Local Area Transportation Report

Holton-Arms School

Bethesda, Maryland

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Executive Summary

This report is a Local Area Transportation Review (LATR) for the Holton-Arms School's proposed enrollment increase in Bethesda, Maryland.

Proposed Project

The site's current and proposed use is a school. Under existing conditions the school is limited to an enrollment cap of 670 students during the school year and 665 during summer camp. The Holton-Arms School seeks to increase its enrollment cap to 870 students during the school year and 970 campers during the summer. No increase in square footage or other construction is proposed with this application. The project site is in the Bethesda/Chevy Chase Policy Area (Policy Area 3).

The site is accessed via Royal Dominion Drive at its intersection with River Road (MD-190). Royal Dominion Drive connects to the site's parking and pick-up/drop-off area.

The school property also has frontage on Burdette Road; however, no personal vehicle or pedestrian access is available from Burdette Road. There is an access point on Burdette Road for emergency vehicles only. There are no plans to activate this frontage or to add secondary access beyond the current Royal Dominion Drive access.

The existing and proposed trip generation summary for the school year and for the summer is shown in Table 1. Existing trip generation was calculated based on inbound and outbound volumes going into the site driveway at the River Road (MD-190) & Royal Dominion Drive intersection using traffic counts collected while school was in session on Tuesday, January 30, 2024, and during the summer on Thursday, June 27, 2024 and Tuesday, July 23, 2024. The methodology for the proposed school year and summer trip generation was developed using existing travel patterns, driveway counts, mode split data, carpooling rates, and modifications to both the school year and summer camp operations. The proposed trip generation methodology is detailed in the Technical Attachments and the proposed operational modifications that will be implemented as a mitigation strategy to reduce the school's peak hour trip generation and disperse trips during the peaks are summarized in Project Description section of this report.

Adequacy Determination

Since the project will result in greater than 50 net trips, a full LATR study is required to assess the impact of the project and assess the adequacy of the nearby transportation facilities. This includes a review of each of the applicable modes of transportation- motor vehicle system adequacy, pedestrian network adequacy, bicycle network adequacy, and transit system adequacy. **Study areas are based on the 2020-2024 Growth and Infrastructure Policy (GIP) requirements and 2023 LATR Guidelines.**

Motor Vehicle System Adequacy

A capacity analysis was completed to compare the future roadway conditions with and without the proposed enrollment cap increases. Given the Project's location within an Orange policy area, both HCM and CLV analyses were required. The results of the HCM and CLV analysis indicate that the Project would not increase delays or CLVs beyond the relevant allowable congestion standards at any of the study intersections. Signal timing adjustments will be necessary in the future with and without the proposed enrollment to optimize operations along River Road due to an increase in roadway volumes associated with background developments.

As requested by Staff, a queueing analysis was also conducted at the study intersections.

Based on the conducted analyses, recommended changes in intersection geometry and phasing at the intersection of River Road (MD-190) & Royal Dominion Drive are identified in this report, along with changes to signal timings along the River Road corridor.

Pedestrian System Adequacy

A review of the existing pedestrian system was conducted in accordance with the LATR Guidelines. The review covered Pedestrian Level of Comfort (PLOC) adequacy, Americans with Disabilities Act (ADA) compliance, and street lighting adequacy.

- *PLOC Walkshed distance: 900 feet*
- *ADA Walkshed distance: 450 feet*

Bicycle System Adequacy

An evaluation of the existing bicycle system was conducted in accordance with the LATR Guidelines. This review was based on the County's Bicycle Level of Traffic Stress (BLTS) methodology and the Bicycle Master Plan.

- *BLTS Bikeshed distance: 900 feet*

Transit System Adequacy

The transit system adequacy test consisted of evaluating the amenities present at bus stops within a specified distance from the project site.

- *Transit Walkshed Distance: 1,300 feet*
- *Applicable number of bus shelters: 3*

Vision Zero Statement

As part the project's Vision Zero Statement, conditions around the project site were evaluated to determine if safety measures may be needed to address safety issues.

As discussed herein, the site is located along River Road (MD-190), part of the High Injury Network (HIN). The project is not anticipated to provide any improvements beyond mitigation to the site's traffic impact.

Project Impact and Off-Site Improvements Summary

The project does not increase the school's square footage, and therefore is not required by the LATR proportionality guide to make any improvements.

Table 1: Existing and Proposed Trip Generation Summary

Line #	Condition	Enrollment	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak In	PM Peak Out	PM Peak Total
	Existing Trip Generation							
1	School Year Enrollment	670 students	537	331	868	161	311	472
2	*Existing School Year Trip Generation Rate Per Student Based on January 2024 Counts*		*0.80*	*0.50*	*1.30*	*0.24*	*0.46*	*0.70*
3	Summer Enrollment (Approved)	665 campers	430	340	770	281	333	614
4	*Existing Summer Trip Generation Rate Per Camper Based on Summer 2024 Counts*		*0.65*	*0.51*	*1.16*	*0.42*	*0.50*	*0.92*
	Proposed Trip Generation with Trip-Reducing TDM Mitigation							
5	**Proposed School Year Enrollment with TDM**	**870 students**	**618**	**400**	**1,018**	**196**	**357**	**553**
6	*Proposed Trip Generation Rate Per Student Based on Trip Generation Model w/ TDM*		*0.71*	*0.46*	*1.17*	*0.23*	*0.41*	*0.64*
7	***Net School Year Trips (Proposed School Year Trips- Existing School Year Trips)***		***81***	***69***	***150***	***35***	***46***	***81***
8	**Proposed Summer Enrollment with TDM**	**970 campers**	***546***	***459***	**1,005**	***350***	***454***	***804***
9	*Proposed Trip Generation Rate Per Camper Based on Trip Generation Model w/ TDM*		*0.56*	*0.48*	*1.04*	*0.36*	*0.47*	*0.83*
10	***Net Summer Trips (Proposed Summer Trips- Existing Summer Trips)***		***N/A***	***N/A***	***N/A***	***69***	***121***	***190***

Notes:

Lines 1-4: **Existing Conditions Data**

- Existing trip generation rates per student/campers are based on driveway counts collected in January 2024 and Summer 2024.

Lines 5-6: Proposed School Year Trip Generation Methodology

- Developed using existing travel patterns, driveway counts, mode split data, and carpooling rates for students and staff.
- Trip distributions and methodology validated through iterative traffic counts analysis.
- Includes modifications to school year operations and implementation of robust transportation demand management (TDM) strategies such as:
  - Limiting student parking passes to 85
  - Significant increase in bus ridership rate from the existing 28% to a target bus ridership of 36%
- Includes conservative approach to other variables where higher trip reductions are expected but were not applied to this analysis such as:
  - Percentage of students carpooling held constant despite expected growth with increased enrollment and expanded carpooling incentives.
  - Conservative increase in carpooling rates and non-auto mode splits for staff applied to this analysis despite higher increases expected due to comprehensive TDM incentives

Line 7: School Year Analysis

- AM peak hour analyzed for net 150 new trips during the school AM peak hour with the corresponding roadway volumes at this time (7:15-8:15 AM)
- PM peak hour analyzed for net 81 new trips during the school's dismissal peak hour (3:15-4:15 PM) with the roadway's peak hour volumes at (3:30-4:30 PM) as a conservative approach

Lines 8-9: **Proposed Summer Trip Generation Methodology**

- Developed using existing travel patterns, driveway counts, mode split data, and carpooling rates for campers and staff.
- Trip distributions and methodology validated through iterative traffic count analysis.
- Includes the following modifications to summer operations:
  - Staggered start/end times
  - Increase in the before-/after- care program
- Includes conservative approach to other variables where additional trips reductions would be expected but were not applied in this analysis such as:
  - Summer bus ridership percentage was held constant despite expected growth that would result in fewer peak hour trips than assumed in this analysis.
  - Number of households with multiple campers held constant despite expected growth with increased summer enrollment.

Line 10: Summer Analysis

- No summer AM peak hour trip analysis because the proposed summer trips are lower than the proposed school year trips during the AM peak hour.
  - The proposed summer enrollment generates 1,005 AM peak hour trips which are 13 fewer trips than the proposed 1,018 school year AM peak hour trips
  - Summer roadway volumes are lower than in the school year and therefore, summer AM analysis would not identify any roadway capacity or adequacy findings beyond those established in the School Year AM analysis for 870 students.
- Summer PM analyzed for net 190 new trips during the summer PM peak hour with the corresponding *school year* roadway volumes at this time (2:30-3:30 PM)
  - Scenario presents a highly conservative approach by analyzing the net summer trips with school year roadway volumes on the network as the roadway volumes are significantly lower in the summer and analysis results represent conditions that would not be experienced during the summer. A summer volume comparison can be found in Table 10 of the LATR. Further data is included in the appendix.

Introduction

This report reviews the transportation elements of the Holton-Arms School. The site, shown in Figure 1, is located within the Bethesda/Chevy Chase Policy Area in Bethesda, Maryland.

The purpose of this report is to:

1. Review the transportation elements of the school expansion plan and assess the adequacy of relevant transportation facilities, as outlined in the County's GIP and LATR guidelines.
2. Provide information to the Montgomery County Park and Planning Commission (Maryland-National Capital Park and Planning Commission/M-NCPPC), the Montgomery County Department of Transportation (MCDOT), and the Maryland State Highway Administration (SHA) on how the site will influence the local transportation network. This report accomplishes this by identifying the potential trips generated by the site on all major modes of travel.
3. Examine the current state of the surrounding multimodal transportation network and identify potential improvement needed, if any, to improve the network to acceptable conditions.

Development Program Overview

The site's current and proposed use is the Holton-Arms School, with no proposed change in square footage. The school seeks to increase their enrollment cap to 870 students for the school year enrollment and 970 campers for summer camp enrollment. The existing school year enrollment cap is 670 students and the existing summer camp registration cap is 665 students.

Study Area Overview

Overview of Regional Access

Under existing conditions, the proposed development site has access to regional vehicular and transit-based transportation options, as shown in Figure 2, that connect the site to destinations within Virginia, the District, and Maryland. The site has a direct frontage on River Road (MD-190), which connects to the Capital Beltway (I-495) that surrounds Washington, DC and its inner suburbs. The Capital Beltway (I-495) is less than ½ mile from the site. River Road (MD-190) also connects to Goldsboro Road (MD-614) and Wilson Lane (MD-188).

Although the site has frontage on Burdette Road, there is no personal vehicle or pedestrian connection to the school campus and is thus not an access point for the site. There is an access point on Burdette Road for emergency vehicles only.

The site has direct access to WMATA bus route T2, providing service to the Rockville and Friendship Heights Metrorail stations, with half-hourly frequencies during weekdays.

Overall, the site has access to several regional roadways and transit, making it convenient to travel between the site and destinations in the District, Virginia, and Maryland.

Overview of Local Access

There are several local transportation options near the site that serve vehicular, transit, walking, and cycling trips under existing conditions.

The site is directly served by River Road (MD-190), a Downtown Boulevard, and is surrounded by Neighborhood Connectors and local streets. Table 2 provides a list of the local roadways in the project study area.

Conventional (unprotected) bicycle lanes exist on portions of River Road (MD-190)—the only bicycle infrastructure near the site. However, the Montgomery County Bicycle Master Plan identifies significant planned improvements in the form of sidepaths on both sides of River Road (MD-190).

There is some pedestrian infrastructure in the vicinity of the site, but there are gaps in connectivity. Gaps are in the form of missing sidewalks and insufficient sidewalk widths along River Road (MD-190), as well as missing or inadequate crosswalks.

Table 2: Summary of Study Area Roadways

Roadway	Jurisdiction	Functional Classification (MDOT SHA/MPOHT)	Rural vs Urban	# of Lanes	Speed Limit
River Road (MD-190)	MDOT SHA	Principal Arterial/Boulevard	Urban	4-7	35 MPH*
Burdette Road	MCDOT	Local/Neighborhood Connector	Urban	2-3	25 MPH
Royal Dominion Drive	MCDOT	Local/Local	Urban	2-4	25 MPH
Nevis Road/Beech Tree Road	MCDOT	Local/Local	Urban	2-3	25 MPH
Arrowood Road	MCDOT	Local/Local	Urban	2	25 MPH
Hillmead Road	MCDOT	Local/Local	Urban	2	25 MPH

*Speed limit was lowered from 45 MPH to 35 MPH in 2018.

Contents of Study

This report contains six (6) sections as follows:

Section 1: Adequacy Determination

This section reviews the transportation components, travel demands and the adequacy requirements of the Holton-Arms School expansion.

Section 2: LATR Vision Zero Statement

This section outlines the required Vision Zero Statement for the project. It includes a review of the High Injury Network, history of crashes around the site, and traffic speeds around the site to determine if measures to manage safety issues around the project may be warranted.

Section 3: Traffic Operations

This section provides a summary of the existing roadway facilities and an analysis of the existing and future roadway capacity in the study area. This section highlights the vehicular impacts of the project, including presenting mitigation measures as needed.

Section 4: Pedestrian Facilities

This section summarizes existing and future pedestrian access to the site, outlines impact, and presents recommendations, as needed. The pedestrian system adequacy test is also presented in this section. The pedestrian system adequacy test includes a review of the following:

- Pedestrian Level of Comfort (PLOC) adequacy
- American with Disabilities Act (ADA) compliance
- Streetlight network

The findings of each individual component are presented along with specific potential improvements that would achieve adequacy, if deemed necessary and feasible.

Section 5: Bicycle Facilities

This section summarizes existing and future bicycle access to the site, reviews the quality of cycling routes to and from the project site, outlines impact, and presents recommendations, as needed. The bicycle system adequacy test is also presented in this section, including a discussion of potential improvements that would achieve adequacy, if deemed necessary and feasible. The bicycle system adequacy test includes a review of the Bicycle Level of Traffic Stress (BLTS) within the study area.

Section 6: Transit Facilities

This section summarizes the existing and future transit service adjacent to the site, reviews how the project's transit demand will be accommodated, outlines impact, and presents recommendations, as needed. The transit system adequacy test is also presented in this section, including a discussion of potential improvements that would achieve adequacy, if deemed necessary and feasible.



Figure 1: Site Aerial

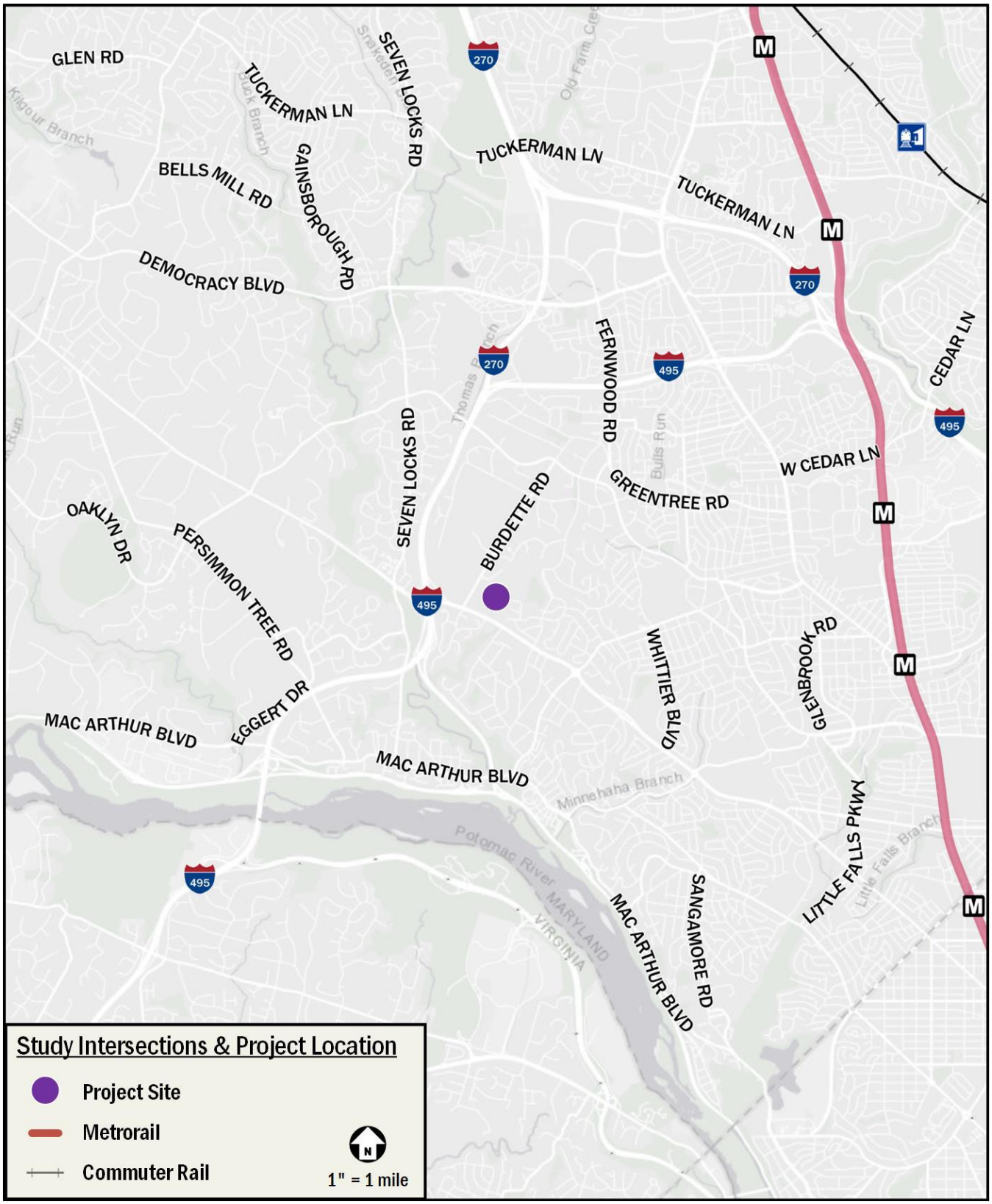

Figure 2: Project Location and Transportation Facilities

Section 1: Project Design and Adequacy Determination

This section reviews the transportation components, travel demands and the adequacy requirements of the Holton-Arms School project.

Project Description

The proposed development site is located at 7303 River Road, in Bethesda, Maryland and is bounded by River Road (MD-190) to the south, residential properties to the east, north, and west, park land to the east, and a commercial development to the west.

The school seeks to increase the enrollment cap to 870 students during the school year and 970 campers for the summer camp. The existing school year enrollment cap is 670 students and the existing summer camp registration cap is 665 students. **The project does not include new construction or an increase in floor area.**

School Year Operations

The Holton-Arms School serves ages 8 to 18 in grades 3-6 (Lower School), grades 7-8 (Middle School), and grades 9-12 (Upper School) during the academic year.

During the academic year, students arrive at 8:00 AM and dismissal takes place at 3:30 PM. A significant number of lower school students participate in programming that dismisses at 4:30 PM. Athletics and other extracurricular activities dismiss after 3:30 PM.

The school also offers an Early Childhood Development/daycare program open to faculty and staff of Holton-Arms School, Norwood School, Landon School, Primary Day School, and Burning Tree Elementary School from 7:30 AM to 5:00 PM and extended day care until 6:00 PM. Under existing conditions, there are 24 children enrolled in the program and the daycare enrollment cap is 31 children. **No changes are being sought for the daycare enrollment cap.**

School Year School Bus Program

The school operates a robust bus program with 12 bus routes during the academic year. In addition, late bus service is offered with 4 buses serving 8 routes.

School Year Transportation Patterns

The following mode splits and commuting assumptions were analyzed as part of existing conditions in this report:

Students:

- 28% of students registered for bus program
- 21% of students carpooling
- 10% of students registered for parking spaces

Daycare:

- 75% carpooling with Holton staff

Staff:

- 98% driving
- Minimal carpooling or commuting by alternative modes of transportation

Summer Camp Operations

The Holton-Arms School Summer Programs serve campers from age 4 to 18.

Under existing summer camp operations, summer programming is offered from 9:00 AM to 3:00 PM. Before and After Care programs are offered during summer operations, starting at 7:30 AM and ending at 6:00 PM.

Summer Camp Bus Program

The school operates 7 bus routes during the summer to serve campers and staff/junior counselors.

Summer Transportation Patterns

The following mode splits and commuting assumptions were analyzed as part of existing conditions in this report:

Campers:

- 49% of campers carpooling with other campers/siblings or staff
- 16% of campers registered for bus program

Staff:

- 16% carpooling
- 8% of staff registered for bus program

Proposed Operational Modifications and Expanded TMP

As part of the project, the school proposes to update their already robust transportation management plan (TMP) to include a comprehensive toolbox of transportation demand management strategies aimed at reducing peak hour trip generation and dispersing traffic to minimize impact to the surrounding roadway network.

