

**444 MAPLE  
MULTI-MODAL TRANSPORTATION  
IMPACT ANALYSIS  
TOWN OF VIENNA, VIRGINIA**

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## **EXECUTIVE SUMMARY**

### **PURPOSE OF REPORT & STUDY OBJECTIVES**

This report presents the results of a traffic impact analysis (TIA) prepared as part of a rezoning application for a proposed redevelopment in the Town of Vienna, Virginia. The application would redevelop the subject site with a mixed-use building comprising of approximately 160 multifamily dwelling units and 20,000 GSF of retail uses. The purpose of this study is to assess the potential effects of the proposed redevelopment on the surrounding and adjacent transportation network and, where necessary, to identify potential mitigation measures to off-set any possible impacts.

The application was originally proposed as a mixed used development of 152 multi-family units, 51,190 GSF of grocery use and 5,482 GSF of retail uses. This development program was used to scope the TIA with the Town. According to VDOT Chapter 870 regulations a TIA is required for rezoning (or equivalent) projects that “will substantially affect transportation on state highways” by generating more than 5,000 new vehicle trips per day (vpd). In consultation with the Town it was determined that the proposed redevelopment would generate slightly fewer than 5,000 vpd. It was determined that although the application did not technically meet the Chapter 870 trip threshold the trips were substantial enough to include VDOT in the scoping of the TIA.

With the original development program the subject application does not require a VDOT Chapter 870 TIA to be submitted, the TIA presented herein was commissioned by the Applicant to address any traffic related questions which may arise from Town staff, VDOT, and /or the neighboring community during the course of normal review of the rezoning application. Since that time the development program has been reduced but the original scope of work agreed upon was used to prepare the TIA.

### **SITE LOCATION AND STUDY AREA**

The approximate 2.76-acre site is located in the southeast quadrant of the Nutley Street (Route 243) and Maple Avenue (Route 123) intersection in the Town of Vienna, Virginia. The application area is further identified as Fairfax County 2016 Tax Map 38-3 ((2)) 139, 140 & 141. Due to the site’s location, future development of the property is recommended in accordance with the Maple Avenue Commercial (“MAC”) Zone as outlined in the Town’s Zoning Ordinance. The “MAC” Zone envisions compact mixed use, and pedestrian oriented development.

To inform the scope of this TIA, a study area was agreed to with the Town of Vienna/VDOT staff at a scoping meeting held at VDOT on April 19, 2016. The study area is generally bounded by Windover Avenue to the north, Roland Street to the south, James Madison Drive to the west, and Courthouse Road (Route 6648)/Lawyers Road (Route 6648) to the east. Per the approved scoping form, the study area includes eight (8) existing study intersections/driveways. Of the eight (8) existing study intersections, one (1) is an existing site driveway that will be removed as a result of this application. The scoping agreement, as signed by the Town/VDOT, is included herein as Appendix A.

### **DESCRIPTION OF PROPOSED DEVELOPMENT**

The site is currently developed with a 119-room hotel and a 3,500 gross square foot (GSF) sit down

restaurant. Vienna Development Associates LLC (the “Applicant”) proposes to rezone the site from C-1 (Local Commercial) to the Maple Avenue Commercial (“MAC”) district and redevelop with a mixed-use building comprised of up to 160 multifamily dwelling units and 20,000 GSF of additional retail uses.

Access to the site is currently provided via a right-in/right-out on Nutley Street, a right-in/right-out on Maple Avenue and a full-movement driveway at an existing, unsignalized median break on Maple Avenue. The right-in/right-out along Maple Avenue would be removed with this application. A full sized plan sheet is provided as Appendix B.

## CONCLUSIONS

Based on this assessment, the traffic generated by the proposed mixed-use development will not adversely impact nearby intersections based on the following:

1. The proposed application seeks to rezone and redevelop approximately 2.76 acres with approximately 160 multifamily dwelling units and 20,000 GSF of additional retail uses.
2. Under existing 2016 conditions, the signalized Nutley Street/Maple Avenue intersection currently operates at an overall level of service (LOS) “E” or better during the weekday AM, PM and Saturday peak hours. All the STOP controlled intersections and driveways that serve the site have traffic movements that operate at LOS “C” or better in the AM, PM and Saturday peak hours.
3. Roadway intersections within the study area would experience increases in traffic as a result of background regional growth and future pipeline developments (including the potential redevelopment of the Marco Polo site).
4. Under 2022 background conditions (build out of the future conditions without the proposed mixed-use development), the signalized Nutley Street/Maple Avenue study intersection would show delays at overall LOS “E” or better during the weekday AM and PM peak hours. LOS would degrade to “F” in the Saturday peak hour. All the STOP controlled intersections and driveways that serve the site have traffic movements that continue to operate at LOS “C” or better in the AM, PM and Saturday peak hours consistent with existing conditions.
5. According to ITE, the proposed mixed-use development is anticipated to generate approximately 125 weekday AM peak hour net new external trips, 133 weekday PM peak hour net new external trips, 261 Saturday peak hour net new external trips, and 1,449 daily (24-hour) net new external trips. These site trips include an internal allowance reduction between the residential and retail components, a minor reduction to account for the commercial and residential uses peaking at different times on Saturday, as well as a pass-by reduction for the retail portion.
6. Under 2022 total future conditions (build out of the future conditions with the proposed mixed-use development), the signalized Nutley Street/Maple Avenue study intersection would show levels of service at overall LOS during the weekday AM, weekday PM, and Saturday peak hours consistent with background future levels of service. All the STOP controlled intersections and driveways that serve the site have traffic movements that continue to operate at LOS “E” or better in the AM, PM and Saturday peak hours generally consistent with background conditions with the exception of the northbound left exit

movement out of the site on to Maple Avenue.

7. Under 2028 total future conditions all through movements along Nutley Street and Maple Avenue would experience increased delay due to increased regional traffic growth.
8. The existing, background and future analysis scenarios indicate that the weekday AM, PM and Saturday peak hour vehicle queues would not be accommodated within existing turn lane bays.

## RECOMMENDATIONS

In order to mitigate the traffic generated by the proposed mixed-use development, the following are recommended:

1. The site should be developed with the proposed access as currently illustrated on the Conceptual Development Plan (CDP) layout that removes the existing right-in/right-out site driveway on Maple Avenue to the subject property to reduce the number of existing curb cuts along Maple Avenue and improve access management.
2. The applicant should promote the pedestrian oriented and mixed-use characteristic of the development by establishing a quality streetscape with pedestrian amenities. Guidance will be provided by the recently approved pedestrian master plan and Maple Avenue Corridor (MAC) Zone guidelines. These include; wide sidewalks meeting or exceeding the MAC's recommended width, improved bus stops located along the frontage, and enhancing the walking experience through design elements (e.g. landscaping, street furniture, public art and/or wayfinding).
3. The applicant should implement certain elements of a transportation demand management (TDM) program in order to further reduce the forecasted peak hour trips for this project, encourage transit related, non-auto modes of travel, and take advantage of the site's proximity to Metrorail.
4. The applicant should coordinate the design of the site with Town staff so as to not preclude any Maple Avenue/Nutley Street signal improvements and/or possible future intersection modifications that may be completed by others.
5. The Town of Vienna promotes and encourages bicycling as an environmentally and healthy way to get around town and was recently designated as a Bicycle Friendly Community by the League of American Bicyclists. The applicant should incorporate and promote bicycling into the site design. These efforts should include providing both short term and long-term bicycle parking for the residents, employees, shoppers, and visitors to the site as well as improved non-motorized connectivity between the site and adjacent neighborhoods. Additionally, should Capital Bikeshare be expanded to the Town of Vienna, an area should be reserved for a future bikeshare station. In addition to widened sidewalks along the site's frontage, the applicant should consider a neighborhood bicycle/pedestrian connection to Millwood Court SW. This will provide access to Courthouse Road via Glen Avenue SW, a town identified bike route.

## Section 1 INTRODUCTION

### PURPOSE

In 2006, the Virginia General Assembly approved legislation (Senate Bill 699, Chapter 527 of the 2006 Acts of Assembly) to enhance the coordination of land use and transportation planning in the Commonwealth. All development proposals which meet certain specific trip generation thresholds are subject to the regulations as outlined in VDOT's *Traffic Impact Analysis Regulations Administrative Guidelines* dated November 2014 (the "Administrative Guidelines"). An amendment to the legislation took effect in January 2012. Based on the legislative updates (now referred to as Chapter 870), a development proposal is generally considered to substantially impact the transportation network if it generates more than 5,000 daily vehicle trips. Based on a review of the Applicant's proposed development plan, a Chapter 870 compliant TIA is **not** required. Although the trip threshold was not met the trips were sufficiently close to the threshold that VDOT was consulted along with Town staff in the scope and review of the traffic study.

Therefore, the purpose of this report is to assess any traffic related questions which may arise from Town staff, VDOT, and /or the neighboring community during the normal course of a review of a rezoning application. To that end, representatives of the development team met with VDOT and the Town of Vienna to identify the study scope and agree on specific study parameters. A copy of the executed scoping agreement is included in Appendix A.

### STUDY OBJECTIVES

The objectives of this assessment were to:

1. Evaluate baseline weekday AM, PM and Saturday peak hour traffic conditions (year 2016).
2. Provide an analysis of weekday AM, PM and Saturday peak hour traffic conditions without the build out of the mixed-use development and including background pipeline developments (year 2022).
3. Provide an analysis of weekday AM, PM and Saturday peak hour traffic conditions with build out of the proposed new mixed-use development (year 2022).
4. Identify development-related traffic impacts associated with the proposed new development, if any.
5. Provide an analysis of weekday AM, PM and Saturday peak hour traffic conditions six (6) years out from build out of the proposed new mixed-use development (year 2028).

Utilizing a five-step process consisting of removing trips associated with the existing uses, adding regional traffic growth, estimating the trip generation associated with approved and proposed developments, trip distribution, and traffic assignment; future conditions were forecasted and intersections were evaluated in terms of levels of service and queuing. Appropriate mitigation measures were then identified and evaluated to remediate impacted levels of service, where applicable.

This study was conducted in general accordance with the 24 VAC 30-155-60 regulations. Sources of data for this analysis included traffic counts conducted by Wells + Associates, VDOT, the Institute of Transportation Engineers (ITE), the Town of Vienna Vienna, Development Associates LLC, Walsh Colucci Lubeley & Walsh PC, Walter Phillips, the Highway Capacity Manual 2000 (as reported by Synchro version 9.1), and the files and libraries of Wells + Associates.

Tasks undertaken in this study included the following:

1. Reviewed the Applicant's proposed plans and other background data.
2. Conducted a field reconnaissance of existing roadway and intersection geometries, traffic controls, and speed limits.
3. Participated in a Scope of Work meeting with VDOT, Town of Vienna staff, and the project team to establish the study scope and specific analysis parameters.
4. Conducted traffic counts at the study intersections during the weekday AM, PM and Saturday peak periods where current counts were not already available.
5. Analyzed existing 2016 levels of service and vehicle queues at each of the key study intersections during the weekday AM, PM and Saturday peak hours.
6. Estimated the number of weekday peak hour trips that would be generated by nearby, but unbuilt developments (i.e. pipeline projects). Trip estimates are based on standard Institute of Transportation Engineers (ITE) 9<sup>th</sup> edition, Trip Generation Manual rates and/or equations.
7. For year 2022, forecasted background future traffic volumes (without the proposed development) based on baseline traffic counts, regional traffic growth, and pipeline development trip assignments.
8. Calculated weekday AM, PM and Saturday peak hour background (without the proposed residential development) levels of service and vehicle queues at each of the key study intersections for year 2022 based on background traffic forecasts and the improved signal cycle length and coordination plans as provided by the Town.
9. Estimated the number of weekday AM, PM and Saturday peak hour trips that would be generated by build-out of the proposed development based on standard ITE 9<sup>th</sup> edition, Trip Generation Manual rates and/or equations.
10. Removed the existing driveway trips from the site driveways based on actual traffic counts.
11. Prepared weekday AM, PM and Saturday peak hour total future traffic forecasts based on background traffic forecasts, the removed existing site trips, and with the proposed mixed-use development site traffic assignments with applicable internal capture and pass-by reductions for the assumed build out year of 2022.
12. Calculated weekday AM, PM and Saturday peak hour total future levels of service and vehicle queues for each of the key study intersections based on projected total future traffic forecasts, existing/future traffic controls, and intersection geometries for 2022.

13. Identified network improvements and/or transportation enhancements required to accommodate future traffic volumes with the proposed new uses.
14. Prepared weekday AM, PM and Saturday peak hour total future traffic forecasts based on the build out year of 2022 forecasts and an additional six (6) years of regional growth for a design year of 2028.
15. Calculated weekday AM, PM and Saturday peak hour total future levels of service and vehicle queues for each of the key study intersections based on projected total future traffic forecasts, existing/future traffic controls, and intersection geometries for 2028.

## STUDY METHODOLOGY

Synchro software (version 9.1) was used to evaluate levels of service at the study intersections during the weekday AM, PM and Saturday peak hours. Synchro is a macroscopic model used for optimizing traffic signal timing and performing capacity analyses. The software can model existing traffic signal timings or optimize splits, offsets, and cycle lengths for individual intersections, an arterial, or a complete network. Synchro allows the user to evaluate the effects of changing intersection geometrics, traffic demands, traffic control, and/or traffic signal settings as well as optimize traffic signal timings.

The levels of service reported for the signalized intersections analyzed herein were taken from the Highway Capacity Manual 2000 (HCM) reports generated by Synchro version 9.1. Level of service descriptions are included in Appendix C. The base Synchro files were obtained from the Town of Vienna. It should be noted that some minor adjustments were made to future conditions Synchro files to address errors and calibrations issues that will be specifically detailed later in the report.

## STUDY AREA

This study was conducted in accordance with the parameters set forth in the executed April 2016 scoping document included in Appendix A that was agreed to by the Town of Vienna and VDOT and the Applicant's representatives. The study area was selected based on those intersections potentially affected by the proposed mixed-use development. The study area/site location is shown on Figure 1-1.

For purposes of this analysis, the following intersections/locations are included in the study area:

1. Nutley Street/Maple Avenue
2. Maple Avenue/Courthouse Road/Lawyers Road
3. Nutley Street/Roland Street
4. Maple Avenue/Right-in/right-out (RIRO) Driveway **[driveway removed with proposal]**
5. Maple Avenue/Full Movement Entrance
6. Nutley Street/Right-in/right-out (RIRO)
7. Nutley Street/Windover Avenue
8. Maple Avenue/ James Madison Drive

Figure 1-2 depicts the location of the study intersections.



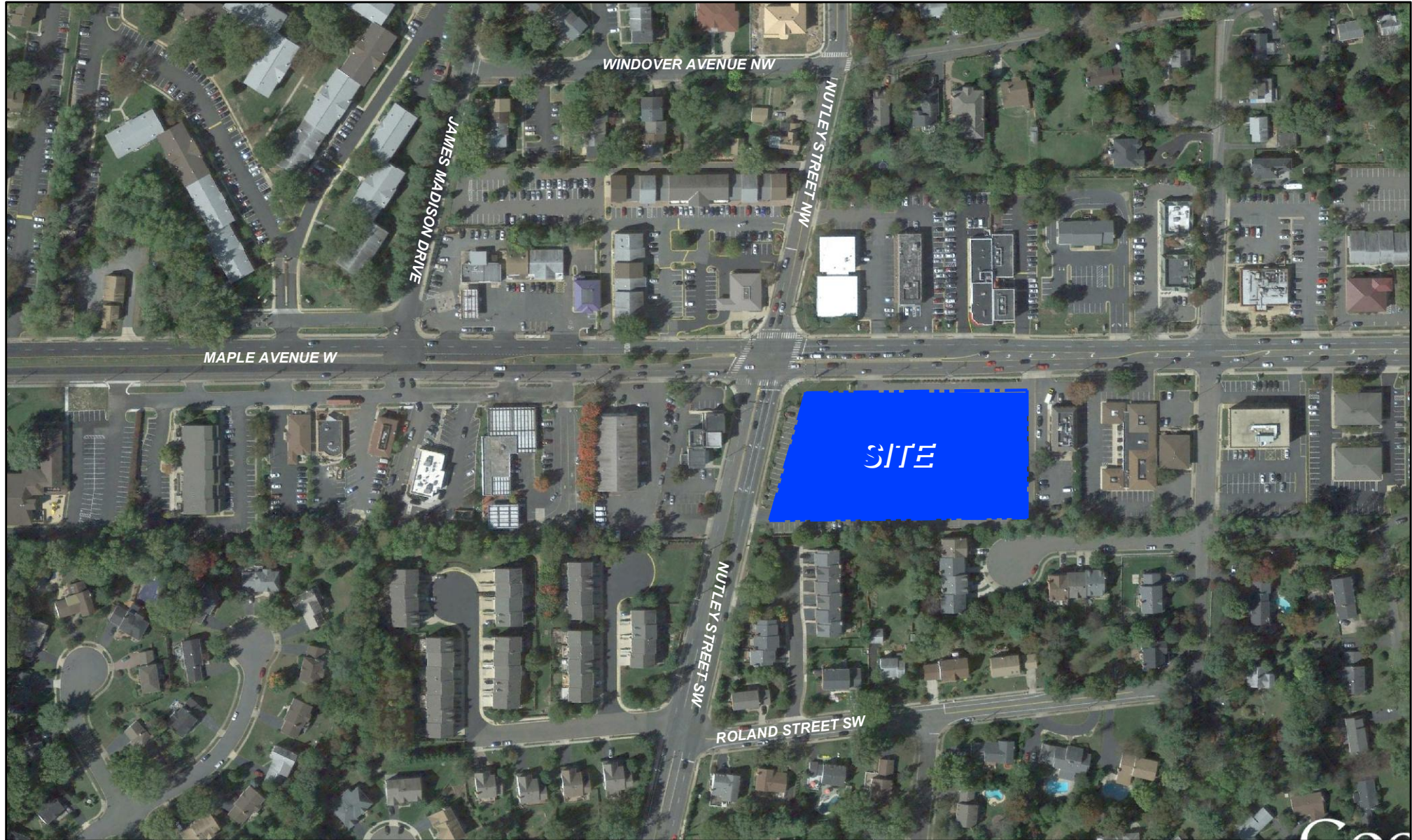


Figure 1-1  
Site Area/Site Location Map

444 Maple  
Town of Vienna





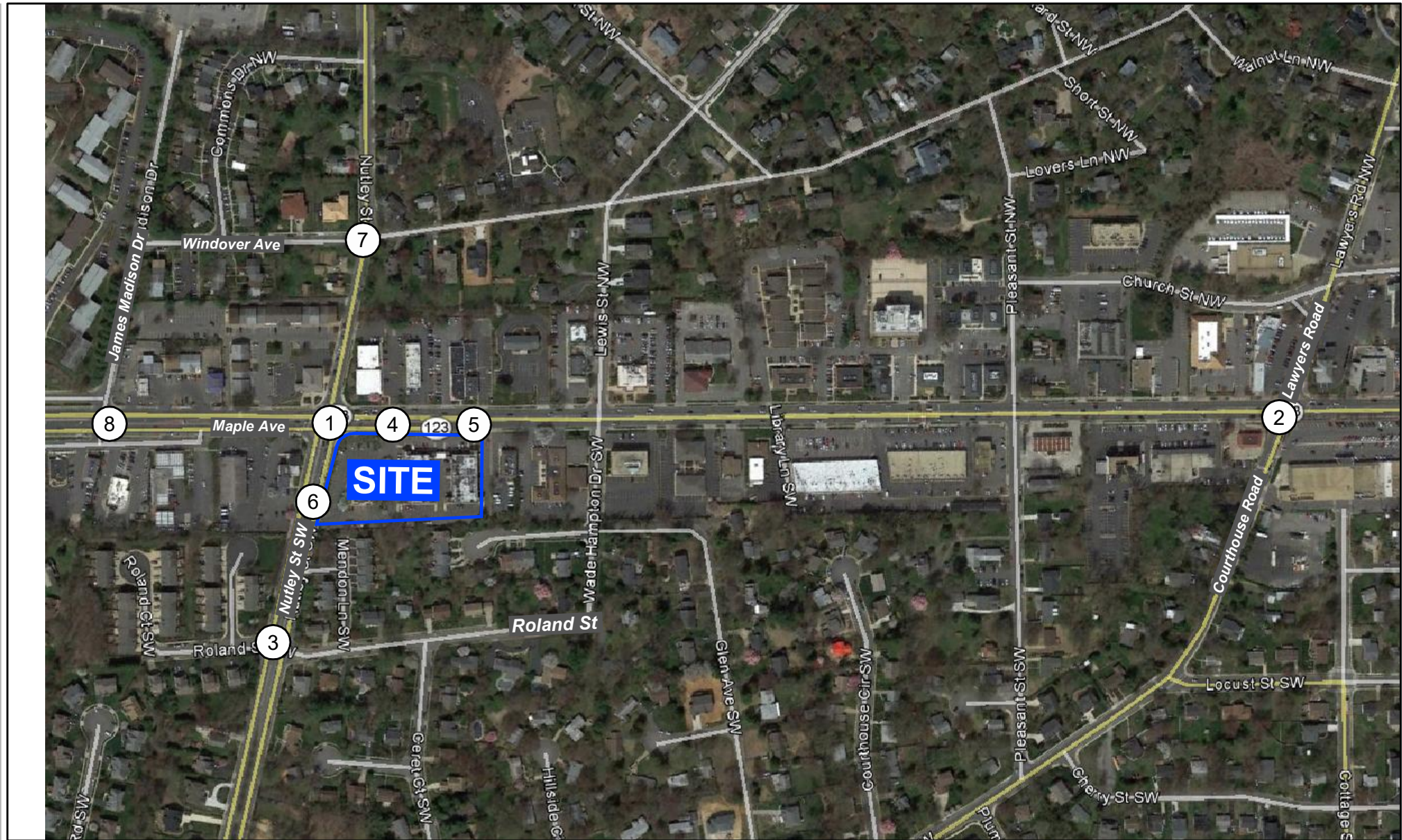


Figure 1-2  
Study Intersections

444 Maple  
Town of Vienna, Virginia



## Section 2 BACKGROUND INFORMATION

### SITE LOCATION/DESCRIPTION

**Overview.** The approximate 2.76-acre site is located in the southeast quadrant of the Nutley Street (Route 243) and Maple Avenue (Route 123) in the Town of Vienna, Virginia as shown on Figure 1-1. The application area is further identified as Fairfax County 2016 Tax Map 38-3 ((2)) 139, 140 & 141.

**Project Description.** The Applicant is proposing to develop the site with a mixed-use building comprised of approximately 160 multifamily dwelling units and 20,000 GSF of additional retail use. The site is currently developed with a 119 room hotel, the Vienna Wolf Trap Hotel, and a 3,500 gross square foot (GSF) sit down restaurant, Tequila Grande. All the existing buildings would be razed.

**Site Access.** Vehicular access to the subject property is currently provided via a right-in/right-out entrance along Nutley Street, a right-in/right-out on Maple Avenue as well as a full-movement entrance on Maple Avenue. The right-in/right-out along Maple Avenue would be removed with this application. A reduction of the proposed Conceptual Development Plan (CDP)/Final Development Plan (FDP) layout is provided on Figure 2-1. A full-size copy of the CDP/FDP layout is included as Appendix B.

**Terrain.** The terrain proximate to and surrounding the site is generally classified as “level”.

**Existing Zoning.** The site is currently zoned C-1 (Local Commercial), Figure 2-2 depicts the existing zoning associated with the subject site, as well as neighboring properties, all as reflected on Fairfax County’s 2016 zoning map.

