for determining the necessity of a left turn lane for divided and undivided roadway conditions by comparing the left turning volumes of a given approach and the respective opposing traffic volume.

Project Information:

Project:	
Project ID:	
Intersection(s) and Movement(s):	4 - Branch Drive at Warrenton Village Center Driveway / Safeway Driveway (NBL & SBL)
Scenario:	2023 Existing Conditions
Analysis:	Gorove Slade

Assessment Summary:

Input				Result	
Study Scenario	**Opposing Vol. (VPH)**	**Advancing Vol. (VPH)**	**Left Turning Vol. (VPH)**	**Left Turn %**	**Treatment**
INT 4 - NBL - 2023 EX AM Peak	90	95	23	24.2%	Not Warranted
INT 4 - NBL - 2023 EX PM Peak	119	149	94	63.1%	Full-width Turn Lane and Taper Warranted (for Undivided and Divided)
INT 4 - SBL - 2023 EX AM Peak	95	90	18	20.0%	Not Warranted
INT 4 - SBL - 2023 EX PM Peak	149	119	48	40.3%	Full-width Turn Lane and Taper Warranted (for Undivided)



Left Turn Lane Warrant Assessment

Four-Lane Highways

Background:

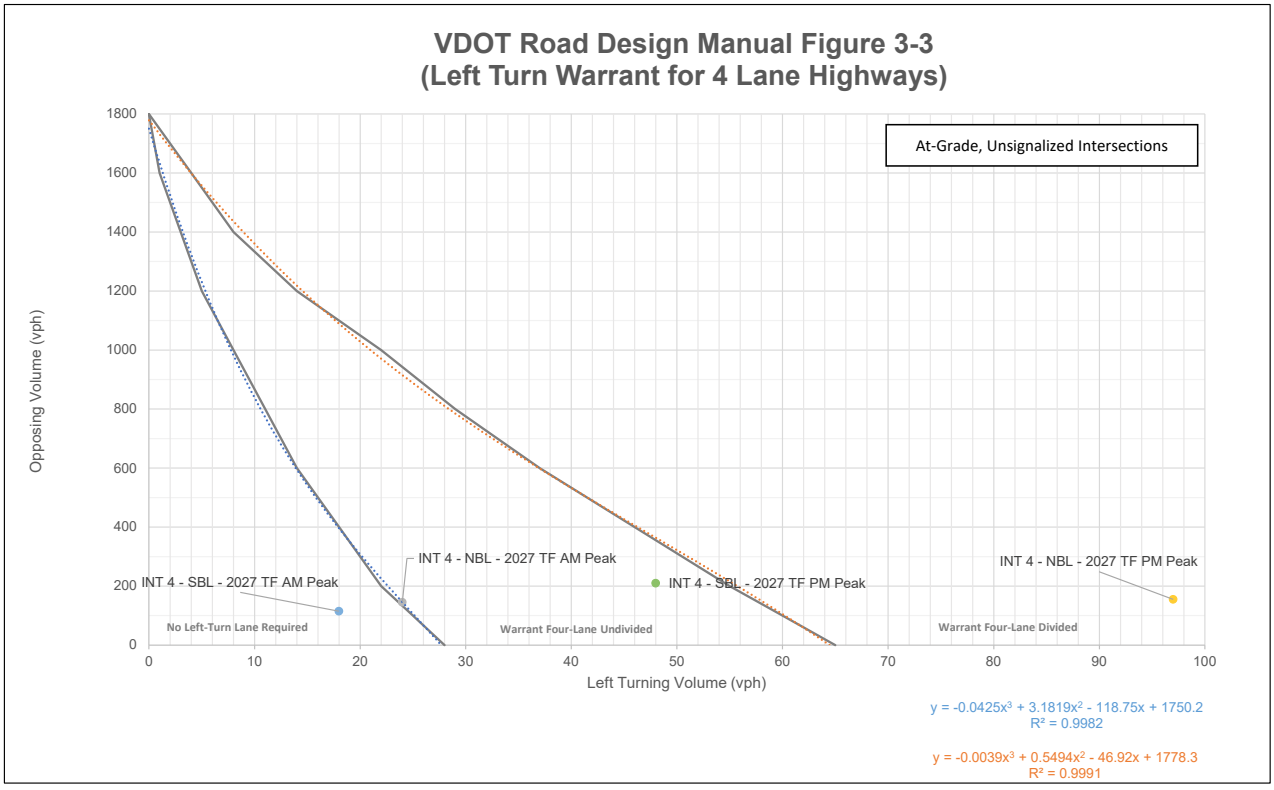
Warrants for left-turn storage lanes on four-lane highways at unsignalized intersections are based on Figure 3-3 in Appendix F of the Virginia Department of Transportation's (VDOT) ***Road Design Manual*** (RDM). The figure provides a graphical representation for determining the necessity of a left turn lane for divided and undivided roadway conditions by comparing the left turning volumes of a given approach and the respective opposing traffic volume.

Project Information:

Project:	Warrenton Village Center
Project ID:	
Intersection(s) and Movement(s):	4 - Branch Drive at Warrenton Village Center Driveway / Safeway Driveway (NBL & SBL)
Scenario:	2027 Future Conditions with Development
Analysis:	Gorove Slade

Assessment Summary:

Input				Result	
Study Scenario	**Opposing Vol. (VPH)**	**Advancing Vol. (VPH)**	**Left Turning Vol. (VPH)**	**Left Turn %**	**Treatment**
INT 4 - NBL - 2027 TF AM Peak	145	115	24	20.9%	Not Warranted
INT 4 - NBL - 2027 TF PM Peak	155	210	97	46.2%	Full-width Turn Lane and Taper Warranted (for Undivided and Divided)
INT 4 - SBL - 2027 TF AM Peak	115	145	18	12.4%	Not Warranted
INT 4 - SBL - 2027 TF PM Peak	210	155	48	31.0%	Full-width Turn Lane and Taper Warranted (for Undivided)



Right Turn Lane Warrant Assessment

Two-Lane Highways

Based on NCHRP Report 279 / VDOT RDM Appendix F
"Intersection Channelization Guide"

Background:

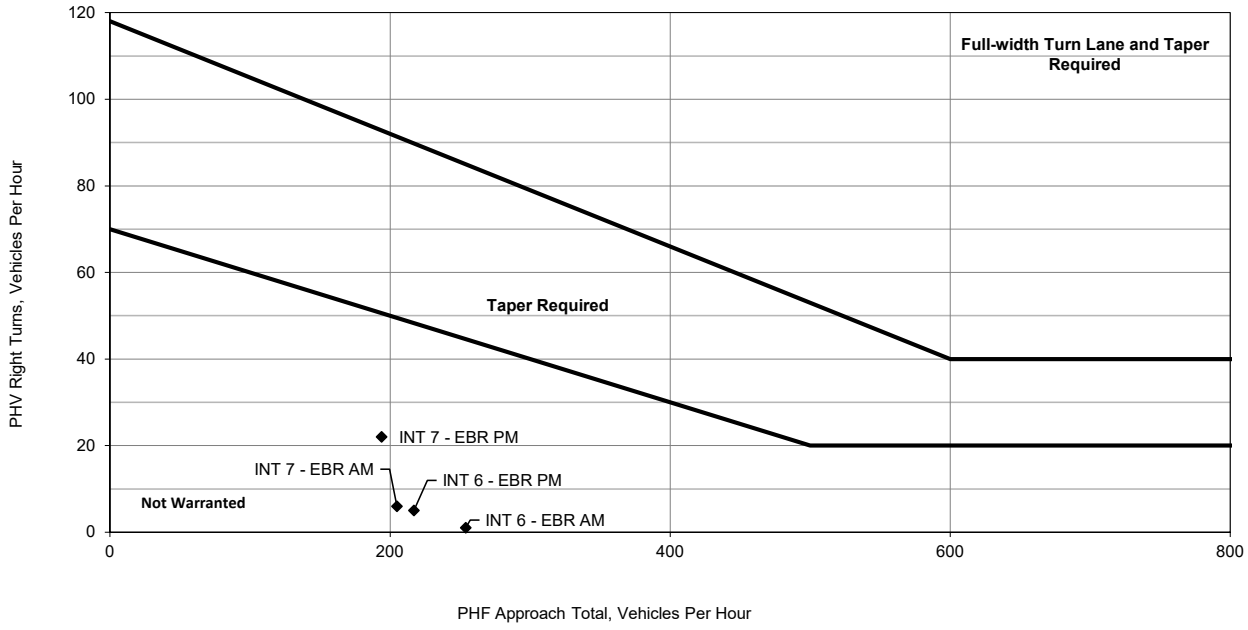
Warrants for right-turn storage lanes on two-lane highways at unsignalized intersections are based on Figure 3-26 in Appendix F of the Virginia Department of Transportation's (VDOT) ***Road Design Manual*** (RDM). This figure provides a graphical representation for determining the necessity of a right turn lane and / or taper by comparing the total volumes of a given approach with their respective right turn volumes.

Project Information:

Project:	Warrenton Village Center
Project ID:	
Intersection(s) and Movement(s):	6 - Oak Springs Drive at Hastings Lane / Future Access (EB)
	7 - Oak Springs Drive at High School Driveway / Future Garage Access (EB)
Scenario:	2027 Future Condtitions with Development
Analyst:	Gorove Slade

Study Scenario	Approach Volume	Right Turn Volume	Minimum Right Turn Taper Threshold	Minimum Right Turn Full Lane Threshold	Treatment
INT 6 - EBR AM	254	1	45	85	Not Warranted
INT 6 - EBR PM	217	5	48	90	Not Warranted
INT 7 - EBR AM	205	6	50	91	Not Warranted
INT 7 - EBR PM	194	22	51	93	Not Warranted

Right Turn Lane Warrant for 2-Lane Highways
(VDOT RDM Appendix F Figure 3-26)



Right Turn Lane Warrant Assessment

Four-Lane Highways

Based on NCHRP Report 279 / VDOT RDM Appendix F
"Intersection Channelization Guide"

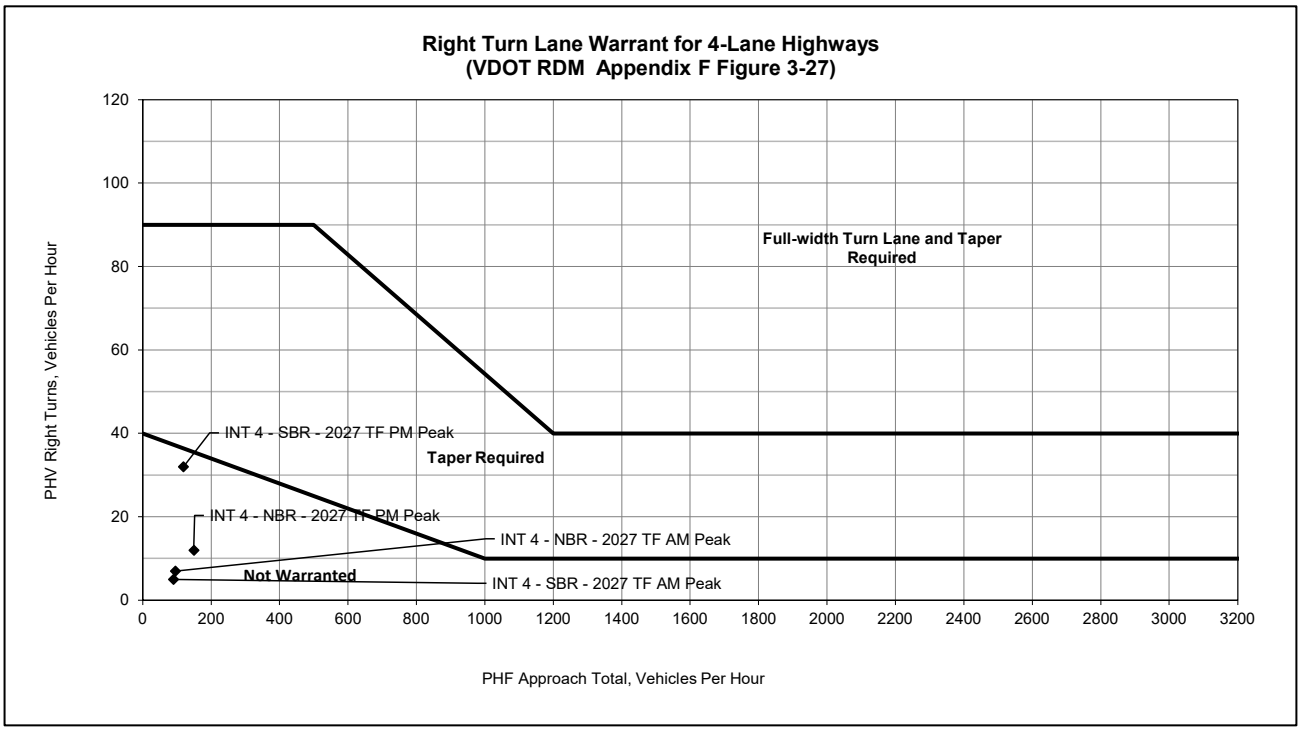
Background:

Warrants for right-turn storage lanes on four-lane highways at unsignalized intersections are based on Figure 3-27 in Appendix F of the Virginia Department of Transportation's (VDOT) ***Road Design Manual*** (RDM). This figure provides a graphical representation for determining the necessity of a right turn lane and / or taper by comparing the total volumes of a given approach with their respective right turn volumes.

Project Information:

Project:	
Project ID:	
Intersection(s) and Movement(s):	4 -Branch Drive at Warrenton Village Center Driveway / Safeway Driveway (NBR & SBR)
Scenario:	2027 Future Conditions with Development
Analyst:	Gorove Slade

Study Scenario	Approach Volume	Right Turn Volume	Minimum Right Turn Taper Threshold	Minimum Right Turn Full Lane Threshold	Treatment
INT 4 - NBR - 2027 TF AM Peak	95	7	37	90	Not Warranted
INT 4 - NBR - 2027 TF PM Peak	149	12	36	90	Not Warranted
INT 4 - SBR - 2027 TF AM Peak	90	5	37	90	Not Warranted
INT 4 - SBR - 2027 TF PM Peak	119	32	36	90	Not Warranted



K. MUTCD 4-Hour Warrant

CHAPTER 4C. TRAFFIC CONTROL SIGNAL NEEDS STUDIES

Section 4C.01 Studies and Factors for Justifying Traffic Control Signals

Standard:

01 **An engineering study of traffic conditions, pedestrian characteristics, and physical characteristics of the location shall be performed to determine whether installation of a traffic control signal is justified at a particular location.**

02 **The investigation of the need for a traffic control signal shall include an analysis of factors related to the existing operation and safety at the study location and the potential to improve these conditions, and the applicable factors contained in the following traffic signal warrants:**

Warrant 1, Eight-Hour Vehicular Volume
Warrant 2, Four-Hour Vehicular Volume
Warrant 3, Peak Hour
Warrant 4, Pedestrian Volume
Warrant 5, School Crossing
Warrant 6, Coordinated Signal System
Warrant 7, Crash Experience
Warrant 8, Roadway Network
Warrant 9, Intersection Near a Grade Crossing

03 **The satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic control signal.**

Support:

04 Sections 8C.09 and 8C.10 contain information regarding the use of traffic control signals instead of gates and/or flashing-light signals at highway-rail grade crossings and highway-light rail transit grade crossings, respectively.

Guidance:

05 *A traffic control signal should not be installed unless one or more of the factors described in this Chapter are met.*

06 *A traffic control signal should not be installed unless an engineering study indicates that installing a traffic control signal will improve the overall safety and/or operation of the intersection.*

07 *A traffic control signal should not be installed if it will seriously disrupt progressive traffic flow.*

08 *The study should consider the effects of the right-turn vehicles from the minor-street approaches. Engineering judgment should be used to determine what, if any, portion of the right-turn traffic is subtracted from the minor-street traffic count when evaluating the count against the signal warrants listed in Paragraph 2.*

09 *Engineering judgment should also be used in applying various traffic signal warrants to cases where approaches consist of one lane plus one left-turn or right-turn lane. The site-specific traffic characteristics should dictate whether an approach is considered as one lane or two lanes. For example, for an approach with one lane for through and right-turning traffic plus a left-turn lane, if engineering judgment indicates that it should be considered a one-lane approach because the traffic using the left-turn lane is minor, the total traffic volume approaching the intersection should be applied against the signal warrants as a one-lane approach. The approach should be considered two lanes if approximately half of the traffic on the approach turns left and the left-turn lane is of sufficient length to accommodate all left-turn vehicles.*

10 *Similar engineering judgment and rationale should be applied to a street approach with one through/left-turn lane plus a right-turn lane. In this case, the degree of conflict of minor-street right-turn traffic with traffic on the major street should be considered. Thus, right-turn traffic should not be included in the minor-street volume if the movement enters the major street with minimal conflict. The approach should be evaluated as a one-lane approach with only the traffic volume in the through/left-turn lane considered.*

11 *At a location that is under development or construction and where it is not possible to obtain a traffic count that would represent future traffic conditions, hourly volumes should be estimated as part of an engineering study for comparison with traffic signal warrants. Except for locations where the engineering study uses the satisfaction of Warrant 8 to justify a signal, a traffic control signal installed under projected conditions should have an engineering study done within 1 year of putting the signal into stop-and-go operation to determine if the signal is justified. If not justified, the signal should be taken out of stop-and-go operation or removed.*

12 *For signal warrant analysis, a location with a wide median, even if the median width is greater than 30 feet, should be considered as one intersection.*

Option:

13 At an intersection with a high volume of left-turn traffic from the major street, the signal warrant analysis may be performed in a manner that considers the higher of the major-street left-turn volumes as the "minor-street" volume and the corresponding single direction of opposing traffic on the major street as the "major-street" volume.

14 For signal warrants requiring conditions to be present for a certain number of hours in order to be satisfied, any four sequential 15-minute periods may be considered as 1 hour if the separate 1-hour periods used in the warrant analysis do not overlap each other and both the major-street volume and the minor-street volume are for the same specific one-hour periods.

15 For signal warrant analysis, bicyclists may be counted as either vehicles or pedestrians.

Support:

16 When performing a signal warrant analysis, bicyclists riding in the street with other vehicular traffic are usually counted as vehicles and bicyclists who are clearly using pedestrian facilities are usually counted as pedestrians.

Option:

17 Engineering study data may include the following:

A. The number of vehicles entering the intersection in each hour from each approach during 12 hours of an average day. It is desirable that the hours selected contain the greatest percentage of the 24-hour traffic volume.
B. Vehicular volumes for each traffic movement from each approach, classified by vehicle type (heavy trucks, passenger cars and light trucks, public-transit vehicles, and, in some locations, bicycles), during each 15-minute period of the 2 hours in the morning and 2 hours in the afternoon during which total traffic entering the intersection is greatest.
C. Pedestrian volume counts on each crosswalk during the same periods as the vehicular counts in Item B and during hours of highest pedestrian volume. Where young, elderly, and/or persons with physical or visual disabilities need special consideration, the pedestrians and their crossing times may be classified by general observation.
D. Information about nearby facilities and activity centers that serve the young, elderly, and/or persons with disabilities, including requests from persons with disabilities for accessible crossing improvements at the location under study. These persons might not be adequately reflected in the pedestrian volume count if the absence of a signal restrains their mobility.
E. The posted or statutory speed limit or the 85th-percentile speed on the uncontrolled approaches to the location.
F. A condition diagram showing details of the physical layout, including such features as intersection geometrics, channelization, grades, sight-distance restrictions, transit stops and routes, parking conditions, pavement markings, roadway lighting, driveways, nearby railroad crossings, distance to nearest traffic control signals, utility poles and fixtures, and adjacent land use.
G. A collision diagram showing crash experience by type, location, direction of movement, severity, weather, time of day, date, and day of week for at least 1 year.

18 The following data, which are desirable for a more precise understanding of the operation of the intersection, may be obtained during the periods described in Item B of Paragraph 17:

A. Vehicle-hours of stopped time delay determined separately for each approach.
B. The number and distribution of acceptable gaps in vehicular traffic on the major street for entrance from the minor street.
C. The posted or statutory speed limit or the 85th-percentile speed on controlled approaches at a point near to the intersection but unaffected by the control.
D. Pedestrian delay time for at least two 30-minute peak pedestrian delay periods of an average weekday or like periods of a Saturday or Sunday.
E. Queue length on stop-controlled approaches.

Section 4C.02 Warrant 1, Eight-Hour Vehicular Volume

Support:

01 The Minimum Vehicular Volume, Condition A, is intended for application at locations where a large volume of intersecting traffic is the principal reason to consider installing a traffic control signal.

02 The Interruption of Continuous Traffic, Condition B, is intended for application at locations where Condition A is not satisfied and where the traffic volume on a major street is so heavy that traffic on a minor intersecting street suffers excessive delay or conflict in entering or crossing the major street.

03 It is intended that Warrant 1 be treated as a single warrant. If Condition A is satisfied, then Warrant 1 is satisfied and analyses of Condition B and the combination of Conditions A and B are not needed. Similarly, if Condition B is satisfied, then Warrant 1 is satisfied and an analysis of the combination of Conditions A and B is not needed.

Standard:

04 **The need for a traffic control signal shall be considered if an engineering study finds that one of the following conditions exist for each of any 8 hours of an average day:**

A. The vehicles per hour given in both of the 100 percent columns of Condition A in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection; or

B. The vehicles per hour given in both of the 100 percent columns of Condition B in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection.

In applying each condition the major-street and minor-street volumes shall be for the same 8 hours. On the minor street, the higher volume shall not be required to be on the same approach during each of these 8 hours.

Option:

05 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, the traffic volumes in the 70 percent columns in Table 4C-1 may be used in place of the 100 percent columns.

Guidance:

06 *The combination of Conditions A and B is intended for application at locations where Condition A is not satisfied and Condition B is not satisfied and should be applied only after an adequate trial of other alternatives that could cause less delay and inconvenience to traffic has failed to solve the traffic problems.*

Standard:

07 **The need for a traffic control signal shall be considered if an engineering study finds that both of the following conditions exist for each of any 8 hours of an average day:**

A. The vehicles per hour given in both of the 80 percent columns of Condition A in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection; and

B. The vehicles per hour given in both of the 80 percent columns of Condition B in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection.

These major-street and minor-street volumes shall be for the same 8 hours for each condition; however, the 8 hours satisfied in Condition A shall not be required to be the same 8 hours satisfied in Condition B. On the minor street, the higher volume shall not be required to be on the same approach during each of the 8 hours.

Table 4C-1. Warrant 1, Eight-Hour Vehicular Volume

Condition A—Minimum Vehicular Volume

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100%[a]	80%[b]	70%[c]	56%[d]	100%[a]	80%[b]	70%[c]	56%[d]
1	1	500	400	350	280	150	120	105	84
2 or more	1	600	480	420	336	150	120	105	84
2 or more	2 or more	600	480	420	336	200	160	140	112
1	2 or more	500	400	350	280	200	160	140	112

Condition B—Interruption of Continuous Traffic

Number of lanes for moving traffic on each approach		Vehicles per hour on major street (total of both approaches)				Vehicles per hour on higher-volume minor-street approach (one direction only)			
Major Street	Minor Street	100%[a]	80%[b]	70%[c]	56%[d]	100%[a]	80%[b]	70%[c]	56%[d]
1	1	750	600	525	420	75	60	53	42
2 or more	1	900	720	630	504	75	60	53	42
2 or more	2 or more	900	720	630	504	100	80	70	56
1	2 or more	750	600	525	420	100	80	70	56

[a] Basic minimum hourly volume

[b] Used for combination of Conditions A and B after adequate trial of other remedial measures

[c] May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

[d] May be used for combination of Conditions A and B after adequate trial of other remedial measures when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

Option:

08 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, the traffic volumes in the 56 percent columns in Table 4C-1 may be used in place of the 80 percent columns.

Section 4C.03 Warrant 2, Four-Hour Vehicular Volume

Support:

01 The Four-Hour Vehicular Volume signal warrant conditions are intended to be applied where the volume of intersecting traffic is the principal reason to consider installing a traffic control signal.

Standard:

02 **The need for a traffic control signal shall be considered if an engineering study finds that, for each of any 4 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 applicable curve in Figure 4C-1 for the existing combination of approach lanes. On the minor street, the higher volume shall not be required to be on the same approach during each of these 4 hours.**

Option:

03 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, Figure 4C-2 may be used in place of Figure 4C-1.

Section 4C.04 Warrant 3, Peak Hour

Support:

01 The Peak Hour signal warrant is intended for use at a location where traffic conditions are such that for a minimum of 1 hour of an average day, the minor-street traffic suffers undue delay when entering or crossing the major street.

Standard:

02 **This signal warrant shall be applied only in unusual cases, such as office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.**

03 **The need for a traffic control signal shall be considered if an engineering study finds that the criteria in either of the following two categories are met:**

A. If all three of the following conditions exist for the same 1 hour (any four consecutive 15-minute periods) of an average day:

1. The total stopped time delay experienced by the traffic on one minor-street approach (one direction only) controlled by a STOP sign equals or exceeds: 4 vehicle-hours for a one-lane approach or 5 vehicle-hours for a two-lane approach; and

2. The volume on the same minor-street approach (one direction only) equals or exceeds 100 vehicles per hour for one moving lane of traffic or 150 vehicles per hour for two moving lanes; and

3. The total entering volume serviced during the hour equals or exceeds 650 vehicles per hour for intersections with three approaches or 800 vehicles per hour for intersections with four or more approaches.

B. The plotted point 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 1 hour (any four consecutive 15-minute periods) of an average day falls above the applicable curve in Figure 4C-3 for the existing combination of approach lanes.

Option:

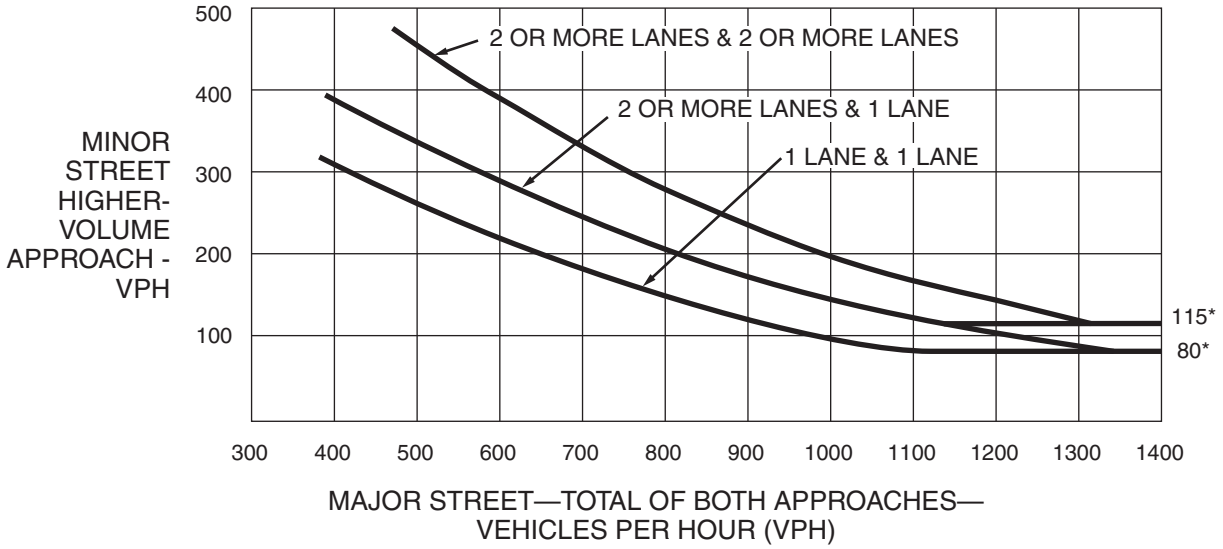
04 If the posted or statutory speed limit or the 85th-percentile speed on the major street exceeds 40 mph, or if the intersection lies within the built-up area of an isolated community having a population of less than 10,000, Figure 4C-4 may be used in place of Figure 4C-3 to evaluate the criteria in the second category of the Standard.

05 If this warrant is the only warrant met and a traffic control signal is justified by an engineering study, the traffic control signal may be operated in the flashing mode during the hours that the volume criteria of this warrant are not met.

Guidance:

06 *If this warrant is the only warrant met and a traffic control signal is justified by an engineering study, the traffic control signal should be traffic-actuated.*

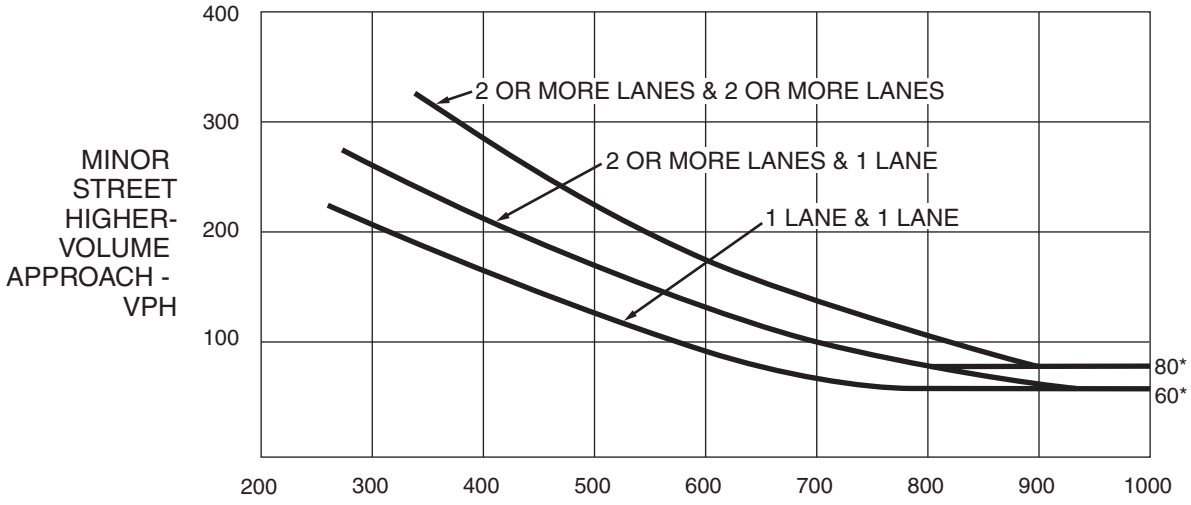
Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume



*Note: 115 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 80 vph applies as the lower threshold volume for a minor-street approach with one lane.

Figure 4C-2. Warrant 2, Four-Hour Vehicular Volume (70% Factor)

(COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 40 MPH ON MAJOR STREET)



*Note: 80 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 60 vph applies as the lower threshold volume for a minor-street approach with one lane.

Market and Fiscal Impacts Analyses
Warrenton Village
Town of Warrenton, Virginia

Prepared for:
Jess Achenbach
Castle Development Partners

June 2023

▪ S. PATZ & ASSOCIATES, INC ▪
▪ REAL ESTATE CONSULTANTS ▪

June 12, 2023

Jess Achenbach
Castle Development Partners
230 Court Square, Suite 202
Charlottesville, Virginia 22902

Jess:

Attached is our full-narrative market study and resulting Fiscal Impacts Analysis (FIA) for the proposed Warrenton Village proposal, to include 376 rental units. The proposal is for three residential components: a 320-unit elevator-served apartment building alongside 36 two-over-two and 20 townhome units. All rental units proposed for Warrenton Village will have market rents and no age restrictions.

The report is presented in three sections. The first is a description of the study site and development proposal. Detailed data describe the Warrenton Village site. The second section is a brief market analysis for the new rental units planned. The market study is not prepared in the same depth as a study for a lender package, as all building and unit designs are not yet set, but sufficient data are provided to determine market support for the proposed 376 rental units. The third section, based on market data, shows the net tax benefits to the Town of Warrenton from the development proposal. The analysis to follow shows full market support for the apartment units at the proposed rents.

The FIA, based on the result of the market analysis, shows a net benefit for the proposal to the Town of Warrenton at $46,100± annually, after build-out. Most of the revenue to the Town will be generated from off-site impacts, as the Town of Warrenton levies low real estate and personal property tax rates. This is reflected in the General Fund revenues. The following table presents the FIA conclusions at build-out.

Summary of On-Site and Off-Site Fiscal Impacts of Apartments, Warrenton Village at Build-Out, Warrenton, Virginia
(Constant 2023 Dollars)

Source of Fiscal Impacts on the Town	Impacts On-Site in Warrenton	Impacts Off-Site in Warrenton	Total Fiscal Impacts
Apartments (320 Units)			
Revenues to the Town	$117,560	$338,870	$456,430
Town Costs	-$280,280	-$145,920	-$426,200
Subtotal	*-$162,720*	*$192,950*	*$30,230*
Two-Over-Two (36 Units)			
Revenues to the Town	$14,550	$55,520	$70,070
Town Costs	-$42,740	-$23,490	-$66,230
Subtotal	*-$28,190*	*$32,030*	*$3,840*
Townhomes (20 Units)			
Revenues to the Town	$8,050	$41,150	$49,200
Town Costs	-$23,310	-$13,860	-$37,170
Subtotal	*-$15,260*	*$27,290*	*$12,030*
Total Residential (376 units)			
Revenues to the Town	$140,160	$435,540	$575,700
Town Costs	-$346,330	-$183,270	-$529,600
Net Fiscal Benefits	**-$206,170**	**$252,270**	**$46,100**

Source: Town of Warrenton, VA; S. Patz & Associates, Inc.

All detailed market and economic data that support our findings and conclusions are presented in the attached report. Please call if additional data or clarification are needed.

Sincerely,

Ariel Goldring

Ariel Goldring
President

Table of Contents

Section I: Introduction

This will set forth our market and Fiscal Impacts Analysis (FIA) for the proposed Warrenton Village apartment community, planned for a well-located 6.46-acre site along the south side of Oak Springs Drive and just north of W. Lee Highway in the Town of Warrenton, Virginia. The vacant property benefits from its close proximity to several large shopping centers, including the Safeway-anchored Warrenton Village, Marshalls-anchored Warrenton Center, and Giant-anchored Oak Springs Plaza. The site is currently zoned C (Commercial). The sponsor is submitting for a Special Use Permit under the existing zoning.

The proposal is for an attractive 376-unit rental community consisting of 320 elevator-served apartment units, alongside 36 two-over-two and 20 townhome units. The complex will offer a wide range of amenities, including a clubhouse, fitness center and outdoor swimming pool. No such concept currently exists in the Town of Warrenton or elsewhere in Fauquier County, and once built, Warrenton Village will be a "step above" the existing apartment market in the Town and County. Construction is planned to begin in late-2024 with a late-2026 delivery.

The Special Use Permit requires a Fiscal Impacts Analysis (FIA), which calculates the net tax benefits that will accrue to the Town of Warrenton at project build-out. The FIA to follow includes net tax benefits from on-site development and off-site expenditures in the Town, as will be fully explained later in the report. The FIA is based on the ability of the site to be developed, as planned, which is described in the market analysis undertaken for this report.

The report to follow is presented in three sections. The first, the Introduction, is an analysis of the Warrenton Village site and a description of the development proposal. Also part of the description is an analysis of the local economy, which shows the level of job growth that supports the magnitude of new housing unit demand planned for the study site.

Section II is an overview analysis of the Warrenton area apartment market. This is not a full-narrative market analysis that would be acceptable by a lender or investor. Rather, it provides

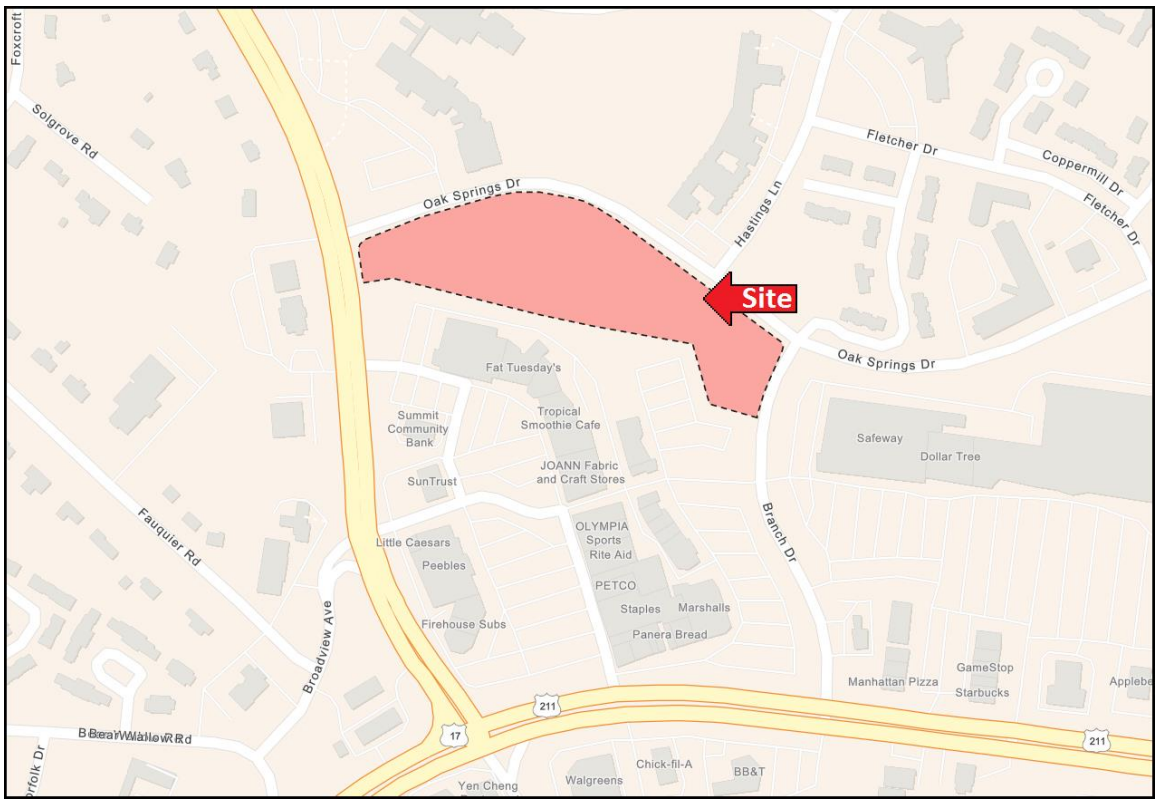
sufficient market data to support the development proposal, as planned. The Conclusions of the market analysis will be the base data for the preparation of the FIA.

Section III is the calculation of the full-narrative FIA that documents annual net tax revenue from the Warrenton Village proposal, based on on-site and off-site revenues from on-site expenditures. Town costs are subtracted from the revenue estimates to establish a net fiscal benefit. For this analysis, all tax revenue and cost data are presented in constant 2023 dollars.

Warrenton Village

Site Description

Map A shows the location of the study site along the southern side of Oak Springs Drive in the Town of Warrenton. The site is bounded to the west by Broadview Drive and to the east by Branch Drive. Its southern boundary is the Warrenton Village Shopping Center, with tenants including Petco, Staples and Marshalls. The study site is shown to be near W Lee Highway, which is a major arterial roadway in the Town that provides direct access to Fauquier Health in the south and U.S. Route 15 in the east.