The updated TMP is provided as a separate document and provides detailed information on the transportation demand management strategies that will be implemented, actively monitored, refined, or phased out over time based on their effectiveness.

The following operational modifications and transportation demand management strategies from the TMP are analyzed in this report:

School Year Modifications:

- Increased bus ridership target of 36%
- 2 new bus routes during the school year for a total of 14 bus routes
- Conservative increase in carpooling rates and non-auto mode splits for staff to reflect comprehensive incentives to be implemented by the school.

Summer Modifications:

- Expanded summer bus program
    - 2 new bus routes offered during summer camp for a total of 9 bus routes
- Staggered start/end times for summer programs
    - Depending on their program, campers will arrive by 9:00 AM, 9:30 AM, and 12:00 PM. Dismissals will take place at 12:00 PM, 3:00 PM, 3:30 PM, and 4:00 PM.

It should be noted that the TMP includes transportation demand management strategies beyond those listed above. The analysis presented in this report is based on conservative assumptions; however, the TMP includes robust measures and targeted incentives designed to actively drive significant reductions in vehicle trips by students and staff. These strategies are expected to achieve greater trip reductions than those estimated in this report.

Access and Circulation

Non-Auto Access

Pedestrian and bicycle access to the site is available via Royal Dominion Drive. There are also internal connections to the surrounding residential neighborhoods used by both staff and students. An internal pathway network connects pedestrians to the school's main building and athletic facilities.

As part of the project, the school proposes upgrading the existing bus stop along the River Road frontage to include a bus shelter further enhancing transit access for the Holton-Arms and surrounding communities.

Vehicular Access

Access to the site is available via Royal Dominion Drive, which provides access to the site's parking, pick-up/drop-off area, and loading facilities.

Site Circulation

A site visit was conducted on November 21, 2024, a typical school day, to observe site circulation and internal operations. Observations were taken from 7:30-8:30 AM and 2:30-4:45 PM. Pick-up/drop-off circulation is shown in Figure 3.

Lower School pick-up/drop-off occurs at the upper lot with parents using Delancey Street (internal road) and queuing at the Lower School's entrance. There is 1,700 feet of queueing space, though observed queues were contained entirely within the Lower School parking lot and the driveway loop.

Upper School pick-up and drop-off occurs in the lower lot, with parents queuing on the school's driveway and in the parking lot. Queuing was contained within the site.

Overall, internal operations are run efficiently, with ample staff directing traffic and ensuring that pick-up and drop-off periods run smoothly. Parents were not observed parking and entering the building with their students.

Future operations and circulation with the increased enrollment will be modified as needed to ensure no spillback onto River Road occurs and may include additional staff as required.

Additional queueing of vehicles generated by the proposed enrollment caps can be accommodated on site.

Parking

The are 310 parking spaces on site that include gravel spaces, handicap spaces, and parallel parking). Parking spaces are distributed throughout the site, with spaces available on the western side of the site near the entrance to the Lower School and spaces also available on the eastern side of the site near the entrance to the Upper School.

Trip Generation

Existing trip generation was calculated using driveway volumes collected while school was in session on Tuesday, January 30, 2024, and during the summer on Thursday, June 27, 2024 and Tuesday, July 23, 2024.

Trip generation rates were calculated for the following analysis periods (these were the peak hours in the Turning Movement Count data):

- School AM Peak Hour (7:15-8:15 AM)
- Roadway PM Peak Hour (3:15-4:15 PM) using School PM Peak Hour trip generation rates (3:30-4:30 PM) for a conservative analysis
- Summer PM Peak Hour (2:30-3:30 PM)

The methodology for the proposed school year and summer trip generation was developed using existing travel patterns, driveway counts, mode split data, carpooling rates, and proposed modifications to both the school year and summer camp operations. Arrival and departure trip distributions were developed for the different trip categories based on travel demand profiles for student/families, staff/faculty, and the school's daycare program. Trip distributions and methodology were then validated through an iterative analysis using the collected traffic counts analysis.

The proposed trip generation also reflects the implementation of trip-reducing transportation demand management (TDM) strategies along with modifications to school year and summer operations as a mitigation measure to reduce school-generated peak hour trips. The proposed trip generation methodology is detailed in the Technical Attachments.

Analysis of conditions with the proposed trip generation with TDM is presented under the Total Future with Mitigation scenario.

Unmitigated trip generation based on existing trip generation rates per student/camper is also analyzed in this report as reference for the unmitigated conditions.

Table 3 summarizes the existing, unmitigated future trip generation, and proposed trip generation with TDM mitigation. Detailed trip generation tables are included in the Technical Attachments.

Table 3: Trip Generation Summary

Condition	Enrollment	AM Peak In	AM Peak Out	AM Peak Total	PM Peak In	PM Peak Out	PM Peak Total
Existing Trip Generation							
School Year Enrollment	670 students	537	331	868	161	311	472
Existing School Year Trip Generation Rate Per Student Based on January 2024 Counts		*0.80*	*0.50*	*1.30*	*0.24*	*0.46*	*0.70*
Summer Enrollment (Approved)	665 campers	430	340	770	281	333	614
Existing Summer Trip Generation Rate Per Camper Based on Summer 2024 Counts		*0.65*	*0.51*	*1.16*	*0.42*	*0.50*	*0.92*
Future Trip Generation without Proposed TDM Mitigation **							
Proposed School Year Enrollment	870 students	697	430	1,127	209	404	613
School Year Trip Generation Rate Based on January 2024 Counts		*0.80*	*0.50*	*1.30*	*0.24*	*0.46*	*0.70*
Net School Year Trips (Proposed School Year Trips No TDM - Existing School Year Trips)		*160*	*99*	*259*	*48*	*93*	*141*
Proposed Summer Enrollment	970 campers	627	496	1,123	338*	403*	741*
Summer Trip Generation Rate Based on Summer 2024 Counts and Staggered Dismissal		*0.65*	*0.51*	*1.16*	*0.35**	*0.41**	*0.76**
Net Summer Trips (Proposed Summer Trips No TDM - Existing Summer Year Trips)		*N/A*	*N/A*	*N/A*	*57**	*70**	*127**
Proposed Trip Generation with Trip-Reducing TDM Mitigation							
Proposed School Year Enrollment with TDM	**870 students**	**618**	**400**	**1,018**	**196**	**357**	**553**
Proposed Trip Generation Rate Per Student Based on Trip Generation Model w/ TDM		*0.71*	*0.46*	*1.17*	*0.23*	*0.41*	*0.64*
Net School Year Trips (Proposed School Year Trips- Existing School Year Trips)		***81***	***69***	***150***	***35***	***46***	***81***
Proposed Summer Enrollment with TDM	**970 campers**	***546***	***459***	**1,005**	***350***	***454***	***804***
Proposed Trip Generation Rate Per Camper Based on Trip Generation Model w/ TDM		*0.56*	*0.48*	*1.04*	*0.36*	*0.47*	*0.83*
Net Summer Trips (Proposed Summer Trips- Existing Summer Trips)		***N/A***	***N/A***	***N/A***	***69***	***121***	***190***

Notes:

** This approach has been superseded by the proposed trip generation with TDM as mitigation and the unmitigated trip generation is provided as reference for the purpose of the unmitigated total future scenario analysis.

* The unmitigated summer PM trip generation was modified to reflect staggered dismissals and the assumption that approximately 805 campers would be dismissed during the summer PM generator peak as detailed in previous submissions of this LATR.

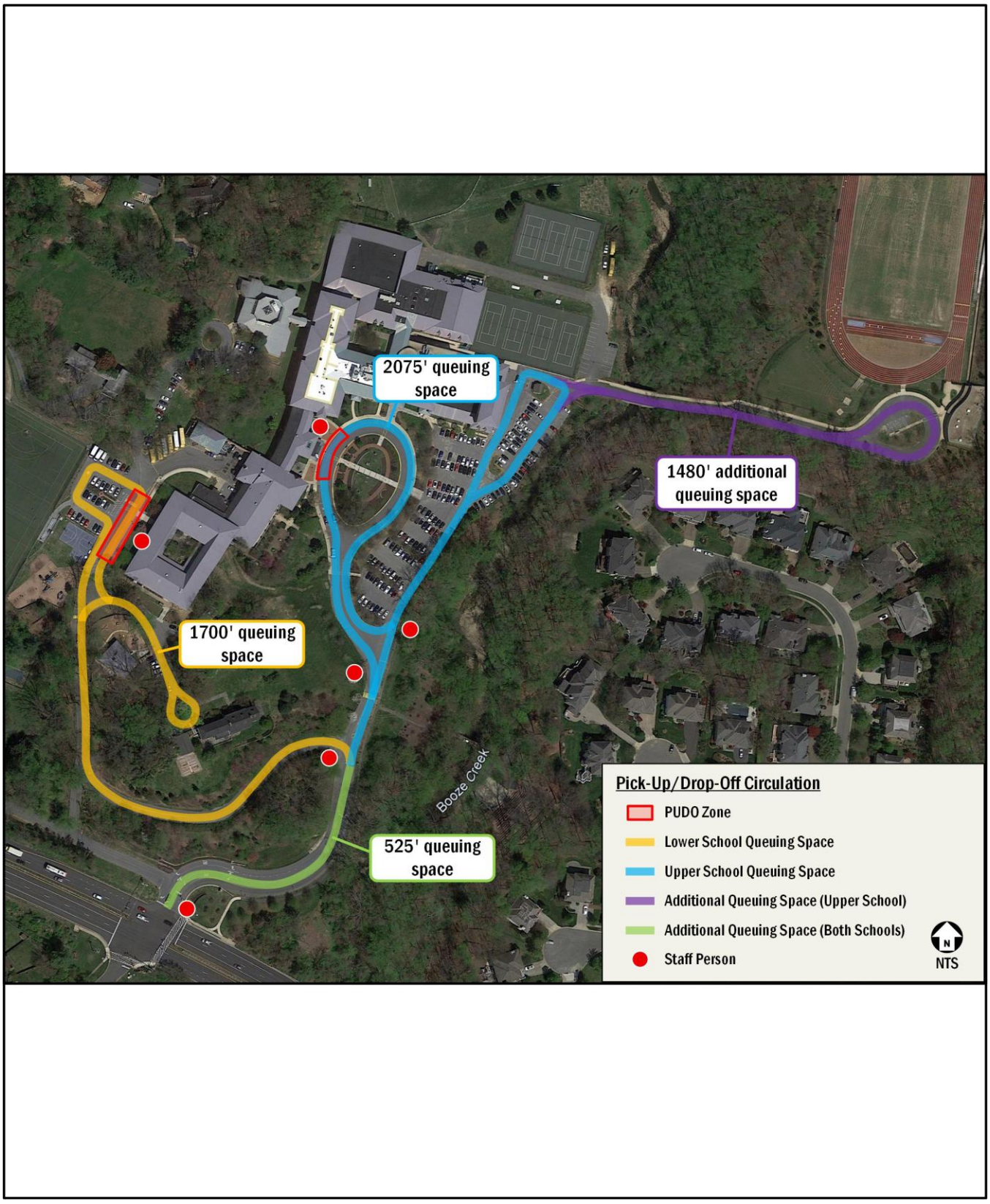

Figure 3: Pick-Up/Drop-Off Circulation

Section 2: Vision Zero Statement

This chapter outlines the project's Vision Zero Statement. The purpose of this statement is to assess high-injury roadways and safety issues in the vicinity of the project site and propose solutions as needed. This chapter also reviews traffic speeds around the site and describes site access in relation to existing safety issues.

For any project generating 50+ net new peak-hour weekday trips, a Vision Zero Statement must be developed with the project made of up the following:

- High Injury Network (HIN) Review to determine if the project is located within a specified proximity of any roadway segments with a designated HIN designation.
- Crash History Review to review crash data within a specified distance near the project site.
- Speed Studies within specified distance from the site frontage to document the average and 85th percentile speeds in the area along with the 10-mile per hour pace.

The following conclusions are reached within this chapter:

- The River Road High Injury Network designated roadway segment is located near the project site.
- The speed limit on River Road was lowered from 45 mph to 35 mph in 2018.
- Neither 85th percentile speeds nor 10-mile pace at any speed study location exceeded their corresponding posted speed limit by 20 percent.
- Neither 85th percentile speeds nor 10-mile pace at any speed study location exceeded their corresponding posted speed limit by 12 mph, the threshold at which automated citations are issued.

These are discussed in detail in the following sections.

High Injury Network Review

High Injury Network (HIN) segments within 900-foot walkshed beyond the site frontage must be documented and reviewed.

The HIN segment along River Road was identified within a 900-foot walkshed from the Project.

Within the 900-foot walkshed, River Road is divided four (4) lane roadway with a 35 mph posted speed limit. In the vicinity of the project site, the River Road average daily traffic (AADT) is 37,060 based on SHA volume data (2023).

In the vicinity of the project site and study area, there is limited pedestrian infrastructure with short segments of sidewalk available near bus stops. Bicycle infrastructure is available along River Road in the form of conventional unprotected bike lanes and no bicycle lanes are provided within the presence of acceleration/deceleration lanes. The adequacy of the Pedestrian and Bicycle networks are discussed in more detail in the Pedestrian System Adequacy and Bicycle System Adequacy sections of this report.

There is a completed Vision Zero project along this same segment, where the speed limit was lowered from 45 mph to 35 mph.

The crashes within the River Road High Injury Network are reviewed in the next section of this report.

Proximate Safety Issues

Using Montgomery County's Open Data Portal for Crash Reporting – Incidents Data for crashes between 2019 and 2024, crashes were reviewed within a 900-foot walkshed around the project site. Severe and fatal crashes within the past five (5) years are summarized in Table 4. The reviewed crashes are shown in Figure 4. The reviewed collision data is summarized as follows:

- One (1) fatal crash was documented at the intersection of River Road and Burdette Road in May 2020;
  - This crash involved a vehicle and a motorcycle at approximately 10pm.
  - Collision type records indicate this crash was a "straight movement angle" collision, involving a vehicle making a left-turn onto Burdette Road.
  - This crash occurred outside typical conditions during the COVID-19 pandemic when school was not in session, in the evening hours, and excessive speeds were often observed with low roadway volumes.
- No other crashes are categorized as major injury crashes were documented within the study area within the past five (5) years;
- No crashes involving pedestrians or bicycles were documented in the study area within the past five (5) years;
- The majority of the crashes within the study area are categorized as "same direction rear end" or "front to rear" crashes.

Speed Study

As part of the LATR Vision Zero Statement, speed studies were conducted at the following locations:

- Burdette Road, north of Burdette Court
- River Road (MD-190), between I-495 Ramps and Burdette Road
- River Road (MD-190), between Royal Dominion Drive and Beech Tree Road

The 48-hour speed data was collected on Tuesday, October 8, 2024 and Wednesday, October 9, 2024. Schools were in session on the days speed data was collected. The speed data collected is included in the Technical Attachments.

Table 5 summarizes the observed speed data, including the 50th and 85th percentile speeds for each observation day and each direction at the study location. The speed data reports are included in the Technical Attachments.

The speed study results are summarized as follows:

- Burdette Road, 200 ft north of Burdette Court
  - The upper limit of the 10-mile pace in the northbound and southbound direction exceeded the posted speed limit by 20 percent, or at least 5 mph over the posted speed limit of 25 mph, on both days.
- None of the observed 85th percentile speeds in the area exceed the posted speed limit by 20 percent. More specifically:
  - 85th percentile speeds on River Road are under 42 mph and do not exceed the posted speed limit of 35 mph by 20 percent or 7 mph.
  - 85th percentile speeds on Burdette Road are 30 mph or under and do not exceed the posted speed limit of 25 mph by 20 percent or 5 mph

Additionally, none of the 85th percentile speeds in the area exceed the posted speed limit by at least 12 mph, which is the speeding threshold before an automated citations are issued. Thus, additional speed management measures are not warranted by MCDOT.

Table 4: Severe and Fatal Crash Summary

Crash Severity	Crash Date	Crash Location	Collision Type	Crash Mode
Fatal	5/28/2020	Intersection	Straight Movement Angle	Motor Vehicle

Table 5: Speed Data Summary

Roadway	Approach	Posted Speed Limit	Day 1 (10/8/24)			Day 2 (10/9/24)		
			50th %	*85th %*	*Pace*	*50th %*	*85th %*	*Pace*
Burdette Road 200 ft north of Burdette Court	NB	25 mph	24 mph	29 mph	22 - 31 mph	24 mph	29 mph	22 - 31 mph
	SB		26 mph	30 mph	23 - 32 mph	25 mph	30 mph	22 - 31 mph
River Road between I-495 ramps and Burdette Road	EB	35 mph	33 mph	41 mph	33 - 42 mph	31 mph	41 mph	32 - 41 mph
	WB		34 mph	41 mph	31 - 40 mph	34 mph	41 mph	30 - 39 mph
River Road between Royal Dominion drive & Beech Tree Rd	EB	35 mph	32 mph	38 mph	30 - 39 mph	32 mph	38 mph	29 - 38 mph
	WB		30 mph	38 mph	31 - 40 mph	28 mph	37 mph	30 - 39 mph

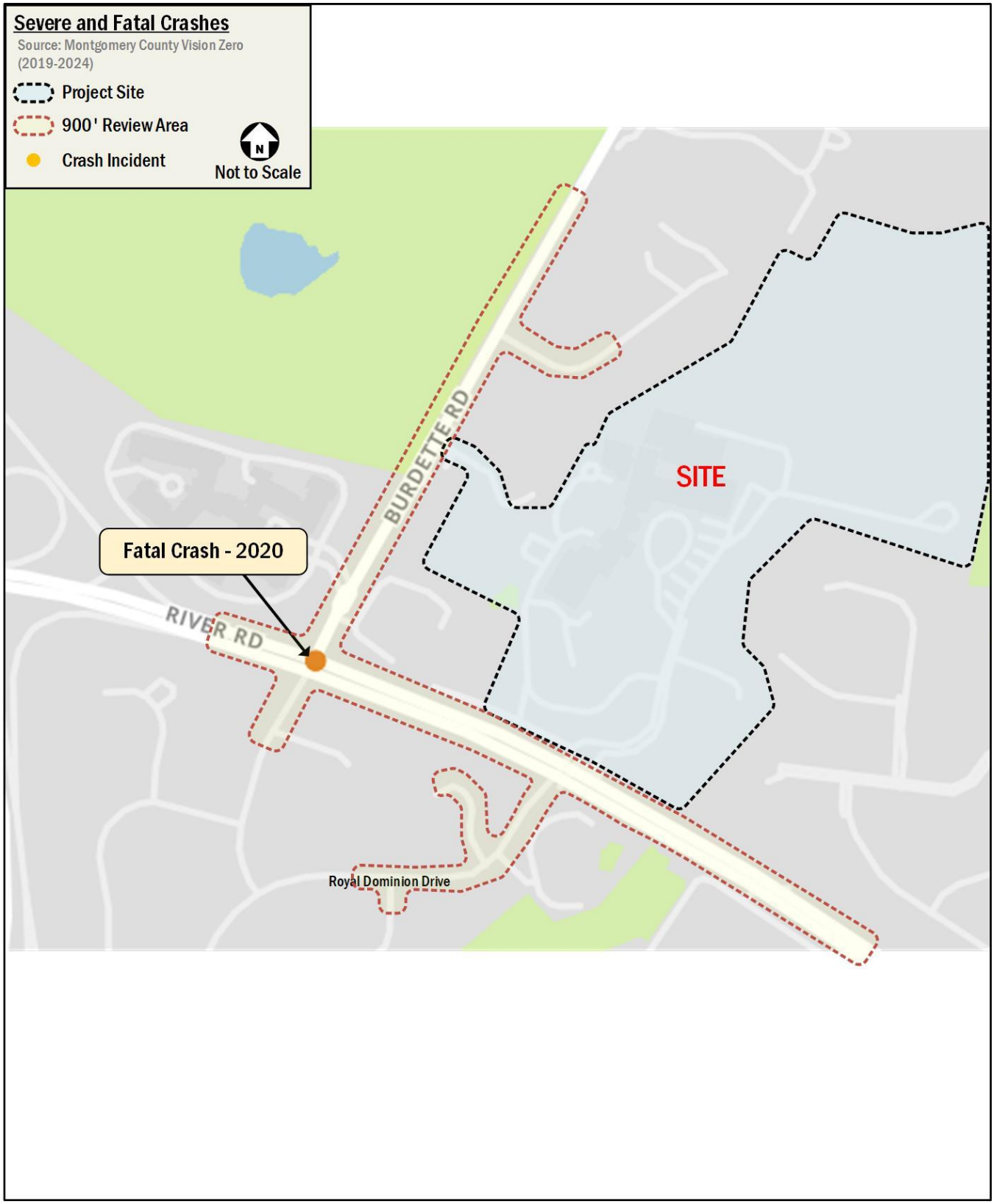

Figure 4: Severe and Fatal Crash Data Near Project Site

Section 3: Traffic Operations

This section provides a summary of an analysis of the existing and future roadway capacity in the study area. Included is an analysis of potential vehicular impacts of the Holton-Arms School expansion project and a discussion of potential improvements as needed.

