

**Traffic Impact Analysis for
Promenade Phase II
Lancaster County, South Carolina**

Prepared for:

**Hutton Indian Land, LLC
Chattanooga, Tennessee**

Prepared by:

**Kimley-Horn and Associates, Inc.
200 South Tryon Street, Suite 200
Charlotte, North Carolina 28202
(704) 333-5131**

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1.0 Executive Summary

The purpose of this Traffic Impact Analysis (TIA) is to review vehicular traffic impacts as a result of the proposed Promenade Phase II development. The primary objectives of the study are:

- To estimate trip generation and distribution for the proposed development.
- To perform intersection capacity analyses for the identified study area.
- To determine the potential traffic impacts of the proposed development.
- To develop recommendations for needed roadway and operational improvements to accommodate the proposed development's traffic impacts.

The proposed site is located east of US 521 in the vicinity of Laurel Hills Road in Lancaster County, South Carolina. As currently envisioned, the proposed development consists of the following land uses, expected to be built-out in 2025:

- 350 townhomes
- 21,900 square-foot (SF) high-turnover sit-down restaurant
- 4,500 SF automated car wash
- 4,500 SF drive-in bank
- 1,500 SF retail
- 4,000 SF medical office
- 11,500 SF fast food with drive through

Based on the current site plan, access to the site is proposed via one full-movement, signalized access point and two right-in/right-out (RIRO) access points along US 521. Connectivity to the future Shelley Mullis Mixed-Use development adjacent to the north is also planned.

Per the Lancaster County Unified Development Ordinance (UDO) Section 6.8, the impact of the development was analyzed for the year after the development is expected to be at full occupancy. Therefore, this TIA evaluates the traffic operations under 2022 existing conditions, 2026 background conditions (without the proposed development), and 2026 build-out conditions (with the proposed development) during the AM and PM peak hours. Through coordination with Lancaster County and South Carolina Department of Transportation (SCDOT) staff, the following study intersections are included:

- US 521 and Shelley Mullis Road
- US 521 and Jenkins Drive/US 521 & Shelley Mullis Mixed Use Access D
- US 521 and Del Webb Boulevard
- US 521 and River Road/Collins Road
- US 521 and Jim Wilson Road
- Shelley Mullis Road and Henry Harris Road
- Jim Wilson Road and Henry Harris Road
- US 521 and Access 1
- US 521 and Laurel Hills Road (Access 2)
- US 521 and Access 3

For purposes of this study, US 521 is referenced as north/south, while all side streets are referenced as east/west.

Kimley-Horn was retained to determine the potential traffic impacts of this development (in accordance with the traffic study guidelines in the *SCDOT Access and Roadside Management Standards (ARMS) Manual* and the Lancaster County UDO Section 6.8), and to identify

transportation improvements that may be required to accommodate these impacts. Based on the analyses contained herein, the following improvements are recommended as developer mitigation:

US 521 and River Road/Collins Road

- Construction of a southbound right-turn lane along US 521 with 125 feet of storage.
- Implementation of Dallas Permitted + Protected phasing on the westbound approach during the PM peak hour.

US 521 and Ridgeline Lane/Shelley Mullis Road

- Reconfiguration of the westbound through lane to an additional left-turn lane along Shelley Mullis Road to create dual left-turn lanes with 250 feet of storage and conversion of the right-turn lane to a shared through-right lane.

US 521 and Del Webb Boulevard

- Reconfigure the westbound dual-left approach to include an exclusive left-turn lane, through lane, and right-turn lane and remove the associated dual-left protected phase if conditions allow permissive phasing.

US 521 and Halifax Drive/Access 1

- Construction of Access 1 to include a single right-in ingress lane, single right-out egress lane, and a 270-foot minimum internal protected stem (IPS) with stop control.

US 521 and Laurel Hills Road (Access 2)

- Construction of Access 2 to include dual ingress lanes, dual left-turn lanes with 175 feet of storage each and a right-turn lane, and a 175-foot minimum IPS.
- Construction of a northbound right-turn lane along US 521 with 100 feet of storage.
- Construction of dual southbound left-turn lanes along US 521 with 275 feet of storage.
- Installation of a traffic signal.

US 521 and Access 3

- Construction of Access 3 to include a single right-in ingress lane, single right-out egress lane, and a 130-foot minimum IPS with stop control.
- Construction of a northbound right-turn lane along US 521 with 100 feet of storage.

It is noted that a future traffic signal is also proposed at the main US 521 access point for the Shelley Mullis Mixed-Use development to the north (Access D). Therefore, an alternative access scenario was also studied based on SCDOT and County request, involving a combined singular traffic signal to serve both developments located at Halifax Drive. Results of the alternative build scenario render the same recommendations above with the following exceptions:

US 521 and Halifax Drive/Access 1

- Construction of Access 1 to include dual ingress lanes, dual left-turn lanes with 275 feet of storage each and a shared through-right lane, and a 275-foot minimum IPS.
- Construction of a northbound left-turn lane along US 521 with 150 feet of storage.
- Construction of dual southbound left-turn lanes along US 521 with 225 feet of storage each.
- Construction of an eastbound left-turn lane along Halifax Drive with 125 feet of storage.
- Installation of a traffic signal.

US 521 and Laurel Hills Road (Access 2)

- Construction of Access 2 to include a single ingress lane, a single right-out egress lane, and a 250-foot minimum IPS with stop control.
- Construction of a northbound right-turn lane with 100 feet of storage along US 521.
- Extension of the existing southbound left-turn lane along US 521 from 175 feet to 350 feet.

In the alternative build scenario, the construction-related costs for the US 521 and Halifax Drive/Access 1 intersection would be shared between the Promenade Phase II and Shelley Mullis Mixed-Use developments. The Shelley Mullis Mixed Use Access D would be limited to stop-controlled RIRO operation with a 250-foot northbound right-turn lane on US 521.

The transportation improvements for the study intersections are subject to approval by SCDOT and Lancaster County. All additions and attachments to State and County roadway system shall be properly permitted, designed, and constructed in conformance to standards maintained by the agencies.

2.0 Introduction

The proposed site is located east of US 521 in the vicinity of Laurel Hills Road in Lancaster County, South Carolina. **Figure 2.1** shows the site location and study area.

As currently envisioned, the proposed development consists of the following land uses, expected to be built-out in 2025:

- 350 townhomes
- 21,900 square-foot (SF) high-turnover sit-down restaurant
- 4,500 SF automated car wash
- 4,500 SF drive-in bank
- 1,500 SF retail
- 4,000 SF medical office
- 11,500 SF fast food with drive through

Based on the current site plan, access to the site is proposed via one full-movement, signalized access point and two right-in/right-out (RIRO) access points along US 521. Connectivity to the future Shelley Mullis Mixed-Use development adjacent to the north is also planned. **Figure 2.2** shows the proposed site plan for the development.

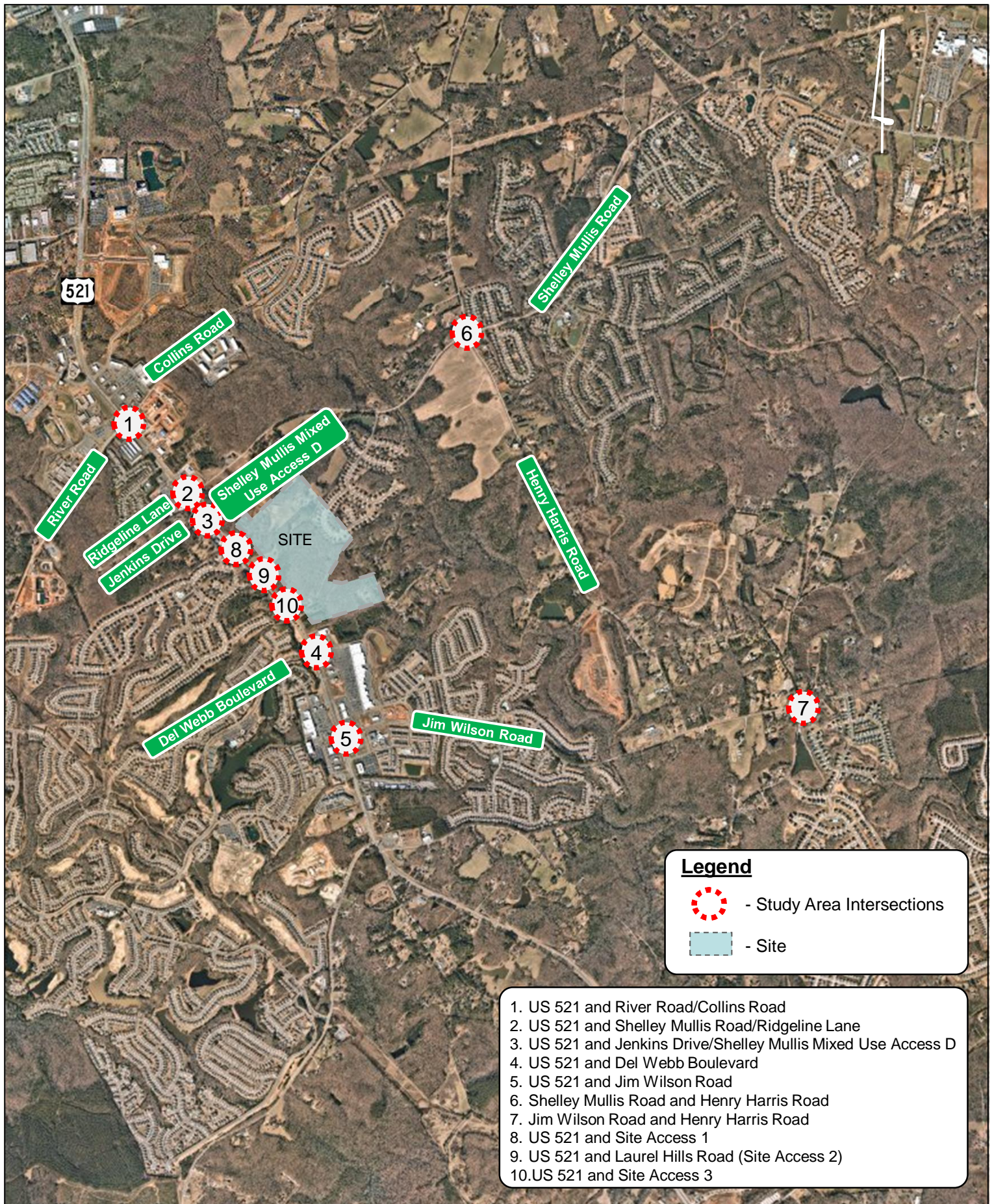
Per the Lancaster County UDO Section 6.8, the impact of the development was analyzed for the year after the development is expected to be at full occupancy. Therefore, this TIA evaluates the traffic operations under 2022 existing conditions, 2026 background conditions (without the proposed development), and 2026 build-out conditions (with the proposed development) during the AM and PM peak hours. Through coordination with Lancaster County and SCDOT staff, the following existing study intersections are included:

1. US 521 and River Road/Collins Road
2. US 521 and Shelley Mullis Road/Ridgeline Lane
3. US 521 and Jenkins Drive/Shelley Mullis Mixed Use Access D
4. US 521 and Del Webb Boulevard
5. US 521 and Jim Wilson Road
6. Shelley Mullis Road and Henry Harris Road
7. Jim Wilson Road and Henry Harris Road
8. US 521 and Access 1
9. US 521 and Laurel Hills Road (Access 2)
10. US 521 and Access 3

For purposes of this study, US 521 is referenced as north/south at all study intersections, with side streets referenced as east/west.

Kimley-Horn was retained to determine the potential traffic impacts of this development (in accordance with the traffic study guidelines in the *SCDOT ARMS Manual* and the Lancaster County UDO Section 6.8) and to identify transportation improvements that may be required to accommodate these impacts.

It is noted that a future traffic signal is also proposed at the main US 521 access point for the Shelley Mullis Mixed-Use development to the north. Therefore, an alternative access scenario was also studied based on SCDOT and County request, involving a combined singular traffic signal to serve both developments located at Halifax Drive.



3.0 Existing Traffic Conditions

Existing traffic conditions were coordinated with Lancaster County and SCDOT staff and collected through field observations and turning-movement counts to establish the existing conditions baseline analysis.

3.1 STUDY AREA

The study area for this TIA consists of the following existing intersections:

1. US 521 and Shelley Mullis Road
2. US 521 and Jenkins Drive/US 521 & Shelley Mullis Mixed Use Access D
3. US 521 and Del Webb Boulevard
4. US 521 and River Road/Collins Road
5. US 521 and Jim Wilson Road
6. Shelley Mullis Road and Henry Harris Road
7. Jim Wilson Road and Henry Harris Road
8. US 521 and Access 1
9. US 521 and Laurel Hills Road (Access 2)
10. US 521 and Access 3

Figure 3.1 shows the current roadway geometry at the study intersections. The primary roadways in the vicinity of the site are described in **Table 3.1** in terms of 2019 SCDOT annual average daily traffic (AADT) volumes in vehicles per day (vpd) available online, facility type and state functional classifications, and posted speed limits in miles per hour (mph).