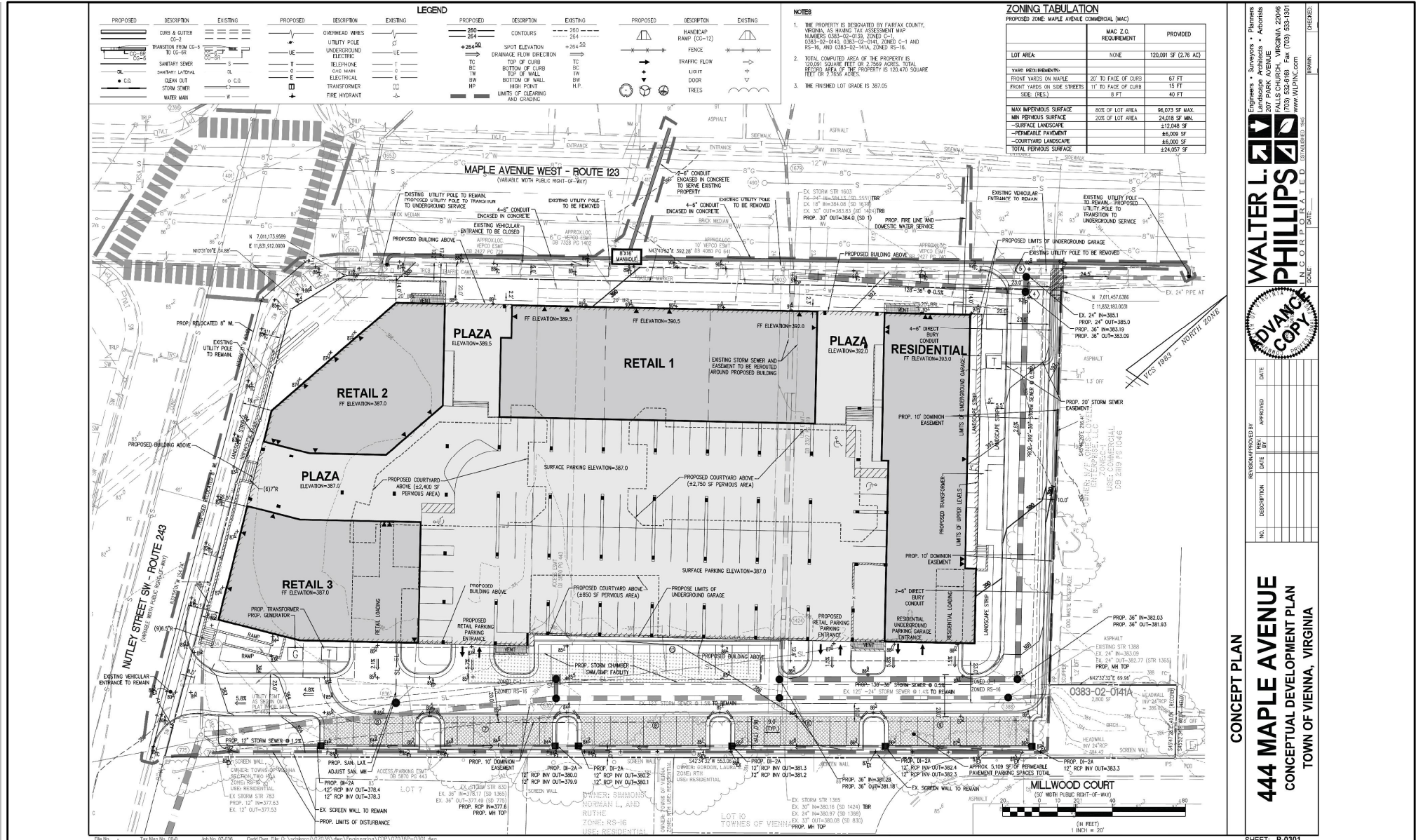
**Surrounding Land Uses and Zoning.** As shown on Figure 2-2, the properties immediately adjacent to the subject site are zoned as follows:

- C-1 (Local Commercial) across Nutley Street to the west, across Maple Avenue to the north, and immediately adjacent to the east
- RTH (Town House) immediately adjacent to the south

### COMPREHENSIVE PLAN

Due to the site’s location, future development of the property is recommended in accordance with the Maple Avenue Commercial (“MAC”) Zone as outlined in the Town’s Zoning Ordinance. The “MAC” Zone envisions compact, mixed-use and pedestrian oriented development.





444 Maple  
Town of Vienna



Figure 2-2  
Existing Zoning Map



## ROADWAY NETWORK

### Existing Roadway Network.

Maple Avenue (VA Route 123) is a four-lane, divided, Urban Principal Arterial with a posted speed limit of 30 mph adjacent to the site. Maple Avenue in the area of the site carries 26,000 average daily trips. A traffic signal and turn lanes exist at the Nutley Street (VA 243) intersection. A center two way turn lane (TWTL) begins along Maple Avenue toward the eastern end of the site to facilitate left turns.

Nutley Street (VA Route 243) is a four-lane, divided, Urban Minor Arterial with a posted speed limit of 30 mph east of the Maple Avenue intersection and an Urban Collector with a speed limit of 30 mph to the west of the Maple Avenue intersection. Nutley Street in the area of the site carries 18,000 average daily trips.

James Madison Drive is a two-lane, undivided, Local Street with a posted speed limit of 25.

Windover Avenue is a two-lane, undivided, Collector with a speed limit of 25 mph between James Madison Drive and Commons Drive NW and Major Collector with a speed limit of 25 mph between Commons Drive NW and Nutley Street NW. Existing lane use and traffic control at key intersections in the site vicinity are shown on Figure 2-3.

## TRANSIT FACILITIES

Existing Transit Services. The site is located approximately 1.2 miles from the Vienna/Fairfax-GMU Metrorail station (Orange Line). The immediate area is served by Fairfax Connector bus routes. Connector bus stops are currently located on Maple Avenue and Nutley Street along the perimeter of the property. They are placed on either side of these roadways. Figure 2-4 locates existing bus stops/shelters adjacent and proximate to the property. A description of the bus service lines serving the site and the surrounding area is provided below:

Fairfax Connector 466 (Vienna - Oakton). Fairfax Connector 466 provides weekday rush hour service circulating between Vienna Metro Station, Chain Bridge Road/James Madison Drive, White Granite Drive/Flagpole Lane, and Bushman Drive/Oakwood Chase Court. Headways are typically 30 to 40 minutes. Additional route information is provided in Appendix D.

Fairfax Connector 461 (Flint Hill – Tapawingo - Vienna). Fairfax Connector 461 provides weekday rush hour service circulating between Vienna Metro Station, Chain Bridge Road/James Madison Drive, Lawyers Road/Lewis Street, and Park Street/Moore Avenue. Headways are typically 20 to 30 minutes. Additional route information is provided in Appendix D.

Fairfax Connector 463 (Maple Avenue - Vienna). Fairfax Connector 463 provides weekday, Saturday and Sunday service between Vienna Metro Station (north side) and Tysons Corner Metro Station (south side). Major stops include Maple Avenue/Courthouse Road, Maple Avenue/Beulah Road, and Chain Bridge Road/Horse Shoe Drive. Headways are typically 20 to 30 minutes. Additional route information is provided in Appendix D.

A review of the bus timetables, as provided in Appendix D, shows that bus users from the site during the peak periods that were analyzed, would have to wait for a bus on the range of 1 minute

to 18 minutes during the AM and PM peak hours and an hour on the weekends. According to the timetables, bus trips from the vicinity of the site take approximately 8 minutes to arrive at the Vienna Metrorail Station.

## **PEDESTRIAN/BICYCLE FACILITIES**

**Existing Facilities.** The subject site is located in an area with connected sidewalks along both sides on Maple Avenue. At the signalized intersection of Maple Avenue/Nutley Street crosswalks with pedestrian countdown signal heads are provided on all legs of the intersection. In the vicinity of the site BikeFairfax identifies Courthouse Road as the preferred bicycle route. Courthouse Road generally parallels Maple Avenue south of Nutley Street and then bends to intersect with Maple Avenue approximately a one-half mile north of Nutley Street.

The existing pedestrian and bicycle facilities within the study area are depicted on Figures 2-5 and 2-6, respectively.



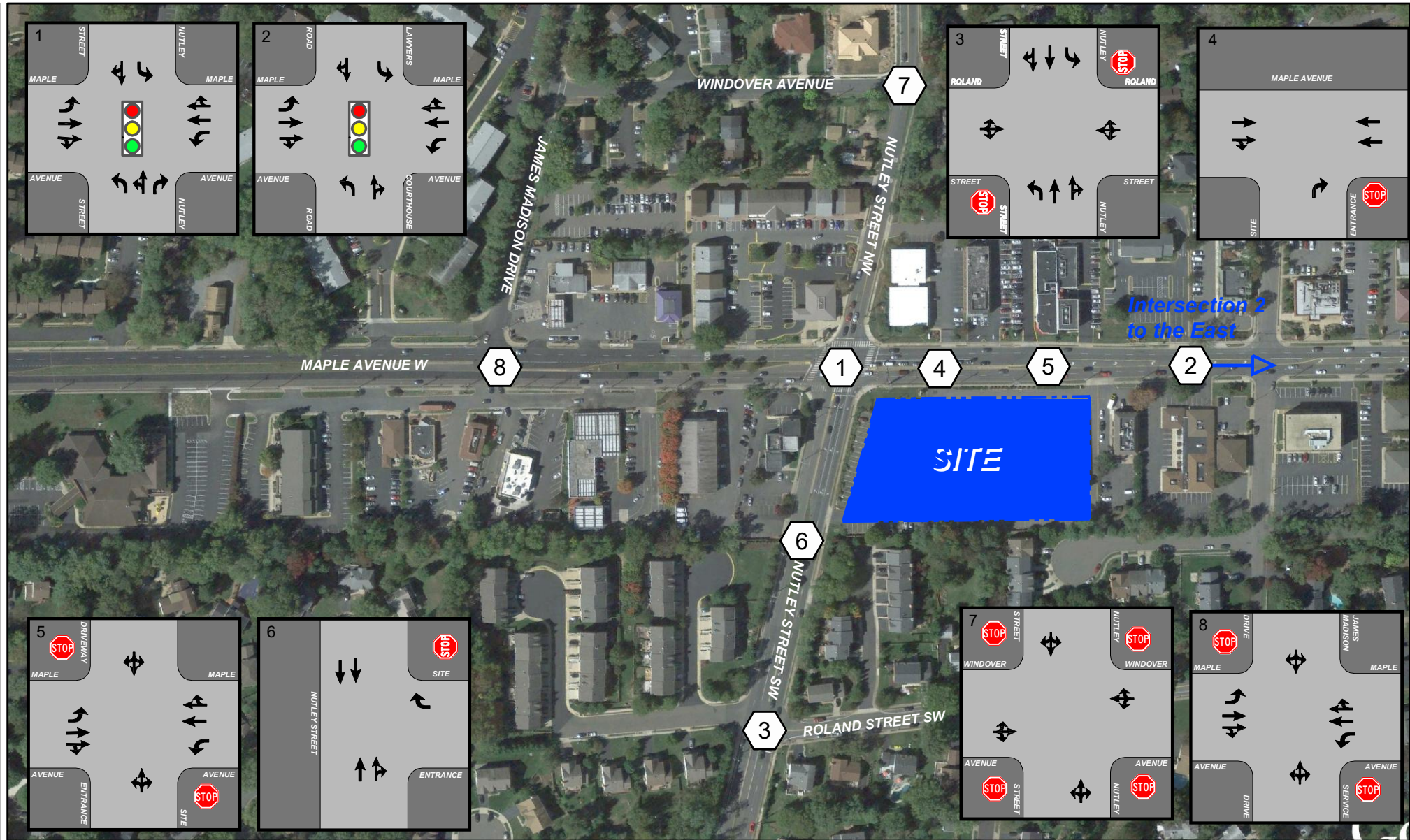


Figure 2-3  
Existing Lane Use and Traffic Control

444 Maple  
Town of Vienna

- ← Represents One Travel Lane
- Signalized Intersection
- Stop Sign





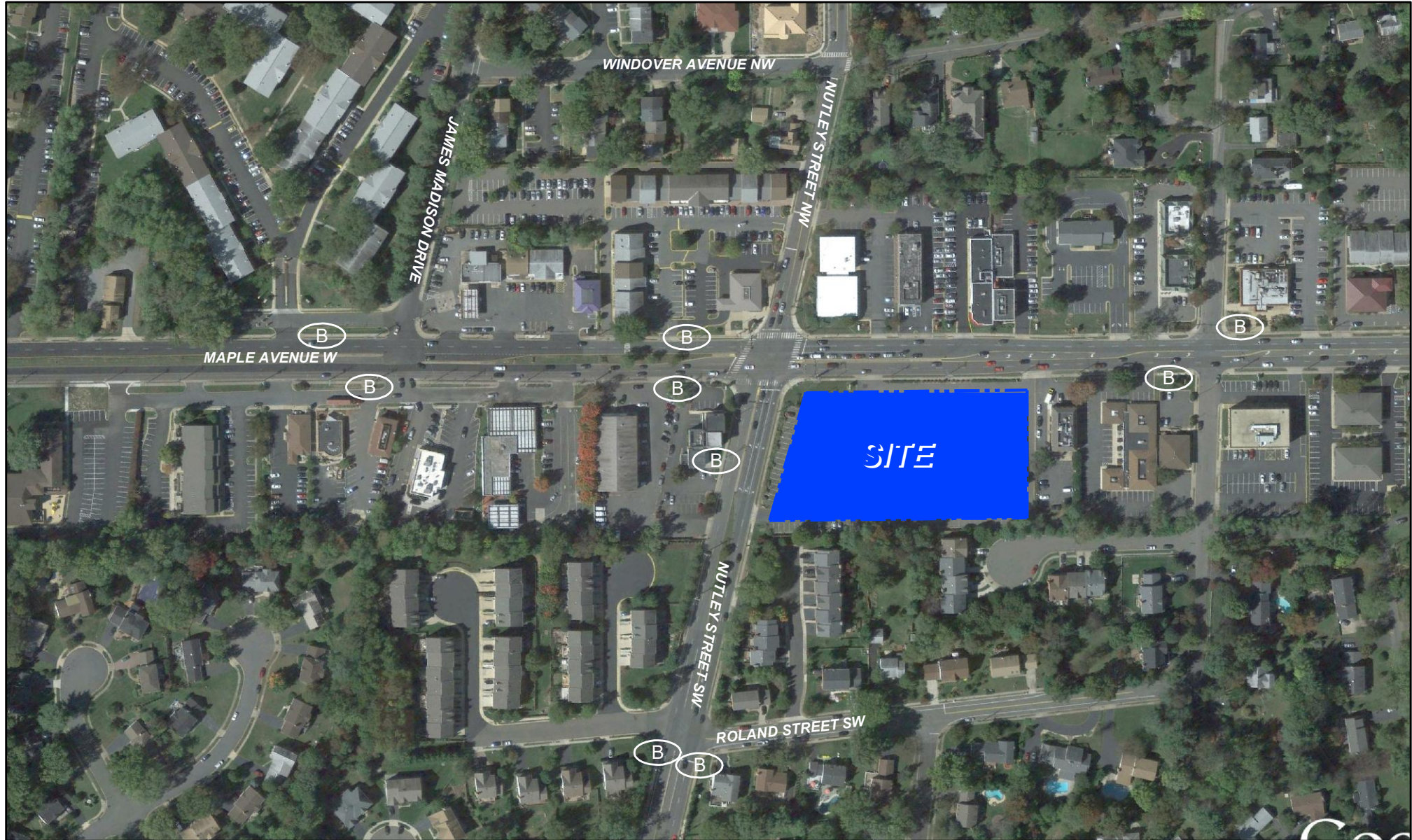


Figure 2-4  
Existing Bus Stop Locations

ⓑ Represents Bus Stop

444 Maple  
Town of Vienna





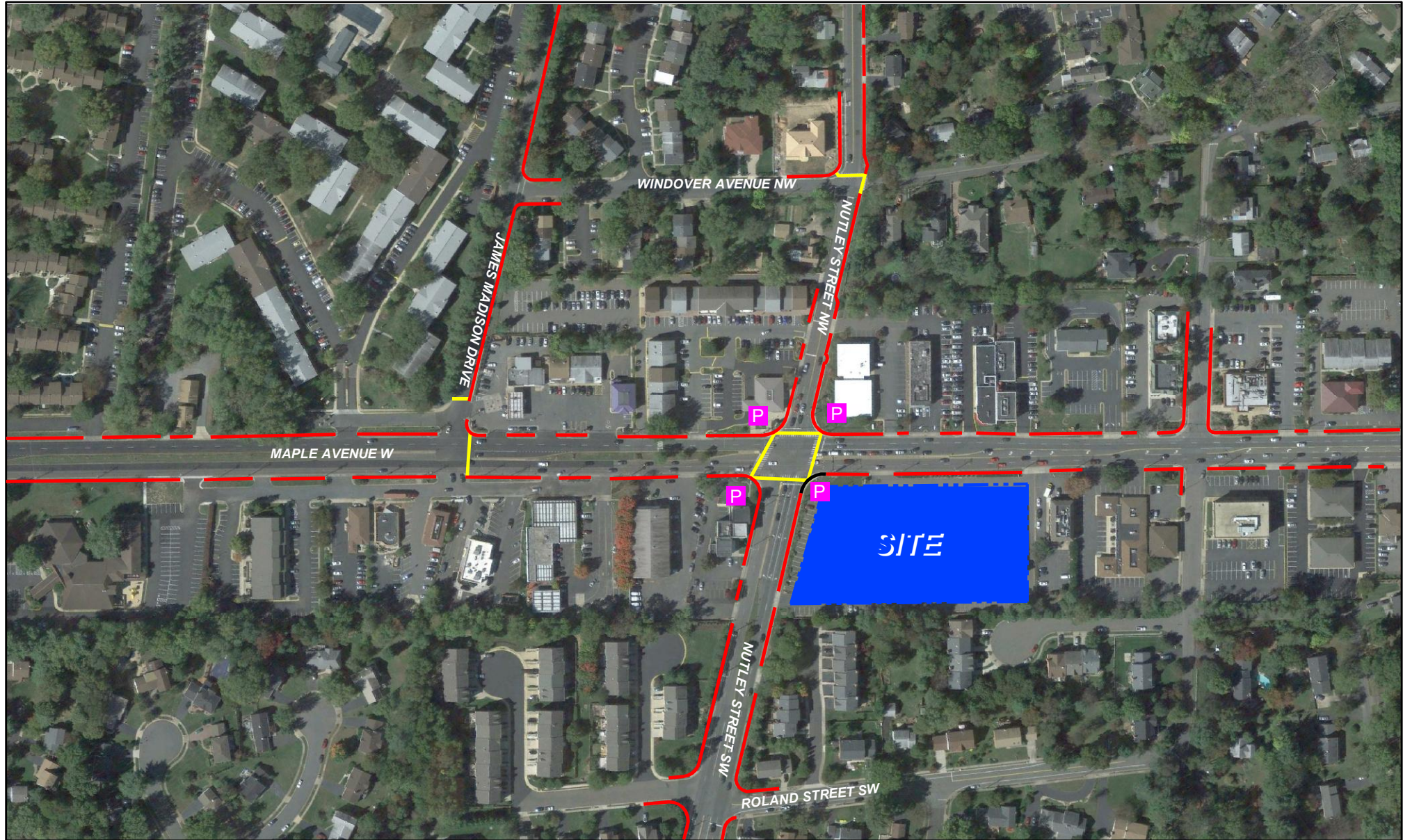


Figure 2-5  
Existing Pedestrian Facilities

444 Maple  
Town of Vienna, Virginia

**P** Pedestrian Crossing Signal

— Concrete Sidewalk  
— Marked Crosswalk





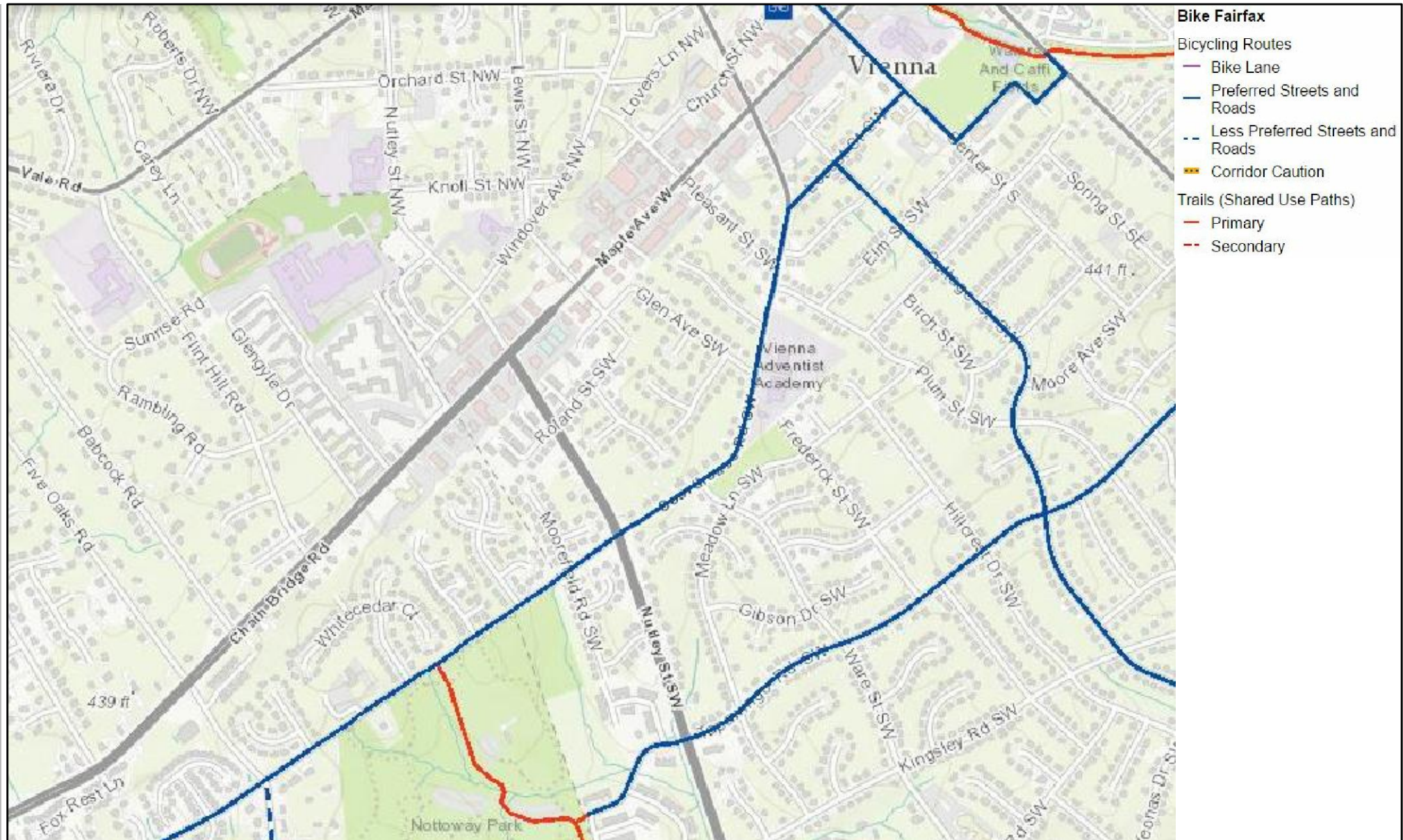


Figure 2-6  
Existing Bicycle Facilities

444 Maple  
Town of Vienna, Virginia





## Section 3

### ANALYSIS OF EXISTING CONDITIONS

#### TRAFFIC VOLUMES

Wells + Associates (W+A) conducted weekday AM, PM and Saturday peak period vehicular and pedestrian traffic counts at the following locations:

1. Nutley Street/Maple Avenue
2. Maple Avenue/Courthouse Road/Lawyers Road
3. Nutley Street/Roland Street
4. Maple Avenue/Right-in/right-out (RIRO) Driveway
5. Maple Avenue/Full Movement Entrance
6. Nutley Street/Right-in/right-out (RIRO)
7. Nutley Street/Windover Avenue [conducted with Flagship Car Wash Project]
8. Maple Avenue/ James Madison Drive [conducted with Flagship Car Wash Project]

Traffic counts were conducted on Tuesday, April 26, 2016 and Saturday April 30, 2016 for all the study intersections listed above with the exception of the Nutley Street/Windover Avenue on Thursday, March 31, 2016 and Maple Avenue/ James Madison Drive on Tuesday, January 27, 2015 and Saturday, January 31, 2015 conducted in association with the Flagship Car Wash project conducted by Wells + Associates. Traffic counts were conducted between the hours of 6:00 AM - 9:00 AM and 4:00 PM - 7:00 PM for the weekday and 10:00 AM – 3:00 PM for Saturday and recorded in 15-minute intervals.

The individual peak hour traffic was evaluated for each intersection and then balanced between intersections where applicable and in accordance with standard practice (i.e., if driveways exist between intersections, those intersections were not balanced). Existing counts utilized from other studies were not balanced. Copies of the count data are included as Appendix E. The weekday AM, PM and Saturday peak hour traffic volumes are summarized on Figure 3-1. The corresponding pedestrian counts at each location are summarized on Figure 3-2.

It should be noted that during the Saturday data collection for the Maple Avenue/Courthouse Road/Lawyers Road study intersection paving was being conducted on the southbound approach. To account for this, overall intersection volumes collected during the peak period were redistributed consistent with the distributions observed during the PM peak hour.

#### OPERATIONAL ANALYSIS

Capacity/level of service (LOS) analyses were conducted at the study intersections based on the existing lane use and traffic controls shown on Figure 2-3, existing 2015 baseline vehicular traffic volumes shown on Figure 3-1, existing traffic signal timings obtained from the Town of Vienna, and the methodology outlined in the *Highway Capacity Manual 2000* as reported by Synchro version 9.1. Descriptions of level of service are provided in Appendix C for signalized and unsignalized locations. The capacity analysis results as reported by Synchro are presented in Appendix F and summarized in Table 3-1 and on Figure 3-3.

**Results.** The results of the existing intersection capacity analyses indicate the signalized Nutley

Street/Maple Avenue intersection currently operates at an overall level of service (LOS “E” or better) during the weekday AM, PM and Saturday peak hours. All the STOP controlled intersections and driveways that serve the site have traffic movements that operate at LOS “C” or better in the AM, PM and Saturday peak hours.

## **QUEUING ANALYSIS**

A queuing analysis was conducted for existing conditions at the study intersections to establish a datum against which to compare future conditions. Synchro was used to conduct the analyses, using the average queue for thru movements and the 95<sup>th</sup> percentile queue lengths for turning movements. The 95<sup>th</sup> percentile queue is defined as the maximum back of queue with 95<sup>th</sup> percentile traffic volumes. The 95<sup>th</sup> percentile queue is not necessarily ever observed, it is simply based on statistical calculations. The queuing results are summarized in Table 3-2. Queue reports are also provided in Appendix F. As shown on Table 3-2, a number of 95<sup>th</sup> percentile queues extend past the available effective storage in the existing condition.