The purpose of the capacity analysis is to:

- Determine the existing capacity of the study area roadways;
- Determine the overall impact of the project on the study area roadways; and
- Discuss potential improvements and mitigation measures to accommodate the additional vehicular trips, if necessary.

The capacity analysis focuses on the school year/typical weekday morning and afternoon peak hours based on the existing traffic volumes in the study area. The traffic counts show the School's PM peak hour takes place from 3:30-4:30 PM while the Roadway PM peak hour occurs at 3:15-4:15 PM. As the roadway PM Peak hour and the School's dismissal peak hour are only off by 15-minutes, the School PM Peak Hour trip generation rates (3:30-4:30 PM) were analyzed with the roadway's PM Peak Hour volumes at 3:15-4:15 PM for a more conservative analysis.

To evaluate the additional trips generated by the proposed Summer Camp enrollment during the afternoon, a Summer PM analysis is also included using school year roadway volumes collected in January 2024 and October 2024 during the hours of Summer Camp dismissal (2:30-3:30 PM).

The following conclusions are reached within this chapter:

- The study area intersections operate well below the congestion thresholds per LATR guidelines during all analysis scenarios for the AM, PM, and Summer PM peak hours.
- Significant queueing is observed along the River Road (MD-190) corridor under Existing, Background, and Total Future conditions. Mitigation measures are recommended to improve queueing along the corridor.
- Changes to intersection geometry and phasing at River Road (MD-190) & Royal Dominion Drive, along with TDM measures and changes to signal timings throughout the corridor, improve queueing along the corridor.

Study Area, Scope, & Methodology

This section outlines the vehicular trips generated in the study area along the vehicular access routes and defines the analysis assumptions.

The scope of the analysis contained within this report was discussed with and agreed to by M-NCPPC as detailed in the approved scoping form. The scoping form document is included in the Technical Attachments. The general methodology of the analysis follows national and Montgomery County/LATR guidelines on the preparation of transportation impact evaluations of site development, unless stated otherwise.

Capacity Analysis Scenarios

The vehicular analyses are performed to determine if the proposed development will lead to adverse impacts on traffic operations. This is accomplished by comparing future scenarios: (1) without the proposed development (referred to as the Background condition) and (2) with the proposed development (referred to as the Future condition).

Specifically, the roadway capacity analysis examined the following scenarios:

- Existing Conditions
- Future Conditions without the development (Background)
- Future Conditions with the development (Total Future)
- Future Conditions with the development and mitigation measures (Total Future with Mitigation) that include:
    - TDM measures to reduce vehicle traffic entering and exiting the site during the peak hours.
    - Changes to northbound lane configuration and the extension of the westbound right turn lane at the intersection of River Road (MD-190) & Royal Dominion Drive.
    - Adjustments to signal timings and offset optimization along the River Road corridor, including the re-servicing of the eastbound left turn phase at the intersection of River Road (MD-190) & Royal Dominion Drive during the AM peak hour.

Study Area

The study area of the analysis is a set of intersections where detailed capacity analyses are performed for the scenarios listed above. The set of intersections decided upon during the study scoping process with M-NCPPC Staff are those intersections most likely to have potential impacts or require changes to traffic operations to accommodate the proposed development.

The number of study intersections analyzed in this report meet the LATR criteria and are based on the maximum number of new weekday peak-hour vehicle trips generated by the proposed project. For the Holton-Arms School expansion, a minimum of two (2) intersections in each direction were required.

Based on the projected future trip generation and the location of the site access points, as well as staff recommendation, the following intersections were analyzed:

1. River Road (MD-190) & SB I-495 (Outer Loop) Off-Ramp
2. Westbound River Road (MD-190) & Signalized Left Turn onto NB I-495 (Inner Loop) On-Ramp
3. River Road (MD-190) & Burdette Road
4. River Road (MD-190) & Royal Dominion Drive
5. River Road (MD-190) & Beech Tree Road/Nevis Road
6. River Road (MD-190) & Wilson Lane (MD-188)
7. Burdette Road & Arrowood Road/Hillmead Road

Figure 5 shows a map of the study area intersections.

For the purposes of the queueing analysis, discussed in more detail after the intersection capacity analysis results, the model used in the Synchro and SimTraffic software also included the River Road (MD-190) & Seven Locks Road and the River Road (MD-190) & Braeburn Parkway intersections. These non-study intersections were included to reflect accurate arrival patterns into the study area network based on the traffic signal timing and offset settings provided by MCDOT. **These two intersections are not study intersections and conditions were not analyzed at these locations**. In addition, turning movement data was not collected at River Road (MD-190) & Seven Locks Road or River Road (MD-190) & Braeburn Parkway and the movements that enter the network these locations are based on the traffic volumes collected at the River Road (MD-190) & SB I-495 (Outer Loop) Off-Ramp intersection and the River Road (MD-190) & Wilson Lane (MD-188) intersection.

Traffic Volume Assumptions

The following section reviews the traffic volume assumptions and methodologies used in the roadway capacity analyses.

Existing Traffic Volumes

The traffic volumes were collected on Tuesday, January 30th, 2024 at the following study intersections:

- River Road (MD-190) & Burdette Road
- River Road (MD-190) & Royal Dominion Drive
- River Road (MD-190) & Beech Tree Road/Nevis Road

The remaining study intersections were added during the scoping process and count data was collected on Wednesday, October 9th, 2024 at the following locations:

- Westbound River Road (MD-190) & Signalized Left-Turn onto NB I-495 (Inner Loop) On-Ramp
- River Road (MD-190) & SB I-495 (Outer Loop) Off-Ramp
- River Road (MD-190) & Wilson Lane (MD-188)
- Burdette Road & Arrowood Road/Hillmead Road

For school year analysis, the morning peak hour is 7:15 – 8:15 AM and the afternoon peak hour is 3:15 – 4:15 PM. Summer camp analysis is based on the summer camp PM peak which takes place from 2:30 to 3:30 PM (derived from count data collected in the June and July 2024) and the corresponding school year roadway volumes collected in January and October 2024. Traffic volume data is provided in the Technical Attachments, along with a comparison between school year and summer roadway volumes that show volumes during the summer are significantly lower than during the school year.

For the purpose of analyzing a balanced network in SimTraffic and to account for volume imbalances due to different data collection dates, the raw peak hour volumes were adjusted to balance with the higher entering/departing volumes between study intersections, making for a more conservative analysis. The existing peak hour traffic volumes (balanced) are presented in Figure 6.

Background Traffic Volumes (without the project)

Traffic projections for the background conditions typically consist of the existing volumes with the addition of traffic generated by approved but unbuilt developments in the study area (known as background developments).

Two (2) background developments contributing to the growth within the study area were identified: Westwood Shopping

Center (preliminary plan number 120170170) and Washington Episcopal Day School (preliminary plan number 120150160).

The Westwood Shopping Center background volumes were derived from the "Phase II" trip generation in the approved 2018 LATR for that development and the corresponding trip distribution for the residential and retail trips presented in the study. It should be noted that a subsequent preliminary plan amendment was approved to replace the unbuilt multifamily component with senior living, the trip generation of the amendment was found to be lower than the approved trip generation; however, the development reserved the trips to potentially apply these to future phases, as such the approved trip generation was used in this analysis.

The Washington Episcopal Day School traffic volumes included in this analysis are based on the "additional" or net trips for additional enrollment and the senior living trips analyzed in the approved 2015 Traffic Impact Study (TIS) for that project. The school trips distribution presented in the study was used for the school trips and the residential trip distribution percentages from the Westwood Shopping Center were applied to the senior living trips.

A map of developments is shown in Figure 7. The total background development peak hour volumes added to the analysis are shown in Figure 8.

Trips generated by background development and trips used to bring the summer up to its peak enrollment were assigned at the study intersections using the global trip distribution assumptions summarized in Table 6.

Table 6: Trip Distribution

To/From	Percentage	
	AM	PM
Inbound		
River Road to the west	63%	61%
River Road to the east	34%	35%
Royal Dominion Drive to the south	3%	4%
Outbound		
River Road to the west	53%	61%
River Road to the east	41%	38%
Royal Dominion Drive to the south	6%	1%

Trip distribution assumptions and routing for the additional school trips are provided in Figure 9 for inbound routing and Figure 10 for outbound routing. Trip distribution for the project was determined based on existing travel patterns in the study area and the direction of travel for school trips based on the site driveway counts.

The traffic volumes for the Background conditions are shown in Figure 11.

Total Future Traffic Volumes (with the project)

The Total Future traffic volumes consist of the Background volumes and the addition of the traffic volumes generated by the proposed project (site-generated trips). Thus, the Total Future traffic volumes include the existing roadway volumes, background development volumes, net trips to account for the difference in approved enrollment trip and enrollment during data collection (for the Summer PM period only), and the net new trips generated by the proposed enrollment increase.

The unmitigated site-generated trips summarized in Table 3 were then applied to the study area roadway network based on the trip distributions discussed for school trips. The resulting site-generated traffic volumes during peak hours are shown in Figure 12. The Total Future traffic volumes are shown in Figure 13.

Geometry and Operations Assumptions

The following section reviews the roadway geometry and operations assumptions made and the methodologies used in the roadway capacity analyses.

Existing Geometry and Operations Assumptions

The geometry and operations assumed in the existing conditions scenario are those present when the main data collection occurred. Gorove Slade made observations and confirmed the existing lane configurations and traffic controls at the intersections within the study area. Existing signal timings and offsets were obtained from Montgomery County and confirmed during field reconnaissance. The signal timing data provided by MCDOT is included in the Technical Attachments.

The lane configurations and traffic controls for the Existing conditions are shown on Figure 14.

Background Geometry and Operations Assumptions

Following national and Montgomery County/LATR methodologies, a background improvement must meet the following criteria to be incorporated into the analysis:

- Be funded; and
- Have a construction completion date prior or close to the proposed development.

Based on these criteria, there are no funded projects which will affect the geometry of the study intersections and therefore the lane configurations and traffic controls in the Background Conditions are consistent with the lane configurations and traffic controls for the Existing Conditions.

Total Future Geometry and Operations Assumptions

As part of the project, changes to the intersection geometry at the intersection of River Road (MD-190) and Royal Dominion Drive were analyzed and the recommendations are as follows:

- Recommend extending the striping for the Westbound right-turn lane from 210' to 500' to accommodate additional cars turning into the site.
    - As part of the mitigation analysis, increasingly longer turn lane lengths were tested and were found to be ineffective in reducing queues.
- Widening the northbound approach to install a 150' left-turn lane.

A modification to traffic signal operations is also recommended to include the re-servicing of the eastbound left-turn phase during the AM peak hour primarily during the peak arrival period 7:30-8:00 AM.

While the duration of the eastbound left phase re-servicing is recommended for the peak arrival period in the morning, the analysis contained in this report assumes phasing with re-servicing for the eastbound left during the entire AM peak hour.

Minor adjustments to signal timings and offsets are recommended throughout the network to improve progression and better distribute queuing along the River Road corridor.

The lane configurations and traffic controls for the Mitigated Total Future condition are shown in Figure 17.

Vehicular Analysis Results

Capacity Analysis

Corridor and intersection capacity analyses were performed at the study intersections shown in Figure 5 for the AM peak hour, PM peak hour, and Summer PM peak hour.

The site is located in the Bethesda/Chevy Chase policy area, an Orange policy area. Per LATR guidelines, "For intersections located within Orange Policy areas, the Highway Capacity Manual operations (delay-based) level of service standard applies to all study intersections." Therefore, delay-based analysis was conducted using Synchro software for corridor delays. The HCM 2010 methodology was used at the isolated unsignalized study intersection that is not located along the River Road corridor. Under Montgomery County and LATR guidelines, the congestion standards set for the site Policy Area include a congestion standard of 80 seconds/vehicle.

All study intersections are located consecutively along the River Road corridor, with the exception of Burdette Road & Arrowood Road/Hillmead Road intersection. Therefore, the corridor was analyzed to determine adequacy, consistent with the LATR guidelines for corridor scenarios, as excerpted below. Per page 33 LATR guidelines:

> ***"If a network of multiple intersections is analyzed, the vehicular delay threshold applies to the network as a whole, not to individual intersections within the network.*** *The focus on average delay is intended to facilitate a focus on management and operations strategies; as the county builds out its roadway network, the emphasis is less on constructing additional automobile capacity and more on finding more efficient means for operating the current network to accommodate changing travel demands through techniques such as signal timing, signing and marking, and vehicle progression."*

For reference purposes, the intersections were also analyzed using the Critical Lane Volume (CLV) methodology. CLV results are provided in the Technical Attachments.

As shown in Table 7 and Table 8, the River Road corridor and the single isolated intersection operate well within the congestion standards under all scenarios. Therefore, the proposed increase in enrollment would not trigger a requirement for intersection capacity improvements, thus satisfying the Motor Vehicle Adequacy Test.

Queuing Analysis

While the analyses indicate the LATR Motor Vehicle Test is passed without the need for improvements, operations were further analyzed at the request of SHA to review queues along the corridor.

It is important to note that this corridor is a heavy commuter route for through traffic to and from the east on River Road, and the queuing deficiencies identified below are a result of that baseline commuter traffic flow. The proposed increase in enrollment does have some layered impact; however, the

corridor capacity is not exceeded based on the policy area congestion standards, which recognize that higher levels of congestion are acceptable in Orange and Red policy areas.

The queuing analysis was performed at the study intersections using SimTraffic. The 50th and 95th Percentile queue lengths are shown for each lane group at each study intersection. The 50th (average) percentile queue is the maximum back of queue on a median cycle. The 95th percentile queue is the maximum back of queue that exceeds five percent of the time.

Table 9 presents the 50th and 95th percentile for all study intersections. Note that in the queueing review below, "SYPM" refers to the School Year PM peak hour while "SSPM" refers to the Summer School PM Peak Hour. The detailed queuing analysis worksheets are provided in the Technical Attachments.

As Table 9 shows, queues exceed available storage length at four (4) intersections under existing conditions:

- River Road (MD-190) & Burdette Road
  - Eastbound Left (AM)
  - Eastbound Right (AM)
  - Westbound Left (SYPM/SSPM)
  - Westbound Thru (SYPM)
  - Westbound Right (SYPM/SSPM)
- River Road (MD-190) & Royal Dominion Drive
  - Eastbound Left (AM)
  - Westbound Thru (SYPM/SSPM)
  - Westbound Right (AM/SYPM/SSPM)
  - Southbound Right (SSPM)
- River Road (MD-190) & Beech Tree/Nevis Road
  - Westbound Left (SYPM)
  - Westbound Thru (SYPM)
  - Westbound Right (SYPM)
  - Northbound Left-Thru (AM/SYPM/SSPM)
  - Northbound Right (AM/SYPM)
- River Road (MD-190) & Wilson Lane
  - Eastbound Left (AM/SYPM/SSPM)
  - Westbound Left (SYPM/SSPM)
  - Westbound Thru (SYPM)
  - Westbound Right (SYPM/SSPM)

Under Background Conditions, queues exceed storage capacity at the same movements during the same peak hours, with one (1) movement experiencing queues that exceed storage capacity during an additional analysis period/additional peak hour. The westbound right movement at River Road & Wilson Lane improved during the Summer PM peak hour to within storage capacity due to the variation inherent in SimTraffic. The following movements exceed the storage capacity under Background Conditions:

- River Road (MD-190) & Burdette Road
  - Eastbound Left (AM)
  - Eastbound Right (AM)
  - Westbound Left (SYPM/SSPM)
  - Westbound Thru (SYPM/SSPM)
  - Westbound Right (SYPM/SSPM)
- River Road (MD-190) & Royal Dominion Drive
  - Eastbound Left (AM)
  - Westbound Thru (SYPM/SSPM)
  - Westbound Right (AM/SYPM/SSPM)
  - Southbound Right (SSPM)
- River Road (MD-190) & Beech Tree/Nevis Road
  - Westbound Left (SYPM)
  - Westbound Thru (SYPM)
  - Westbound Right (SYPM)
  - Northbound Left-Thru (AM/SYPM/SSPM)
  - Northbound Right (AM/SYPM)
- River Road (MD-190) & Wilson Lane
  - Eastbound Left (AM/SYPM/SSPM)
  - Westbound Left (SYPM/SSPM)
  - Westbound Thru (SYPM)
  - Westbound Right (SYPM)

With the addition of volumes generated by the proposed expansion, queues exceed available storage length at the following locations under future conditions:

- River Road (MD-190) & Burdette Road
  - Eastbound Left (AM)
  - Eastbound Right (AM)
  - Westbound Left (SYPM/SSPM)
  - Westbound Thru (SYPM)
  - Westbound Right (SYPM/SSPM)
- River Road (MD-190) & Royal Dominion Drive
  - Eastbound Left (AM)
  - Eastbound Thru (AM)
  - Westbound Left (AM)
  - Westbound Thru (SYPM/SSPM)
  - Westbound Right (AM/SYPM/SSPM)
  - Southbound Right (SYPM)
- River Road (MD-190) & Beech Tree/Nevis Road
  - Westbound Left (SYPM)
  - Westbound Thru (SYPM)
  - Westbound Right (SYPM)
  - Northbound Left-Thru (AM/SYPM/SSPM)
  - Northbound Right (AM/SYPM)
- River Road (MD-190) & Wilson Lane
  - Eastbound Left (AM/SYPM/SSPM)
  - Westbound Left (SYPM/SSPM)
  - Westbound Thru (SYPM)
  - Westbound Right (SYPM/SSPM)

Under Total Future conditions the westbound thru movement at River Road & Burdette Road and the southbound right movement at River Road & Royal Dominion Drive improved

during the Summer PM peak hour to within storage capacity due to the variation inherent in SimTraffic.

Mitigation Measures

While the increased enrollment does not trigger LATR thresholds for intersection capacity improvements, mitigation measures were identified to reduce the school's trip generation impact, and to improve progression and better distribute queuing along the River Road corridor.

Trip-Reducing TDM Mitigation Measures

To minimize the impact of the proposed enrollment increase and reduce school-generated trips, the school is implementing comprehensive transportation demand management (TDM) strategies that include a significant increase in bus ridership levels, carpooling and transit incentives, staggered start/end times for summer programming, and other strategies aimed at dispersing peak traffic and limiting the school's impact to the surrounding roadway network. The TMP includes information about the proposed transportation demand management strategies. The proposed mitigated trip generation with TDM is summarized in the Trip Generation section of this report and outlined in Table 3.

Site trips with TDM measures are shown in Figure 15, and total future trips with mitigation and TDM measures are shown in Figure 16.

Intersection Improvements and Traffic Signal Phasing Mitigation Measures

In addition to the transportation demand management strategies to reduce peak hour trips, mitigation to address queueing is recommended as follows:

- Optimized signal timings and offsets along the River Road (MD-190) Corridor
- River Road (MD-190) & Royal Dominion Drive intersection improvements
    - Intersection improvements
        - Install northbound left turn lane
        - Extend westbound right turn lane
- Traffic signal phasing modifications
    - Protected left turns for eastbound and westbound River Road
    - Re-servicing of the eastbound left-turn phase at River Road (MD 190) and Royal Dominion Drive in the AM peak hour.

The recommended mitigation measures reflect input from reviewing agencies and are as follows:

- The protected-only/exclusive left-turn phasing at the Royal Dominion Drive intersection is recommended to address SHA comments, as protected turning movements are a priority for SHA along the River Road corridor. Similarly, the re-servicing of the eastbound left-turn phase at the site access was identified as a measure that should be considered for implementation to address existing conditions and improve eastbound operations during the morning peak hour.
- The removal of the permitted left-turn phases for eastbound and westbound River Road at the site access generally results in longer queues overall. As this increase in queueing is a result of the effort to address comments related to pre-existing conditions and not the direct impact of the proposed project/enrollment increase, a "modified background" scenario with the phasing changes was also analyzed to provide comparable analysis results.

Table 9 includes queues for the modified background scenario and the mitigated total future scenario. The recommended lane use changes are shown in Figure 17.