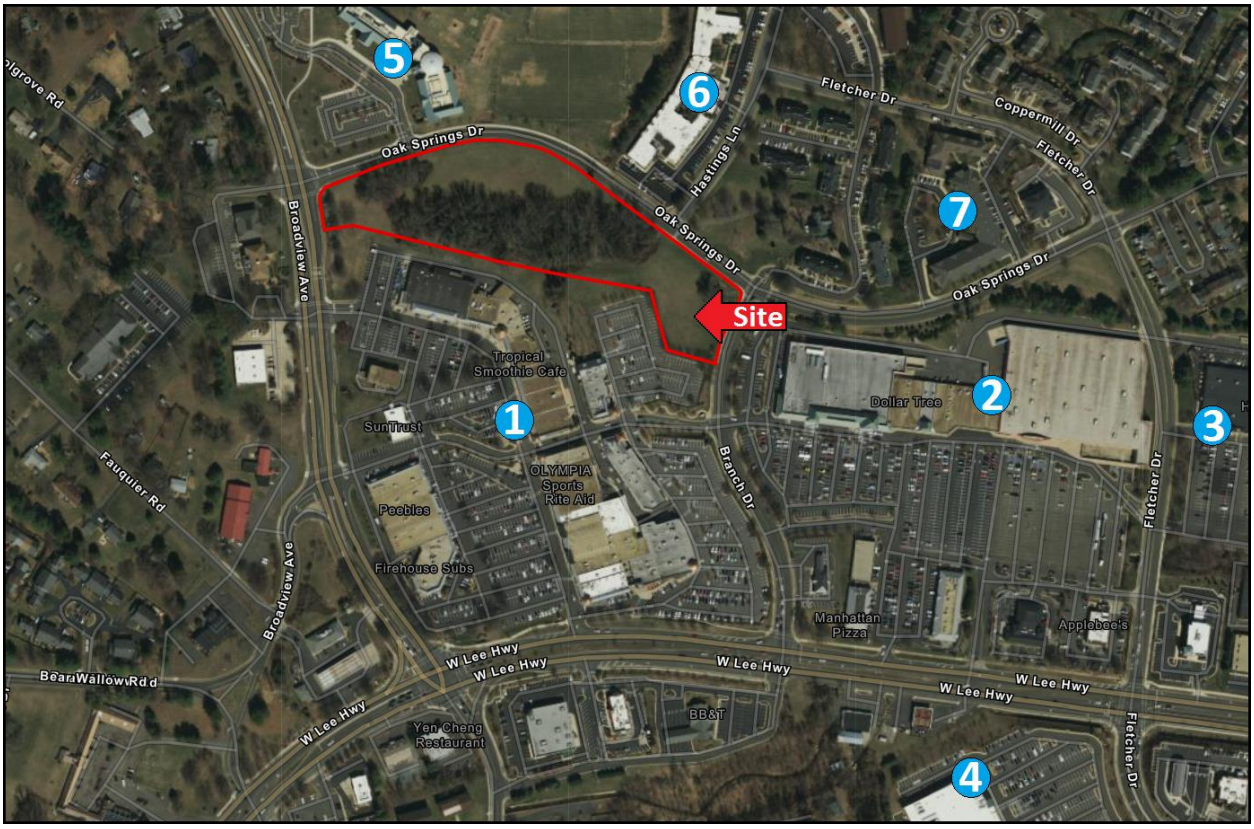


Map A – Site Location

Shown next is a northern aerial of the study site. The aerial shows the irregularly shaped site to be located within a mixed-use setting. Commercial uses generally flank W Lee Highway to the south. This includes the Marshalls-anchored Warrenton Center (Note 1), Safeway-anchored Warrenton Village (Note 2), Giant-anchored Oak Springs Plaza (Note 3) and Harris Teeter-anchored North Rock Shopping Center (Note 4). This is the largest commercial concentration in the Warrenton area. Many of the area restaurants and retailers are within walking distance of the Warrenton Village site.

To the north of the study site is a large private school with over 500 students called Highland School (Note 5) as well as the 130-bed Brookside Rehab & Nursing Center (Note 6). Residential areas are situated to the northeast of the study site and include The Oaks of Warrenton (Note 7), a 111-unit affordable, age-restricted apartment community that was built in two phases

in 1996 and 2001. Most of the other nearby homes are townhomes and condos that have generally sold in the $200,000s and $300,000s.



Northern Aerial

Overall, the study site is well-located and in close proximity to local arterial streets, an interchange with U.S. Route 15, nearby employment centers, and a host of big-box and small retailers that serve the existing residential market.

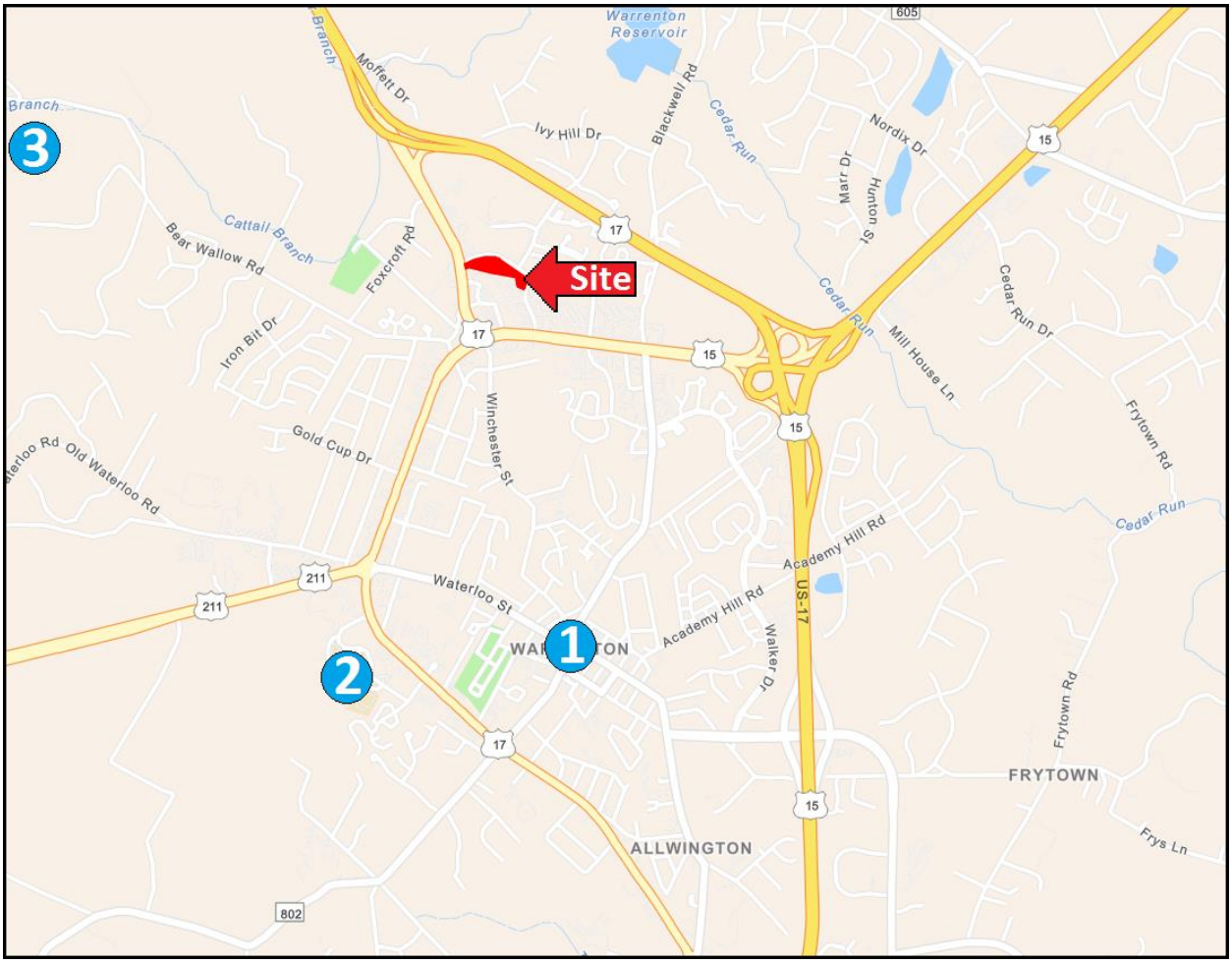
Map C, on page 10, depicts the site setting within the Town of Warrenton. As previously noted, the site is located near W Lee Highway, which accesses U.S. Route 15 less than a mile to the east. This roadway provides direct access to the greater Gainesville/ Haymarket area of western Prince William County, which is the nearest employment cluster outside of Fauquier County. Gainesville is an approximately 12-mile drive from the study site and is the location of

an interchange with I-66 that extends to other major employment centers elsewhere in Northern Virginia.

U.S. Route 17 is also shown to be located just north of the study site via Broadview Avenue. This roadway accesses the community of Marshall at the northern edge of Fauquier County, as well as Bealeton to the south. Both locations are primarily residential. In addition, Map C shows the site's close proximity to Downtown Warrenton, approximately 1.5 miles from the study site. This is the location of several restaurants, specialty retailers and professional office space.

Also shown to be located near the study site is Fauquier Hospital (Note 2), which is located at 500 Hospital Drive in Warrenton. This is a 97-bed, acute care hospital offering surgical services (including robotics), a 24-hour Emergency Department, extensive medical imaging capabilities and an Intensive Care Unit. Construction was recently completed in 2020 on the hospital's new 25,640± square foot Cancer Center. There is approximately 50,000 square feet of medical office space adjacent to Fauquier Hospital. North of the hospital is the large Fauquier Health Rehabilitation and Nursing Center and four office structures that are occupied by County officials.

Map C also shows the site to be located within close proximity of the Warrenton Training Center (Note 3), which is a 346-acre classified United States government communication complex. County staff estimate that the complex employs approximately 350 people.



Map C - Site Setting

Shown next are photos of the study site. The site is shown to be partially wooded and fully vacant.


Southern View of site from Oak Springs Drive

Development Program

The development program for Warrenton Village involves the development of a vacant 6.46-acre parcel with a mix of an elevator-served apartment building alongside two-over-two and townhomes for rent.

Table 1 provides a detailed description of the study proposal, with data on unit sizes, unit mix and proposed rents. The table shows a mix of 133 one-bedroom, 159 two-bedroom and 84 three-bedroom units. One-bedroom apartment units will be spacious and range in size between 642 and 950 square feet, or an average of 771 square feet. Two-bedroom units, each with two full bathrooms will also be large, ranging in size between 980 and 1,184 square feet, or an average of 1,103 square feet. The three-bedroom apartment units will range in size between 1,388 and 2,583 square feet. The three-bedroom two-over-two units will be 1,586 and 2,583 square feet. The three-bedroom townhome units will all measure 2,050 square feet. The three-bedroom units will have between 2.0 and 3.5 bathrooms.

Rents will exclude utilities but will include in-unit washers and dryers at no additional cost to the tenant. One-bedroom rents are proposed to range between $1,650 and $1,900, or an average of $1,750. The smaller two-bedroom apartment units will rent for $2,200 while the larger two-bedroom apartment units will rent for $2,350. The two-bedroom units will rent for an average of $2,250. The three-bedroom apartment units will rent for between $2,400 and $2,550. The three-

bedroom two-over-two units will rent for between $2,800 and $3,000. The three-bedroom townhome units will rent for between $3,100 and $3,200.

Table 1: Proposed Unit Characteristics, Warrenton Village, June 2022

	Unit Type	Bathrooms	Total Units	Unit Sizes (Sq. Ft.)	Proposed Rents 1/
One-Bedroom					
A1	Apartment	1.0	50	642	$1,650
A2	Apartment	1.0	28	725	$1,725
A3	Apartment	1.0	2	790	$1,750
A4	Apartment	1.0	22	768	$1,750
A5	Apartment	1.0	11	850	$1,800
A5A	Apartment	1.0	3	950	$1,900
A6	Apartment	1.0	6	750	$1,750
A7A	Apartment	1.0	4	724	$1,700
A7B	Apartment	1.0	4	738	$1,725
A8	Apartment	1.0	3	775	$1,750
Subtotal/ Average			*133*	*771*	*$1,750*
Two-Bedroom					
B1	Apartment	2.0	92	1,054	$2,200
B2	Apartment	2.0	45	1,167	$2,300
B3	Apartment	2.0	7	1,040	$2,200
B4	Apartment	2.0	4	1,130	$2,300
B5A	Apartment	2.0	3	1,184	$2,350
B5B	Apartment	2.0	4	1,164	$2,300
B6	Apartment	2.0	4	980	$2,100
Subtotal/ Average			*159*	*1,103*	*$2,250*
Three-Bedroom					
C1	Apartment	2.0	17	1,388	$2,400
C2	Apartment	2.0	4	1,425	$2,500
C3	Apartment	3.0	7	1,496	$2,550
D1	Two-Over Two	2.5	18	1,586	$2,800
D2	Two-Over Two	2.5	18	2,583	$3,000
E1	Townhome	2.5	10	2,050	$3,100
E2	Townhome	3.5	10	2,050	$3,200
Subtotal/ Average			*84*	*1,797*	*$2,793*
Total			**376**		

Notes: 1/ Excludes utilities. Includes washer/ dryers.

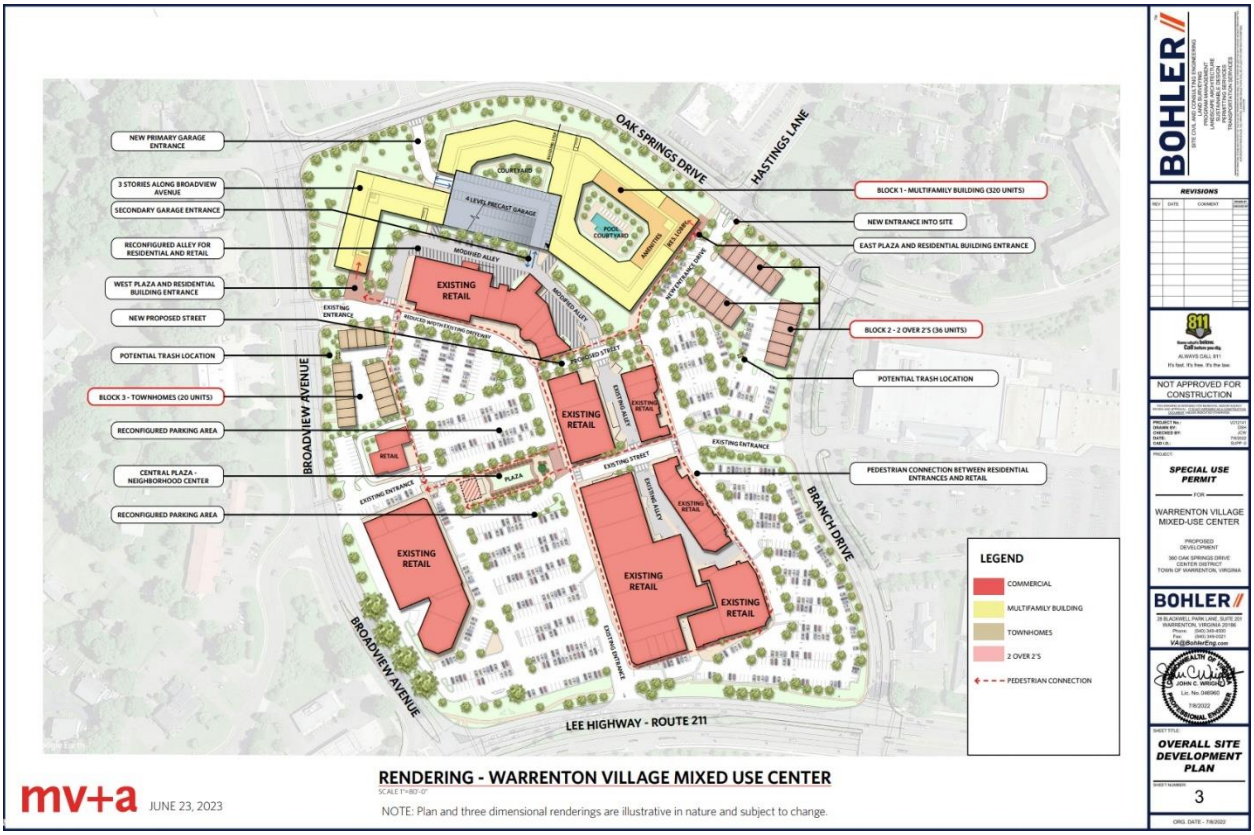
Source: Castle Development Partners

The Warrenton Village proposal will considerably exceed the quality, designs, finishes, and amenities at the market area's apartment properties. The rental units will be comparatively large and, unlike any other rental units in the market area, within walking distance of a host of area retailers and restaurants. Unit features will include granite countertops, stainless steel

appliances, LVT plank throughout (with exception of carpet in bedrooms), 9' ceilings, LED lights, and balconies in all apartment units.

Shown next is the proposed site plan for Warrenton Village. The site plan shows that the apartment community will be accessed from Oak Springs Drive in the north by a newly built roadway.

The community will consist of two development areas. To the west will be a large three- and four-story 320-unit, elevator apartment building. This building will contain 10,000± square feet of amenity space, including a leasing office, large clubroom, fitness center and business center. It will also contain two landscaped courtyards, one of which will include a large outdoor swimming pool. The building will also access a four-story, 445-space parking garage. The eastern side of the property will include the remaining rental units. There will be a total of 574 parking spaces. This equates to a parking ratio of 1.53 spaces per housing unit.



Warrenton Village Site Plan

A rendering of the proposed apartment community is presented next. The renderings show a contemporary and attractive flat roof design that is well above the competition in terms of curb appeal and design features. The building exteriors will contain a mix of masonry, wood siding and white cement panel. Overall, Warrenton Village will be an attractive, upscale community with no direct area competition.

Warrenton Village Rendering

Market Area Economic Overview

This part of Section I of the market analysis presents an economic overview of Fauquier County, with base data for all of Fauquier County, which includes the Town of Warrenton. Data from the U.S. Bureau of Labor Statistics do not provide employment data on the Town level. Three economic factors are presented and analyzed to show the economic stability of the County: (1) at-place job growth, (2) employment and labor force trends, and (3) an evaluation of active development plans that are expected to generate new job and employment growth. These are the primary factors that show the level of economic stability in the market area and the ability for new investments, particularly for new housing.

The three economic factors under study are analyzed in the paragraphs to follow. Key to this analysis is that job growth supports growth in population and households, and therefore,

housing unit demand, particularly of the type of housing under study. Thus, the establishment of the market area's economic stability is a key issue related to the demographic growth of the market area. The economic analysis is presented to support the demographic projections used to support future apartment unit demand.

At-Place Jobs

At-place employment refers to jobs physically based at employers in Fauquier County, whether the job is based in private sector or government offices, manufacturing facilities, schools, retail stores, restaurants, nursing home or other facilities. As of year-end 2019, and prior to the more recent pandemic-induced job losses, Fauquier County had 22,250± at-place jobs, which exceeds the 2008 total by over 850 jobs, or four percent.

The County faced heavy job losses between 2008 and 2010 due to the recession of that time and a period in which at-place employment declined by 1,250±. Net job growth began soon after in 2011, with at-place jobs exceeding the pre-recession peak in 2013. Most recently, employment expanded by 300± in 2018, but fell by 170± in 2019. The job losses in 2019 were not associated with any mass layoffs and were principally driven by the loss of 120± jobs in the Accommodations/ Food sector.

Public sector jobs account for the majority of employment in the County, with nearly 20 percent of jobs in Fauquier County associated with local, state of federal employment. Most of these public sector jobs are associated with local government and tied to the Fauquier County School Board. Much of the federal employment is related to the U.S. Department of Transportation, which operates a facility in Warrenton. Public sector employment has also been a source of modest job growth, with nearly 360 public sector jobs added since 2008.

The largest private employment sector in Fauquier County is the Retail Trade sector, which accounts for nearly 13 percent of County-wide employment. Much of this employment is clustered in and around Warrenton, and to a smaller extent the Bealeton area. Several of the

County's larger employers are in this sector, including Walmart, Food Lion and Home Depot. Employment in this sector has expanded by 160± since 2008.

The next largest private employment sector in the County is the Health Care sector, accounting for 2,550± jobs, or 11.5 percent of County employment. Much of this employment is associated with the Fauquier Health System, which is the largest private employment in the County with over 1,000 employees.

Several other employment sectors have recorded job growth during this period. These include Professional/ Technical Services (420± new jobs), Accommodations/ Food (230± new jobs), Administrative/ Waste Services (160± new jobs), Education (120± new jobs), Education (120± new jobs), Other Services (80± new jobs), Finance/ Insurance (70± new jobs), Manufacturing (60± new jobs) and Real Estate (40± new jobs).

Only four employment sectors have recorded a net loss of jobs since 2008. The heaviest job losses were concentrated in the Construction sector, which has 350 fewer jobs as of year-end 2019 compared to year-end 2018. Most of these losses, however, occurred in the years immediately following the Great Recession. Construction employment has grown every year since 2014, with over 500 jobs added since that time. Other sectors with job losses since 2008 include Wholesale Trade (240± jobs lost), Information (70± jobs lost) and Management of Companies (40± jobs lost).

Table 2: Trends in Average At-Place Employment, Fauquier County, Virginia, 2008-2019

Industry	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Agriculture	550	393	401	ND	ND	ND	396	396	392	ND	ND	ND
Mining	57	53	51	ND	ND	ND	54	56	64	ND	ND	ND
Utilities	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	116
Construction	2,880	2,316	2,248	2,112	2,066	2,023	2,117	2,210	2,292	2,350	2,459	2,530
Manufacturing	863	797	756	794	798	825	873	918	950	958	935	923
Wholesale Trade	727	615	546	563	481	448	420	434	448	507	490	485
Retail Trade	2,713	2,573	2,637	2,673	2,790	2,864	2,859	2,994	3,044	2,950	2,899	2,873
Transport./ Wareh.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	239
Information	246	197	162	147	160	101	113	128	133	140	137	181
Finance/Insurance	479	445	486	509	501	504	515	467	497	496	526	553
Real Estate	218	315	318	308	365	377	363	288	262	271	253	258
Prof./Tech.	1,307	1,339	1,352	1,632	1,662	1,658	1,654	1,716	1,761	1,690	1,792	1,727
Mgmt of Co.s	212	213	192	ND	242	175	174	181	178	176	167	169
Admin./Waste	487	432	413	ND	534	485	472	484	522	548	622	645
Education	365	350	319	322	339	338	342	421	448	482	524	484
Health Care	2,415	2,499	2,386	2,386	2,703	2,781	2,747	2,686	2,575	2,532	2,544	2,549
Arts/Enter./Rec.	442	414	467	444	417	411	359	346	334	328	303	306
Accom./Food	2,067	1,932	1,962	1,969	2,025	2,095	2,050	2,201	2,370	2,407	2,414	2,293
Other Services	998	943	972	972	1,081	1,009	1,060	1,110	1,119	1,154	1,192	1,080
Local Gov.	3,199	3,268	3,264	3,434	3,314	3,302	3,226	3,194	3,263	3,280	3,314	3,350
State Gov.	392	398	401	389	404	413	409	393	391	390	394	394
Federal Gov.	421	435	454	564	623	610	597	581	601	610	618	625
Total	**21,395**	**20,273**	**20,145**	**20,781**	**21,387**	**21,213**	**21,076**	**21,549**	**22,054**	**22,116**	**22,417**	**22,249**

Notes: ND = Data do not meet BLS or State agency disclosure standards.

Source: United States Department of Labor, Bureau of Labor Statistics

Table 3 shows the net change in at-place job totals since 2008. Very few sectors experienced job losses during this period. Job growth has been spread among a diverse set of sectors. The key figure shown in Table 3 is the 4.0 percent net growth in new jobs since 2008, for a net increase of 850± jobs.

Table 3: Change in Average At-Place Employment, Fauquier County, Virginia, 2008-2019

Industry	Net Change	Percent Change
Construction	-350	-12.2%
Manufacturing	60	7.0%
Wholesale Trade	-242	-33.3%
Retail Trade	160	5.9%
Information	-65	-26.4%
Finance/Insurance	74	15.4%
Real Estate	40	18.3%
Prof./Tech.	420	32.1%
Mgmt of Co.s	-43	-20.3%
Admin./Waste	158	32.4%
Education	119	32.6%
Health Care	134	5.5%
Arts/Enter./Rec.	-136	-30.8%
Accom./Food	226	10.9%
Other Services	82	8.2%
Local Gov.	151	4.7%
State Gov.	2	0.5%
Federal Gov.	204	48.5%
Total	**854**	**4.0%**

Notes: ND = Data do not meet BLS or State agency disclosure standards.
Source: United States Department of Labor, Bureau of Labor Statistics

Next shown, in Table 4, are the employment changes that occurred in 2020, which is an outlier year given the unusual impact of the COVID-19 pandemic. The data show a significant loss of jobs, with a reduction in employment of over 880, or by 4.0 percent.

These losses occurred across most employment sectors, with the heaviest job losses impacting the Accommodations/ Food services sector (370± jobs lost), Local Government sector (190± jobs lost) and Health Care sector (170± jobs lost). Although these losses are sizeable, many of these layoffs are expected to be temporary and will likely be recovered once 2021 employment data are released. The local housing market has not been negatively affected by these job losses.

Of note is that several employment sectors did add jobs in 2020, including the Professional/ Technical Services sector (130± new jobs), Retail Trade sector (50± new jobs) and the Transportation/ Warehousing sector (50± new jobs).

Data for 2021 show an increase of 440± jobs in Fauquier County, which signals a continued recovery. Several employment categories recorded net job growth. There are just over 430 fewer at-place jobs at year-end 2021 compared to the pre-pandemic peak.

Table 4: Change in Total At-Place Employment, Fauquier County, Virginia, 2019-2021

	2019	2020	2021	Net Change
Utilities	116	122	117	1
Construction	2,530	2,527	2,624	94
Manufacturing	923	841	960	37
Wholesale Trade	485	473	454	-31
Retail Trade	2,873	2,921	2,944	71
Transportation/Warehousing	239	286	311	72
Information	181	163	179	-2
Finance/Insurance	553	550	549	-4
Real Estate	258	260	268	10
Professional/Technical Services	1,727	1,859	1,871	144
Management of Companies	169	158	126	-43
Admin./Waste Services	645	593	622	-23
Educational Services	484	460	504	20
Health Care	2,549	2,379	2,269	-280
Arts/Entertainment/Recreation	306	235	241	-65
Accommodations/Food	2,293	1,926	2,058	-235
Other Services	1,080	955	1,061	-19
Local Government	3,350	3,161	3,209	-141
State Government	394	396	362	-32
Federal Government	625	652	659	34
Total	**22,249**	**21,370**	**21,813**	**-436**

Source: United States Department of Labor

The U.S. Bureau of Labor Statistics has not yet released year-end data for 2022. However, as of September 2022, the date for which the most recent data are available, Fauquier County totals nearly 22,400 at-place jobs, which is in line with pre-pandemic employment levels.

Employment and Labor Force

Employment differs from at-place jobs as it refers to the number of market area residents who are employed, no matter where the job is located. At-place jobs refer to where the job is located, i.e., within Fauquier County. Data are current to year-end 2021 for Employment and Labor Force.

Fauquier County realized a net increase in employment of 770± over the twelve-year period between 2008 and 2019. Like at-place job trends, employment grew early in the decade, up until 2008, when employment reached a pre-recession peak of 36,400± jobs.

Employment totals are larger than at-place job totals, which means net out-commuting occurs into neighboring jurisdictions. These trends are an indication of the market for housing in Fauquier County, with a high percentage of County labor force working across the Washington Region. However, they are selecting homes in Fauquier County.

Employment fell sharply in 2009 when 940± jobs were lost, pushing the unemployment rate from 3.6 percent to 5.6 percent in a single year. A slow recovery began soon after in 2011. Growth in employment occurred every year since, with total employment exceeding pre-recession levels in 2019. The labor force has also grown every year between 2015 and 2019, suggesting sustained confidence in the labor market. This has pushed the overall unemployment rate higher than it otherwise would be.

Recent years have been characterized by a steady increase in the pace of job growth. Employment grew by 350± in 2017, 1,010± in 2018 and 1,070± in 2019. This exceeds the level of growth of at-place jobs and denotes that part of the growth in the resident population of Fauquier County was driven by new jobs in neighboring communities.

Data in Table 5 show that the unemployment rate was a low 2.4 percent in 2019, down from 3.9 percent in 2015. The low unemployment rate means that new job growth will require new residents for the County.

Total employment declined by 2,110± in 2020, pushing the unemployment rate up from a low 2.4 percent in 2019 to 4.7 percent, the highest unemployment rate since 2013. Data for 2021 show some improvements, with employment expanding by 80±. The labor for declined by 560± in 2021, which contributed to the low unemployment rate of 3.0 percent.

Table 5: Trends in Employment and Unemployment, Fauquier County, Virginia, 2008-2021

	Labor Force	Employment	Unemployment	Percent Unemployed
2008	37,765	36,403	1,362	3.6%
2009	37,560	35,459	2,101	5.6%
2010	35,805	33,536	2,269	6.3%
2011	36,073	34,092	1,981	5.5%
2012	35,975	34,162	1,813	5.0%
2013	35,928	34,198	1,730	4.8%
2014	36,049	34,427	1,622	4.5%
2015	35,873	34,477	1,396	3.9%
2016	35,977	34,745	1,232	3.4%
2017	36,269	35,091	1,178	3.2%
2018	37,054	36,096	958	2.6%
2019	38,085	37,168	917	2.4%
2020	36,777	35,058	1,719	4.7%
2021	36,217	35,138	1,079	3.0%
Net Change	**-1,548**	**-1,265**	**-283**	**-0.6%**

Source: United States Department of Labor, Bureau of Labor Statistics

COVID-19 and Employment

Table 6 shows monthly employment data as of April 2023 in Fauquier County to illustrate the local employment impact of the COVID-19 pandemic. This is the date for which the most recent data are available. Trend data show that total employment has increased by nearly 1,400 since January 2020, with the number of unemployed shrinking by over 120. These data show considerable economic improvements.

The unemployment rate, as of April 2023, is a very low 2.1 percent, down from 9.1 percent in April 2020. The low unemployment rate reflects the difficulty that local employers report in hiring new staff and necessitates new residents to the County to fill vacant and future jobs.

Table 6: Trends in Employment and Unemployment, Fauquier County, Virginia, 2020-2023 YTD

	Labor Force	Employment	Unemployment	Percent Unemployed
January 2020	37,631	36,674	957	2.5%
February 2020	37,692	36,824	868	2.3%
March 2020	37,237	36,207	1,030	2.8%
April 2020	35,897	32,638	3,259	9.1%
May 2020	35,376	32,643	2,733	7.7%
June 2020	36,700	33,899	2,801	7.6%
July 2020	36,521	34,131	2,390	6.5%
August 2020	36,545	34,630	1,915	5.2%
September 2020	35,851	34,310	1,541	4.3%
October 2020	36,555	35,198	1,357	3.7%
November 2020	36,289	34,973	1,316	3.6%
December 2020	36,117	34,929	1,188	3.3%
January 2021	36,048	34,716	1,332	3.7%
February 2021	35,894	34,635	1,259	3.5%
March 2021	36,013	34,747	1,266	3.5%
April 2021	36,141	35,085	1,056	2.9%
May 2021	36,334	35,173	1,161	3.2%
June 2021	37,478	36,109	1,369	3.7%
July 2021	37,536	36,293	1,243	3.3%
August 2021	37,231	36,054	1,177	3.2%
September 2021	36,740	35,719	1,021	2.8%
October 2021	37,217	36,329	888	2.4%
November 2021	36,843	36,218	625	1.7%
December 2021	37,157	36,284	873	2.3%
January 2022	37,155	36,215	940	2.5%
February 2022	37,078	36,203	875	2.4%
March 2022	37,349	36,459	890	2.4%
April 2022	37,520	36,729	791	2.1%
May 2022	37,611	36,624	987	2.6%
June 2022	38,342	37,327	1,015	2.6%
July 2022	38,549	37,524	1,025	2.7%
August 2022	38,216	37,051	1,165	3.0%
September 2022	37,678	36,664	1,014	2.7%
October 2022	38,207	37,193	1,014	2.7%
November 2022	37,968	36,945	1,023	2.7%
December 2022	37,974	37,115	859	2.3%
January 2023	38,232	37,132	1,100	2.9%
February 2023	38,299	37,320	979	2.6%
March 2023	38,759	37,783	976	2.5%
April 2023	38,846	38,012	834	2.1%
Net Change	**1,215**	**1,338**	**-123**	**-0.4%**

Notes: 1/ Preliminary. Subject to change.

Source: U.S. Department of Labor, Bureau of Labor Statistics

Current Developments

Most businesses in Fauquier County are small, with over 90 percent having fewer than 20 employees. The largest employer in the County is the Fauquier County School Board, with over 1,900 employees. The second largest employer is the Fauquier Health System, which employs over 1,000 people. The next two largest employers are the U.S. Department of Transportation and Walmart. All of these employers are located within quick driving distance of the Warrenton Village site.

The agriculture and forestry industries directly employ over 500 people, with many more employed in related industries. Tourism represents a growing segment of the economic sector in Fauquier County with nearly 30 vineyards and wineries spread across the County. More recently, the County has also targeted defense and other government contractors as a vital sector, with over 100 firms operating in the County.

Recent job generating development activity in Fauquier County include:

- **E-Z Treat**, a manufacturer of residential and commercial wastewater treatment systems, announced in December 2022 that it would expand its Catlett operations with a new 33,000± square foot building that will generate 16 new engineering and manufacturing jobs.

- **Silver Branch Brewing**, a Maryland-based brewery, announced in June, 2023 that it would open a location in Fauquier County, adding 38 new jobs. The expansion will be the second location for the brewery. Silver Branch is taking over the Warrenton location of the former Wort Hog Brewing Co., which closed in early-2022. The brewery will have 18 to 24 rotating taps at each location. The Warrenton location will add between 750 to 1,000 barrels of capacity. The facility is expected to open in the fall of 2023.

- **Piedmont Urgent Care** announced in September 2021 that it would build a single-story, 7,540± square foot urgent care facility and pharmacy on the corner of Blackwell Road and Walker Drive in Warrenton. The facility has since opened.

- **Oak View National Bank** announced in May 2021 that it would build a 7,000± square foot building on a vacant lot on Waterloo Street, near its current headquarters on Broadview Avenue in Warrenton. The new Warrenton facility will feature a drive thru. Construction was completed in 2022.

- **Lord Fairfax Community College**. Construction was completed in June 2022 on a new science and technology building on the Fauquier campus of Lord Fairfax Community College to be called Eleanor C. and William A. Hazel Hall. The two-story, 40,000± square foot building houses a nursing skills lab, science labs, engineering and fabrication labs, classrooms, a board room, faculty offices, study spaces and a lounge and a conference center with banquet seating for 275 people. The college also has plans currently under review to construct a single-story, 8,130± square foot trades lab building. The new building will allow the college to offer trades classes for the first time on the Fauquier Campus, including a new carpentry program. Other programs planned for the new building include electrical, HVAC, plumbing and heavy equipment operator.

- **Catlett Data Center Park**. This is a proposal to construct two data centers of 1.4 million square feet at Route 28 and Gaskins Lane.

- **Royal Farms**. Construction was completed in 2022 on new Royal Farms at the southwest corner of Routes 17 and 29 at Opal. The development includes a 4,650± square foot convenience store and 14 fuel pumps. Future development of the remaining 2.1 acres calls for an unspecified 3,160± square foot fast-food restaurant, which would share the same entrance with Royal Farms.

- **Hilton Home2 Suites at Mintbrook**. This is proposed four-story, 90- to 100-room hotel planned for a site within the Mintbrook development in Bealeton. The proposal is currently under review.

- **Puller Veterans Care Center**. Construction was completed in March 2022 on this long-term care center at Vint Hill for military veterans at Vint Hill Road and MacIntosh Drive in eastern Fauquier. The 145,000± square foot, 128-bed facility has eight, 16-bed "houses" flanking the "community center." Each resident has a private room and bathroom. The center has a large dining area, but each house also has a kitchen for smaller meal gatherings, including those with family members. The facility employs approximately 220 people.

- **Lock-It-Up Self Storage**. Plans were submitted in mid-2022 to construct a self-service storage facility, to include storage units and an office, at 10526 Global Way in Bealeton. The facility will consist of six self-storage buildings, totaling 65,750± square feet. The individual storage buildings range from 4,400± square feet to 21,750± square feet. Approximately 1,050± square feet within one of the buildings will be dedicated for office space for the facility.

- **Wexford Village**. Plans were submitted in mid-2022 for commercial development on the west side of Marsh Road across from Village Center Drive in Bealeton. Plans call for a car wash as well as a total of 90,000± square feet of warehouse/self-storage facility use.

- **The Bank of Clarke County** opened a new branch at 530 Blackwell Road in Warrenton in July 2022.

- **17/66 Industrial Park Lot 8**. Plans were submitted in mid-2022 for the construction of a 104,700± square foot warehouse building along Whitting Road between the Norfolk Southern Railroad and Brampton Court. The proposal is still under review.

- **Vint Hill Independent /Assisted Living**. This is a proposal for a retirement community to be built near the intersection of Rogues Road and Farm Station Road in the Vint Hill area. The facility, which is currently under review, is proposed for 90 apartment units.

- **Amazon Web Services** announced in June 2022 that it would build a 220,200± square foot data center in Warrenton, at the intersection of Blackwell Road and Lee Highway. The Warrenton Town Council approved a special use permit for the project in February 2023. The facility is expected to employ approximately 52 people.

It is difficult to quantify the level of future job growth in Fauquier County, as many employers are small and therefore their expansion plans are not tracked by local or state economic development agencies. Economic development officials note that many local employers have vacant positions that they are struggling to fill, partially due to housing availability for prospective employees.

In addition is a significant level of future job growth in neighboring Prince William County. Data in Table 3 and Table 5 above show that Fauquier County is the location of a considerable number of commuters, and thus the local housing market is greatly impacted by job growth elsewhere in Northern Virginia.

Research from S. Patz & Associates has identified at least 3,500 new jobs that have been publicly announced over the next few years within neighboring Prince William County. This total likely undercounts the level of future job growth as many expansions are smaller in scale and not publicly reported. Many of these jobs are in the western portion of Prince William County and near Fauquier County. In addition are several million square feet within multiple data centers that are planned and under construction in this part of the county that will generate new, high-paid jobs.

Demographic Trends and Projections

Demographic trends for Fauquier County, which include the Town of Warrenton, as well as the adjacent areas of western Prince William County, are presented in Table 7. The Prince William County portion of the market area includes the community of Gainesville and the Town of Haymarket. This portion of Prince William County was included in the market area based on interviews with area apartment managers who note a very limited supply of upscale apartment units in Warrenton, with Warrenton likely to compete with the greater Gainesville/ Haymarket area for the upscale rental market.

The market area's population, as of 2022, is estimated to total 203,890±, based on calculations from the Weldon Cooper Center for Public Service and derived from the most recent 2020 U.S. Census count. For Fauquier County, the 2022 population total of 73,540± exceeds the 2010 census count by 8,340±, or an annual population growth rate of nearly 700. This means that population growth in the County for the 2010 decade is below the rate of the 2000 decade, when the population increased by an annual average of approximately 1,000 people. The Prince William County portion of the market area had a significant increase in population since 2010, with the population expanding by over 28,000. This was a slower pace of population growth compared to the 2000s.