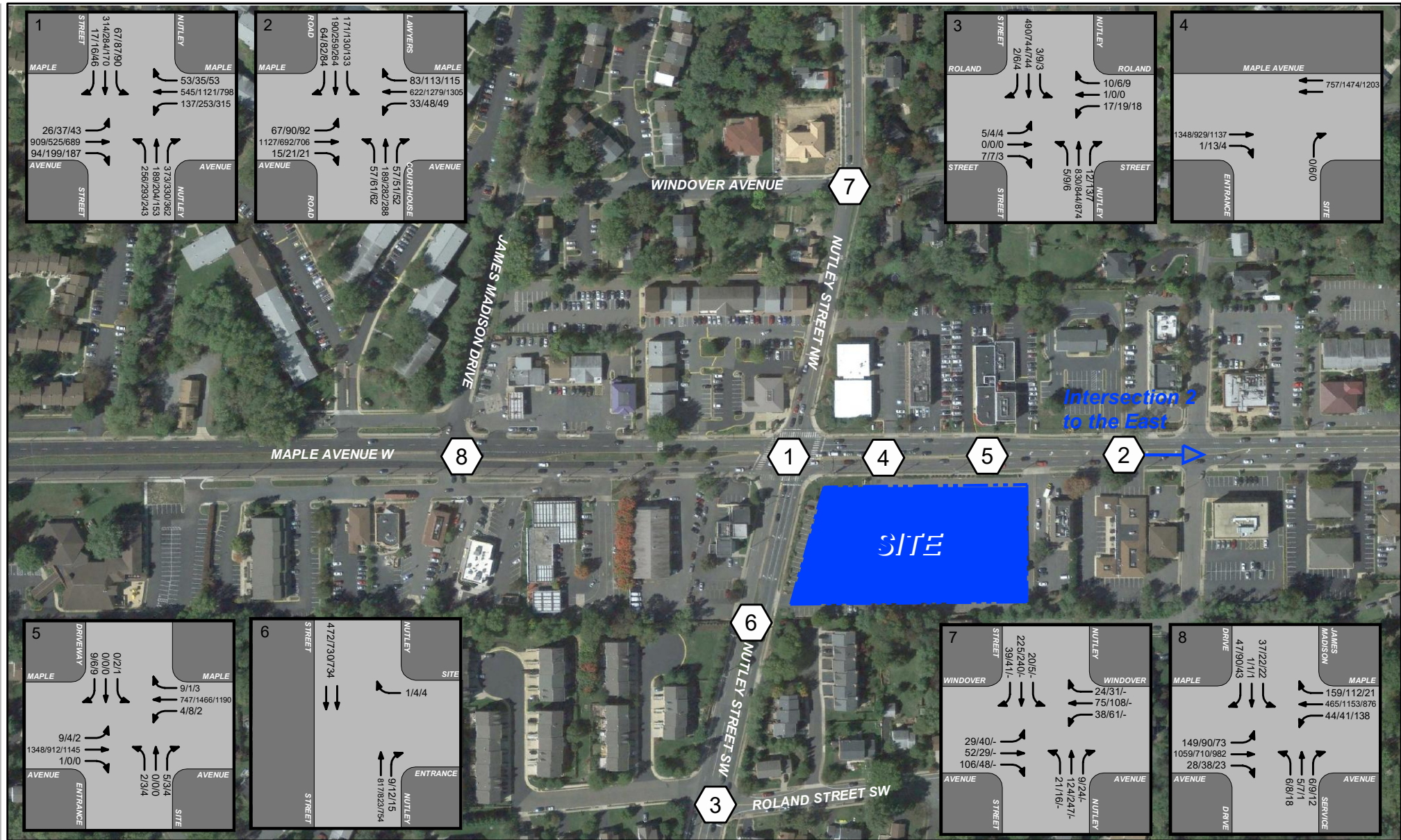


Figure 3-1  
Existing Peak Hour Traffic Volumes

444 Maple  
Town of Vienna, Virginia

AM PEAK HOUR  
PM PEAK HOUR  
000 / 000 / 000 - SAT PEAK HOUR





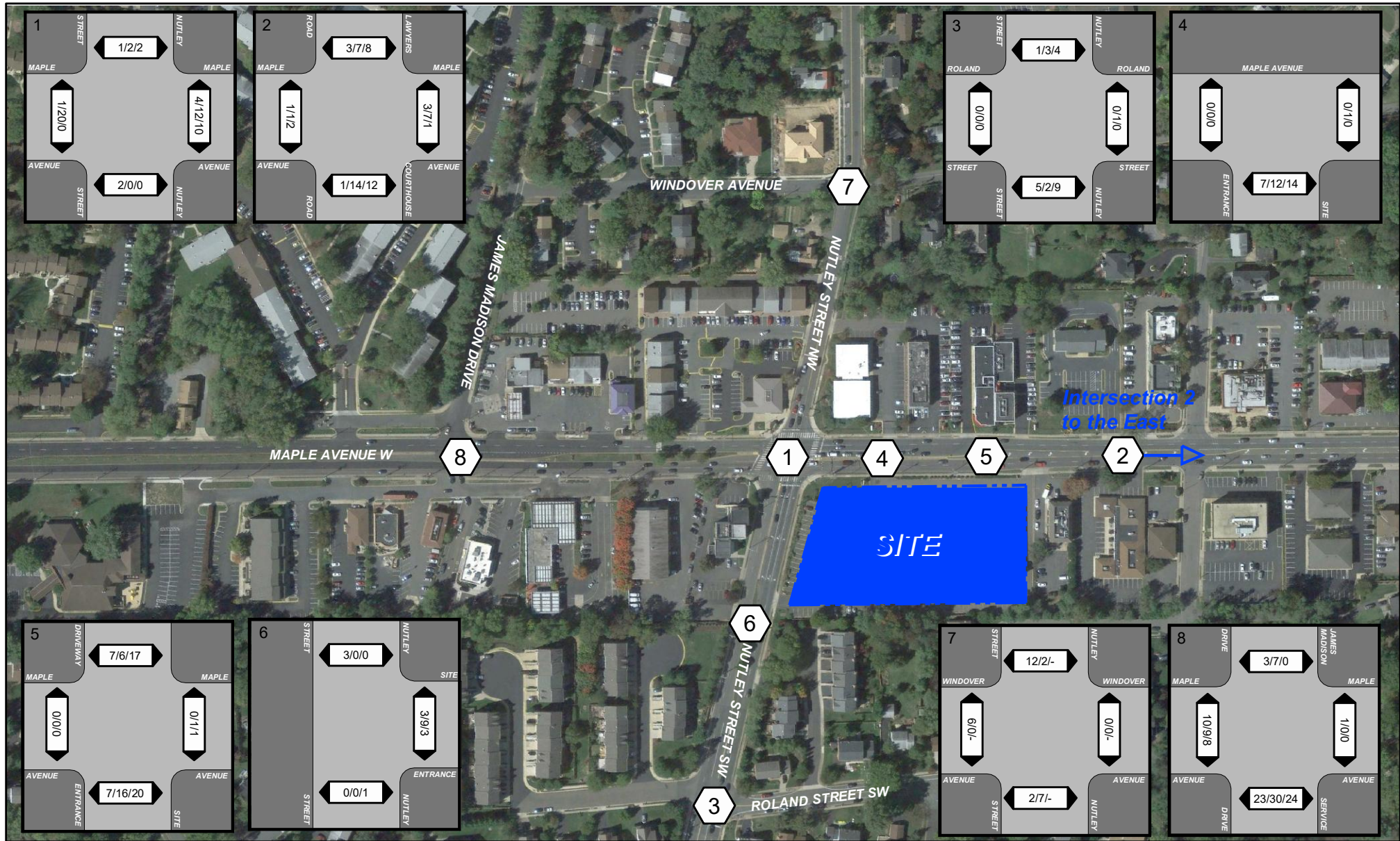


Figure 3-2  
Existing Peak Hour Pedestrian Volumes

444 Maple  
Town of Vienna, Virginia

AM PEAK HOUR  
PM PEAK HOUR  
000 / 000 / 000 -SAT PEAK HOUR



Table 3-1  
444 Maple  
Existing Intersection Levels of Service Summary (1) (2) (3) (4)

| Intersection                                         | Approach Roadway              | Operating Condition | Approach/ Movement | AM              | Existing PM     | SAT             |
|------------------------------------------------------|-------------------------------|---------------------|--------------------|-----------------|-----------------|-----------------|
| <b>1 Nutley Street/Maple Avenue</b>                  | Maple Avenue                  | Signal              | EBL                | C (28.6)        | D (40.8)        | D (35.8)        |
|                                                      |                               |                     | EBTR               | F (81.0)        | D (50.8)        | F (139.5)       |
|                                                      | Maple Avenue                  |                     | WBL                | D (50.4)        | D (52.1)        | D (52.0)        |
|                                                      |                               |                     | WBTR               | C (32.6)        | D (53.5)        | C (34.6)        |
|                                                      | <b>Nutley Street</b>          |                     | NBL                | E (68.1)        | F (95.8)        | E (66.4)        |
|                                                      |                               |                     | NBLT               | E (67.8)        | F (95.5)        | E (65.9)        |
|                                                      | <b>Nutley Street</b>          |                     | NBR                | D (44.8)        | D (39.6)        | C (27.2)        |
|                                                      |                               |                     | SBL                | D (49.7)        | E (58.4)        | D (54.0)        |
|                                                      |                               |                     | SBTR               | F (154.6)       | F (120.6)       | E (73.4)        |
|                                                      |                               |                     | <b>Overall</b>     | <b>E (71.2)</b> | <b>E (63.5)</b> | <b>E (72.6)</b> |
| <b>2 Courthouse Road, Lawyers Road/ Maple Avenue</b> | Maple Avenue                  | Signal              | EBL                | E (69.2)        | F (106.4)       | E (68.6)        |
|                                                      |                               |                     | EBTR               | D (38.6)        | C (27.9)        | C (27.6)        |
|                                                      | Maple Avenue                  |                     | WBL                | E (67.5)        | F (80.3)        | E (68.8)        |
|                                                      |                               |                     | WBTR               | C (29.9)        | E (59.7)        | F (100.8)       |
|                                                      | <b>Courthouse Road</b>        |                     | NBL                | E (77.1)        | F (80.7)        | E (73.7)        |
|                                                      |                               |                     | NBTR               | E (73.5)        | F (123.3)       | F (103.5)       |
|                                                      | <b>Lawyers Road</b>           |                     | SBL                | F (104.1)       | F (89.4)        | E (75.4)        |
|                                                      |                               |                     | SBTR               | D (49.4)        | E (68.8)        | E (57.5)        |
|                                                      |                               |                     | <b>Overall</b>     | <b>D (46.4)</b> | <b>E (63.6)</b> | <b>E (76.5)</b> |
|                                                      |                               |                     |                    |                 |                 |                 |
| <b>3 Nutley Street/ Roland Street</b>                | Rowland Street                | STOP                | EBLTR              | C (15.9)        | C (17.6)        | C (18.8)        |
|                                                      |                               |                     | WBLTR              | C (23.0)        | D (30.7)        | C (23.5)        |
|                                                      | <b>Nutley Street</b>          |                     | NBL                | A (9.1)         | A (9.8)         | A (9.5)         |
|                                                      |                               |                     | NBTR               | A (0.0)         | A (0.0)         | A (0.0)         |
|                                                      | <b>Nutley Street</b>          |                     | SBL                | A (9.5)         | A (9.2)         | A (9.0)         |
|                                                      |                               |                     | SBTR               | A (0.0)         | A (0.0)         | A (0.0)         |
|                                                      |                               |                     | EBTR               | A (0.0)         | A (0.0)         | A (0.0)         |
|                                                      |                               |                     | WBT                | A (0.0)         | A (0.0)         | A (0.0)         |
|                                                      |                               |                     | NBR                | A (0.0)         | A (9.1)         | C (17.8)        |
|                                                      |                               |                     |                    |                 |                 |                 |
| <b>4 RIRo/ Maple Avenue</b>                          | Maple Avenue                  | STOP                | EBTR               | A (0.3)         | A (0.3)         | A (0.1)         |
|                                                      |                               |                     | WBTR               | A (0.2)         | A (0.3)         | A (0.1)         |
|                                                      | Maple Avenue                  |                     | NBLTR              | B (13.3)        | B (14.6)        | C (15.1)        |
|                                                      |                               |                     | SBLTR              | B (11.2)        | C (21.8)        | C (15.2)        |
|                                                      | <b>Site Entrance Driveway</b> |                     | WBR                | B (11.5)        | A (9.1)         | A (9.0)         |
|                                                      |                               |                     | NBTR               | A (0.0)         | A (0.0)         | A (0.0)         |
|                                                      |                               |                     | SBT                | A (0.0)         | A (0.0)         | A (0.0)         |
|                                                      |                               |                     | EBLTR              | B (10.3)        | B (10.5)        | -               |
|                                                      |                               |                     | WBLTR              | B (10.1)        | B (12.0)        | -               |
|                                                      |                               |                     | NBLTR              | B (10.2)        | B (13.2)        | -               |
| <b>5 Site entrance/ Maple Avenue</b>                 | Site Entrance                 | STOP                | EBLTR              | B (10.3)        | B (10.5)        | -               |
|                                                      |                               |                     | WBLTR              | B (10.1)        | B (12.0)        | -               |
|                                                      | Nutley Street                 |                     | NBLTR              | B (10.2)        | B (13.2)        | -               |
|                                                      |                               |                     | SBLTR              | B (12.0)        | B (13.1)        | -               |
|                                                      | <b>Nutley Street</b>          |                     | <b>Overall</b>     | <b>B (10.9)</b> | <b>B (12.5)</b> | -               |
|                                                      |                               |                     |                    |                 |                 |                 |
|                                                      |                               |                     |                    |                 |                 |                 |
|                                                      |                               |                     |                    |                 |                 |                 |
|                                                      | Windover Avenue               | ALL WAY STOP        | EBLTR              | B (10.3)        | B (10.5)        | -               |
|                                                      |                               |                     | WBLTR              | B (10.1)        | B (12.0)        | -               |
| <b>6 Nutley Street/ Site entrance</b>                | Site Entrance                 | STOP                | EBLTR              | B (10.3)        | B (10.5)        | -               |
|                                                      |                               |                     | WBLTR              | B (10.1)        | B (12.0)        | -               |
|                                                      | Nutley Street                 |                     | NBLTR              | B (10.2)        | B (13.2)        | -               |
|                                                      |                               |                     | SBLTR              | B (12.0)        | B (13.1)        | -               |
|                                                      | <b>Nutley Street</b>          |                     | <b>Overall</b>     | <b>B (10.9)</b> | <b>B (12.5)</b> | -               |
|                                                      |                               |                     |                    |                 |                 |                 |
|                                                      |                               |                     |                    |                 |                 |                 |
|                                                      |                               |                     |                    |                 |                 |                 |
|                                                      | Windover Avenue               | ALL WAY STOP        | EBLTR              | B (10.3)        | B (10.5)        | -               |
|                                                      |                               |                     | WBLTR              | B (10.1)        | B (12.0)        | -               |
| <b>7 Nutley Street/ Windover Avenue</b>              | Windover Avenue               |                     | NBLTR              | B (10.2)        | B (13.2)        | -               |
|                                                      |                               |                     | SBLTR              | B (12.0)        | B (13.1)        | -               |
|                                                      | <b>Nutley Street</b>          |                     | <b>Overall</b>     | <b>B (10.9)</b> | <b>B (12.5)</b> | -               |
|                                                      |                               |                     |                    |                 |                 |                 |
|                                                      |                               |                     |                    |                 |                 |                 |
|                                                      |                               |                     |                    |                 |                 |                 |
|                                                      | Maple Avenue                  | STOP                | EBL                | A (9.2)         | B (11.1)        | A (9.7)         |
|                                                      |                               |                     | EBTR               | A (0.0)         | A (0.0)         | A (0.0)         |
|                                                      | Maple Avenue                  |                     | WBL                | B (11.7)        | A (9.7)         | B (12.4)        |
|                                                      |                               |                     | WBTR               | A (0.0)         | A (0.0)         | A (0.0)         |
| <b>8 James Madison Drive/ Maple Avenue</b>           | Maple Avenue                  | STOP                | NBLTR              | F (110.1)       | F (113.7)       | F (254.6)       |
|                                                      |                               |                     | SBLTR              | F (92.4)        | F (91.3)        | F (147.5)       |
|                                                      | <b>Driveway</b>               |                     |                    |                 |                 |                 |
|                                                      |                               |                     |                    |                 |                 |                 |
|                                                      | <b>James Madison Drive</b>    |                     |                    |                 |                 |                 |
|                                                      |                               |                     |                    |                 |                 |                 |
|                                                      |                               |                     |                    |                 |                 |                 |
|                                                      |                               |                     |                    |                 |                 |                 |
|                                                      | Maple Avenue                  |                     |                    |                 |                 |                 |
|                                                      |                               |                     |                    |                 |                 |                 |
|                                                      | Maple Avenue                  |                     |                    |                 |                 |                 |
|                                                      |                               |                     |                    |                 |                 |                 |

Notes (1) Numbers in parentheses ( ) represent delay at signalized intersections in seconds per vehicle.  
(2) Numbers in brackets [ ] represent delay at unsignalized intersections in seconds per vehicle.  
(3) Asterisks \* represent delays in excess of 999.9 seconds.  
(4) Roadway names in bold are considered north/south for purposes of this analysis



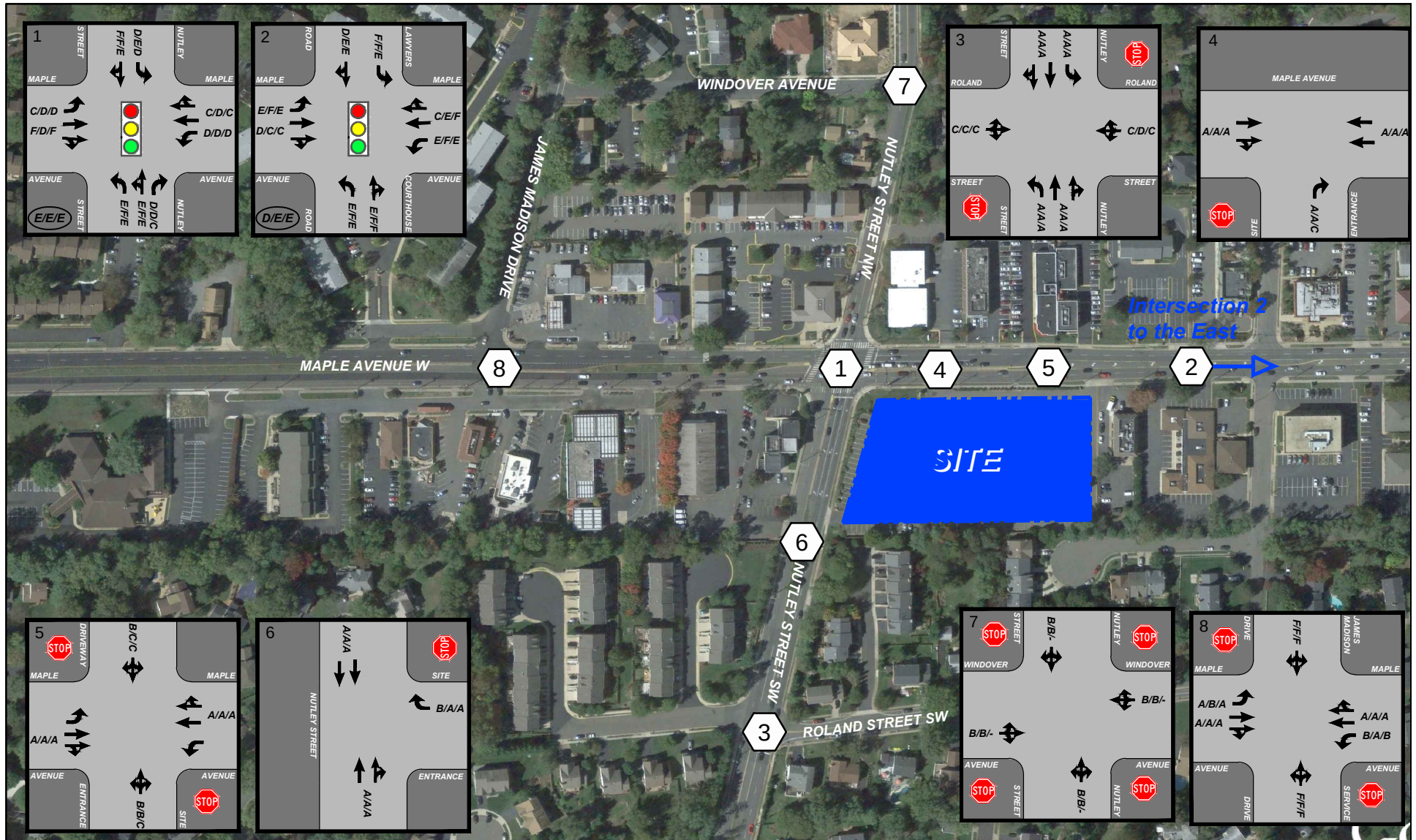


Figure 3-3  
Existing Levels of Service

444 Maple  
Town of Vienna

← Represents One Travel Lane  
 Signalized Intersection  
 Stop Sign





Table 3-2  
444 Maple  
Existing Intersection Queuing Summary (1) (2) (3)

| Intersection                                         | Approach<br>Roadway    | Operating<br>Condition | Approach/<br>Movement | Available<br>Storage (ft) | AM  | Existing<br>PM | SAT  |
|------------------------------------------------------|------------------------|------------------------|-----------------------|---------------------------|-----|----------------|------|
| <b>1 Nutley Street/Maple Avenue</b>                  | Maple Avenue           | Signal                 | EBL                   | 90                        | 34  | 43             | 49   |
|                                                      |                        |                        | EBTR                  | n/a                       | 718 | 447            | 693  |
|                                                      | Maple Avenue           |                        | WBL                   | 285                       | 217 | 306            | 511  |
|                                                      |                        |                        | WBTR                  | n/a                       | 315 | 745            | 495  |
|                                                      | <b>Nutley Street</b>   |                        | NBL                   | 220                       | 310 | 458            | 276  |
| <b>Nutley Street</b>                                 |                        |                        | NBLT                  | n/a                       | 321 | 475            | 284  |
|                                                      |                        |                        | NBR                   | n/a                       | 227 | 201            | 179  |
|                                                      |                        |                        | SBL                   | 200                       | 106 | 153            | 136  |
|                                                      |                        |                        | SBTR                  | n/a                       | 573 | 601            | 293  |
|                                                      |                        |                        |                       |                           |     |                |      |
| <b>2 Courthouse Road, Lawyers Road/ Maple Avenue</b> | Maple Avenue           | Signal                 | EBL                   | 160                       | 119 | 204            | 148  |
|                                                      |                        |                        | EBTR                  | n/a                       | 647 | 365            | 342  |
|                                                      | Maple Avenue           |                        | WBL                   | 145                       | 68  | 100            | 92   |
|                                                      |                        |                        | WBTR                  | n/a                       | 334 | 989            | 1023 |
|                                                      | <b>Courthouse Road</b> |                        | NBL                   | 230                       | 106 | 125            | 111  |
| <b>Lawyers Road</b>                                  |                        |                        | NBTR                  | n/a                       | 376 | 644            | 594  |
|                                                      |                        |                        | SBL                   | 245                       | 318 | 238            | 204  |
|                                                      |                        |                        | SBTR                  | n/a                       | 323 | 539            | 512  |
|                                                      |                        |                        |                       |                           |     |                |      |
|                                                      |                        |                        |                       |                           |     |                |      |
| <b>3 Nutley Street/ Roland Street</b>                | Rowland Street         | STOP                   | EBLTR                 | n/a                       | 3   | 3              | 2    |
|                                                      | Rowland Street         |                        | WBLTR                 | n/a                       | 11  | 15             | 11   |
|                                                      | <b>Nutley Street</b>   |                        | NBL                   | 165                       | 1   | 1              | 1    |
|                                                      |                        |                        | NBTR                  | n/a                       | 0   | 0              | 0    |
|                                                      | <b>Nutley Street</b>   |                        | SBL                   | 145                       | 0   | 1              | 0    |
| <b>4 RiRo/ Maple Avenue</b>                          |                        |                        | SBTR                  | n/a                       | 0   | 0              | 0    |
|                                                      | Maple Avenue           | STOP                   | EBTR                  | n/a                       | 0   | 0              | 0    |
|                                                      | Maple Avenue           |                        | WBT                   | n/a                       | 0   | 0              | 0    |
|                                                      | <b>Site Entrance</b>   |                        | NBR                   | n/a                       | 0   | 1              | 1    |
|                                                      |                        |                        |                       |                           |     |                |      |
| <b>5 Site entrance/ Maple Avenue</b>                 | Maple Avenue           | STOP                   | EBTR                  | n/a                       | 1   | 1              | 0    |
|                                                      | Maple Avenue           |                        | WBTR                  | n/a                       | 1   | 1              | 0    |
|                                                      | <b>Site Entrance</b>   |                        | NBLTR                 | n/a                       | 1   | 1              | 2    |
|                                                      | <b>Driveway</b>        |                        | SBLTR                 | n/a                       | 1   | 3              | 2    |
|                                                      |                        |                        |                       |                           |     |                |      |
| <b>6 Nutley Street/ Site entrance</b>                | Site Entrance          | STOP                   | WBR                   |                           | 0   | 0              | 0    |
|                                                      | Nutley Street          |                        | NBTR                  | n/a                       | 0   | 0              | 0    |
|                                                      | <b>Nutley Street</b>   |                        | SBT                   | n/a                       | 0   | 0              | 0    |
|                                                      |                        |                        |                       |                           |     |                |      |
|                                                      |                        |                        |                       |                           |     |                |      |
| <b>7 Nutley Street/ Windover Avenue</b>              | Windover Avenue        | ALL WAY                | EBLTR                 | n/a                       | n/a | n/a            | n/a  |
|                                                      | Windover Avenue        | STOP                   | WBLTR                 | n/a                       | n/a | n/a            | n/a  |
|                                                      | <b>Nutley Street</b>   |                        | NBLTR                 | n/a                       | n/a | n/a            | n/a  |
|                                                      | <b>Nutley Street</b>   |                        | SBLTR                 | n/a                       | n/a | n/a            | n/a  |
|                                                      |                        |                        |                       |                           |     |                |      |
| <b>8 James Madison Drive/ Maple Avenue</b>           | Maple Avenue           | STOP                   | EBL                   | 205                       | 14  | 12             | 8    |
|                                                      |                        |                        | EBTR                  | n/a                       | 0   | 0              | 0    |
|                                                      | Maple Avenue           |                        | WBL                   | 145                       | 7   | 4              | 23   |
|                                                      |                        |                        | WBTR                  | n/a                       | 0   | 0              | 0    |
|                                                      | <b>Driveway</b>        |                        | NBLTR                 | n/a                       | 33  | 45             | 81   |
| <b>James Madison Drive</b>                           |                        |                        | SBLTR                 | n/a                       | 107 | 133            | 112  |
|                                                      |                        |                        |                       |                           |     |                |      |

Notes: (1) Turning movement queue length is based on the 95th percentile queue in feet as reported by Synchro, Version 9.  
(2) Roadway names in bold are considered north/south for purposes of this analysis  
(3) Queues for All Way STOPs (Nutley Street/Windover Avenue) not reported by Synchro

## Section 4

### 2022 ANALYSIS OF FUTURE (BACKGROUND) CONDITIONS WITHOUT PROPOSED DEVELOPMENT

#### METHODOLOGY

Weekday AM, PM and Saturday peak hour future traffic forecasts without the proposed development were developed based on a composite of existing baseline traffic volumes, increases in traffic associated with regional growth, and increases in traffic associated with other not yet constructed (pipeline) developments. This methodology was discussed with VDOT and Town staff as reflected in the signed scoping agreement in Appendix A.