Table 3.1- Study Area Roadways

Roadway	Section type	2019 AADT	Posted speed limit
US 521	4-lane divided principal arterial	32,000 N of River Road 19,500 S of Collins Road	45 mph
Shelley Mullis Road	2-lane undivided major collector	6,800 W of Henry Harris Road	45 mph
Del Webb Boulevard	4-lane divided local road	Not available	Not posted
Jim Wilson Road	2-lane undivided major collector	6,300 E of US 521	35 mph at US 521 45 mph at Henry Harris Road
Henry Harris Road	2-lane undivided major collector	Not available	35 mph
River Road	2-lane undivided local road	Not available	35 mph
Collins Road	2-lane undivided major collector	Not available	35 mph

3.2 EXISTING TRAFFIC CONDITIONS

AM (7:00-9:00) and PM (4:00-6:00) peak-period intersection turning-movement counts (TMCs) were collected by Quality Counts LLC on Tuesday, April 5, 2022 at the following intersections:

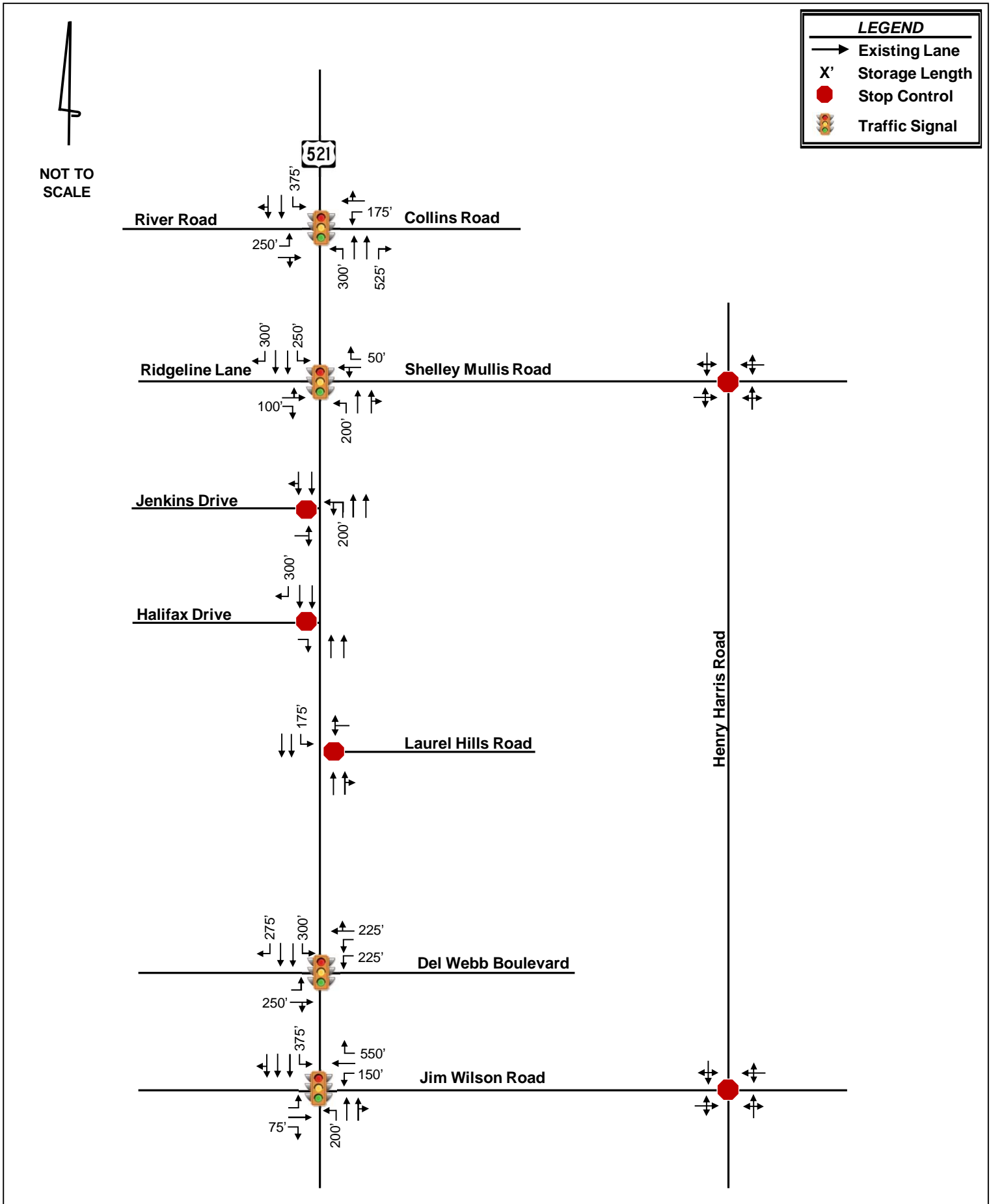
- US 521 and Shelley Mullis Road
- US 521 and Jenkins Drive/US 521 & Shelley Mullis Mixed Use Access D
- US 521 and Del Webb Boulevard

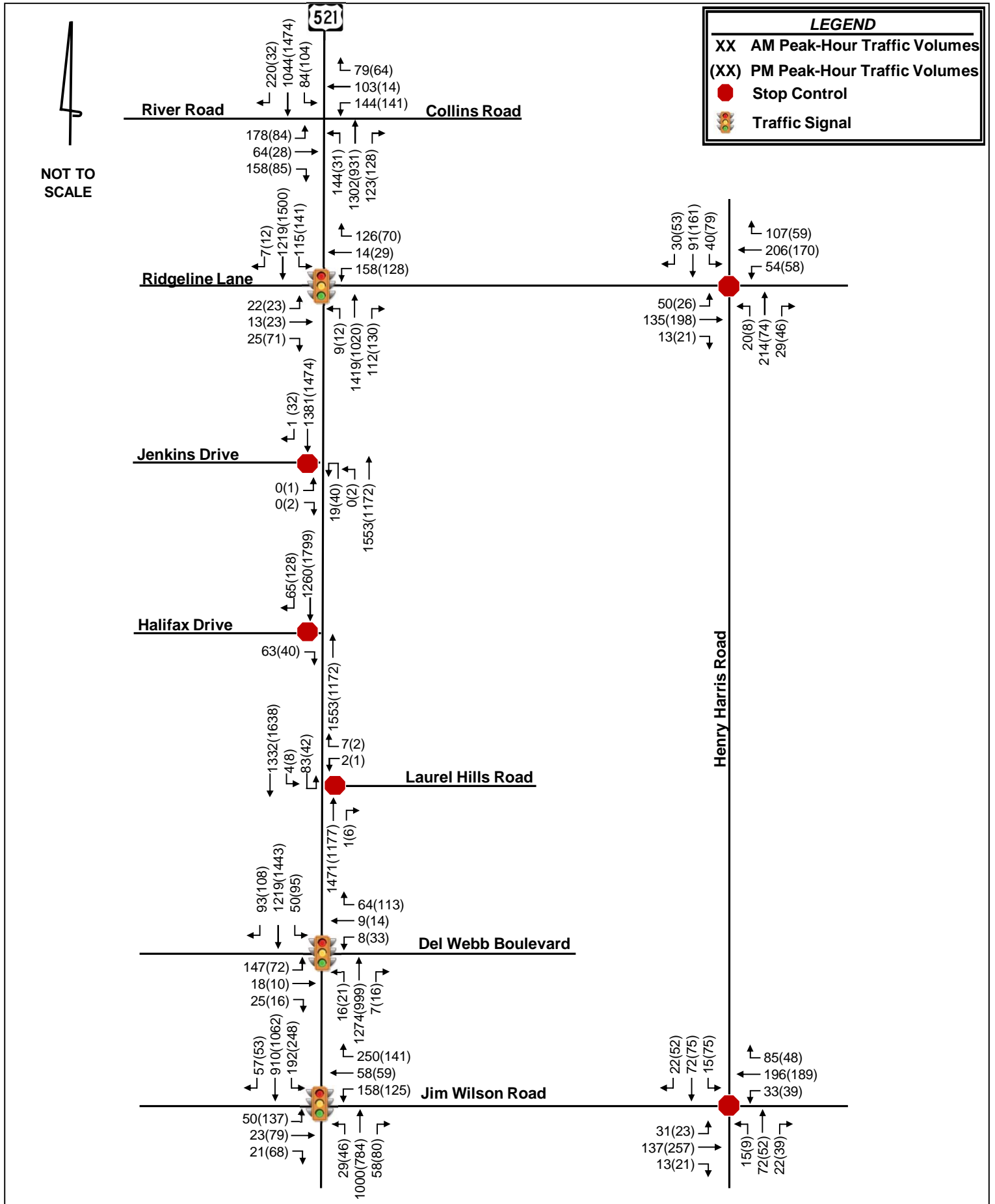
- US 521 and River Road/Collins Road
- US 521 and Jim Wilson Road
- Shelley Mullis Road and Henry Harris Road
- Jim Wilson Road and Henry Harris Road
- US 521 and Halifax Drive

The AM and PM peak hours identified differed amongst some of the study intersections yet were found to be mostly consistent. Therefore, a corridor-wide peak hour of 8:00-9:00 AM and 4:00-5:00 PM was used as the baseline data to represent the most frequent peak hour for traffic volumes within the specified count timeframes. The respective peak hour volumes for the intersections of Shelley Mullis Road/Henry Harris Road and Jim Wilson Road/Henry Harris Road were used due to the distance between these intersections from the remaining study area.

Volume balancing was not performed between the study area intersections due to the presence of streets/driveways.

Figure 3.2 shows the 2022 existing AM and PM peak-hour traffic volumes. Raw peak-hour intersection TMC data is provided in the **Appendix**.





4.0 Background Traffic Conditions

Projected background (non-project) traffic is defined as the expected growth or change in traffic volumes on the surrounding roadway network between the year the existing counts were collected and the expected build-out year absent the construction and opening of the proposed project. This includes both non-specific general growth based on historical increase in local traffic volumes (historical growth) and growth in traffic volumes caused by specific approved developments within the relative vicinity of the proposed development.

4.1 HISTORICAL GROWTH TRAFFIC

Historical growth is the increase in existing traffic volumes due to usage increases and non-specific growth throughout the area, and accounts for growth that is independent of specific approved off-site developments or planned transportation projects. Historical growth traffic is calculated using an annual growth rate, which is applied to the existing traffic volumes up to the future horizon year. Based on coordination with SCDOT and Lancaster County staff, the existing 2022 peak-hour traffic volumes were grown by an annual growth rate of 3.4% per year to the study's 2026 horizon year. Growth rate calculations can be seen in **Table 4.1**.

Table 4.1- Historical Growth Rate Calculation

SCDOT AADT			
	2019	2009	Growth Rate (2009-2019)
US 521 (North of River Rd/Collins Rd)	32,000	22,400	3.6%
US 521 (South of Jim Wilson Rd)	19,500	14,400	3.1%
Average			3.4%

4.2 APPROVED OFFSITE DEVELOPMENT TRAFFIC

Based on agency coordination, four approved offsite developments within the vicinity of this study area were included in the 2026 background traffic. The development, land uses and intensities, build-out percentage, and committed improvements based on its associated approved TIA and agency confirmation are outlined below:

- Shelley Mullis Mixed Use- 0% built out in 2022, 70% in 2026
 - Construct a westbound left-turn lane with 350' of storage at US 521 and Shelley Mullis Road/Ridgeline Lane.
 - Extend the existing southbound left-turn lane from 250' to 350' of storage.
 - Restripe the existing eastbound shared left-through lane and right-turn lane to a left-turn lane and shared through-right lane at US 521 and Shelley Mullis Road/Ridgeline Lane.
 - Construct Access D aligned with Jenkins Drive with a traffic signal, northbound right-turn lane with 250' of storage, southbound left-turn lane with 225' of storage, and westbound approach with a left-through lane and right-turn lane with 150' of storage.
- Harris Mill- 0% in 2022, 100% in 2026
 - Construct a single-lane roundabout at Jim Wilson Road and Henry Harris Road.
 - Construct a northbound right-turn lane with 250' of storage at US 521 and Shelley Mullis Road/Ridgeline Lane.
 - Extend the existing westbound right-turn lane from 50' to 300' of storage (maximize) and implement right-turn overlap phasing at US 521 and Shelley Mullis Road/Ridgeline Lane.

- Extend the existing westbound left-turn lane from 225' to 325' at US 521 and Jim Wilson Road.
- Extend the existing westbound right-turn lane from 500' to 800' at US 521 and Jim Wilson Road.
- Construct a northbound right-turn lane at US 521 and Jim Wilson Road with 175' of storage.
- Crossridge- 0% in 2022, 100% in 2026
 - No committed improvements in study area.
- Wilson Creek Subdivision – 0% in 2022, 100% in 2026
 - Construct a single-lane roundabout at Shelley Mullis Road and Henry Harris Road with right-turn slip lanes on the eastbound, westbound, and southbound approaches.