The slower level population growth that has occurred in Fauquier County and western Prince William County since 2010 is due to a lack of new housing development and readily available land for the development of new homes. Modest employment growth in Fauquier County is a second factor. The analysis to follow shows only a limited number of new and proposed apartment communities in the market area at this time. Based on population trends, planned housing developments and some job growth, the market area population is projected to reach 219,280± by 2027.

The target market for the new apartment units at Warrenton Village is renter households earning incomes of $66,000 and above, when incomes are reported in constant 2023 dollars.

Households in this income category can afford net rents of $1,650 and above, based on 30 percent of income allocated toward net rents.

As of 2022, the market area has approximately 8,780 renter households in the target income category. This total is 2,640± more than in 2010, with much of this growth supported almost by renters in scattered rental units within for-sale subdivisions. As will be shown below, the market area has very few "upscale" apartment communities, and most are now mature. Trend data and future employment growth support a continued net increase in renters within this income category, with an expectation to reach 9,880± target renter households by 2027, the forecast date of this report. This represents an increase of 1,100± households.

Table 7: Trends and Projections of Population and Households, Warrenton Village Market Area, 1990-2027
(Constant 2023 dollars)

	1990	2000	2010	2022	2027
Market Area Population	69,950	93,140	166,960	203,890	219,280
Fauquier County	48,740	55,140	65,200	73,540	--
Prince William County Portion 3/	21,210	38,000	101,760	130,350	--
Group Quarters Population	1,470	770 1/	750	1,150	1,150
Household Population	68,480	92,370	166,210	202,740	218,130
Persons Per Household	2.84	2.74	2.91	2.90	2.89
Total Households	24,140	33,770	57,040	71,630	75,480
Renter Households	7,100	8,740	13,240	18,160	20,210
Percent Renter Households	29.4%	25.9%	23.2%	25.4%	26.7%
Target Market ($66,000+)					
Total Households	3,070	3,960	6,140	8,780	9,880
Percent of Renter Households	43.2%	45.3%	46.4%	48.3%	48.9%

Notes: 1/ Decline due to closure of Vint Hill Station in 1997, a U.S. Army and NSA signals intelligence and electronic warfare facility.
2/ Growth driven by opening of White Springs Senior Living, Poet's Walk Warrenton, The Villa at Suffield Meadows, and Puller Veterans Station.
3/ Includes the following U.S. Census tracts in Prince William County, VA: 9014.03, 9014.07, 9014.08, 9014.09, 9014.10, 9014.11, 9014.12, 9014.13, 9014.14, 9014.15, 9014.16, 9014.17, 9015.03, 9015.04, 9015.05, 9015.06, 9015.07, 9015.08, 9015.09, 9015.10 and 9015.11.

Source: U.S. Census Bureau; Weldon Cooper Center for Public Service; S. Patz & Associates, Inc.

It should be noted that the demographic trends and projections detailed in Table 7 include the Town of Warrenton. Demographic trends and projections are analyzed for the entire market area, which is comprised of Fauquier County (including Warrenton), as well as the adjacent areas of Gainesville and Haymarket in Prince William County. The market area is the geographic area from which the majority of future tenants at Warrenton Village are expected to originate from and where the competitive rental housing alternatives are located. An analysis of demographic trends and projections of only the Town of Warrenton would understate the market for future renters.

Data in Table 8 show the demographic trends and projections within the Town of Warrenton for comparison purposes. The projections shown are opportunity projections, as they rely on the ability of the Warrenton Village proposal to be built and occupied. Absent this proposal, the projected population in the Town would be reduced.

The data show modest growth among target income households prior to 2022, which is principally due to a lack of new apartment unit development targeting the upscale market. A comparison to the data in Table 7 shows that most target income households have resorted to renting outside of the Town of Warrenton.

Table 8: Trends and Projections of Population and Households, Town of Warrenton, Virginia, 1990-2027
(Constant 2023 dollars)

	1990	2000	2010	2022	2027
Town of Warrenton Population	4,830	6,670	9,610	10,200	10,850
Group Quarters Population	270	410	340	340	340
Household Population	4,560	6,260	9,270	9,860	10,510
Persons Per Household	2.34	2.34	2.48	2.48	2.47
Total Households	1,950	2,680	3,740	3,980	4,260
Renter Households	920	1,140	1,510	1,570	1,950
Percent Renter Households	47.1%	42.3%	40.3%	39.5%	45.8%
Target Market ($66,000+)					
Total Households	460	440	590	630	1,030
Percent of Renter Households	50.0%	38.6%	38.9%	40.1%	52.8%

Source: U.S. Census Bureau; S. Patz & Associates, Inc.

The key point in Table 8 is that the Town of Warrenton has historically had a small number of renter households, particularly in the targeted income range under study. This is a supply, rather than a demand issue, as the shortage of quality rental housing has pushed prospective renters outside of the Town and in many cases outside of Fauquier County. The construction of a new and attractive rental community, of the type proposed for Warrenton Village, provides an opportunity to reverse these past trends. Again, it should be noted that while Warrenton Village will clearly impact the Town of Warrenton the most, it is likely to attract renters from outside of the Town as well.

Section II: Apartment Market Analysis

This part of the report studies the depth of the greater Warrenton area "better" apartment market. The analysis is intended to determine market support for the apartment units proposed at Warrenton Village. As will be shown, there are no upscale, professionally managed market rate apartment properties in Fauquier County.

In addition to the analysis of the current apartment market, the last subsection of Section II studies the apartment unit pipeline in the market area. These apartment properties are studied for development status, project size and comparison with the Warrenton Village proposal.

Characteristics of the Current Apartment Market

Competitive Apartment Market

The existing professionally managed apartment market in the greater Warrenton area is small, with nearly all professionally managed apartment buildings having income- or age-restrictions in place. Thus, most apartment communities in the Warrenton area and elsewhere in Fauquier County serve a separate population compared to the Warrenton Village proposal. The small number of market rate apartment units in the area are mature, and not fully competitive with the upscale and fully-amenitized Warrenton Village proposal.

The existing market rate apartments in the greater Warrenton area include the 100-unit Aspen Apartments South, 24-unit Green Street Apartments and 24-unit Victoria Gardens Apartments. These are mature, modest rental properties that were built between the 1960s and 1980s and are routinely at full occupancy. They serve a more modest income market compared to the Warrenton Village proposal with lower, non-competitive rents. They therefore do not represent true competition for the Warrenton Village proposal.

The demographic analysis shown above in Table 7 identifies a considerable number of higher-income renter households in the market area, with over 40 percent of renters earning

annual incomes over $66,000. These renters almost entirely occupy scattered townhomes and single-family homes that were not initially built as rental properties, but are instead leased by private individuals, realtors and property management firms. Most are two- and three-bedroom units, with two-bedroom units renting between $1,600 and $2,100 and three-bedroom units primarily renting for over $2,000. Essentially all of these homes are occupied at this time. Data in Table 8 show that a small share of these households currently resides in the Town of Warrenton, with the small percentage due to the persistent limited supply of upscale rental housing.

The closest upscale apartment cluster to Warrenton is the greater Gainesville/ Haymarket area of western Prince William County, which is an approximately 20-minute drive from Warrenton. Management at apartment properties in this area note that they partially compete with the Warrenton market given the severely limited supply of "better" apartments there. There are only three "somewhat" upscale apartments in this part of western Prince William County, as detailed in Table 9 below.

All are now becoming somewhat mature, with two properties—Somerhill Farms and Marque Apartments—now 17 years old, and one property—Somerset Pointe—over 20 years old. Marque Apartments generates one-bedroom rents of between $2,205 and $2,215. Two-bedroom rents at Somerhill Farms and Marque Apartments exceed $2,200. Somerset Pointe has more modest rents as this is an older apartment property. These rents have been readily accepted by the market as all three properties are at or near full occupancy.

The one-bedroom rents at Warrenton Village are proposed to be below the one-bedroom rooms at Marque Apartments and Somerhill Farms. The two-bedroom rents proposed for Warrenton Village will be approximately $200 below the two-bedroom rents at Marque Apartments and Somerhill Farms, on average. The proposed three-bedroom rents of between $2,400 and $3,000 are similar to the rents being generated at area scattered three-bedroom units, most of which offer no on-site amenities and require tenants to cover the costs of landscaping and snow removal. Most are now at least a decade old and with lesser levels of unit finishes and

features compared to the Warrenton Village proposal. The proposed three-bedroom rents are above the rents at Somerset Pointe, which is now over two decades old.

Table 9: Characteristics of Better Apartment Communities, Gainesville/Haymarket, VA, June 2022

	Year Built	Total Units	Vacant Units	One-Bedroom	Two-Bedroom	Three-Bedroom
Residences at Somerhill Farms 1/	2006	140	1	$1,893-$1,967	$2,262-$2,924	$2,398
Marque Apartments	2006	200	7	$2,205-$2,215	$2,214-$2,466	$2,963-$2,998
Somerset Pointe	2001	173	3	$1,517	$1,815	$2,088
Proposed Rents				**$1,650-$1,900**	**$2,200-$2,350**	**$2,400-$3,000**

Notes: 1/ Rent data only provided for vacant and soon-to-be vacant units.
Source: Field and Telephone Survey by S. Patz and Associates, Inc.

Shown next are photos of the above apartment properties. All are multi-level buildings, but none have contemporary designs, and none are as attractive as the Warrenton Village proposal.

Somerhill Farms

Marque Apartments

Somerset Pointe

The key point is that the Town of Warrenton does not currently offer any upscale, professionally managed apartment units that would be fully competitive with Warrenton Village. The same is true for other locations in Fauquier County. Western Prince William County does have a small number of more upscale apartment units, but these are now becoming mature and do not offer the same level of amenities and features as other newly built apartment properties in Northern Virginia.

Despite the lack of inventory, the market area does have a considerable number of higher-income renter households, with nearly half of these renters earning annual incomes above $66,000. This denotes that most of these renters are leasing scattered, non-amenitized townhomes and single-family homes. Many of these households can afford "better" apartment units but have few available options. Most of the newer scattered rental units are renting at similar rents to those proposed for Warrenton Village. There is clearly a market for upscale rental housing that is not being adequately served at this time.

Apartment Pipeline

There is currently only one apartment community in active planning in Fauquier County, and none under construction. Vint Hill Lofts is proposed for 183 apartment units to be built at

the former Vint Hill Farm Station Barrack at 4221 Sigler Road and 4285 Bludau Drive. The community will contain a mix of 29 studio, 128 one-bedroom and 26 two-bedroom apartment units. Studio rents will start at $1,175, one-bedroom rents will start at $1,550 and two-bedroom rents will start at $2,050. Rents will include water, sewage, trash and basic high-speed internet. All units will be equipped with a washer and dryer. The developers, Echelon Resources, have not yet secured all County approvals.

Apartment Market Summary and Demand Analysis

At this time, the rental market under study is fully occupied and a sizable pent-up demand exists due to job growth in Warrenton, elsewhere in Fauquier County and neighboring jurisdictions in Northern Virginia. Coupled with this job growth is the longstanding lack of upscale apartment unit development in the area. Area employers, many of which are actively filling open positions, report challenges with attracting new employees, which is partially a function of a very limited supply of apartments in the greater Warrenton area.

The Town of Warrenton and Fauquier County have not been the location of new market rate apartment unit development in several decades. This is despite the fact that the number of higher income renters has steadily increased in the area since 2000, denoting that many of these households have resorted to renting scattered, non-amenitized rental units within for-sale subdivisions. Western Prince William County has also not been the location of new apartment unit development, with the newest apartments now 17 years old. This is partially due to a lack of property zoned land for apartment unit development. The better apartment properties in this portion of Prince William County are typically fully occupied or with very few vacant apartment units.

Many protentional renters who are employed locally have resorted to renting outside of the market area due to the limited apartment unit supply, a trend that could be reversed if a new attractive apartment community were to be built in Warrenton. Additionally, commuters who may want to select Warrenton as an attractive location to relocate have limited options. Some

renters have also resorted to leasing less desirable units due to the extremely limited rental housing supply.

The net demand analysis is shown below based on the projection of new apartment units less vacant and pipeline proposals. From the 1,100± total apartment unit demand projection is subtracted 183 pipeline apartment units proposed for Vint Hill Lofts and the 376-unit Warrenton Village proposal. There are essentially no vacancies in the market area for comparable upscale rental units. The net demand analysis shows an underserved market, resulting in a surplus demand of 540± apartment units.

The 1,100 figure is an extrapolation from the analysis of demographic trends and projections, which begins on Page 27. This number represents the total growth in demand for the competitive apartment market area, distinct from the County itself. The boundaries of the market area are detailed in Table 8, which includes small portions of Prince William County.

Our demand projection is likely to "be in the ballpark," but it is difficult to make projections within a marketplace that has not added new market rate apartment units in several years. Nevertheless, the demand analysis is defined as positive.

Net Demand Analysis
(2022-2027)

	Total Units
Demand	1,100
Less:	
Pipeline Units	183
Warrenton Village	376
(Subtotal)	*(559)*
Surplus Demand	**541**

We are aware that the Warrenton Village proposal is large, but the analysis above clearly indicates a pent-up demand for new, upscale apartment units. The proposal offers a diversity of unit types, including three-bedroom townhomes attractive to families, and elevator-served apartment units that will likely attract young professionals and active seniors. The contemporary

design, expansive amenity package and walkability to area retailers, grocery stores and restaurants will set Warrenton Village apart from all of the existing apartments in Fauquier County and the greater Gainesville area. If built as proposed, Warrenton Village should be successful in terms of lease up and at the rents proposed.

Section III: Fiscal Impacts Analysis

This section of the report outlines the methodology and findings of the Fiscal Impacts Analysis (FIA) for the proposed residential development comprising Warrenton Village in the Town of Warrenton at build-out. The FIA compares the tax revenues expected from the proposal, as previously described, with the tax-supported costs the Town of Warrenton will incur to serve the project once it is fully developed. The net fiscal benefits will be the difference between those revenues and the various costs to the Town associated with new development. As noted above, the development plan involves constructing 376 rental units.

On-site fiscal impacts from Warrenton Village pertain to development on the site itself. Fiscal impacts generated off-site, due to the spin-off effects of resident and employee expenditures within the Town of Warrenton, are examined separately. For off-site impacts, economic impact assessments are undertaken to demonstrate how consumer expenditures will stimulate new business within the Town, based on new business receipts, employment, and employee earnings resulting from those expenditures.

Summary of Fiscal Impacts

Table 10 presents a summary of the revenues, costs and net fiscal benefits (revenue surplus or deficit) for the proposed 320 apartment, 36 two-over-two and 20 rental townhome units that are proposed for the Warrenton Village site and for the economic activity that would be generated in the Town of Warrenton by residents off-site.

The data in Table 10 show negative on-site impacts, which is primarily due to two factors. For one, the Town of Warrenton levies a low real estate tax rate of only $0.0401 per $100 of value. Thus, while Warrenton Village will likely be assessed at over $100 million, the taxable amount to the Town of Warrenton for the property would be relatively modest. Second, the largest revenue sources for the General Fund Budget are other local taxes. These include nine different local taxes, most of which do not generate on-site revenues. The majority of local tax revenues, for instance,

are generated by the Meals Tax, BPOL and Local Sales Taxes. As a consequence of the above two factors, a large share of total fiscal impacts will be generated by off-site economic activity.

In total, and at build-out, the full development and occupancy of the new rental units at Warrenton Village will generate a positive annual fiscal benefit of approximately $46,100, reported in constant 2023 dollars.

Table 10: Summary of On-Site and Off-Site Fiscal Impacts of Apartments, Warrenton Village at Build-Out, Warrenton, Virginia
(Constant 2023 Dollars)

Source of Fiscal Impacts on the Town	Impacts On-Site in Warrenton	Impacts Off-Site in Warrenton	Total Fiscal Impacts
Apartments (320 Units)			
Revenues to the Town	$117,560	$338,870	$456,430
Town Costs	-$280,280	-$145,920	-$426,200
Subtotal	*-$162,720*	*$192,950*	*$30,230*
Two-Over-Two (36 Units)			
Revenues to the Town	$14,550	$55,520	$70,070
Town Costs	-$42,740	-$23,490	-$66,230
Subtotal	*-$28,190*	*$32,030*	*$3,840*
Townhomes (20 Units)			
Revenues to the Town	$8,050	$41,150	$49,200
Town Costs	-$23,310	-$13,860	-$37,170
Subtotal	*-$15,260*	*$27,290*	*$12,030*
Total Residential (376 units)			
Revenues to the Town	$140,160	$435,540	$575,700
Town Costs	-$346,330	-$183,270	-$529,600
Net Fiscal Benefits	**-$206,170**	**$252,270**	**$46,100**

Source: Town of Warrenton, VA; S. Patz & Associates, Inc.

In addition to the on-site fiscal impacts, the economic impacts off-site in the Town of Warrenton from new resident expenditures would generate additional tax revenue. Based on anticipated household incomes, resident expenditures could equal approximately $26.4 million annually at businesses in the Town, with another $52.3 million in business expenditures to be generated by the "ripple effect" of resident expenditures across the local economy. This would generate a total of over $78.6 million in business activity in the Town.

The off-site expenditures will generate new jobs. These would be added region-wide and not just in the Town of Warrenton. Annual earnings from these new jobs would provide additional fiscal impacts across the region. These calculations were reduced by 30 percent to account for consumer expenditures outside of the Town, particularly elsewhere in Fauquier County and in neighboring communities such as Prince William County. Thus, the off-site calculations capture expenditures only within Warrenton.

The following analysis presents the derivation of the fiscal impacts to be derived from the development at the Warrenton Village site. These impacts include the net fiscal benefits of the proposed rental units, being the difference between tax revenue generated for the Town of Warrenton and the costs of public services to serve residents of the new development. As stated above, economic impacts include new business revenue, employees, and employee earnings that would accrue in the Town as a result of resident expenditures in the Town annually.

On-Site Fiscal Impacts: From New Rental Units

The following analyses derive the revenues generated for the Town of Warrenton from Warrenton Village "on-site." "On-site" denotes revenues that are derived directly from real estate development and personal property taxes, while "off-site" impacts are generated from local business growth based on new resident expenditures. Off-site impacts will be treated separately as "economic impacts," although their fiscal benefits are also assessed. Data in the tables to follow are rounded off to the nearest ten dollars and represent annual amounts after build-out. All data are presented in constant 2023 dollars.

Table 11 summarizes the various revenues to accrue to the Town of Warrenton from the development and lease-up of the 376 rental units to be built at the study site. Real Estate taxes would account for nearly 38 percent of the revenue to be generated on-site. Personal Property and Consumer Utility taxes would account for the remainder of the $140,160 in on-site tax revenue.

Table 11: Summary of Annual On-Site Revenues, Warrenton Village at Build-Out, Warrenton, Virginia
(Constant 2023 Dollars)

	Amount	Percent of Total
Apartments		
Real Estate Tax	$44,060	37.5%
Personal Property Tax	$13,980	11.9%
Consumer Utility Tax	$59,520	50.6%
Subtotal	*$117,560*	*100.0%*
Two-Over-Two		
Real Estate Tax	$5,530	38.0%
Personal Property Tax	$2,300	15.8%
Consumer Utility Tax	$6,720	46.2%
Subtotal	*$14,550*	*100.0%*
Townhomes		
Real Estate Tax	$3,150	39.1%
Personal Property Tax	$1,250	15.5%
Consumer Utility Tax	$3,650	45.3%
Subtotal	*$8,050*	*100.0%*
Total		
Real Estate Tax	$52,740	37.6%
Personal Property Tax	$17,530	12.5%
Consumer Utility Tax	$69,890	49.9%
Total Revenue	**$140,160**	**100.0%**

Source: Town of Warrenton; S. Patz & Associates, Inc.

Each revenue source will be explained in the paragraphs to follow. A separate section of the report will address the costs of services and facilities that the Town of Warrenton must provide to serve the future development.

Real Estate Tax

Development costs for Warrenton Village are detailed in Table 12. Total development costs are expected to be approximately $343,277 per apartment unit, $383,277 per two-over-two and $393,277 per townhome unit, including site preparation and land acquisition costs. These costs are based on data provided by the sponsor and are consistent with developments costs for other new, upscale rental communities in this part of Virginia. The total property development cost is approximately $131.5 million. At the Town's real estate tax rate of $0.0401 per $100 of

assessed value, real estate taxes would total $52,740 each year after buildout, in constant 2023 dollars.

Table 12: Real Estate Tax, Warrenton Village at Build-Out, Warrenton, Virginia
(Constant 2023 dollars)

	Apartments	Two-Over-Two	Townhomes	Total
Cost/Price per Unit	$343,277	$383,277	$393,277	$349,852
Number of Units	320	36	20	376
Total Cost	$109,880,640	$13,797,972	$7,865,540	$131,544,152
Tax Rate	$0.0401/$100	$0.0401/$100	$0.0401/$100	$0.0401/$100
Real Estate Tax	**$44,060**	**$5,530**	**$3,150**	**$52,740**

Source: Town of Warrenton, VA; S. Patz & Associates, Inc.

Personal Property Tax

Personal property taxes for residences in Virginia are based on the depreciated values of vehicles used solely for residential purposes. Residents at Warrenton Village are projected to own approximately 575 vehicles, based on an estimated 1.53 vehicles per apartment unit and 2.00 per two-over two and townhome units at the community. This is in line with the average car ownership rate in the Town of Warrenton.

Residents of Warrenton are required to pay a flat fee of $25 per vehicle, as well as a personal property tax on vehicles at a rate of $1.00 per $100 in assessed value. The Town exempts the personal property tax on vehicles valued at less than $20,000 and exempts the tax on the first $20,000 of value for those that are worth more. To be conservative, only 15 percent of vehicles are estimated to be valued above $20,000. At this value, the total on-site personal property value for residents would come to approximately $298,000. At the tax rate of $1.00 per $100 of assessed value, on-site personal property taxes would be $2,980 annually in constant 2023 dollars. Added to this total is a flat fee of $25 per vehicle, which adds an additional revenue of $14,550 for a total revenue of $17,530. This is shown in Table 13.

Table 13: Personal Property Taxes, Warrenton Village at Build-Out, Warrenton, Virginia
(Constant 2023 Dollars)

	Apartments	Two-Over-Two	Townhomes	Total
Number of Units	320	36	20	376
Percent Occupied	97.0%	97.0%	97.0%	97.0%
Occupied Units	310	35	19	364
Vehicles per Unit	1.53	2.00	2.00	1.60
Number of Vehicles	474	70	38	582
Number of Vehicles above $20,000 (15%)	71	11	6	88
Depreciated Value Per Vehicle (Above $20,000)	$3,000	$5,000	$5,000	$3,350
Total Depreciated Value	$213,000	$55,000	$30,000	$298,000
Tax at $1.00/$100	**$2,130**	**$550**	**$300**	**$2,980**
+$25/Vehicle	**$11,850**	**$1,750**	**$950**	**$14,550**
Total Tax	**$13,980**	**$2,300**	**$1,250**	**$17,530**

Source: Town of Warrenton; S. Patz & Associates, Inc.

Consumer Utility Tax

Consumer utility taxes are taxes on expenditures on consumer utilities including electricity, natural gas and telephone utilities. These taxes are collected by the utility companies and remitted to the Town. While the tax rates for the different utilities vary, experience has shown that the average tax is about $4.00 per utility, per month. This analysis assumes an occupancy rate of 97 percent to allow for lease-up and normal turnover. At this rate, there would be 364 occupied rental units. For four utilities per household, averaging $4.00 per utility per month for 12 months, the total utility tax for Warrenton Village would be $69,890 annually. This is shown in Table 14.

Table 14: Consumer Utility Taxes, Warrenton Village at Build-Out, Warrenton, Virginia
(Constant 2023 Dollars)

	Apartments	Two-Over-Two	Townhomes	Total
Number of Units	320	36	20	376
Percent Occupied	97.0%	97.0%	97.0%	97.0%
Occupied Units	310	35	19	364
Utilities Per Unit	4	4	4	4
Each Utility Average	$4.00	$4.00	$4.00	$4.00
Number of Months	12	12	12	12
Total Utility Tax	**$59,520**	**$6,720**	**$3,650**	**$69,890**

Source: Town of Warrenton; S. Patz & Associates, Inc.

On-Site Fiscal Impacts: Town Costs to Serve Warrenton Village

The focus of the on-site fiscal impacts of costs to the Town of Warrenton from Warrenton Village is the General Fund Budget expenditures expressed on a per capita basis. Per capita expenditures are allocated (by type) to residents and businesses (in terms of numbers of employees) on a proportional basis according to utilization by each type of persons. These costs cover both other operations for services and capital improvements in the form of annual debt service to support the capital improvements programs of the Town. There are no impacts on schools, as public schools are funded by county, state and federal sources.

Budget expenditures will be discussed below, and per capita costs will be calculated based on current types of users. Applying these costs per capita to the residents of Warrenton Village produces an estimate of the annual costs to the Town for services to the proposed new apartment units.

For the Town's adopted FY 2023 budget, approximately 67.8 percent of all General Fund expenditures are supported by local taxes, the remainder being revenues from the state and federal governments. An examination of budgeted revenues for the year will demonstrate this proportion. The fiscal impact costs are based on General Fund expenditures supported by local taxes.

Table 15: General Fund Revenue by Type from Local Taxes, Town of Warrenton, Virginia

	Amount	Percent of Total
General Property Taxes	$1,449,235	8.8%
Other Local Taxes	$9,675,138	58.9%
Subtotal Local Taxes	*$11,124,373*	*67.8%*
Non-Tax Revenue	$5,288,712	32.2%
Total General Fund Revenue	**$16,413,085**	**100.0%**

Source: Adopted FY 2023 Budget for the Town of Warrenton

When the expenditures for each type of user are determined, and the tax-supported proportions are calculated, these costs are divided by the number of persons by type. The population of the Town of Warrenton is estimated to total 10,330± as of 2023, based on recent census data. Regarding jobs in the Town, data from the U.S. Bureau of Labor Statistics (BLS) only track the number of at-place jobs at the county-wide level and not the town level. This is the standard source of employment data for analyses of this type. Data from the Fauquier County Department of Economic Development show that approximately 14,000 people are employed within the Town limits. This is nearly 70 percent of total employment in Fauquier County.

When the expenditures for each type of user are determined, and the tax-supported proportions are calculated, these costs are divided by the number of persons by type. For residents, this is calculated at $558 per person, while it stands at $388 per employee for businesses. The disparity is due to approximately $2.61 million allocated to the Town's Parks and Recreation department.

The budget total for the Town for FY 2023, is $16.41 million, with 42.5 percent of that cost for the Town's population and 57.5 percent for employment, or persons with jobs in the Town.

Table 16: Allocation of General Fund Expenditures by Type for Residents (Population) and Businesses (Employees), Town of Warrenton, Virginia
(Constant 2023 dollars)

	Adopted FY 2023 Population	Adopted FY 2023 Employment	Adopted FY 2023 Total
General Gov't Admin.	$915,956	$1,241,372	$2,157,328
Public Safety	$1,806,918	$2,448,872	$4,255,790
Public Works	$1,939,681	$2,628,802	$4,568,483
Parks, Rec. & Culture	$2,608,455	$0	$2,608,455
Community Development	$571,657	$774,754	$1,346,411
Contributions	$29,022	$39,332	$68,354
Non-departmental	$149,726	$202,919	$352,645
Dept Service	$358,785	$492,341	$855,618
Transfer to Capital	$84,916	$115,084	$200,000
Total General Fund Expenditures	**$8,465,114**	**$7,943,477**	**$16,413,084**
Percent Tax Support	67.78%	67.78%	67.78%
Tax-supported Expenditures	$5,737,440	$5,383,888	$11,124,372
Number of Persons	10,330	14,000	24,330
Per Capita Tax Support	$555	$385	$457

Sources: FY 2023 Adopted Budget for Town of Warrenton, VA; U.S. Census Bureau, Fauquier County Department of Economic Development;

Tax-Supported Costs of Warrenton Village

As explained above, costs to the Town to serve Warrenton Village are derived by multiplying the per capita costs of residents and employees by the numbers of those persons. These are tax-supported costs, to be compared to the taxes generated by Warrenton Village. The costs will cover costs of facilities in terms of debt service for capital improvements.

There is expected to be about 624 residents at Warrenton Village at build out, at a ratio of 1.3 people for one-bedroom units, 1.8 people for two-bedroom units and 2.2 persons for three-bedroom units. These data are based on current demographic trends at the existing newly built apartment complexes in the market area. Data were derived from interviews with on-site property managers in the region.

It was shown above in Table 16 that the average tax-supported cost for residents in the Town is $555 per resident. For the residents of Warrenton Village, total tax-supported costs to the

Town of Warrenton would be approximately $346,330. This calculation is presented in Table 17 below.

Table 17: Tax Supported Costs for Residents, Warrenton Village, at Build-Out, Warrenton, Virginia
(Constant 2023 Dollars)

	Apartments	Two-Over-Two	Townhomes	Total
Number of Units	320	36	20	376
Percent Occupied	97.0%	97.0%	97.0%	97.0%
Occupied Units	310	35	19	364
Persons per Unit	1.63	2.20	2.20	1.71
Residents	505	77	42	624
Expenditure Per Capita	$555	$555	$555	$555
Population Expenditures	**$280,280**	**$42,740**	**$23,310**	**$346,330**

Source: Town of Warrenton; S. Patz & Associates, Inc.

On-Site Fiscal Impacts

Data in Table 18 below compares the calculated on-site tax revenues expected from Warrenton Village at build-out with the tax-supported costs required to serve the residents of the new rental units to be built. The annual net fiscal benefit will be a deficit of $206,170, in constant 2023 dollars.

Table 18: Net On-Site Fiscal Tax Benefit, Warrenton Village, at Build-Out, Warrenton, Virginia
(Constant 2023 dollars)

	Apartments	Two-Over-Two	Townhomes	Total
Total Tax Revenue	$117,560	$14,550	$8,050	$140,160
Population Expenditures	-$280,280	-$42,740	-$23,310	-$346,330
Net Fiscal Benefit	**-$162,720**	**-$28,190**	**-$15,260**	**-$206,170**

Source: Town of Warrenton; S. Patz & Associates, Inc.

Off-Site Impacts: Economic and Fiscal

In addition to the revenues and costs that accrue to the Town of Warrenton from the apartments "on-site" – that is, due to the apartments and residents themselves in their dwellings, there are also off-site impacts that occur, as residents spend part of their income in the Town for consumer goods, and as businesses re-spend the income from purchases by residents by the

purchase of goods and services from other vendors in the Town. Calculations to follow are reduced by 30 percent to account for expenditure that occurs to businesses outside of the Town. This ratio is based on the number of employees in the Town relative to the County. This is a conservative estimate.

The U.S. Bureau of Labor Statistics details average consumer expenditure by location and income levels. There is no direct budget information for Fauquier County or the Town of Warrenton. Instead, national data for a budget for household incomes, based on national averages, has been chosen for this calculation. Among the larger expenditures by consumers are over 20± percent for housing and over 25± percent for retail trade, including automobiles.

Consumer expenditures made off-site in Warrenton are translated into economic impacts in the Town using multiplier matrices provided for the local area by the U.S. Bureau of Economic Analysis, Department of Commerce. These multipliers capture the round-by-round flows of expenditures in the Town initiated by residents at the new homes. There are separate matrices for business receipts, employment and employee earnings. The items in the consumer budget are multiplied in turn by these expenditure-specific categories in each matrix and summed to give the "ripple effect" of circulation of money through the economy. The ripple effects, plus the original consumer expenditures, equal the total economic impacts of homes residents on the Town economy.

Business Receipts

Residents of Warrenton Village are anticipated to allocate approximately 78.9 percent of their total income towards non-housing expenditures. The residual income is predominantly apportioned towards taxes and personal savings. The income estimates of future tenants are deduced from the proposed rents outlined in Table 1, with an assumption that a typical household will have an income that is approximately 15.0 percent higher than the minimum required to qualify for residency in the community. This requirement stipulates that a minimum of 30 percent of income be allocated towards net rent. This income range is conservative and is

representative of the anticipated typical renter demographic within the community, as the majority are expected to earn above the established minimum threshold.

Overall, this equates to $26.4 million in annual consumer expenditures from the expected residents at full build-out. The ripple, or multiplier effect, will generate another $52.3 million in annual receipts among Town businesses, for a total business receipts impact of $78.6 million. These business receipts will form the basis for many tax receipts for the Town of Warrenton from the impacted businesses.

Source of Impact	Apartments	Two-Over-Two	Townhomes	Total
Direct Consumer Expenditures	$20,324,220	$3,268,300	$2,753,100	$26,345,620
Indirect Ripple Effect	$41,637,240	$6,695,610	$3,948,100	$52,280,950
Total Business Receipts	**$61,961,460**	**$9,963,910**	**$6,701,200**	**$78,626,570**

Employment and Earnings

Since there are only a few employees on-site for the apartment units, essentially all employment and employee earnings impacts come from the ripple or multiplier effects on businesses, i.e., employee earnings that support increased business receipts in the Town. There will be approximately 476 new full-time equivalent employment positions created from resident expenditures at Warrenton Village, over time, with total earnings for these employees of $21.5 million.

Spinoff Employment and Salaries			
	Employees	Average Salary	Total Earnings
Apartments	379	$45,185	$17,125,115
Two-Over-Two	61	$45,183	$2,756,163
Townhomes	36	$45,450	$1,636,200
Total/ Average	**476**	**$45,273**	**$21,517,478**

The new jobs to be created by the construction of Warrenton Village would not only enhance Warrenton's economic vitality but also diversify the employment base. The creation of these new jobs will span various sectors, reflecting the broad impact of the proposed

development. It is important to underscore that this job growth will have a multiplier effect, stimulating other sectors of the local economy indirectly. The new jobs, along with the associated attraction of new residents and increased patronage of local businesses, would significantly contribute to attracting further investment from potential employers.

Furthermore, the proposed development aligns with Warrenton's comprehensive plan which envisions the Town as a hub for culture, entertainment, and the arts. The design elements of the project are formulated to enrich the Town's cultural fabric, including providing a diversity of home types. As such, the merits of this development extend beyond immediate economic advantages and aim to cultivate a long-term vision for Warrenton.

Off-Site Fiscal Impact

Table 19 summarizes the revenues and costs to the Town of Warrenton from the off-site impacts of Warrenton Village. These impacts derive primarily from the $78.6 million in new business receipts in the Town, plus estimates of real property and business personal property for a typical commercial operation. It is proper to look at these impacts as long-term. That is, it is not likely that the projected 476 new employees will be immediate or lead to abrupt expansion of the property tax base, but this should happen over time as part of business expansion in the Town.

Other tax receipts should accrue as soon as consumers at Warrenton Village begin making expenditures, that is, as soon as the property is built out and stabilized occupancies are achieved. In the short run, revenues should start at approximately $65,330 rising to $435,540 as businesses expand physically. Costs are based on 476 new employees within the Town at a cost to the Town of $385 per employee, as derived above in Table 16. With costs of $183,270, the net fiscal benefits from off-site expenditures from Warrenton Village residents should be approximately $252,270.

Table 19: Off-Site Fiscal Impact of Consumer Expenditures by Type, Residents of Warrenton Village, at Build-Out, Warrenton, Virginia
(Constant 2023 dollars)

	Apartments	Two-Over-Two	Townhomes	Total
Annual Revenues for the Town:				
Real Estate Tax	$12,150	$1,950	$1,640	$15,740
Business Property Tax	$37,870	$6,090	$5,100	$49,060
Cigarette Tax	$2,190	$350	$210	$2,750
Machinery and Tools Tax	$34,820	$5,600	$4,720	$45,140
Retail Sales Tax	$38,890	$6,250	$5,270	$50,410
BPOL Tax	$37,910	$6,100	$5,130	$49,140
Transient Occupancy Tax	$24,880	$4,000	$3,370	$32,250
Utility Tax	$13,040	$2,130	$1,290	$16,460
Bank Franchise Tax	$10,950	$2,760	$1,640	$15,350
Meals Tax	$105,680	$16,990	$10,020	$132,690
Motor Vehicle Licenses	$10,650	$1,720	$1,430	$13,800
Personal Property Tax	$9,840	$1,580	$1,330	$12,750
Total Revenue	**$338,870**	**$55,520**	**$41,150**	**$435,540**
Less Costs to the Town	**-$145,920**	**-$23,490**	**-$13,860**	**-$183,270**
Net Fiscal Benefit to the Town	**$192,950**	**$32,030**	**$27,290**	**$252,270**

Source: RIMS II Modeling System; U.S. Bureau of Economic Analysis; S. Patz & Associates, Inc.

Warrenton Village Conclusions

Table 20 shows a summary of net tax benefits for the proposed rental units at Warrenton Village. On-site benefits will produce a deficit of $206,170 due to the Town's low real estate tax rates. The off-site benefits will total $252,270, and therefore fully offset any on-site losses. Combined, this will generate a fiscal surplus of $46,100 annually at build-out for the Town of Warrenton.

Table 20: Summary of On-Site and Off-Site Fiscal Impacts of Apartments, Warrenton Village at Build-Out, Warrenton, Virginia
(Constant 2023 Dollars)

Source of Fiscal Impacts on the Town	Impacts On-Site in Warrenton	Impacts Off-Site in Warrenton	Total Fiscal Impacts
Apartments (320 Units)			
Revenues to the Town	$117,560	$338,870	$456,430
Town Costs	-$280,280	-$145,920	-$426,200
Subtotal	*-$162,720*	*$192,950*	*$30,230*
Two-Over-Two (36 Units)			
Revenues to the Town	$14,550	$55,520	$70,070
Town Costs	-$42,740	-$23,490	-$66,230
Subtotal	*-$28,190*	*$32,030*	*$3,840*
Townhomes (20 Units)			
Revenues to the Town	$8,050	$41,150	$49,200
Town Costs	-$23,310	-$13,860	-$37,170
Subtotal	*-$15,260*	*$27,290*	*$12,030*
Total Residential (376 units)			
Revenues to the Town	$140,160	$435,540	$575,700
Town Costs	-$346,330	-$183,270	-$529,600
Net Fiscal Benefits	**-$206,170**	**$252,270**	**$46,100**

Source: Town of Warrenton, VA; S. Patz & Associates, Inc.

STATEMENT OF JUSTIFICATION
WARRENTON VILLAGE CENTER
SPECIAL USE PERMIT APPLICATION

GPIN 6985-20-7247-000 and GPIN 6984-29-6753-000

Owner: Jefferson Associates L P, Warrenton Center, LLC
Applicant: NewCastle Development Group

February 14, 2024

INTRODUCTION

NewCastle Development Group (hereinafter, the "Applicant") is seeking a Special Use Permit for two parcels, totaling 29.05 acres and identified as GPINs 6984-20-7247-000 and 6984-29-6753-000 (the "Property"), to add residential units into the existing Warrenton Village Center (the "Center") in order to create a new mixed-use, live/work/play community (the "Proposal"). The Proposal seeks to bring a maximum of 386 residential dwellings to the existing commercial center through a variety of dwelling types, including traditional apartment units, 2-over-2s units and townhomes.

The Property is located within the New Town Warrenton District in the Plan Warrenton 2040 Comprehensive Plan, which is described as "a location for signature office/jobs center; with a greater intensity of mixed use and strong live, work and play options. A mix of uses could be organized around an internal street network and public amenities, such as civic spaces, parks green spaces and public gathering areas." This guidance from Plan Warrenton 2040 was the framework upon which the Proposal was contemplated and designed.