#### REGIONAL GROWTH

As agreed to in the scoping documentation, increases in traffic associated with regional growth was recommended by Town and VDOT staff to be 1.0 percent per year compounded for through movements along Maple Avenue and Nutley Street and the turning movements at that intersection. The resulting regional growth volumes are shown on Figure 4-1.

#### PIPELINE TRIPS

Traffic from two (2) pipeline developments were included to obtain the 2022 background traffic forecasts (future traffic forecasts without the development). Each individual pipeline development is located on Figure 4-2 and their individual trip generation is summarized in Table 4-1. The total pipeline trip assignments with all the pipeline developments are shown on Figure 4-3. Each pipeline development is described below:

- 1) Flagship Carwash [Tax Map 38-3((2))115 and 38-3((2))152A]: The subject site is located on 540 Maple Avenue. On May 9, 2016, the Vienna Town Council unanimously approved Rezoning PF-40-15-PMAC for the subject property. The development would include:
  - Car Wash
  - Fast-food Restaurant with Drive-thru of 5,001 GSF
- 2) Maple Avenue Consolidation [Tax Map 38-4((4))2 & 4 and 38-4((2))15, 16 and 17]: The subject site is located at 245 Maple Avenue and 101, 107, 115 Pleasant Street. The Rezoning (PF-74-15-PMAC) would consolidate a number of uses including some retail and an approximately 22,000 GSF vacant space including the former Marco Polo Restaurant. The new development would include:
  - Retail uses of approximately 26,000 GSF
  - 49 Townhouse style units

Although both Staff and Planning Commission recommended approval of the rezoning the Vienna Town Council was unable to achieve supermajority vote on June 6, 2016. *Despite the project being unapproved it was considered as a pipeline background project to account for a potential redevelopment of the site in the near future.*

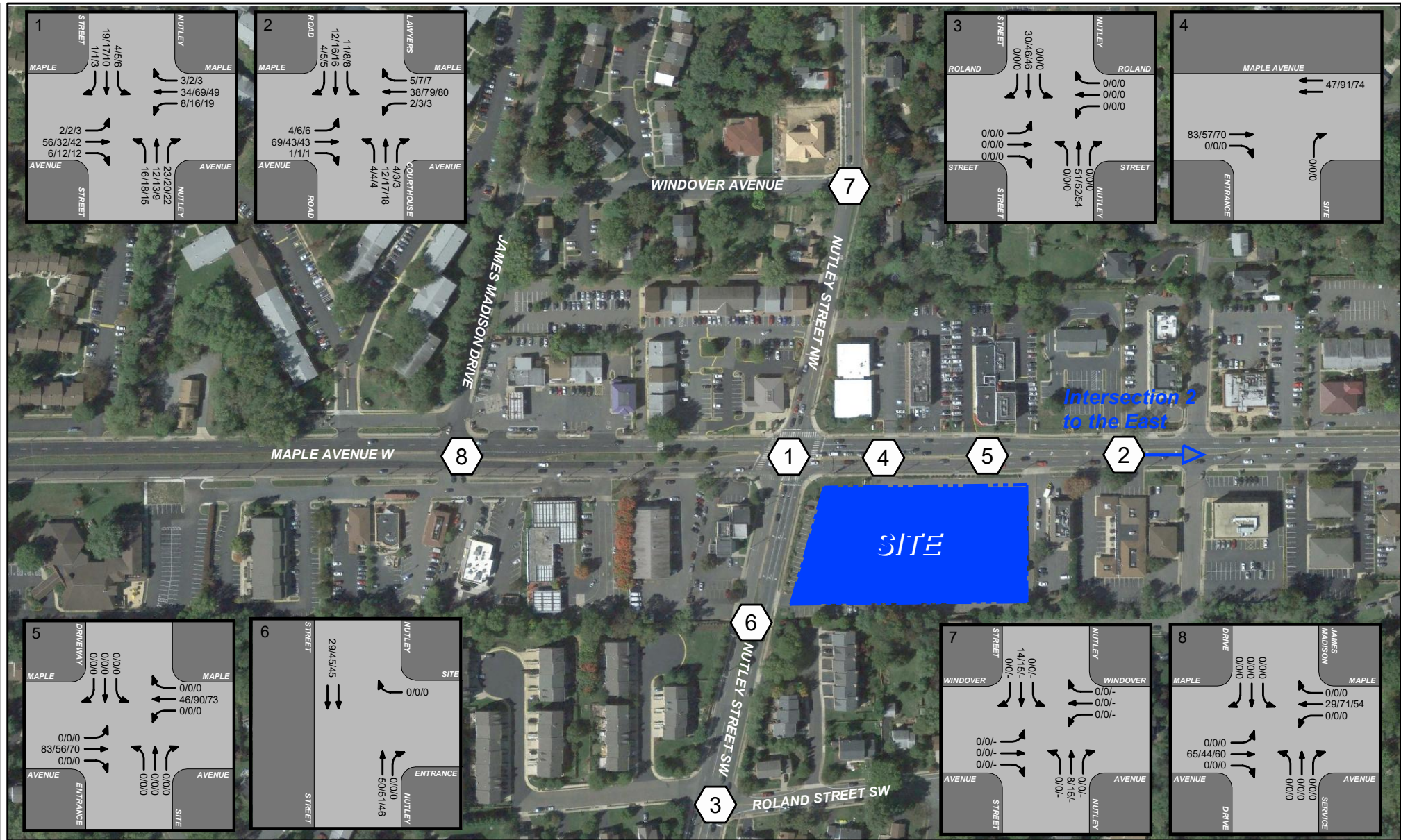


Figure 4-1  
2022 Regional Traffic Growth

444 Maple  
Town of Vienna, Virginia

AM PEAK HOUR  
PM PEAK HOUR  
000 / 000 / 000 - SAT PEAK HOUR





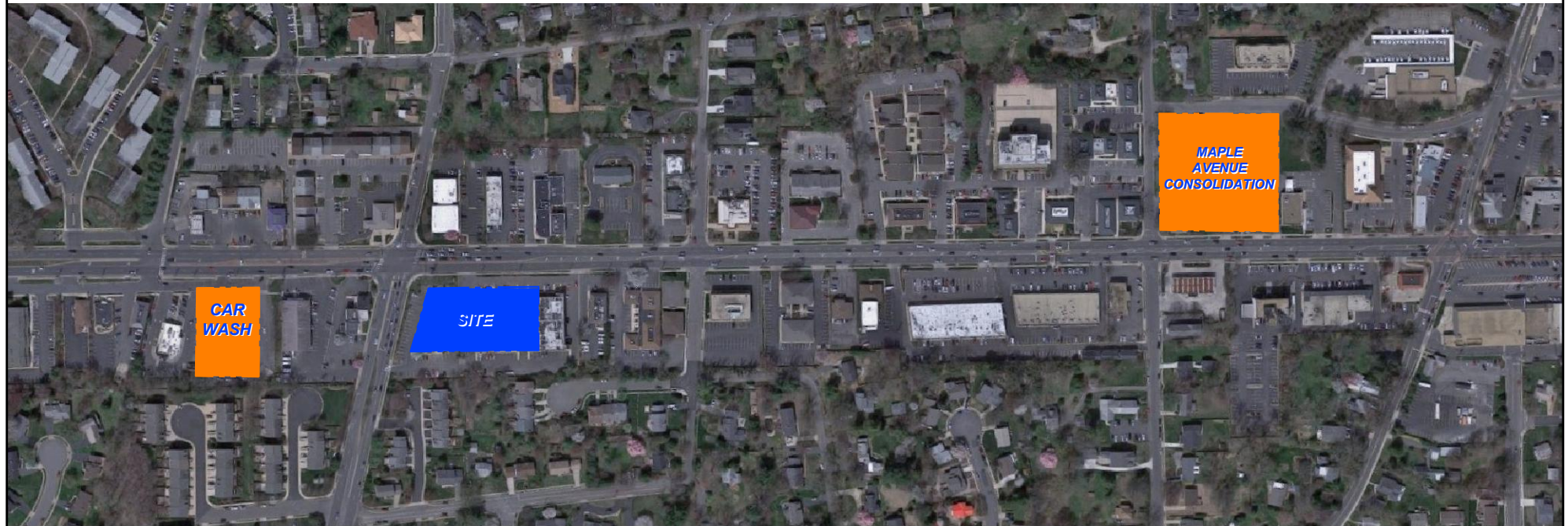


Figure 4-2  
Location of Pipeline Developments

444 Maple  
Town of Vienna, Virginia







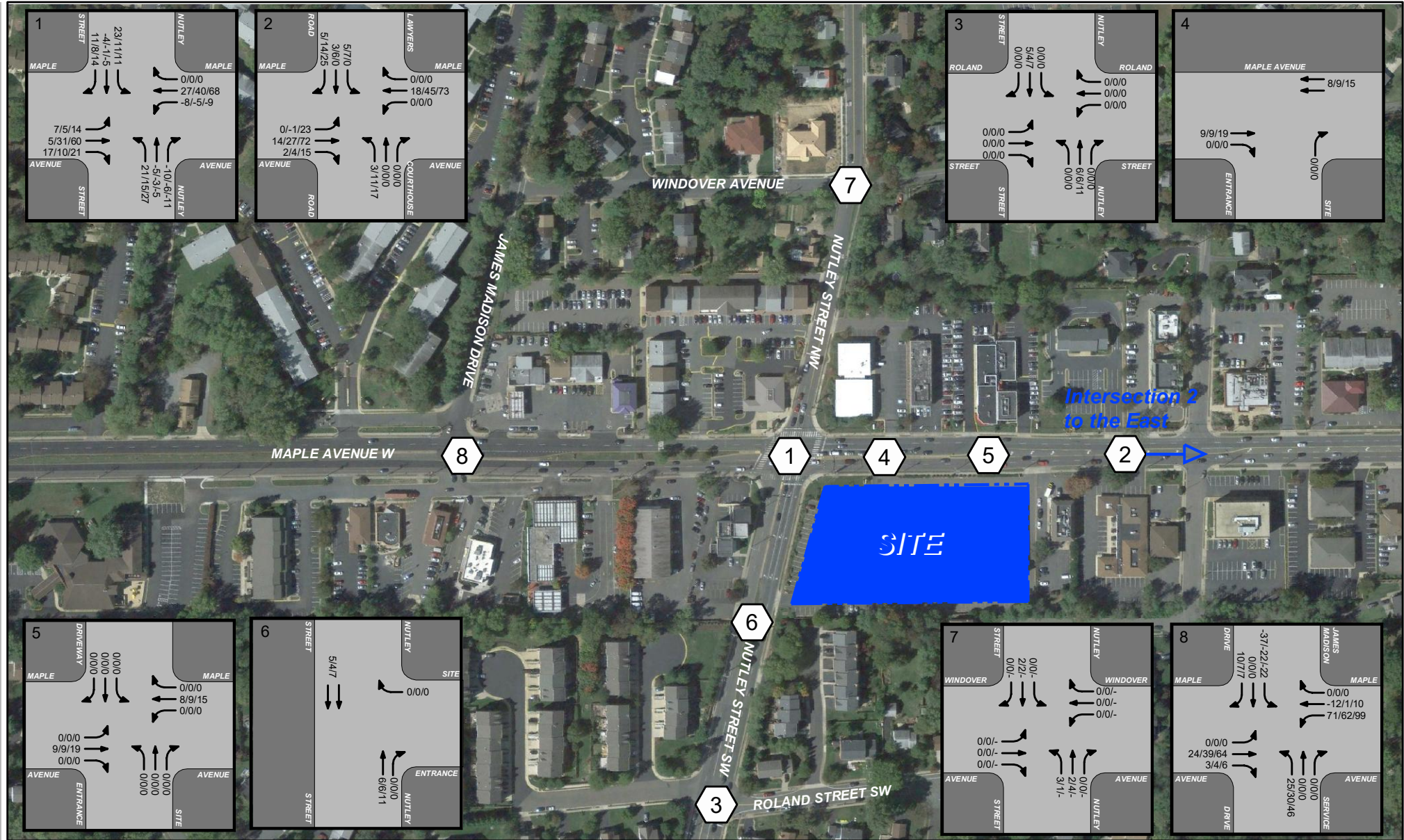


Figure 4-3  
Total Pipeline Trip Assignments

444 Maple  
Town of Vienna, Virginia

AM PEAK HOUR  
PM PEAK HOUR  
000 / 000 / 000 - SAT PEAK HOUR





## TOTAL BACKGROUND FUTURE TRAFFIC FORECASTS

Background future traffic forecasts (without the proposed development) were developed for the forecast year of 2022. These forecasts were developed by combining the baseline traffic volumes shown on Figure 3-1, regional growth estimates shown on Figure 4-1, and the total pipeline trip assignments shown on Figure 4-3. The resulting background traffic forecasts for year 2022 are provided on Figure 4-4.

## TRANSPORTATION IMPROVEMENTS BY OTHERS

Several unbuilt/incomplete programmed transportation improvements (as of the date of the existing traffic counts) were identified for inclusion within the study area for the background and total future conditions analyses. The following outlines those improvements assumed complete by year 2022:

- Flagship Carwash (Rezoning PF-40-15-PMAC). Proffers dated May 2, 2016 provided that “subject to VDOT and Town approval, Applicant shall design and construct a HAWK (High Intensity Activated Crosswalk) beacon at the Maple Avenue pedestrian crosswalk, and construct other improvements relating to pedestrian access”.
- An optimization of signal timings along Maple Avenue was provided by the Town and included in the background future and total future analyzes. Among the improvements are cycle length adjustments and offset optimization. It should be noted that to account for a minimum error in timings provided by the town timings were adjusted slightly in this analysis to correct those errors.

The background future lane use and traffic controls assumed under background conditions that incorporate those transportation improvements and assumptions listed above are shown on Figure 4-5.

R:\PROJECTS\7390 MAPLE AVENUE RESIDENTIAL\GRAPHICS\7390 GRAPHICS.DWG

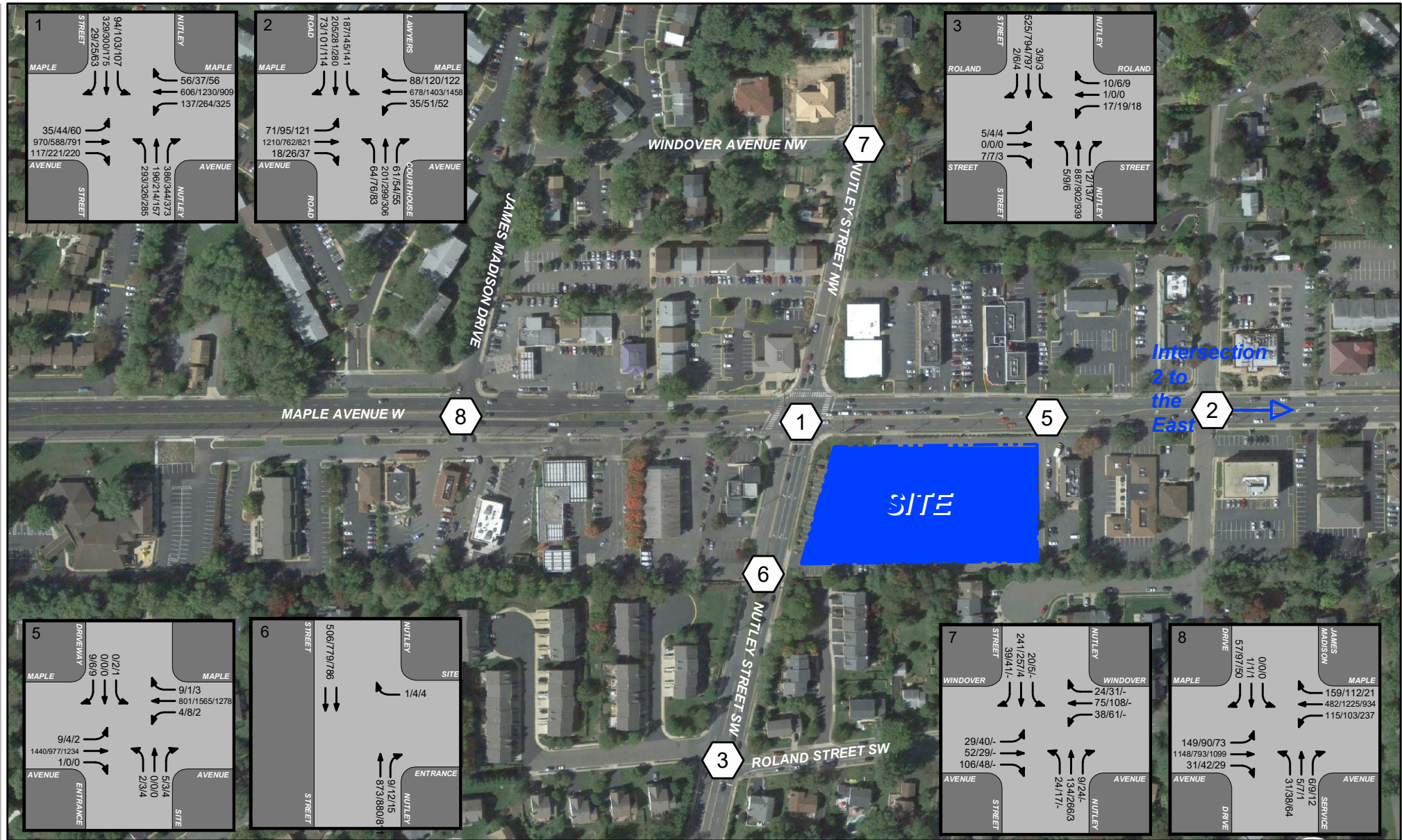


Figure 4-4  
2022 Background Future Traffic Forecasts

444 Maple  
Town of Vienna, Virginia

AM PEAK HOUR  
PM PEAK HOUR  
000 / 000 / 000 - SAT PEAK HOUR





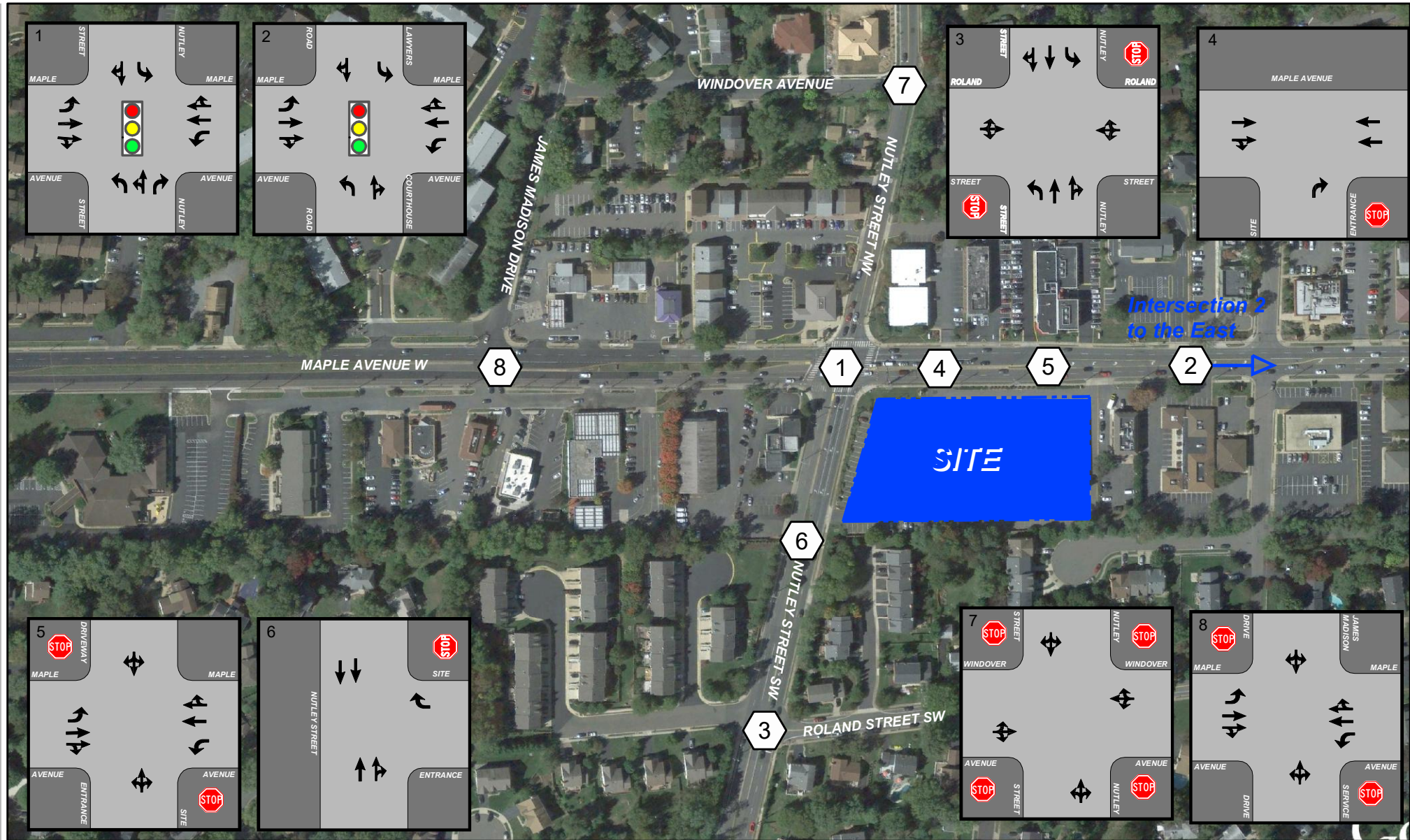


Figure 4-5  
2022 Background Future Lane Use and Traffic Controls

444 Maple  
Town of Vienna

- ← Represents One Travel Lane
- 🚦 Signalized Intersection
- 🛑 Stop Sign





## OPERATIONAL ANALYSIS

The total background future (without proposed development) capacity analyses for year 2022 were performed at the study intersections based on the background future traffic forecasts shown on Figure 4-4 and the future background lane use and traffic controls shown on Figure 4-5. The results of the background future conditions analyses are presented in Appendix G and summarized in Table 4-1. The results are also summarized graphically on Figure 4-6.

**Results.** The results of the background future (without the proposed development) intersection capacity analyses indicate the signalized Nutley Street/Maple Avenue intersection continues to operate at an overall level of service (LOS “E” or better) during the weekday AM and PM peak hours. The Saturday peak hour will degrade to overall LOS “F” due to regional growth and pipeline traffic. In addition it is expected that pedestrian safety in the vicinity of the Maple Avenue/James Madison Drive intersection would improve with the inclusion of the HAWK signal. All the STOP controlled intersections and driveways that serve the site have traffic movements that operate at LOS “C” or better in the AM, PM and Saturday peak hours.

## QUEUEING ANALYSIS

A queueing analysis was conducted for 2022 background conditions at the study intersections and compared to the queueing analysis completed for existing conditions. The results are summarized in Table 4-2. Queue reports are also provided in Appendix G. As shown on Table 3-2, a number of 95<sup>th</sup> percentile queues extend past the available effective storage in the background total future (without the proposed) condition consistent with existing conditions.