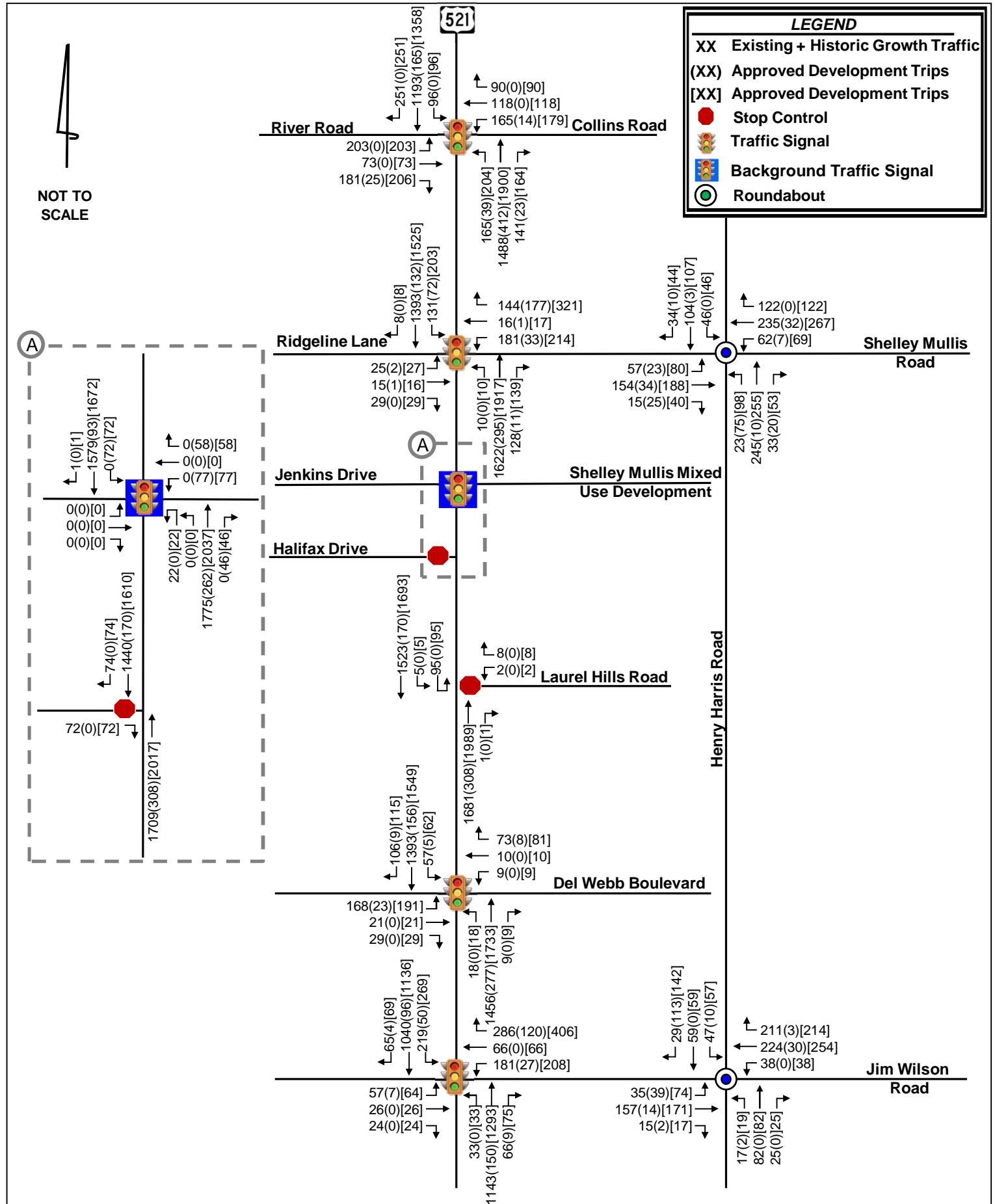
Offsite approved development traffic volumes were taken directly from each respective TIA and factored as appropriate given the approximate build-out percentages. Existing intersection splits were used to carry and assign volumes appropriately at study area intersections that were not included in the approved TIAs. Approved development data and calculations are included in the **Appendix**.

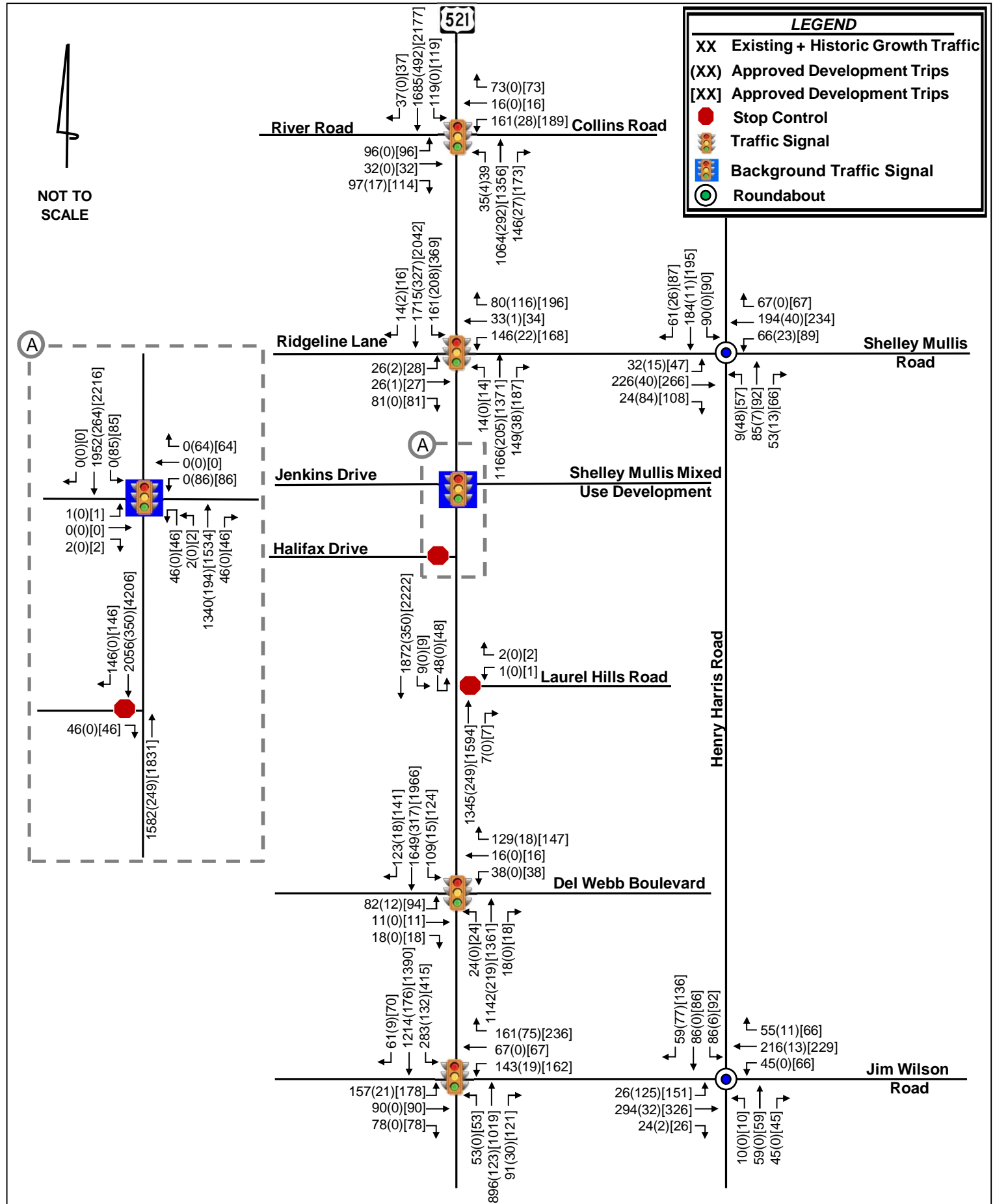
4.3 PLANNED TRANSPORTATION PROJECTS

Based on coordination with SCDOT and Lancaster County staff, no additional planned transportation projects are included in the study. However, the Rock Hill-Fort Mill Area Transportation Study (RFATS) has recently funded a corridor study for US 521 from the NC state line to SC 75. Any proposed road improvements, particularly traffic signals, would be speculative in nature until that plan is developed and accepted.

4.4 2026 BACKGROUND TRAFFIC

2026 background traffic consists of existing 2022 traffic, 2026 historical growth traffic, and approved development traffic. **Figures 4.1 and 4.2** show the 2026 background AM and PM peak-hour traffic volumes, respectively.





5.0 Site Traffic Volume Development

Site traffic developed for this TIA is defined as the vehicle trips expected to be generated and added to the study area by the construction of the proposed development, and the distribution and assignment of that traffic within the identified study area.

5.1 TRAFFIC GENERATION

The traffic generation potential of the proposed development was determined using the trip generation rates published in *Trip Generation* (Institute of Transportation Engineers, 11th Edition) for the proposed land uses. **Table 5.1** summarizes the projected trip generation for the proposed development.

Table 5.1 - Trip Generation (Trip Generation Edition 11)											
ITE LUC	Land Use	Intensity		Daily	AMPeak Hour			PMPeak Hour			Peak Hour Type/Data Source
					Total	In	Out	Total	In	Out	
720	Medical-Dental Office Building	4,000	SF	144	12	9	3	16	5	11	Adj Street/ITE Rate
822	Strip Retail Plaza (<40k)	1,500	SF	293	8	5	3	20	10	10	Adj Street/ITE Eqn
912	Drive-in Bank	4,500	SF	452	45	26	19	95	48	47	Adj Street/ITE Rate
948	Automated Car Wash	4,500	SF	734	40	25	15	64	32	32	See Footnote
932	High-Turnover Sit Down Restaurant	7,500	SF	804	103	59	44	123	63	60	Generator/ITE Rate
932	High-Turnover Sit Down Restaurant	7,200	SF	772	98	56	42	118	60	58	Generator/ITE Rate
932	High-Turnover Sit Down Restaurant	7,200	SF	772	98	56	42	118	60	58	Generator/ITE Rate
934	Fast Food Restaurant with Drive-Thru Window	2,500	SF	1,169	112	57	55	83	43	40	Adj Street/ITE Rate
934	Fast Food Restaurant with Drive-Thru Window	5,000	SF	2,337	223	114	109	165	86	79	Adj Street/ITE Rate
934	Fast Food Restaurant with Drive-Thru Window	4,000	SF	1,870	178	91	87	132	69	63	Adj Street/ITE Rate
220	Multifamily Housing Low-Rise - (Townhomes)	350	DU	2,319	131	31	100	171	108	63	Adj Street/ITE Eqn
	Subtotal			11,666	1,048	529	519	1,105	584	521	
	Internal Capture			1,152	70	35	35	206	103	103	
	ITE 822 Pass-By - 0% AM / 34% PM			4	0	0	0	4	2	2	
	ITE 912 Pass-By - 29% AM / 35% PM			26	10	5	5	16	8	8	
	ITE 932 Pass-By - 0% AM / 43% PM			42	0	0	0	42	21	21	
	ITE 932 Pass-By - 0% AM / 43% PM			42	0	0	0	42	21	21	
	ITE 932 Pass-By - 0% AM / 43% PM			42	0	0	0	42	21	21	
	ITE 934 Pass-By - 49% AM / 50% PM			86	52	26	26	34	17	17	
	ITE 934 Pass-By - 49% AM / 50% PM			170	104	52	52	66	33	33	
	ITE 934 Pass-By - 49% AM / 50% PM			136	84	42	42	52	26	26	
	ITE Pass-By			548	250	125	125	298	149	149	
	Adjacent Street Traffic				2,803			2,815			
	10% Adjacent Street Traffic			564	282	141	141	282	141	141	
	Pass-By^			532	250	125	125	282	141	141	
Net New External Trips				9,982	728	367	358	617	340	277	
*Daily and AM trip generation data is not available for ITE 948 (Automated Car Wash); therefore, the ratio of the daily or AM to PM peak rates for ITE 949 (Car Wash and Detail Center) was multiplied by the PM peak hour rate for ITE 948 to determine the AM and daily rates for ITE 948. Note that ITE only provides data for wash stalls for ITE 949; therefore, the comparison of ITE 948 to ITE 949 is based on wash stalls. To determine the daily and AM peak rates for ITE 948 based on square footage, the ratio of the daily or AM to PM peak rate for wash stalls was multiplied by the PM peak rate provided by ITE for SF.											
^ Pass by limited by adjacent street traffic											

5.2 SITE TRAFFIC DISTRIBUTION AND ASSIGNMENT

The proposed development's trips were assigned to the surrounding network based on AADT data, approved development distribution, and the proposed site layout. The overall site traffic distribution and assignment, approved by SCDOT and Lancaster County staff, are shown in **Figure 5.1**.

The alternative trip assignment percentages are shown in **Figure 5.2** with changes highlighted.

5.3 2026 BUILD-OUT TRAFFIC VOLUMES

The 2026 build-out traffic volumes include the assignment of the projected site traffic generation and 2026 background traffic volumes.

The traffic volumes associated with Halifax Drive were redistributed under 2026 alternative build-out conditions due to the road access changing from RIRO to full movement with the proposed traffic signal and aligned with Access 1. Therefore, the traffic volumes both in and out of Halifax Drive were assumed to be a combination of the U-turns at US 521 and Jenkins Drive/Shelley Mullis Mixed Use Access D and US 521 and Laurel Hills Road (Access 2), respectively. 90% of the northbound U-turns from US 521 and Jenkins Drive/Shelley Mullis Mixed Use Access D were assumed as eastbound left-turns out of Halifax Drive. Based on review of the 2026 background volumes, there were 72 eastbound right-turns out of Halifax Drive and 95 southbound U-turns at US 521 and Laurel Hills Road (Access 2). Due to the volume of southbound U-turns at US 521 and Laurel Hills Road (Access 2) exceeding the eastbound right-turn volume out of Halifax Drive, 50% of the eastbound right-turns from Halifax Drive were assumed to be eastbound left-turns out of Halifax Drive. This instigates a reduction in the volume of southbound U-turns at US 521 and Laurel Hills Road (Access 2) by the volume of eastbound right-turns redistributed to eastbound left-turns.

The traffic volumes associated with Murphy Hills Road would be redistributed under 2026 alternative build-out conditions due to the road access changing from RIRO to full movement with the proposed traffic signal and construction of Access 1 aligned with Halifax Drive. However, no volumes associated with inbound or outbound traffic were noted during TMC collection. If volumes were present during either peak hour, they would be subject to redistribution.