Under the Total Future with Mitigation scenario queues at several approaches exceed those in the modified background scenario, however, these queues are expected along a corridor with high commuter volumes. Where queues increase, the increases are largely consistent with Background conditions and increases do not exceed 125 feet or five (5) car lengths. The recommended mitigation strategies significantly improve progression of vehicles traveling along the River Road corridor and afternoon operations are observed to experience shorter corridor delays with significantly reduced queues observed on the east end of the study area. The following movements exceed the storage capacity under the Total Future with Mitigation conditions:

- **River Road (MD-190) & Burdette Road**
    - Eastbound Right (AM)
        - No site traffic added to this movement

- This queue is primarily impacted by the number of vehicles merging on to the eastbound thru lanes coming off the I-495 off-ramp and thru queues blocking access to the right turn lane.
- Exceeds under modified background conditions in the AM
- Queues for this movement increase by less than one car length.

- Westbound Left (SYPM/SSPM)
  - No site traffic added to this movement
  - Queues for this movement are a direct result of westbound thru queues blocking access to the westbound left turn lane. The left turn storage is adequate to contain these vehicles were it not blocked by the thru queue.
- Westbound Thru (SYPM/SSPM)
  - This queue is primarily impacted by the number of vehicles merging on to the right lanes just downstream of this intersection to access the I-495 ramps.
- Westbound Right (SYPM/SSPM)
  - No site traffic added to this movement
  - Queues for this movement are a direct result of westbound thru queues blocking access to the westbound right turn lane. The right turn storage is adequate to contain these vehicles were it not blocked by the thru queue.

- **River Road (MD-190) & Royal Dominion Drive**
  - Eastbound Left (AM/SSPM)
    - Total future mitigated simulations show an increase of 10 ft (less than 1 car length) in the AM peak hour and field observations indicate this queue clears quickly
    - The summer scenario is analyzed with school-year roadway volumes. As summer roadway volumes are significantly lower, and this is a highly conservative analysis, this queue is not expected in actual future summer conditions. See Table 10 for volume comparisons. Additional volume data can be found in the Technical Attachments.
  - Eastbound Right (AM)
    - This queue exceeds the storage length by 17 feet, less than one (1) car length.
  - Westbound Left (SSPM)
    - Queues at this movement are a direct of westbound thru queues blocking access to the westbound left turn lane. The left turn storage is adequate to contain these vehicles were it not blocked by the thru queue.
  - Westbound Thru (SYPM/SSPM)
    - Queues at this intersection are a direct result of westbound queues spilling over from the Burdette Road intersection.
  - Westbound Right (AM/SYPM/SSPM)
    - Queues for this movement are a direct result of westbound thru queues blocking access to the westbound right turn lane. The right turn storage is adequate to contain these vehicles were they not blocked by the thru queue.
- **River Road (MD-190) & Beech Tree/Nevis Road**
  - Westbound Left (SYPM)
    - No site traffic added to this movement
    - Queues for this movement are a direct result of westbound thru queues blocking access to the westbound left turn lane. The left turn storage is adequate to contain these vehicles were they not blocked by the thru queue.
  - Westbound Thru (SYPM)
    - Queues at this intersection are a direct result of westbound queues spilling over from the Burdette Road intersection.
  - Westbound Right (SYPM)
    - This queue exceed background conditions by less than one (1) car length
  - Northbound Left-Thru (AM/SYPM/SSPM)
    - No site traffic added to this movement
    - Exceeds under background conditions in the AM, SYPM, and SSPM
  - Northbound Right (AM/SYPM)
    - No site traffic added to this movement
    - Exceeds under background conditions in the AM and SYPM
- **River Road (MD-190) & Wilson Lane**
  - Eastbound Left (AM/SYPM/SSPM)
    - Exceeds under background conditions in the AM, SYPM, and SSPM
    - Total future mitigated simulations show improvements in the AM, SYPM, and SSPM
  - Westbound Left (SYPM/SSPM)
    - Exceeds under background conditions in the SYPM and SSPM
  - Westbound Thru (SYPM)
    - Exceeds under background and existing conditions in the SYPM
  - Westbound Right (SYPM/SSPM)
    - Queues in the SYPM and SSPM exceed the storage length by 25’ (1 car length) and 78 ft (about 3 car lengths) respectively.

The recommended mitigation measures significantly reduce queues in the peak direction of commuter traffic flow (westbound) along River Road (MD-190) in the afternoon period. **While it is noted that through queues increase and decrease at some locations, the simulations show that progression along the corridor would overall improve with this redistribution of queuing so that no one intersection is significantly overloaded, as is the case with conditions with or without the increased enrollment.**

Table 7: River Road Corridor Delay Results*

Direction/Total	Existing						Background						Background (Modified)						Total Future						Total Future (Mitigation)					
	AM School Peak		***PM Peak***		*Summer PM Peak*		***AM School Peak***		***PM Peak***		*Summer PM Peak*		***AM School Peak***		***PM Peak***		*Summer PM Peak*		***AM School Peak***		***PM Peak***		*Summer PM Peak*		*AM School Peak*		*PM Peak*		*Summer PM Peak*	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
Eastbound:	20.0	C	16.0	B	20.0	C	22.0	C	16.0	B	20.0	C	29.0	C	17.0	B	24.0	C	30.0	C	18.0	B	20.0	C	31.0	C	17.0	B	28.0	C
Westbound:	27.0	C	30.0	C	38.0	D	29.0	C	31.0	C	39.0	D	48.0	D	38.0	D	35.0	D	43.0	D	42.0	D	39.0	D	57.0	E	38.0	D	35.0	D
Corridor:	**23.0**	**C**	**24.0**	**C**	**30.0**	**C**	**24.0**	**C**	**25.0**	**C**	**30.0**	**C**	**36.0**	**D**	**28.0**	**C**	**30.0**	**C**	**35.0**	**D**	**31.0**	**C**	**30.0**	**C**	**40.0**	**D**	**28.0**	**C**	**32.0**	**C**

* Total corridor delays (Control Delay + Queue Delay)

Table 8: Isolated Intersection HCM Delays

Intersection	Existing						Background						Total Future					
	AM School Peak		***PM Peak***		*Summer PM Peak*		***AM School Peak***		***PM Peak***		*Summer PM Peak*		***AM School Peak***		***PM Peak***		*Summer PM Peak*	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
7. Burdette Road & Arrowood Road/ Hillmead Road	**7.9**	**A**	**8.1**	**A**	**8.1**	**A**	**7.9**	**A**	**8.1**	**A**	**8.1**	**A**	**7.9**	**A**	**8.1**	**A**	**8.1**	**A**

Table 9: Queueing Analysis Results

Intersection and Lane Group	Storage Length (ft)	Existing						Background						Background (Exclusive Lefts, EBL re-servicing in the AM)						Total Future						Total Future Mitigated (TDM + exclusive lefts, EBL re-servicing in the AM)					
		AM School Peak		***PM Peak***		*Summer PM Peak*		***AM School Peak***		***SY PM Peak***		*Summer PM Peak*		***AM School Peak***		***SY PM Peak***		*Summer PM Peak*		***AM School Peak***		***SY PM Peak***		*Summer PM Peak*		*AM School Peak*		*SY PM Peak*		*Summer PM Peak*	
		50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th
1. I-495 SB Ramps & River Road																															
Eastbound Thru	855	82	177	54	140	52	132	89	174	36	103	48	124	70	158	50	135	64	155	101	189	48	119	50	130	83	182	49	125	50	125
Westbound Thru	885	86	173	51	136	62	149	79	166	52	135	55	147	73	165	59	148	63	162	90	177	50	130	52	138	66	154	57	142	57	147
Northbound Left	210	111	178	96	163	95	156	116	181	89	142	97	158	114	176	97	160	97	160	117	173	91	153	106	169	111	171	94	155	98	161
2. I-495 NB Ramps & River Road																															
Eastbound Left	670	239	355	240	356	243	357	244	359	230	355	251	361	245	357	247	369	250	375	245	362	245	363	252	366	244	360	237	349	255	369
Eastbound Thru	920	-	-	-	-	-	-	1	9	-	-	-	-	1	16	125	264	0	2	54	251	-	-	-	-	14	127	-	-	2	29
Westbound Thru	775	373	333	206	366	207	381	180	340	217	375	206	361	171	356	208	387	198	373	178	340	208	373	206	362	187	355	192	358	210	372
3. Burdette Road & River Road																															
Eastbound Left	175	69	189	81	152	75	139	78	214	84	152	77	144	84	221	85	162	89	175	106	268	78	142	75	138	85	219	84	158	88	175
Eastbound Thru	1,750	388	720	92	217	104	235	427	713	104	233	120	280	410	653	116	251	119	248	533	787	110	249	118	255	468	719	111	230	163	418
Eastbound Right	400	337	791	1	10	3	25	380	807	1	11	2	24	321	758	2	17	3	18	520	868	2	14	2	16	406	831	1	14	51	302
Westbound Left	195	2	11	105	315	46	205	10	76	131	348	64	246	3	16	115	328	63	240	5	49	127	340	65	244	3	13	109	323	63	244
Westbound Thru	870	95	256	714	1031	497	837	106	271	769	1009	605	936	51	204	699	1007	488	860	136	337	726	1004	520	808	67	227	667	978	635	963
Westbound Right	270	9	61	166	443	79	307	7	32	163	441	124	391	7	75	187	464	90	328	7	59	181	461	73	295	5	54	164	441	99	348
Northbound LTR	820	46	94	27	66	25	68	47	101	26	62	28	67	37	79	23	60	25	62	41	91	20	55	30	73	45	100	22	55	27	68
Southbound Left Thru	200	86	155	44	96	47	104	87	153	51	105	49	100	75	158	50	108	38	91	87	156	50	107	43	99	76	145	46	107	46	120
Southbound Right	200	46	86	41	94	50	104	47	102	43	91	52	107	47	94	46	99	53	111	43	82	43	90	56	114	50	96	51	111	58	123
4. Royal Dominion Drive & River Road																															
Eastbound Left	500	253	542	86	174	112	196	259	539	84	189	110	217	281	591	130	305	173	325	362	627	94	180	127	221	289	549	205	461	304	586
Eastbound Thru	865	376	761	131	242	156	309	394	774	147	277	156	310	488	834	192	355	211	380	473	898	169	320	166	312	452	785	205	441	336	775
Eastbound Right	240	47	217	2	11	10	72	47	217	5	49	10	73	47	217	3	14	15	111	54	235	7	69	8	52	66	257	5	51	23	134
Westbound Left	235	65	196	26	139	43	169	71	210	43	197	42	177	87	239	36	163	58	187	83	250	44	202	34	142	102	260	32	145	86	255
Westbound Thru	1,935	492	1140	1458	2541	903	2011	527	1292	1565	2490	1093	2224	815	1758	1675	2519	1043	2205	833	1857	1736	2458	1007	2098	919	1898	1763	2458	1257	2432
Westbound Right	210	139	345	97	314	129	339	134	336	108	332	156	375	176	372	91	304	141	356	179	374	134	361	146	357	-	-	-	-	-	-
Westbound Right	*500*	-	-	-	-	-	-			-		-		-	-	-	-	-	-							311	737	254	711	345	785
Northbound LTR	350	101	194	58	119	72	137	102	184	60	131	78	152	94	190	55	137	71	141	108	207	61	124	84	165	-	-	-	-	-	-
Northbound Left	*150*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	27	65	28	69	33	78
Northbound Thru Right	*350*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	72	145	33	76	43	92
Southbound Left	280	60	155	47	133	63	159	65	173	45	130	70	169	64	180	42	121	74	202	91	220	63	190	88	205	86	200	52	140	97	228
Southbound Left Thru	1425	110	188	86	170	204	591	114	213	84	169	191	536	117	211	91	193	183	523	143	269	121	286	151	350	137	245	104	251	337	830
Southbound Thru Right	*1425*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Southbound Right	330	77	183	136	251	150	383	74	170	137	265	156	393	67	147	134	257	156	381	115	266	174	332	162	325	91	200	156	280	214	464

	Intersection and Lane Group	Storage Length (ft)	Existing						Background						Background (Exclusive Lefts, EBL re-servicing in the AM)						Total Future						Total Future Mitigated (TDM + exclusive lefts, EBL re-servicing in the AM)					
			AM School Peak		PM Peak		Summer PM Peak		AM School Peak		SY PM Peak		Summer PM Peak		AM School Peak		SY PM Peak		Summer PM Peak		AM School Peak		SY PM Peak		Summer PM Peak		AM School Peak		SY PM Peak		Summer PM Peak	
			50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th	50th	95th
5.	Beech Tree/Nevis Road & River Road																															
	Eastbound Left	300	9	29	15	43	38	118	8	26	16	41	32	94	10	30	16	71	36	115	10	34	16	39	34	97	11	34	15	41	42	153
	Eastbound Thru	1,935	160	333	138	299	136	321	160	312	144	312	140	331	160	304	197	440	219	433	160	311	147	336	132	333	182	349	181	400	192	426
	Eastbound Right	270	4	53	4	18	13	107	3	18	5	21	7	57	3	18	29	173	18	132	7	75	10	93	8	58	8	76	17	121	12	95
	Westbound Left	250	21	51	130	349	43	156	32	111	116	334	67	238	26	92	119	340	54	212	37	142	130	358	55	203	29	85	134	370	64	232
	Westbound Thru	1,780	197	371	844	2116	260	929	228	393	896	2206	424	1325	216	377	937	2214	411	1171	256	524	1138	2426	353	1189	213	387	1100	2362	635	1773
	Westbound Right	450	14	90	139	512	31	219	13	42	141	521	91	409	12	40	113	460	33	220	36	209	141	520	52	302	11	36	151	540	99	427
	Northbound Left Thru	70	109	201	54	125	45	94	105	204	50	105	47	99	111	211	51	117	40	91	101	194	53	120	44	94	103	187	55	121	46	99
	Northbound Right	70	72	146	39	93	27	57	69	141	39	82	26	59	70	147	38	83	26	60	69	139	42	90	28	66	71	138	36	76	28	61
	Southbound Left Thru	1,060	84	161	113	195	105	175	80	146	104	185	110	201	78	150	117	217	105	190	79	143	115	204	100	179	80	144	110	190	106	177
	Southbound Right	150	19	49	12	38	21	49	20	59	17	57	22	73	19	48	19	78	16	47	23	62	20	64	18	58	19	48	13	42	18	48
6.	Wilson Lane & River Road																															
	Eastbound Left	330	260	375	266	378	275	386	250	372	256	372	271	378	252	371	248	375	247	362	252	372	265	379	271	385	245	370	249	365	246	363
	Eastbound Thru	1780	543	1228	367	665	341	589	426	873	337	547	341	599	465	962	318	588	273	506	471	1051	359	623	352	630	379	824	291	516	281	536
	Eastbound Right	400	104	391	48	259	6	83	79	339	51	268	25	185	90	363	25	184	8	102	81	344	45	251	20	161	79	339	28	195	6	82
	Westbound Left	270	85	200	119	309	116	303	68	170	126	325	105	276	85	212	129	328	102	267	82	184	117	324	105	274	68	138	137	343	114	298
	Westbound Thru	1,585	256	407	997	1768	538	871	270	441	996	1802	556	929	265	409	916	1795	641	1241	278	436	1128	1920	639	1111	258	406	1024	1882	766	1513
	Westbound Right	400	6	90	172	518	101	402	9	111	123	442	89	375	3	63	144	478	77	348	9	111	153	492	104	407	3	61	144	478	113	425
	Northbound Left	260	35	86	94	163	85	158	39	87	96	167	81	146	34	83	94	163	79	147	40	90	96	168	90	165	40	90	96	183	88	166
	Northbound Thru	1130	89	144	87	142	85	139	91	159	76	127	88	141	87	140	85	138	87	139	96	152	82	136	88	153	92	146	85	132	85	144
	Northbound Right	300	12	79	-	-	-	-	22	120	-	-	-	-	9	70	-	-	-	-	4	47	-	-	-	-	20	105	-	-	-	-
	Southbound Left	230	55	111	61	116	55	107	54	109	62	117	62	120	52	103	63	121	49	104	52	105	67	118	51	111	56	115	61	116	49	100
	Southbound Thru	570	85	147	226	426	207	418	73	151	250	442	223	421	76	162	246	433	205	409	88	181	257	458	185	401	79	168	236	412	213	423
	Southbound Right	300	17	98	142	243	135	246	20	110	149	241	138	248	27	126	149	242	130	245	34	142	152	238	128	246	19	107	152	238	145	242
7.	Arrowood Road/Hillmead Road & Burdette Road																															
	Eastbound Left/Right	1700	21	45	19	47	25	54	22	46	19	48	25	57	19	45	18	43	22	52	20	45	16	46	25	55	22	46	20	47	24	56
	Westbound Left/Right	300	23	51	21	49	20	45	21	49	20	48	21	48	20	50	20	45	22	45	26	53	21	45	21	47	23	53	22	48	19	43
	Northbound Left Thru	1055	31	61	48	84	42	73	30	57	40	67	42	75	33	67	46	79	43	76	30	55	43	74	40	74	32	62	45	78	42	77
	Southbound Left Thru	1,480	36	58	30	56	38	63	35	56	31	52	37	62	31	51	34	60	38	67	32	53	33	56	37	64	31	51	34	57	37	63

Table 10: School Year and Summer Traffic Volume Comparison

River Road (MD 190) at Royal Dominion Drive	PM Peak Hour Total (WB+EB)	2:30-7:00 PM (WB+EB)
Tuesday, January 30, 2024		
School Year (SY) Volumes	3,121	13,615
Thursday, June 27, 2024		
Summer Traffic Volumes	2,535	13,015
Percent difference from SY Volumes	*-18.8%*	*-4.4%*
Tuesday, July 23, 2024		
Summer Traffic Volumes	2,338	11,498
Percent difference from SY Volumes	*-25.1%*	*-15.5%*