The Proposal seeks to create a critical mass of residential units on the vacant land north of Warrenton Village Center via a multifamily apartment building and structured parking garage that will 1) bring much needed rental supply to the Warrenton housing market and 2) introduce a new supply of consumers to support the existing businesses of not only Warrenton Village Center, but of all of Warrenton's established commercial/retail businesses.

The Applicant proposes to offer a wider range of housing types and price points through two additional sections of housing, which will include 2-over-2 and townhome dwelling units. These infill blocks, which will provide much needed "missing middle" housing types, will be utilized to integrate residential dwellings into the existing commercial center, creating a true mixed-use environment.

Lastly, the Applicant proposes a multitude of new improvements to the existing Warrenton Village Center, including public plazas, increased pedestrian walkability, and an enhanced road network, all of which adhere to the goals and initiatives of the New Town Warrenton District's vision for mixed-use centers.

SPECIAL USE PERMIT – MODIFICATIONS/WAIVERS

The Applicant is requesting the following modifications from Town Council, via approval of a Special Use Permit:

1. Increase in Overall Project Density

- Article 2-6.1: The maximum density specified in the zoning ordinance for a given zoning district shall not be exceeded. The maximum density is 5 units per acre or 10 units per acre with inclusion of 10% affordable dwelling units.
- Waiver Request #1: Increase density to 386 units or 13.28 per acre.
- In lieu of calculating density on a dwelling unit per acre basis, applicant proposes to calculate residential density based on existing commercial square footage (1 dwelling unit per 500 square feet of non-residential space, as allowed under the Mixed-Use Development Option of the Commercial District zoning ordinance)
    - Dwelling units allowed per DU/A calculation:
        - 29.05 acres x 5 DU/A = 145 units
    - Dwelling units allowed per DU/A calculation (assuming affordable housing bonus):
        - 29.05 acres x 10 DU/A = 290 units
    - Dwelling units allowed per DU/GSF calculation:
        - 219,792 GSF / 500 = 439 units
- Proposed dwelling units = 386 units

2. Front Yard Setback Modification along Broadview Avenue
    - Article 3-4.10.4: Required front yard setback from ROW greater than 50' is 40' minimum, if no parking or loading is proposed.
    - Waiver Request #2: Decrease minimum setback to 14' along Broadview Avenue.
    - This modification will allow the units to be closer to street, creating a more urban form and character.

3. Side & Rear Yard Setbacks along all internal property lines
    - Article 3-4.10.4: Required side/rear yard setbacks is 5' minimum.
    - Waiver Request #3: Decrease side/rear yard setbacks to 0'.
    - This modification will allow the overall development to function as a true mixed-use development that will not be segmented by internal separations.

4. Landscape Buffers along internal property lines and public ROW
    - Article 8-8.5: Minimum buffer width for commercial uses adjacent to residential uses is 25', plus 1' for each foot of building height over 35'. Minimum buffer width for rear boundaries of residential uses from public ROW is 25'.
    - Waiver Request #4a: Decrease buffer width between commercial and residential uses to 0'.
    - Waiver Request #4b: Decrease rear buffer width for residential uses from public ROW to 14'.
    - This modification will allow the overall development to function as a true mixed-use development by creating an integrated project that is not segmented by buffer strips adjacent to residential and commercial uses. The schematic landscaping plan has identified areas where plantings are proposed.

5. Height Modifications
    - Article 2-20: Height limit for dwellings may be increased up to 45' and up to three stories provided that front, side and year setbacks increase 1' for each additional foot of building height over 35'.
    - Waiver Request #5: Increase height limit for dwellings as follows:
        - 54' max height for Block 1, Oak Springs Drive Frontage
        - 36' max height for Block 1, Broadview Drive Frontage
        - 45' max height for Block 2

- 36’ max height for Block 3

CREATION OF A MIXED-USE CENTER

The goal of the new Warrenton Village Center is to create a mixed-use community that is representative of the Plan Warrenton 2040’s vision for the New Town Warrenton Character District. The New Town Warrenton District emphasizes highly visible centers with greater intensity of mixed-use and strong live, work and play options. This mix of uses is ideally located around an internal street network and public amenities, such as civic spaces, parks, green space and public gathering areas. This was the guiding directive when designing the Proposal.

The existing Warrenton Village Center is an established commercial center with a wide variety of in-place retail tenants. Due to the existing operations of these long-standing Warrenton businesses, the Proposal does not have the luxury of a “clean slate” from which to design the “quintessential” mixed-use community—impacts to tenants must be minimized, displacement of tenants may not be acceptable and the ability to demise existing structures, if possible, must be done extremely selectively.

So, while the existing commercial structures must remain as is, the Proposal seeks to improve the under-utilized commercial areas with the introduction of public amenities, increased pedestrian circulation and new interesting gathering areas—in this way, the new residential areas will offer a place to live, and the enhanced commercial areas will offer a place to “play.”

The goal of the design is not to create a new apartment community adjacent to an existing commercial center. The goal is to create an integrated village environment where both uses enjoy and thrive off one another and the lines between residential and commercial uses becomes blurred.

The Proposal focuses on two primary components to create a mixed-use community that will have little to no negative impact on existing businesses:

1) introduction of residential dwellings into the existing commercial center to create a live, work, play environment; and

2) installation of new public amenity areas and pedestrian connectivity to tie the different uses together in a cohesive manner.

1) Introduction of Residential Dwellings

The Proposal includes three new residential “blocks.” Each block will submit its own Site Development Plan and will meet the general requirements of a “standalone” site plan with respect to open space requirements, parking requirements, landscaping requirements, ADU requirements, etc. While it is not possible for each of the individual blocks to satisfy all the guiding principles of the 2040 Plan, when combined, they will create a cohesive mixed-use center that exhibits all the goals of the New Town Character District. The “Block Sequencing and Required Site Improvements” section later in this Statement of Justification will provide additional detail on how the Applicant proposes to ensure that this comprehensive plan will be realized.

Block 1 (Multi-Family Apartments): located on the vacant land along Oak Springs Drive, between Broadview Avenue and Hastings Lane, this component of the SUP will include a maximum of 320 rental dwellings, comprised of 1-, 2-, and 3-bedroom units, a four-story parking garage and

approximately 10,000 square feet of clubhouse and amenity space, including a state-of-the-art fitness facility, work-from-home/co-working spaces, entertainment lounges, cyber and coffee cafes, gathering spaces, and more. The building will also offer two interior courtyards that will include a saltwater pool and resort style pool deck, outdoor kitchens and grilling stations, outdoor game spaces, ample seating and lounging areas, firepits and "brew gardens."

Primary access to the internal, four-story, parking garage will be located on Oak Springs Drive, directly across from the entrance into Highland School. The residential leasing offices and amenity areas will be accessed at the corner of Oak Springs Drive and the new Hastings Lane extension. On-street parallel parking along the Hastings Lane extension will be provided for prospective tenants that are visiting the leasing facilities.

All building frontage facing Broadview Avenue will be three stories, while building frontage facing Oak Springs Drive and Hasting Lane will be four stories. All first-floor units along Broadview Avenue, Oak Springs Drive and Hastings Lane will feature direct entry access to promote pedestrian walkability.

This block will include the majority of the proposed residential units and will have the greatest impact on bringing much needed housing supply and consumers to Warrenton.

Block 1 Multi-Family Apartment Building Elevation

Block 2 (Multi-Family 2-over-2s): a maximum of 36 2-over-2 dwelling units are proposed in the northeast corner of the Warrenton Village Center, at the intersection of Oak Springs Drive and Hastings Lane. These buildings will be four stories, with one unit located on the 1st and 2nd floors and a second unit located on the 3rd and 4th floors of each residential "stack." All units will include a one-car garage and direct pedestrian access to first-floor units along Oak Springs Drive and Branch Drive.

Block 2 will introduce a housing type that is not currently available in Warrenton and provide new supply to the highly desirable "missing middle" housing stock.

Block 2 Multi-Family 2-over-2 Elevation

Block 3 (Multi-Family Townhomes): a maximum of 30 townhomes are proposed on the west side of Warrenton Village Center along Broadview Avenue. These will be three story units and feature a two-car garage in each unit and direct pedestrian sidewalk access to all units.

Block 3 will be true infill into the existing commercial center, better integrating the two uses and promoting walkability between the Central and West Plazas. These units will add additional units to the "missing middle" housing supply.

Block 3 Multi-Family Townhome Elevation

2) Installation of Public Improvements

Central Plaza: the Applicant proposes to create a new Central Plaza at the core of Warrenton Village Center. This public gathering space will include a plaza green with seating and lounging areas for visitors and provide a place for local businesses to hold activities; a splash-pad that will be a major attractor for families with young children and serve as a central landmark for the newly improved center; and an area for a potential future retail building that would further activate this public amenity—ownership envisions a coffee or ice cream shop with indoor/outdoor seating that will be a destination for all residents of Warrenton. This plaza will be adorned with street and ornamental trees and planting beds and feature a raised watertable street crossing that will connect the space to the existing retail in a pedestrian safe manner. The new Central Plaza will serve as Warrenton Village Center's vehicular and pedestrian crossroads, a hub that will function

as the heart of the Center and is sized, programmed, and planned to allow for community activities as well as everyday use.

East and West Plazas: Smaller public plazas are proposed at the Broadview Avenue entrance and the Hasting Lane entrance into the Warrenton Village Center. These plazas are connecting points celebrating the east and west entrances to the multifamily building and will act as visual links between the residential and commercial areas. These "doorways" into the Center will enhance walkability for the residents by providing easy and direct connection to the retail areas. The plazas will also help transition from public sidewalks to private interior residential lobbies. The 24/7 illuminated interiors of the lobbies will provide visual activation for both plazas and serve as an anchoring use for the open spaces.

The East and West plazas will serve as passive, ceremonial transition zones between the private residential realm and the public retail realm. Their primary intent and use is to connect residents with the rest of the commercial center, while also allowing for a different, less active, and smaller public area for passive recreation.

Dog Park and Picnic Area: a new dog park and seating areas will be accessible to both residents and the general public. The dog park will include a fenced in area for off-leash play, pet water fountains and waste clean up stations. Just outside of the dog area will be picnic table seating areas for pet owners and guests to relax and congregate while their pets play.

Oak Springs Drive Pedestrian Crosswalks: two crosswalks are proposed on Oak Springs Drive—one at Hastings Land and one at the Highland School entrance. These new crosswalks will provide safe points of pedestrian access for people visiting the Center from the north side of Oak Springs Drive.

Completion of Outer Sidewalk Ring: the Proposal seeks to complete a sidewalk ring around the entirety of the Warrenton Village Center. Each residential block will include sidewalks along its outer rim (either along Broadview Avenue, Oak Springs Drive or Branch Drive) to piece together a fully encompassing sidewalk circle.

Additionally, there is currently a large gap in the sidewalk connection along the east side of Broadview Avenue. The Applicant proposes to install a new ~475' section of sidewalk in this area (located behind the Galaxy Strike Bowling Center building). Once completed, this section of sidewalk and the new sidewalks within the residential blocks will complete an outer ring of sidewalks around the entire Warrenton Village Center.

Internal Pedestrian Connectivity: residential tenants will benefit from quick and easy access to all the businesses of Warrenton Village Center via new sidewalks, crosswalks and wayfinding markers. All new buildings will be encircled by new sidewalks and will include direct entry access to ground level units (with the exception of those units in Block 1 that will face the rear of the existing commercial building). The addition of the plazas, linked together with internal sidewalks, will serve to better activate and tie together the different uses found within the Center. Finally, new crosswalks are proposed at all primary street crossings. These improvements will not only benefit pedestrian circulation within the site, but will also allow for easier and safer travel for those accessing the site from the outside.

A Conceptual Circulation Plan for pedestrian, vehicular and bicycle traffic can be found on Sheet 23 of the SUP.

Hastings Lane Extension: a new vehicular and pedestrian entrance into the Warrenton Village Center is proposed at the Oak Springs Drive and Hastings Lane intersection. This new entrance will provide a new source of direct ingress/egress into the Center, which will help to facilitate less congestion at the Center's other entrances and result in less traffic on Oak Springs Drive and Branch Drive, as vehicles no longer have to circle around the Center to access one of the existing entrances on Broadview Avenue and Branch Drive.

Summary of Improvements, included within each block:

Block 1:
- Multi-family building and parking garage
- Central Plaza
- West Plaza
- East Plaza
- Hastings Lane extension
- Reconfiguration of commercial parking
- Modified Alley, all improvements
- Dog park and picnic area
- Sidewalks included in Block 1 Improvements – Sheet 4 of SUP
- Two crosswalks across Oaks Springs Drive at Hastings Lane and Highland School entrance

Block 2:
- 2-over-2 dwelling units and parking
- Sidewalks included in Block 2 Improvements – Sheet 5 of SUP

Block 3:
- Townhome dwelling units and parking
- Sidewalks included in Block 3 Improvements – Sheet 5 of SUP
- New sidewalk section on east side of Broadview Ave (behind Galaxy Strike Bowling Center building)

ADDITIONAL JUSTIFICATIONS AND PROPOSAL DETAILS

Density

Plan Warrenton 2040 states that the calculation of density on a unit per acre basis can be deficient in a mixed-use environment – "when considering implementation, conventional zoning that separates land uses and measures development intensities by dwelling units per acre (DU/AC) is not compatible with a vision of mixed-use, walkable neighborhoods with a range of housing types" and "if the density requirements for a zoning district are revised accordingly, the chances are high that a typical multi-family building will be built." It recognizes that using DU/AC as a density measurement often gives a false perception of increased density with housing types that are lower in square footage and are stacked vertically, such as the apartments and "2-over-2" units included in the Proposal. To eliminate the false sense of increased density given the proposed housing types, this submittal proposes to utilize an alternative density calculation method that is included in Article 9-25.1.B of the Zoning Ordinance.

Per the Mixed-Use Development Option in Article 9-25.1.B of the Zoning Ordinance, which stipulates that a mixed-use property can be approved for up to one dwelling unit per 500 gross

square feet (GSF) of non-residential floor space, the Property could be permitted to have up to 439 units with approval of an SUP, given the existing 216,306 gross square feet of non-residential floor space (219,792 GSF / 500 GSF = 439 units).

The Warrenton Village Center proposes a maximum of 386 residential dwellings, paired with 219,792 square feet of non-residential uses. Therefore, while the Applicant is requesting a modification for increased density, the request is 53 units less than the maximum amount that can be approved via an SUP.

Plan Warrenton 2040 encourages "setting district standards based on form rather than density" to "achieve the middle-range housing types desired." Accordingly, this proposal prioritizes site design and a mix of housing types over a strict adherence to underlying density requirements. This enhanced site design will mitigate any effects of the additional density, with an emphasis on walkability, a variety of housing types, and the integration of multiple uses within a single destination location.

Lastly, the Economic and Fiscal Resilience goals of the Plan Warrenton 2040 call for "a range of housing types and housing assistance programs for employees to live in Warrenton." This proposal accomplishes this by including affordable housing and a range of housing types that will be attractive to current Warrenton residents, as well as potential employers looking to bring new business and employees to Warrenton. This proposal supports Plan Warrenton 2040's goal to "promote Character Districts as the place to accommodate a range of housing typologies" by proposing a variety of housing types, including multi-family, 2-over-2s, and townhomes. This new stock of residential units and new housing types will bolster a housing supply that is severely underserved and sorely needed within the Town.

The Applicant's proposal meets and advances nearly all of the housing goals stated in the Plan Warrenton 2040. Additionally, it promotes consolidation of a high amount of density into an infill project, in lieu of sprawl development that is detrimental to the area's rural preservation.

Height

The New Town Character District uses a form-based transect approach to development, which defines form with greater maximum height towards Lee Highway and the center of the district, with a gradual step down in scale towards Oak Springs Drive, where the Property is located. Since the Property is in the Transition Zone, building heights of one-to-three stories or 35' are recommended.

Applicant is seeking a modification for a fourth story on the east side of Block 1 and all of Block 2, which is one story greater than the three recommended in the Transition Zone. Since Plan Warrenton 2040 envisions developments along Lee Highway and east of Broadview Avenue to be up to six stories, the Property would still maintain a step down in scale towards Oak Springs Drive at four stories. Therefore, the requested height modification is still in conformance with the goal of Plan Warrenton 2040, which is to step down in height towards residential zones.

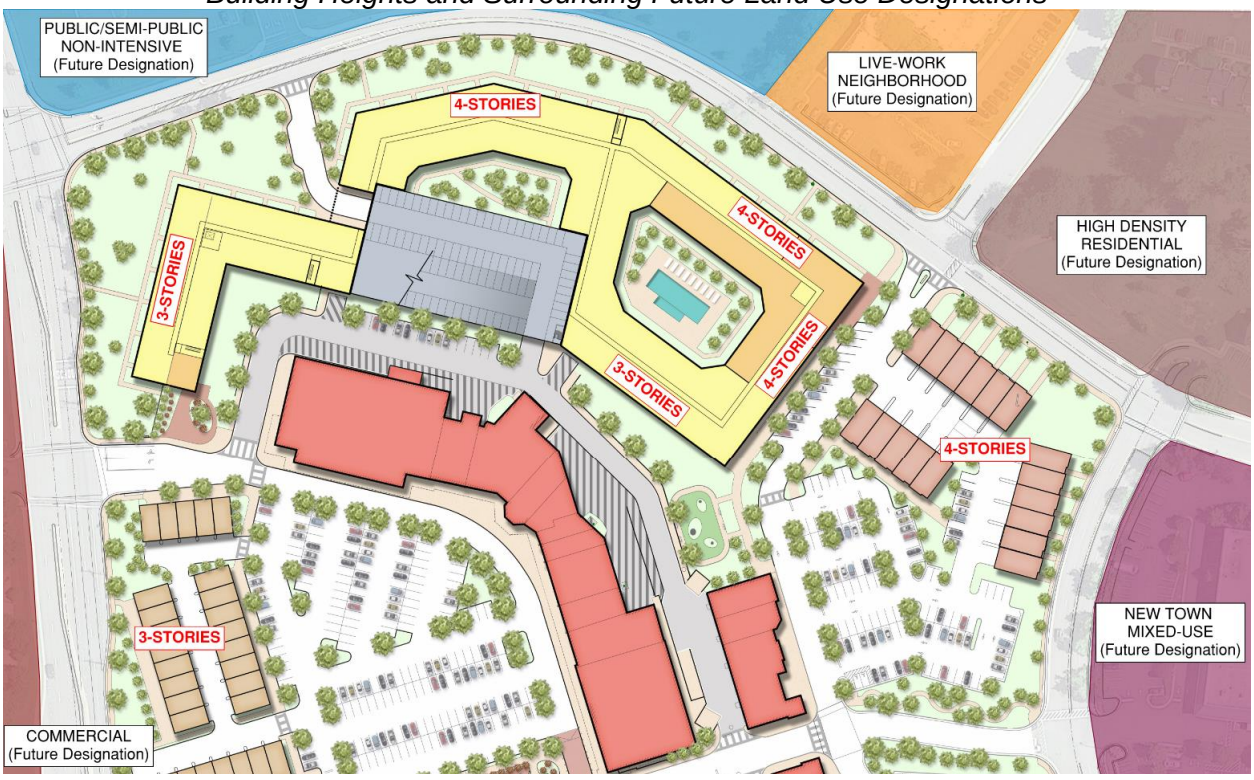
The goal of the height recommendations of Plan Warrenton 2040 is to step down towards residential zones. The Proposal achieves this goal by locating its three-story sections in the areas that are nearest to single family residential, as well as have low density designations in the Future Land Use Map—most notably, those neighborhoods located on the west side of Broadview Avenue—and increasing heights in areas that are near existing commercial and Future Land Use designations that allow up to three stories (i.e. High Density Residential). As proposed, the

buildings on the west side of the Property (including the multi-family apartment building and multi-family townhomes) will conform to the recommended three-story heights, while the buildings on the east side of the Property (including the multi-family apartment building and the multi-family 2-over-2s), which are located adjacent to existing commercial, such as Warrenton Village Center and the Brookside Rehab & Nursing Center, will step up to four-stories.

Inclusion of four-story buildings at this location will provide a more gradual step down from the six stories allowed along Lee Highway to the three-stories allowed in the High-Density Residential areas shown on the Future Land Use Map on the north side of Oak Springs Drive. This will create a better design aesthetic than the stark contrast of a dramatic drop from six stories down to three stories. From a visual perspective along Oak Springs Drive, this modification would allow for three-story buildings on the north side of the street, four-story buildings on the south side of the street in the Transition Zone, then escalating up to six-story buildings along Lee Highway—a gradual and appropriate escalation in heights.

It is noteworthy that the Property drops in elevation from west to east by approximately 45'. The far eastern side of the Property, where the four-story sections are located, is significantly lower than the western side—placement of the taller buildings at this location was intentional to make it better conform in appearance with the adjacent three-story buildings.

Building Heights and Surrounding Future Land Use Designations



Another transition goal of Plan Warrenton 2040 is that "the neighborhood edge provides the means of transition from the Character District to adjoining properties." Four-story apartments are an appropriate transition to the High-Density Residential areas located to the north, which will be similar in character and use. High-Density Residential will allow up to 12 units per acre, which is in line with the DU/AC proposed at Warrenton Village Center (13.28 DU/AC).

Further, the Future Land Use Plan's Character District Summaries calls for "greater intensity of mixed-use and strong live, work, and play options" in the New Town Warrenton District and notes that this district has "high visibility," due to its proximity to Route 29. The requested modifications to increase density and height support the need for greater intensities and higher visibility in this character district.

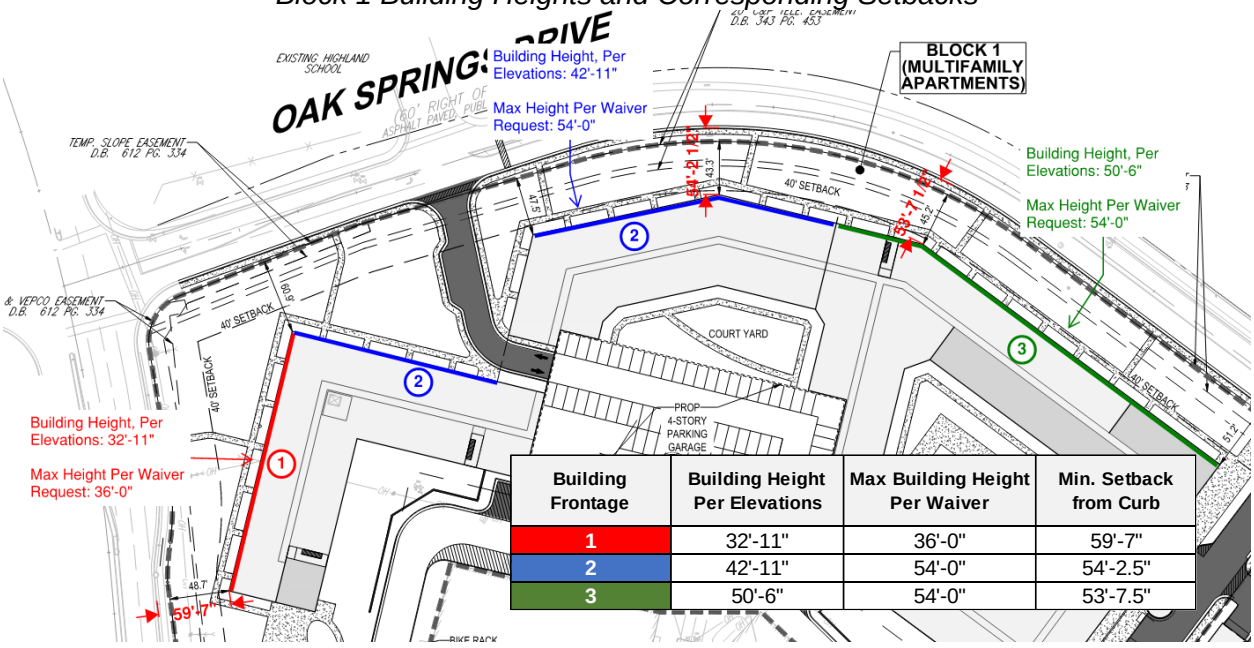
Finally, one of the ten guiding principles for the character districts is to place parking behind buildings and away from street frontages. To accomplish this goal, the Applicant has proposed an interior structured parking garage that will not be visible from surrounding streets. Increasing building heights in select areas is the only way to create the necessary density needed to facilitate this improved parking condition.

Building Heights and Setbacks

Article 2-20 allows for building height limits to increase above 35' if the corresponding setback increases by an equal amount. The intent of offering a mechanism by which an applicant can increase building heights if corresponding building setbacks are simultaneously and equally increased, is to ensure that an appropriate balance or ratio of height to depth is maintained. The general rule of thumb in land planning is that for every one foot of building height, there should be a minimum of one foot of corresponding setback. Applicant has satisfied this standard by providing appropriately sized setbacks that correspond with the proposed increases in building height limits.

The below illustration examines the three building frontages of the Block 1 apartment building. Anticipated building heights are calculated using the average ground surface elevation across a building's frontage in relation to the highest point of a flat roof (parapets have not been included in building heights, per IBC code definition). For each building frontage, the corresponding minimum setback from the back of street curb has been provided. Along all three frontages, building setbacks are equal to or greater than the anticipated building height, confirming that the appropriate standard has been achieved.

Block 1 Building Heights and Corresponding Setbacks



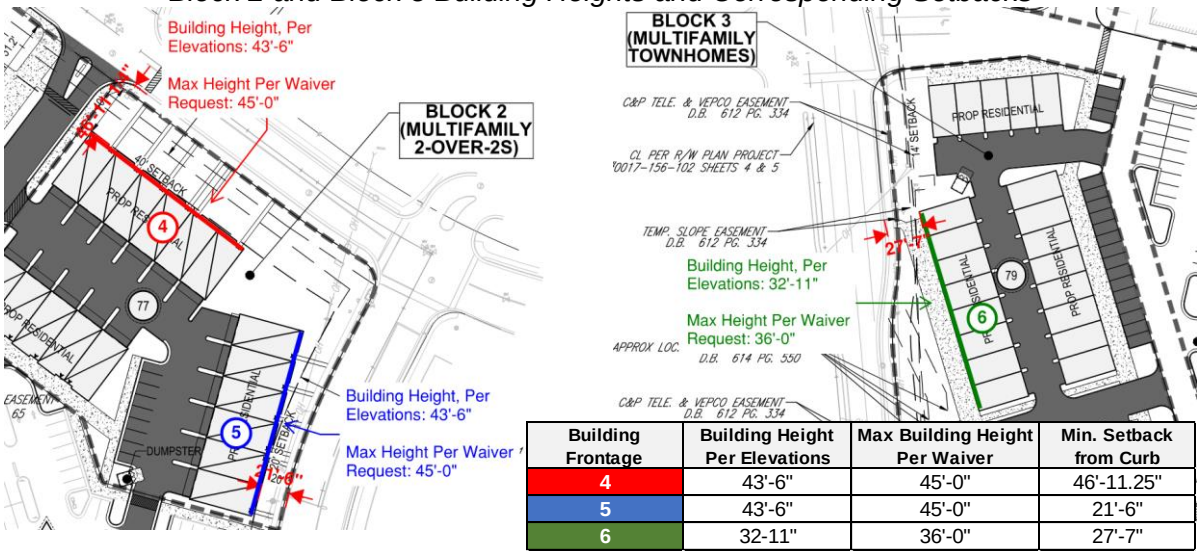
Building Frontage	Building Height Per Elevations	Max Building Height Per Waiver	Min. Setback from Curb
1	32'-11"	36'-0"	59'-7"
2	42'-11"	54'-0"	54'-2.5"
3	50'-6"	54'-0"	53'-7.5"

Note—Applicant acknowledges that setbacks are defined by the Town from property lines, however, the point of this exercise is to illustrate that proper height to setback standards have been provided, which apply to the public's viewpoint (i.e. traveling the street) and not an intangible property line. Applicant is therefore requesting a height waiver because it acknowledges that adequate setbacks from property lines have not been provided.

In Block 2, proper anticipated building height to minimum setbacks ratios are provided along Frontage #4 (Oak Springs Drive), but not along Frontage #5 (Branch Drive). The Applicant feels that this is appropriate given the internal nature of Branch Drive as a "cut through" drive within the Warrenton Village Center. Branch Drive serves the Center more as an internal drive than as a primary thoroughfare, in which case it is appropriate to push buildings up onto internal street frontages.

Block 3 has anticipated building heights below 35', which would typically require no additional setbacks. However, a waiver is already being requested at this location to reduce setbacks to 14'.

Block 2 and Block 3 Building Heights and Corresponding Setbacks



Building Frontage	Building Height Per Elevations	Max Building Height Per Waiver	Min. Setback from Curb
4	43'-6"	45'-0"	46'-11.25"
5	43'-6"	45'-0"	21'-6"
6	32-11"	36'-0"	27'-7"

Below is the compiled list of anticipated building heights along street frontages and the maximum height allowed per the Applicant's waiver request. Slight height increases have been added into the maximum height limits to provide buffer for average ground surface grade changes that may occur during Site Development Plan.

Building Frontage	Location	Block	Building Height Per Elevation	Max Height Per Waiver Request
1	Broadview Avenue	1	32'-11"	36'-0"
2	Oak Springs Drive	1	42'-11"	54'-0"
3	Oak Springs Drive	1	50'-6"	54'-0"
4	Oak Springs Drive	2	43'-6"	45'-0"
5	Branch Drive	2	43'-6"	45'-0"
6	Broadview Avenue	3	32-11"	36'-0"

See Elevation Sheets 11-15 of SUP for a depiction of these calculations.

Affordable Housing

To support the need for affordable housing within the Town of Warrenton, the Applicant proposes that for a minimum affordability period of twenty-five years from the issuance of this Special Use Permit (the "Affordability Period), at least ten percent (10%) of the residential dwelling units built on the Property shall be designated as affordable low-income restricted units (the "Affordable Dwelling Units or ADUs").

Allocation of the Affordable Dwelling Units between 1-, 2- and 3-bedroom units will be at the discretion of the Applicant, so long as a minimum of ten percent (10%) of residential dwelling units within each of the three residential blocks are maintained as Affordable Dwelling Units. In other words, each individual residential block will satisfy the 10% affordability requirement independently of the other blocks. The ADUs shall be similar to the market rate units in architectural design, fixture/appliance selections and unit size. No more than three ADU units will be positioned adjacent to one another at any given time.

"Qualified Parties" who will be eligible to rent or purchase one of the ADUs, are defined as:

> For the purposes of qualifying for the lease of the affordable rental ADU a Qualified Party shall be an individual or a family (x) whose gross annual family income does not exceed 80% of the current Fauquier County Area Median Family Income ("AMI") at the time the rental application is opened for such Qualified Parties, as the AMI is published by the United States Department of Housing and Urban Development or other approved source of such information such as the United States Census Bureau, and (y) for whom the monthly rental of such unit does not exceed 30% of the Qualified Party's gross monthly family income.
>
> For the purposes of qualifying for the purchase of an affordable townhome ADU, a Qualified Party shall be an individual or a family (x) whose gross annual family income does not exceed 80% of the current Fauquier County AMI at the time application is opened for such Qualified parties, as the AMI is published by the United States Department of Housing and Urban Development or other approved source of such information such as the United States Census Bureau, and (y) for whom the monthly mortgage payment for such unit does not exceed 30% of the Qualified Party's gross annual family income.
>
> Persons eligible for assistance under the following state or federal programs:
>
> a. Virginia Housing Development Authority
>
> b. Section 8 Rental Assistance Program
>
> c. Department of Housing and Urban Development Community Block Grant Program
>
> d. Farmer's Home Administration Program
>
> e. Other programs similar to those named herein as approved by Town Council

The ADU status of the aforesaid minimum ten percent (10%) of total units shall be set forth in a deed of restrictive covenants recorded against the Property and shall continue to bind the ten percent (10%) minimum unit requirement within each block to the Property for a period of twenty-

five years from the issuance of this Special Use Permit; provided, however, that for rental units, the Applicant may recalculate the rental rate based on factors (x) and (y) above.

The Applicant shall establish in a deed of restrictive covenants a program for the administration of this ADU program according to the requirements of these conditions. The Applicant (or Owners Associations with respect to any purchase units if the Applicant is no longer the Declarant) shall make each ADU available for a period of not less than 90 days for rental units and 180 days for purchase units, following the issuance of a certificate of occupancy for each unit.

The Applicant shall designate on the Construction Drawings submitted for building permit approval which units will be the initial ADUs; however, the units that are selected as the initial rental ADU units are not required to remain as the designated rental ADUs for the entirety of the Affordability Period. The Applicant will have the authority to re-designated the rental ADUs from time to time based on leases and vacancies. The Applicant will maintain a building plan set at the leasing office located in the Block 1 at all times that shows which units are currently designated as rental ADUs.

The documents creating the ADU program shall be reviewed and approved by the Town Attorney prior to their recordation in the Land Records.

ADUs will first be made available to the following persons: those residing or working in the Town of Warrenton or Fauquier County; Town of Warrenton or Fauquier County teachers; Town of Warrenton or Fauquier County first responders. The Applicant shall contact the appropriate local Social Service and/or Housing Authority offices for identification and placement of local residents.

The community's Property Management Team shall make annual reports to the Zoning Administrator as to the number, type and location of units hereunder that shall have been rented as ADUs and shall verify that they have been rented to Qualified Parties.

These obligations are described in greater detail in the proposed Conditions of Approval.

Condo Sale of Block 2 and Block 3

All dwelling units in all three blocks are intended to be for rent, however, Applicant will maintain the ability to sell the entirety of Block 2 (Multi-Family 2-over-2s) and/or the entirety of Block 3 (Multi-Family Townhomes) as Condos. The Applicant agrees to sell all or none of the units within Block 2 or Block 3, so as to prohibit a mix of for rent and for sale units in the same block.

All conditions of the SUP will continue to be enforced in a block sale scenario through the Declarations of Restrictive Covenants that the Applicant will record and encumber the Block 2 and/or Block 3 parcels. In a block sale scenario, Homeowner Associations will be established to maintain all conditions of the SUP and will own the block parcel, while individual condo owners will own the condo dwelling units.

In a sale scenario, residents/owners of the condos will not be tenants of the apartment community and will not have access to the rental amenities located within Block 1.

In a block sale scenario, 10% of the units within the sold block will be required to be sold as ADUs, in accordance with the language outlined in the SUP's Affordable Housing Conditions of Approval.

Architecture

Included with the SUP application, the Applicant has submitted a separate document titled "Warrant Village Center – Design Story" to provide more detail on the intent and thought process behind the selected aesthetics.

The Conditions of Approval includes language that the final design of all buildings shall be in general conformance with the materials included in this SUP submittal.

A list of prohibited materials is also included in the Conditions of Approval.

Garage Screening

A structured parking garage is proposed in Block 1. Three of the garage's four sides will be concealed within the apartment building and not visible from the exterior. The south facing façade, while exposed, is not anticipated to be easily viewed from ground level, given its position behind the existing Warrenton Village Center commercial buildings. To mitigate concerns that may remain regarding its visibility, the Applicant will install a screen on the southern facing façade of the garage to minimize its visual impact. A concept of this screening is provided below.

Conceptual Garage Screening Design on South Facing Façade

Block Sequencing and Required Site Improvements

Applicant can develop the blocks in any order. Each block will have its own independent Site Development Plan, separately submitted and approved by the Town of Warrenton.

All improvements included within each individual block are shown on SUP Sheet 4 and Sheet 5.

To ensure that site improvements are completed in a timely manner along with the residential buildings, Applicant agrees that the Town of Warrenton will withhold Certificates of Occupancy (COs) in accordance with the following schedule:

- Block 1: the 215th CO within Block 1 will not be issued until such time as all Block 1 site improvements have been substantially completed;
- Block 2: the 25th CO within Block 2 will not be issued until such time as all Block 2 site improvements have been substantially completed;

- Block 3: the 22nd CO within Block 3 will not be issued until such time as all Block 3 site improvements have been substantially completed.

It is anticipated, but not required, that Block 1 (Multi-family Apartment Building) will commence construction first. Block 2 (Multi-Family 2-over-2s) is anticipated to commence simultaneously with Block 1 or shortly after, depending on market conditions. Block 3 (Multi-Family Townhomes) will commence last, due to in-place tenants in the current retail building at that location (Summit Community Bank). It is anticipated that Block 3 will commence upon lease expiration of current retail tenant, but exact timing is unknown.

Open Space

Each individual residential block/parcel, as well as the residual retail parcel, will individually satisfy the 10% open space requirement.

Applicant will construct all open spaces in general conformance with the renderings and materials included in the SUP and inclusive of the "New Improvements" listed on Sheet 6 "Open Space Plan."

Most Notably:

- Open Space A in Block 1 will include the West Plaza, inclusive of a hardscape residential plaza with bench seating and a bike rack;
- Open Space D in Retail Block will include a fenced in dog play area, picnic table seating and a bike rack;
- Open Space E in Retail Block will include the Central Plaza, inclusive of a lawn area, splash-pad, bench seating, two bike racks, and future commercial pad.

Site Conditions

The proposed development consists of two parcels totaling approximately 29.05 acres. Approximately 22.59 acres are the existing shopping center known as Warrenton Village Center and the remaining 6.46 acres are a vacant semi-wooded parcel with road frontage on Broadview Avenue and Oak Springs Drive. The topography of the site ranges in elevation from 550' at the northwest corner of the site at Broadview Avenue to an elevation of 505' along the eastern property line at Branch Avenue. Site soils consist of various loams such as Rohrersville, Middleburg, Fauquier Silt, Glenelg and Elioak. A detailed tree survey will be provided at the time of Site Development Plan.

The Property is surrounded by a mix of commercial, education and residential uses:

- To the north, across Oak Springs Drive, is Highland Private School, Brookside Rehab and Nursing Center and the Cedars of Warrenton town home community;
- To the east, across Branch Drive, is Safeway and other commercial businesses included within Warrenton Village Center;
- To the south is Warrenton Village Center;
- To the west, across Broadview Avenue, are standalone commercial and office uses and single family neighborhoods.

Construction Impacts

Construction limits of disturbance will be limited to within the Property. No neighboring or adjoining properties will be included within the limits of disturbance. No offsite impacts or storage will be required. If substantial rock is discovered at the Property, blasting may be required and permitted in accordance with Town of Warrenton requirements.

Per Gorove Slade's Traffic Impact Analysis, turn lanes are not warranted at the proposed access points on Oak Springs Drive, therefore, the only impact to the public right of way will be the two new connections to Oak Springs Drive and the two new crosswalks on Oak Springs Drive.

Construction Timelines

Block 1 (Multi-family Apartments): Construction will take approximately 24 to 28 months.

Site Work Duration: 6 to 8 months
Vertical Construction Commencement: ~ Month 6
Vertical Construction Duration: 18 to 20 months
Clubhouse/Leasing Delivery: ~ Month 20
First Units Available: ~ Month 20
Construction Completion: ~ Month 26

Block 2 (Multi-family 2-over-2s): Construction will take approximately 14 months.

Site Work Duration: 3 to 4 months
Vertical Construction Commencement: ~ Month 4
Vertical Construction Duration: 8 to 10 months
First Units Available: ~ Month 12
Construction Completion: ~ Month 14

Block 3 (Multi-family Townhomes): Construction will take approximately 14 months.