The traffic volumes associated with left-turns out of Laurel Hills Road were also redistributed under 2026 alternative build-out conditions due to the road access changing from full movement to a directional crossover. Therefore, these volumes were assumed to be right turns out of Laurel Hills Road and make a U-turn at the median breaks between US 521 and Halifax Drive/Access 1 and US 521 and Shelley Mullis Road/Ridgeline Lane. The traffic volumes associated with left-turns into Laurel Hills Road remain constant when compared to the background and build-out conditions. The proposed directional crossover access restriction would not restrict southbound left-turns from entering Laurel Hills Road that occur in background and build-out conditions.

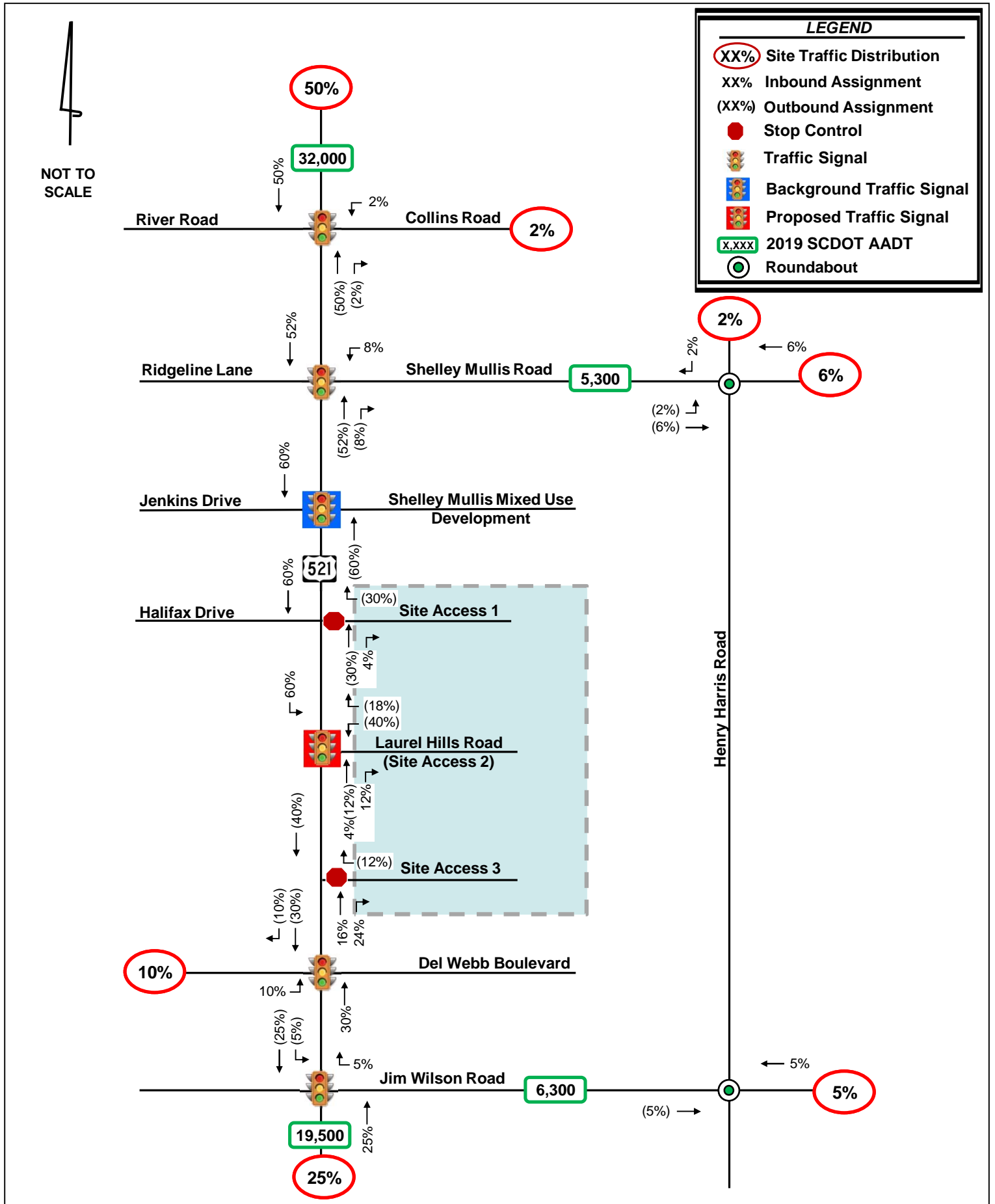
The traffic volumes associated with the Shelley Mullis Mixed Use development were redistributed under 2026 alternative build-out conditions due to the road access changing from full-movement to RIRO. Therefore, the southbound and westbound left-turns in and out of the site were displaced to be served by the traffic signal proposed as part of the construction of Access 1 aligned with Halifax Drive. All southbound left-turns at US 521 and Jenkins Drive/Shelley Mullis Mixed Use Access D were assumed to be southbound left-turns into Access 1. All westbound left-turns at US 521 and Jenkins Drive/Shelley Mullis Mixed Use Access D were assumed to be westbound left-turns out of Access 1.

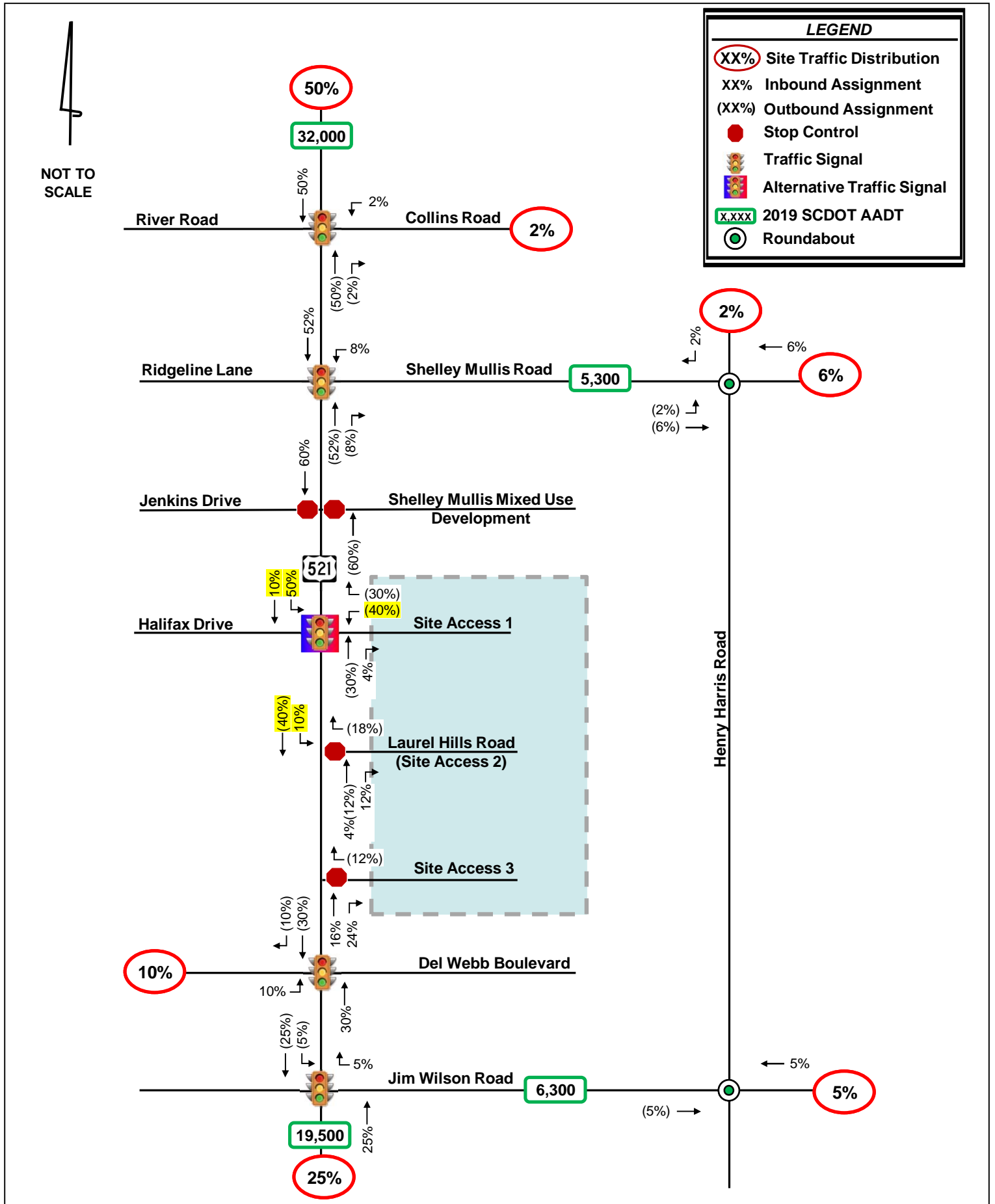
Additionally, the traffic volumes associated with left-turns out of Jenkins Drive were redistributed under 2026 alternative build-out conditions due to the road access changing from full-movement to RIRO. Therefore, these volumes were assumed to be right turns out of Jenkins Drive and make a U-turn at the median break of US 521 and Laurel Hills Road (Access 2). The traffic volumes associated with left-turns into Jenkins Drive were also redistributed under 2026 alternative build-out conditions with the road access change. These volumes were assumed to make a U-turn at the median breaks between US 521 and Halifax Drive/Access 1 and US 521 and Shelley Mullis Road/Ridgeline Lane. These volumes would then be added to the southbound right-turn traffic at US 521 and Jenkins Road/Shelley Mullis Mixed Use Access D.

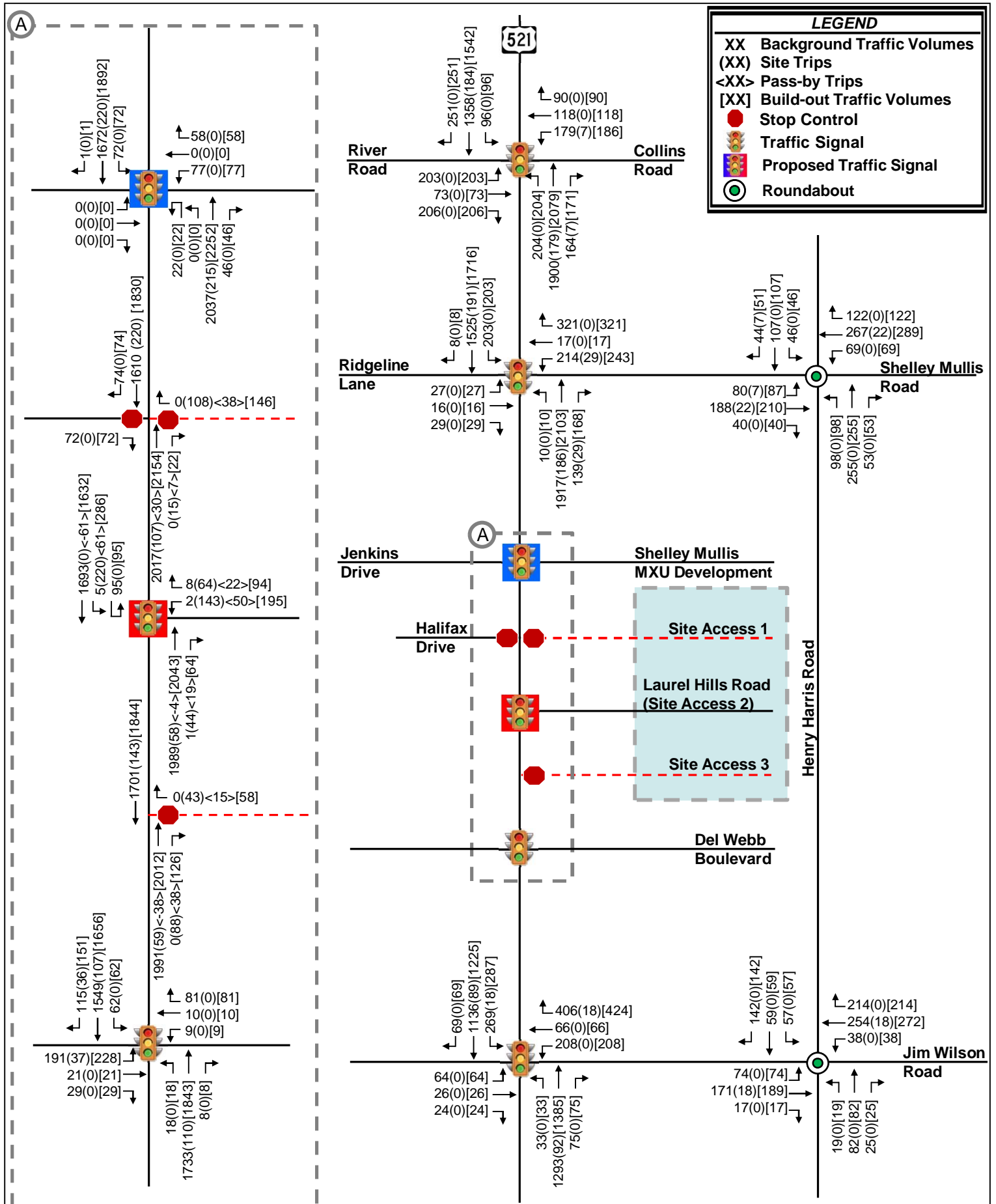
Figures 5.3 and 5.4 show the projected 2026 build-out traffic volumes for the AM and PM peak-hours, respectively.