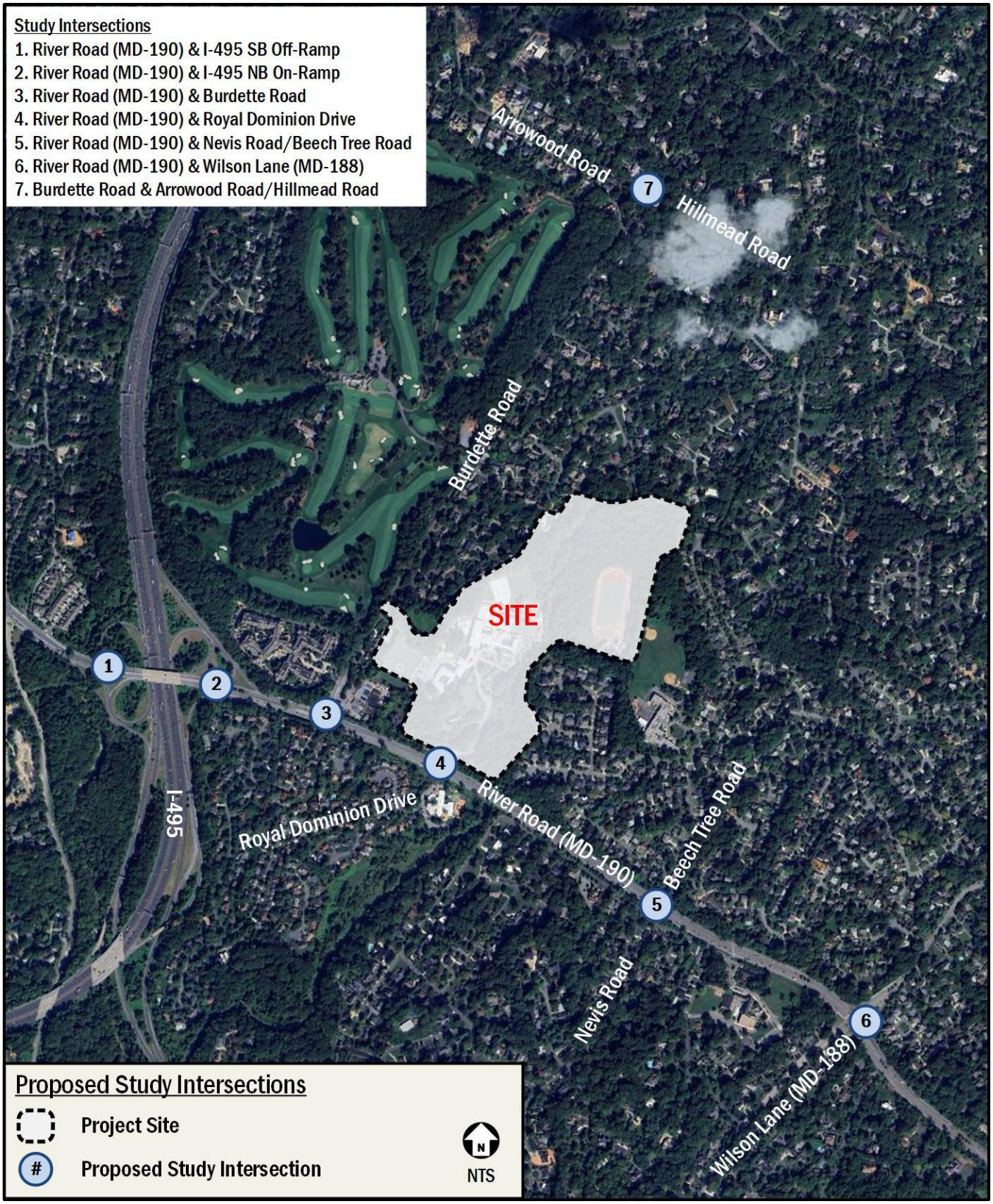

Figure 5: Study Intersections

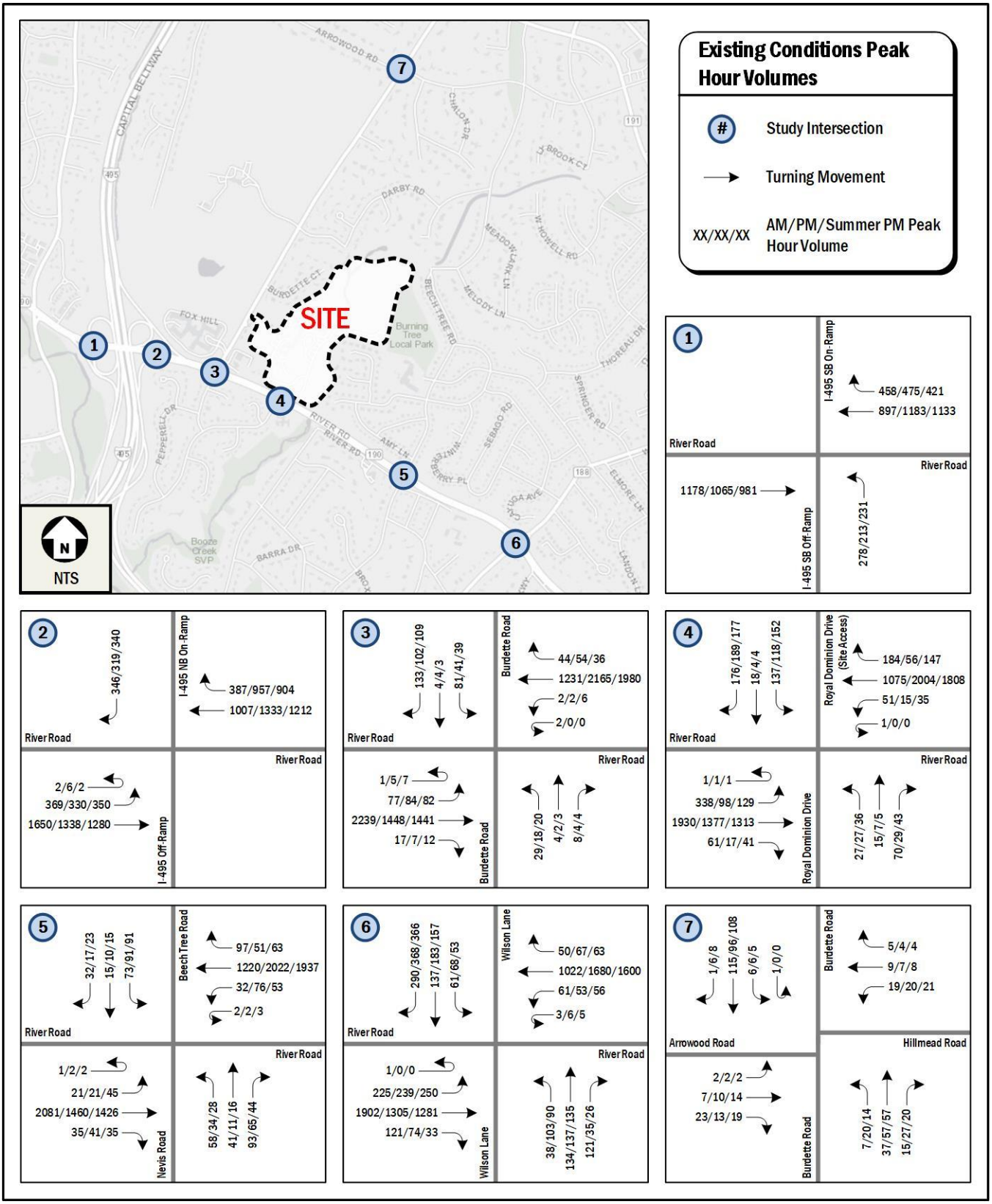

Figure 6: Existing Conditions Peak Hour Traffic Volumes

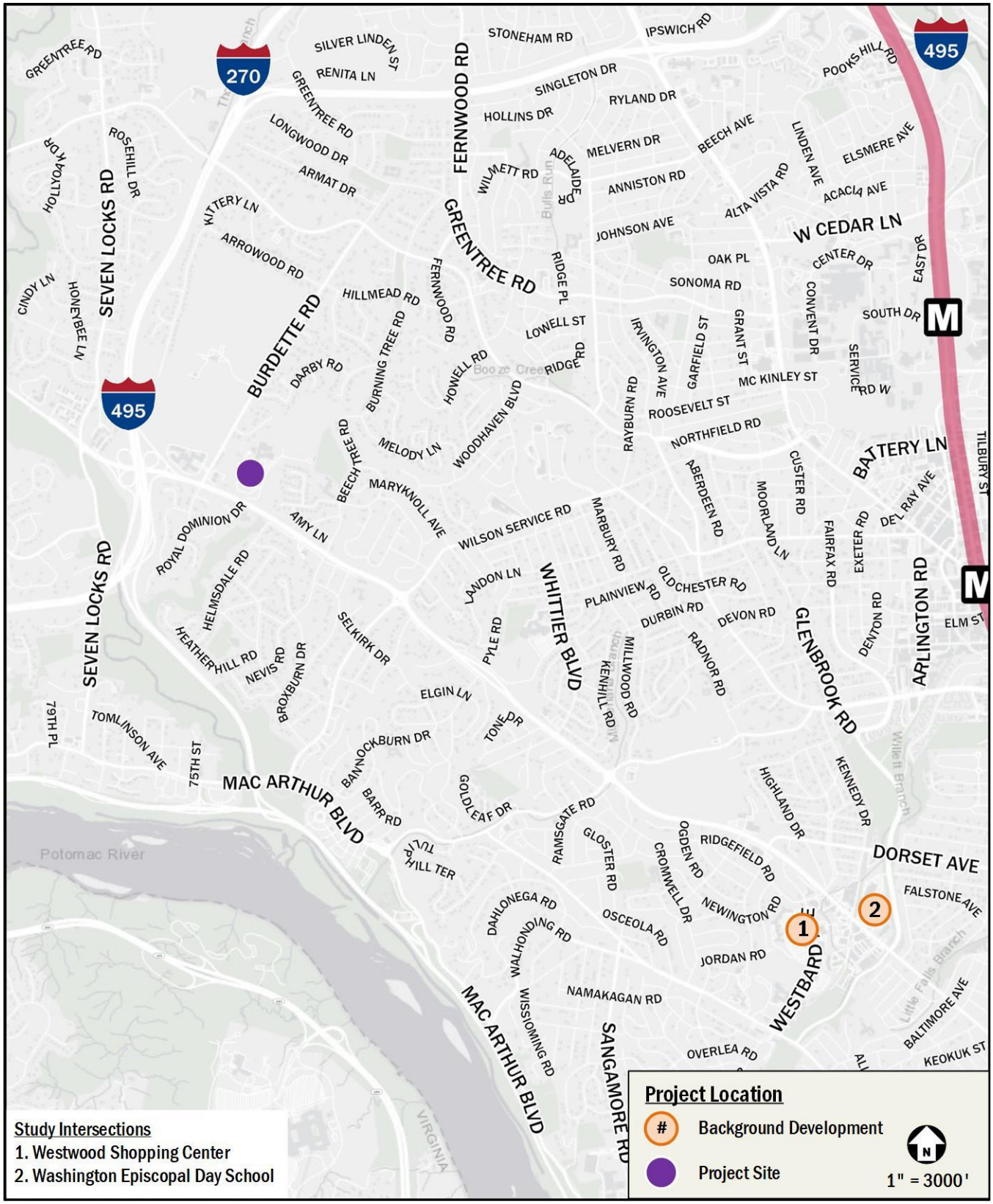

Figure 7: Background Developments

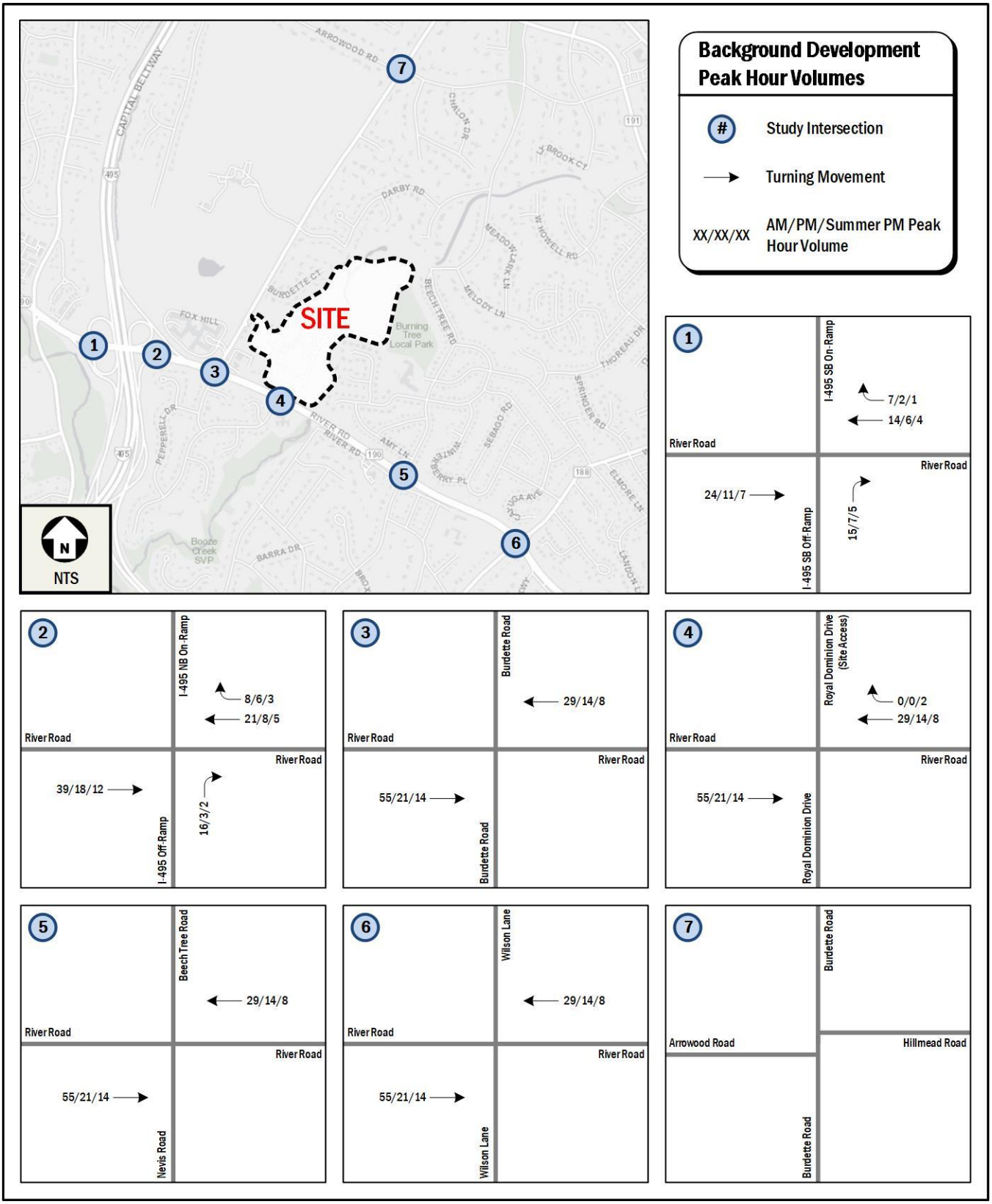

Figure 8: Background Development Peak Hour Volumes

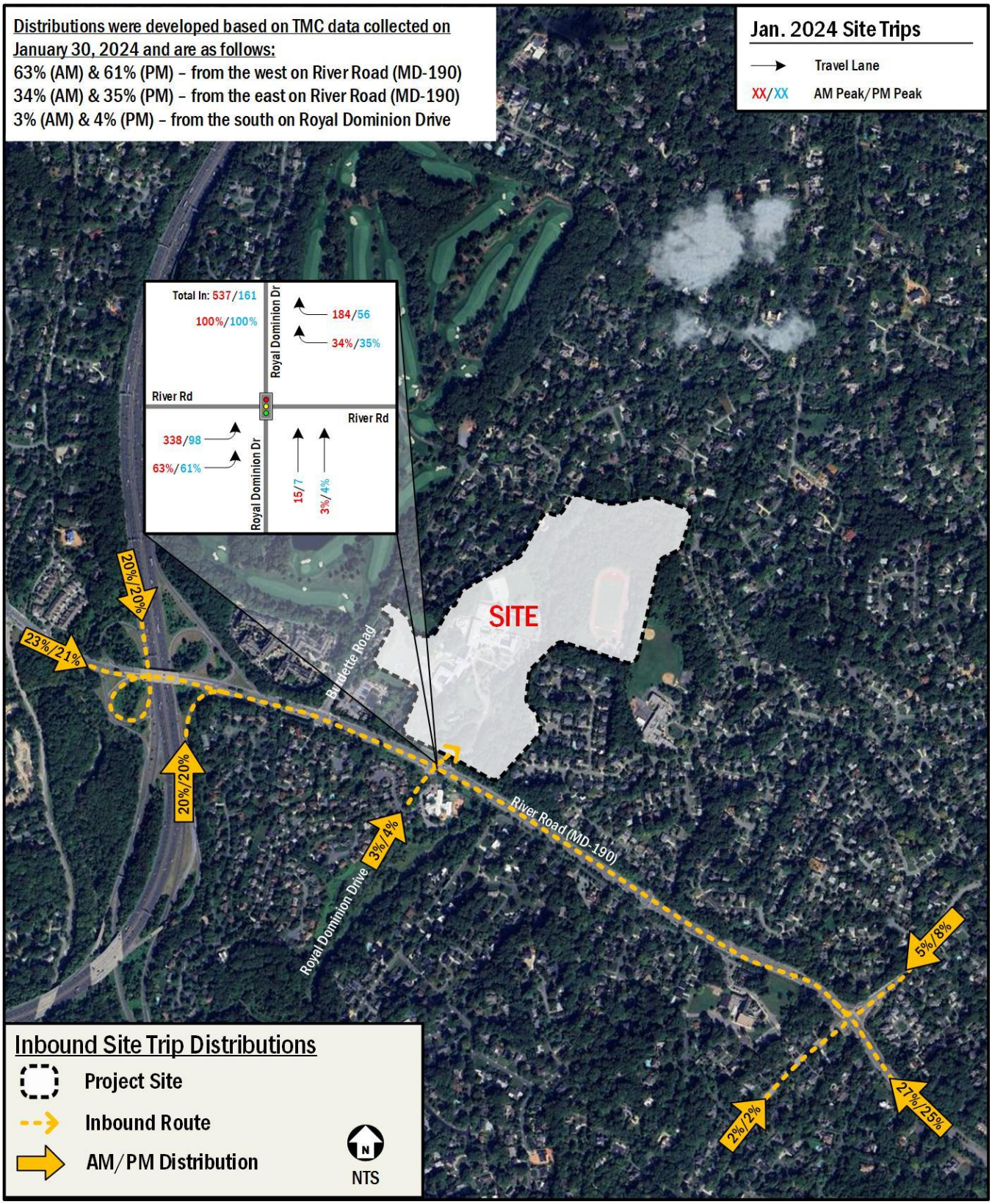

Figure 9: Inbound Trip Distribution

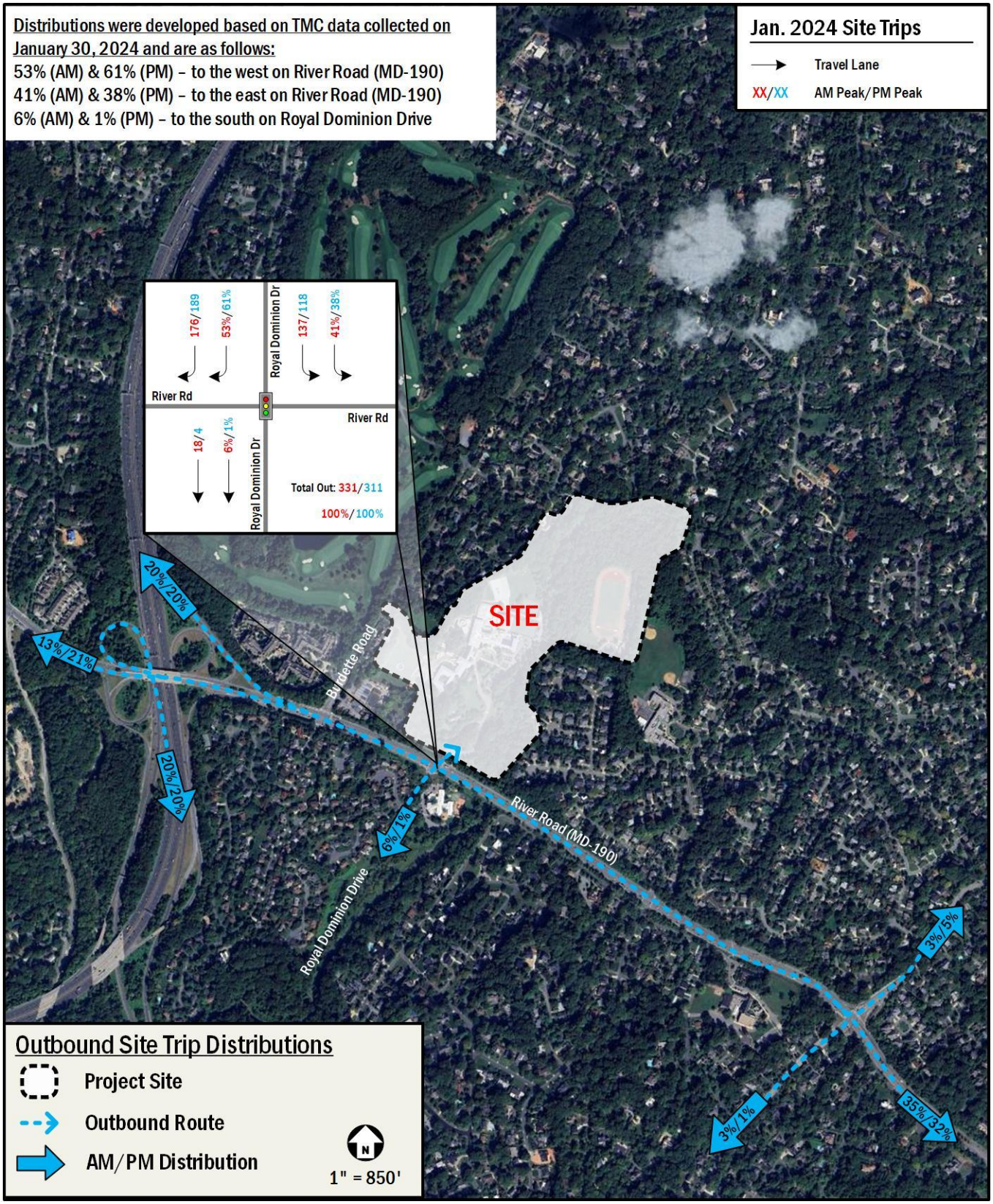

Figure 10: Outbound Trip Distribution

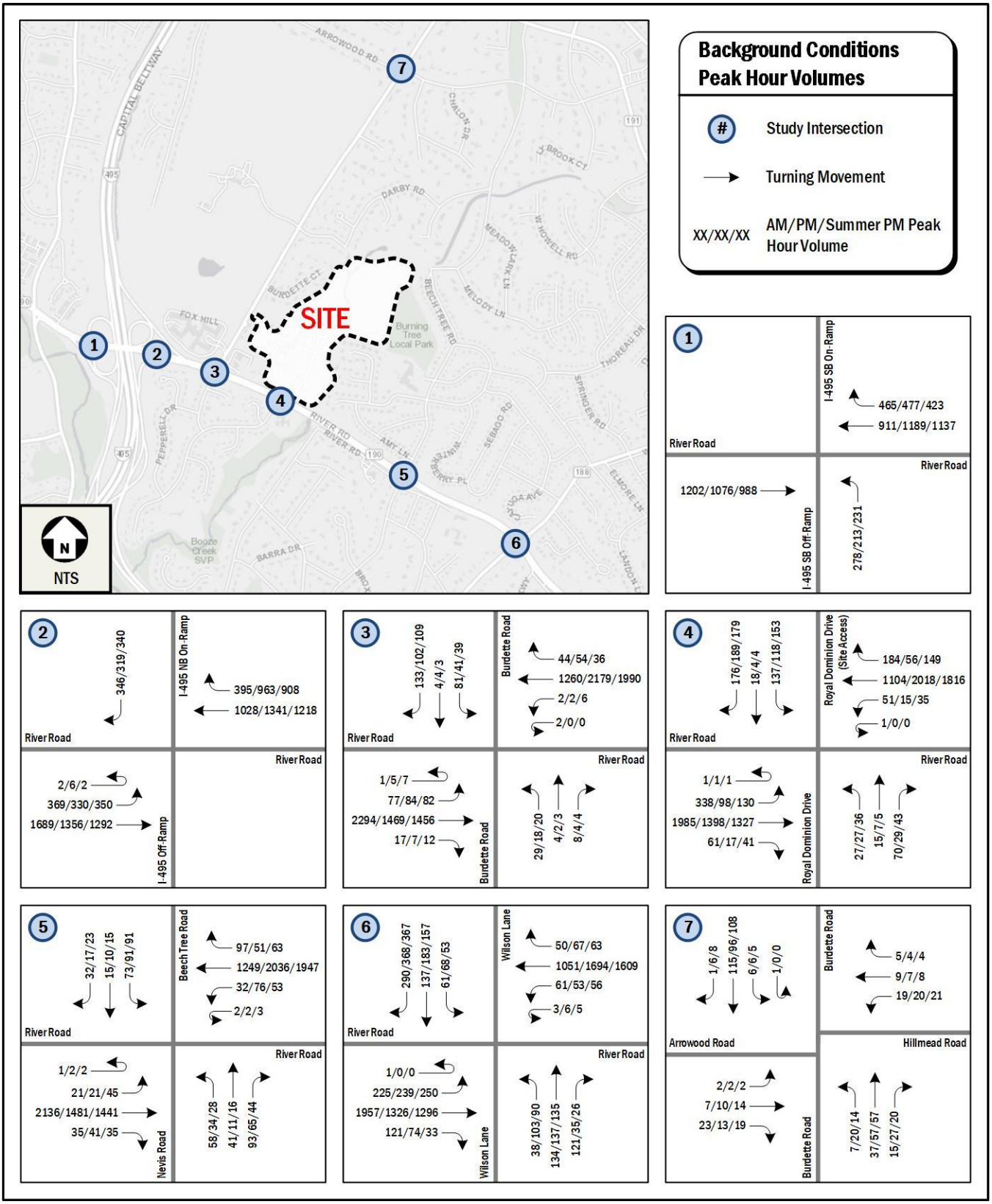

Figure 11: Background Conditions Peak Hour Volumes

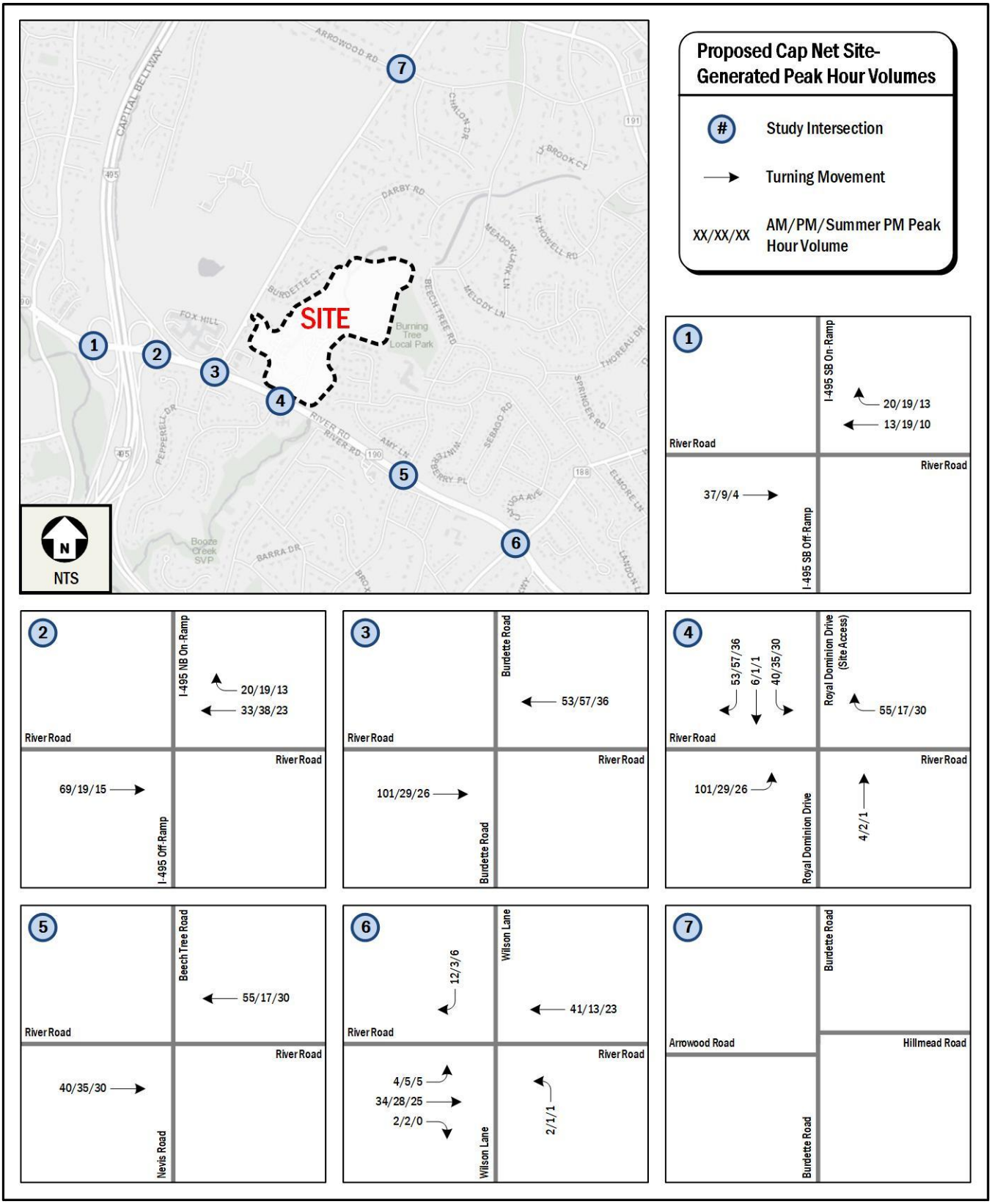

Figure 12: Proposed Net Site-Generated Peak Hour Volumes

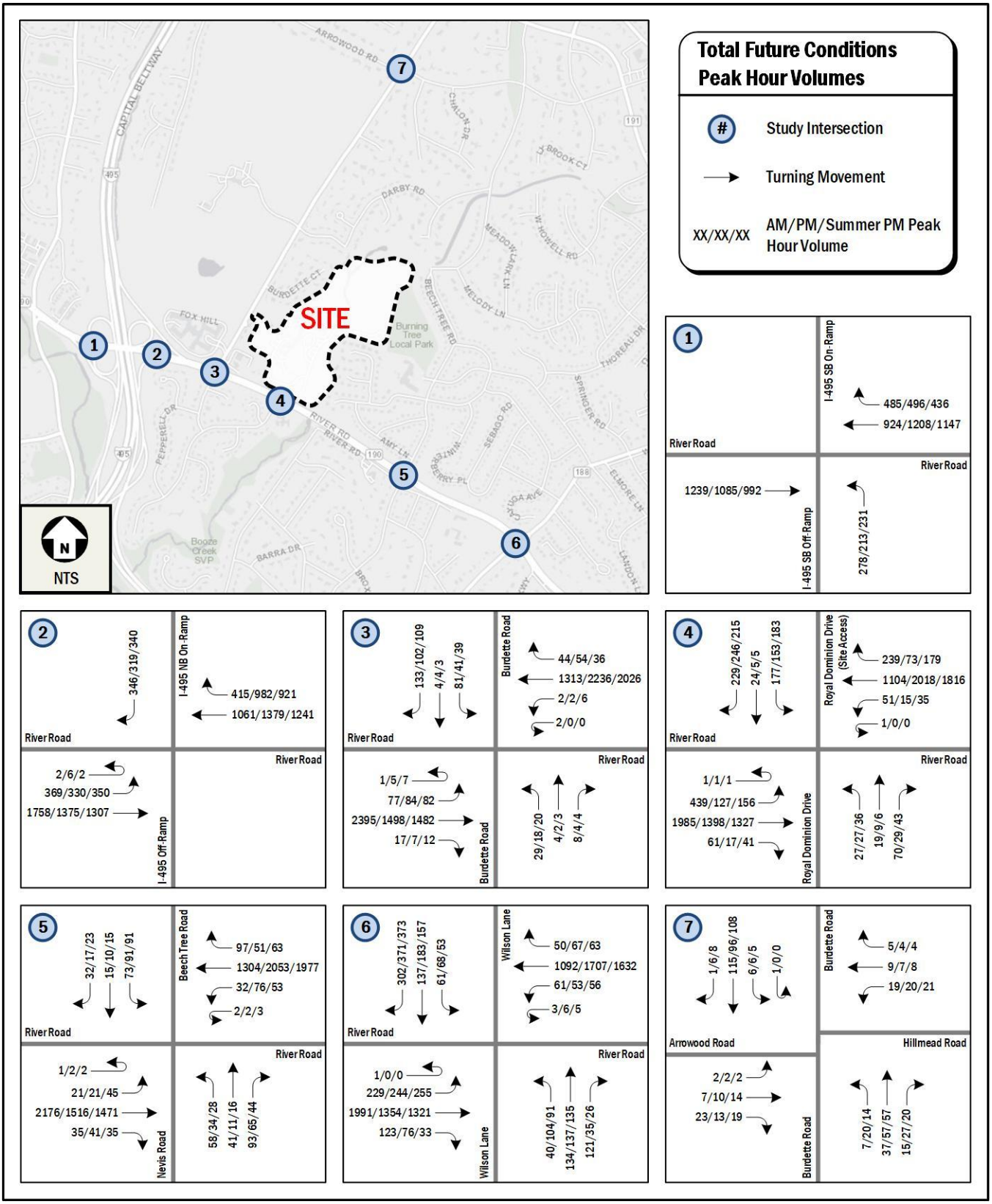

Figure 13: Total Future Conditions Peak Hour Volumes

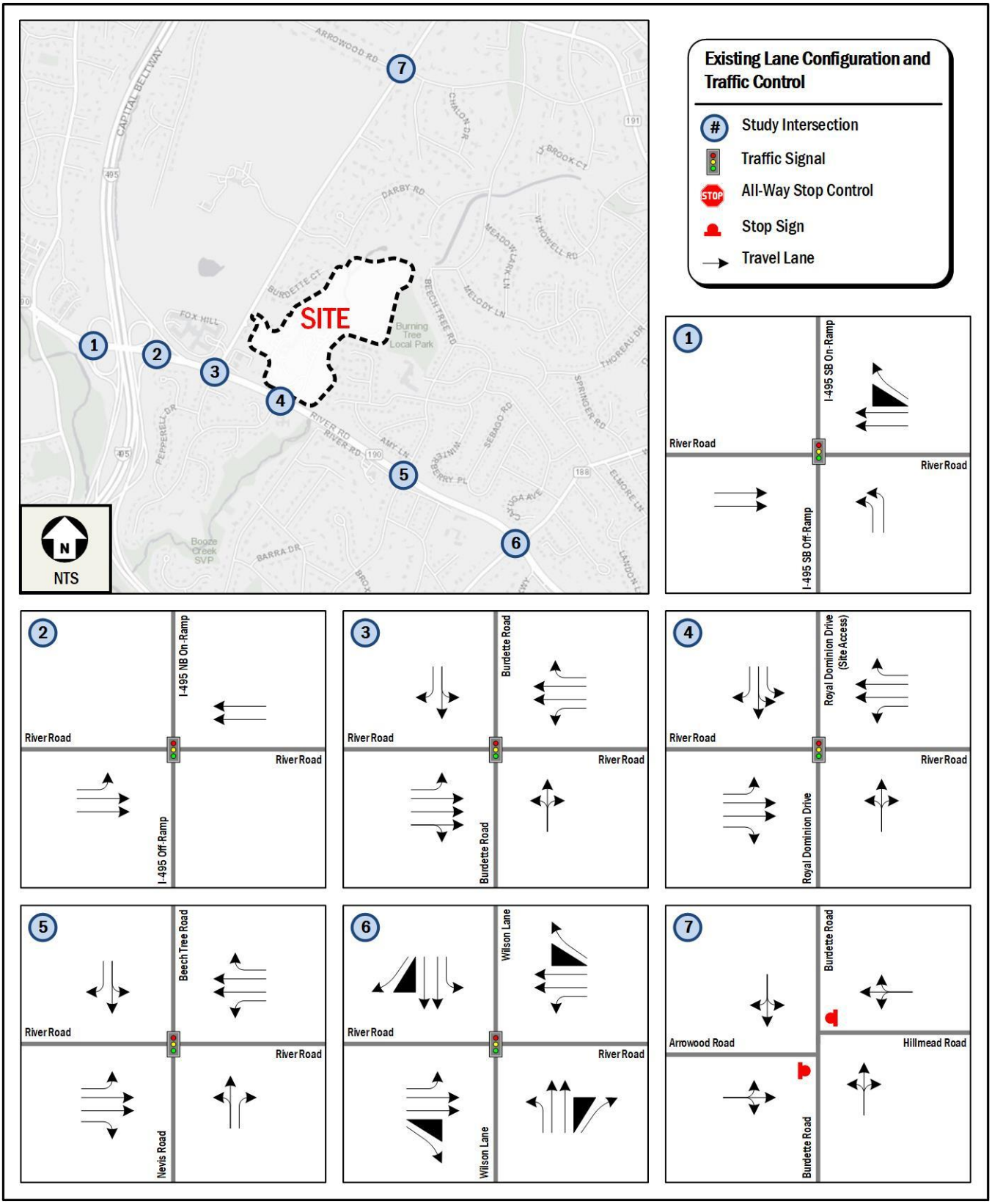

Figure 14: Existing Lane Configuration and Traffic Control

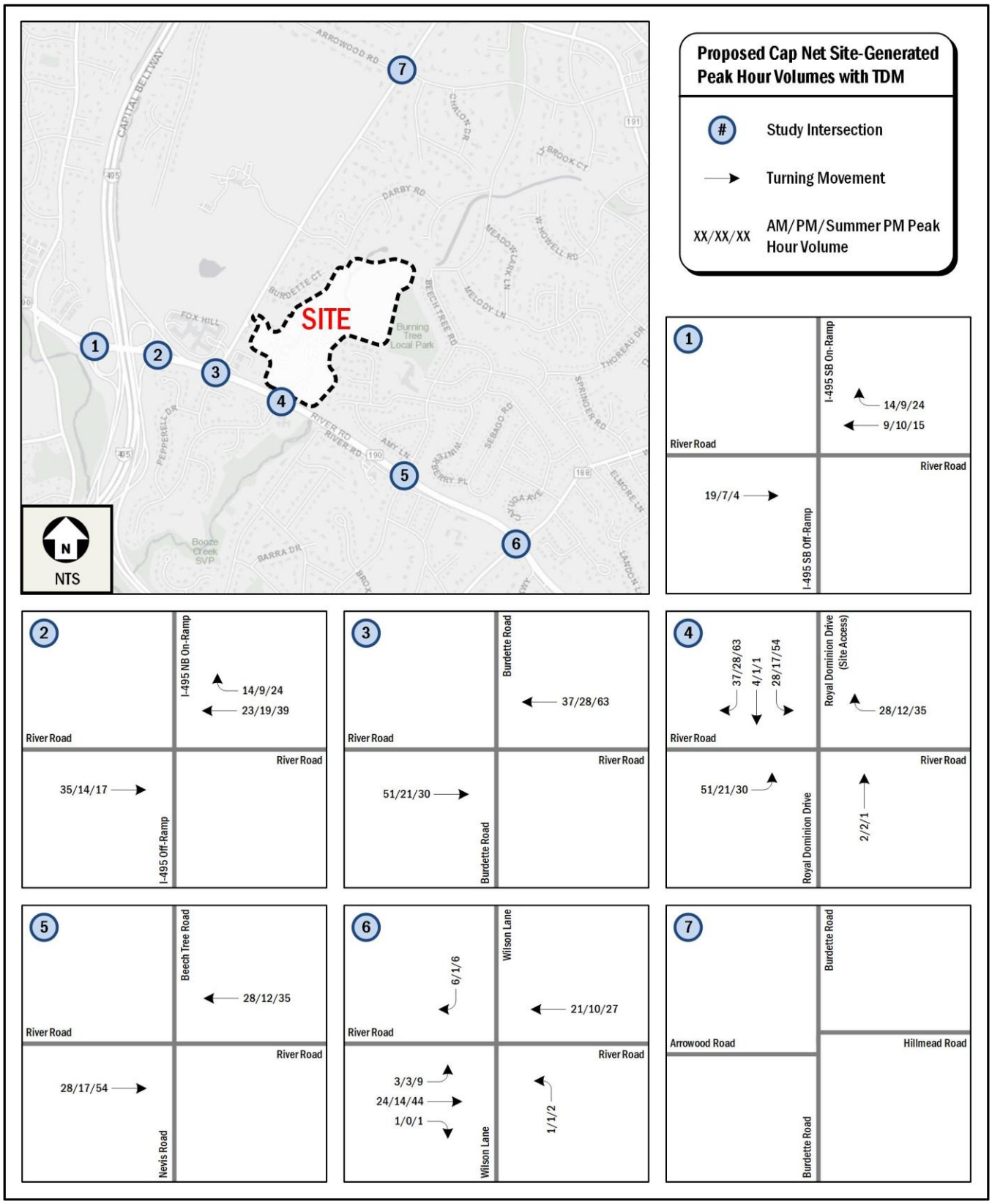

Figure 15: Proposed Mitigated Net Site-Generated Peak Hour Volumes

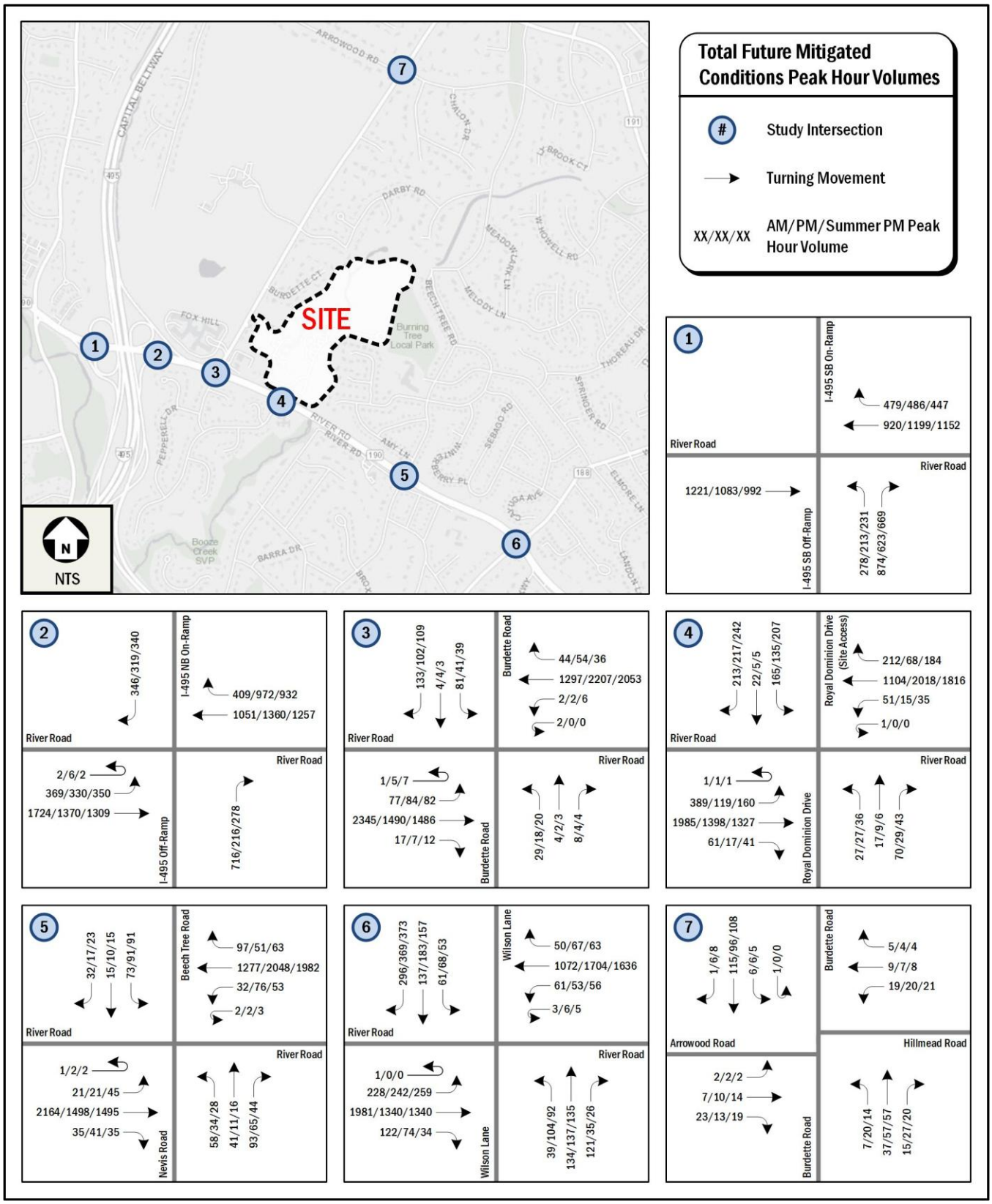

Figure 16: Total Future Mitigated Conditions Peak Hour Volumes

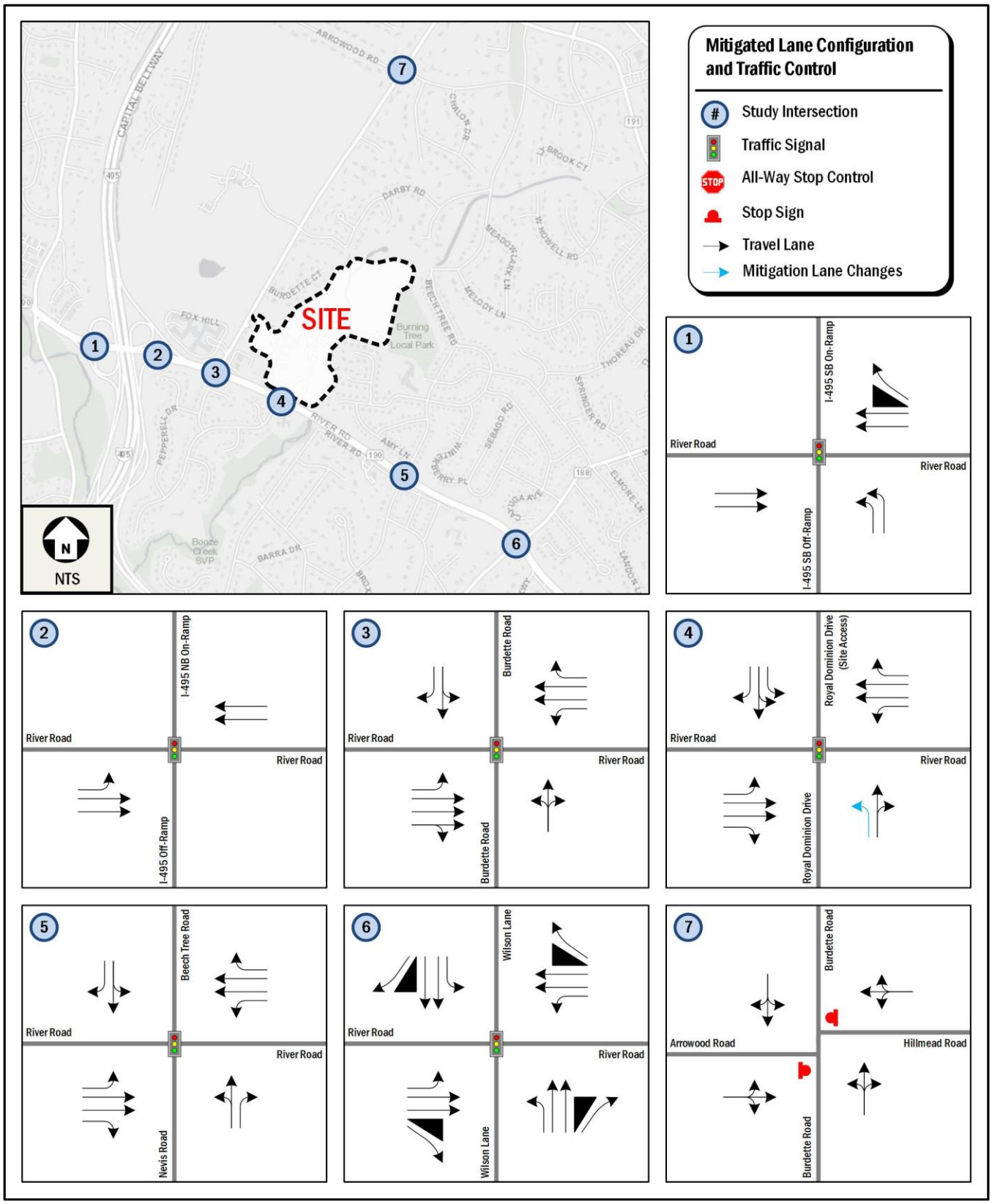

Figure 17: Mitigated Lane Configuration and Traffic Control

Section 4: Pedestrian Facilities

This chapter reviews the existing and future pedestrian access to the site and reviews walking routes to and from the site. A review of the pedestrian system adequacy is also provided in this chapter.

The following conclusions are reached within this chapter:

- The existing pedestrian infrastructure surrounding the site requires improvements to provide an adequate walking environment in all directions.
- Gaps in the pedestrian network exist in the form of missing or narrow sidewalks, missing or narrow buffers, deficient streetlighting, missing crossings and curb ramp deficiencies.
- In accordance with the proportionality guide, the project is not required to make improvements to the surrounding pedestrian network as it does not involve any new construction or additional floor space.

Existing Facilities Overview

As part of the multi-modal adequacy review included in this LATR, pedestrian, bicycle, and transit facilities around the proposed project site were evaluated.

There are minimal pedestrian facilities within the PLOC study area. Pedestrian connectivity to and from the site is limited by missing sidewalks, insufficient buffers, and inadequate crossings.

Pedestrian Circulation

Pedestrian access to the site is available via Royal Dominion Drive. Internal pedestrian circulation routes will provide connectivity within the site.

Pedestrian System Adequacy

For any project generating 50 net new peak-hour weekday trips, quantitative pedestrian system adequacy analysis is required to assess the existing system's adequacy along with the project's trip generation.

The Pedestrian System Adequacy Test consists of three (3) components:

- Pedestrian Level of Comfort (PLOC),
- ADA Compliance, and
- Streetlighting.

PLOC Review and Methodology

The Pedestrian Level of Comfort (PLOC) Review is based on an analysis of how comfortable it is to navigate pedestrian pathways within the project study area. Streets in Montgomery County are ranked from PLOC-1 ("Very Comfortable") to PLOC-4 ("Undesirable"). These ratings are based on several factors, including pathway width, width of buffer between the pathway and the street, speed limit of the adjacent street, and the presence of on-street buffers such as parking lanes or separated bike lanes. PLOC ratings are also given to street crossings and are determined by the number of lanes in the street to be crossed, the speed limit of that street, and the existing conditions of the crossing (if there are marked crosswalks, medians, etc.).

The goal of the PLOC Review is to identify any locations within the study area that are either a PLOC-3 ("Uncomfortable") or a PLOC-4 ("Undesirable") and find improvements to bring them to a PLOC-1 or PLOC-2.

PLOC Study Area