Table 4-2  
444 Maple  
Background Future Intersection Levels of Service Summary (1) (2) (3) (4)

| Intersection                                  | Approach Roadway                 | Operating Condition | Approach/ Movement | AM        | Existing PM | SAT       | Background 2022 |           |           |
|-----------------------------------------------|----------------------------------|---------------------|--------------------|-----------|-------------|-----------|-----------------|-----------|-----------|
|                                               |                                  |                     |                    |           |             |           | AM              | PM        | SAT       |
| 1 Nutley Street/Maple Avenue                  | Maple Avenue                     | Signal              | EBL                | C (28.6)  | D (40.8)    | D (35.8)  | C (28.5)        | D (42.5)  | D (38.6)  |
|                                               |                                  |                     | EBTR               | F (81.0)  | D (50.8)    | F (139.5) | F (86.1)        | D (53.1)  | F (208.1) |
|                                               | Maple Avenue                     |                     | WBL                | D (50.4)  | D (52.0)    | D (52.0)  | E (68.7)        | F (67.2)  | E (67.3)  |
|                                               |                                  |                     | WBTR               | C (32.6)  | D (53.5)    | C (34.6)  | C (27.7)        | C (32.3)  | C (21.6)  |
|                                               | Nutley Street                    |                     | NBL                | E (68.1)  | F (95.8)    | E (66.4)  | E (66.4)        | F (120.8) | E (55.1)  |
|                                               |                                  |                     | NBLT               | E (67.8)  | F (95.5)    | E (65.3)  | E (65.3)        | F (120.4) | D (54.8)  |
|                                               | Nutley Street                    |                     | NBR                | D (44.8)  | D (39.6)    | C (22.2)  | D (22.6)        | D (54.6)  | A (5.8)   |
|                                               |                                  |                     | SBL                | D (49.7)  | E (58.4)    | D (54.0)  | D (50.6)        | E (59.7)  | D (53.6)  |
|                                               | Overall                          |                     | SBLT               | E (154.6) | F (120.6)   | E (73.4)  | E (157.5)       | E (145.5) | E (76.0)  |
|                                               |                                  |                     | Overall            | E (71.2)  | E (63.5)    | E (72.6)  | E (69.1)        | E (66.6)  | F (86.8)  |
| 2 Courthouse Road, Lawyers Road/ Maple Avenue | Maple Avenue                     | Signal              | EBL                | E (69.2)  | F (106.4)   | E (68.6)  | E (77.9)        | F (120.9) | D (54.5)  |
|                                               |                                  |                     | EBTR               | D (38.6)  | C (27.9)    | C (27.6)  | C (22.2)        | B (16.7)  | C (29.8)  |
|                                               | Maple Avenue                     |                     | WBL                | E (67.5)  | F (80.3)    | E (68.8)  | E (67.1)        | E (74.2)  | E (73.2)  |
|                                               |                                  |                     | WBTR               | C (29.9)  | E (59.7)    | F (100.8) | C (27.2)        | F (85.2)  | F (151.7) |
|                                               | Courthouse Road                  |                     | NBL                | E (77.1)  | F (80.7)    | F (73.7)  | F (85.2)        | F (87.5)  | E (74.0)  |
|                                               |                                  |                     | NBLT               | E (73.5)  | F (123.3)   | F (103.5) | E (78.2)        | F (139.2) | F (140.5) |
|                                               | Lawyers Road                     |                     | SBL                | F (104.1) | F (89.4)    | E (75.4)  | F (105.2)       | F (96.5)  | E (76.7)  |
|                                               |                                  |                     | SBLT               | D (49.4)  | E (68.8)    | E (57.5)  | D (46.0)        | F (86.3)  | F (89.8)  |
|                                               | Overall                          |                     | Overall            | D (46.4)  | E (63.6)    | E (76.5)  | D (39.9)        | E (76.5)  | F (105.5) |
|                                               |                                  |                     |                    |           |             |           |                 |           |           |
| 3 Nutley Street/ Roland Street                | Rowland Street                   | STOP                | EBLTR              | C (15.9)  | C (17.6)    | C (18.8)  | C (15.1)        | C (17.7)  | C (23.4)  |
|                                               |                                  |                     | WBLT               | C (23.0)  | D (30.7)    | C (23.5)  | C (22.4)        | D (30.8)  | D (31.6)  |
|                                               | Nutley Street                    |                     | NBL                | A [9.1]   | A [9.8]     | A [9.5]   | A [9.1]         | A [9.7]   | A [9.7]   |
|                                               |                                  |                     | NBLT               | A [0.0]   | A [0.0]     | A [0.0]   | A [0.0]         | A [0.0]   | A [0.0]   |
|                                               | Nutley Street                    |                     | SBL                | A [9.5]   | A [9.2]     | A [9.0]   | A [9.4]         | A [9.3]   | A [9.6]   |
|                                               |                                  |                     | SBLT               | A [0.0]   | A [0.0]     | A [0.0]   | A [0.0]         | A [0.0]   | A [0.0]   |
|                                               | 4 R/Ro/ Maple Avenue             | STOP                | EBTR               | A [0.0]   | A [0.0]     | A [0.0]   | A [0.0]         | A [0.0]   | A [0.0]   |
|                                               |                                  |                     | WBT                | A [0.0]   | A [0.0]     | A [0.0]   | A [0.0]         | A [0.0]   | A [0.0]   |
|                                               | Site Entrance                    |                     | NBR                | A [0.0]   | A [9.1]     | C [17.8]  | A [0.0]         | A [9.3]   | C [19.8]  |
|                                               |                                  |                     |                    |           |             |           |                 |           |           |
| 5 Site entrance/ Maple Avenue                 | Maple Avenue                     | STOP                | EBTR               | A [0.3]   | A [0.3]     | A [0.1]   | A [0.4]         | A [0.3]   | A [0.1]   |
|                                               |                                  |                     | WBTR               | A [0.2]   | A [0.3]     | A [0.1]   | A [0.2]         | A [0.3]   | A [0.1]   |
|                                               | Site Entrance                    |                     | NBLT               | B [13.3]  | B [14.6]    | C [15.1]  | B [14.4]        | C [15.2]  | C [16.4]  |
|                                               |                                  |                     | SBLT               | B [11.2]  | C [21.8]    | C [15.2]  | B [11.5]        | C [24.1]  | C [16.2]  |
|                                               | 6 Nutley Street/ Site entrance   | STOP                | WBR                | B [11.5]  | A [9.1]     | A [9.0]   | A [9.8]         | A [9.1]   | A [9.5]   |
|                                               |                                  |                     | NBTR               | A [0.0]   | A [0.0]     | A [0.0]   | A [0.0]         | A [0.0]   | A [0.0]   |
|                                               | Nutley Street                    |                     | SBT                | A [0.0]   | A [0.0]     | A [0.0]   | A [0.0]         | A [0.0]   | A [0.0]   |
|                                               |                                  |                     |                    |           |             |           |                 |           |           |
|                                               | 7 Nutley Street/ Windover Avenue | ALL WAY STOP        | EBLTR              | B [10.3]  | B [10.5]    | -         | B [10.5]        | B [10.7]  | -         |
|                                               |                                  |                     | WBLT               | B [10.1]  | B [12.0]    | -         | B [10.3]        | B [12.4]  | -         |
|                                               | Nutley Street                    |                     | NBLT               | B [10.2]  | B [13.2]    | -         | B [10.5]        | B [14.1]  | -         |
|                                               |                                  |                     | SBLT               | B [12.0]  | B [13.1]    | -         | B [12.6]        | B [13.9]  | -         |
| 8 James Madison Drive/ Maple Avenue           | Maple Avenue                     | STOP                | EBL                | A [9.2]   | B [11.1]    | A [9.7]   | A [9.3]         | B [11.6]  | A [9.9]   |
|                                               |                                  |                     | EBTR               | A [0.0]   | A [0.0]     | A [0.0]   | A [0.0]         | A [0.0]   | A [0.0]   |
|                                               | Maple Avenue                     |                     | WBL                | B [11.7]  | A [9.7]     | B [12.4]  | B [13.7]        | B [10.7]  | C [16.7]  |
|                                               |                                  |                     | WBTR               | A [0.0]   | A [0.0]     | A [0.0]   | A [0.0]         | A [0.0]   | A [0.0]   |
|                                               | Driveway                         |                     | NBLT               | F [110.1] | F [113.7]   | F [254.6] | F [933.0]       | F [789.9] | F [7]     |
|                                               |                                  |                     | SBLT               | F [92.4]  | F [91.3]    | F [147.5] | B [13.0]        | C [15.6]  | C [24.4]  |
|                                               | James Madison Drive              |                     |                    |           |             |           |                 |           |           |
|                                               |                                  |                     |                    |           |             |           |                 |           |           |
|                                               | Overall                          |                     | Overall            | B [10.9]  | B [12.5]    | -         | B [11.2]        | B [13.2]  | -         |
|                                               |                                  |                     |                    |           |             |           |                 |           |           |

Notes (1) Numbers in parentheses ( ) represent delay at signalized intersections in seconds per vehicle.  
(2) Numbers in brackets [ ] represent delay at unsignalized intersections in seconds per vehicle.  
(3) Asterisks \* represent delays in excess of 999.9 seconds.  
(4) Roadway names in bold are considered north/south for purposes of this analysis



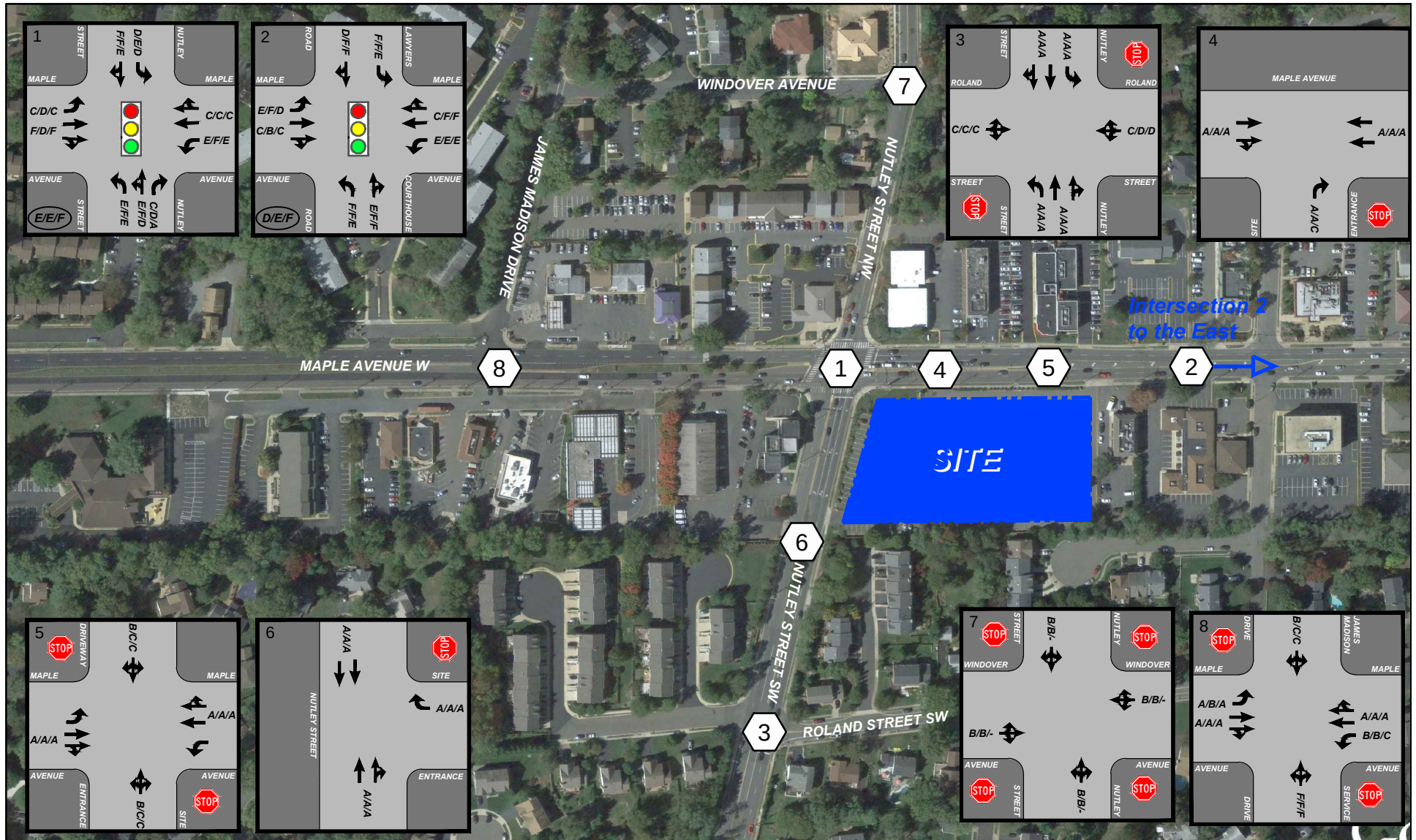


Figure 4-6  
2022 Background Future Levels of Service

444 Maple  
Town of Vienna

← Represents One Travel Lane  
 Signalized Intersection  
 Stop Sign



Table 4-3  
444 Maple  
Background Future Intersection Queuing Summary (1) (2) (3)

| Intersection                                  | Approach Roadway                    | Operating Condition | Approach/ Movement         | Available Storage (ft) | Existing |     | Background 2022 |     |      |      |
|-----------------------------------------------|-------------------------------------|---------------------|----------------------------|------------------------|----------|-----|-----------------|-----|------|------|
|                                               |                                     |                     |                            |                        | AM       | PM  | SAT             | AM  | PM   | SAT  |
| 1 Nutley Street/Maple Avenue                  | Maple Avenue                        | Signal              | EBL                        | 90                     | 34       | 43  | 49              | 42  | 48   | 63   |
|                                               |                                     |                     | EBTR                       | n/a                    | 718      | 447 | 693             | 793 | 502  | 825  |
|                                               | Maple Avenue                        |                     | WBL                        | 285                    | 217      | 306 | 511             | 205 | 362  | 503  |
|                                               |                                     |                     | WBTR                       | n/a                    | 315      | 745 | 495             | 354 | 864  | 607  |
|                                               | Nutley Street                       |                     | NBL                        | 220                    | 310      | 458 | 276             | 300 | 517  | 248  |
|                                               |                                     |                     | NBLT                       | n/a                    | 321      | 475 | 284             | 307 | 536  | 252  |
|                                               | Nutley Street                       |                     | NBR                        | n/a                    | 227      | 201 | 179             | 102 | 257  | 12   |
|                                               |                                     |                     | SBL                        | 200                    | 106      | 153 | 136             | 14  | 175  | 157  |
| 2 Courthouse Road, Lawyers Road/ Maple Avenue | Maple Avenue                        | Signal              | EBL                        | 160                    | 119      | 204 | 148             | 126 | 217  | 173  |
|                                               |                                     |                     | EBTR                       | n/a                    | 647      | 365 | 342             | 321 | 320  | 483  |
|                                               | Maple Avenue                        |                     | WBL                        | 145                    | 68       | 100 | 92              | 76  | 86   | 86   |
|                                               |                                     |                     | WBTR                       | n/a                    | 334      | 989 | 1023            | 308 | 1134 | 1181 |
|                                               | Courthouse Road                     |                     | NBL                        | 230                    | 106      | 125 | 111             | 117 | 156  | 141  |
|                                               |                                     |                     | NBTR                       | n/a                    | 376      | 644 | 594             | 414 | 681  | 642  |
|                                               | Lawyers Road                        |                     | SBL                        | 245                    | 318      | 238 | 204             | 350 | 279  | 223  |
|                                               |                                     |                     | SBTR                       | n/a                    | 323      | 539 | 512             | 351 | 643  | 616  |
| 3 Nutley Street/ Roland Street                | Rowland Street                      | STOP                | EBLTR                      | n/a                    | 3        | 3   | 2               | 3   | 3    | 3    |
|                                               |                                     |                     | WBLTR                      | n/a                    | 11       | 15  | 11              | 11  | 15   | 16   |
|                                               | Nutley Street                       |                     | NBL                        | 165                    | 1        | 1   | 1               | 0   | 1    | 1    |
|                                               |                                     |                     | NBTR                       | n/a                    | 0        | 0   | 0               | 0   | 0    | 0    |
|                                               | Nutley Street                       |                     | SBL                        | 145                    | 0        | 1   | 0               | 0   | 1    | 0    |
|                                               |                                     |                     | SBTR                       | n/a                    | 0        | 0   | 0               | 0   | 0    | 0    |
|                                               | Maple Avenue                        |                     | EBTR                       | n/a                    | 0        | 0   | 0               | 0   | 0    | 0    |
|                                               |                                     |                     | Maple Avenue Site Entrance | n/a                    | 0        | 0   | 0               | 0   | 0    | 0    |
| 4 RIRo/ Maple Avenue                          | Maple Avenue                        | STOP                | NBR                        | n/a                    | 0        | 1   | 1               | 0   | 1    | 2    |
|                                               |                                     |                     |                            |                        |          |     |                 |     |      |      |
|                                               | Maple Avenue                        |                     | EBTR                       | n/a                    | 1        | 1   | 0               | 1   | 1    | 0    |
|                                               |                                     |                     | WBTR                       | n/a                    | 1        | 1   | 0               | 1   | 1    | 0    |
|                                               | Maple Avenue Site Entrance Driveway |                     | NBLTR                      | n/a                    | 1        | 1   | 2               | 1   | 1    | 2    |
|                                               |                                     |                     | SBLTR                      | n/a                    | 1        | 3   | 2               | 1   | 4    | 3    |
|                                               | Site Entrance                       |                     | WBR                        | 0                      | 0        | 0   | 0               | 0   | 0    | 0    |
|                                               |                                     |                     | Nutley Street              | n/a                    | 0        | 0   | 0               | 0   | 0    | 0    |
| 5 Site entrance/ Maple Avenue                 | Nutley Street                       | STOP                | SBT                        | n/a                    | 0        | 0   | 0               | 0   | 0    | 0    |
|                                               |                                     |                     |                            |                        |          |     |                 |     |      |      |
|                                               | Nutley Street                       |                     | EBLTR                      | n/a                    | n/a      | n/a | n/a             | n/a | n/a  | n/a  |
|                                               |                                     |                     | WBLTR                      | n/a                    | n/a      | n/a | n/a             | n/a | n/a  | n/a  |
|                                               | Site Entrance Driveway              |                     | NBLTR                      | n/a                    | 1        | 1   | 2               | 1   | 1    | 2    |
|                                               |                                     |                     | SBLTR                      | n/a                    | 1        | 3   | 2               | 1   | 4    | 3    |
|                                               | Site Entrance                       |                     | WBR                        | 0                      | 0        | 0   | 0               | 0   | 0    | 0    |
|                                               |                                     |                     | Nutley Street              | n/a                    | 0        | 0   | 0               | 0   | 0    | 0    |
| 6 Nutley Street/ Site entrance                | Nutley Street                       | STOP                | SBT                        | n/a                    | 0        | 0   | 0               | 0   | 0    | 0    |
|                                               |                                     |                     |                            |                        |          |     |                 |     |      |      |
|                                               | Nutley Street                       |                     | EBLTR                      | n/a                    | n/a      | n/a | n/a             | n/a | n/a  | n/a  |
|                                               |                                     |                     | WBLTR                      | n/a                    | n/a      | n/a | n/a             | n/a | n/a  | n/a  |
|                                               | Site Entrance                       |                     | NBLTR                      | n/a                    | 1        | 1   | 2               | 1   | 1    | 2    |
|                                               |                                     |                     | SBLTR                      | n/a                    | 1        | 3   | 2               | 1   | 4    | 3    |
|                                               | Site Entrance                       |                     | WBR                        | 0                      | 0        | 0   | 0               | 0   | 0    | 0    |
|                                               |                                     |                     | Nutley Street              | n/a                    | 0        | 0   | 0               | 0   | 0    | 0    |
| 7 Nutley Street/ Windover Avenue              | Windover Avenue                     | ALL WAY STOP        | EBLTR                      | n/a                    | n/a      | n/a | n/a             | n/a | n/a  | n/a  |
|                                               |                                     |                     | WBLTR                      | n/a                    | n/a      | n/a | n/a             | n/a | n/a  | n/a  |
|                                               | Windover Avenue                     |                     | NBLTR                      | n/a                    | n/a      | n/a | n/a             | n/a | n/a  | n/a  |
|                                               |                                     |                     | SBLTR                      | n/a                    | n/a      | n/a | n/a             | n/a | n/a  | n/a  |
|                                               | Nutley Street                       |                     | EBL                        | 205                    | 14       | 12  | 8               | 14  | 13   | 8    |
|                                               |                                     |                     | EBTR                       | n/a                    | 0        | 0   | 0               | 0   | 0    | 0    |
|                                               | Nutley Street                       |                     | WBL                        | 145                    | 7        | 4   | 23              | 22  | 13   | 60   |
|                                               |                                     |                     | WBTR                       | n/a                    | 0        | 0   | 0               | 0   | 0    | 0    |
| 8 James Madison Drive/ Maple Avenue           | Maple Avenue                        | STOP                | NBLTR                      | n/a                    | 33       | 45  | 81              | 150 | 174  | *    |
|                                               |                                     |                     | SBLTR                      | n/a                    | 107      | 133 | 112             | 10  | 23   | 22   |
|                                               | Maple Avenue                        |                     | EBL                        | 205                    | 14       | 12  | 8               | 14  | 13   | 8    |
|                                               |                                     |                     | EBTR                       | n/a                    | 0        | 0   | 0               | 0   | 0    | 0    |
|                                               | Maple Avenue                        |                     | WBL                        | 145                    | 7        | 4   | 23              | 22  | 13   | 60   |
|                                               |                                     |                     | WBTR                       | n/a                    | 0        | 0   | 0               | 0   | 0    | 0    |
|                                               | James Madison Drive Driveway        |                     | NBLTR                      | n/a                    | 33       | 45  | 81              | 150 | 174  | *    |
|                                               |                                     |                     | SBLTR                      | n/a                    | 107      | 133 | 112             | 10  | 23   | 22   |

Notes (1) Turning movement queue length is based on the 95th percentile queue in feet as reported by Synchro, Version 9.  
(2) Roadway names in bold are considered north/south for purposes of this analysis  
(3) Queues for All Way STOPS (Nutley Street/Windover Avenue) not reported by Synchro

## Section 5 SITE ANALYSIS

### OVERVIEW

The Applicant has filed a rezoning application to permit the development of approximately 160 multifamily dwelling units and 20,000 GSF additional retail uses. As scoped with County and VDOT staff, this TIA provides an analysis of 2022 build-out conditions. The trip generation and distribution analyses were conducted in accordance with the established study scope provided in Appendix A.

### EXISTING SITE DRIVEWAY TRAFFIC REMOVED

The existing peak hour driveway trips associated with the subject property were removed from the road network as shown on Figure 5-1.

### SITE TRIP GENERATION ANALYSIS

The number of trips that would be generated by the proposed development were estimated based on the ITE 9<sup>th</sup> Edition, *Trip Generation Manual* using the peak hour of the adjacent street rates/equations, where applicable. The trip generation for the proposed mixed-use development is summarized on Table 5-1 and described below.

- 125 weekday AM peak hour trips
- 133 weekday PM peak hour trips
- 261 Saturday peak hour trips
- 1,449 average weekday daily trips

The net new external vehicle trips detailed above include and internal allowance reduction of 5%, 10%, and 15% in the AM, PM, and Saturday peak hours respectively. This reduction, consistent with the agreed upon scope provided in Appendix A, accounts for trips going to/from the apartment/retail components that are contained to the site. Additionally, a 35% pass-by reduction for the retail component only was taken to account for existing trips that are currently on the existing network that would be pulled from the network to use the retail portions of the site.

During the course of analysis it was realized that the trip generation rates/equations in ITE for the residential and commercial uses for a Saturday represent the peak hour of the generator for those specific uses and by their nature experience their traffic peak at different times of the day. This variation in the peak hours of the different land uses is more evident during the weekend. Having a mix of uses that provide synergy with each other as well as distribute peak hour traffic is in line with the MAC district “vision” as well as the intent of the developer. To account for this difference diurnal rates for the shopping center use as provided by ITE *Trip Generation* and for the residential use as provided by the *ITE Journal* were consulted. According to the diurnal rates the inbound trips for a shopping center and outbound trips for a residential use correspond to the analyzed Saturday peak hour so no reduction was taken for those specific movements. A slight reduction was taken for outbound shopping center trips and inbound residential trips based on the variation of the diurnal each of the uses relative to the single Saturday peak hour that was evaluated in the study. The diurnal rate sources are provided as Appendix H and the reductions are shown with the other reductions above on Table 5-1.



Table 5-1 also provides a trip generation analysis assuming the subject site was developed by-right (without the need for a rezoning application). For purposes of this analysis, it was assumed that the site could redevelop as a grocery store use. As shown in Table 5-1, the site could potentially generate substantially more vehicle trips if redeveloped by-right than trips generated by the proposed redevelopment.

## **PROPOSED SITE ACCESS**

Vehicular access to the subject property is proposed to be provided by a full-movement driveway at an existing, unsignalized median break on Maple Avenue and a STOP controlled right-in/right-out (RiRo) driveway on Nutley Street. These access points currently exist and will remain unchanged with the exception of a right-in/right-out entrance on Maple Avenue which will be eliminated with the development of the site. A reduction of the proposed layout is provided on Figure 2-1 and a full-size copy of the CDP/FDP layout is included as Appendix B. The total future lane use and traffic controls assumed under total future conditions that incorporates the proposed site access and those transportation improvements listed under Section 4 of this TIA is shown on Figure 5-2.

## **SITE TRIP DISTRIBUTION**

The distribution of the new vehicle peak hour trips generated by the proposed mixed-use development were based on a review by VDOT and Town staff, a review of existing traffic patterns in the study area, future development patterns, local knowledge, and engineering judgment as recommended by 24 VAC 30-155-60.D. As scoped and agreed to with VDOT and Town staff (see Appendix A), the trip distributions assumed for the proposed residential development are depicted on Figure 5-3.

## **SITE TRIP ASSIGNMENTS**

The new vehicle peak hour trips summarized in Table 5-1 were assigned to the public roadway network according to the directional distributions depicted on Figure 5-3. The resulting trip assignments are also provided on Figure 5-3.