Site Work Duration: 3 to 4 months
Vertical Construction Commencement: ~ Month 4
Vertical Construction Duration: 8 to 10 months
First Units Available: ~ Month 12
Construction Completion: ~ Month 14

Construction schedules included herein are estimates and subject to change based on potential unanticipated delays, such as those caused by severe weather, material shortages, etc.

Economic Impact

A Fiscal Impact Analysis by S. Patz & Associates, Inc. determined that the Proposal would result in a $46,100 annual surplus for the Town of Warrenton, plus the additional benefit of much needed housing supply.

The full report has been submitted as part of the SUP application.

Traffic Impact Analysis

New access to the Property will be provided via a parking deck entry with direct access to Oak Springs Drive (Town Route 3), a fourth-leg to the existing full-movement intersection of Oak Springs Road at Hastings Lane, and via the existing shopping center accesses to the south.

Based on the capacity and queueing analysis results, the proposed Warrenton Village Center will not have a substantial impact on the surrounding transportation and roadway network. No improvements are warranted or recommended to mitigate traffic concerns created by the Proposal.

It is anticipated that the peak activity times for the proposed residential units would have only a short overlap with the Highland School peak arrival and dismissal times. Based on existing traffic counts, the school driveway on Oak Springs Drive sees most activity after 7:45 AM and has very little traffic after 4:30 PM. Typical peak times for multi-family residences are 7:00-8:00 AM and 5:00-6:00 PM, according to the Institute of Transportation Engineers. Similarly, the Traffic Impact Study prepared for the site indicates that with both Highland School traffic and new trips from the residential units, acceptable traffic operations would be maintained at the shared entrance location during all times of day.

The full report on transportation impacts can be found in the Traffic Impact Analysis by Gorove Slade that has been submitted as part of this SUP application.

New Amenities for Public Use

In addition to the extensive package of amenities that will be offered to tenants within the Block 1 multi-family apartment building, the Proposal also includes a variety of new improvements that will be available to and benefit the general public:

- Improved walkability through an enhanced sidewalk and crosswalk network within the Center will make for a more efficient shopping experience.
- New and improved crosswalks on Oak Springs Drive at Hastings Lane and at the Highland School entrance will create easier and safer points of pedestrian access to the Center.
- Traffic slowing measures will create a safer walking environment.
- The Central Plaza will provide a new destination family attraction for residents of Warrenton with its splash-pad, activity area and future eatery.
- The Dog Park will offer a new off-leash area for pets to play, while owners can relax nearby on benches and picnic tables.

Impact on Community Facilities

Stormwater Management will include, but not be limited to both structural and non-structural best management practices for managing stormwater runoff. This could include underground stormwater facilities, bio-retention areas and rain gardens.

The Property will connect to public water and sewer. The average daily water/sewer demand will be approximately 57,900 gpd (386 units * 150 gpd). Based on comments received from the Town of Warrenton Department of Public Works and Utilities there are no concerns with providing adequate capacity for the Proposal.

No negative impacts regarding the local schools are anticipated, given the adequate capacity in the local school system. See further details in below section—"Impacts on Schools."

The Property will rely on Town Services such as fire, rescue, and police services.

Impact on Schools

School age children residing at the proposed community would attend the following public schools:

Elementary:	Bradley
Middle School:	Warrenton
High School:	Fauquier

Per the Fauquier County Public Schools Ten-Year Enrollment Projection, dated November 2018, the max capacity and projected enrollments of these schools are shown in the table below. Based on the available data, an increase of 111 elementary students, 82 middle school students and 284 high school students would be required to meet the capacity at any of these schools over the next five years.

Available Capacity at District Public Schools

Bradley Elementary School

Max Capacity 588	*School Year*					
	2023-24	*2024-25*	*2025-26*	*2026-27*	*2027-28*	*2028-29*
Enrollment Projections	474	473	475	475	475	477
Available Capacity	114	115	113	113	113	111

Warrenton Middle School

Max Capacity 545	*School Year*					
	2023-24	*2024-25*	*2025-26*	*2026-27*	*2027-28*	*2028-29*
Enrollment Projections	427	440	454	463	462	458
Available Capacity	118	105	91	82	83	87

Fauquier High School

Max Capacity 1,634	*School Year*					
	2023-24	*2024-25*	*2025-26*	*2026-27*	*2027-28*	*2028-29*
Enrollment Projections	1,302	1,287	1,283	1,305	1,314	1,350
Available Capacity	332	347	351	329	320	284

COMBINED

Max Capacity 2,767	*School Year*					
	2023-24	*2024-25*	*2025-26*	*2026-27*	*2027-28*	*2028-29*
Enrollment Projections	2,203	2,200	2,212	2,243	2,251	2,285
Available Capacity	564	567	555	524	516	482

Given that the most common age demographics among market rate apartment renters is 25-35 and 55-65 years of age, the percentage of units with school age children as tenants is very low. The average number of school age students per unit within the Applicant's rental portfolio is as follows:

Average School Age Children Per Dwelling Unit – Applicant Rental Portfolio

School Type	Children Per Dwelling Unit	# of Students (applied to proposed 386 unit community)
Elementary	3.4%	13
Middle	1.1%	4
High	2.2%	9
Total	6.7%	26

From tenant data collected across the Applicant's entire rental portfolio, the anticipated number of school aged children living at the proposed community is 26. As shown by this data, even if this anticipated amount was doubled, it would not threaten to meet the available capacity of the three district public schools.

Topography

To address grade changes of approximately 45' from west to east across the site and approximately 10' from south to north, the architect and engineering teams have utilized different grade mitigation methods such as stepped buildings, introduction of "basement" units, small retaining walls and adding elevated stoops with sidewalk access.
Below is a building elevation to help illustrate some of these strategies—this elevation is taken from the new Hastings Lane extension, looking west at the proposed multi-family building.

Profile Illustrating the "Stepping" of the Apartment Building

In Section A, at the corner of Oak Springs and Branch Drive, the Property's elevation is at its lowest point. The leasing offices and amenity areas have been located at this corner and the finished floor elevation of the building has been dropped to mitigate the lower elevations and provide direct on-grade access at that point. These sections will also benefit from increased ceiling heights created from the "sunken" finished floor elevation.

In Section B, as the site's elevation rises, residential units will be elevated above the street level, with access to those units provided by a secondary sidewalk that sits on top of a section of masonry retaining wall. One "public" sidewalk will be placed adjacent to the street and run with the slope and a secondary "private" sidewalk will be placed adjacent to the building in an elevated, level position. The elevated residential units will have direct access to the raised secondary sidewalk, which will also create increased privacy for those ground floor residents. See image below for illustration of this concept.

View of Section B Showing "Double Sidewalk" Configuration

In Section C, the finished floor elevation of the building is on-grade at street level and no grade mitigation is required.

In Section D, where there is a steep increase in elevation, the building will step from four-stories to three-stories, utilizing a retaining wall hidden within the building's foundation to mitigate the significant grade change.

Through methods such as these around the Property, the elevation changes across the site will be mitigated in subtle and attractive ways that enhance the aesthetic of the building and avoid large and potentially unsightly retaining walls.

Geotech

A geotechnical report will be completed at the time of Site Development Plan. Results of the study will be incorporated into the certified structural design and approved during the building permit review process.

Road & Infrastructure Maintenance

The Warrenton Village Center will be owned and maintained by Jefferson Associates L P, Warrenton Center, LLC and/or affiliated entities. These entities will be responsible for the continued maintenance and cleaning of all existing and proposed improvements, including but not limited to residential buildings, private roads, sidewalks, stormwater facilities, parking areas, plazas and open space, as well as continued maintenance of landscaping, including mowing, weeding, mulching and snow removal.

Modified Alley – Improvements, Vehicular Access & Loading, and Screening

Improvements to the existing alley located behind the retail buildings are proposed with this SUP plan. The primary usage of the Modified Alley will continue to be for "back of house" loading functions and trash pickup areas for the existing commercial buildings. These functions will be improved through several enhancements, including a consolidation of existing dumpster locations into three, centrally located, screened trash areas (see Sheet 19 of SUP), removal and cleanup of existing "ancillary" structures that have been erected adjacent to the commercial buildings, painting of the rear facing commercial façade, and striping of "back of house" areas to designate retail loading and trash zones. This alley will also include approximately twenty-five parking spaces that will be reserved for employees of the commercial tenants.

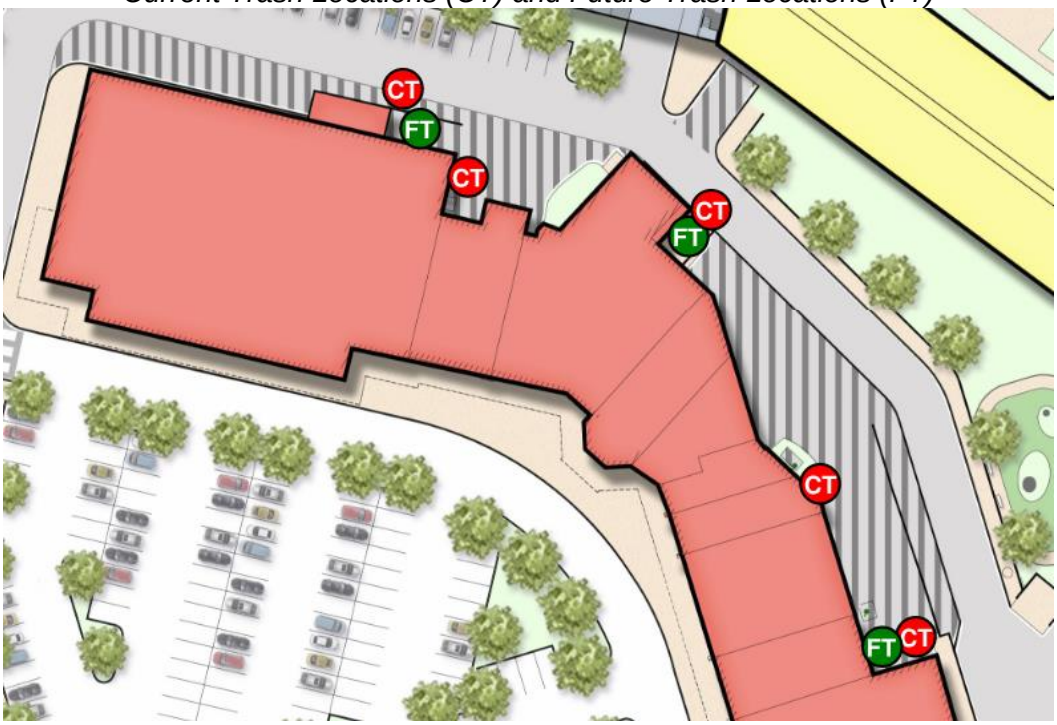
The Modified Alley will also serve as a secondary vehicular ingress/egress into the garage, as well as provide Residential Loading and Trash Pickup Areas. Two residential loading and trash pickup areas have been designated within the Modified Alley. The primary ingress/egress into the garage will be located on Oak Springs Drive, so as to minimize vehicular traffic in the Modified Alley.

Vehicular studies have been performed to ensure appropriate turning radii will be provided for commercial loading vehicles and adequate lines of site around all corners/turns will be confirmed during Site Development Plan review. These studies were coordinated with the existing shopping center owner to ensure that adequate loading space will be provided for each of the business's required loading vehicle sizes and types. Additionally, convex traffic safety mirrors can be installed at any location that poses a safety concern.

The Applicant plans to incorporate a number of visual improvements to the Modified Alley, summarized below:

- Garage positioning: the garage has purposefully been located in a parallel position along the rear of the commercial buildings so that the majority of the multi-family building that abuts the "back of house" area is non-residential space.
- Trash screening: commercial trash areas have been consolidated into three locations, all of which will have new privacy fencing installed around the designated areas. Construction details of all screening and fencing will be addressed at the time of Site Development Plan.

Current Trash Locations (CT) and Future Trash Locations (FT)



- Landscape buffers and screening: all portions of the Modified Alley that are within the potential viewshed of residential dwelling units will include 35' to 50' of landscape buffers, plus privacy fencing along the drive lanes—see Sheets 18 & 19 of SUP. Construction details of all screening and fencing will be addressed at the time of Site Development Plan.

- Painting: all rear elevations of the commercial building that are adjacent to the Modified Alley will be repainted in a consistent, neutral color.
- Striping: all residential and commercial trash and loading areas will be striped to encourage loading/delivery activity to stay out of the travel way and within the designated locations.
- Demolition: all ancillary structures that have been erected adjacent to the commercial building will be demised and removed. Examples of these ancillary structures are shown below.

"Ancillary Structures" in the Existing Alley



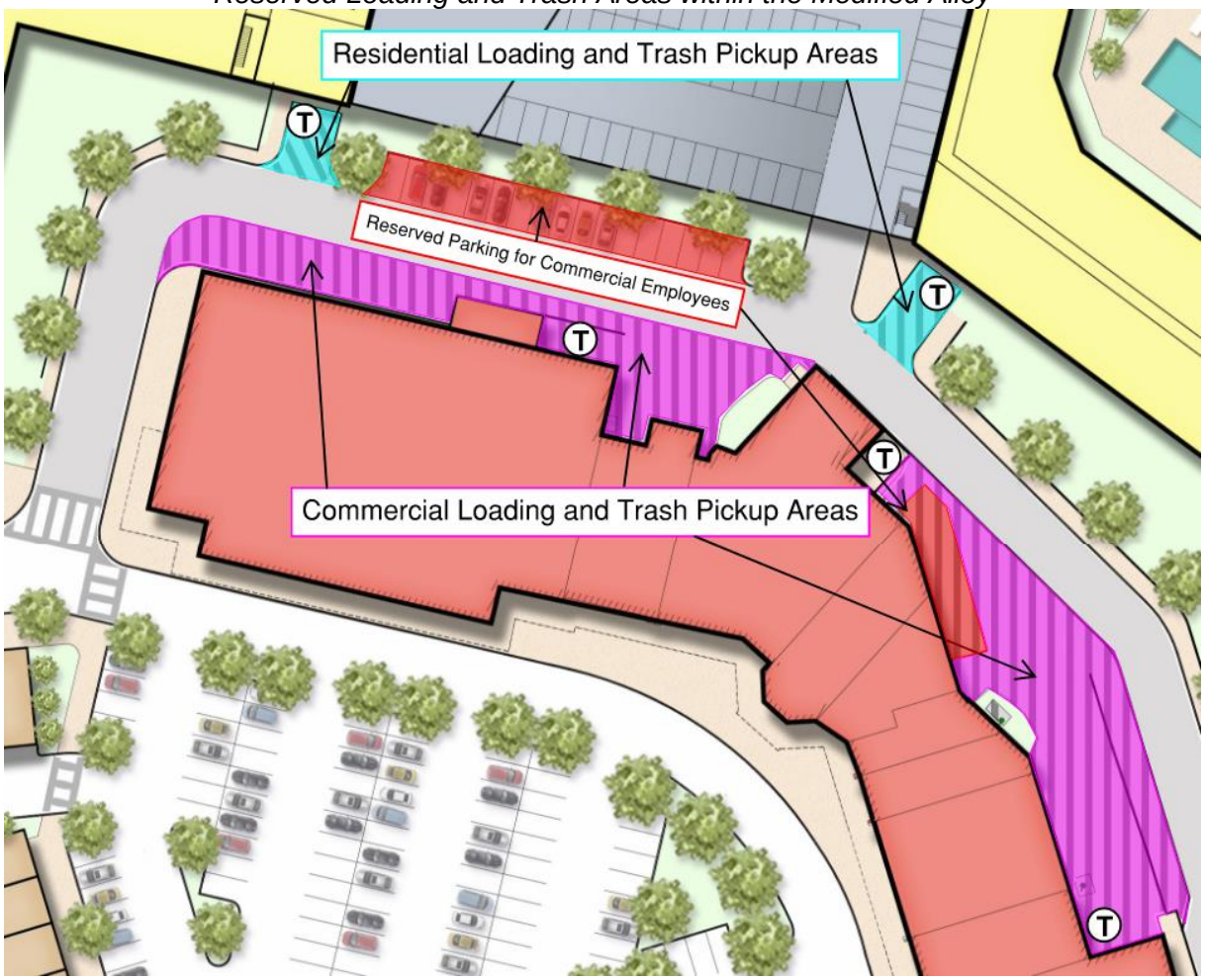

Loading and Trash Pickup Areas

Striped loading and trash pickup areas are proposed along both sides of the Modified Alley. The loading areas are intended to be reserved for exclusive use by either the residential tenants or the commercial tenants, as outlined below:

- Commercial Loading and Trash Area (PINK): these striped areas will be reserved for exclusive use by commercial tenants for "back of house" operations. These areas will provide access to necessary loading and delivery areas for the commercial tenants in accordance with their current and future needs. Existing loading areas and loading doors/docks will continue to serve the commercial building—no changes are proposed to the existing commercial loading bays and appropriate turning radii will be provided to ensure that commercial vehicles maintain access to existing loading facilities. Commercial trash dumpsters will be consolidated to the three locations marked with a "T" and will be shielded with privacy fencing. Privately contracted waste management services will pick up trash at these locations on scheduled trash days.

- Residential Loading and Trash Area (BLUE): these striped areas will be reserved for exclusive use by residential tenants for “move in / move out” purposes. Tenants will have the ability to reserve these areas on an hourly basis at specific times to facilitate move ins and move outs. Reservations for use of these spaces will be made through the property management team. These two loading areas are a minimum of 30’ deep, which is adequate space to fit the maximum sized commercial rental truck (e.g. U-Haul truck). These areas will also serve as trash pickup locations for the residential building. On scheduled trash days, property management will roll dumpsters from the trash compactors located on the interior of the building to these locations, where they will be picked up by privately contracted waste management services.
    - No ground level residential units will be placed adjacent to the Residential Loading and Trash Areas. Those areas of the buildings will be designated for loading and trash services.
- Reserved Parking for Commercial Employees (RED): to ensure that employees of the commercial tenants do not utilize the loading areas for employee parking, approximately 25 parking spaces will be provided for their exclusive use along the Modified Alley. This will help to provide consistent, unimpeded trash and loading access to both the residential and commercial tenants.

Reserved Loading and Trash Areas within the Modified Alley



Trash

The Applicant shall maintain Warrenton Village Center in a clean and orderly manner and shall arrange for the pickup of trash, litter, and debris on a daily basis through a private refuse collection company.

Deliveries and refuse/solid waste collection shall follow Town Code Section 11-19(9).

Residential Trash Locations: trash facilities are proposed at three locations (found on Sheets 4 & 5 of the SUP):

1) Block 1: A trash compactor will be located within the multi-family building. Trash chutes will be located on all floors of the building for direct deposit of trash from residential floors into the trash compactor. Trash bins will be rolled out by property management to one of the Residential Loading and Trash Pickup Areas on either side of the garage on trash pickup days.
2) Block 2: It is anticipated that each individual unit will have its own trash bin kept within that unit's garage. Residents will be responsible for rolling trash bins out to the rear alley on trash pickup days.
    a. If the municipality will not allow individual trash bins/pickup, the location for a potential trash dumpster that will serve all residents of Block 2 has been included in the SUP plans.
    b. Block 2 dumpster will be surrounded by privacy fencing, as well as landscape buffering.
3) Block 3: It is anticipated that each individual unit will have its own trash bin kept within that unit's garage. Residents will be responsible for rolling trash bins out to the rear alley on trash pickup days.
    a. If the municipality will not allow individual trash bins/pickup, the location for a potential trash dumpster that will serve all residents of Block 3 has been included in the SUP plans.
    b. Block 3 dumpster will be surrounded by privacy fencing, as well as landscape buffering.

Commercial Trash Locations: trash dumpsters behind the existing retail buildings will be consolidated into the three centrally located trash areas shown on Sheet 14 of the SUP. These trash areas will be hidden from public view with new privacy fencing.

All exterior refuse storage areas will be shielded within enclosures or privacy screening.

Wayfinding

The Applicant will include detailed locations and specifications on all proposed signage and wayfinding in the site plan. All signage will comply with the Zoning Ordinance at the time of Site Development Plan.

A Conceptual Signage Plan can be found on Sheet 21of the SUP.

Lighting

The Applicant will prepare a detailed lighting plan in conformance with §9-8 of the Zoning Ordinance and will install lighting in accordance with that plan. This will be reviewed at the time of Site Plan Development review.

Light pollution restrictions will include:

- All site lighting, to include both new fixtures within the new development areas as well as any non-residential area that is modified as a part of site development, must consist of fully-shielded, full cut-off fixtures to meet the requirements of Article 9, Section 9-8.
- Color temperature of exterior light fixtures will be 3,000 degrees kelvin or lower.
- Average horizontal illumination level of exterior light fixtures will be 3.0 footcandles or less.

A Conceptual Lighting Plan can be found on Sheet 22 of the SUP.

Bicycle Plan

The streets within the retail and residential areas are proposed to function as shared streets for both cars and bicycles. This is appropriate given the low vehicular volumes, short street segments that limit vehicular speeds, existing and proposed character of the property with significant pedestrian/vehicle interactions, and the need to minimize street widths to keep pedestrian crossing distances short.

Eliminated/shortened travel ways, especially those encouraging speedy vehicular use between Broadview Avenue and Oak Springs Drive, change the nature of available accessways within the Center. This combined with on-street parking – parallel and head-in spaces, reduced driveway widths and raised crosswalks, will automatically provide traffic calming and slower traffic speeds, thereby making it safer for multi-modal use. Visitors entering the site are immediately confronted with a travel landscape that is unlike urban throughfares and more like parking lots with limited speeds, but good visibility. Unlike urban throughfares, which are designed for speedy travel between points A and B, visitors entering the Center will be immediately at B. The proposed streets and accessways encourage visitors to think about parking their vehicles or bikes and setting out on foot.

A Conceptual Circulation Plan, including proposed bicycle travel ways and public bike rack locations, can be found on Sheet 23 of the SUP.

Resident Connectivity to the Town of Warrenton

The Applicant believes that the new residents of Warrenton Village Center should not only benefit the commercial tenants at the Center but should provide new patronage to all of Warrenton's businesses. To do this, the Applicant desires to enhance and promote new and existing transportation networks to other areas of Warrenton.

Warrenton Circuit Rider: to encourage increased use of this public transport by residents, the Applicant proposes the following concepts:

1) There are currently Green Route and Blue Route stops within Warrenton Village Center at the current location of Joann Fabrics. If desired by the Town, the Applicant agrees to work with the Town to establish additional stops at the West Plaza and/or East Plaza residential lobbies.
2) Install permanent signage within residential lobbies to promote this public transportation option.
3) Establish a program with the Town that provides tenants with a monthly stipend for Circuit Rider fares—"Circuit Rider Cash" or something similar that would be accepted by the buses and funded by the apartment community.

Green Building Design

All residential buildings will be designed and certified to a National Green Building Standard (NGBS), Level Bronze, or higher. This certification requires minimum efficiency standards among building materials, plumbing and electrical fixtures, appliances and much more. If NGBS is not available for this project, an equivalent certification from an alternative third-party green building rating system will be acceptable.

EV Stations

To encourage continued growth of electric vehicles, a minimum of 5% of parking spaces within the Block 1 parking garage will include electric charging stations for resident use. Block 2 and Block 3 will not include charging stations, as residents will be able to utilize individual unit garages to supply EV power.

Noise & Exhaust

The proposed development will not produce any noticeable increase in noise or odor.

Emergency Services

All plans will be in conformance with Town Code and approved at Site Development Plan.

Sheet 8 of the SUP provides a Fire Truck Movement plan, confirming 360 degree fire truck access to all buildings.

Community Hours of Operations

All proposed residential rental units in all three blocks (multi-family, townhome and 2-over-2 units) will be part of the same new apartment community. All residents will have access to the community amenities found primarily at the Block 1 multi-family building. Hours of operations for the community's amenities will be as follows:

Leasing Office: 9am-6pm (Monday-Friday), 10am-5pm (Saturday), Closed (Sunday)
Mail & Packaging: 24 hours a day, 7 days a week
Bike Storage: 24 hours a day, 7 days a week
Pool and Pool Deck: 10am – 8pm, 7 days a week (Memorial Day to Labor Day)
Fitness: 24 hours a day, 7 days a week
Co-Working Space: 24 hours a day, 7 days a week
Entertainment Lounge: 24 hours a day, 7 days a week
Gathering Room: 24 hours a day, 7 days a week
Garage Parking: 24 hours a day, 7 days a week

3-Bedroom Unit Maximum

3-bedroom apartments are important to provide a wide range of housing types and price points to the residents of Warrenton. 3-bedroom units provide the lowest rental rates on a per bedroom basis and are therefore pivotal when seeking to provide lower cost options to the Town's residents. In order to minimize concerns regarding potential fiscal impacts of 3-bedroom units, the Applicant agrees to cap 3-bedroom units in Block 1 at 10% of the total Block 1 units.

PLAN WARRENTON 2040

Plan Warrenton 2040 establishes a series of goals for future development within Warrenton. This proposal advances many of these goals, which have been outlined below:

Housing Goals

Character Districts are identified as an opportunity for "expanding housing options" and to "accommodate a range of housing typologies." The Proposal advances this goal via inclusion of multiple housing types.

Goals H-1 and H-1.3 recommend the creation of workforce housing. The Proposal advances this by creating a variety of housing types to provide a wide range of rental price points, as well as inclusion of an affordable housing component.

Goal H-1.1 is to encourage "Missing Middle" housing types. The Proposal advances this goal by providing highly sought after rental dwellings in both townhome and 2-over-2 product types.

Goal H-1.2 of the Plan is to encourage the creation of a range of housing types. The Proposal meets this goal by providing 1-, 2- and 3-bedroom multi-family apartment units, as well as 2-over-2 and townhome dwelling units.

Goal H-2.2 of the Plan provides for appropriate use and scale of development and proper transitions to existing neighborhoods. The Proposal meets this goal by placing higher, four-story buildings in areas closer to existing commercial and future three-story residential, and then steps down to three-story buildings on the west side, where existing neighborhoods and future low density residential are found on the west side of Broadview Avenue.

Open Space, Parks, & Environment Goals

Goals P-3 and P-3.1 focus on providing residents with access to green and public spaces. The Proposal meets this goal by providing significant open space in close proximity to new residential housing, most notably, at the newly proposed Central, East and West Plazas.

Transportation Goals

Goals T-3.6 and T-3.10 focus on encouraging bicycle friendly policies and bicycle parking in new development standards. A bike storage room will be located within the multi-family building for use by all residents, as well as multiple bike racks throughout the site to promote bicycle transportation and recreation.

Goals T-3.4 and T-4.3 focus on creating a walkable network with sidewalk, pedestrian safety features, and increased network connectivity. An extensive new sidewalk network is being proposed throughout the Warrenton Village Center to promote walkability for residents and commercial shoppers alike. Pedestrians will have the ability to easily navigate between the residential, commercial and plaza areas with new sidewalks, crosswalks and vehicular traffic slowing measures.

Economics & Fiscal Resilience Goals

Goal E-1.2 of the Plan calls for a range of housing, with appropriate levels of density and transitions. The Proposal meets this goal by providing a variety of housing types, with height and density tapering down toward existing residential neighborhoods.

Goal E-1.5 of the Plan focuses on a diverse, equitable stable tax base. The Proposal advances this goal by providing opportunities for an increased tax base through its added housing stock.

Goal E-2.2 of the Plan promotes Warrenton's high quality of life to attract employers to work here. The Proposal will appeal to employers wanting to offer their employees new, high quality housing options. Warrenton Village Center will provide the Town with the first new, Class A apartment community in decades.

Goal E-2.5 of the Plan calls for development of a range of housing types. The Proposal meets this goal by providing 1-, 2- and 3-bedroom multi-family apartment units, as well as 2-Over-2 and townhome dwelling units.

Goal E-3.3 of the Plan focuses on maximizing public spaces and right-of-way for outdoor gathering space. The Proposal meets this goal by adding significant publicly accessible open space to the Property, most notably, at the Central, East and West Plazas.

Land Use & Character Districts

The Plan recommends a set of ten design criteria for projects within a Character District. The proposal meets and advances all these criteria, as shown below:

1. Discernable Center

The highlight of the proposed Warrenton Village Center is the new Central Plaza. The Plaza is centrally located within the 29-acre site at the crossroads of vehicular and pedestrian circulation and positioned to benefit the new residential units and existing commercial businesses alike. The Central Plaza is proposed as approximately one-half acre and includes a spash-pad, public green, hardscapes for seating and decorative planters and flower beds. It is sized, programmed, and designed for everyday use as well as for larger community activities. Additionally, the Central Plaza is bookended by a space for future retail development that would further activate the public amenity. A new raised watertable crosswalk will provide safe pedestrian connectivity and new wayfinding will allow the entire Warrenton Village Center to easily locate and enjoy this new public space.

2. Connected sidewalks with a clear pedestrian path, street trees, and lighting

The new Warrenton Village Center will benefit from a multitude of improvements that will increase pedestrian connectivity throughout the entire site. New sidewalks will be added along the entire perimeter of all residential blocks, including direct sidewalk connectivity to all street facing, ground floor units. The extension of Hastings Lane and accompanying sidewalks will offer a new pedestrian access point from Oak Springs Drive. Multiple sidewalks will link the three new residential blocks to the new public amenities and allow maximum ease of walkability from one side of the Property to the other.

Ample street trees, landscaping and lighting will line the sidewalks along the streets and private drives, providing shade during the day and lighting during the evenings to create a pleasant and safe walking environment.

Detailed landscaping and lighting plans will be provided at Site Development Plan review. Concept plans have been included on Sheets 9 & 10 (landscape) and Sheet 22 (lighting) of the SUP.

The siting of all three blocks, the sidewalk connections leading from the residential to the retail and the consistent street wall and streetscape envisioned will allow for a familiar experience typically seen in traditional mixed-use settings.

3. Buildings that are placed close to the street to create a sense of place

All buildings have been placed along exterior streets to create desirable streetscapes and a sense of place. Majority of parking has been pulled away from streets and concealed from view within a centrally located parking garage—inclusion of the parking garage has eliminated the need for unattractive surface parking lots.

Portions of all three building types (multi-family, 2-over-2s and townhomes) have been faced inwards so that they are visible from the commercial areas to enhance the mixed-use feel of the Center.

Street-facing, ground level units in all residential buildings will have direct access from the units to the sidewalk systems installed along all public and private streets.

4. Parking placed behind buildings and away from street frontages

All parking for Block 1 will be centrally located within a four-story parking garage that has been concealed from public view within the building itself.

Block 2 and Block 3 will have interior garages (two-car garage per townhome unit and one-car garage per 2-over-2 unit) and residents of those units will have the ability to park behind their garages in the unit's driveway space and/or in visitor parking areas found within both blocks.

5. Complete streets create a balance between cars, pedestrians, and bicyclists

The street networks are designed to slow vehicular traffic, create ease of access for residents and visitors, and promote pedestrian activity.

A bike storage room will be located within the multi-family building for use by all residents, as well as multiple bike racks throughout the site to promote bicycle transportation and recreation—see Sheet 23 of the SUP.

An extensive new sidewalk network is being proposed throughout the Warrenton Village Center to promote walkability for residents and commercial shoppers alike. Pedestrians will have the ability to easily navigate between the residential, commercial and plaza areas with new sidewalks, crosswalks and vehicular traffic slowing measures.

6. Compact street blocs encourage walking

The deliberate location of the Central Plaza and reorganization of vehicular, pedestrian and bicycle traffic around it allows the center to appear as a collection of smaller blocks, providing numerous ways for residents and visitors to explore areas within the center.

These enhancements will create smaller, more compact blocks to promote easy walkability from the new residential to the existing retail.

Further traffic calming by way of raised crosswalks/watertables at important intersections and elimination of travel ways designed for speed will encourage pedestrian use.

7. A park, trail, or activity center is within a half mile walking radius

The proposed development will link its new residents directly to the adjacent shops and businesses of Warrenton Village Center, turning the existing retail into an active pedestrian amenity. The creation of the Central Plaza, East and the West Plaza will further promote the Warrenton Village Center as a destination for not only residents of the community, but all residents of Warrenton. The location of the plazas and their use and function is directly tied to the role they are expected to play. The Central Plaza is 'centrally' located at the crossroads – vehicular and pedestrian to allow it to function as the neighborhood center and is sized, programmed, and planned to allow for community activities as well as everyday use. The East and West plazas serve as passive, ceremonial transition zones between the private residential realm and the public retail realm. Their primary intent and use is to connect residents with the rest of the commercial center while also allowing for a different, less active and smaller public area for passive recreation.

8. A variety of dwelling types accommodates a wide range of family sizes and income levels and commercial activity

As the first large rental community in the area in over a decade, the proposed Warrenton Village Center will add diversity to the housing market by providing much needed market rate and affordable rental dwellings. The community will offer 1-, 2-, and 3-bedroom apartment units within Block 1, as well as unique 2-over-2 and townhome units to supply the "missing middle" in Blocks 2 and 3—all dwellings will be for rent.

9. Neighborhood identity connects district wayfinding and identification with a larger marketing effort to bring private investment to the neighborhood

Warrenton Village Center is an existing neighborhood anchor and community shopping destination. The new Warrenton Village Center will synergistically elevate the overall development, redefining the neighborhood identity as a regional Live-Work-Play destination for both residents and visitors from the surrounding area.

The overall aesthetic of the new Warrenton Village Center brand and identity will be a contemporary design that thoughtfully incorporates Warrenton's rich history, focusing on equestrian inspired materials and textures. The sleek façade of the exterior pairs light colored brick and cementitious panels with warm stone, wood, and dark metal accents.

Signage and wayfinding will exercise these same principles to create a sense of place and affirm the character of the new development. The existing equestrian themed signage at Warrenton Village Center will be contemplated to create fresh branding and wayfinding that complements the existing infrastructure with a new modern and sleek identity.

10. The neighborhood edge provides the means of transition from the Character District to adjoining properties.

The buildings are designed to scale appropriately with the adjacent current and future uses, which are primarily commercial with some periphery residential. At four-stories, the proposed new buildings will be a step down from the six-stories allowed along Lee Highway and create an appropriate transition to the three-story residential areas allowed on the north of Oak Springs Drive. Three-story sections of the buildings are proposed along the western side of the Property, near areas designated as Low Density Residential on the Future Land Use Map.

Project ID: SUP 22-5
GPIN: 6984-29-6753-000 & 6985-20-7247-000
360 Oak Springs Drive, Center District, Town of Warrenton, Virginia 20186

#	Department	Issue	Reviewer
1	Planning	Plan Warrenton 2040: New Town Character District	Denise Harris
2	Planning	Plan Warrenton 2040: New Town Character District	Denise Harris
3	Planning	Plan Warrenton 2040: New Town Character District	Denise Harris
4	Planning	Plan Warrenton 2040: New Town Character District	Denise Harris

5	Planning	Plan Warrenton 2040: New Town Character District	Denise Harris
6	Planning	Plan Warrenton 2040: New Town Character District	Denise Harris
7	Planning	Plan Warrenton 2040: New Town Character District	Denise Harris

8	Planning	Plan Warrenton 2040: New Town Character District	Denise Harris
9	Planning	Housing & Density	Denise Harris
10	Planning	Housing & Density	Denise Harris
11	Planning	Housing & Density	Denise Harris
12	Planning	Housing & Density	Denise Harris
13	Planning	Housing & Density	Denise Harris
14	Planning	Community Facilities & Infrastructure	Denise Harris
15	Planning	Community Facilities & Infrastructure	Denise Harris

16	Planning	Transportation	Denise Harris
17	Planning	Transportation	Denise Harris
18	Planning	Transportation	Denise Harris

19	Planning	Transportation	Denise Harris
20	Planning	Transportation	Denise Harris
21	Planning	Transportation	Denise Harris
22	Planning	Transportation	Denise Harris
23	Planning	Transportation	Denise Harris
24	Planning	Transportation	Denise Harris

25	Planning	Walkability	Denise Harris
26	Planning	Lighting & Signage	Denise Harris
27	Planning	Economic Impact	Denise Harris
28	Planning	Environmental	Denise Harris
29	Planning	Environmental	Denise Harris

30	Zoning	General	Heather Jenkins
31	Zoning	General	Heather Jenkins
32	Zoning	General	Heather Jenkins
33	Zoning	General	Heather Jenkins
34	Zoning	Article 2-18 -- Permitted Enchroachments	Heather Jenkins
35	Zoning	Article 3-4.10.3 -- Permitted Uses in the Commercial District	Heather Jenkins
36	Zoning	Article 6 -- Signs	Heather Jenkins

37	Zoning	Article 6 -- Signs	Heather Jenkins
38	Zoning	Article 6 -- Signs	Heather Jenkins
39	Zoning	Article 6 -- Signs	Heather Jenkins
40	Zoning	Article 7 -- Parking	Heather Jenkins
41	Zoning	Article 7 -- Parking	Heather Jenkins
42	Zoning	Article 8 -- Landscaping	Heather Jenkins
43	Zoning	Article 8 -- Landscaping	Heather Jenkins

44	Zoning	Article 8 -- Landscaping	Heather Jenkins
45	Zoning	Article 8 -- Landscaping	Heather Jenkins
46	Zoning	Article 8 -- Landscaping	Heather Jenkins
47	Zoning	Article 8 -- Landscaping	Heather Jenkins
48	Zoning	Article 8 -- Landscaping	Heather Jenkins

49	Zoning	Article 9-8 -- Lighting	Heather Jenkins
50	Zoning	Article 9-8 -- Lighting	Heather Jenkins
51	Zoning	Article 9-8 -- Lighting	Heather Jenkins
52	Zoning	Article 9-3.1 -- Affordable Dwelling Unit Provisions	Heather Jenkins
53	Zoning	Article 9-3.5 -- Affordable Dwelling Unit Provisions	Heather Jenkins
54	Zoning	Article 9-17 -- Steep Slopes	Heather Jenkins

55	Zoning	Article 9-25.1.B -- Density	Heather Jenkins
56	Zoning	Article 9-25.1.C -- Density	Heather Jenkins
57	Zoning	Article 9-25.1.C -- Density	Heather Jenkins
58	Zoning	Article 9-25.1.D -- Phasing	Heather Jenkins
59	Zoning	Article 9-25.1.E -- Subject Parcels	Heather Jenkins

60	Zoning	Article 9-25.1.G -- Integration	Heather Jenkins
61	Zoning	Article 9-25.1.H -- Open Space	Heather Jenkins
62	Zoning	Article 9-25.1.H -- Open Space	Heather Jenkins
63	Zoning	Article 9-25.1.I -- Lot and Yard Regulations	Heather Jenkins

64	Zoning	Article 9-25.1.I -- Lot and Yard Regulations	Heather Jenkins
65	Zoning	Article 9-25.1.J -- Modifications	Heather Jenkins
66	Public Works & Utilities	General	Paul Bernard
67	Public Works & Utilities	Article 4 -- Site Conservation Manual (SCM)	Paul Bernard
68	Public Works & Utilities	Article 5 -- Stormwater Management	Paul Bernard

69	Public Works & Utilities	Water and Sanitary Sewer	Paul Bernard
70	Public Works & Utilities	Transportation	Paul Bernard
71	Traffic Impact Analysis	Analysis Files	Zachary Bugg

72	Traffic Impact Analysis	Analysis Files	Zachary Bugg
73	Traffic Impact Analysis	Analysis Files	Zachary Bugg
74	Traffic Impact Analysis	Analysis Files	Zachary Bugg
75	Traffic Impact Analysis	Analysis Files	Zachary Bugg
76	Traffic Impact Analysis	Analysis Files	Zachary Bugg
77	Traffic Impact Analysis	Analysis Files	Zachary Bugg
78	Traffic Impact Analysis	Analysis Files	Zachary Bugg

79	Traffic Impact Analysis	Analysis Files	Zachary Bugg
80	Traffic Impact Analysis	Analysis Files	Zachary Bugg
81	Traffic Impact Analysis	Background and Volume Development	Zachary Bugg
82	Traffic Impact Analysis	Trip Assignment	Zachary Bugg
83	Traffic Impact Analysis	Trip Assignment	Zachary Bugg
84	Traffic Impact Analysis	Trip Assignment	Zachary Bugg
85	Traffic Impact Analysis	Other	Zachary Bugg

86	Traffic Impact Analysis	Other	Zachary Bugg
87	Traffic Impact Analysis	Other	Zachary Bugg
88	Traffic Impact Analysis	Lane Configurations & Mitigation Measures	Zachary Bugg
89	Traffic Impact Analysis	Lane Configurations & Mitigation Measures	Zachary Bugg
90	Traffic Impact Analysis	Lane Configurations & Mitigation Measures	Zachary Bugg
91	VDOT	Special Use Permit	Stephen Brich
92	VDOT	Special Use Permit	Stephen Brich
93	VDOT	Traffic Impact Analysis	Stephen Brich

94	VDOT	Traffic Impact Analysis	Stephen Brich
95	VDOT	Traffic Impact Analysis	Stephen Brich
96	Fire & Rescue	General	James Swain
97	Fire & Rescue	General	James Swain
98	Fire & Rescue	General	James Swain
99	Fire & Rescue	General	James Swain

100	Fire & Rescue	General	James Swain
101	Fire & Rescue	General	James Swain
102	Fire & Rescue	General	James Swain
103	Fire & Rescue	General	James Swain
104	Fire & Rescue	General	James Swain
105	Fire & Rescue	General	James Swain
106	Fire & Rescue	General	James Swain

Comment	Applicant Response
There are caveats on the SUP plans that all images are illustrative and subject to change	"Subject to change" language has been removed from SUP sheets. Section 4 of COA includes language that final design shall be in general conformance to Elevations included in the SUP.
Staff encourages the Applicant to also provide elevations from Broadview	Two renderings from Broadview have been added to the SUP.
There are details proposed that do not follow the Ten Guiding Principles. For example, the screening wall proposed the length of the alley road will create a tunnel effect that is not inviting or cohesive in nature.	We feel that the submittal strongly adheres to the 10 guiding principles. The ~6' height and placement of the screening wall in the alley will avoid a tunnel effect from being created--that screening has been incorporated to benefit the ground level units in that area, so that they do not look directly into the commercial "back of house" areas. Additionally, the alley is purposefully a secondary access area and not meant to be a highly trafficked alley. Vehicular ingress/egress will be focussed towards the Oak Springs garage entrance and pedestrian access will utilize the building lobby located at the West Plaza.
There continues to be gaps in pedestrian connections between blocks and central commercial development. This is especially true of Block 2, which does not have sidewalks and resident pedestrians would have to walk in the road and through parking lots to reach restaurants in locations currently occupied by Red Zone and Faang Thai.	New sidewalks encircle all three residential blocks, with direct sidewalk access provided to all ground level units. Crosswalks have been added to connect all residential blocks directly to the commercial center--including a new crosswalk across the New Entrance Drive (Hastings Lane) adjacent to the proposed dog park. New sidewalk will also be added to the missing section located along Broadview behind the bowling alley--sidewalk is shown meandering and partially running adjacent to interior drive aisle curb as to avoid impact to existing mature trees along Broadview Ave. This has been added to the COA.