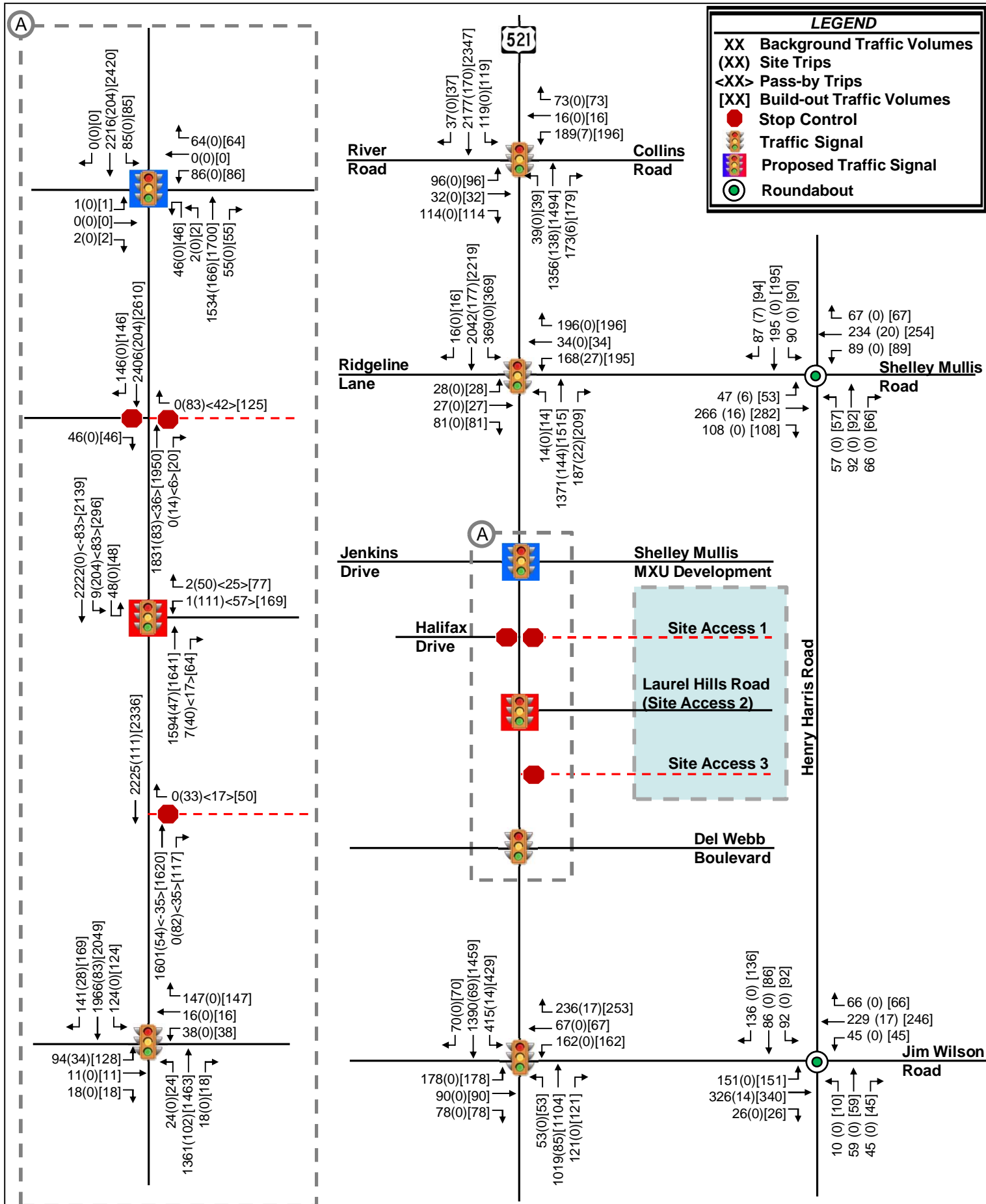
Figures 5.5 and 5.6 show the projected 2026 build-out traffic volumes for the alternative scenario at intersections impacted by the assignment change.

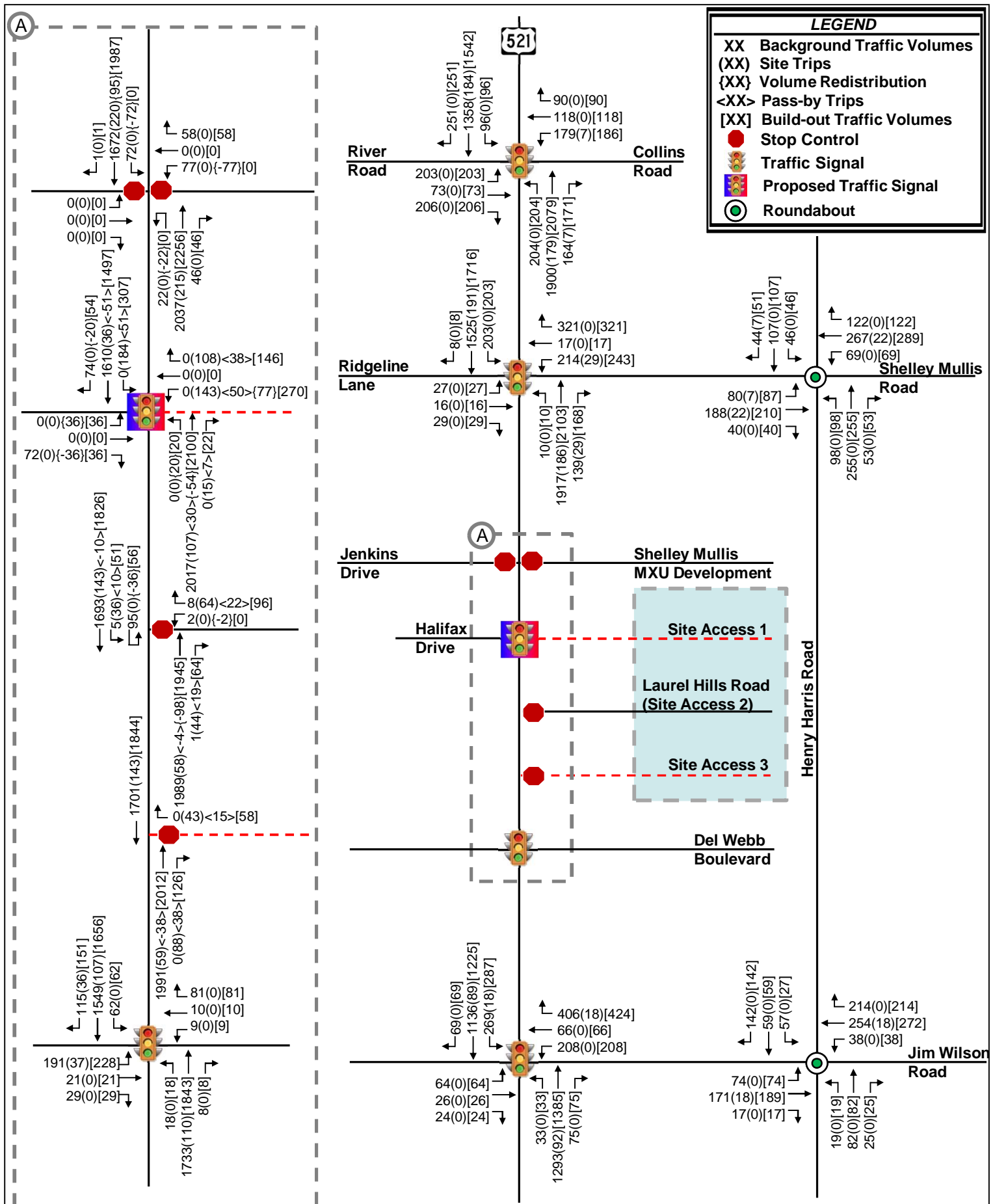
Intersection volume development worksheets for study area intersections are provided in the **Appendix**.

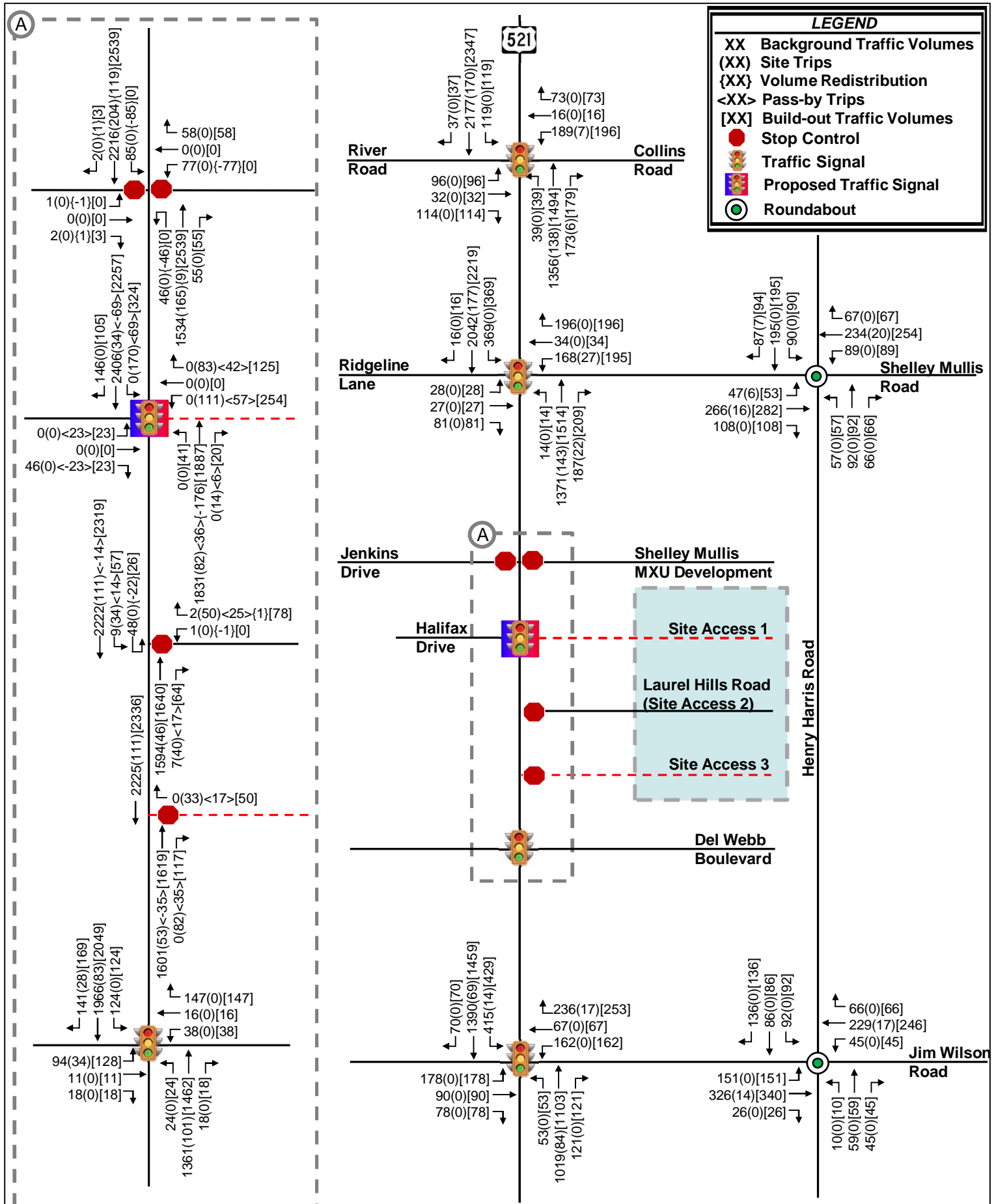












6.0 Capacity Analysis

Capacity analyses were performed for the AM and PM peak hours using Synchro Version 10 software to determine the operating characteristics at the signalized and stop-controlled intersections of the adjacent street network and to evaluate the impacts of the proposed development. In addition, the SIDRA Version 9 software was used to determine the operating characteristics and evaluate the impacts of the proposed development at the planned roundabouts in the study area. Capacity is defined as the maximum number of vehicles that can pass over a particular road segment, or through a particular intersection, within a specified period of time under prevailing operational, geometric and controlling conditions within a set time duration.

The *Highway Capacity Manual* (HCM) defines level of service (LOS) as a “quantitative stratification of a performance measure or measures representing quality of service” and is used to “translate complex numerical performance results into a simple A-F system representative of travelers’ perceptions of the quality of service provided by a facility or service”. The HCM defines six levels of service, LOS A through LOS F, with A having the best operating conditions from the traveler’s perspective and F having the worst. However, it must be understood that “the LOS letter result hides much of the complexity of facility performance”, and that “the appropriate LOS for a given system element in the community is a decision for local policy makers”. According to the HCM, “for cost, environmental impact, and other reasons, roadways are typically designed not to provide LOS A conditions during peak periods but instead to provide some lower LOS that balances individual travelers’ desires against society’s desires and financial resources. Nevertheless, during low-volume periods of the day, a system element may operate at LOS A.”

LOS for a two-way stop-controlled (TWSC) intersection is determined by the control delay at the side-street approaches, typically during the highest volume periods of the day, the AM and PM peak periods. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. With respect to field measurements, control delay is defined as the total elapsed time from the time a vehicle stops at the end of the queue to the time the vehicle departs from the stop line. It is typical for stop sign-controlled side streets and driveways intersecting major streets to experience long delays during peak hours, particularly for left-turn movements. The majority of the traffic moving through the intersection on the major street experiences little or no delay.

LOS for signalized intersections is reported for the intersection as a whole, also typically during the highest volume periods of the day, the AM and PM peak periods. One or more movements at an intersection may experience a low level-of-service, while the intersection as a whole may operate acceptably.