The study area is limited to roadways classified primary residential and higher and is based on the site's policy area and peak-hour person trips. Based on the project site's location within an Orange Policy Area and trip generation, the required PLOC study area is a 900-foot walkshed beyond the site frontage. The PLOC study area is shown in Figure 18. The PLOC study area presented in Figure 18 is based on Planning Staff feedback and was reviewed and approved during the scoping process. The facilities inventory and adequacy review were conducted for the larger of the two (2) study areas presented in Figure 18.

PLOC Deficiencies

As part of the PLOC review, the score ratings available from the Montgomery County PLOC Database were reviewed and field verified based on data collection within the study area that included verification of sidewalk and buffer widths, speed limits, and presence of on-street separation.

Based on the PLOC review, approximately 7,905 linear feet off-site did not meet PLOC adequacy standards. More specifically:

- 7,480 linear feet total of pathways did not meet PLOC adequacy standards
- 425 linear feet of crossings did not meet PLOC adequacy standards

Figure 19 presents the location of the identified PLOC deficiencies where facilities do not meet the criteria for a comfortable score. Table 11 outlines the identified deficiencies and improvements required to achieve an adequate PLOC score.

ADA Compliance Review and Methodology

Per the 2023 LATR Guidelines, the project is required to conduct an American Disabilities Act (ADA) Compliance Review using the ADA Curb Ramps Survey form as available directly from the ADA website. The survey includes a detailed assessment of the attributes of every curb ramp located within a specified walkshed. The list of reviewed attributes includes the following:

- Ramp width
- Ramp slopes
  - Cross-slope
  - Running-slope
  - Gutter slope
- Slopes of flared sides
- Landing width
- Sidewalk width
- Presence of a detectable warning surface
- Height of level changes
- Presence of parking lane
- Type of curb ramp

The ADA Compliance Review Study Area is one-half the size of the PLOC Study Area, which is a walkshed determined by the site's policy area and peak-hour person trips generated.

This study identified all locations where the above deficiencies were verified to exist.

ADA Compliance Study Area

The study area is limited to roadways classified as primary residential and higher and is based on the site's policy area and peak-hour trips. Based on the project site location within an Orange Policy Area and the project's trip generation, the required ADA study area is a 450-foot walkshed beyond the site frontage. The ADA study area is presented in Figure 20.

ADA Compliance Deficiencies

Based on the ADA review, 5 curb ramps do not meet ADA adequacy standards. More specifically:

- One (1) curb ramp is deficient in their gutter slope
- Two (2) curb ramps are deficient in their cross slope
- Three (3) ramps are deficient in the slope of their flared sides, or missing flared sides entirely
- Two (2) curb ramps are built up to the curb and not outside the path of cars

Figure 21 presents the location of the identified ADA deficiencies and Table 12 outlines the identified deficiencies and improvements required to provide ADA-compliant facilities. A detailed review of curb ramps within the ADA study area is included in the Technical Attachments.

Streetlight Network Review, Methodology, & Study Area

Street lighting adequacy is based on MCDOT standards to ensure a sufficient level of street lighting is provided within the project's study area. Street lighting adequacy requires the applicant to identify deficiencies in the existing streetlight network within the PLOC study area (for this project, a 900-foot walkshed). Standards vary depending on roadway type and surroundings land uses. The street lighting study area is presented in Figure 18.

Streetlight Network Deficiencies

Based on the streetlight network review, approximately 31 streetlights are needed to meet streetlight network adequacy standards.

The segments missing streetlights are identified in Figure 22. Table 13 outlines the applicable spacing standard and number of streetlights required to achieve adequacy. An inventory of the reviewed streetlights that includes pole numbers, where available, and approximate GIS coordinates is included in the Technical Attachments.