The Comp Plan is very intentional in stating the height on Oak Street shall be 1-3 stories to serve as a transition zone. While the Applicant offers a reasoning for the 4-story structure is a step down from 6-stories on Lee Hwy, no such structures exist yet and the Comp Plan is specific regarding heights on Oak Springs. The Comp Plan is a guide and Council may choose to vary from it, but Staff will continue to point out the adopted goals of the Comp Plan.	Understood. SOJ "Height" Section includes justification language for our 4-story sections. Waiver #7 of the SUP includes our request to modify our proposed heights from those included in the Comp Plan.
Applicant is proposing first floor residential and will need to include this request in the waiver/modification 9.23.1 Section of the Zoning Ordinance to ensure no issues in the future.	Per Section 9-25.1 on Mixed-Use Regulations: A.A mixed-use development, that includes residential use only structures, shall contain a minimum of five (5) acres. Town Council may approve a mixed-use development utilizing residential use only structures on parcels less than five (5) acres when approved as part of the Special Use Permit application which includes a concept plan detailing the integration of the different uses B.3. Residential units located on the first floor of a mixed-use structure shall not front the street or drive aisle Per Section A., we are submitting the SUP for Town approval to allow the residential use only structures. Per Section B.3., only applies to mixed-use structures (which we do not have) and does not apply to a mixed-use development. Per the ordinance and the summary above, we believe the waiver/modification would only be required for a mixed use structure. Because our project does not include such structures, we do not believe a waiver is necessary.
Relocation of Panera--drive through requires SUP and should be added to applications.	The Panera relocation has been deleted from this Application. That area has been added to Block 3 and will included additional townhome units.

Applicant modified phasing to blocks. This approach is still considered phasing and Conditions of Approval will need to carefully consider triggers for each proposed aspect of the mixed-use development. For example, Statement of Justification states all public improvements are proposed to be constructed as part of Block 1; yet it states the full internal pedestrian loop will be completed with Block 3. Please clarify.	Updated Langauge has been added the SOJ and COA--"Block Sequencing and Required Site Improvements." Blocks can be developed in any order, but the Town will have the ability to withhold Certificates of Occupancy within each individual block until such time as the site improvements including in that block have been substantially completed.
ADUs should not be grouped together. A condition of Approval will be needed to ensure this.	Language has been added to SOJ and COA: "No more than three ADU units will be positioned adjacent to one another at any given time."
Applicant may like to indicate in the SUP a minimum number of ADUs to be included in each proposed block and ensure they will not be grouped together within the blocks.	SOJ and COA have been updated: all residential blocks will independently maintain 10% of the units within each block as ADUs.
Will there be a variety of types of units offered in the ADU program ranging from the proposed 1-3 bedrooms?	ADU units will be offered in 1-, 2-, and 3-bedroom units types, as well as townhomes and 2-over-2s. Owner will have the ability to increase/decrease allocation between 1-, 2-, and 3-bedroom units based on market demand and unit availability, so long as a minium of 10% of the units in each individual block are maintained as ADUs. This language is included in the SOJ and COA.
Will the ADUs have same elevations, square footages, and finishes as the market rate units.	Language included in SOJ and COA: "The ADUs shall be similar to the market rate units in architectural design, fixture/appliance selections and unit size."
Will there be a mechanism to verify the ADU units without relying on a report from the Property Manager.	We have proposed the same ADU language as cases previously approved by Town Council. We are amenable to other audit mechanisms that the Town may propose.
Staff encourages the Applicant to revisit the treatment of refuse and dumpsters. Attention to these details can result in a community feeling pleasant or the reverse.	Additional language has been added to the "Trash" and "Loading and Trash Pickup Areas" sections of the SOJ regarding trash details, locations, pickup and shielding.
Landscaping plan includes trees over the exact location of the proposed dumpsters. Both these items are necessary. Ensuring the development properly accommodates and considers both is important for residents and commercial tenants.	Block 2 landscaping has been revised to eliminate the conflict.

Staff continues to be concerned about the access road to the parking garage through the rear commercial delivery points. The proposal to use a street that is aged and connects to a rear non-architectural side of aging commercial buildings does not provide visual or usable connectivity.	We must work within the parameters established by the existing commercial building. The alley has been designed to maintain delivery access to the rear of the commercial and also provide secondary access to the residential garage. The overall project has been designed to pull vehicles and pedestrians away from the alley--purposefully making this area a secondary means of ingress/egress. Even so, significant attention has been given to improving this area, including landscape buffering, trash consolidation, privacy fencing, painting of the commercial building, removal of "ancillary" structures and asphalt painting that will clearly define thoroughfares from "back of house" areas. See details of these improvements in the SOJ ("Modified Alley" section). "Modified Alley" has been added to the COA to ensure that this area is improved in accordance with the SUP plan.
Are proposed elevations of the back of the existing commercial proposed to be modified or is it just repainting.	Rear elevations will be painted a consistent, neutral color. All trash dumpsters will be consolidated to two, centralized, screened locations. All existing "ancillary" structures will be removed.
"Ancillary" structures are proposed to be demolished yet there does not appear to be a description as to what those structures are.	"Makeshift" structures have been erected behind the commerical building at various locations. These appear to be used for storage. Pictures of these structures have been added to the SOJ.

How will this alley become an inviting area for residents to feel safe and comfortable.	This area is not intended to be a focal point of the community--this area is now and will continue to be primarily for "back of house" use and secondary access. The design of the project purposefully directs vehicular and pedestrian traffic towards the commercial center and new plazas, that are intended to be the inviting, communal areas. That said, substantial improvements are being made to this alley to ensure that it is comfortable and safe for residents, including landscaping, lighting, painting, privacy fencing, consolidation of trash, removal of "ancillary" structures and asphlt painting.
Site is overparked according to the required 1,069 spaces to the proposed 1,557 spaces. Likewise, the Fiscal Impact Analysis anticipates 575 vehicles, but 607 spaces are provided. Recommend looking at proposal through lens of transferring from an auto-oriented strip mall to a walkable, mixed-use environment.	Proposed parking is higher than required parking b/c the existing commercial parking areas are significantly over parked. The new parking allocated to the residential blocks is in line with required levels.
Concern with locations where parking is proposed to back out/into proposed drive aisles. In order to move towards a more grid system road network, these types of parking spaces are not conducive. Applicant should consider removing these spaces to allow for more green space and sidewalks.	Back out/in spaces have been deleted from the SUP. Those spaces are now proposed as parallel spaces--these spaces are necessary to remain in the plan to provide parking for prospective tenants visiting the leasing offices in Block 1.
Careful attention should be given to interesctions, crosswalks and potential bump out for pedestrians.	Understood. These will be designed in detail at Site Development Plan.
Condition of Approval will require a cooperative parking agreement between all parcels, now and future.	Each residential block and the commerical center meet their own individual parking requirements--as shown on SUP Sheet 4. No shared parking agreements will be required. Guess parking spaces in Block 2 and Block 3 will include signage that spaces are reserved for resident use only.
Town was awarded Smartscale funding for roundabout at the intersection of Broadview and Winchester. The "peanut" roundabout at Broadview (western side of property) was not succesful this round.	Understood. The roundabout at Broadview and Winchester is included in the Traffic Impact Analysis and recommendations from that analysis contemplate that improvement.

There is confusion over the timing triggers proposed for when these improvements will be built. Phasing has been proposed to be removed, but the blocks are still proposed to be built as the market indicates--there needs to be a nexus between the timing of the proposed improvements. Please clarify.	Each of the three blocks and the site improvements tied to each of those blocks are shown on Sheet 4 and Sheet 5 of the SUP. The blocks can be developed in any order, but the Town of Warrenton will have the authority to limit issuance of COs with each block until such time as the site improvements within that block have been completed. This language has been added to the SOJ and COA--"Block Sequencing and Required Improvements"
Consideration should be given to producing a Master Sign Plan for the entire development and conditioned as part of the approval process. Currenlty, SUP plans are labeled as conceptual and subject to change.	Conceptual signage design has been included in the "Warrenton Village Center Design Story" materials, as well as the "Conceptual Site Signage Plan" sheet in the SUP. These materials provide representation of the anticipated site signage. Signage design and locations will be approved by the Town at Site Development Plan.
FIA references on Page 36 a demand for 1,100 units. The assumption is this demand is for the entire County. Please confirm the geographic area the demand is representing and the source of the projection.	The 1,100 figure is an extrapolation from the analysis of demographic trends and projections, which begins on page 27. This number represents the total demand for the competitive apartment market area, distinct from the county itself. The boundaries of this market area are detailed in Table 8, which includes small portions of Prince William County. This statement has been added to the updated report submitted with this 3rd submission.
Staff continues to request how the proposed units will be treated on Branch Avenue. For example, if there will need to be a retaining wall constructed on the Branch Drive side of the development, the wall may visually close off the roadway making a tighter and less comfortable travel way for cars, bikes and pedestrians.	No retaining wall is anticipated to be required. If required, a short wall would only be anticpated for the southern-most units (±40'-50') proposed along Branch Drive. The wall will be tied into the building construction and we do not feel that it will create an unattractive or uncomfortable condition.
Applicant may consider developing a Geotechnical Report sooner than time of site plan to demonstrate potential environmental impacts (i.e. blasting). Town has taken blasting into consideration in the past.	Understood. Applicant is comfortable with risks associated with delaying Geotechnical Report.

Statement of Justification describes three distinct development phases--1) multi-family apartment building, 2) 2 over 2 and townhome units, and 3) improvements to the commercial area of pedestrians, vehicular traffic and a plaza. The plan does not show these areas as three phases, nor do the proposed Conditions of Approval address the timing of these phases. Additional information is needed.	Site plan improvements tied to each block are shown on Sheet 4 and Sheet 5 of the SUP. Language has been added to the SOJ and COA that will limit approval of Certificates of Occupancy within individual blocks until such time as the site improvements within that block have been substantially completed.
Provide screening details such as height, material, etc or provide a prominent note on the plan that all screening shall be addressed at the time of site development plan.	Language has bee added to SOJ that "Construction details of all screening and fencing will be addressed at time of Site Development Plan." Note #12 has been added to the General Notes in the SUP (Sheet 3 & 4).
Remove phasing from the plan if phasing is no longer being utilized--example, Sheet 2 references phasing within the curve table	All references to phasing have been removed from the SUP.
Phasing is still shown throughout plan and the statement of justification references Blocks. Provide a phasing plan sheet or address phasing in the Conditions of Approval.	Each of the three blocks and the site improvements tied to each of those blocks are shown on Sheet 4 and Sheet 5 of the SUP. The blocks can be developed in any order, but the Town of Warrenton will have the authority to limit issuance of COs with each block until such time as the site improvements within that block have been completed. This language has been added to the SOJ and COA--"Block Sequencing and Required Improvements"
Setback modification request does not specify that it will included decks. Specify whether the deck is included within the building footprint shown on the plan. Permitted deck encroachments: uncovered decks must be at least 10' from rear property line and cannot encroach in front/side yard setbacks. Covered decks cannot encroach setbacks.	Decks are not included in the footprint shown. Typical unit decks protrude 2' past the building footpring, however those 2' protrusions will not encroach into any of the required setbacks. Note has been added to reference 2' decks.
The application materials should be revised as necessary to clarify that all residential development will be multi-family, with Block 2 and Block 3 having the appearance of townhomes/2 over 2 units.	All materials have been updated to reflect this request.
Note on SUP plan that signage is required to meet requirements of Article 6 of the Town of Warrenton Zoning Ordinance at the time of Site Development Plan	Note has been added to the Conceptual Signage Plan sheet.

The statement of justification acknowledges that signage shall comply with the Zoning Ordinance but does not specificy that signage is required to comply at the time of Site Development Plan. Add this note to the Statement of Justification.	Requested note has been added to SOJ--"Wayfinding" section.
Conceptual building signage (#3) shown on Sheet 16 does not meet the Zoning Ordinance for Building Signage--"6-13.3.2; Building Signs shall not extend above the top of the roofline of the building to which it is attached."	Conceptual sign image #3 has been revised. Signs will be in conformance with all requirements of Article 6.
Conceptual monument signage depicted on Sheet 16 (#1) will be requiredd to meet the requirements of Article 6-13.4 and will be subject to line-of-sight review during the Site Plan process; provide note to clarify requirement.	Note has been added to the Conceptual Signage Plan sheet.
Loading area noted in front of the parking garage shows pull in spaces on the illustrative plan. Clarify what type of loading is intended and if any changes are proposed to the existing loading areas behind the shopping center.	"Loading and Trash Pickup Areas" section has been added to the SOJ to provide more detail on the different loading areas. Changes to the existing loading areas are outlined in the "Modified Alley" section of the SOJ.
How far away will the loading areas be from residential windows, decks and HVAC intake (7-18 and 9-14.4 ZO)	"Loading and Trash Pickup Areas" section has been added to the SOJ to provide more detail on the reserved loading and trash areas. No residential units will be located on the ground level adjacent to these areas. Residential trash will be located within the buildings in trash compactor rooms. Trash will only be rolled out to the trash pickup spots on scheduled trash days. Note--all HVAC units will be located on the buildings roof.
Advisory comment remains: Conformance w/ landscaping requirements is required at time of SDP submission. Modifications to the required buffers under Article 8-8 may be approved by Town Council. The application includes a request to modify "interior lot line buffers requirements." Provide additional information regarding this request, specifically noting which buffers are included in the modification. For example, is this for the 25' buffer between commercial/residential uses or for storage/loading areas?	Additional clarification added to Waiver #4 on Sheet 7.
Advisory Comment remains: A 25-foot buffer is noted as to be provided along Branch Drive, however the setback is noted as 20 feet along Branch Drive. Clarify the width of the buffer to be provided	Setback along Branch drive is 20', which is in compliance with front setback requirement along that street.

The concept plan does not show all landscaping calculations required under Articles 8-6 and 8-10. Modifications of these sections may not be granted. Conformance with landscaping requirements is required at time of SDP submission. As presented staff cannot verify if the information provided meets Articles 8-6 and 8-10. Staff is also having a hard time verifying that there are no discrepancies in the number of trees noted between the planting table, landscape plan, and tables A-C.	Landscape Plan revised and note added that compliance with landscaping requirements will be shown with Site Development Plan. Note--the existing retail portion of site does not meet 10% canopy coverage requirement. Reducing parking to add additional landscape islands could aide this, but is not proposed as part of this SUP.
Understory trees are proposed for Street Trees on a 1/50 feet basis. Ornamental trees may be substituted for canopy trees on a two to one basis. (8-5.5.3 ZO). Provide additional understory trees as necessary.	Comment addressed in Landscape Plan.
The applicant is requesting to be waived from the buffer requirement between residential and commercial, however there are areas where additional buffering may be needed, to include the area between Block 3 and the new retail/drive-thru. Staff recommends providing additional screening in this area, such as a screening wall and/or dense evergreen shrubs to reduce the impact from headlight glare on residences.	Location has been revised with elimination of the Panera building and addition of more townhomes. Given the new configuration, we do not believe there is a need for increased landscape buffer at this location.
The cross-section on Sheet 13 of the plan as well as the other renderings show additional landscaping between the commercial area and the residential areas that is not shown on the plan drawing or captured in the conditions of approval. Staff recommends that the plan drawing should be revised to show this additional landscaping as well as a condition of approval to require a mixture of canopy, understory, shrubs and herbaceous perennials within all landscaped buffer areas and green spaces if this is the final site condition that is desired.	Cross section has been revised to align with site plan.
To address the landscaping comments, staff requests that the plan set be revised to include a waiver/modification sheet that delineates those site areas where a waiver or modification is being requested, to include a comparison between the ordinance requirements and the proposed conditions.	Sheet 7 "Waiver Information" has been added to the SUP to define all waivers and illustrate the location of each waiver request.

The Statement of Justification acknowledges all lighting must meet requirements of Article 9 of the Zoning Ordinance. A conceptual lighting plan has been provided but staff is unable to determine that the lighting will meet Ordinance requirements. The applicant acknowledges on the plan that all fixtures on site will require conformance to current lighting standards at the time of site development plan.	Note has been added to the Conceptual Lighting Plan sheet.
The wall sconce lighting and the utility lighting depicted on the lighting plan (#2) does not meet Zoning Ordinance requirements. This type of lighting must be shielded from the top so that light is not emitted above the horizontal plane. This comment should also include the utility lighting.	Concept light #2 has been revised.
Staff recommends an approval condition be added to state that all site lighting, to include both new fixtures within the new development areas as well as any non-residential area that is modified as a part of site development, must consist of fully-shielded, full cut-off fixtures to meet the requirements of Article 9, Section 9-8. The applicant may wish to consider additional conditions of approval to address potential glare such as limiting the height of all outdoor fixtures to 14 feet, limiting the color temperature to 3,000 kelvin or lower, and limiting the average horizontal illumination level to no more than 2.5 footcandles.	COA has been updated with following conditions: -All site lighting, to include both new fixtures within the new development areas as well as any non-residential area that is modified as a part of site development, must consist of fully-shielded, full cut-off fixtures to meet the requirements of Article 9, Section 9-8. -Color temperature of exterior light fixtures will be 3,000 degrees kelvin or lower. -Average horizontal illumination level of exterior light fixtures will be 3.0 footcandles or less.
The Statement of Justification identifies those eligible for rental of the affordable dwelling units as those that do not exceed 80% of the Fauquier County area median income. The statement of justification and plan must be revised to address all forms of affordable housing qualification such Section 8 rental assistance, Virginia Housing Development Authority, Farmer's Home Administration, etc	ADU language has been updated in the SOJ and COA to include the state and federal programs outlined in the Zoning Ordinance.
The statement of justification states that Affordable dwelling units may be advertised to Town first responders and Fauquier County teachers. The Ordinance states that units should first be made available to those residing and/or working in the Town of Warrenton or Fauquier County. It does not specify that they must be teachers or first responders	ADU language has been updated in the SOJ and COA to reflect the specify language included in the Zoning Ordinance--ADU's will first be made available to persons living or working in the Town of Warrenton or Fauquier County.
It appears there may be areas of steep slopes on the vacant parcel to be developed. Note any steep slopes on the existing conditions plan.	Steep slopes are shown in dark gray on the Existing Conditions Plan.

The Applicant is requesting from Town Council residential density in excess of 5 units per acre. Phase one is proposed to have 339 units and Phase 2 is to have 97 units, for a total of 436 units. The proposed density does not exceed one unit per 500 gross square feet of non-residential floor space. The Applicant has not sufficiently proven that the requested density is in conformance with the Comprehensive Plan as the area is included within the Transition Zone for building height (1-3 stories, 35 feet max).	See SOJ - "Density" section for detail on density calculation, justification, and conformance with Plan Warrenton 2040.
The statement of justification notes the affordable dwelling units will initially be identified on the plan but are subject to change. Affordable dwelling units must be specifically identified on the plan.	Building plans are not currently available to show which units are designated as ADUs. These designations will be shown on the Construction Drawings submitted for building permits. Language has been added to SOJ and COA to reflect this.
The 10% affordable housing bonus permits a 100% density increase. At 29.05 acres and 5 units per acre, equaling 145.25 units, a 100% density bonus allows for 290.5 units. Phase one proposes 339 units.	See SOJ - "Density" section for detail on density calculation, justification, and conformance with Plan Warrenton 2040.
Original Comment:The plan sheet shows two phases, although only one is proposed at this time. As such, Phase 1 must meet all the requirements with regards to Phasing. Include the existing commercial property/calculations in the development tabulation for Phase 1. This comment does not appear to have been addressed. The plan still references phasing and the statement of justification mentions “Blocks”. Clarification is needed, because the applicant also appears to be requesting a waiver for phasing.	Each individual block will have its own unique site plan that will be approved by the Town of Warrenton. Each block will meet the requirements of a standalone site plan--i.e. open space requirements, parking requirements, ADU requirements, etc. The combination of the three blocks will together satisfy the goals and requirements of the 2040 Plan, as it would not be possible for each block to individually satisfy those goals. There are three individual pieces of this puzzle--but once put together, we will achieve the goal of creating a comprehensive mixed use community in that is reflective of the 2040 Plan.
Provide a separate sheet showing the existing and proposed parcel boundaries, to include existing/proposed building footprints and required setbacks from property lines.	Sheet 2A "Parcel Overview Plan" has been added to the SUP to address this comment.

Original Comment: Pedestrian and bicycle routes shall be provided to connect all uses per Article 9-25.1 Subsection G. Show or note the location of areas designated for bicycle traffic on the SUP Plan. Note the width of the proposed sidewalks. Clarification: Provide ingress/egress information in the area of the main parking garage entrance off of Oak Springs Drive	An extensive sidewalk network is proposed with the new uses to connect with and compliment the existing sidewalks in the retail center. The streets within the retail and residential areas are proposed to function as shared streets for both cars and bicycles. This is appropriate given the low vehicular volumes, short street segments that limit vehicular speeds, existing and proposed character of the property with significant pedestrian/vehicle interactions, and the need to minimize street widths to keep pedestrian crossing distances short. Both garage entrances will be two-way--arrows have been added to the plans. All interior roads will be shared roads for bicycles and vehicles. A 5' sidewalk minimum has been added to the COA.
Original Comment: A minimum of 10% of open space must provide parks, squares, or other open space uses. Delineate any proposed natural open space areas open space on the plan, Clarification: Delineation to include the area (sq.ft.) of each open space area, the proposed use/activity within all open space areas, and adequate improvements/amenities to support the proposed open space use.	Sheet 6 "Open Space Plan" has been added to the SUP to clarify locations, sizes and improvements within each open space. These details have been added to the SOJ and COA as well. Each block/residential parcel and the residual retail parcel will individually meet the 10% open space requirement.
Staff notes that the conceptual renderings show amenities that are not included in the plan data or approval conditions; amenities and open space improvements that are not conditioned or specified in the documents may not reflect the final site conditions. Recommend providing a condition of approval to state the requirement for benches, tables, play equipment, and other amenities to adequately support open space use so that the final built conditions of the development more closely match the conditions shown in the renderings.	Sheet 6 "Open Space Plan" has been added to the SUP to clarify locations, sizes and improvements within each open space. Language has been added to the SOJ and COA to confirm that open space improvements will be in general conformance with the materials included in the SUP and the details provided on Sheet 6.
Side yard setbacks are not noted on the plan. Clarify where the boundary line adjustment is to be placed and note setbacks accordingly.	All setbacks have been added to the Overall Site Development Plan.

A modification of building height is requested. Include the setback adjustment provided to setbacks in the calculations for the increase building height. The Applicant has not sufficiently proven that the requested building height is in conformance with the Comprehensive Plan as the area is included within the Transition Zone for building height (1-3 stories, 35 feet max).	Building Heights and Setbacks section has been added to the SOJ to detail proposed building heights and corresponding setbacks.
The Applicant's letter states they are requesting modifications to increase the overall density, reductions in front yard setback along Oak Springs Drive, reduce interior lot buffer requirements, and allow increased building height. Ensure it is clear what modifications are being requested from Town Council with the Special Use Permit under Article 9-25.1 Subsection J.	See "Special Use Permit Modifications" section of SOJ and "Section 3--Waivers and modifications" of the COA. We believe these sections adequately outline the modifications being requested.
The SUP application does not provide the detailed design required for the final site development plan (SDP) submittal. Therefore enough information is not available to conduct the engineering review at this time. If this project is to be designed and developed in phases, or blocks, please be sure to design the initial infrastructure to support the subsequent blocks.	Detailed design to be submitted for approval at Site Development Plan. Infrastructure will be designed to ensure flexible sequencing of blocks.
Conformance with erosion and sediment control (ESC) requirements is required at the time of SDP submission. The concept plan does not include the ESC measures and calculations that will be required with the final site development plan. That plan must meet the Site Conservation Manual Article 4, VAC 9-25-840, Virginia and Erosion and Sediment Control Law, and State Regulations.	Detailed ESC plans will be submitted for approval at Site Development Plan.
Conformance with stormwater requirements is required at the time of SDP submission. The concept plan does not show stormwater facilities that will be required to bring this project into conformance with current regulations. As a new development project, they must meet the requirements of the Stormwater Management Ordinance Article 5 and State Regulations for new development. That means they will need to provide at least a 20% reduction in runoff and nutrients from the site.	Detailed stormwater plans will be submitted for approval at Site Development Plan.

This proposal claims an allowable maximum density of 432 units. The design calls for 376 residential units and 216,306 SF of retail/commercial space. Assuming these densities are correct and acceptable by Zoning, this total development could place a demand of from 90,000 to 160,000 gallons per day (GPD) on the Town's water plant. The latest Sewer and Water Capacity analysis conducted for the Town estimated the water demand for this property's proposed density at 156,000 GPD. This will equate to from 16 to 28% of the projected water demand for the Lee Highway, New Town, Land Use District, while the project includes 16% of that total district land area. During the final design process, the Applicant will need to provide flow projections and fixture unit counts for meter sizing requirements. Fire protection requirements will also need to be met. More information will be provided regarding the proposed connection for water and sewer service to this development with the final site plan. This plan will also require adequate water system easements to serve the added residential and commercial applications. These demands will put a little extra pressure on our water reservoir capacity, and the wastewater generated will put a significantly more pressure on our Cedar Run pump station and the Treatment Plant.	Flow projections, fixture counts and fire protection measures will be submitted for approval at Site Development Plan.
This plan improves the access to the parking area for the apartment building. The final design will need to ensure adequacy and compatibility of access with turn lanes off Oak Spring Road. As indicated in the comment responses, detailed elements will be addressed at the time of final site plan design. The proposed angled parking on Hastings Drive extended, would imply one-way traffic coming into the site, or those cars leaving the parking will need to exit through the shopping center. This could create traffic conflicts if folks pulling out of the angled parking and trying to position themselves for existing the site to the north.	All warranted road improvements (including turn lanes off Oak Springs Road) will be included in plan submitted for approval at Site Development Plan. The angled parking on Hastings Lane have been removed and replaced with parallel spots.
0% grade has been coded for all study intersection approaches within the Synchro files. We recommend updating the grades to reflect the general terrain of the signalized and stop- controlled study intersections. Google Earth is a planning-level resource to estimate intersection approach grades.	Analysis files have been revised to include estimated grade.

Pedestrian volumes have not been coded in the Synchro models. We recommend coding these to match the peak hour pedestrian counts for the existing scenarios and carrying these through (with any assumed growth, with appropriate documentation provided) for future scenarios.	Analysis files have been revised to include pedestrian volume.
We recommend adjusting the number of pedestrian calls per hour at all signalized intersections to reflect the pedestrian demand.	Analysis files have been revised as requested.
For all future background and total traffic conditions, a minimum peak hour factor of 0.92 should be used at all study intersections per the TOSAM. The total traffic conditions Synchro model includes different peak hour factors for various movements at Intersections 6 and 7; we recommend using a consistent peak hour factor of 0.92 for the whole intersection.	Analysis files have been revised as requested.
Intersection 1 - we do not recommend coding the northbound and southbound right turns as "free" movements, as there is no receiving lane on Broadview Ave. One approximation for coding this signal timing would be to code it as permissive in the minor street through phase and the overlapping major street left turn phase (phases 1 and 3 for the northbound right turn and phases 4 and 5 for the southbound right turn).	Analysis files have been revised as requested.
Intersection 1 (SIDRA analysis) -the U-turn volumes have been included as left-turn volumes. We recommend coding U-turn movements separately.	SIDRA file has been revised as requested.
Intersections 1 and 10 (SIDRA analysis) - 50 pedestrians/hour have been coded for all approaches. We recommend changing the pedestrian demand to match the count data or documenting the assumptions behind the projected growth in pedestrian demand.	SIDRA file has been revised as requested.
Intersections 1 and 10 (SIDRA analysis) - Conceptual renderings within the project cut sheets for these proposed roundabouts are referenced in the TIA Appendix. Consider adjusting the geometry (circulating width, island diameter, entry radius, entry angle) to match the concept drawings.	SIDRA file has been revised as requested for intersection 1. The roundabout at Intersection 10 has been removed.

Intersection 10 (SIDRA analysis) - the number of circulating lanes should be 1 for the SW approach for all SIDRA analyses. Adjust circulating width for the W approach to reflect two circulating lanes. Suggest estimating the AM and PM peak hour demands at the E and W driveway approaches based on land uses/trip generation rather than assuming I vph per movement.	Intersection 10 is no longer a roundabout as it was not approved for SMARTSCALE funding.
Intersection 7 - we suggest a design speed of 25 mph for the southbound approach. We recommend coding a storage length for either the left or right turn lane on the southbound approach.	Analysis files have been revised as requested.
Regional growth rates have been applied to all movements at all study intersections. We do not agree with applying regional growth to driveways and minor side street approaches, as the land uses there are not expected to change before the site is developed, and this conflates the impact of the site trips.	Understood. Growth was applied to all movements to be conservative. Analysis has been revised to remove growth from driveways and minor street approaches.
Approximately half of the external trips are assigned to the Driveway at Intersection 7, and half are assigned to Intersection 6. No trips are assigned to the shopping center site accesses at Intersections 2, 4, 9, or 10. Given that the apartment units constitute 85% of the development and a dedicated parking deck will be provided with a primary access at Intersection 7, we suggest assigning more site trips to the driveway at Intersection 7.	Trip assignments have been revised as suggested.
Alternatively, some vehicles may exit the parking deck to the south and access the external street network at Intersections 9, 10, 2, or 4, although this is a much more circuitous route. We recommend assigning a small number of trips to these other external intersections to reflect that some drivers may choose this route.	Trip assignments have been revised as suggested.
The westbound left turn delay during the PM peak hour under total traffic conditions at Intersection 8 is much higher than Intersection 9 (approximately 50 seconds compared with 10 seconds). We recommend reassigning some trips from Intersection 8 to Intersection 9 to reflect that some vehicles may divert to this intersection to access the street network.	Trip assignments have been revised as suggested.
Figure 16 - please provide a higher-resolution version of the site plan in the next submission.	A higher resolution version of the site plan has been included.

Figure 19 - two AM peak hour volumes do not match the Synchro files (off by one vph): the northbound left turn at Intersection 5 and the westbound through movement at Intersection 7.	Volume figure has been updated to match the synchro
Please include the signal timing plans in the appendix.	Signal timing plans have been added to the appendix.
We recommend including a planning-level signal warrant analysis at Intersection 8.	A planning level signal warrant has been included.
We recommend evaluating a crosswalk crossing Oak Springs Dr at Intersection 7.	A crosswalk study will be submitted as a separate document.
We recommend evaluating left turn lanes on northbound and southbound Branch Dr at Intersection 4.	Left and right turns were evaluated and discused in the report. The exisitng volumes warrant a northobund left turn lane.
Oak Springs Drive has a functional roadway classification of Major Collector. When full access commercial entrances are directly across from each other, it is defined as an intersection for access management spacing purposes. Based on VDOT's Road Design Manual Appendix F-31, the minimum spacing standards for an unsignalized intersection is 440' for a collector roadway. If the roadway was maintained by VDOT, an access management exception (AME) would be required for any unsignalized intersection that does not meet the minimum access management spacing. (LU)	It does not appear that Oak Springs Drive is a VDOT maintained roadway and therefore is not subject to VDOT spacing standards.
The pedestrian crossing of Oak Springs Drive at the intersection of Hasting Lane, is in conflict with the proposed commercial entrance and will need to be relocated. Unsignalized pedestrian crossings should be to be analyzed per VDOT IIM-TE-384.1 (LU)	A crosswalk study will be submitted as a separate document.
In General: The proposed roundabout at the intersection of BUS 17 at Broadview Avenue/ Warrenton Village South ("Study Intersection #10") was not selected for SmartScale Round 5 funding. Accordingly, the intersection should be analyzed as still an unsignalized conventional intersection in 2027, not as a roundabout. (TE)	Understood. The roundabout has been removed and the intersection remains unsignalized.

2027 Synchro Models: The 2027 models have the BUS 17/BUS 29/211 and Winchester intersection ("Study Intersection # l ") as a signalized intersection despite the TIA text saying the intersection is assumed to be a roundabout. Due to the different platooning of traffic leaving signal vs a roundabout, whether the intersection is modeled as signalized or a roundabout in Synchro does affect the delay and LOS at the BUS 17/BUS 29/211 & Branch Drive ("Study Intersection #3") signal. Even though Sidra is being used for the Intersection #1 LOS analysis, switch Study Intersection #1 to a roundabout in the 2027 Synchro models. (TE)	Analysis files have been revised as requested.
Page 52: Unsignalized pedestrian crossings will need to be analyzed per IIM-TE-384.1, not IIM-TE-384.0 as stated in the TIA. (TE)	A crosswalk study will be submitted as a separate document.
With the development of Mixed-Use Occupancies, there is an expanded need for response to fires and emergencies. Please consider allowing 360 degrees of access around the property, if possible, to include the parking garage.	A sheet showing Fire Truck Movement (Sheet 8) around all blocks has been added to the SUP.
Consider wider access roads to allow for fire apparatus to be set up to rescue trapped occupants on upper floors.	Proposed access roads are sufficient to provide necessary setup space--all clearance spaces will be addressed and approved at Site Development Plan.
Consider the parking garage and the need for access for fire apparatus. The proposal doesn't appear to allow access for our larger apparatus which will increase the chances of a catastrophic fire in the garage and adjacent structures.	Garage will be designed per code and approved at Site Development Plan and Building Permits.
Consider not allowing electric vehicle charging within the parking garage. Major cities and populated areas are currently having difficulties dealing with fire in EV and other rechargeable transportation methods. If a fire occurs with an EV, the response to the fire will be hampered and delayed due to fire hose deployment within the depths of the parking garage. Numerous fires have occurred throughout the Country where an extreme amount of water was needed to extinguish these fires.	To serve the growing demand for EV spaces by residents and lack of sufficient surface parking spaces, Applicant does intend to include EV spaces in the garage.

Added fire protection in the apartments? Will there be a fire suppression system in the garage? We would highly recommend it if not required due to the remoteness.	It is unknown at this time whether the garage will include a fire suppression system. This will be determined once the garage has been designed. The garage design and potential inclusion of a fire suppression system will be in accordance with IBC and NFPA building code requirements.
Strict enforcement of no parking areas to ensure adequate area for set up of fireapparatus.	No parking areas will be striped and include signage. Details of these measures to be included in plans submitted for approval at Site Development Plan.
Consider not narrowing the access road to the garage or back of the house access roads.	Proposed access roads are sufficient to provide necessary setup space--all clearance spaces will be addressed and approved at Site Development Plan.
The Warrenton Volunteer Fire Company does not have any apparatus that will allow access into the garage.	Garage will be designed per code and approved at Site Development Plan and Building Permits.
Consider more fire hydrants to ensure coverage for other responding apparatus. If a working fire happens units will deploy on the front and rear. Availability of water will ensure a quicker response to trapped or endangered occupants.	Fire hydrant plan will be be provided and approved at Site Development Plan and will be in conformance with town code.
Ensure flat areas 1/4 of the height of the building all the way around the building for ground ladder placement to perform any rescues where aerial apparatus isn't available.	The current plan satisfies this request.
Consider all curbs be rounded to allow fire apparatus access.	The curb plan will be be provided and approved at Site Development Plan and will be in conformance with town code. Mountable curbs can be considered and included at that time.