LOS for roundabout intersections is reported for the intersection as a whole but uses the same control delay thresholds as unsignalized intersections. However, if the volume-to-capacity ratio on an approach of the intersection is greater than 1.0, that approach or intersection is reported as LOS F regardless of the reported control delay.

Tables 6.0-A and **6.0-B** list the LOS control delay thresholds published in the HCM for roundabouts, unsignalized and signalized intersections as well as the unsignalized operational descriptions assumed herein.

Table 6.0-A Level-of-Service Control Delay Thresholds for Unsignalized Intersections/Roundabouts		
Level-of-Service	Average Control Delay per Vehicle [sec/veh]	
A	≤ 10	Short Delays
B	$> 10 - 15$	
C	$> 15 - 25$	
D	$> 25 - 35$	Moderate Delays
E	$> 35 - 50$	
F	> 50	Long Delays

Table 6.0-B Level-of-Service Control Delay Thresholds for Signalized Intersections	
Level-of-Service	Control Delay per Vehicle [sec/veh]
A	≤ 10
B	$> 10 - 20$
C	$> 20 - 35$
D	$> 35 - 55$
E	$> 55 - 80$
F	> 80

SCDOT staff provided the signal plans and time of day plans for all existing signalized study area intersections which were used in the development of the 2022 existing conditions Synchro network. The cycle lengths, splits, and offsets included in the time-of-day plans were used for the existing conditions network. Under future year conditions, cycle lengths were maintained, and the splits were optimized. It should be noted that with the pedestrian timings included in the Synchro model, the split times on the side streets taken from the signal plans were shorter than the minimum splits, recognizing that the pedestrian phases would not be called during every cycle with existing push buttons.

Signal and time of day plans for the study intersections are included in the **Appendix**.

Peak hour factors (PHFs) were taken directly from the count data for the existing conditions scenario. A PHF of 0.9 was assumed for future year analyses during the AM and PM peak hours. Heavy vehicle percentages were taken directly from field observations, subject to a two-percent minimum.

Capacity analyses were performed for the 2022 existing traffic conditions, 2026 background traffic conditions, and 2026 build-out traffic conditions. Reports generated by Synchro Version 10 and SIDRA software are included in the **Appendix**. SimTraffic queueing/blocking reports for the build-out improved scenario are also included in the **Appendix**.

Mitigation for traffic impacts caused by the proposed development were noted and recommended based on Lancaster County and SCDOT mitigation requirements. When determining the proposed development's traffic impact to the study area intersections, the 2026 background and 2026 build-out conditions were compared.

Based on Lancaster County guidelines "for collector or local streets, Level-of-Service (LOS) C or better shall be maintained. On any arterial or higher order street, a LOS D or better shall be maintained. Where the existing LOS is below these standards, the traffic impact analysis shall

identify those improvements required to ensure that development related traffic demands result in no net reduction in LOS, and identify additional improvements needed to raise the level of service to the standards on the applicable street to the adopted LOS standard.” For the purposes of this TIA, the capacity analyses identifying additional improvements needed to raise the LOS to the adopted standards is referred to as “Build IMP Target LOS.”

Based on the SCDOT *ARMS* Manual, the TIA ‘should include proposed improvements or access management techniques that will mitigate any significant changes in the levels of service.’ For the purposes of this TIA, “significant changes” were assumed where the overall intersection or stop-controlled approach delay increases by more than 25% or drops by one or more LOS grade between 2026 background and 2026 build-out conditions.

6.1 US 521 AND RIVER ROAD/COLLINS ROAD

Table 6.1 summarizes the LOS, control delay (seconds), and 95th percentile queue lengths at the signalized intersection.

Table 6.1 - US 521 and River Road/Collins Road												
Condition	Measure	EB		WB		NB			SB			Intersection LOS (Delay)
		EBL	EBTR	WBL	WBTR	NBL	NBT	NBR	SBL	SBTR	SBR	
AM Peak Hour												
2022 Existing	LOS (Delay)	D (45.3)		F (156.3)		C (29.3)			F (151.3)			F (91.8)
	Synchro 95th Q	185'	139'	#217'	179'	110'	m#721'	m26'	80'	#963'	-	
2026 Background	LOS (Delay)	D (45.5)		F (82.6)		F (124.0)			F (121.5)			F (112.0)
	Synchro 95th Q	#220'	227'	#315'	#276'	m#159'	m#1048'	m22'	#123'	#1095'	-	
2026 Build-out	LOS (Delay)	D (43.8)		F (83.2)		F (174.2)			F (176.0)			F (155.9)
	Synchro 95th Q	#215'	227'	#330'	#276'	m#131'	m#1066'	m21'	#123'	#1284'	-	
2026 Build-out IMP	LOS (Delay)	D (50.2)		F (102.4)		F (152.4)			E (60.3)			F (105.9)
	Synchro 95th Q	#270'	260'	#370'	#336'	m#182'	m#1286'	m4'	#140'	#1023'	112'	
2026 Build-out Target LOS	LOS (Delay)	D (45.3)		F (88.3)		C (20.1)			D (36.5)			C (33.5)
	Synchro 95th Q	#239'	252'	#355'	#313'	m125'	m479'	m4'	#139'	584'	101'	
PM Peak Hour												
2022 Existing	LOS (Delay)	C (29.1)		E (60.6)		B (13.3)			C (24.3)			C (23.6)
	Synchro 95th Q	98'	36'	197'	41'	m26'	217'	24'	63'	#878'	-	
2026 Background	LOS (Delay)	C (24.7)		E (56.5)		C (26.3)			F (125.1)			F (80.2)
	Synchro 95th Q	114'	77'	245'	63'	m14'	m746'	m57'	#150'	#1633'	-	
2026 Build-out	LOS (Delay)	C (24.1)		E (56.5)		C (28.7)			F (169.4)			F (104.4)
	Synchro 95th Q	113'	76'	252'	62'	m13'	m754'	m51'	#179'	#1819'	-	
2026 Build-out IMP	LOS (Delay)	D (42.1)		F (152.0)		A (8.6)			F (99.4)			E (66.9)
	Synchro 95th Q	137'	104'	#309'	72'	m14'	m246'	m0'	129'	#1710'	0'	
2026 Build-out Target LOS	LOS (Delay)	D (42.1)		F (152.0)		A (8.1)			C (22.4)			C (26.0)
	Synchro 95th Q	137'	104'	#309'	72'	m15'	m133'	m5'	90'	809'	0'	
Background Storage		250'		175'		300'		525'	375'			

Exceeds storage
 # 95th percentile volume exceeds capacity, queue may be longer
 m Volume for 95th percentile queue is metered by upstream signal

Table 6.1 shows that the overall intersection currently operates at LOS F during the AM peak hour and LOS C during the PM peak hour. Under 2026 background and build-out conditions, the overall intersection is expected to operate at LOS F during both peak hours. Given the expected increase in delay during both peak hours, identification of potential mitigation improvements is required. The following improvements were considered to mitigate the impact of the proposed site:

- Construction of a southbound right-turn lane along US 521.
- Increase the cycle length to 140 seconds in both peak hours.
- Implement Dallas Permitted + Protected phasing on the westbound approach in the PM peak hour.

With these improvements in place, the intersection is expected to continue operating at LOS F during the AM peak hour and LOS E during the PM peak hour and with less delay during both peak hours when compared to background conditions.

Upon review of the Synchro 95th percentile queue, the southbound right-turning queue is 112 feet. Therefore, a right-turn lane with storage length of 125 feet is recommended.

Per Lancaster County guidelines, if the existing LOS is below the threshold identified (LOS D for principal arterials), the TIA “shall identify additional improvements needed to raise the level of service on the applicable street to the adopted LOS standard.” The following improvements were identified to achieve LOS D for the overall intersection:

- An additional northbound through lane and receiving lane along US 521.
- An additional southbound through lane and receiving lane along US 521.

6.2 US 521 AND SHELLEY MULLIS ROAD/RIDGELINE LANE

Table 6.2 summarizes the LOS, control delay, and 95th percentile queue lengths at the signalized intersection.

Table 6.2 - US 521 and Ridgeline Lane/Shelley Mullis Road													
Condition	Measure	EB		WB			NB			SB			Intersection LOS (Delay)
		EBL	EBTR	WBL	WBTR	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
AM Peak Hour													
2022 Existing	LOS (Delay)	C (31.5)		E (65.0)			D (37.7)			B (13.2)			C (30.2)
	Synchro 95th Q	53'	0'	187'	99'	-	9'	#889'	-	m32'	m398'	m0'	
2026 Background	LOS (Delay)	C (27.8)		D (52.9)			E (75.2)			B (16.4)			D (48.6)
	Synchro 95th Q	47'	46'	#312'	34'	335'	m1'	#1222'	m4'	m#159'	m577'	m0'	
2026 Build-out	LOS (Delay)	C (31.6)		E (56.5)			F (119.3)			C (25.2)			E (73.2)
	Synchro 95th Q	47'	54'	#375'	34'	335'	m1'	m#1228'	m4'	m#125'	m607'	m0'	
2026 Build-out IMP	LOS (Delay)	E (56.0)		F (135.7)			D (42.0)			C (31.4)			D (45.8)
	Synchro 95th Q	#70'	61'	#252'	#494'	-	m0'	m#1126'	m1'	m#206'	m762'	m0'	
PM Peak Hour													
2022 Existing	LOS (Delay)	C (28.7)		E (60.3)			C (21.1)			B (13.1)			C (20.6)
	Synchro 95th Q	68'	40'	200'	35'	-	m11'	507'	-	m102'	445'	m2'	
2026 Background	LOS (Delay)	D (45.2)		D (48.9)			C (30.4)			B (19.8)			C (26.8)
	Synchro 95th Q	50'	19'	#255'	57'	157'	m5'	#813'	m24'	m215'	m847'	m0'	
2026 Build-out	LOS (Delay)	D (44.9)		D (53.3)			E (55.1)			C (28.7)			D (40.6)
	Synchro 95th Q	50'	142'	#315'	57'	157'	m6'	#949'	m53'	m185'	m861'	m0'	
2026 Build-out IMP	LOS (Delay)	F (122.4)		E (61.0)			C (23.7)			D (36.0)			D (36.2)
	Synchro 95th Q	93'	122'	246'	342'	604'	m1'	m#928'	m12'	m294'	m800'	m0'	
Background Storage			100'	350'		300'	200'		250'	350'		300'	

Exceeds storage

95th percentile volume exceeds capacity, queue may be longer

m Volume for 95th percentile queue is metered by upstream signal

Table 6.2 shows that the overall intersection currently operates at LOS C during both peak hours. Under 2026 background conditions, the overall intersection is expected to operate at LOS D during the AM peak hour and LOS C during the PM peak hour. As part of the Harris Mill development discussed in Section 4.2, the following improvement is expected to be in place in 2026 background conditions:

- Northbound right-turn lane with 250 feet of storage
- Extension of the westbound right-turn lane from 50 feet to 300 feet of storage (maximize) and implementation of right-turn overlap phasing

Additionally, as part of the Shelley Mullis Mixed Use development discussed in Section 4.2, the following improvements are expected to be in place in 2026 background conditions:

- Westbound left-turn lane with 350 feet of storage
- Restriping of the existing eastbound approach to an exclusive left-turn lane and shared through-right lane
- Extension of the existing southbound left-turn lane from 250 feet to 350 feet of storage

With the inclusion of the site traffic in build-out conditions, the intersection is expected to operate at LOS E during the AM peak hour and LOS D during the PM peak hour. Given the expected decrease in LOS during the AM peak hour and increase in delay during both peak hours, identification of potential mitigation improvements is required. The following improvements were considered to mitigate the impact of the proposed site:

- Reconfiguration of the through lane to an additional westbound left-turn lane along Shelley Mullis Road to create dual left-turn lanes and conversion of the right-turn lane to a shared through-right lane; remove background overlap phase.
- Increase in the cycle length to 140 seconds in both peak hours.
- Remove the pedestrian phase on the westbound approach from the signal timing.

It is noted that removing the pedestrian phase is not recommended, but since pedestrian push buttons are provided at this intersection, the pedestrian phase will be called only as needed and not every cycle. Based on review of the pedestrian volumes at this intersection, there were no pedestrians recorded during either peak hour. Furthermore, with the proposed westbound left-turn lane further increasing the necessary pedestrian walk time, this intersection was analyzed with the pedestrian phase excluded in the build improved scenario.

With these modifications in the model, the intersection would be expected to operate at LOS D during both peak hours.

Upon review of the Synchro 95th percentile queues, the westbound left-turning queue is 252 feet. Therefore, 250 feet of storage is recommended for the dual westbound left-turn lanes.

6.3 US 521 AND JENKINS DRIVE/SHELLEY MULLIS MIXED USE ACCESS D

Table 6.3 summarizes the LOS, control delay, and 95th percentile queue lengths at the unsignalized full movement intersection. Under 2026 background and build-out conditions, the intersection is assumed to be signalized and remain full movement. Under 2026 alternative build-out conditions, the intersection is assumed to be unsignalized with movement restricted to right-in right-out (RIRO).