## **PARKING SUPPLY**

The Applicant is proposing to provide 336 parking spaces within structured and surface parking to accommodate the proposed uses. A reduction of the proposed parking plan is provided as Figure 5-4. Specifically, the Applicant is proposing to provide 199 spaces for the residential uses and 137 spaces for the retail uses (including assumptions for potential restaurant use within the retail space). Article 16 of the Town Code of Vienna specifies the following off-street parking requirements for the proposed uses:

|                  |                                              |
|------------------|----------------------------------------------|
| Multiple Family: | Efficiency: 1 space/dwelling unit            |
|                  | One Bedroom: 1.5 spaces/dwelling unit        |
|                  | Two or more Bedrooms: 2 spaces/dwelling unit |

Commercial Building: 1 space/200 SF of floor area  
Restaurant: 1 space/4 seats

As provided for in the Town's MAC zoning designation as an incentive for meeting certain design features, the Applicant proposes to apply a 15 percent reduction in the minimum number of parking spaces required under Article 16. Furthermore, the proposed parking supply accounts for an incentive to provide structured parking in that each space within a parking structure can be counted as 1.25 spaces towards meeting the minimum parking requirement. These reductions are accounted for the proposed parking supply reflected in Figure 5-4.

Table 5-1  
444 Maple  
Site Trip Generation <sup>(1)</sup>

| Scenario                                      | Land Use Code | Amount | Units | AM Peak Hour |           | Total       | PM Peak Hour |              | Total        | Average Daily Trips |  | Saturday Peak Hour |             | Total        |
|-----------------------------------------------|---------------|--------|-------|--------------|-----------|-------------|--------------|--------------|--------------|---------------------|--|--------------------|-------------|--------------|
|                                               |               |        |       | In           | Out       |             | In           | Out          |              | Daily Trips         |  | In                 | Out         |              |
| <b>Proposed Program</b>                       |               |        |       |              |           |             |              |              |              |                     |  |                    |             |              |
| Apartment                                     | 220           | 160    | Rooms | 16           | 66        | 82          | 69           | 37           | 106          | 1,093               |  | 45                 | 38          | 83           |
|                                               |               |        |       | (1)          | (2)       | (3)         | (3)          | (2)          | (5)          | (133)               |  | (7)                | (6)         | (13)         |
| Internal allowance (5%/10%/15%)               |               |        |       |              |           |             |              |              |              |                     |  | (1)                | 0           | (1)          |
| Saturday Off-Peak Reduction (2% In, 0% Out)   |               |        |       |              |           |             |              |              |              |                     |  |                    |             |              |
| Net External Trips                            |               |        |       | 15           | 64        | 79          | 66           | 35           | 101          | 960                 |  | 37                 | 32          | 70           |
| Specialty Retail                              | 826           | 20,000 | SF    | 36           | 38        | 74          | 24           | 30           | 54           | 886                 |  | 160                | 147         | 307          |
|                                               |               |        |       |              |           |             |              |              |              |                     |  |                    |             |              |
| <b>Retail Subtotal</b>                        |               |        |       | <b>36</b>    | <b>38</b> | <b>74</b>   | <b>24</b>    | <b>30</b>    | <b>54</b>    | <b>886</b>          |  | <b>160</b>         | <b>147</b>  | <b>307</b>   |
| Internal allowance (5%/10%/15%)               |               |        |       | (2)          | (1)       | (3)         | (2)          | (3)          | (5)          | (133)               |  | (6)                | (7)         | (13)         |
| Saturday Off-Peak Reduction (0% In, 2.2% Out) |               |        |       |              |           |             |              |              |              |                     |  | 0                  | (3)         | (3)          |
| Net External Trips                            |               |        |       | 34           | 37        | 71          | 22           | 27           | 49           | 753                 |  | 154                | 137         | 294          |
| Pass-by Trips (35%)                           |               |        |       | (12)         | (13)      | (25)        | (8)          | (9)          | (17)         | (264)               |  | (54)               | (48)        | (103)        |
| Net New External Retail Trips                 |               |        |       | 22           | 24        | 46          | 14           | 18           | 32           | 489                 |  | 100                | 89          | 191          |
| <b>By-Right</b>                               |               |        |       |              |           |             |              |              |              |                     |  |                    |             |              |
| <b>Net New Trips</b>                          |               |        |       | <b>37</b>    | <b>88</b> | <b>125</b>  | <b>80</b>    | <b>53</b>    | <b>133</b>   | <b>1,449</b>        |  | <b>137</b>         | <b>121</b>  | <b>261</b>   |
| Supermarket                                   | 850           | 62,780 | SF    | 132          | 81        | 213         | 282          | 270          | 552          | 6,419               |  | 353                | 339         | 692          |
|                                               |               |        |       | (46)         | (28)      | (75)        | (99)         | (95)         | (193)        | (2,247)             |  | (124)              | (119)       | (242)        |
| Pass-by Trips (35%)                           |               |        |       |              |           |             |              |              |              |                     |  |                    |             |              |
| <b>Net New Trips</b>                          |               |        |       | <b>86</b>    | <b>53</b> | <b>138</b>  | <b>183</b>   | <b>175</b>   | <b>359</b>   | <b>4,172</b>        |  | <b>229</b>         | <b>220</b>  | <b>450</b>   |
| <b>Difference (Proposed minus By-Right)</b>   |               |        |       | <b>(49)</b>  | <b>35</b> | <b>(13)</b> | <b>(103)</b> | <b>(122)</b> | <b>(226)</b> | <b>(2,723)</b>      |  | <b>(92)</b>        | <b>(99)</b> | <b>(189)</b> |

Note(s):  
(1) Trip generation based on the Institute of Transportation Engineers' Trip Generation Manual, 9th Edition.  
(2) For LU code 220 no Directional Distribution for Saturday is provided by ITE. For purposes of this analysis, the distribution used is for LU Code 230 (Residential Condominium/Townhouse)  
(3) For LU code 826 no Saturday Peak Hour is provided by ITE. For purposes of this analysis, the Saturday Peak Hour of Generator for LU Code 820 (Shopping Center) was used



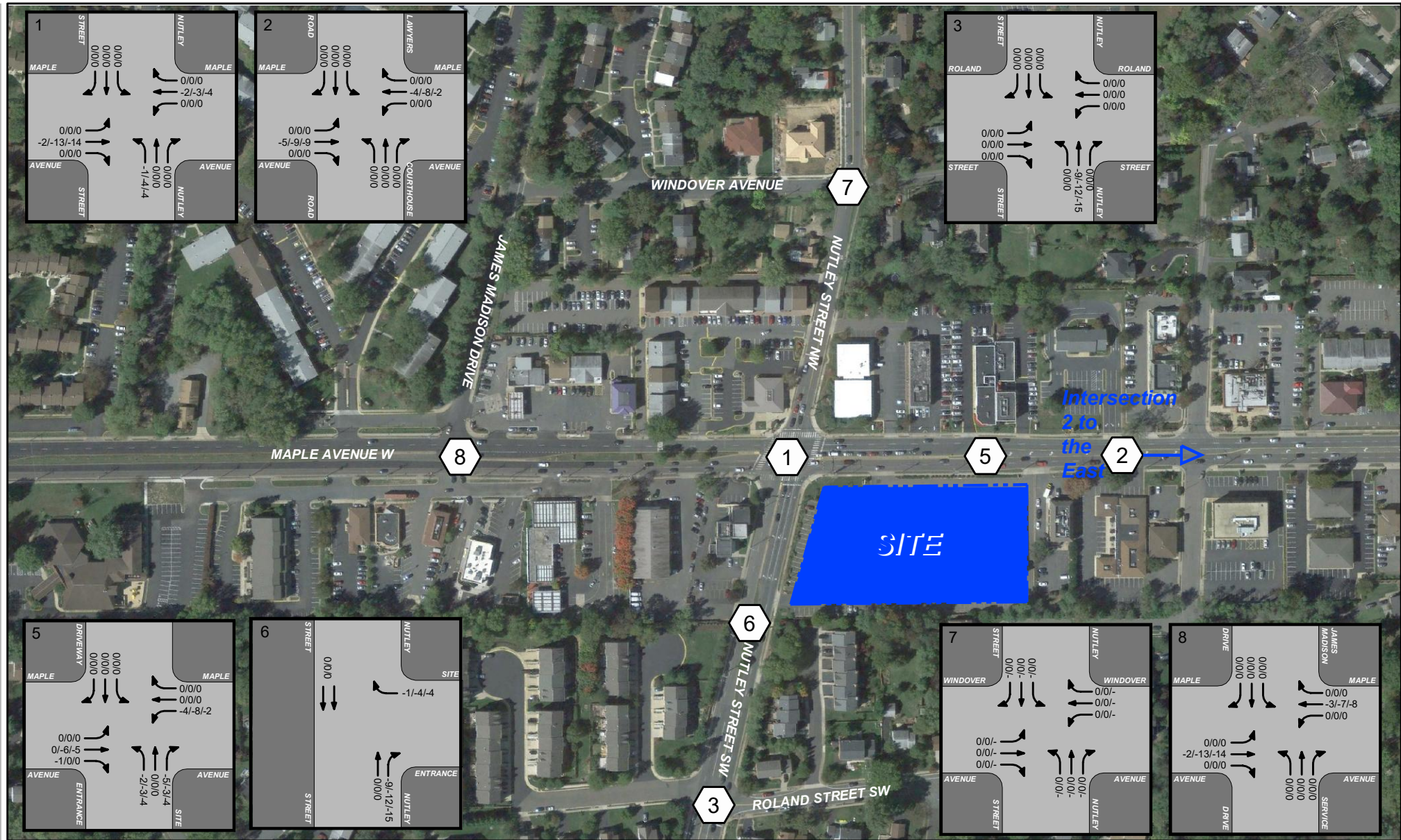


Figure 5-1  
Existing Site Trips To Be Removed

444 Maple  
Town of Vienna, Virginia

AM PEAK HOUR  
PM PEAK HOUR  
000 / 000 / 000 - SAT PEAK HOUR





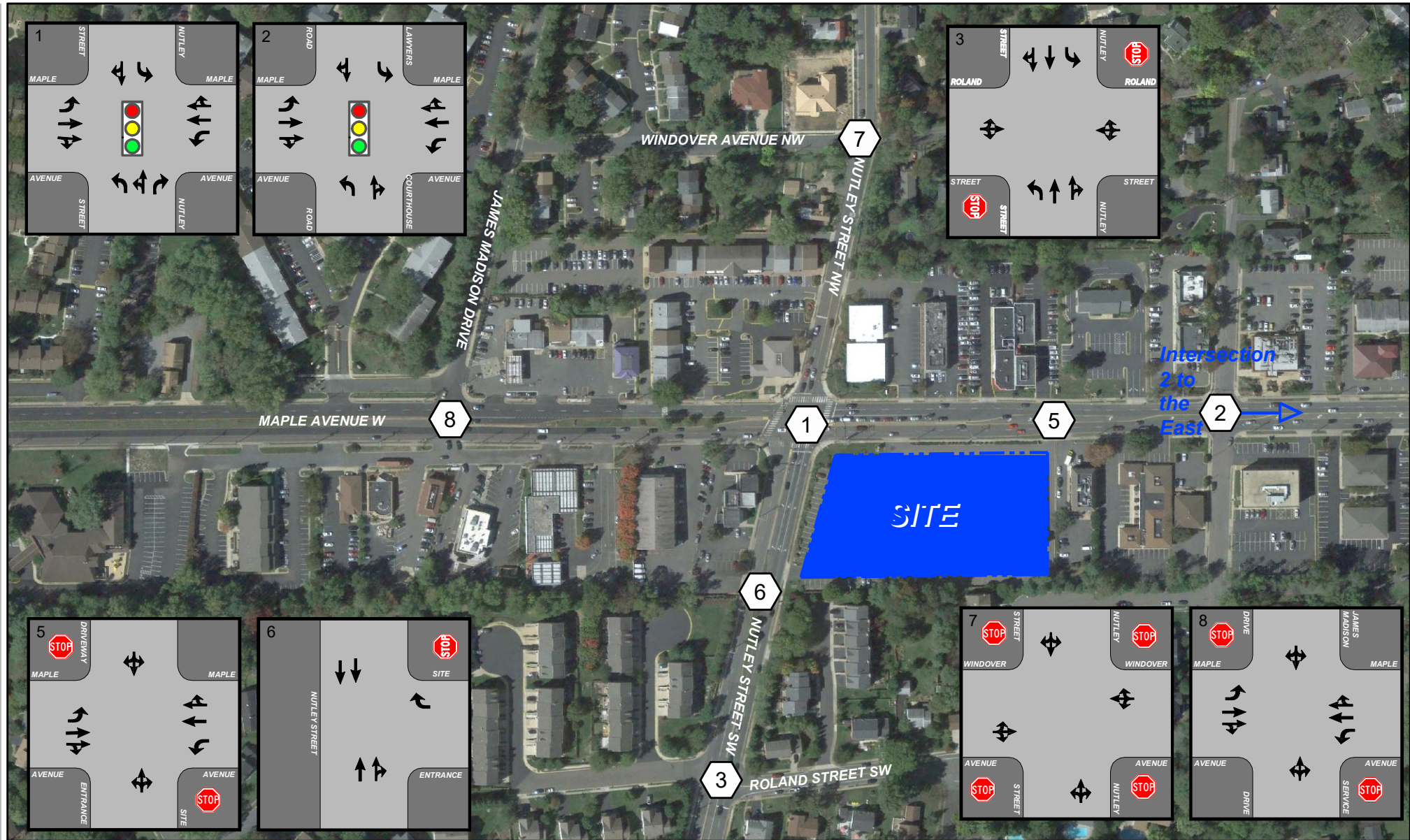


Figure 5-2  
Future Lane Use and Traffic Controls

444 Maple  
Town of Vienna

- ← Represents One Travel Lane
- 🚦 Signalized Intersection
- 🛑 Stop Sign







Figure 5-3  
Site Trip Assignments and Percent Distribution

444 Maple  
Town of Vienna, Virginia



|                        | Unit                               | Area     | Balcony | B2                                                       | B1       | G         | F1        | F2        | F3        | Total      |                       | Ratio      |
|------------------------|------------------------------------|----------|---------|----------------------------------------------------------|----------|-----------|-----------|-----------|-----------|------------|-----------------------|------------|
| S                      | S1                                 | 527 SF   | 0 SF    | 0                                                        | 0        | 0         | 3         | 0         | 0         | 3          | 6                     | 3.8%       |
|                        | S2                                 | 647 SF   | 0 SF    | 0                                                        | 0        | 0         | 1         | 1         | 1         | 3          |                       |            |
| 1 BR                   | A1                                 | 702 SF   | 0 SF    | 0                                                        | 0        | 0         | 11        | 11        | 11        | 33         | 90                    | 56.3%      |
|                        | A2                                 | 702 SF   | 66 SF   | 0                                                        | 0        | 0         | 8         | 11        | 11        | 30         |                       |            |
|                        | A3                                 | 774 SF   | 0 SF    | 0                                                        | 0        | 0         | 1         | 1         | 1         | 3          |                       |            |
|                        | A4                                 | 759 SF   | 0 SF    | 0                                                        | 0        | 0         | 2         | 2         | 2         | 6          |                       |            |
| DEN                    | B1                                 | 863 SF   | 0 SF    | 0                                                        | 0        | 0         | 3         | 3         | 3         | 9          | 90                    | 56.3%      |
|                        | B2                                 | 900 SF   | 0 SF    | 0                                                        | 0        | 0         | 1         | 1         | 1         | 3          |                       |            |
|                        | B3                                 | 897 SF   | 0 SF    | 0                                                        | 0        | 0         | 1         | 1         | 1         | 3          |                       |            |
|                        | B4                                 | 918 SF   | 0 SF    | 0                                                        | 0        | 0         | 1         | 1         | 1         | 3          |                       |            |
| 2 BEDROOM              | C1                                 | 1,053 SF | 0 SF    | 0                                                        | 0        | 0         | 7         | 7         | 7         | 21         | 64                    | 40.0%      |
|                        | C2                                 | 1,053 SF | 66 SF   | 0                                                        | 0        | 0         | 2         | 2         | 2         | 6          |                       |            |
|                        | C3                                 | 1,185 SF | 0 SF    | 0                                                        | 0        | 0         | 3         | 3         | 3         | 9          |                       |            |
|                        | C4                                 | 1,124 SF | 176 SF  | 0                                                        | 0        | 0         | 5         | 5         | 6         | 16         |                       |            |
|                        | C5                                 | 1,159 SF | 0 SF    | 0                                                        | 0        | 0         | 1         | 1         | 1         | 3          |                       |            |
|                        | C6                                 | 1,227 SF | 166 SF  | 0                                                        | 0        | 0         | 1         | 1         | 1         | 3          |                       |            |
|                        | C7                                 | 1,055 SF | 66 SF   | 0                                                        | 0        | 0         | 1         | 1         | 1         | 3          |                       |            |
|                        | C8                                 | 1,109 SF | 66 SF   | 0                                                        | 0        | 0         | 1         | 1         | 1         | 3          |                       |            |
| Total Units            |                                    |          |         | 0                                                        | 0        | 0         | 53        | 53        | 54        | 160        |                       |            |
| AREA                   |                                    |          |         |                                                          |          |           |           |           |           | Total      | Average Area per Unit |            |
|                        | Net Residential Area               |          |         | 0 SF                                                     | 0 SF     | 0 SF      | 46,364 SF | 46,889 SF | 48,013 SF | 141,266 SF | Avg/Unit              | 882.9 SF   |
|                        | Amenity Area                       |          |         | 0 SF                                                     | 0 SF     | 6,231 SF  | 2,532 SF  | 0 SF      | 0 SF      | 8,763 SF   | Efficiency            | 82.4%      |
|                        | Gross Residential Area Excluding B |          |         | 0 SF                                                     | 0 SF     | 6,231 SF  | 55,641 SF | 54,157 SF | 55,380 SF | 171,409 SF | Avg/Unit              | 1,071.3 SF |
|                        | Gross Residential Area Including B |          |         | 0 SF                                                     | 0 SF     | 6,231 SF  | 57,479 SF | 56,193 SF | 57,592 SF | 177,495 SF | Avg/Unit              | 1,109.3 SF |
|                        | Gross Retail Area (Non Restaurant) |          |         | 0 SF                                                     | 0 SF     | 10,103 SF | 0 SF      | 0 SF      | 0 SF      | 10,103 SF  |                       |            |
|                        | Gross Restaurant Area              |          |         | 0 SF                                                     | 0 SF     | 10,213 SF | 0 SF      | 0 SF      | 0 SF      | 10,213 SF  |                       |            |
| Outdoor Retail Seating |                                    |          | 0 SF    | 0 SF                                                     | 2,032 SF | 0 SF      | 0 SF      | 0 SF      | 2,032 SF  |            |                       |            |
| PARKING                | Required                           |          |         |                                                          |          |           |           |           |           | Required   |                       | Reduced    |
|                        | Residential Parking Required       |          |         | 1 / Studio, 1.5 / 1 BR, 2 / 2BR+, Optional 15% Reduction |          |           |           |           |           | 269        | -15%                  | 229        |
|                        | Retail Parking Required            |          |         | 5 Spaces / 1000 SF, Optional 15% Reduction               |          |           |           |           |           | 51         | -15%                  | 44         |
|                        | Restaurant Parking Required        |          |         | 1 Space / 4 Seats (1 Seat = Area x 60% / 15 sf)          |          |           |           |           |           | 103        | -15%                  | 88         |
|                        | Outdoor Seating Parking Required   |          |         | 1 Space / 4 Seats (1 Seat = Area / 15 sf)                |          |           |           |           |           | 34         | -15%                  | 29         |
|                        | Total Retail Parking Required      |          |         |                                                          |          |           |           |           |           | 188        |                       | 161        |
|                        | Total Parking Required             |          |         |                                                          |          |           |           |           |           | 457        |                       | 390        |
|                        | Provided                           |          |         | Bonus: Structured Parking Garage Counts as 1.25 Spaces   |          |           |           |           |           | Provided   |                       | Bonus      |
|                        | Parking Type                       |          |         | Garage                                                   | Garage   | Surface   |           |           |           |            |                       | 25%        |
|                        | Residential Parking Provided       |          |         | 199                                                      | 0        | 0         | 0         | 0         | 0         | 199        |                       | 249        |
| BIKE PARKING           | Retail Parking Provided            |          |         | 0                                                        | 85       | 52        | 0         | 0         | 0         | 137        |                       | 159        |
|                        | Total Parking Provided             |          |         | 199                                                      | 85       | 52        | 0         | 0         | 0         | 336        |                       | 408        |
|                        | Res Bike Parking Required          |          |         | 1 / 10 DU + 1 / 50 DU                                    |          |           |           |           |           | 20         |                       |            |
|                        | Retail Bike Parking Required       |          |         | 1 / 5,000 SF + 1 / 25,000 SF                             |          |           |           |           |           | 3          |                       |            |
|                        | Total Bike Parking Required        |          |         |                                                          |          |           |           |           |           | 23         |                       |            |
|                        | Res Bike Parking Provided          |          |         | 0                                                        | 0        | 60        | 0         | 0         | 0         | 60         |                       |            |
| BIKE PARKING           | Retail Bike Parking Provided       |          |         | 0                                                        | 0        | 20        | 0         | 0         | 0         | 20         |                       |            |
|                        | Total Bike Parking Provided        |          |         | 0                                                        | 0        | 80        | 0         | 0         | 0         | 80         |                       |            |

Figure 5-4  
Parking Supply

## **Section 6**

### **2022 BUILD OUT ANALYSIS OF TOTAL FUTURE CONDITIONS WITH PROPOSED DEVELOPMENT**

#### **TOTAL FUTURE TRAFFIC FORECASTS**

The 2022 and 2028 total future traffic forecasts associated with the proposed mixed-use development were developed by combining the baseline traffic volumes shown on Figure 3-1, regional growth estimates shown on Figure 4-1, the total pipeline trip assignments shown on Figure 4-3, the removal of existing site trips as shown on Figure 5-1, and the total site trip assignments shown on Figure 5-3. The resulting total future traffic forecasts for year 2022 and 2028 are provided on Figure 6-1 and Figure 6-1a respectively.

#### **OPERATIONAL ANALYSIS**

The total future (with proposed development) capacity analyses for year 2022 and 2028 were performed at the study intersections based on the total future traffic forecasts shown on Figure 6-1 and Figure 6-1a and the future lane use and traffic controls shown on Figure 5-2. The results of the total future conditions analyses are presented in Appendix I and summarized in Table 6-1. The results are also summarized graphically on Figure 6-2 and Figure 6-2a.

**Results.** The results of the total future (with the proposed development) intersection capacity analyses indicate the signalized Nutley Street/Maple Avenue intersection continues to operate during the weekday AM, PM and Saturday peak hours consistent with background future conditions. All the STOP controlled intersections and driveways that serve the site have traffic movements that operate at LOS “D” or better in the AM, PM and Saturday peak hours, with the exception northbound left movements exiting the site along Maple Avenue.

#### **QUEUING ANALYSIS**

A queuing analysis was conducted for 2022 total future conditions at the study intersections and compared to the queuing analysis completed for background conditions. The results are summarized in Table 6-2. Queue reports are also provided in Appendix I. As shown on Table 6-2, a number of 95<sup>th</sup> percentile queues extend past the available effective storage in the total future condition consistent with background future conditions.