Warrenton Village Mixed Use Center
1st Review Respone
Project ID: SUP 22-5
GPIN: 6984-29-6753-000 & 6985-20-7247-000
360 Oak Springs Drive, Center District, Town of Warrenton, Virginia 20186
Date: July 10, 2023

Project and Document Comments

Comment #	Department	Issue	Reviewer
1	Planning Division	Plan Submission	Millie Latack, Planner
2	Planning Division	Plan Submission	Millie Latack, Planner
3	Planning Division	Plan Submission	Millie Latack, Planner
4	Planning Division	Plan Warrenton 2040: New Town Character District	Millie Latack, Planner

5	Planning Division	Plan Warrenton 2040: New Town Character District	Millie Latack, Planner
6	Planning Division	Plan Warrenton 2040: New Town Character District	Millie Latack, Planner
7	Planning Division	Plan Warrenton 2040: New Town Character District	Millie Latack, Planner
8	Planning Division	Housing & Density	Millie Latack, Planner

9	Planning Division	Housing & Density	Millie Latack, Planner
10	Planning Division	Community Facilities & Infrastructure	Millie Latack, Planner
11	Planning Division	Community Facilities & Infrastructure	Millie Latack, Planner
12	Planning Division	Community Facilities & Infrastructure	Millie Latack, Planner
13	Planning Division	Transportation	Millie Latack, Planner

14	Planning Division	Transportation	Millie Latack, Planner
15	Planning Division	Transportation	Millie Latack, Planner
16	Planning Division	Transportation	Millie Latack, Planner
17	Planning Division	Transportation	Millie Latack, Planner
18	Planning Division	Transportation	Millie Latack, Planner
19	Planning Division	Lighting & Signage	Millie Latack, Planner

20	Planning Division	Lighting & Signage	Millie Latack, Planner
21	Planning Division	Economic Impact	Millie Latack, Planner
22	Planning Division	Economic Impact	Millie Latack, Planner
23	Planning Division	Environmental - Trees	Millie Latack, Planner

24	Planning Division	Environmental - elevations and topography	Millie Latack, Planner
25	Planning Division	Environmental	Millie Latack, Planner
26	Planning Division	Zoning Ordinance	Millie Latack, Planner
27	Planning Division	Zoning Ordinance	Millie Latack, Planner
28	Zoning Administrator	Zoning Ordinance	Kelly Machen, ZA
29	Zoning Administrator	Zoning Ordinance	Kelly Machen, ZA

30	Zoning Administrator	Zoning Ordinance	Kelly Machen, ZA
31	Zoning Administrator	Zoning Ordinance - Article 2-18 — Permitted Encroachments	Kelly Machen, ZA
32	Zoning Administrator	Zoning Ordinance - Article 3-4.10.3 - Permitted Uses in the Commercial District	Kelly Machen, ZA
33	Zoning Administrator	Zoning Ordinance - Article 3-4.10.4- Lot & Yard Regulations	Kelly Machen, ZA
34	Zoning Administrator	Zoning Ordinance - Article 3-4.10.4- Lot & Yard Regulations	Kelly Machen, ZA
35	Zoning Administrator	Zoning Ordinance - Article 6 — Signs	Kelly Machen, ZA

36	Zoning Administrator	Zoning Ordinance - Article 7 — Parking	Kelly Machen, ZA
37	Zoning Administrator	Zoning Ordinance - Article 7 — Parking	Kelly Machen, ZA
38	Zoning Administrator	Zoning Ordinance - Article 7 — Parking	Kelly Machen, ZA
39	Zoning Administrator	Zoning Ordinance - Article 7 — Parking	Kelly Machen, ZA
40	Zoning Administrator	Zoning Ordinance - Article 7 — Parking	Kelly Machen, ZA
41	Zoning Administrator	Zoning Ordinance - Article 8 — Landscaping	Kelly Machen, ZA

42	Zoning Administrator	Zoning Ordinance - Article 8 — Landscaping	Kelly Machen, ZA
43	Zoning Administrator	Zoning Ordinance - Article 8 — Landscaping	Kelly Machen, ZA
44	Zoning Administrator	Zoning Ordinance - Article 8 — Landscaping	Kelly Machen, ZA
45	Zoning Administrator	Zoning Ordinance - Article 9-8 — Lighting	Kelly Machen, ZA
46	Zoning Administrator	Zoning Ordinance - Article 9-17 — Steep Slopes	Kelly Machen, ZA
47	Zoning Administrator	Zoning Ordinance - Article 9-25.1.B — Density	Kelly Machen, ZA

48	Zoning Administrator	Zoning Ordinance - Article 9-25.1. C — Density	Kelly Machen, ZA
49	Zoning Administrator	Zoning Ordinance - Article 9-25.1. C — Density	Kelly Machen, ZA
50	Zoning Administrator	Zoning Ordinance - Article 9-25.1.D- Phasing	Kelly Machen, ZA
51	Zoning Administrator	Zoning Ordinance - Article 9-25.7.E— Subject Parcels	Kelly Machen, ZA
52	Zoning Administrator	Zoning Ordinance - Article 9-25.1. G — Integration	Kelly Machen, ZA
53	Zoning Administrator	Zoning Ordinance - Article 9-25.1.H - Open Space	Kelly Machen, ZA
54	Zoning Administrator	Zoning Ordinance - Article 9-25.1.1— Lot and Yard Regulations	Kelly Machen, ZA

55	Zoning Administrator	Zoning Ordinance - Article 9-25.1.1— Lot and Yard Regulations	Kelly Machen, ZA
56	Zoning Administrator	Zoning Ordinance - Article 9-25.1.J — Modifications	Kelly Machen, ZA
57	Zoning Administrator	Zoning Ordinance - Article 11-3.10.3 — Evaluation Criteria; Issues for Consideration	Kelly Machen, ZA
58	Zoning Administrator	Zoning Ordinance - Article 11-3.10.3 — Evaluation Criteria; Issues for Consideration	Kelly Machen, ZA
59	Zoning Administrator	Zoning Ordinance - Article 11-3.10.3 — Evaluation Criteria; Issues for Consideration	Kelly Machen, ZA
60	Zoning Administrator	Zoning Ordinance - Article 11-3.10.3 — Evaluation Criteria; Issues for Consideration	Kelly Machen, ZA
61	Zoning Administrator	Zoning Ordinance - Article 11-3.10.3 — Evaluation Criteria; Issues for Consideration	Kelly Machen, ZA

62	Zoning Administrator	Zoning Ordinance - Article 11-3.10.3 — Evaluation Criteria; Issues for Consideration	Kelly Machen, ZA
63	Zoning Administrator	Zoning Ordinance - Article 11-3.10.3 — Evaluation Criteria; Issues for Consideration	Kelly Machen, ZA
64	Zoning Administrator	Zoning Ordinance - Article 11-3.10.3 — Evaluation Criteria; Issues for Consideration	Kelly Machen, ZA
65	Vanderpool, Frostick & Nishanian, P.C.	Zoning Ordinance - Setbacks, Section 3-4.10.4	Tyler J. Blaser, Vanderpool, Frostick & Nishanian, P.C.
66	Vanderpool, Frostick & Nishanian, P.C.	Zoning Ordinance - Buffer and Landscapnig, Section 8-6.2	Tyler J. Blaser, Vanderpool, Frostick & Nishanian, P.C.
67	Public Works and Utilities	General	Paul Bernard P.E., Town Engineer; Dina Hermoso, Stormwater Administrator

68	Public Works and Utilities	Article 4 — Site Conservation Manual (SCM)	Paul Bernard P.E., Town Engineer; Dina Hermoso, Stormwater Administrator
69	Public Works and Utilities	Article 5— Stormwater Management (SWM)	Paul Bernard P.E., Town Engineer; Dina Hermoso, Stormwater Administrator
70	Public Works and Utilities	Water and Sanitary Sewer	Paul Bernard P.E., Town Engineer; Dina Hermoso, Stormwater Administrator
71	Public Works and Utilities	Transportation	Paul Bernard P.E., Town Engineer; Dina Hermoso, Stormwater Administrator
72	Police Department - CPTED	Traffic	Lieutenant A. Arnold

73	Police Department - CPTED	Traffic	Lieutenant A. Arnold
74	Police Department - CPTED	Traffic	Lieutenant A. Arnold
75	Police Department - CPTED	Traffic	Lieutenant A. Arnold
76	Police Department - CPTED	Traffic	Lieutenant A. Arnold
77	Police Department - CPTED	Pedestrian	Lieutenant A. Arnold
78	Police Department - CPTED	Pedestrian	Lieutenant A. Arnold

79	Police Department - CPTED	Lighting	Lieutenant A. Arnold
80	Police Department - CPTED	Landscaping	Lieutenant A. Arnold
81	Police Department - CPTED	Landscaping	Lieutenant A. Arnold
82	Planning Division		Adam Shellenberger, Chief of Planning
83	VDOT	Traffic	Craig Simpson
84	VDOT	Traffic	Craig Simpson
85	VDOT	Traffic	Craig Simpson

86	VDOT	Traffic	Craig Simpson
87	VDOT	Traffic	Craig Simpson

Comment
The Statement of Justification notes this SUP is for Phase 1, while Phase 2 details will be provided with an SUP amendment. Several areas in the plan and within the Economic Impact Analysis note certain aspects of Phase 2. If both phases are to be reviewed as a master plan development, as intended by the Zoning Ordinance, then more information is needed on how the mixed-use will be integrated and the timing of this phasing.
In the "General Notes" section of Sheet 4 on the SUP Plan, GPIN 6985-20-7247-000 (6.46 acres total) is Phase 1 and GPIN 6984-29-6753-000 (22.59 acres total) is Phase 2. But, in the "Development Tabulation" total Phase 1 acreage is noted as 9.39 acres, exceeding the total acres of GPIN 6985-20-7247-000.
The Statement of Justification and SUP Plan states the parking garage will be 4-stories while the Fiscal Impact Analysis states the garage will be 5-stories (page 32).
As proposed without detail information on Phase 2, the height of the development will be central to the mixed-use center and step-up to residential neighborhoods on the secondary streets rather than stepping down…not meeting the intent of the Character District (pg 4).

The proposed development currently does not show a discernible center. There is a proposed plaza area that is not centered and undersized compared to the 29.05-acre development area.
The residential dwellings are set back behind existing commercial making them a standalone building area visually cutoff and separated from the commercial development.

Visual site lines of the development are important in creating place. As proposed, the hardscape plaza is the only portion of the new development that would have through visibility of a portion of the mixed-use center. The courtyards proposed are incapsulated within the apartment complex or behind the existing commercial separating the site of the development detaching the major residential component from the commercial (see Figure 1).

The proposal fails to demonstrate how the existing commercial and proposed residential will be integrated to create a mixed-use community. At this time, the proposal appears to be an apartment building on vacant land with little consideration to the larger intent of the mixed-use ordinance and Comprehensive Plan guidance.

More detailed information is required for the Affordable Dwelling Unit Program provided. The proposed program length of 10 years is less than half of the required 25 years. Information on the units that would be available to the program, how the program will be administered, and how the program will be assured continuance through the required timeframe are a few pieces of information still needed.

The Fiscal Analysis does not speculate the impact on local Town housing requirements and implications. This is necessary in determining benefit to Warrenton and its residents. All listed benefits of the housing opportunity are framed within Fauquier County. Current housing availability for those who work in Town is minimal with a goal to be providing housing opportunity for those invested in the community.

Calculated load on the public water and sewer system for the new residents should be provided to determine if capacity exists.

Information related to the party responsible for the maintenance of the road and infrastructure has not been provided. No information was provided regarding trash services, as well.

Fauquier County Community Development staff has recommended apartment units should not exceed more than two bedrooms, as three-bedroom unit is the largest potential of capital and fiscal impacts. Additionally, the demand for three-bedrooms would be accommodated by the proposed Warrenton Village Townhomes with additional current and prospective Townhome developments in and around Warrenton.

The intersections throughout the larger proposed parcel are not supportive of safe multimodal travel ways. Current internal street configuration has several points of conflict for pedestrians and cars creating an unfavorable environment to encourage biking (see Figures 2-4). Consideration to reconfigure the existing internal circulation to allow for safer multimodal circulation.

Bike storage for the apartments and bike racks throughout the center encourage bike use but the internal configuration does not note any additional provisions to ensure safe travel, i.e., bike path, signage, striping, wayfinding, etc. Consideration to include such elements is strongly encouraged.

The proposed single access to the parking garage through the rear commercial delivery points is problematic. The proposal to use a street that is aged and connects to a rear nonarchitectural side of aging commercial buildings does not provide visual or usable connectivity.

There will be visibility issues around tight corners (see Figures 5-6) and, without a lighting plan, dangerous travel ways for pedestrians, bicycles, and cars.

The applicant should review the roundabouts, the Pipeline Study and produce a Traffic Impact analysis this proposal will have on the surrounding network.

There seem to be breaks within the internal circulation near the mixed-use center entrances. Crosswalks for the main entrances will be integral to pedestrian safety for the residential to access the commercial center. Portions of internal improvements in the Phase 2 area were provided but do not address all pedestrian points. Clarification is also needed if these improvements will be in Phase 1 or Phase 2. Below are examples of locations that seem to be missing sidewalk or crosswalk improvements (see Figures 7-9).

General lighting information should be provided to review impacts on safety and setting for the development. The main entrance goes behind existing commercial buildings with minimal lighting which creates unsafe environments for drivers and pedestrians. Further, the lighting impact of the front-facing portion of the complex needs to be addressed in relationship to the impact of light shed on Oak Springs Drive and Hasting Lane neighborhoods.

Please include a Master Sign Plan for the entire development. This will give a better idea of wayfinding elements related to internal circulation, safety caution related to multimodal transportation, visual impact on neighboring residential/commercial, and more.

The entirety of the Fiscal Impact Analysis provided focuses on the impact on Fauquier County. No information was provided pertaining to the following:
- Physical and financial impact on TOWN water, sewer, and trash services
- Physical and financial impact on TOWN infrastructure maintenance
- Impact on TOWN residential tax base (real estate & personal property)
- Impact on TOWN business tax base (business, meals, etc.)

Information regarding the increase in employment base is minimal, as the heavy commercial component is within Phase 2. A complete picture of beneficial outcome related to employment base, employer attraction, and promotion of Warrenton as a cultural, entertainment, and arts center. All elements of which are listed in the Comprehensive Plan as goals for future Town development.

There are a considerable number of trees and natural landscape that will be removed for the development. A general comparison of what is being removed and what is being replaced would make for better context.

Elevations and topography vary drastically throughout the Phase 1 parcel and to the adjoining existing commercial. Particularly on the corner of Branch Drive and Oak Springs Drive (see Figures 10-11). Information regarding how the site will be shored (if the site will be leveled, retaining wall constructed, etc.) for the development is necessary to understand how it will impact existing infrastructure, site lines, interconnected walkability, and general community character. For example, if there will need to be a retaining wall constructed on the Branch Drive side of the development, the wall may visually close off the roadway making a tighter and less comfortable travel way for cars, bike, and pedestrians.

The Interpretative Guide for Fauquier County Soils Part II notes 45B and 55B as moderate for
shrink swell potential and 55B is noted as low for bearing capacity. It is understood the State
Code requires mitigation for soils considered moderate for shrink swell to be addressed at time of site development. That said, the amount of moderate 45B and 55B soil on the proposed parcel may require larger applications of mitigation and excavation.

Information regarding the extent of the disturbance and its impact on neighboring or adjoining properties needs to be addressed, including if blasting will be required.

While the Zoning Division provides its own comments, all Special Use Permit are evaluated under the criterion listed in §11-3.10.3. Please review the criteria and provide information that addresses the factors for consideration.

The application states it is only for phase 1. However, the statement of justification and SUP plans includes partial information about phase 2. Include all improvements and information associated phase 2 within the application.

The application does not clearly describe how refuse will be addressed on site for the residential uses.

The location shown for View 3 on Sheet 6 does not match the illustration provided for View 3. It appears that View 3 is from the front side of the existing commercial, not the area between the buildings as seen on Sheet 6. Provide additional information on how the backside of the existing commercial is to be treated or seen by residents.

Decks are shown on the proposed elevations. Uncovered decks must be at least 10 feet from a rear property line and cannot encroach in front/side yard setbacks. Covered decks cannot encroach in setbacks. If requesting a modification of setbacks for decks, specifically note the request in the SUP Plan and Letter of Justification.

The applicant has proposed multifamily and two over two townhouse units as part of a mixed-use development. Townhouses are defined as having one unit per lot. Clarify use and proposed lot lines.

Phase I does not meet front setback requirements along Oak Springs Drive within the Commercial district. The Applicant has requested a modification of this requirement from Town Council as part of the SUP per Article 9-25.1, Subsection J. In general, the setbacks noted on the plans as "required" do not include Article 2-13.10. To provide additional clarity show the math for setbacks, including any reductions granted by design or through Article 2-13.10 and any increases due to building height.

Phase I does not meet height requirements as defined in article 3-4.5.8 of the Zoning Ordinance. Maximum achievable height is 3-story. The applicant has requested a modification of this requirement per article 9-25.1, Subsection I.

No signs included as part of the application but are mentioned in the Statement of Justification. Any proposed signs will need to meet the regulations noted under Article 6 of the Zoning Ordinance.

Accessible parking is not addressed but must be provided according to the Americans with Disabilities Act at time of Site Development Plan
(SDP) submission.

Existing parking appears to be modified but the parking calculations for the existing shopping center are provided under table line for Phase 2. Staff should be able to clearly verify that parking will continue to be met
for Phase 1.

The shopping center parking calculations need to include, "plus additional spaces, as required herein, for offices, theaters, banks, personal services, and eating establishments."

The parking garage unloads onto a narrow area behind the Costello's Ace hardware store. This location could prove difficult for safe access and travel to/from the property. (7-2.5 ZO)

The loading area noted in front of the parking garage shows pull in spaces on the illustrative plan. Clarify what type of loading is intended
and if any changes are proposed to the existing loading areas behind the shopping center. How far away will the loading areas be from residential windows, decks, and HVAC intake? (7-18 and 9-14.4 ZO).

Conformance with landscaping requirements is required at time of SDP submission. Modifications to the required buffers under Article 8-8 may be approved by Town Council. The application includes a request to modify "interior lot line buffer requirements." Provide additional information regarding this request, specifically noting which buffers are included in the modification. For example, is this for the 25-foot buffer between commercial/residential uses or for storage/loading areas?

A 25-foot buffer is noted as to be provided along Branch Drive, however the setback is noted as 20 feet along Branch Drive. Clarify the width of the buffer to be provided.

The concept plan does not show all landscaping calculations required under Articles 8-6 and 8-10. Modifications of these sections may not be granted. Conformance with landscaping requirements is required at time of SDP submission. As presented staff cannot verify if the information provided meets Articles 8-6 and 8-10. Staff is also having a hard time verifying that there are no discrepancies in the number of trees noted between the planting table, landscape plan, and tables A-C.

Understory trees are proposed for Street Trees on a 1/50 feet basis. Ornamental trees may be substituted for canopy trees on a two to one
basis. (8-5.5.3 ZO)

The Statement of Justification acknowledges all lighting must meet requirements of Article 9 of the Zoning Ordinance. No lighting plan has
been provided at this time but all fixtures on site will require conformance to current lighting standards at the time of site development plan.

It appears there may be areas of steep slopes on the vacant parcel to be developed. Note any steep slopes on the existing conditions plan.

The Applicant is requesting from Town Council residential density in excess of 5 units per acre. Phase one is proposed to have 339 units and
Phase 2 is to have 97 units, for a total of 436 units. The proposed density does not exceed one unit per 500 gross square feet of non-residential floor space. The Applicant has not sufficiently proven that the requested density is in conformance with the Comprehensive Plan as the area is included within the Transition Zone for building height (1-3 stories, 35 feet
max).

The Applicant is requesting from Town Council an increase in residential density as part of the SUP by providing 10% of the proposed dwellings as affordable dwelling units. The applicant would like to only provide these units for a maximum of 10 years. After the 10-year agreement, the dwellings would be rented at market rate. However, under Article 9-3.2,
affordable housing should be provided for at least 25 years. Town Council will need to approve the suggested 10-year provision.

The 10% affordable housing bonus permits a 100% density increase. At 29.05 acres and 5 units per acre, equaling 145.25 units, a 100% density bonus allows for 290.5 units. Phase one proposes 339 units.

The plan sheet shows two phases, although only one is proposed at this time. As such, Phase 1 must meet all the requirements with regards to Phasing. Include the existing commercial property/calculations in the development tabulation for Phase 1.

It is unclear what parcels are to be proposed. The plan notes a boundary line adjustment is to be completed with the site plan but does not show proposed the adjustment.

Pedestrian and bicycle routes shall be provided to connect all uses per Article 9-25.1 Subsection G. Show or note the location of areas designated for bicycle traffic on the SUP Plan. Note the width of the proposed sidewalks.

A minimum of 10% of open space must provide parks, squares, or other open space uses. Delineate any proposed natural open space areas open space on the plan.

Side yard setbacks are not noted on the plan. Clarify where the boundary line adjustment is to be placed and note setbacks accordingly.

A modification of building height is requested. Include the setback adjustment provided to setbacks in the calculations for the increase
building height. The Applicant has not sufficiently proven that the requested building height is in conformance with the Comprehensive Plan as the area is included within the Transition Zone for building height (1-3 stories, 35 feet max).

The Applicant's letter states they are requesting modifications to increase the overall density, reductions in front yard setback along Oak Springs Drive, reduce interior lot buffer requirements, and allow increased building height. Ensure it is clear what modifications are being requested from Town Council with the Special Use Permit under Article 9-25.1 Subsection J.

The project is required to meet all building and safety codes.

Information has not been provided regarding any potential impacts from loading/unloading noise near the proposed residential units.

No signs are shown. Signs will need to meet the Zoning Ordinance prior to obtaining a building permit.

A modification of buffer requirements is requested. Landscaping requirements cannot be fully verified at this time. Landscaping must be in full compliance with the Zoning Ordinance at time of SDP submission (except for any approved
modifications).

No refuse enclosures are shown on the application. All refuse storage areas must be shielded. A loading area is shown in front of the proposed parking garage; Loading areas for the commercial uses need to be specified and noted on the plans.

Hours of operation for the clubhouse area, leasing office, and pool are not specified in the Statement of Justification.

One loading area is shown on the plans between the parking garage and commercial building. No screening or landscaping is shown in this area.

Exhaust odors caused by vehicles loading and unloading supplies for the existing commercial development is not addressed.

Section 3-4.10.4 of the Zoning Ordinance requires a minimum setback for the Commercial District of 60 feet from right of way of major thoroughfare or collector street having right of way greater than 50 feet (e.g. Oak Springs & Broadview), and 40 feet from right of way of a service drive (e.g. Branch). Section 9.25(I) provides that as part of a mixed-use development, Residential lots shall meet
the Lot and Yard Regulations for the RMF District, which only requires a 25 ft. setback. The provided setback along Branch does not meet either of these the minimum required setbacks.

The total paved area for parking, circulation, ingress, egress, and loading is not readily apparent on the proposed Site Development Plan, nor is the total area to be landscaped. The proposed plan does indicate there will be a
total of 1,448 parking spaces, which would require 1,448 trees and 4,344 shrubs. The proposed plan does not meet this requirement.

The SUP application does not provide enough information to verify the work type and the area to be disturbed in phase 2. Please include additional details if phase 2 is planned to be included at this time.

Conformance with erosion and sediment control (ESC) requirements is required at the time of SDP submission. The concept plan does not appear to show ESC measures and calculations. They must meet the Site Conservation Manual Article 4, VAC 9-25-840, Virginia and Erosion and Sediment Control Law, and State Regulations.

Conformance with stormwater requirements is required at the time of SDP submission. The concept plan does not appear to show stormwater facilities. As a new development project, they must meet the requirements of the Stormwater Management Ordinance Article 5 and State Regulations for new development. That means they will need to provide at least a 20% reduction in runoff and nutrients from the site.

The average daily demand for water and sewer for these 436 residential units should be approximately 65,400 gallons per day (gpd) assuming 150 gpd/unit. More information will be provided regarding the proposed connection for water and sewer service to this development with the final site plan.

As a general comment the back alley to the Warrenton Village Shopping Center this is an interesting primary point of access to these residential units. The final design will need to make sure compatibility of access with the loading and deliveries of the shopping center. We will wait to see how the details of these points of access will be addressed with the final design in the site plan.

As proposed, the approximately 1862 weekday vehicular trips generated would mostly be entering and exiting the parking garage behind Costello's Ace Hardware and Fat Tuesday's. There is not enough room to safely handle that kind of traffic volume as well as delivery trucks, trash placement and trash pickup, etc

Vehicular traffic would come to a choke point behind Joann Fabrics and Red Zone. There
is a semi-truck delivery area behind Joann Fabrics that narrows the road. The safety of
employees for businesses taking trash out in that area is a concern.

Blind corners would result in traffic accidents — particularly from employee parking or delivery drivers.

Emergency vehicle access into the facility does not appear to be an issue, but any significant police or emergency services response would completely block ingress and egress to the parking garage.

The increase in volume of traffic would result in back up delays for vehicular traffic trying to turn left onto Broadview Ave. with no traffic control devices added.

As mentioned above, the employees of the businesses that back up to this proposed site
will face challenges from the traffic volume.

Because the site makes walking to the existing shopping center easy, traffic calming
devices/measures should be considered at all pedestrian crossings.

A lighting plan was not submitted. Lighting should be LED or OLED with a correlated color temperature of between 2700 and 3000 Kelvin. After installation a night-time lighting study should be done to check illumination, uniformity, and brightness and to ensure the lights are properly shielded so glare doesn't affect traffic on neighboring roads.

Tree type and placement should be planned so the canopy doesn't interfere with the lights in the parking lot as they grow.

Shrubs should be low growing so as not to obscure sight lines or cover windows.

Fauquier County suggests that the Town and Applicant consider limiting or prohibiting the three-bedroom apartment units. The three-bedroom apartment units are the most likely to house families and could potentially contain four children each. As such, these units present the largest potential for capital and fiscal impact to the County/School budget. Furthermore, we believe that the demand for three-bedroom housing units is likely accommodated by (1) the townhomes proposed in this application, (2) other townhome developments proposed in an around Warrenton, and (3) the existing townhomes in close proximity to the subject property as well as around Warrenton.

VDOT concurs with Town, that a Traffic Impact Analysis (TIA) should be performed for the proposed development to evaluate impacts of the proposed development to the Town and transportation network.

The crash history should also be reviewed as part of the TIA. The intersection of Bus 17 (Broadview Ave) & Warrenton Ctr has a Culpeper District Potential Safety Improvement (PSI) intersection ranking of 103 and the intersection of Bus 29/211 (Lee Hwy) & Winchester Street has a Culpeper District (PSI) intersection ranking of 36.

Trip genaration should be provided based on the ITE Trip Generation Manual.

With the improvements to the pedestrian infrastructure along Oak Springs Drive and the anticipated increase in pedestrian trips that will be generated from this development, the unsignalized pedestrian crossings along Oak Springs Drive and at the intersection of Bus 17 (Broadview Ave) & Oak Springs Drive should be reviewed per the latest IIM-TE-384.0 (Pedestrian Crossing Accomodations at Unsignalized Approaches). Pedestrian routes and existing/proposed pedestrian crossings should be reviewed as part of the TIA.

The Statement of Justification Transportation Impact section references a technical memorandum prepared by Kittleson & Associates dates March 23, 2022 that was not received by VDOT and has not been reviewed.

Applicant Response
Phasing has been removed from the SUP application.
Phasing has been removed. General Notes have been updated.
Parking garage will be a 4-story structure. All sheets have been updated accordingly.
Phase 2 has been deleted from the SUP. Justification for the SUP's height modification can be found in the SOJ Section - Height.

A new Central Plaza has been added to the plan that is appropriately sized for the 29-acre development area, centrally located and designed with improvements to create a descernible center--public green, gazebo, seating, and potential for future retail activation. An additional West Plaza has been added adjacent to the northern entrance on Broadview Avenue to serve as a connection point between the proposed residential building and existing retail to improve the integration of the two uses with a shared space. Both plazas are designed and located to benefit both residential and commercial uses within the Center.

We have reorganized the plan by providing a new cut-through street shortening the distance between the east residential entrance and the retail. A west entrance to the residential building has been added along with a plaza to connect the west end of the building with retail. A centrally located, sizable Central plaza with regoranized streets and accessways breaks the plan of the center into smaller blocks and is now accessible and visible from different areas within the center.

SOJ Section - Creation of a Mixed-Use Community has been added to satisfy this comment.

SOJ Section - Affordable Housing has been updated to satisfy this comment.

Fiscal Analysis has been updated to report impacts on the Town of Warrenton, instead of greater Fauquier County.

The average daily water/sewer demand will be approximately 56,400 gpd (376 unts * 150 gpd).

SOJ Section - Road & Infrastructure Maintenance has been added to satisfy this comment.

SOJ Section - Trash has been added to satisfy this comment.

3-bedroom apartments are important to provide a wide range of housing types and price points to the residents of Warrenton. 3-bedroom units provide the lowest cost option on a per bedroom basis, so are pivotal when seeking to provide lower cost options to residents. Applicant will agree to cap 3-bedroom units in the apartment building at 10% of the units.

SOJ Section - 3-Bedroom Unit Maximum has been added to address this comment.

Eliminated/shortened travelways, especially those encouraging speedy vehicular use between Broadview Ave and Oak Springs Drive, change the nature of available accessways within the center. This combined with on-street parking – parallel, angled and head-in spaces, reduced driveway widths and raised crosswalks, will automatically provide traffic calming and slower traffic speeds thereby making it safer for multi modal use. Visitors entering the site are immediately confronted with a landscape that is unlike urban throughfares and more like parking lots with limited speeds but good visibility. Unlike urban throughfares which are designed for speedy travel between points A and B, visitors entering the project are already at B. The project streets and accessways encourage visitors to think about parking their vehicles or bikes and setting out on foot.

Short term bike parking will be spread along the retail sidewalk, Central, East and West plazas for conveient use by residents and visitors. Long term bike parking within the residential building will be provided for residents. Due to the various traffic calming measures we are undertaking, we believe the plan now supports multi modal use with improved safety for pedestrians. New crosswalks, reduced driveway widths, signage, lighting, pavement markings, etc will improve visibility, navigation and intent of the infrastructure.
Plan has been revised to move the primary garage access to Oak Springs Drive. A single, secondary access along the rear alley will serve primarily "back of house" functions and tenant loading/unloading.
Considerable measures including eliminating/shortening travelways designed for speed, reduced driveway widths, improved crosswalks, on-street parking, lighting, signage, stop signs, etc will improve multi modal use and overall safety.
Traffic Impact Analysis by Gorove Slade has been provided with this submittal and contemplates these potential improvements.
Refer to Conceptual Circulation Plan (Sheet 18) included with the submittal to see reorganized circulation patterns.
Comment noted. Conceptual lighting plan (Sheet 17) is included with the submittal. Detailed lighting plan addressing lighting impacts will be provided at site plan.

Conceptual Site Signage Plan (Sheet 18) has been included in the SUP.
FIA has been updated accordingly
Phase II has been removed. FIA has been updated accordingly.
Existing trees can be found on SUP Sheet 2. Proposed street trees can be found on SUP Sheet 6.

The site renderings have been updated to show the change in grade across the site. A detailed grading plan will be provided at time of site plan. See SOJ Section - Topography for additional information.
A geotechnical study will be completed at time of site plan.
Limits of construction disturbance will be limited to within the Property. No adjoining parcels will be included within limits of disturbance.
The submittal adequately addresses all SUP criteria list in §11-3.10.3
Phasing has been removed from the SUP application.
Clarification on trash locations and pickup has been added to SOJ Section - Trash

Views have been updated in revised submittal.

Residents will have limited views of the backside of the existing commercial center and in most cases will have fences and/or vegetation obscuring the view of the backside of the commercial center.

Additional information on alley improvements and screening can be found in SOJ Section - Modified Alley – Improvements, Vehicular Access & Loading, and Screening

A setback modification is being requested and has been noted on the plans and in the SOJ Section - Special Use Permit Modifications.

Townhomes and 2-Over-2s are rental properties and have a multi-family use designation. These units will not have individual lot lines/parcels.

A setback modification is being requested and has been noted on the plans and in the SOJ Section - Special Use Permit Modifications.

A reduction in setbacks is requested to achieve the mixed use nature of development with buildings closer to road.

A height modification is being requested.

See SOJ Section - Height for additional justification.

Conceptual Site Signage Plan (Sheet 18) has been included with this submittal, which describes the types of signage and general anticipated location of such signs. All signs will meet regulations noted under Article 6 of the Zoning Ordinance.

Accessible parking will be addressed at SDP submission.
The parking table has been revised on Sheet 4.
The parking table has been revised on Sheet 4.
Garage access has been revised so that the primary ingress/egress is located on Oak Springs Drive. A single, secondary ingress/egress is located at the alley to service "back of house" functions and loading/unloading.
Two loading spaces for the residential multifamily building are now shown in the alley flanking the residential garage. Loading spaces will allow for residential tenants to use moving trucks to move in and out of the building. Trash for the building will be held in designated trash rooms within the building and directly connected to the loading areas to allow carting of the trash dumpsters on days for collection by the trash truck. This will cause minimal inconvenience, unsightliness, odor to residential tenants or impact on the commercial center operations. No residential unit (windows and decks) will be located immediately adjacent to these loading areas. All HVAC systems will be located on the roof.
A landscape buffer modification to waive ALL interior buffer requirements between the proposed residential and existing retail is being requested.

A 20' buffer along Branch Drive has been provided along Branch Drive and is shown on Sheet 3 and Sheet 5 of the SUP.
Landscape calculations under Articles 8-6 and 8-10 have been shown for Residential blocks. Parking lot trees outside of residential blocks have been replaced with equivalent trees to give the same coverage as what was previously provided. The initial plan for the commercial side of this parcel was approved prior to the currently approved zoning ordinance and will not meet the appropriate canopy that is currently required. See Landscape Sheet 6.
Street trees have been adjusted. In instances where overhead wires are present, understory trees are proposed at a two to one basis for large canopy trees. See Landscape Sheet 6.
Applicant will coordinate and provide the required exhibits for this item demonstrating compliance at the time of site development plan. For current review, a conceptual lighting plan has been included describing the types of lighting and their general location anticipated at this moment.
Areas of Steep Slopes have been noted on Sheet 2 of the SUP.
See SOJ Section - Height and SOJ Section - Density for additional justification.

Application has been revised to include a twenty-five (25) year affordability period.
A density modification is being requested with this SUP. See SOJ Section - Density
Phasing has been removed from the SUP application. All submittal materials have been updated accordingly.
The proposed parcel lines have been added to Sheet 2.
New crosswalks, raised tabletop crossing, reduced driveway widths along along the retail and continuous sidewalks along the connecting streets – existing as well as proposed, will allow for safe pedestrian and bicycle access between the retail, residential and communal uses on the site. See Sheet 18 for pedestrian/vehicular/bicycle circulation plan. Sidewalk dimensions have been added to the SUP sheets.
10% openspace has been provided and labled on the plans.
The proposed boundary lot adjustment has been shown on Sheet 2 of the SUP. Additionolly, a modification request to reduce the side yard setbacks has been requested.

See SOJ Section - Height for additional justification.
The modifications being requested has been listed on Sheet 3 of the SUP and in the SOJ. Locations of the waivers have been noted on the SUP Plans.
Conformance with all building and safety codes will be confirmed at SDP and building permit review.
Residential units have been pulled away from loading and trash pickup areas. No noise impacts are anticipated.
Conceptual Site Signage Plan (see Sheet 16)has been included with this submittal--all signs will meet regulations noted under Article 6 of the Zoning Ordinance.
Landscaping will be in full compliance with the Zoning Ordinance at time of SDP submission.
Trash and Loading Areas have been labled on the plan. Additional information can be found in SOJ Section - Modified Alley and SOJ Section - Trash All refuse storage areas will be shielded.

Hours of operation have been added to the SOJ Section - Community Hours of Operations
Plan has been revised to include two loading areas for the multifamily building. Screening and landscaping has been added to the rear alleway--see Sheets 13 & 14.
Alley width is wide enough and vehicular volume is not be substantial enough in these areas to create any concerns.
A setback modification are being requested for Oak Springs and Branch Drive and have been noted on Sheet 3 of the SUP and in the SOJ.
Calculations for interior parking lot landscaping for residential blocks has been provided and meets the requires parking lot tree and shrub requirements. Parking lot trees for the existing commercial side of the site have been replaced on an equivalent basis for any trees that are to be removed due to site improvements. The initial plan for the commercial side of this parcel was approved prior to the currently approved zoning ordinance and will not meet the appropriate interior landscaping area that is currently required. See Landscape Sheet 6.
Phasing has been removed from the SUP application. All submittal materials have been updated accordingly.

Conformance with ESC requirements will be addressed at SDP.
Conformance with stormwater requirements will be addressed at SDP.
Density has been reduced to 376. This will be addressed at final site plan.
The primary point of ingress/egress to the garage has been relocated to Oak Springs Drive. The single remaining ingress/egress to the garage from the alley will primarily serve "back of house" function and resident loading/unloading.
Primary ingress/egress of garage has been relocated to Oak Springs Drive to reduce vehicular trips in the alley to an acceptable level. It is anticpated that the Oak Springs grarage access and the access across from Hastings Lane would each carry approximately 1,600 and 800 weekday vehicluar trips, respectively. Capactiy analysis shows these two intersections operating at LOS C or better during both peak hours with the proposed development in place.

A new primary access point to the multifamily residential garage has been provided along Oak Springs Drive to alleviate concerns of a single access point from the alley behind the commercial center. This along with an access point to the garage from the alley will provide two ways of entering/exiting the residential garage. Additionally, the new street alignment bisecting the existing commercial center will provide for additional circulation for both retail trucks and residential. The alley as designed will provide functions an alley usually does – access for loading and trash pickup for retail and residential uses, and a secondary access point for retail employee or resident parking.
Comment received. All corners will be analysed and reviewed at SDP.
Vehicle ingress/egress to garage has been split--one on Oaks Springs Drive and one at alley to alleviate this concern.
Capacity analysis of the westbound left onto Broadview shows a minor increase in delay and no change in level of service with the addition of the site traffic. The operation is anticpated to be similar to condtions without the development in place. This intersection was also analyzed with the planned roundabout. With the roundabout in place, the approach is expected to operate at LOS A with and without the site trips.
Primary ingress/egress of garage has been relocated to Oak Springs Drive to reduce vehicular trips in the alley to an acceptable level. Additionally, 24 parking spaces are proposed at the alley to be restricted to commercial employee use only.
Elimination/shortening of speedy travelways, reduced width driveways, new crosswalks including raised crosswalks where necessary and incorporation of parking - parallel, angled and head-in, along travelways, will have the effect of reduced vehicular speed and improved pedestrian safety at crossings within the site.

Comment noted. While a conceptual lighting plan has been included with this submittal (Sheet 17), a final lighting plan detailing all requirements will be provided at the time of Site Plan.

Landscape plan will be coordinated with lighting plan to confirm no interference.

Landscape plan will incorporate low growing plants so as not to obscure sight lines and cover windows.

3-bedroom apartments are important to provide a wide range of housing types and price points to the residents of Warrenton. 3-bedroom units provide the lowest rental rates on a per bedroom basis and are therefore pivotal when seeking to provide lower cost options to the Town's residents. In order to minimize concerns regarding potential fiscal impacts of 3-bedroom units, the Applicant agrees to cap 3-bedroom units in the multifamily building at 10% of the total proposed units. This has been added to SOJ Section - 3-Bedroom Unit Maximum

A full TIA analysis by Gorove Slade has been submitted with this application. No offsite improvements are warranted or recommended with construction of the proposed site.