Table 6.3 - US 521 and Jenkins Drive/Shelley Mullis Mixed Use Access D										
Condition	Measure	EB	WB		NB			SB		Intersection
		EBLR	WBLT	WBR	NBUL	NBTR	NBR	SBL	SBTR	LOS (Delay)
AM Peak Hour										
2022 Existing	LOS (Delay)	A (0.0)	-		A (0.9)			A (0.0)		-
	Synchro 95th Q	0'	-	-	25'	0'	0'	0'	0'	
2026 Background	LOS (Delay)	A (0.0)	E (77.5)		C (25.8)			A (8.4)		B (19.9)
	Synchro 95th Q	0'	#175'	36'	m6'	#1149'	m7'	m0'	353'	
2026 Build-out	LOS (Delay)	A (0.0)	E (77.5)		D (45.1)			B (12.9)		C (31.8)
	Synchro 95th Q	0'	#175'	36'	m6'	#1367'	m7'	m32'	489'	
2026 Alternative Build-out	LOS (Delay)	A (0.0)	E (40.8)		A (0.0)			A (0.0)		-
	Synchro 95th Q	-	-	43'	-	0'	0'	-	0'	
2026 Build-out IMP	LOS (Delay)	A (0.0)	E (77.0)		D (35.5)			A (8.5)		C (24.8)
	Synchro 95th Q	0'	#183'	43'	m1'	m#1366'	m0'	m38'	m410'	
PM Peak Hour										
2022 Existing	LOS (Delay)	F (258.0)	-		A (8.6)			A (0.0)		-
	Synchro 95th Q	28'	-	-	123'	0'	0'	0'	0'	
2026 Background	LOS (Delay)	A (0.3)	F (93.0)		B (14.6)			B (18.8)		B (19.8)
	Synchro 95th Q	0'	#200'	45'	m29'	m507'	m10'	m11'	#1287'	
2026 Build-out	LOS (Delay)	A (0.3)	F (93.0)		A (6.7)			D (47.5)		D (36.8)
	Synchro 95th Q	0'	#200'	45'	m29'	m622'	m10'	m24'	m#1382'	
2026 Alternative Build-out	LOS (Delay)	D (34.1)	C (23.9)		A (0.0)			A (0.0)		-
	Synchro 95th Q	3'	-	28'	-	0'	0'	-	0'	
2026 Build-out IMP	LOS (Delay)	A (0.3)	F (90.9)		A (4.5)			D (41.2)		C (28.0)
	Synchro 95th Q	0'	#207'	50'	m23'	93'	m0'	m18'	m#1506'	
Background Storage				150'	200'		250'	225'		

95th percentile volume exceeds capacity, queue may be longer
m Volume for 95th percentile queue is metered by upstream signal

As shown in Table 6.3, the stop-controlled eastbound approach of Jenkins Drive currently operates with short delays during the AM peak hour. It is noted that no vehicles were present at this intersection at the time of TMC collection. During the PM peak hour, the eastbound approach is expected to operate with long delays. Under 2026 background conditions, the westbound approach is expected to be constructed by the Shelley Mullis Mixed Use development in addition to the following improvements:

- Northbound right-turn lane along US 521 with 250 feet of storage.
- Southbound left-turn lane along US 521 with 225 feet of storage.
- Westbound approach left-through and right-turn lane with 150 feet of storage.
- Installation of a traffic signal.

With these improvements in place, the intersection is expected to operate at LOS B during both peak hours. When the site traffic is added in 2026 build-out conditions, the intersection is expected to operate at LOS C during the AM peak hour and LOS D during the PM peak hour. It is noted that in both peak hours, the background LOS B is a result of hovering just below (within 0.1-0.2 seconds) the LOS B/C demarcation of 20 seconds.

As discussed in Section 5.3, under 2026 alternative build-out conditions the intersection is expected to be restricted to RIRO operation on both the eastbound and westbound approaches and remain unsignalized. Additionally, with the access restriction, the southbound left-turn lane is no longer expected to be constructed. With these assumptions in place, the stop-controlled side streets are expected to operate with short to moderate delays.

With the system cycle length increase from 130 seconds to 140 seconds in both peak hours under build improved conditions, the intersection is expected to operate at LOS C during both peak hours.

6.4 US 521 AND DEL WEBB BOULEVARD

Table 6.4 summarizes the LOS, control delay, and 95th percentile queue lengths at the signalized intersection.

Table 6.4 - US 521 and Del Webb Boulevard												
Condition	Measure	EB		WB			NB		SB			Intersection
		EBL	EBTR	WBL	WBT	WBR	NBL	NBTR	SBL	SBTR	SBR	LOS (Delay)
AM Peak Hour												
2022 Existing	LOS (Delay)	E (66.6)		C (31.8)			D (44.2)		C (25.6)			D (36.5)
	Synchro 95th Q	#223'	27'	9'	17'	-	m24'	#691'	77'	589'	m6'	
2026 Background	LOS (Delay)	F (165.3)		C (26.7)			E (57.4)		C (24.4)			D (48.5)
	Synchro 95th Q	#375'	56'	13'	63'	-	m19'	m#1031'	103'	#891'	20'	
2026 Build-out	LOS (Delay)	F (246.0)		C (26.7)			F (84.1)		C (26.9)			E (67.6)
	Synchro 95th Q	#454'	56'	13'	63'	-	m18'	m#1004'	103'	#996'	40'	
2026 Build-out IMP	LOS (Delay)	F (169.4)		B (18.8)			D (46.1)		C (28.6)			D (45.8)
	Synchro 95th Q	#467'	54'	29'	31'	13'	m20'	m#1228'	m90'	m#1054'	m57'	
PM Peak Hour												
2022 Existing	LOS (Delay)	D (52.0)		C (33.2)			B (16.7)		C (28.4)			C (25.1)
	Synchro 95th Q	111'	26'	28'	37'	-	38'	541'	m132'	#835'	m18'	
2026 Background	LOS (Delay)	F (131.9)		D (40.6)			C (28.3)		D (45.4)			D (41.4)
	Synchro 95th Q	#212'	39'	36'	125'	-	m27'	m363'	#213'	#1276'	36'	
2026 Build-out	LOS (Delay)	F (242.4)		D (42.3)			C (32.2)		E (58.1)			D (54.9)
	Synchro 95th Q	#291'	39'	36'	132'	-	m25'	m373'	#220'	#1356'	53'	
2026 Build-out IMP	LOS (Delay)	F (187.1)		C (27.8)			C (24.4)		D (39.9)			D (39.3)
	Synchro 95th Q	#304'	38'	77'	41'	43'	m28'	m384'	m159'	#1396'	m50'	
Background Storage			250'	225'			225'		300'		275'	

95th percentile volume exceeds capacity, queue may be longer

m Volume for 95th percentile queue is metered by upstream signal

Table 6.4 shows that the overall intersection currently operates at LOS D during the AM peak hour and LOS C during the PM peak hour. Under 2026 background conditions, the overall intersection is expected to operate at LOS D during both peak hours. Under 2026 build-out conditions, the intersection is expected to operate at LOS E during the AM peak hour and LOS D during the PM peak hour. Given the expected degradation in LOS during the AM peak hour and increase in delay during both peak hours, identification of potential mitigation improvements is required. The following improvements were considered to mitigate the impact of the proposed site:

- Reconfigure the dual-left westbound approach to include an exclusive left-turn lane, through lane, and right-turn lane and remove the associated dual-left protected phase.
- Increase the cycle length to 140 seconds in both peak hours.

With these improvements in place, the intersection is expected to operate at LOS D during both peak hours, and with less delay than in background conditions.

6.5 US 521 AND JIM WILSON ROAD

Table 6.5 summarizes the LOS, control delay, and 95th percentile queue lengths at the signalized intersection.

Table 6.5 - US 521 and Jim Wilson Road													
Condition	Measure	EB			WB			NB			SB		Intersection LOS (Delay)
		EBL	EBTR	EBR	WBL	WBTR	WBR	NBL	NBTR	NBR	SBL	SBTR	
AM Peak Hour													
2022 Existing	LOS (Delay)	C (33.3)			D (40.5)			C (33.8)			A (9.2)		C (24.2)
	Synchro 95th Q	60'	45'	0'	164'	86'	112'	20'	#532'	-	143'	33'	
2026 Background	LOS (Delay)	D (42.7)			E (70.4)			D (46.9)			C (22.0)		D (41.1)
	Synchro 95th Q	92'	52'	0'	#356'	104'	380'	21'	#780'	0'	m291'	281'	
2026 Build-out	LOS (Delay)	D (42.7)			E (69.5)			E (72.3)			C (22.2)		D (50.6)
	Synchro 95th Q	92'	52'	0'	#356'	104'	409'	21'	#870'	0'	m290'	299'	
2026 Build-out IMP	LOS (Delay)	D (49.8)			F (86.6)			D (48.7)			C (22.8)		D (45.0)
	Synchro 95th Q	102'	58'	0'	#403'	115'	456'	21'	#925'	0'	m322'	273'	
PM Peak Hour													
2022 Existing	LOS (Delay)	D (46.0)			D (35.2)			D (43.5)			D (36.2)		D (39.6)
	Synchro 95th Q	142'	121'	26'	132'	91'	76'	31'	410'	-	m#260'	436'	
2026 Background	LOS (Delay)	E (64.1)			D (44.0)			E (59.6)			C (29.8)		D (43.7)
	Synchro 95th Q	#264'	132'	1'	#200'	102'	146'	32'	#636'	1'	m376'	m350'	
2026 Build-out	LOS (Delay)	E (64.1)			D (43.5)			F (80.8)			C (29.8)		D (50.4)
	Synchro 95th Q	#264'	132'	1'	#200'	102'	161'	32'	#721'	1'	m371'	m350'	
2026 Build-out IMP	LOS (Delay)	E (72.1)			D (51.2)			E (60.1)			C (29.1)		D (45.1)
	Synchro 95th Q	#294'	146'	10'	#235'	113'	189'	33'	#744'	11'	m#443'	m343'	
Background Storage			75'	75'	325'		800'	200'		175'	375'		

Exceeds storage

95th percentile volume exceeds capacity, queue may be longer

m Volume for 95th percentile queue is metered by upstream signal

Table 6.5 shows that the overall intersection currently operates at LOS C during the AM peak hour and LOS D during the PM peak hour. As part of the Harris Mill development discussed in Section 4.2, the following improvements are expected to be in place in 2026 background conditions:

- Northbound right-turn lane with 175 feet of storage
- Extension of the existing westbound right-turn lane from 500 feet to 800 feet
- Extension of the existing westbound left-turn lane from 225 feet to 325 feet

Under 2026 background and build-out conditions with these improvements in place, the overall intersection is expected to operate at LOS D during both peak hours. Since the proposed development is not expected to degrade overall LOS, and delay is not increased by more than 25%, no developer improvements are recommended.

With the cycle length increase from 130 seconds to 140 seconds in both peak hours under build improved conditions associated with the US 521 and Del Webb Boulevard intersection, the intersection is expected to operate at LOS D during both peak hours.

6.6 SHELLEY MULLIS ROAD AND HENRY HARRIS ROAD

Table 6.6 summarizes the LOS, control delay, and 95th percentile queue lengths at the unsignalized intersection.

Table 6.6 - Henry Harris Road and Shelley Mullis Road									
Condition	Measure	EB		WB		NB	SB		Intersection
		EBLTR	EBR	WBLTR	WBR	NBLTR	SBLTR	SBR	LOS (Delay)
AM Peak Hour									
2022 Existing	LOS (Delay)	C (18.8)		E (41.2)		D (31.4)	C (16.5)		D (30.2)
	Synchro 95th Q	75'	-	245'	-	178'	53'	-	
2026 Background	LOS (Delay)	A (5.5)		A (9.2)		A (9.9)	A (5.8)		A (8.1)
	Synchro 95th Q	32'	4'	78'	78'	84'	22'	22'	
2026 Build-out	LOS (Delay)	A (8.5)		A (9.7)		B (10.5)	A (6.0)		A (8.5)
	Synchro 95th Q	37'	4'	88'	88'	93'	23'	23'	
2026 Alternative Build-out IMP									
2022 Existing	LOS (Delay)	C (17.8)		C (18.3)		B (14.1)	C (20.2)		C (18.0)
	Synchro 95th Q	88'	-	95'	-	43'	110'	-	
2026 Background	LOS (Delay)	A (8.0)		A (5.8)		A (7.6)	A (7.2)		A (7.1)
	Synchro 95th Q	55'	55'	40'	7'	34'	44'	44'	
2026 Build-out	LOS (Delay)	A (8.3)		A (6.0)		A (7.8)	A (7.5)		A (7.4)
	Synchro 95th Q	63'	63'	44'	7'	35'	46'	46'	

As shown in Table 6.6, the all-way stop-controlled (AWSC) intersection currently operates at LOS D during the AM peak hour and LOS C during the PM peak hour. As part of the Wilson Creek Subdivision development discussed in Section 4.2, a single-lane roundabout with right-turn slip lanes on the eastbound, westbound, and southbound approaches is expected to be in place during 2026 background conditions. Under 2026 background and build-out conditions, the intersection is expected to operate at LOS A during both peak hours.

Since the proposed development is not expected to degrade LOS, and delay is not increased by more than 25%, no developer improvements are recommended.

6.7 JIM WILSON ROAD AND HENRY HARRIS ROAD

Table 6.7 summarizes the LOS, control delay, and 95th percentile queue lengths at the unsignalized intersection.