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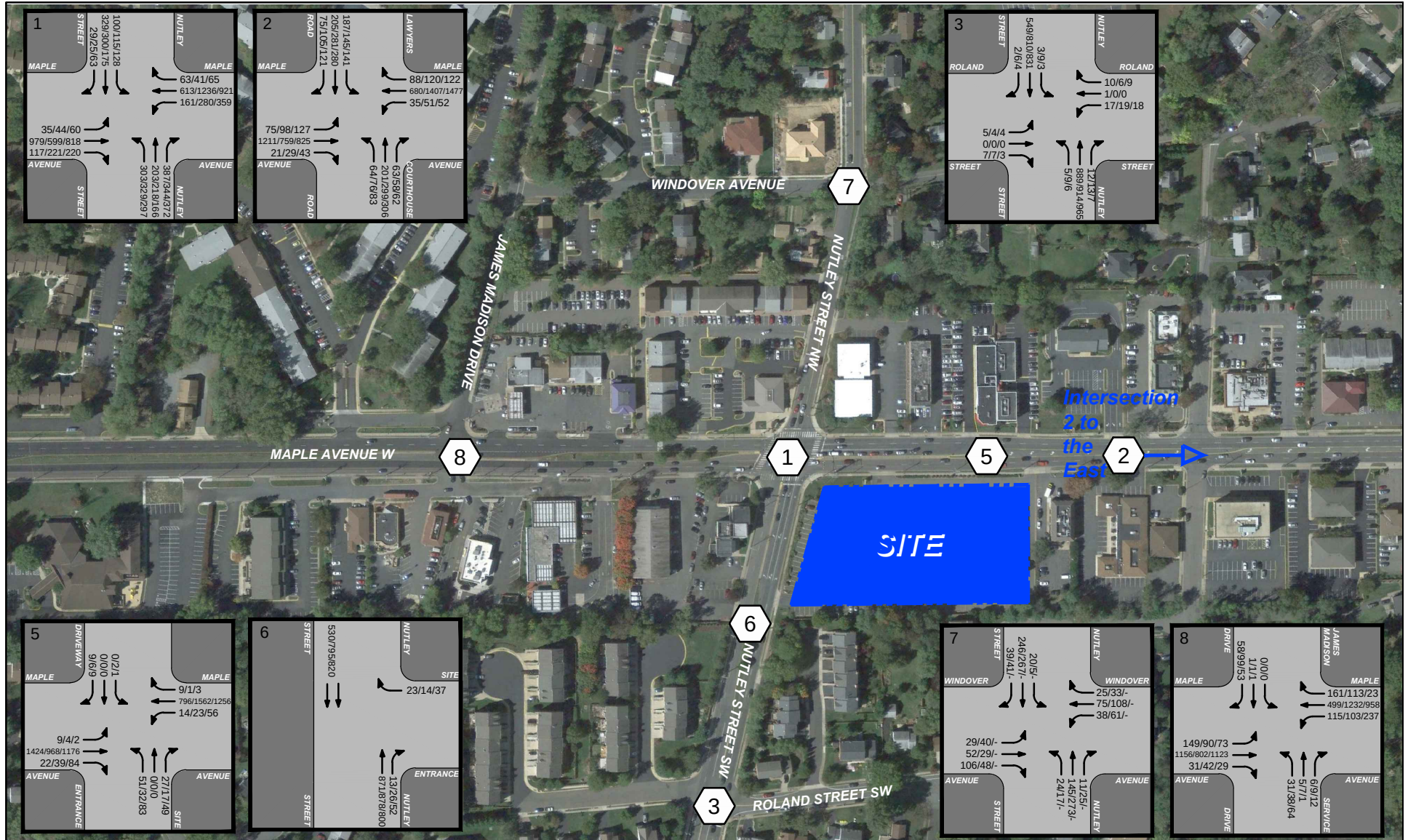


Figure 6-1  
2022 Total Future Traffic Forecasts

444 Maple  
Town of Vienna, Virginia

JCP



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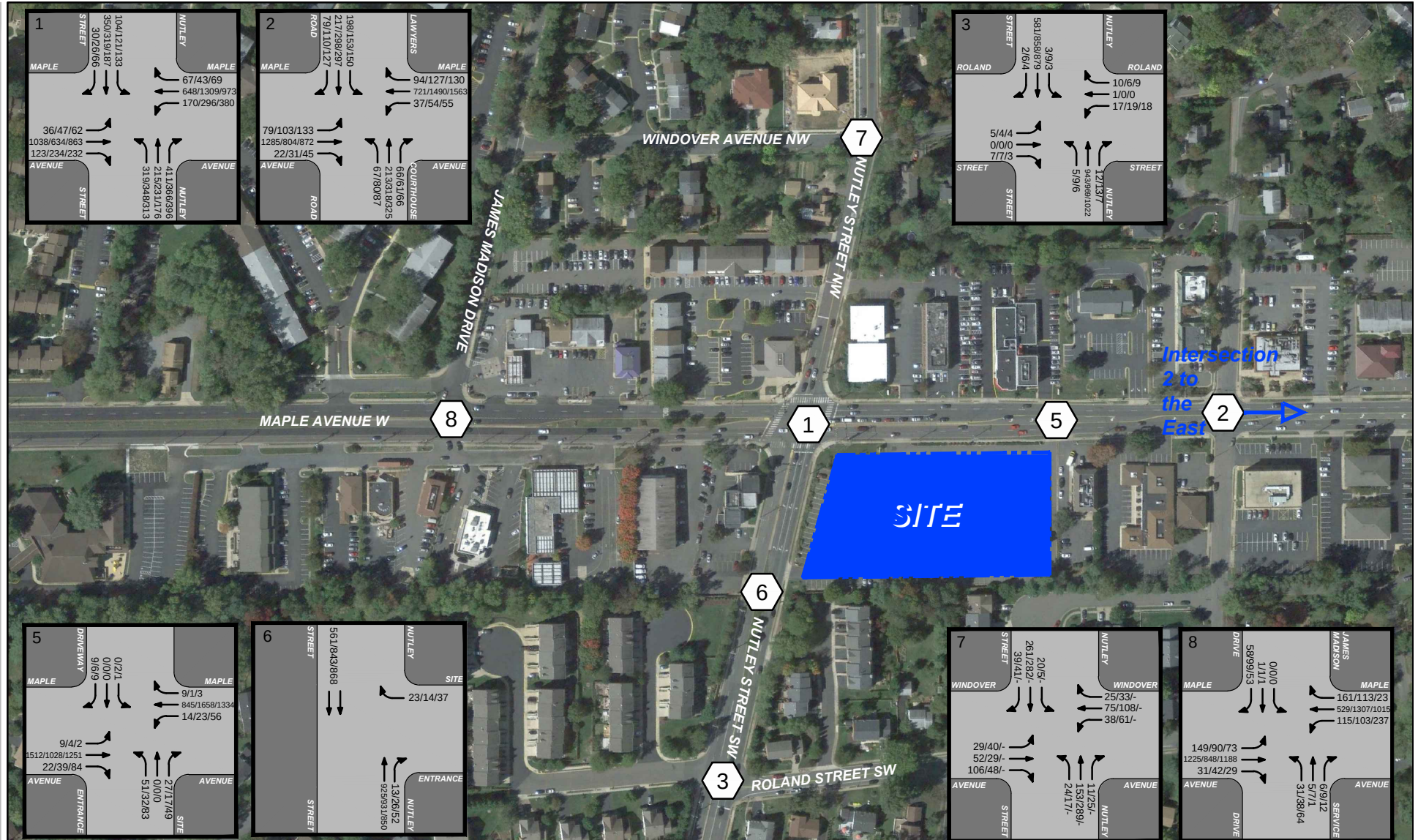


Figure 6-1a  
2028 Total Future Traffic Forecasts

444 Maple  
Town of Vienna, Virginia

JCP



Table 6-1

444 Maple

Total Future Intersection Levels of Service Summary (1) (2) (3) (4)

| Intersection                                  | Approach/<br>Roadway | Operating<br>Condition | Approach/<br>Movement | Existing  |           |           | Background 2022 |           |           | Total Future 2022 |           |           | Total Future 2028 |            |           |
|-----------------------------------------------|----------------------|------------------------|-----------------------|-----------|-----------|-----------|-----------------|-----------|-----------|-------------------|-----------|-----------|-------------------|------------|-----------|
|                                               |                      |                        |                       | AM        | PM        | SAT       | AM              | PM        | SAT       | AM                | PM        | SAT       | AM                | PM         | SAT       |
| 1 Nutley Street/Maple Avenue                  | Maple Avenue         | Signal                 | EBL                   | C (28.6)  | D (40.8)  | D (35.8)  | C (28.5)        | D (42.5)  | D (38.6)  | C (29.8)          | D (42.9)  | D (39.8)  | C (30.9)          | D (44.1)   | D (42.0)  |
|                                               |                      |                        | EBTR                  | F (81.0)  | D (50.8)  | F (39.5)  | F (86.1)        | D (53.1)  | F (208.1) | F (105.3)         | D (54.7)  | F (243.4) | F (143.7)         | E (55.2)   | F (276.2) |
|                                               | Maple Avenue         |                        | WBL                   | D (50.4)  | D (52.1)  | D (52.1)  | F (68.7)        | F (80.7)  | F (80.7)  | F (80.7)          | F (80.7)  | F (81.5)  | F (81.5)          | F (134.2)  | F (110.7) |
|                                               |                      |                        | WBTR                  | C (32.6)  | C (32.6)  | C (34.6)  | C (32.7)        | C (32.3)  | C (21.6)  | C (28.7)          | C (33.9)  | C (32.9)  | C (30.1)          | C (42.2)   | C (29.1)  |
|                                               | Nutley Street        |                        | NBL                   | E (68.1)  | F (95.8)  | E (66.4)  | E (66.4)        | F (120.8) | E (55.1)  | E (66.8)          | F (118.3) | E (57.4)  | E (69.3)          | F (132.2)  | E (59.9)  |
|                                               |                      |                        | NBLT                  | E (67.8)  | F (95.5)  | E (65.9)  | E (65.3)        | F (120.4) | D (54.8)  | E (66.0)          | F (118.3) | E (55.5)  | E (68.2)          | F (127.8)  | E (58.3)  |
|                                               | Nutley Street        |                        | NBR                   | D (44.8)  | D (39.6)  | D (27.2)  | C (22.6)        | C (22.6)  | A (5.8)   | C (22.5)          | D (51.1)  | A (7.4)   | C (25.5)          | D (54.3)   | A (10.0)  |
|                                               |                      |                        | SBL                   | D (49.7)  | E (58.4)  | D (52.6)  | D (50.6)        | E (59.7)  | D (53.6)  | D (50.9)          | E (60.8)  | D (54.7)  | D (51.1)          | E (62.8)   | D (54.3)  |
|                                               | Overall              |                        | SBLTR                 | E (154.6) | E (120.6) | E (73.4)  | E (157.5)       | E (145.5) | E (76.0)  | E (157.5)         | E (152.0) | E (76.0)  | E (183.9)         | E (205.6)  | E (79.9)  |
|                                               |                      |                        | Overall               | E (71.2)  | E (63.5)  | E (72.6)  | E (69.1)        | E (66.6)  | F (86.8)  | E (76.1)          | F (92.0)  | F (99.5)  | F (93.0)          | E (80.0)   | F (113.7) |
| 2 Courthouse Road, Lawyers Road/ Maple Avenue | Maple Avenue         | Singl                  | EBL                   | E (69.2)  | F (106.4) | E (68.6)  | E (77.9)        | F (120.9) | D (54.5)  | E (79.1)          | F (125.2) | E (56.3)  | E (79.0)          | F (132.8)  | E (59.9)  |
|                                               |                      |                        | EBTR                  | D (38.6)  | C (27.9)  | E (68.6)  | C (22.2)        | B (16.7)  | C (29.8)  | C (23.3)          | B (17.3)  | C (29.4)  | C (28.6)          | B (17.8)   | C (30.5)  |
|                                               | Maple Avenue         |                        | WBL                   | E (67.5)  | F (80.3)  | E (68.6)  | E (67.1)        | E (74.2)  | E (73.2)  | E (67.0)          | E (74.3)  | E (73.2)  | E (76.9)          | E (76.9)   | E (73.9)  |
|                                               |                      |                        | WBTR                  | C (29.9)  | E (59.7)  | F (100.8) | C (27.2)        | F (85.2)  | F (151.7) | C (27.4)          | F (86.9)  | F (162.1) | C (28.3)          | F (113.4)  | F (199.3) |
|                                               | Courthouse Road      |                        | NBL                   | E (77.1)  | F (80.7)  | E (73.7)  | F (85.2)        | F (87.5)  | F (74.0)  | F (85.2)          | F (87.5)  | F (74.0)  | F (89.4)          | F (88.9)   | F (75.6)  |
|                                               |                      |                        | NBLT                  | E (73.5)  | F (123.3) | F (103.5) | E (78.2)        | F (139.2) | F (140.5) | E (78.8)          | F (144.2) | F (148.9) | F (86.3)          | F (174.9)  | F (85.3)  |
|                                               | Lawyers Road         |                        | SBL                   | F (104.1) | F (89.4)  | E (75.4)  | F (105.2)       | F (96.5)  | E (76.7)  | F (105.2)         | F (96.5)  | E (76.7)  | F (130.4)         | F (100.1)  | F (78.9)  |
|                                               |                      |                        | SBLT                  | D (49.4)  | E (68.8)  | E (67.5)  | D (49.0)        | F (86.3)  | E (89.8)  | D (49.1)          | F (88.0)  | E (95.0)  | D (50.8)          | E (113.5)  | E (113.5) |
|                                               | Overall              |                        | Overall               | D (46.4)  | E (43.6)  | E (76.5)  | D (39.9)        | E (76.5)  | F (105.5) | D (40.5)          | E (78.3)  | F (111.4) | D (45.5)          | F (95.7)   | F (134.1) |
|                                               |                      |                        | Overall               | C (159)   | C (177.6) | C (18.8)  | C (15.1)        | C (17.7)  | C (23.4)  | C (15.6)          | C (18.1)  | D (25.3)  | C (16.8)          | C (20.1)   | D (28.8)  |
| 3 Nutley Street/ Roland Street                | Rowland Street       | STOP                   | EBLTR                 | C (23.0)  | D (30.7)  | C (23.0)  | C (22.4)        | D (30.8)  | D (31.6)  | C (22.0)          | D (32.1)  | D (34.8)  | D (26.2)          | E (38.7)   | E (42.1)  |
|                                               |                      |                        | NBLTR                 | A (9.1)   | A (9.8)   | A (9.5)   | A (9.1)         | A (9.7)   | A (9.7)   | A (9.2)           | A (9.8)   | A (9.9)   | A (9.3)           | B (10.1)   | B (10.1)  |
|                                               | Nutley Street        |                        | NBLT                  | A (10.0)  | A (10.0)  | A (10.0)  | A (10.0)        | A (10.0)  | A (10.0)  | A (10.0)          | A (10.0)  | A (10.0)  | A (10.0)          | A (10.0)   | A (10.0)  |
|                                               |                      |                        | SBL                   | A (9.5)   | A (9.2)   | A (9.4)   | A (9.4)         | A (9.3)   | A (9.6)   | A (9.4)           | A (9.3)   | A (9.7)   | A (9.7)           | B (10.0)   | B (10.0)  |
|                                               | Nutley Street        |                        | SBLT                  | A (10.0)  | A (10.0)  | A (10.0)  | A (10.0)        | A (10.0)  | A (10.0)  | A (10.0)          | A (10.0)  | A (10.0)  | A (10.0)          | A (10.0)   | A (10.0)  |
|                                               |                      |                        | Overall               | A (10.0)  | A (10.0)  | A (10.0)  | A (10.0)        | A (10.0)  | A (10.0)  | A (10.0)          | A (10.0)  | A (10.0)  | A (10.0)          | A (10.0)   | A (10.0)  |
|                                               | Maple Avenue         | STOP                   | EBTR                  | A (10.0)  | A (10.0)  | A (10.0)  | A (10.0)        | A (10.0)  | A (10.0)  | A (10.0)          | A (10.0)  | A (10.0)  | A (10.0)          | A (10.0)   | A (10.0)  |
|                                               |                      |                        | WBTR                  | A (10.0)  | A (10.0)  | A (10.0)  | A (10.0)        | A (10.0)  | A (10.0)  | A (10.0)          | A (10.0)  | A (10.0)  | A (10.0)          | A (10.0)   | A (10.0)  |
|                                               | Site Entrance        |                        | NBL                   | A (10.0)  | A (10.0)  | A (10.0)  | A (10.0)        | A (10.0)  | A (10.0)  | A (10.0)          | A (10.0)  | A (10.0)  | A (10.0)          | A (10.0)   | A (10.0)  |
|                                               |                      |                        | Overall               | A (10.0)  | A (10.0)  | A (10.0)  | A (10.0)        | A (10.0)  | A (10.0)  | A (10.0)          | A (10.0)  | A (10.0)  | A (10.0)          | A (10.0)   | A (10.0)  |
| 4 RRo/ Maple Avenue                           | Maple Avenue         | STOP                   | EBTR                  | A (10.3)  | A (10.3)  | A (10.1)  | A (10.4)        | A (10.3)  | A (10.1)  | A (10.4)          | A (10.3)  | A (10.1)  | A (10.4)          | A (10.4)   | A (10.1)  |
|                                               |                      |                        | WBTR                  | A (10.2)  | A (10.3)  | A (10.1)  | A (10.4)        | A (10.3)  | A (10.1)  | A (10.4)          | A (10.3)  | A (10.1)  | A (10.4)          | A (10.4)   | A (10.1)  |
|                                               | Site Entrance        |                        | NBLTR                 | B (13.3)  | B (14.6)  | C (15.1)  | B (14.4)        | C (15.2)  | C (16.4)  | D (27.9)          | C (20.2)  | E (35.6)  | E (35.2)          | C (21.7)   | E (44.5)  |
|                                               |                      |                        | SBLTR                 | B (11.2)  | C (21.8)  | C (15.2)  | B (11.5)        | C (24.1)  | C (16.2)  | B (11.5)          | C (24.7)  | C (16.7)  | B (11.7)          | D (27.3)   | C (17.8)  |
|                                               | Site Entrance        | STOP                   | WBL                   | B (11.5)  | A (9.1)   | A (9.0)   | A (9.8)         | A (9.1)   | A (9.5)   | B (10.0)          | A (9.2)   | A (9.8)   | B (10.3)          | A (9.2)    | B (10.0)  |
|                                               |                      |                        | NBLTR                 | A (10.0)  | A (10.0)  | A (10.0)  | A (10.0)        | A (10.0)  | A (10.0)  | A (10.0)          | A (10.0)  | A (10.0)  | A (10.0)          | A (10.0)   | A (10.0)  |
|                                               | Nutley Street        |                        | SBL                   | A (10.0)  | A (10.0)  | A (10.0)  | A (10.0)        | A (10.0)  | A (10.0)  | A (10.0)          | A (10.0)  | A (10.0)  | A (10.0)          | A (10.0)   | A (10.0)  |
|                                               |                      |                        | Overall               | A (10.0)  | A (10.0)  | A (10.0)  | A (10.0)        | A (10.0)  | A (10.0)  | A (10.0)          | A (10.0)  | A (10.0)  | A (10.0)          | A (10.0)   | A (10.0)  |
|                                               | Site Entrance        | STOP                   | WBLTR                 | B (10.3)  | B (10.5)  | -         | B (10.5)        | B (10.7)  | -         | B (10.6)          | B (10.9)  | -         | B (10.8)          | B (11.1)   | -         |
|                                               |                      |                        | NBLTR                 | B (10.2)  | B (13.2)  | -         | B (10.5)        | B (14.1)  | -         | B (10.7)          | B (14.6)  | -         | B (11.0)          | C (15.7)   | -         |
| 5 Site entrance/ Maple Avenue                 | Maple Avenue         | STOP                   | SBLTR                 | B (12.0)  | B (13.1)  | -         | B (12.6)        | B (13.2)  | -         | B (12.8)          | B (14.4)  | -         | B (13.4)          | C (15.5)   | -         |
|                                               |                      |                        | Overall               | B (10.9)  | B (12.5)  | -         | B (11.2)        | B (13.2)  | -         | B (11.4)          | B (13.7)  | -         | B (11.8)          | B (14.5)   | -         |
|                                               | Site Entrance        | STOP                   | WBL                   | A (9.2)   | B (11.1)  | A (9.7)   | A (9.3)         | A (11.6)  | A (9.9)   | A (9.3)           | B (11.6)  | A (9.9)   | A (9.4)           | B (12.1)   | B (10.1)  |
|                                               |                      |                        | EBTR                  | A (10.0)  | A (10.0)  | A (10.0)  | A (10.0)        | A (10.0)  | A (10.0)  | A (10.0)          | A (10.0)  | A (10.0)  | A (10.0)          | A (10.0)   | A (10.0)  |
|                                               | Maple Avenue         |                        | WBL                   | B (11.7)  | A (9.7)   | B (13.7)  | B (13.7)        | B (10.7)  | C (16.7)  | B (13.8)          | B (10.7)  | C (17.2)  | B (14.6)          | B (11.0)   | C (18.6)  |
|                                               |                      |                        | WBTR                  | A (10.0)  | A (10.0)  | A (10.0)  | A (10.0)        | A (10.0)  | A (10.0)  | A (10.0)          | A (10.0)  | A (10.0)  | A (10.0)          | A (10.0)   | A (10.0)  |
|                                               | Nutley Street        |                        | NBLTR                 | F (110.1) | F (113.7) | F (254.6) | F (933.0)       | F (789.9) | F [1]     | F (987.0)         | F (843.1) | F [1]     | F (1286.3)        | F (1249.4) | F [1]     |
|                                               |                      |                        | SBLTR                 | F (92.4)  | F (91.3)  | F (147.5) | B (13.0)        | C (15.6)  | C (24.4)  | B (13.1)          | C (15.9)  | D (26.3)  | B (14.0)          | C (18.9)   | E (36.9)  |
|                                               | James Madison Drive  | STOP                   | WBL                   | A (9.2)   | B (11.1)  | A (9.7)   | A (9.3)         | A (11.6)  | A (9.9)   | A (9.3)           | B (11.6)  | A (9.9)   | A (9.4)           | B (12.1)   | B (10.1)  |
|                                               |                      |                        | EBTR                  | A (10.0)  | A (10.0)  | A (10.0)  | A (10.0)        | A (10.0)  | A (10.0)  | A (10.0)          | A (10.0)  | A (10.0)  | A (10.0)          | A (10.0)   | A (10.0)  |
| 6 Nutley Street/ Site entrance                | Maple Avenue         | STOP                   | WBL                   | B (10.1)  | A (9.7)   | B (13.7)  | B (13.7)        | B (10.7)  | C (16.7)  | B (13.8)          | B (10.7)  | C (17.2)  | B (14.6)          | B (11.0)   | C (18.6)  |
|                                               |                      |                        | WBTR                  | A (10.0)  | A (10.0)  | A (10.0)  | A (10.0)        | A (10.0)  | A (10.0)  | A (10.0)          | A (10.0)  | A (10.0)  | A (10.0)          | A (10.0)   | A (10.0)  |
|                                               | Site Entrance        |                        | NBLTR                 | B (11.2)  | C (21.8)  | C (15.2)  | B (11.5)        | C (24.1)  | C (16.2)  | B (11.5)          | C (24.7)  | C (16.7)  | B (11.7)          | D (27.3)   | C (17.8)  |
|                                               |                      |                        | SBLTR                 | B (11.2)  | C (21.8)  | C (15.2)  | B (11.5)        | C (24.1)  | C (16.2)  | B (11.5)          | C (24.7)  | C (16.7)  | B (11.7)          | D (27.3)   | C (17.8)  |
|                                               | Nutley Street        | STOP                   | WBL                   | B (11.5)  | A (9.1)   | A (9.0)   | A (9.8)         | A (9.1)   | A (9.5)   | B (10.0)          | A (9.2)   | A (9.8)   | B (10.3)          | A (9.2)    | B (10.0)  |
|                                               |                      |                        | NBLTR                 | A (10.0)  | A (10.0)  | A (10.0)  | A (10.0)        | A (10.0)  | A (10.0)  | A (10.0)          | A (10.0)  | A (10.0)  | A (10.0)          | A (10.0)   | A (10.0)  |
|                                               | Site Entrance        |                        | SBL                   | A (10.0)  | A (10.0)  | A (10.0)  | A (10.0)        | A (10.0)  | A (10.0)  | A (10.0)          | A (10.0)  | A (10.0)  | A (10.0)          | A (10.0)   | A (10.0)  |
|                                               |                      |                        | Overall               | A (10.0)  | A (10.0)  | A (10.0)  | A (10.0)        | A (10.0)  | A (10.0)  | A (10.0)          | A (10.0)  | A (10.0)  | A (10.0)          | A (10.0)   | A (10.0)  |
|                                               | Nutley Street        | STOP                   | WBLTR                 | B (10.3)  | B (10.5)  | -         | B (10.5)        | B (10.7)  | -         | B (10.6)          | B (10.9)  | -         | B (10.8)          | B (11.1)   | -         |
|                                               |                      |                        | NBLTR                 | B (10.2)  | B (13.2)  | -         | B (10.5)        | B (14.1)  | -         | B (10.7)          | B (14.6)  | -         | B (11.0)          | C (15.7)   | -         |
| 7 Nutley Street/ Windover Avenue              | Maple Avenue         | STOP                   | SBLTR                 | B (12.0)  | B (13.1)  | -         | B (12.6)        | B (13.2)  | -         | B (12.8)          | B (14.4)  | -         | B (13.4)          | C (15.5)   | -         |
|                                               |                      |                        | Overall               | B (10.9)  | B (12.5)  | -         | B (11.2)        | B (13.2)  | -         | B (11.4)          | B (13.7)  | -         | B (11.8)          | B (14.5)   | -         |
|                                               | Windover Avenue      | STOP                   | WBL                   | A (9.2)   | B (11.1)  | A (9.7)   | A (9.3)         | A (11.6)  | A (9.9)   | A (9.3)           | B (11.6)  | A (9.9)   | A (9.4)           | B (12.1)   | B (10.1)  |
|                                               |                      |                        | EBTR                  | A (10.0)  | A (10.0)  | A (10.0)  | A (10.0)        | A (10.0)  | A (10.0)  | A (10.0)          | A (10.0)  | A (10.0)  | A (10.0)          | A (10.0)   | A (10.0)  |
|                                               | Nutley Street        |                        | WBL                   | B (11.7)  | A (9.7)   | B (13.7)  | B (13.7)        | B (10.7)  | C (16.7)  | B (13.8)          | B (10.7)  | C (17.2)  | B (14.6)          | B (11.0)   | C (18.6)  |
|                                               |                      |                        | WBTR                  | A (10.0)  | A (10.0)  | A (10.0)  | A (10.0)        | A (10.0)  | A (10.0)  | A (10.0)          | A (10.0)  | A (10.0)  | A (10.0)          | A (10.0)   | A (10.0)  |
|                                               | Nutley Street        |                        | NBLTR                 | F (110.1) | F (113.7) | F (254.6) | F (933.0)       | F (789.9) | F [1]     | F (987.0)         | F (843.1) | F [1]     | F (1286.3)        | F (1249.4) | F [1]     |
|                                               |                      |                        | SBLTR                 | F (92.4)  | F (91.3)  | F (147.5) | B (13.0)        | C (15.6)  | C (24.4)  | B (13.1)          | C (15.9)  | D (26.3)  | B (14.0)          | C (18.9)   | E (36.9)  |
|                                               | James Madison Drive  | STOP                   | WBL                   | A (9.2)   | B (11.1)  | A (9.7)   | A (9.3)         | A (11.6)  | A (9.9)   | A (9.3)           | B (11.6)  | A (9.9)   | A (9.4)           | B (12.1)   | B (10.1)  |
|                                               |                      |                        | EBTR                  | A (10.0)  | A (10.0)  | A (10.0)  | A (10.0)        | A (10.0)  | A (10.0)  | A (10.0)          | A (10.0)  | A (10.0)  | A (10.0)          | A (10.0)   | A (10.0)  |

Notes: (1) Numbers in parentheses ( ) represent delay at signalized intersections in seconds per vehicle.