A crash assessment is included with the full TIA analysis by Gorove Slade.

A trip generation table based on ITE 11th edition is included with the full TIA analysis by Gorove Slade. The proposed site is expected to generate approximately 150 new trips during the AM peak hour, 192 new trips during the PM peak hour, and 2,534 new daily trips on a typical weekday.

A summary of pedestrian routes and existing/propsed pedestrian crossings is included with the full TIA analysis by Gorove Slade. A detailed pedestrian analysis per TE-384.1 will be submitted as a subsequent document.
A full TIA analysis by Gorove Slade has been submitted with this application.

EXPERIENCE WARRENTON VIRGINIA EST. 1810

Planning Commission Work Session
SUP 2022-04 Warrenton Village Center Mixed Use
March 19, 2024

PC Decision Deadline June 27,2024 Unless Applicant Defers

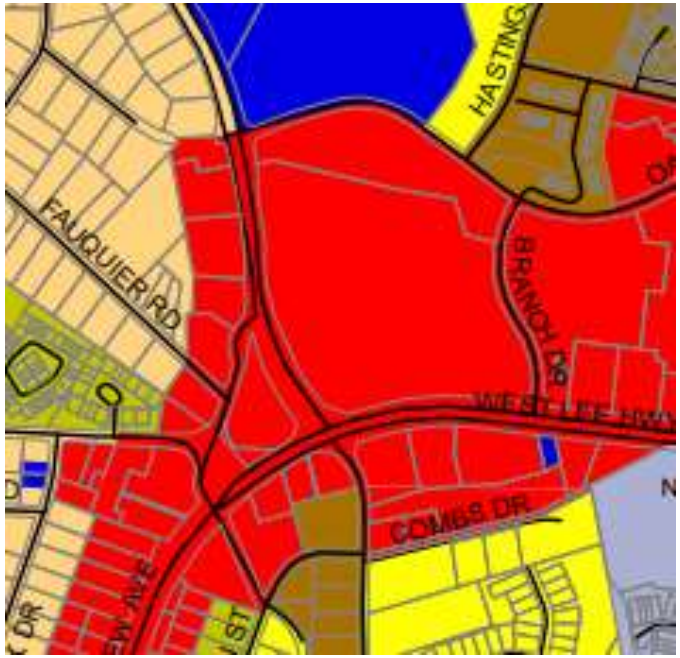
Special Use Permit Application

- **GPINs:** 6984-20-7247-000/6984-29-6753-000
- **Property Owner:** Warrenton Center LLC/Jefferson Associates LP
- **Representative:** Jess Achenbach, Castle Development Partners
- **Zoning: C** (Commercial)
- **Comprehensive Plan:** New Town Character District
- **SUP** to allow for mixed use development on approximately 29.05 Acres
- Maximum 386 Residential Dwellings
  - 320 Rental Apartments 1-3 BD
  - Approximately 36 2 over 2
  - Approximately 30 Townhomes
  - 10% Affordable Dwelling Unit

Location

Adjacent Land Uses

Zoning Map



Existing Commercial

Public/Semi Public School

Senior Care

Apartments

Zoning Districts

- R-15
- R-10
- R-6
- RT
- RMF
- RO
- PSP
- C

Future Land Use Map

Plan Warrenton 2040

- Walkability Audit & Complete Streets
- 10 Guiding Principles
  - Discernible Center
  - Connected Sidewalks, Street Trees, Lighting
  - Buildings close to the street
  - Parking behind buildings
  - Variety of Dwelling Types
  - Park/Trail/Activity Center ½ mile radius
- Broadview = Gateway
- Lee Highway = Boulevard
- Oak Springs Drive/ Branch = Neighborhood

New Town Warrenton District

With large lots, direct access from Route 29, and high visibility, this district could be a location for a signature office/jobs center; with greater intensity of mixed use and strong live, work, and play options. A mix of uses could be organized around an internal street network and public amenities, such as civic spaces, parks, green space, and public gathering areas.

Smart Scale Projects

Proposal

Proposal Includes

- 320 Apartments 1-3 BD, 4 story parking garage
- 36 2 over 2 4 story, 1 car garage
- 30 Townhomes 3 Story, 2 car garage
- 10% Affordable Dwellings
- Central Plaza
- Dog Park
- Pedestrian Connectivity/Crosswalks
- Hastings Lane Extension

Elevations

Elevations

Agency Reviews

- Full site
- Transportation and Internal Circulation
- Parking
- Walkability/Bicycle/Grid Connections
- Landscaping/Signage
- Lighting
- VDOT Pipeline Study/Smart Scale
- Plan Warrenton 2040

Requested Modifications and Waivers

- Increase in maximum density
- Broadview Avenue Setbacks
- Side and Rear Yard Setbacks
- Decrease Buffers between Commercial and Residential Uses
- Building Heights; plus along Oak Springs and Broadview

NEWCASTLE
DEVELOPMENT GROUP

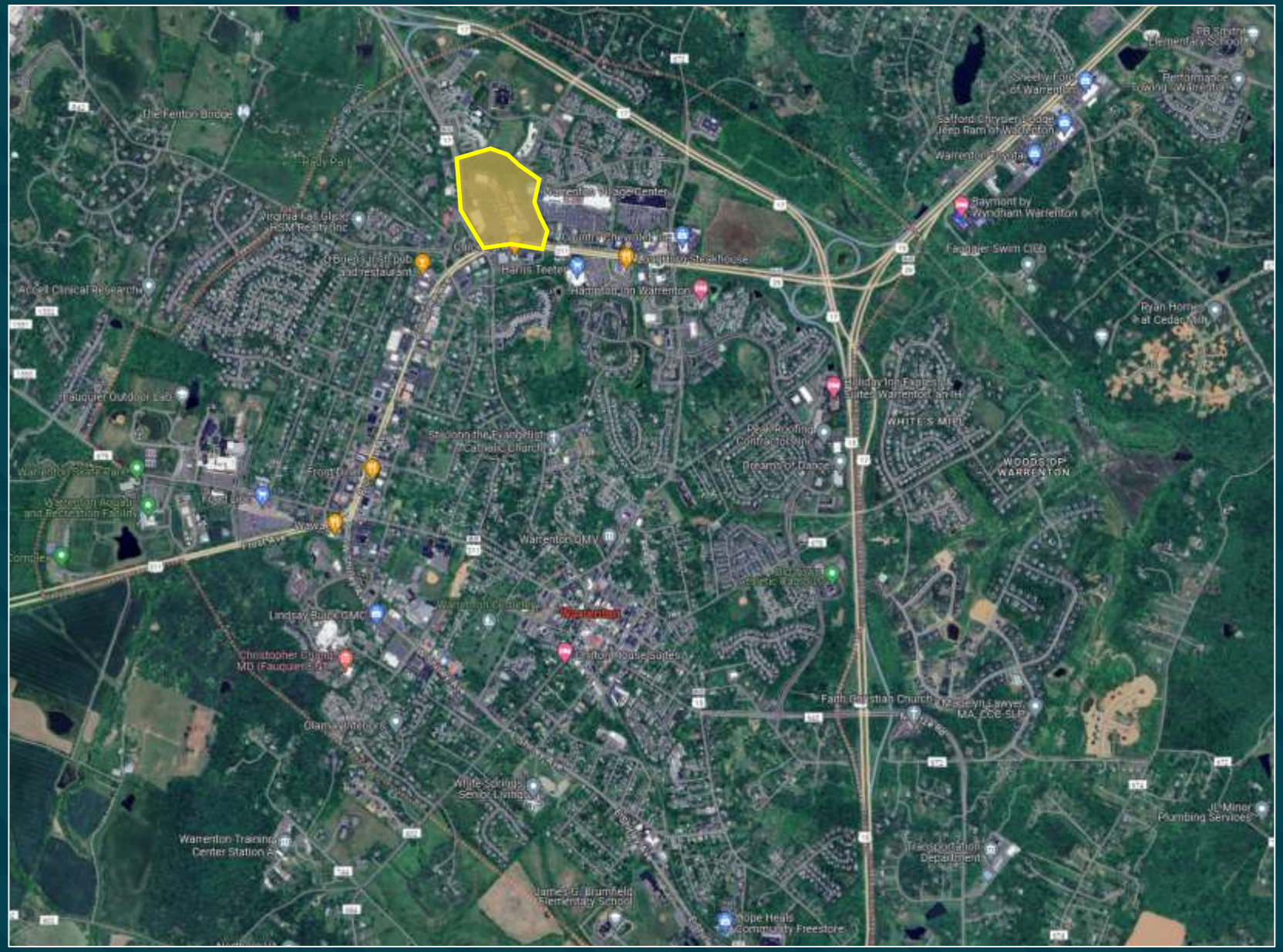
SPECIAL USE PERMIT #SUP 22-5

WARRENTON VILLAGE CENTER

PLANNING COMMISSION WORK SESSION
MARCH 19, 2024

1070

LOCATION



Warrenton Village Center
Built in 1959

West Lee Hwy.
Warrenton, VA 20186

218,000 SF
Existing Commercial Space

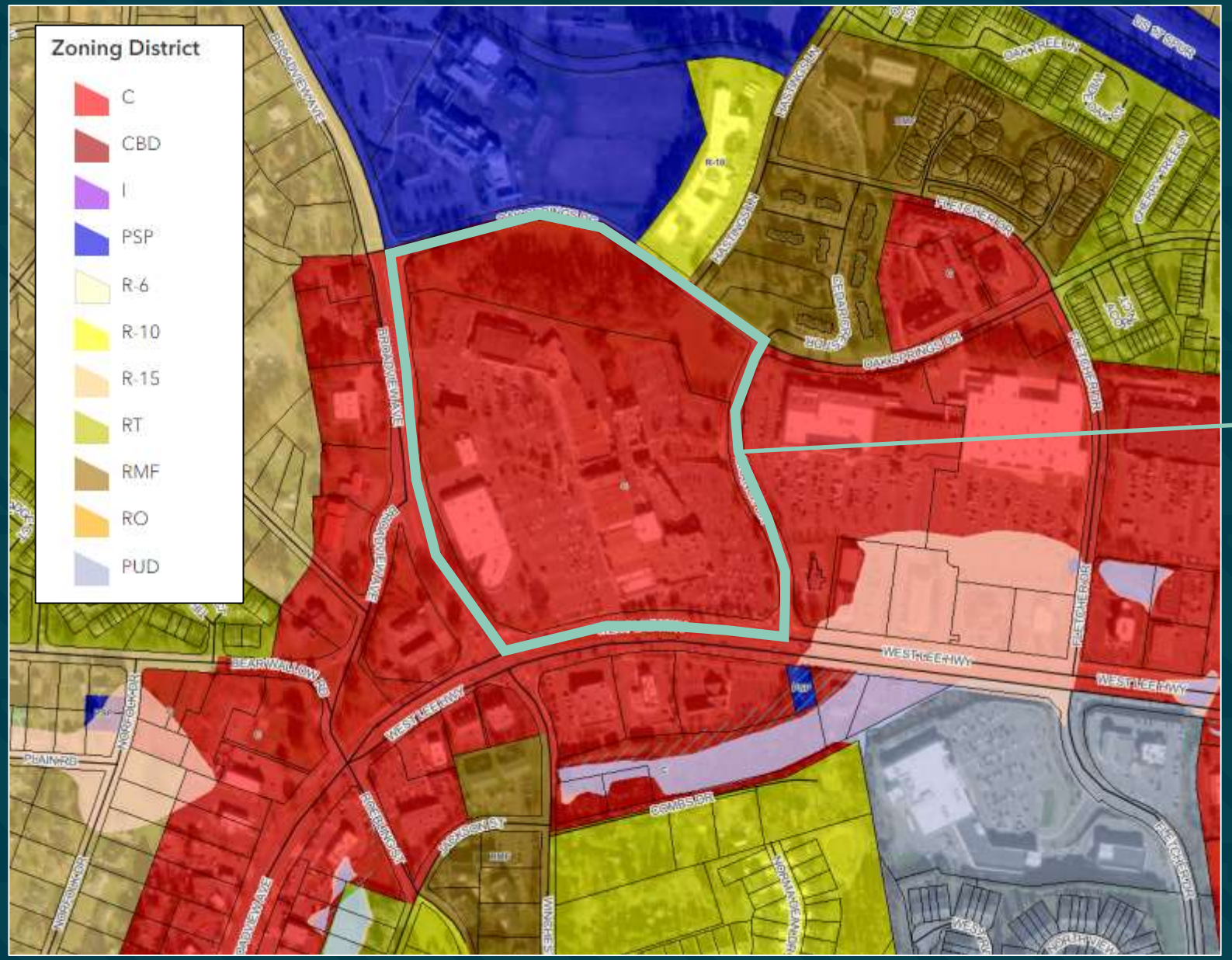
~6.5 acres
Currently Vacant Land

EXISTING CONDITIONS

Proposed Development Area

Existing Commercial Center

ZONING



Commercial (C)

COMPREHENSIVE PLAN

EXPERIENCE WARRENTON VIRGINIA

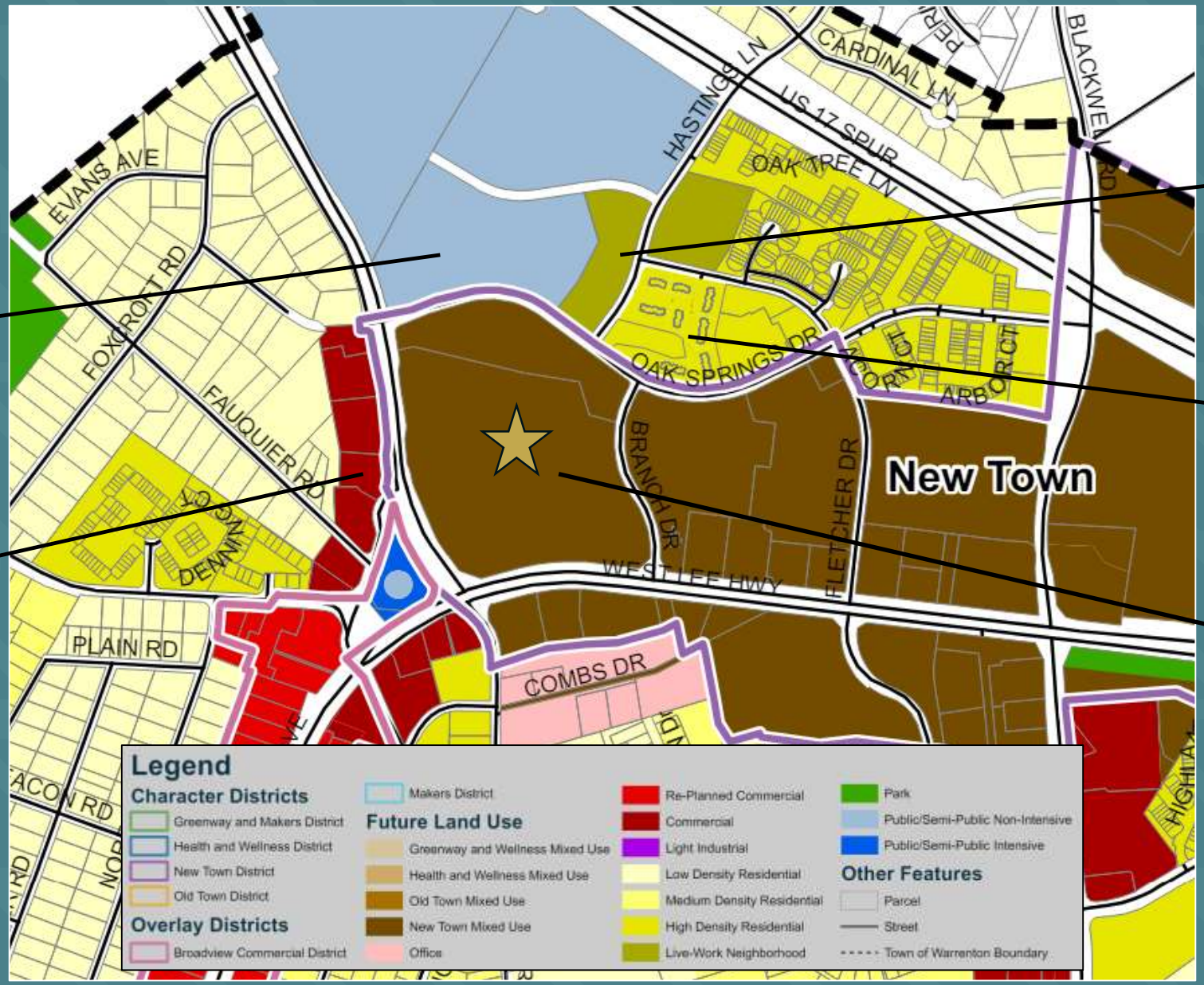
ADOPTED COPY APRIL 13, 2021

PLAN WARRENTON 2040

FUTURE LAND USE MAP

Public/Semi-Public Non-Intensive

Commercial



Live-Work Neighborhood

High Density Residential

New Town Mixed Use

CHARACTER DISTRICTS

New Town Warrenton District

With large lots, direct access from Route 29, and high visibility, this district could be a location for a signature office/jobs center; with greater intensity of mixed use and strong live, work, and play options. A mix of uses could be organized around an internal street network and public amenities, such as civic spaces, parks, green space, and public gathering areas.

THE TEN GUIDING PRINCIPLES FOR CHARACTER DISTRICTS

1. **A discernible center.** Every neighborhood should have a discernible center that is walkable within a quarter-mile radius. The center can accommodate programmed or spontaneous events, or simply be a place people relax or meet friends. The center is often a hardscaped plaza or a green or park space; sometimes it can even be a busy street corner or a main street.
2. **Connected sidewalks with a clear pedestrian path, street trees, and lighting.** Streets within the Character District form a connected network, which disperses traffic by providing a variety of pedestrian and vehicular routes to any destination. There is an interconnected street grid network that disperses traffic and eases walking.
3. **Buildings that are placed close to the street to create a sense of place.** All buildings are directly accessible with front doors from the street.
4. **Parking placed behind buildings and away from street frontages.** Interior access roads to services and parking are designed into the site plan.
5. **Complete streets create a balance between cars, pedestrians, and bicyclists.** Complete Streets have no singular design prescription. Each one is unique and responds to its community context; however, complete streets are designed to balance drivers, pedestrians, and bicyclists.
6. **Compact street blocks encourage walking.** Compact street blocks that are 200 to 400 feet wide and up to 600-feet deep provide a comfortable neighborhood scale that facilitates a fine-grain development pattern and walking experience. For blocks that exceed the maximum recommended length of 600 feet, a mid-block pedestrian path is recommended to allow for passage.
7. **A park, trail, or activity center is within a half mile walking radius.** Linkages to pedestrian amenities can be made with continuous sidewalks, street trees, and through-block pedestrian pathways.
8. **A variety of dwelling types accommodates a wide range of family sizes and income levels and commercial activity.** The variety provides synergy among uses and creates an immediate critical mass to sustain retail and commercial uses.
9. **Neighborhood identity connects district wayfinding and identification with a larger marketing effort to bring private investment to the neighborhood.** Neighborhood identity provides the brand and image of the area, and a basis for a marketing strategy to promote businesses, events, and future development opportunities.
10. **The neighborhood edge provides the means of transition from the Character District to adjoining properties.** The edge would transition to adjacent established neighborhoods and future land-use categories and exhibit compatibility in scale, massing, and setback with existing and planned developed on adjacent land.

COMPREHENSIVE PLAN

WHAT CAN NEW TOWN WARRENTON DISTRICT BE IN THE YEAR 2040?

Internal walkable streets and hardscaped plazas that can accommodate events and pedestrian activity.

Multi-purpose public areas can accommodate annual and regional events.

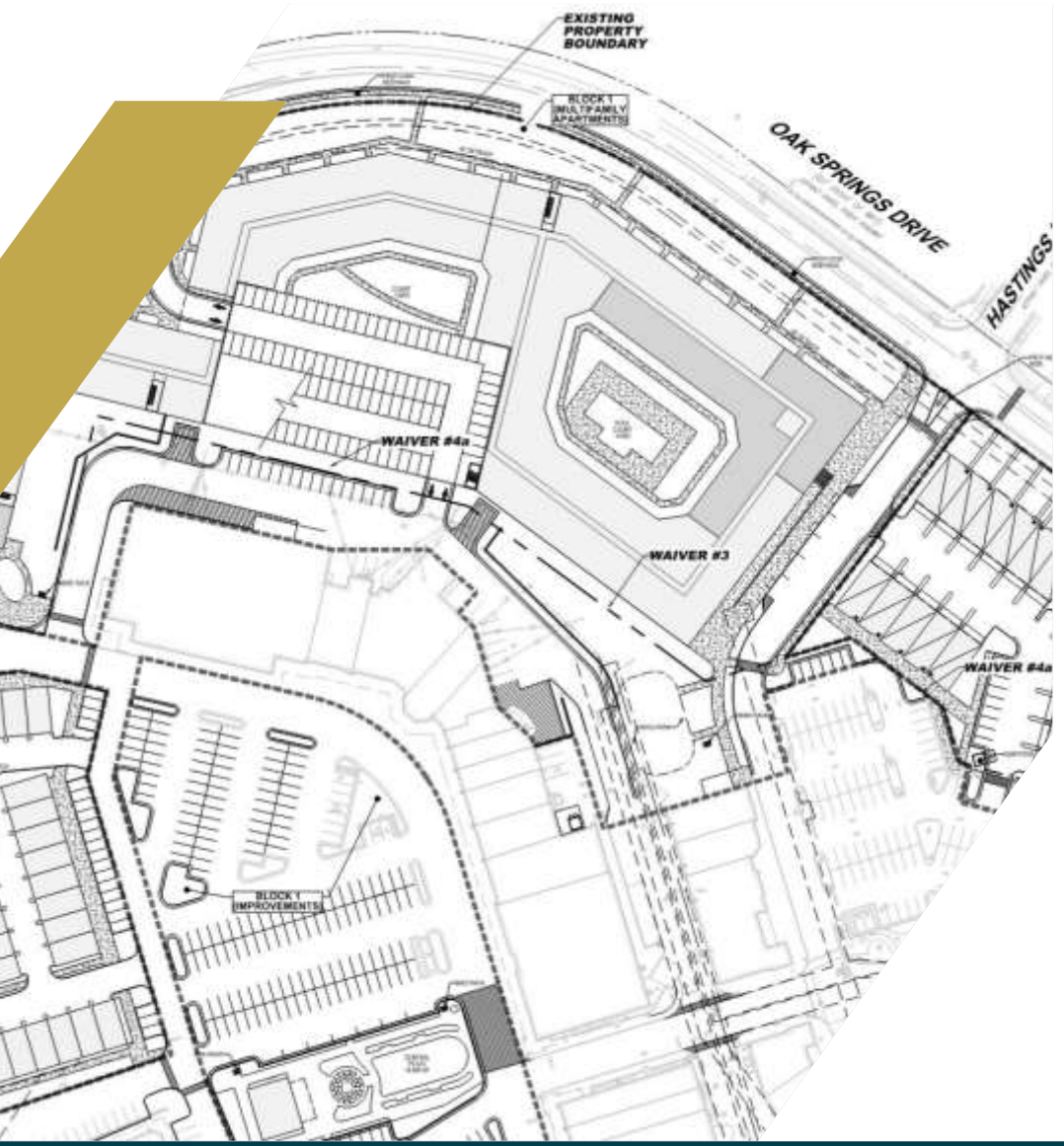
A mix of employment, residential, and commercial uses can be designed around public amenities.

The development along the neighborhood edge is compatible with adjoining neighborhoods.

Daylighting flood plains (as a flood control project) provides an opportunity to create park with pedestrian amenities. Carroll Creek Park. Frederick, MD

Create residential communities with visual sight lines through the development, and where possible, with pedestrian pathways.

SUP MODIFICATION & WAIVERS



- **Waiver Request #1:** Increase density to 386 units or 13.28 per acre
- **Waiver Request #2:** Decrease minimum setback to 14′ along Broadview Avenue
- **Waiver Request #3:** Decrease side/rear yard setbacks to 0′
- **Waiver Request #4a:** Decrease buffer width between commercial and residential uses to 0′
- **Waiver Request #4b:** Decrease rear buffer width for residential uses from public ROW to 14′
- **Waiver Request #5:** Increase height limit for dwellings as follows:
  - 54′ max height for Block 1, Oak Springs Drive Frontage
  - 36′ max height for Block 1, Broadview Drive Frontage
  - 45′ max height for Block 2
  - 36′ max height for Block 3

1078

BENEFITS OF PROPOSAL

PLAN 2040

Advances all goals of Plan 2040 Character Districts

HOUSING SUPPLY

Provides much needed additional housing supply near retail and other services/facilities via infill development and not urban sprawl

HOUSING TYPES

Provides much needed housing types unique to the Town, including "missing middle" townhomes, 2-over-2s and the first new multifamily community in decades

AFFORDABLE HOUSING

10% of units within each residential block will be dedicated as Affordable Dwelling Units, restricted to residents with household incomes below 80% AMI at restricted rental rates

PEDESTRIAN ACCESS

Provides new and improved, safe pedestrian access to and circulation within Warrenton Village Center for new residents and existing neighbors

PUBLIC SPACES

The Central Plaza will be the new centerpiece of the Center, featuring activity and eating areas and a splashpad; a new dog park and picnic area will also be open to for public use

INCREASED PATRONAGE

New resident supply will provide increased patronage to all of Warrenton's existing businesses

ECONOMIC IMPACT

$46,100 projected annual surplus for the Town of Warrenton

RESIDENTIAL BLOCK 1

Multi-Family Apartments

- Location: Vacant land on north side of the Center along Oak Springs Drive
- Units: Up to 320 total units
- Types: 1-, 2-, and 3-bedroom apartment units
- Parking: Internal 4-level parking garage
- Amenities:
  - 10,000 square foot leasing and amenity center
  - Central Plaza
  - East & West “Entrance” Plazas
  - Dog Park & Picnic Area
  - Pedestrian connectivity and circulation

1080

RESIDENTIAL BLOCK 1

West facing elevation from Hastings Lane

East facing elevation from Broadview Ave

RESIDENTIAL BLOCK 1

South facing elevation from Oak Springs Drive (left side)

South facing elevation from Oak Springs Drive (right side)

RESIDENTIAL BLOCK 1

Leasing entrance at intersection of Oaks Springs Drive & Hastings Lane

RESIDENTIAL BLOCK 1

View from intersection of Oaks Springs Drive & Hasting Lane
**Block 1 (Apartment Bldg.) on right; Block 2 (2-Over-2s) on left*

RESIDENTIAL BLOCK 1

View from intersection of Oaks Springs Drive & Broadview Avenue

RESIDENTIAL BLOCK 1

View from Broadview Avenue entrance into Warrenton Village Center

RESIDENTIAL BLOCK 1

View from Hastings Lane out towards Oaks Springs Drive entrance
**Block 1 (Apartment Bldg.) on left; Block 2 (2-Over-2s) on right*

RESIDENTIAL BLOCK 1

View from within Center out towards Broadview Avenue entrance
**Block 1 (Apartment Bldg.) on right; Block 3 (Townhomes) on left*

RESIDENTIAL BLOCK 2

Multi-Family 2-Over-2

- Location: Vacant land at northeast corner of the Center at intersection of Oak Springs Drive and Branch Drive
- Units: Up to 36 total units
- Widths: Units currently proposed with 24' widths, yielding a plan count of 34 units. Proposal is up to 36 total units to account for width flexibility, which could impact total unit count.
- Types: 2-story, 3-bedroom "condo" units
- Parking: Each unit has one internal parking garage and one dedicated exterior surface space

1089

RESIDENTIAL BLOCK 2

Front and side elevations

RESIDENTIAL BLOCK 2

View from Oak Springs Drive

RESIDENTIAL BLOCK 3

Multi-Family Townhomes

- Location: West side of the Center along Broadview Avenue, currently occupied by Summit Community bank and a vacant commercial bank building
- Units: Up to 30 total units
- Widths: Units currently proposed with 20' widths, yielding a plan count of 29 units. Proposal is up to 30 total units to account for width flexibility, which could impact total unit count.
- Types: 3-story, 3-bedroom townhome units
- Parking: Each unit has two internal parking garages and two dedicated exterior surface spaces

RESIDENTIAL BLOCK 3

Front and side elevations

RESIDENTIAL BLOCK 3

View from Broadview Avenue

RESIDENTIAL BLOCK 3

View of townhomes from within the Center

PROJECT IMPROVEMENTS

CENTRAL PLAZA

A new vehicular and pedestrian hub that will function as the heart of the Center and is sized, programmed, and planned to allow for community activities as well as everyday use

EAST & WEST PLAZAS

Smaller public plazas are proposed at the Broadview Avenue entrance and the Hasting Lane entrance to serve as “doorways” into the Center and enhance walkability between uses

DOG PARK / PICNIC AREA

New off-leash, fenced dog park and picnic areas will be accessible to the public.

OAK SPRINGS CROSSWALKS

Two crosswalks are proposed on Oak Springs Drive—one at Hastings Lane and one at the Highland School entrance, which will provide safe access for neighbors to the north

SIDEWALK RING COMPLETION

Proposal will complete a full ring of sidewalk around the entire Center, including the addition of a missing section of sidewalk behind Galaxy Strike Bowling

HASTINGS LANE EXTENSION

New vehicular and pedestrian entrance into the Center is proposed at the Oak Springs Drive and Hastings Lane intersection

MODIFIED ALLEY

Will serve as a secondary vehicular ingress/egress into the garage, as well as provide both residential and commercial loading and trash pickup areas

PEDESTRIAN CIRCULATION

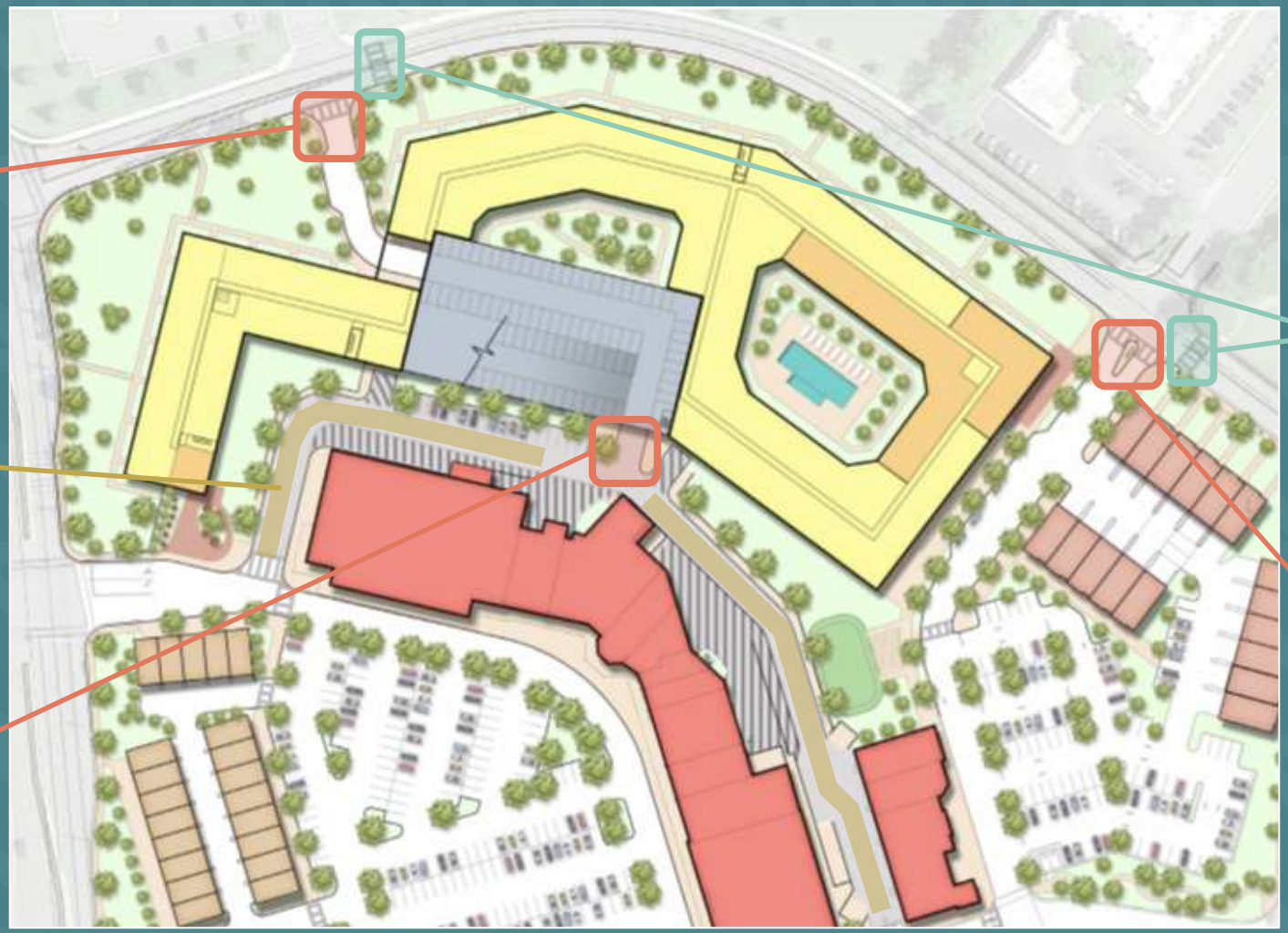
Proposal includes an enhanced system of sidewalks, crosswalks and wayfinding to improve the safety and ease of pedestrian access the Center’s businesses

PROJECT IMPROVEMENTS – TRAFFIC

Oak Springs Entrance

Modified Alley

Secondary Garage Entrance



Oak Springs Crosswalks

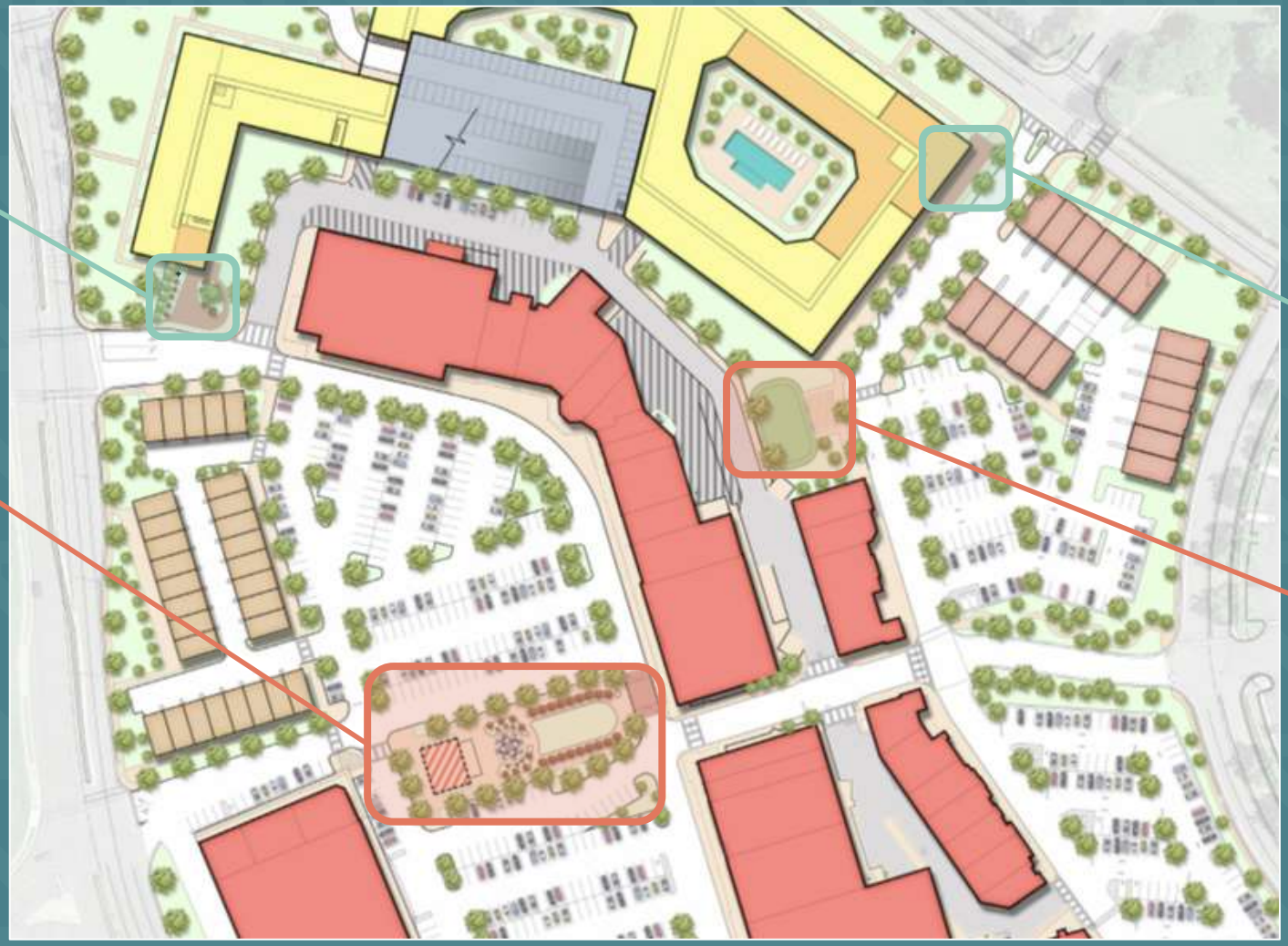
Hastings Lane Entrance

PROJECT IMPROVEMENTS – PUBLIC SPACE

West Plaza

Central Plaza

Pedestrian Circulation



East Plaza

Dog Park & Picnic Area

PROJECT IMPROVEMENTS

Bird's eye view of Central Plaza

PROJECT IMPROVEMENTS

Alternate bird's eye view of Central Plaza (Note Blocks 1 & 2 in background)

PROJECT IMPROVEMENTS

Ground level view of Central Plaza

PROJECT IMPROVEMENTS

Ground level view within Central Plaza (Note Blocks 1 & 3 in background)

PROJECT IMPROVEMENTS

Ground level view of pedestrian access to Central Plaza (Note Block 3 in background)

PROJECT IMPROVEMENTS

Ground level view of Central Plaza

PROJECT IMPROVEMENTS

Ground level view of West Plaza

PROJECT IMPROVEMENTS

Ground level view of East Plaza

Draft 2024 Planning Commission Goals

- Provide the Town Council with recommendations on land use applications, policies, and plans that with result in balanced, equitable, orderly growth.
- Ensure recommendations are well informed and legally defensible.
- Be transparent and open to the public on all matters related to land use.
- Base recommendations on the adopted policy and plans that set forth the vision for the Town.
- Develop a best practice process for the adoption of the Capital Improvement Program.
- Be engaged and informed on the Comprehensive Plan goals in reviewing current land use applications.
- Continue to examine and attend training seminars~~, as permitted under current Health Advisory~~.
- Collaborate with adjacent Planning Commissions~~, as permitted under current Health Advisory~~.
- Perform site visits, as appropriate, for land use applications.
- Be engaged and informed on the activities of the ~~Architectural Review Board~~ Town and community.
- Learn from the success stories of other jurisdictions that are applicable to Warrenton.