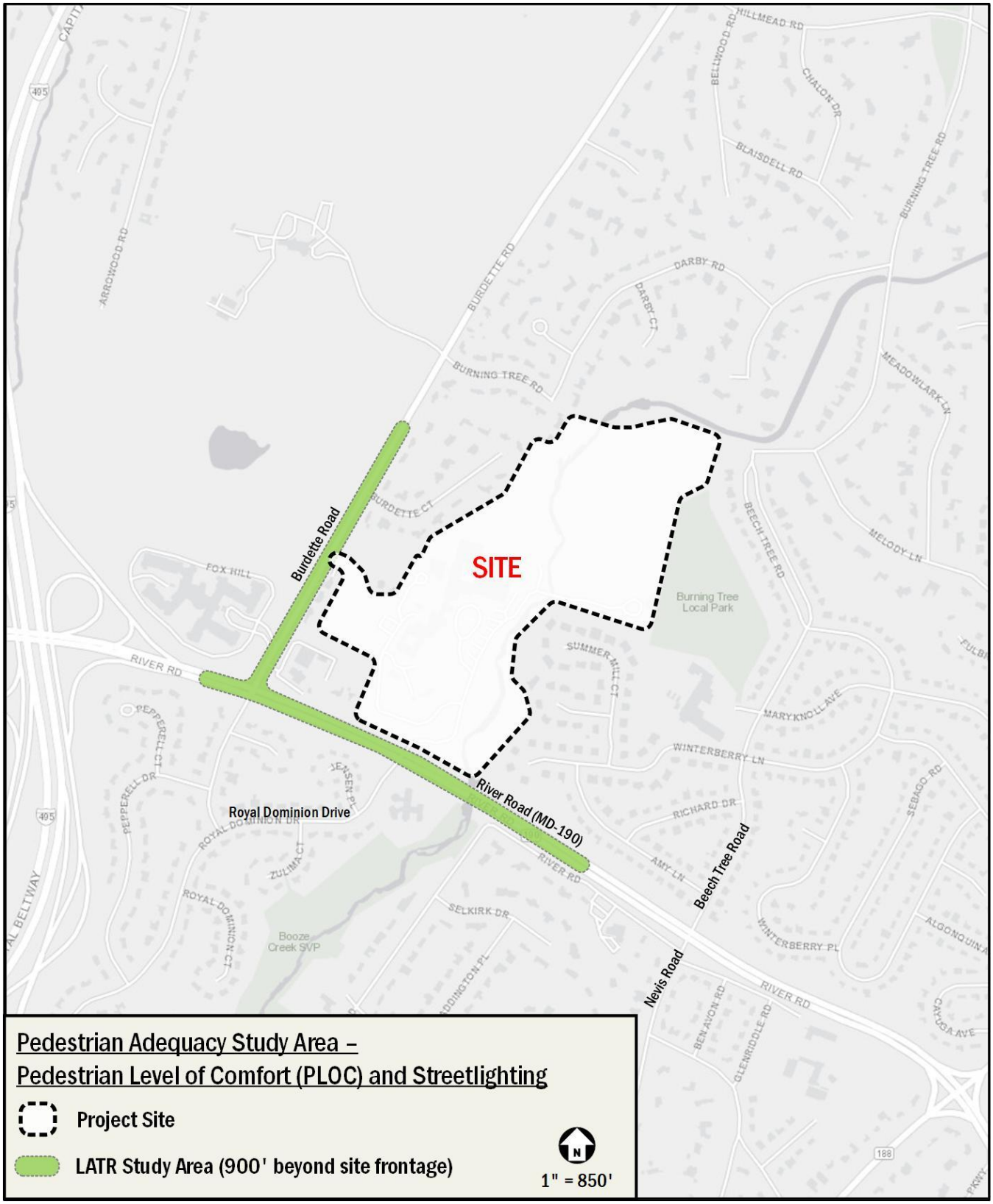

Figure 18: Pedestrian System Adequacy PLOC and Streetlights Study Area



Figure 19: PLOC Adequacy Evaluation

Table 11: PLOC Deficiencies

#	Location	Category	Existing PLOC Score	PLOC Deficiency	Adequacy Mitigation	Mitigation Linear Feet	PLOC Score After Mitigation	Notes
				PLOC - Segments				
1	River Road: east of Site (north side)	PLOC - Pathway	4	No sidewalk	Add sidewalk (11' default, 8' min) with buffer (8' default)	1,100'	2	BLTS #30
2	River Road: east of Site (south side)	PLOC - Pathway	4	No sidewalk	Add sidewalk (11' default, 8' min) with buffer (8' default, 6' min)	1,100'	2	BLTS #31
3	River Road: west of Site (north side)	PLOC - Pathway	4	No sidewalk	Add sidewalk (11' default, 8' min) with buffer (8' default, 6' min)	300'	2	BLTS #32
4	River Road: west of Site (north curb)	PLOC - Pathway	3	No DPL or SBL/buffer too narrow	Expand street buffer (8' default, 6' min)	75'	2	BLTS #33
5	River Road: west of Site (south side)	PLOC - Pathway	4	No sidewalk	Add sidewalk (11' default, 8' min) with buffer (8' default, 6' min)	300'	2	BLTS #36
6	River Road: west of Site (south curb)	PLOC - Pathway	3	No DPL or SBL/buffer too narrow	Expand street buffer (8' default, 6' min)	120'	2	BLTS #37
7	Burdette Road: south of Private Road/Site Frontage (east side)	PLOC - Pathway	4	No sidewalk	Add sidewalk (11' default, 8' min) with buffer (8' default, 6' min)	825'	2	
8	Burdette Road: north of Private Road/Site Frontage (east side)	PLOC - Pathway	4	No sidewalk	Add sidewalk (11' default, 8' min) with buffer (8' default, 6' min)	900'	2	
9	Burdette Road: north of Private Road/Site Frontage (west side)	PLOC - Pathway	4	No sidewalk	Add sidewalk (11' default, 8' min) with buffer (8' default, 6' min)	900'	2	
10	River Road: west of Burdette Road (north)	PLOC - Pathway	3	No DPL or SBL/buffer too narrow	Expand street buffer (8' default, 6' min)	150'	2	BLTS #34
11	River Road: west of Burdette Road (south)	PLOC - Pathway	4	No sidewalk	Add sidewalk (11' default, 8' min) with buffer (8' default, 6' min)	150'	2	BLTS #35
12	Site Frontage: west of Royal Dominion Drive (north)	PLOC - Pathway	4	No sidewalk	Add sidewalk (11' default, 8' min) with buffer (8' default, 6' min)	350'	2	BLTS #38
13	Site Frontage: east of Royal Dominion Drive (north)	PLOC - Pathway	4	No DPL or SBL/buffer too narrow	Expand street buffer (8' default, 6' min)	430'	2	BLTS #39
14	Site Frontage: west of Royal Dominion Drive (south)	PLOC - Pathway	4	No DPL or SBL/no buffer	Add street buffer (8' default, 6' min)	350'	2	BLTS #40
15	Site Frontage: east of Royal Dominion Drive (south)	PLOC - Pathway	4	No sidewalk	Add sidewalk (11' default, 8' min) with buffer (8' default, 6' min)	430'	2	BLTS #41
				PLOC - Crossings				
16	River Road midblock crossing	PLOC Crossing - Uncontrolled	3	Speed too high, unsignalized	Install high visibility crosswalk, reduce speed to 30	130'	2	
17	Royal Dominion Drive/River Road (east side)	PLOC Crossing - Signalized	4	No centerline/refuge island, speed too high	Install refuge island, reduce speed to 30	15'	2	
18	Royal Dominion Drive/River Road (south side)	PLOC Crossing - Signalized	3	No centerline/refuge island, speed too high	Install refuge island, reduce speed to 30	15'	2	
19	Royal Dominion Drive/River Road (west side)	PLOC Crossing - Signalized	4	No crosswalk	Install high visibility crosswalk, reduce speed to 30	100'	2	
20	Royal Dominion Drive/River Road (north side)	PLOC Crossing - Signalized	4	No crosswalk	Install high visibility crosswalk, reduce speed to 30	55'	2	
21	Burdette Road/River Road (south side)	PLOC Crossing - Signalized	3	No centerline/refuge island, speed too high	Install refuge island, reduce speed to 30	10'	2	
22	Burdette Road/River Road (east side)	PLOC Crossing - Signalized	3	Speed too high	Reduce speed to 30	0'	2	
23	Burdette Road/River Road (west side)	PLOC Crossing - Signalized	4	No crosswalk	Install high visibility crosswalk, reduce speed to 30	90'	2	
24	Burdette Road/River Road (north side)	PLOC Crossing - Signalized	3	No centerline/refuge island, speed too high	Install refuge island, reduce speed to 30	10'	2	
					Total PLOC Off-Site Deficiencies:	**7,905'**		