(2) Numbers in brackets [ ] represent delay at unsignalized intersections in seconds per vehicle.

(3) Asterisks \* represent delays in excess of 999.9 seconds.

(4) Roadway names in bold are considered north/south for purposes of this analysis



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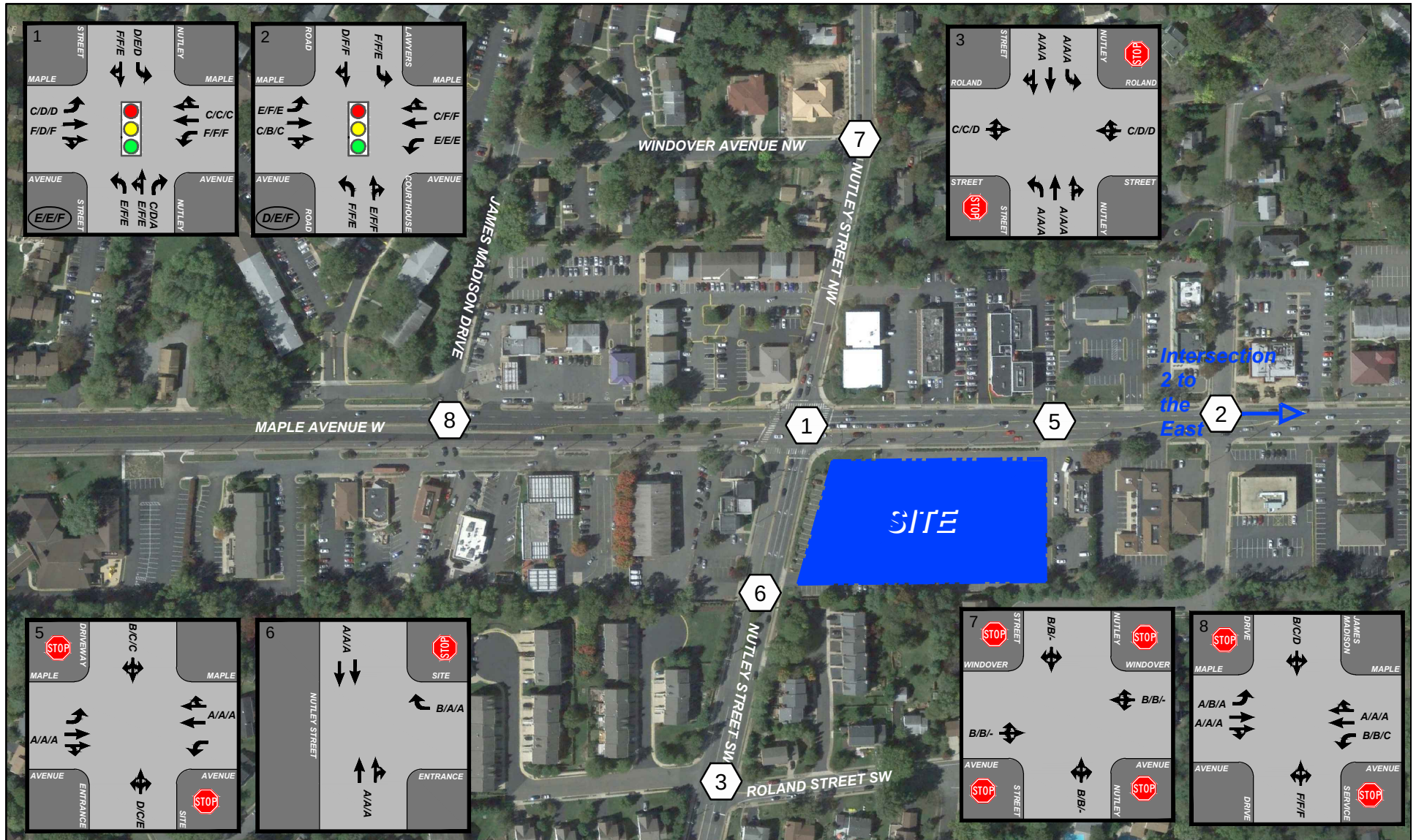


Figure 6-2  
2022 Total Future Levels of Service

444 Maple  
Town of Vienna

← Represents One Travel Lane  
 Signalized Intersection  
 Stop Sign





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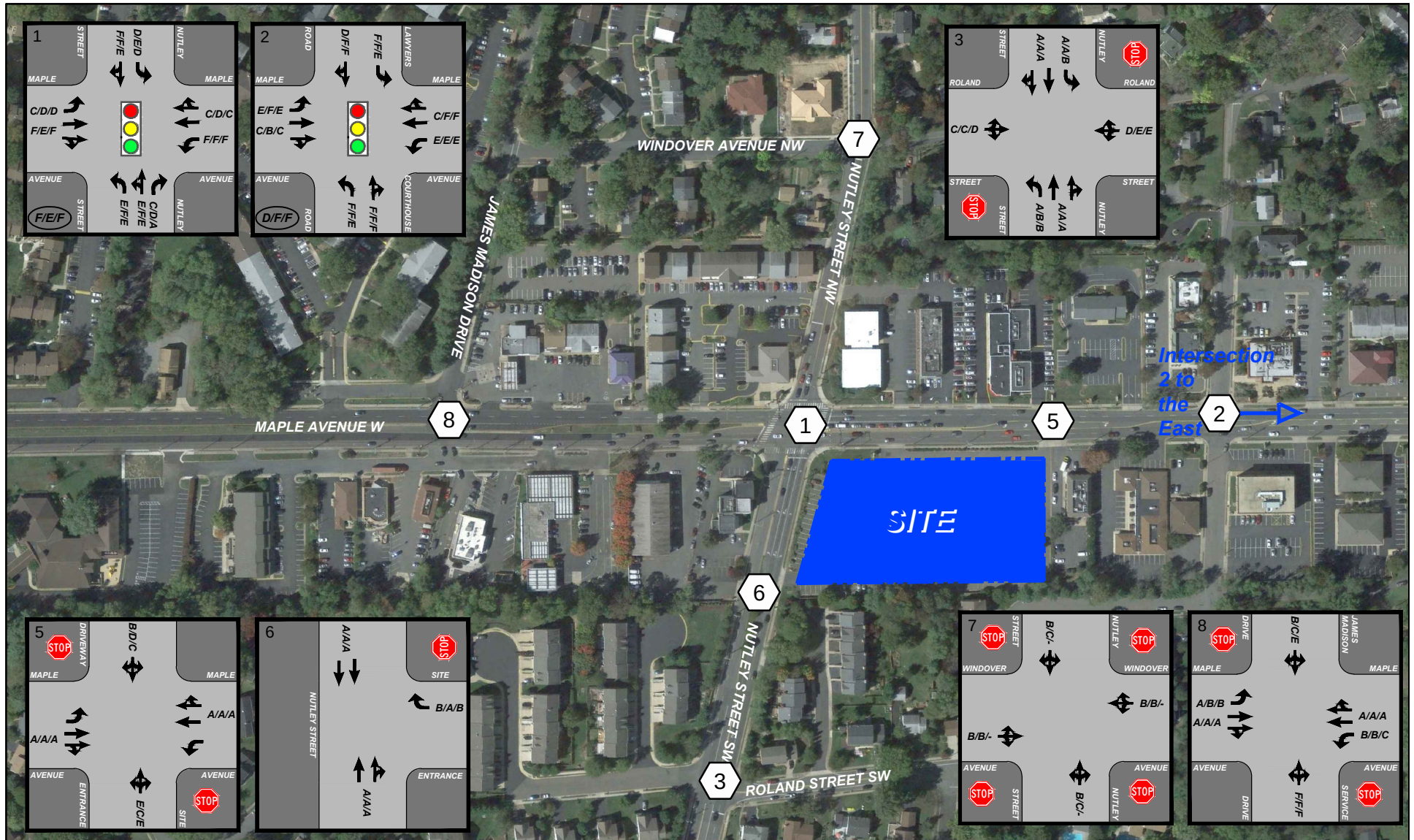


Figure 6-2A  
2028 Total Future Levels of Service

444 Maple  
Town of Vienna

- ← Represents One Travel Lane
- Signalized Intersection
- Stop Sign



Table 6-2  
444 Maple

Total Future Intersection Queuing Summary (1) (2) (3)

| Intersection                                  | Approach Roadway       | Operating Condition | Approach/ Movement | Available Storage (ft) | Existing |     |      | Background 2022 |      |      | Total Future 2022 |      |      | Total Future 2028 |      |      |
|-----------------------------------------------|------------------------|---------------------|--------------------|------------------------|----------|-----|------|-----------------|------|------|-------------------|------|------|-------------------|------|------|
|                                               |                        |                     |                    |                        | AM       | PM  | SAT  | AM              | PM   | SAT  | AM                | PM   | SAT  | AM                | PM   | SAT  |
| 1 Nutley Street/Maple Avenue                  | Maple Avenue           | Signal              | EBL                | 90                     | 34       | 43  | 49   | 42              | 48   | 63   | 42                | 48   | 63   | 43                | 50   | 65   |
|                                               |                        |                     | EBTR               | n/a                    | 718      | 447 | 693  | 793             | 502  | 825  | 804               | 512  | 854  | 876               | 552  | 918  |
|                                               | Maple Avenue           |                     | WBL                | 285                    | 217      | 306 | 511  | 205             | 362  | 503  | 262               | 417  | 578  | 280               | 482  | 626  |
|                                               |                        |                     | WBTR               | n/a                    | 315      | 745 | 495  | 354             | 864  | 607  | 360               | 877  | 631  | 383               | 971  | 694  |
|                                               | <b>Nutley Street</b>   |                     | NBL                | 220                    | 310      | 458 | 276  | 300             | 517  | 248  | 338               | 533  | 277  | 396               | 573  | 303  |
| Nutley Street                                 |                        |                     | NBL-T              | n/a                    | 321      | 475 | 284  | 307             | 536  | 252  | 341               | 538  | 274  | 409               | 583  | 303  |
|                                               |                        |                     | NBR                | n/a                    | 227      | 201 | 179  | 102             | 257  | 12   | 108               | 259  | 22   | 134               | 275  | 43   |
|                                               |                        |                     | SBL                | 200                    | 106      | 153 | 136  | 14              | 175  | 157  | 14                | 192  | 184  | 154               | 203  | 192  |
|                                               |                        |                     | SBLR               | n/a                    | 573      | 601 | 293  | 628             | 653  | 341  | 628               | 653  | 341  | 676               | 703  | 377  |
|                                               |                        |                     |                    |                        |          |     |      |                 |      |      |                   |      |      |                   |      |      |
| 2 Courthouse Road, Lawyers Road/ Maple Avenue | Maple Avenue           | Signal              | EBL                | 160                    | 119      | 204 | 148  | 126             | 217  | 173  | 133               | 228  | 190  | 139               | 243  | 218  |
|                                               |                        |                     | EBTR               | n/a                    | 647      | 365 | 342  | 321             | 320  | 483  | 326               | 325  | 483  | 317               | 325  | 508  |
|                                               | Maple Avenue           |                     | WBL                | 145                    | 68       | 100 | 92   | 76              | 86   | 86   | 75                | 86   | 86   | 80                | 92   | 91   |
|                                               |                        |                     | WBTR               | n/a                    | 334      | 989 | 1023 | 308             | 1134 | 1181 | 309               | 1140 | 1198 | 331               | 1250 | 1301 |
|                                               | <b>Courthouse Road</b> |                     | NBL                | 230                    | 106      | 125 | 111  | 117             | 156  | 141  | 117               | 156  | 141  | 126               | 167  | 154  |
| Lawyers Road                                  |                        |                     | NBLR               | n/a                    | 376      | 644 | 594  | 414             | 681  | 642  | 416               | 693  | 658  | 454               | 747  | 710  |
|                                               |                        |                     | SBL                | 245                    | 318      | 238 | 204  | 350             | 279  | 223  | 350               | 279  | 223  | 374               | 301  | 246  |
|                                               |                        |                     | SBLR               | n/a                    | 323      | 539 | 512  | 351             | 643  | 616  | 355               | 653  | 631  | 379               | 710  | 684  |
|                                               |                        |                     |                    |                        |          |     |      |                 |      |      |                   |      |      |                   |      |      |
|                                               |                        |                     |                    |                        |          |     |      |                 |      |      |                   |      |      |                   |      |      |
| 3 Nutley Street/ Rowland Street               | Rowland Street         | STOP                | EBLTR              | n/a                    | 3        | 3   | 2    | 3               | 3    | 3    | 3                 | 3    | 3    | 3                 | 4    | 3    |
|                                               | Rowland Street         |                     | WBLTR              | n/a                    | 11       | 15  | 11   | 11              | 15   | 16   | 11                | 15   | 18   | 13                | 19   | 22   |
|                                               | <b>Nutley Street</b>   |                     | NBL                | 165                    | 1        | 1   | 1    | 0               | 1    | 1    | 0                 | 1    | 1    | 0                 | 1    | 1    |
|                                               |                        |                     | NBTR               | n/a                    | 0        | 0   | 0    | 0               | 0    | 0    | 0                 | 0    | 0    | 0                 | 0    | 0    |
|                                               | <b>Nutley Street</b>   |                     | SBL                | 145                    | 0        | 1   | 0    | 0               | 1    | 0    | 0                 | 1    | 0    | 0                 | 1    | 0    |
| 4 R/Ro/ Maple Avenue                          |                        |                     | SBTR               | n/a                    | 0        | 0   | 0    | 0               | 0    | 0    | 0                 | 0    | 0    | 0                 | 0    | 0    |
|                                               |                        |                     |                    |                        |          |     |      |                 |      |      |                   |      |      |                   |      |      |
|                                               | Maple Avenue           | STOP                | EBTR               | n/a                    | 0        | 0   | 0    | 0               | 0    | 0    | n/a               | n/a  | n/a  | n/a               | n/a  | n/a  |
|                                               | Maple Avenue           |                     | WBL                | n/a                    | 0        | 0   | 0    | 0               | 0    | 0    | n/a               | n/a  | n/a  | n/a               | n/a  | n/a  |
|                                               | <b>Site Entrance</b>   |                     | NBR                | n/a                    | 0        | 1   | 1    | 0               | 1    | 2    | n/a               | n/a  | n/a  | n/a               | n/a  | n/a  |
| 5 Site entrance/ Maple Avenue                 | Maple Avenue           | STOP                | EBTR               | n/a                    | 1        | 1   | 0    | 1               | 1    | 0    | 1                 | 1    | 0    | 1                 | 1    | 0    |
|                                               | Maple Avenue           |                     | WBTR               | n/a                    | 1        | 1   | 0    | 1               | 1    | 0    | 2                 | 3    | 9    | 3                 | 3    | 10   |
|                                               | <b>Site Entrance</b>   |                     | NBLTR              | n/a                    | 1        | 1   | 2    | 1               | 1    | 2    | 38                | 16   | 78   | 48                | 18   | 94   |
|                                               | <b>Driveway</b>        |                     | SBLTR              | n/a                    | 1        | 3   | 2    | 1               | 4    | 3    | 1                 | 4    | 3    | 1                 | 4    | 3    |
|                                               |                        |                     |                    |                        |          |     |      |                 |      |      |                   |      |      |                   |      |      |
| 6 Nutley Street/ Site entrance                | Site Entrance          | STOP                | WBLR               | n/a                    | 0        | 0   | 0    | 0               | 0    | 0    | 3                 | 1    | 4    | 3                 | 1    | 4    |
|                                               | Nutley Street          |                     | NBTR               | n/a                    | 0        | 0   | 0    | 0               | 0    | 0    | 0                 | 0    | 0    | 0                 | 0    | 0    |
|                                               | <b>Nutley Street</b>   |                     | SBT                | n/a                    | 0        | 0   | 0    | 0               | 0    | 0    | 0                 | 0    | 0    | 0                 | 0    | 0    |
|                                               |                        |                     |                    |                        |          |     |      |                 |      |      |                   |      |      |                   |      |      |
|                                               |                        |                     |                    |                        |          |     |      |                 |      |      |                   |      |      |                   |      |      |
| 7 Nutley Street/ Windover Avenue              | Windover Avenue        | ALL WAY             | EBLTR              | n/a                    | n/a      | n/a | n/a  | n/a             | n/a  | n/a  | n/a               | n/a  | n/a  | n/a               | n/a  | n/a  |
|                                               | Windover Avenue        | STOP                | WBLTR              | n/a                    | n/a      | n/a | n/a  | n/a             | n/a  | n/a  | n/a               | n/a  | n/a  | n/a               | n/a  | n/a  |
|                                               | <b>Nutley Street</b>   |                     | NBLTR              | n/a                    | n/a      | n/a | n/a  | n/a             | n/a  | n/a  | n/a               | n/a  | n/a  | n/a               | n/a  | n/a  |
|                                               | <b>Nutley Street</b>   |                     | SBLTR              | n/a                    | n/a      | n/a | n/a  | n/a             | n/a  | n/a  | n/a               | n/a  | n/a  | n/a               | n/a  | n/a  |
|                                               |                        |                     |                    |                        |          |     |      |                 |      |      |                   |      |      |                   |      |      |
| 8 James Madison Drive/ Maple Avenue           | Maple Avenue           | STOP                | EBL                | 205                    | 14       | 12  | 8    | 14              | 13   | 8    | 15                | 13   | 8    | 15                | 14   | 8    |
|                                               |                        |                     | EBTR               | n/a                    | 0        | 0   | 0    | 0               | 0    | 0    | 0                 | 0    | 0    | 0                 | 0    | 0    |
|                                               | Maple Avenue           |                     | WBL                | 145                    | 7        | 4   | 23   | 22              | 13   | 60   | 23                | 13   | 62   | 25                | 14   | 69   |
|                                               |                        |                     | WBTR               | n/a                    | 0        | 0   | 0    | 0               | 0    | 0    | 0                 | 0    | 0    | 0                 | 0    | 0    |
|                                               | <b>Driveway</b>        |                     | NBLTR              | n/a                    | 33       | 45  | 81   | 150             | 174  | *    | 152               | 177  | *    | 160               | 193  | err  |
| James Madison Drive                           |                        |                     | SBLTR              | n/a                    | 107      | 133 | 112  | 110             | 23   | 22   | 11                | 24   | 25   | 12                | 31   | 36   |
|                                               |                        |                     |                    |                        |          |     |      |                 |      |      |                   |      |      |                   |      |      |

Notes: (1) Turning movement queue length is based on the 95th percentile queue in feet as reported by Synchro, Version 9.

(2) Roadway names in bold are considered north/south for purposes of this analysis

(3) Queues for All Way STOPS (Nutley Street/Windover Avenue) not reported by Synchro

## Section 7

### TRANSPORTATION DEMAND MANAGEMENT

In an effort to decrease reliance on the personal automobile and encourage the use of transit, ridesharing, bicycling, and walking, the Applicant should implement a TDM Program. "TDM is a general term for strategies that result in more efficient use of transportation resources. There are many different TDM strategies with a variety of impacts. Some improve the transportation options available to consumers, while others provide an incentive to choose more efficient travel patterns. Some reduce the need for physical travel through mobility substitutes or more efficient land use. TDM strategies can change travel timing, route, destination, or mode."

The following strategies should be considered:

- A. Designate a Transportation Management Coordinator (TMC) to implement the TDM program and advise residents, tenants, and employees of the availability and location of the TDM coordinator and program at least once a year. The position may be part of other duties assigned to the individual. Duties of the TMC would include the following:
  - 1. Assist residents and employees in making effective and efficient commuting choices.
  - 2. Disseminate Metrorail, Fairfax Connector, ridesharing, and other relevant transit options to new residents, tenants and employees.
  - 3. Solicit support from the Metropolitan Washington Council of Governments (MWCOC) Commuter Connections program, the Washington Metropolitan Area Transit Authority (WMATA), the Fairfax County government, and others.
  - 4. Provide on-site assistance to residents and employees in forming and maintaining carpools and vanpools.
  - 5. Disseminate park-and-ride lot information to prospective carpoolers and vanpoolers.
  - 6. Encourage residents and employees to ride bikes or walk to work.
  - 7. Market and promote the TDM Program among residents and employees through printed materials and web sites (if available).
  - 8. Installation of transportation information displays in building lobby areas, displays stocked with transit, vanpool, carpool, guaranteed ride home, etc. brochures and flyers, and installation of digital display screens for transit information showing real-time bus route and Metrorail information and alerts.
- B. Incentives to use transit, including:
  - 1. Provide information on Metrorail, Fairfax Connector, and other public transportation facilities, services, routes, schedules, and fares.
  - 2. At the time of initial lease/sales, provide SmarTrip cards to residents.
  - 3. Provide safe, convenient, and attractive pedestrian connections on and off-site.
  - 4. Provide safe, secure bicycle parking for both employees and residents.
- C. Parking management, including:
  - 1. Provide parking spaces on site for a car sharing service (i.e., Zip or Flex Car).
  - 2. Institute paid parking and/or unbundle the multi-family parking spaces.



## Section 8

### CONCLUSIONS AND RECOMMENDATIONS

#### CONCLUSIONS

Based on this assessment, the traffic generated by the proposed mixed-use development will not adversely impact nearby intersections based on the following:

1. The proposed application seeks to rezone and redevelop approximately 2.76 acres with approximately 160 multifamily dwelling units and 20,000 GSF of additional retail uses.
2. Under existing 2016 conditions, the signalized Nutley Street/Maple Avenue intersection currently operates at an overall level of service (LOS) "E" or better during the weekday AM, PM and Saturday peak hours. All the STOP controlled intersections and driveways that serve the site have traffic movements that operate at LOS "C" or better in the AM, PM and Saturday peak hours.
3. Roadway intersections within the study area would experience increases in traffic as a result of background regional growth and future pipeline developments (including the potential redevelopment of the Marco Polo site).
4. Under 2022 background conditions (build out of the future conditions without the proposed mixed-use development), the signalized Nutley Street/Maple Avenue study intersection would show improved at overall LOS "E" or better during the weekday AM, PM and LOS "F" during the Saturday peak hour. All the STOP controlled intersections and driveways that serve the site have traffic movements that continue to operate at LOS "C" or better in the AM, PM and Saturday peak hours consistent with existing conditions.
5. According to ITE, the proposed mixed-use development is anticipated to generate approximately 125 weekday AM peak hour net new external trips, 133 weekday PM peak hour net new external trips, 261 Saturday peak hour net new external trips, and 1,449 daily (24-hour) net new external trips. These site trips include an internal allowance reduction between the residential and retail components, a minor reduction to account for the commercial and residential uses peaking at different times on Saturday, as well as a pass-by reduction for the retail portion.
6. Under 2022 total future conditions (build out of the future conditions with the proposed mixed-use development), the signalized Nutley Street/Maple Avenue study intersection would show levels of service at overall LOS "E" or better during the weekday AM, weekday PM, and LOS "F" during the Saturday peak hours consistent with background future levels of service. All the STOP controlled intersections and driveways that serve the site have traffic movements that continue to operate at LOS "E" or better in the AM, PM and Saturday peak hours generally consistent with background conditions with the exception of the northbound left exit movement out of the site on to Maple Avenue.
7. Under 2028 total future conditions all through movements along Nutley Street and Maple Avenue would experience increased delay due to increased regional traffic growth.
8. The existing, background and future analysis scenarios indicate that the weekday AM, PM

and Saturday peak hour vehicle queues would not be accommodated within existing turn lane bays.

## RECOMMENDATIONS

In order to mitigate the traffic generated by the proposed mixed-use development, the following are recommended:

1. The site should be developed with the proposed access as currently illustrated on the Conceptual Development Plan (CDP) layout that removes the existing right-in/right-out site driveway on Maple Avenue to the subject property to reduce the number of existing curb cuts along Maple Avenue and improve access management.
2. The applicant should promote the pedestrian oriented and mixed-use characteristic of the development by establishing a quality streetscape with pedestrian amenities. Guidance will be provided by the recently approved pedestrian master plan and Maple Avenue Corridor (MAC) Zone guidelines. These include; wide sidewalks meeting or exceeding the MAC's recommended width, improved bus stops located along the frontage, and enhancing the walking experience through design elements (e.g. landscaping, street furniture, public art and/or wayfinding).
3. The applicant should implement certain elements of a transportation demand management (TDM) program in order to further reduce the forecasted peak hour trips for this project, encourage transit related, non-auto modes of travel, and take advantage of the site's proximity to Metrorail.
4. The applicant should coordinate the design of the site with Town staff so as to not preclude any Maple Avenue/Nutley Street signal improvements and/or possible future intersection modifications that may be completed by others.
5. The Town of Vienna promotes and encourages bicycling as an environmentally and healthy way to get around town and was recently designated as a Bicycle Friendly Community by the League of American Bicyclists. The applicant should incorporate and promote bicycling into the site design. These efforts should include providing both short term and long-term bicycle parking for the residents, employees, shoppers, and visitors to the site as well as improved non-motorized connectivity between the site and adjacent neighborhoods. Additionally, should Capital Bikeshare be expanded to the Town of Vienna, an area should be reserved for a future bikeshare station. In addition to widened sidewalks along the site's frontage, the applicant should consider a neighborhood bicycle/pedestrian connection to Millwood Court SW. This will provide access to Courthouse Road via Glen Avenue SW, a town identified bike route.