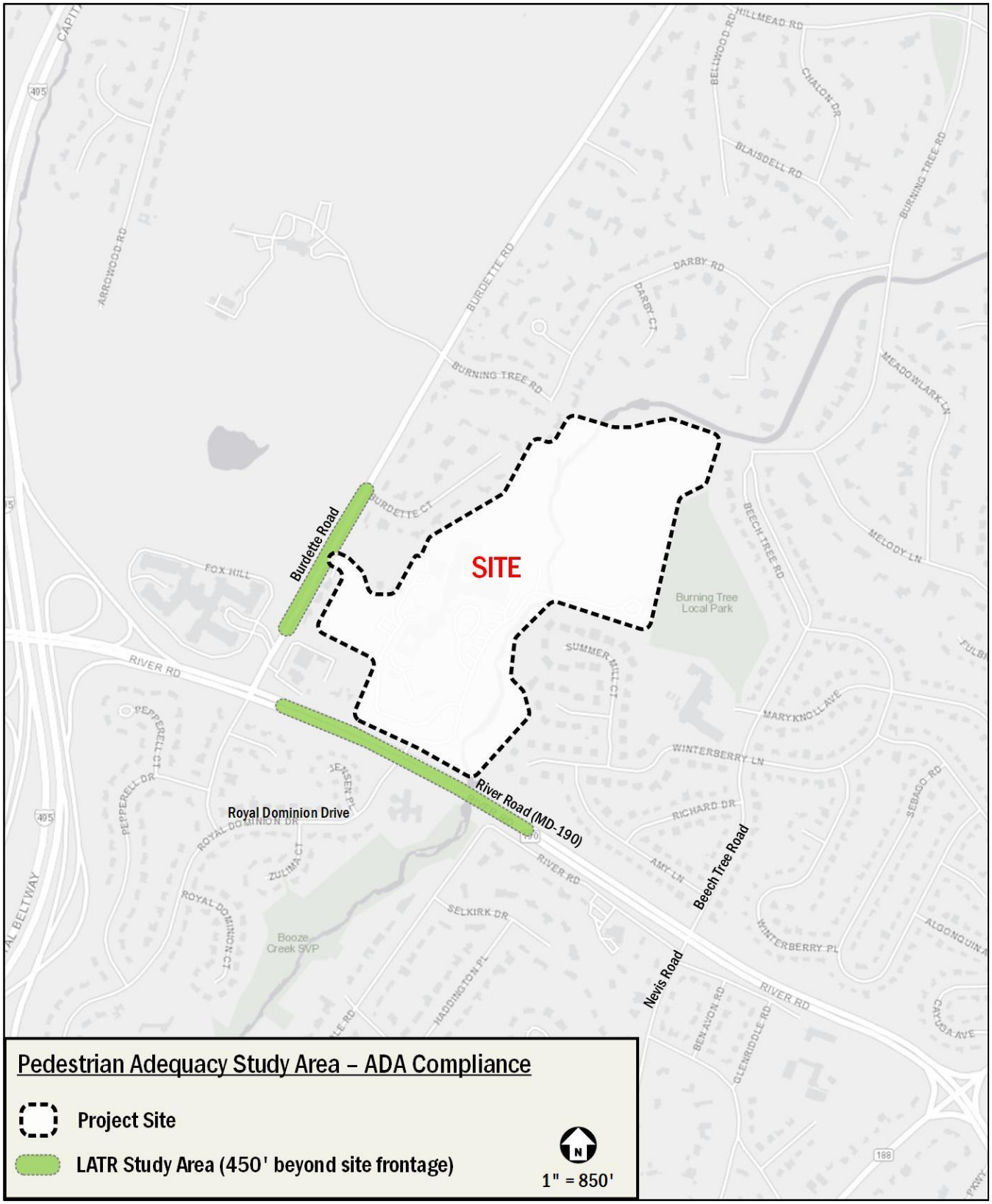

Figure 20: Pedestrian System Adequacy ADA Compliance Study Area



Figure 21: ADA Compliance Adequacy Evaluation



Figure 22: Streetlighting Deficiencies

Table 12: ADA Deficiencies

#	Location	Category	ADA Deficiency	Adequacy Mitigation
25	River Road & Royal Dominion Drive: SW corner	Curb Ramp	Cross slope and flared side slope exceed standards	Rebuild with appropriate cross slope and flared side slope
26	River Road & Royal Dominion Drive: SE corner, facing Royal Dominion Drive	Curb Ramp	Gutter slope exceeds standards, missing a flared side	Rebuild with appropriate gutter slope and flared side
27	River Road & Royal Dominion Drive: SE corner, facing river Road	Curb Ramp	Missing flared side	Rebuild with flared side
28	River Road midblock crossing - between Royal Dominion drive and Nevis/Beech Tree Road: north side	Curb Ramp	CR built up to the curb and not outside the path of cars	Rebuild with more space between CR and traffic
29	River Road midblock crossing - between Royal Dominion drive and Nevis/Beech Tree Road: south side	Curb Ramp	Cross slope exceeds standards, CR built up to the curb and not outside the path of cars	Rebuild with appropriate cross slope and more space between CR and traffic

Table 13: Streetlight Spacing Deficiencies

#	Location	Category	Streetlighting Deficiency	Adequacy Mitigation
49	Burdette Road between Private Road and Burdette Court	Streetlighting	Greater than 300' distance between streetlights	Add one (1) new streetlight
50	River Road between Royal Dominion Drive and Burdette Road (north side)	Streetlighting	Greater than 150' distance between streetlights	Add five (5) new streetlights
51	River Road between Royal Dominion Drive and Burdette Road (south side)	Streetlighting	Greater than 150' distance between streetlights	Add six (6) new streetlights
52	River Road east of Royal Dominion Drive (north side)	Streetlighting	Greater than 150' distance between streetlights	Add nine (9) new streetlights
53	River Road east of Royal Dominion Drive (south side)	Streetlighting	Greater than 150' distance between streetlights	Add ten (10) new streetlights

Section 5: Bicycle Facilities

This chapter summarizes existing and future bicycle access and reviews the quality of cycling routes to and from the site. A review of the adequacy of the existing bicycle system is also provided in this chapter.

The following conclusions are reached within this chapter:

- There are non-continuous conventional bike lanes along River Road (MD-190);
- The future bicycle network as identified in the Bicycle Master Plan will include a sidepath along River Road (MD-190);
- In accordance with the proportionality guide, the project is not required to make improvements to the surrounding bicycle network as it does not involve building additional square footage.

Existing Bicycle Facilities

Currently, there are conventional bicycle lanes along River Road that are interrupted where acceleration/deceleration lanes are present. The conventional bike lanes are not continuous and do not provide sufficient bicycle connectivity around the project site.

Planned Bicycle Facilities

According to the planned bicycle network from the Montgomery County Bicycle Master Plan, there are planned sidepaths along River Road (MD-190).

The existing and planned bicycle facilities around the project site are shown in Figure 23.

Bicycle System Adequacy

The bicycle system adequacy test requires that the Applicant identify any conditions where the Bicycle Level of Traffic Stress (BLTS) is above a BLTS score of two (2) “low stress”. The BLTS, like the PLOC, is a measure that quantifies the amount of discomfort that people feel due to vehicle traffic when they bicycle on different types of streets. The BLTS for a roadway segment is a number between zero (0) and four (4), where BLTS-0 represents no traffic stress present, such as on an off-street trail, and BLTS-4 represents a very high level of stress, such as on a high-speed road with no dedicated bicycle facilities. This score is determined through roadway characteristics such as the road’s speed limit, the presence of a center line, parking turnover, the presence of bike lanes and paths, and any physical separation between these lanes/paths and vehicular traffic. Wherever the BLTS is greater than two (2), improvements should be identified to improve it to the Bicycle Master Plan facility or to BLTS-2 or BLTS-1 where no facility is identified.

Bicycle System Adequacy Study Area

The Bicycle System Adequacy Study Area is determined by the site’s policy area and peak-hour person trips generated. Unlike ADA, PLOC, or Streetlight compliance, the walkshed is not limited to roadways classified primary residential and higher—any public roadway is applicable.

Given this site’s location within an Orange Policy Area and project trip generation, the Bicycle System Adequacy study area is 900 feet beyond the site frontage. The Bicycle Adequacy study area is presented in Figure 24. As with the pedestrian network adequacy study area, the bicycle adequacy evaluation was conducted based on the larger study area.

Bicycle System Adequacy Deficiencies

As part of the BLTS review, the score ratings available from the Montgomery County BLTS Database were confirmed through verification of sidewalk/sidepath widths and presence of on-street facilities.

Based on the Bicycle System Adequacy review, the section of River Road within the study area is ranked at a Moderate High and High level of stress. The sidepath along River Road in the County’s Bicycle Master Plan is planned to improve the BLTS to a level 2, meeting adequacy standards.

A summary of the Bicycle System Adequacy review is outlined in Table 14 and Figure 25.



Figure 23: Existing and Future Bicycle Facilities

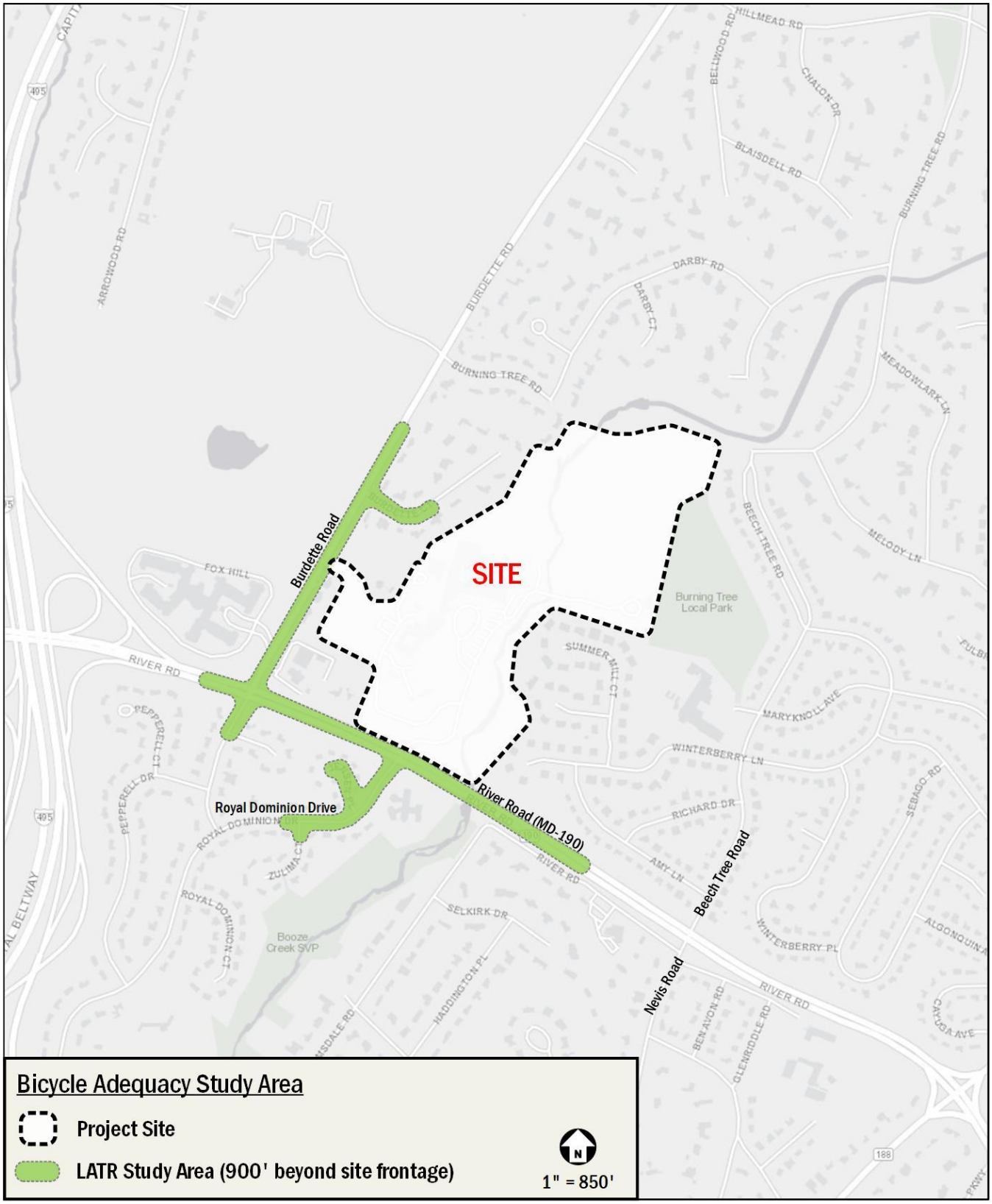

Figure 24: Bicycle Adequacy Study Area



Figure 25: Bicycle Level of Traffic Stress Adequacy Evaluation

Table 14: BLTS Deficiencies

#	Location	Existing BLTS	Adequacy Mitigation	BLTS After Mitigation	Mitigation Linear Feet
30	River Road: east of site (north side)	3	Construct sidepath	2	1400
31	River Road: east of site (south side)	3	Construct sidepath	2	1400
32	River Road: west of site (north side)	3	Construct sidepath	2	300
33	River Road: east of Burdette Road (north side)	4	Construct sidepath	2	340
34	River Road: west of Burdette Road (north)	4	Construct sidepath	2	70
35	River Road: west of Burdette Road (south)	4	Construct sidepath	2	70
36	River Road: west of site (south side)	4	Construct sidepath	2	230
37	River Road: east of Burdette Road (south side)	4	Construct sidepath	2	340
38	Site Frontage: west of Royal Dominion Drive (north)	4	Construct sidepath	2	220
39	Site Frontage: east of Royal Dominion Drive (north)	4	Construct sidepath	2	280
40	Site Frontage: west of Royal Dominion Drive (south)	4	Construct sidepath	2	290
41	Site Frontage: east of Royal Dominion Drive (south)	4	Construct sidepath	2	280
			Total BLTS Off-Site Deficiencies:		**5,220'**

Section 6: Transit Facilities

This chapter discusses the existing transit facilities in the vicinity of the site, accessibility to transit, and evaluates the overall transit impacts of the project.

The following conclusions are reached within this chapter:

- The project site has access to regional and local transportation facilities that accommodate staff, student, and visitor trips.
- The school will improve transit access and facilities in the area with the installation of a new shelter at the existing bus stop on the River Road frontage.

Existing Transit Service

The project site has access to regional and local transit services through Metrobus. A stop for the WMATA Metrobus T2 line located along the site frontage, and there are seven (7) stops total within the study area. This line provides a direct connection to the Friendship Heights metro stop on the Red Line, which connects Rockville, MD with Glenmont, MD while providing access to the District core. Connections can be made at the Metro Center and Gallery Place-Chinatown stations to access the five (5) other Metrorail lines, allowing access to destinations in Virginia and Prince George's County, Maryland. As of February 2024, Red Line trains run every six (6) minutes till 9:30 PM on weekdays and weekends and every five (5) minutes during the AM and PM Rush hours on the weekdays. Late-night trains after 9:30 PM run every 10 minutes during weekdays and weekends. Metrorail currently begins at 5:00 AM and 7:00 AM on weekdays and weekends, respectively. Service ends at 12:00 AM on Sunday through Thursday and 1:00 AM on Friday and Saturday.

The school plans to install a bus shelter at the stop along its frontage.

Bus Transit System Adequacy

The Bus Transit System Adequacy Test, for Orange policy areas, requires that the applicant identify the need for new bus shelters. To reach adequacy standards, there must be three (3) bus shelters with Real Time Information displays (RTI) within the study area.

Bus Transit System Adequacy Study Area

The Bus Transit System Adequacy Study Area is determined by the site's policy area and peak-hour person trips generated. For projects in an Orange Policy Area generating over 200 trips, the study area outlined in the LATR is 1,300' beyond site frontage, with three (3) shelters (with Real-Time Displays or RTIs) required.

The Bus Transit Adequacy study area can be seen in Figure 26.

Bus Transit System Adequacy Deficiencies

Based on the Bus Transit System Adequacy review, shown in Figure 27, adequate transit facilities are not available under existing conditions per the County standard of three (3) shelters with RTI displays within 1,300 feet of the site frontage. There are currently no existing stops that feature shelters and RTI displays, and only one (1) bus stop in the study area features a shelter. A summary of transit deficiencies is provided in Table 15.

The frontage bus stop will be improved with a new shelter as part of the project.

Table 15: Bus Stop Deficiencies

#	Location	Stop ID	Deficiency	Adequacy Mitigation	Mitigation Linear Feet
42	River Rd & Burdette Rd	2000140	No shelter or RTI	Add shelter and RTI	N/A
43	River Rd & Burdette Rd	25374	No RTI	Add RTI	N/A
44	River Rd & Royal Dominion Dr	2000134	No shelter or RTI	Add shelter and RTI	N/A
45	River Rd & Dominion Dr	2001331	No shelter or RTI	Add shelter and RTI	Bus shelter installation proposed (frontage improvement)
46	River Rd & Helmsdale Rd	2001312	No shelter or RTI	Add shelter and RTI	N/A
47	River Rd & Helmsdale Rd	2001330	No shelter or RTI	Add shelter and RTI	N/A
48	River Rd & Beech Tree Rd	2001329	No shelter or RTI	Add shelter and RTI	N/A

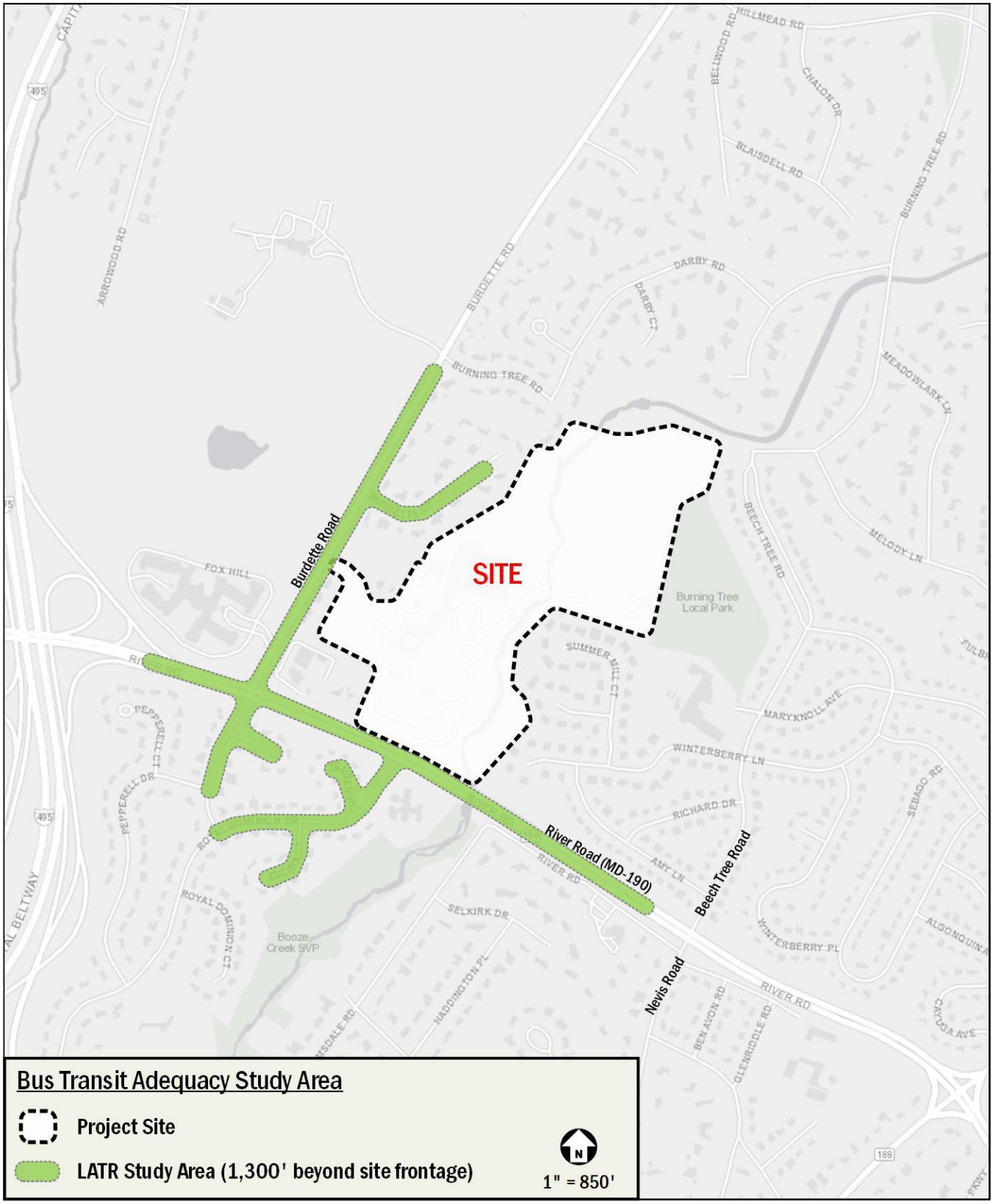

Figure 26: Transit Adequacy Study Area



Figure 27: Transit Deficiencies