Table 6.7 - Henry Harris Road and Jim Wilson Road						
Condition	Measure	EB	WB	NB	SB	Intersection
		EBLTR	WBLTR	NBLTR	SBLTR	LOS (Delay)
AM Peak Hour						
2022 Existing	LOS (Delay)	B (12.3)	C (19.6)	B (11.4)	B (11.4)	C (15.6)
	Synchro 95th Q	45'	150'	25'	25'	
2026 Background	LOS (Delay)	A (5.7)	A (9.1)	A (5.2)	A (7.0)	A (7.4)
	Synchro 95th Q	33'	85'	16'	38'	
2026 Build-out	LOS (Delay)	A (5.9)	A (9.4)	A (5.3)	A (7.2)	A (7.6)
	Synchro 95th Q	36'	90'	17'	38'	
2026 Alternative Build-out IMP						
2022 Existing	LOS (Delay)	C (20.0)	C (16.6)	B (12.9)	B (14.6)	C (16.7)
	Synchro 95th Q	120'	85'	38'	55'	
2026 Background	LOS (Delay)	A (9.9)	A (7.1)	A (7.1)	A (7.5)	A (8.3)
	Synchro 95th Q	88'	49'	19'	47'	
2026 Build-out	LOS (Delay)	B (10.1)	A (7.3)	A (7.3)	A (7.7)	A (8.5)
	Synchro 95th Q	98'	52'	19'	48'	

As shown in Table 6.7, the AWSC intersection currently operates at LOS C during both peak hours. As part of the Harris Mill development discussed in Section 4.2, a single-lane roundabout is expected to be in place during 2026 background conditions. Under 2026 background and build-out conditions, the intersection is expected to operate at LOS A during both peak hours.

Since the proposed development is not expected to degrade LOS, and delay is not increased by more than 25%, no developer improvements are recommended.

6.8 US 521 AND HALIFAX DRIVE/ACCESS 1

Table 6.8 summarizes the LOS, control delay, and 95th percentile queue lengths at the currently unsignalized RIRO intersection. Under 2026 build-out conditions, the intersection is assumed to be remain RIRO following the construction of Access 1. Under 2026 alternative build-out improved conditions, the intersection is assumed to be signalized with full-movement minor street approaches.

Table 6.8 - US 521 and Halifax Drive/Access 1												
Condition	Measure	EB		WB		NB			SB			Intersection LOS (Delay)
		EBL	EBTR	WBL	WBTR	NBL	NBT	NBR	SBL	SBT	SBR	
AM Peak Hour												
2022 Existing	LOS (Delay)	C (17.7)		-		A (0.0)			A (0.0)			-
	Synchro 95th Q	-	18'	-	-	-	0'	-	-	0'	0'	
2026 Background	LOS (Delay)	C (22.6)		-		A (0.0)			A (0.0)			-
	Synchro 95th Q	-	28'	-	-	-	0'	-	-	0'	0'	
2026 Build-out	LOS (Delay)	D (28.0)		F (103.2)		A (0.0)			A (0.0)			-
	Synchro 95th Q	-	35'	-	175'	-	0'	0'	-	0'	0'	
2026 Alternative Build-out	LOS (Delay)	+		+		A (0.1)			F (162.4)			-
	Synchro 95th Q	+	+	+	+	5'	0'	0'	568'	0'	0'	
2026 Build-out IMP	LOS (Delay)	D (28.0)		F (103.2)		A (0.0)			A (0.0)			-
	Synchro 95th Q	-	35'	-	175'	-	0'	0'	-	0'	0'	
2026 Alternative Build-out IMP	LOS (Delay)	D (36.9)		F (122.5)		E (70.7)			B (17.9)			D (53.1)
	Synchro 95th Q	77'	0'	#270'	28'	m3'	m#1220'	m0'	m#220'	m380'	m4'	
PM Peak Hour												
2022 Existing	LOS (Delay)	C (23.7)		-		A (0.0)			A (0.0)			-
	Synchro 95th Q	-	18'	-	-	-	0'	-	-	0'	0'	
2026 Background	LOS (Delay)	E (43.6)		-		A (0.0)			A (0.0)			-
	Synchro 95th Q	-	38'	-	-	-	0'	-	-	0'	0'	
2026 Build-out	LOS (Delay)	F (55.6)		F (50.9)		A (0.0)			A (0.0)			-
	Synchro 95th Q	-	45'	-	103'	-	0'	-	-	0'	0'	
2026 Alternative Build-out	LOS (Delay)	+		+		A (0.8)			F (110.3)			-
	Synchro 95th Q	+	+	+	+	28'	0'	0'	500'	0'	0'	
2026 Build-out IMP	LOS (Delay)	F (55.6)		F (50.9)		A (0.0)			A (0.0)			-
	Synchro 95th Q	-	45'	-	103'	-	0'	-	-	0'	0'	
2026 Alternative Build-out IMP	LOS (Delay)	D (36.3)		F (87.6)		C (25.7)			C (20.4)			C (27.6)
	Synchro 95th Q	56'	0'	#238'	0'	m#69'	m#1166'	m0'	m172'	m764'	m8'	
Background Storage											300'	

Exceeds storage

95th percentile volume exceeds capacity, queue may be longer
m Volume for 95th percentile queue is metered by upstream signal
+ Computation not defined

As shown in Table 6.8, the stop-controlled eastbound approach of Halifax Drive currently operates with short delays during both peak hours. Under 2026 background conditions, the eastbound approach is expected to continue operating with short delays during the AM peak hour, and with moderate delays during the PM peak hour. With the inclusion of site traffic in 2026 build-out conditions and construction of Access 1, the eastbound approach is expected to operate with moderate delays during the AM peak hour and long delays during the PM peak hour. The westbound approach is expected to operate with long delays during both peak hours. It is noted that a southbound right-turn lane is already present at this intersection, therefore a northbound right-turn lane was considered as potential mitigation. Based on review of the northbound right-turn traffic volumes, only 22 vehicles are expected to make a northbound right turn. As a result, this improvement yields limited improvement to the capacity of the westbound approach, and this improvement yields no improvement to capacity of the eastbound approach. Additionally, the IPS provided for Access 1 should be a minimum of 270 feet under this configuration based on review of the SimTraffic microsimulation maximum queue of 264 feet on the westbound approach.

The alternative build AM and PM peak hour analysis results shown in Table 6.8 consider the redistribution of the outbound and inbound left-turns from the development at US 521 and Jenkins Drive/Shelley Mullis Mixed Use Access D included in the traffic assignment at this intersection as discussed in Section 5.3. The following configuration was identified to achieve a minimum LOS D during both peak hours:

- Traffic signal
- Northbound right-turn lane with 100 feet of storage
- Northbound left-turn lane with Dallas Permitted phasing with 150 feet of storage
- Dual southbound left-turn lanes and protected phasing
- Eastbound left-turn lane
- Westbound dual left-turn lanes with 250 feet of storage, protected phasing, and a shared through-right-turn lane

With these improvements in place, the intersection is expected to operate at LOS D during the AM peak hour and LOS C during the PM peak hour.

For the proposed turn lanes along US 521 and based on review of the SimTraffic microsimulation, the maximum northbound right-turn queue was reported as 26 feet. Therefore, the SCDOT minimum of 100 feet should be provided for the northbound right-turn lane. Similarly, the maximum northbound left-turn queue was reported as 67 feet. Therefore, the SCDOT minimum of 150 feet should be provided for the northbound left-turn lane. Additionally, the maximum southbound left-turn queue was reported as 226 feet. Therefore, 225 feet of storage should be provided for the dual southbound left-turn lanes.

For the proposed turn lanes along Halifax Drive and Access 1 and based on review of the microsimulation, the SimTraffic maximum westbound Access 1 left-turn queue was reported as 254 feet, while Synchro provides a 95th percentile queue of 270 feet. Therefore, a minimum of 275 feet of storage should be provided for the dual westbound left-turn lanes. Similarly, the maximum eastbound left-turn queue was reported as 113 feet. Therefore, 125 feet of storage should be provided for the eastbound left-turn lane.

Additionally, the IPS provided for Access 1 should be a minimum of 275 feet under this configuration based on the SimTraffic maximum queue of 254 feet on the westbound approach and the Synchro 95th percentile queue of 270 feet.

6.9 US 521 AND LAUREL HILLS (ACCESS 2)

Table 6.9 summarizes the LOS, control delay, and 95th percentile queue lengths at the currently unsignalized full-movement intersection. Under 2026 build-out improved conditions, the intersection is assumed to be signalized with full-movement access for Access 2. Under 2026 alternative build-out conditions, the intersection is assumed to be a directional crossover.

Table 6.9 US 521 and Laurel Hills Road (Access 2)								
Condition	Measure	WB		NB		SB		Intersection
		WBLR	WBR	NBT	NBR	SBUL	SBTR	LOS (Delay)
AM Peak Hour								
2022 Existing	LOS (Delay)	D (31.1)		A (0.0)		A (3.8)		-
	Synchro 95th Q	8'	-	0'	0'	90'	0'	
2026 Background	LOS (Delay)	D (25.5)		A (0.0)		D (36.6)		-
	Synchro 95th Q	5'	-	0'	0'	273'	0'	
2026 Build-out	LOS (Delay)	F (477.4)		A (0.0)		F (598.1)		-
	Synchro 95th Q	603'	-	0'	0'	1233'	0'	
2026 Alternative Build-out	LOS (Delay)	F (57.7)		A (0.0)		F (87.0)		-
	Synchro 95th Q	90'	-	0'	0'	360'	0'	
2026 Build-out IMP	LOS (Delay)	E (78.0)		C (25.3)		C (24.7)		C (28.5)
	Synchro 95th Q	#179'	82'	m987'	m0'	m#305'	417'	
2026 Alternative Build-out IMP	LOS (Delay)	F (51.6)		A (0.0)		F (69.8)		-
	Synchro 95th Q	83'	-	0'	0'	345'	0'	
PM Peak Hour								
2022 Existing	LOS (Delay)	D (30.9)		A (0.0)		A (1.2)		-
	Synchro 95th Q	5'	-	0'	0'	38'	0'	
2026 Background	LOS (Delay)	F (557.8)		A (0.0)		A (1.8)		-
	Synchro 95th Q	20'	-	0'	0'	68'	0'	
2026 Build-out	LOS (Delay)	F (277.8)		A (0.0)		F (77.1)		-
	Synchro 95th Q	420'	-	0'	0'	68'	0'	
2026 Alternative Build-out	LOS (Delay)	E (39.5)		A (0.0)		A (3.4)		-
	Synchro 95th Q	55'	-	0'	0'	110'	0'	
2026 Build-out IMP	LOS (Delay)	E (57.7)		A (6.5)		B (16.7)		B (15.0)
	Synchro 95th Q	127'	56'	m93'	m0'	m176'	m521'	
2026 Alternative Build-out IMP	LOS (Delay)	E (36.1)		A (0.0)		A (2.7)		-
	Synchro 95th Q	50'	-	0'	0'	98'	0'	
Background Storage						175'		

95th percentile volume exceeds capacity, queue may be longer

m Volume for 95th percentile queue is metered by upstream signal

As shown in Table 6.9, the stop-controlled westbound approach of Laurel Hills currently operates with moderate delay during both peak hours. Under 2026 background conditions, the westbound approach is expected to continue operating with moderate delay during the AM peak hour, and with long delay during the PM peak hour. With the inclusion of site traffic in 2026 build-out conditions and construction of Access 1, the westbound approach is expected to operate with long delays during both peak hours. The following configuration was identified to achieve a minimum LOS D during both peak hours:

- Traffic signal
- Northbound right-turn lane
- Dual southbound left-turn lanes
- Dual westbound left-turn lanes

With these improvements in place, the intersection is expected to operate at LOS C during the AM peak hour and LOS B during the PM peak hour.

For the proposed turn lanes along US 521 and based on review of the SimTraffic microsimulation, the maximum northbound right-turn queue was reported as 41 feet. Therefore, the SCDOT minimum of 100 feet of storage for right-turn lanes should be provided for the northbound right turn lane. Additionally, the maximum southbound left-turn queue was reported as 276 feet. Therefore, 275 feet of storage should be provided for the dual southbound left-turn lanes.

For the proposed turn lanes along Access 2, based on review of the SimTraffic microsimulation, the maximum westbound left-turn queue was reported as 160 feet. Therefore, 175 feet of storage should be provided for the dual westbound left-turn lanes. Additionally, the IPS provided for Access 2 should be a minimum of 180 feet under the build-out improved configuration based on the Synchro 95th percentile queue.

Under 2026 alternative build-out conditions, the intersection was analyzed as a directional crossover with a median opening to allow left-turns into Access 2 as discussed in Section 5.3. Under this configuration, the westbound approach is expected to operate with long delays during the AM peak hour and moderate delays during the PM peak hour. The following laneage was identified to improve the proposed Access 2:

- Northbound right-turn lane

With this improvement in place, the intersection is expected to operate with long delays during the AM peak hour and moderate delays during the PM peak hour, with slightly less delay than background conditions. As discussed in Section 7, this lane is also warranted based on the SCDOT Auxiliary Turn Lane Warrants.

Based on review of the SimTraffic microsimulation for the alternative scenario, the maximum northbound right-turn queue was reported as 26 feet. Therefore, the SCDOT minimum of 100 feet should be provided for the northbound right-turn lane. Additionally, the maximum southbound left-turn queue was reported as 354 feet compared with a Synchro 95th percentile queue of 345 feet. Therefore, 350 feet of storage should be provided for the southbound left-turn lane. A maximum westbound queue of 245 feet is reported. Thus, the minimum IPS provided for Access 2 under the alternative build-out configuration is 250 feet.

6.10 US 521 ACCESS 3

Table 6.10 summarizes the LOS, control delay, and 95th percentile queue lengths at the proposed unsignalized RIRO intersection under both 2026 build-out conditions.

Table 6.10 - US 521 and Access 3					
Condition	Measure	WB	NB		SB
		WBR	NBT	NBR	SBT
AM Peak Hour					
2026 Build-out	LOS (Delay)	E (35.5)	A (0.0)		A (0.0)
	Synchro 95th Q	38'	0'	0'	0'
2026 Build-out IMP	LOS (Delay)	D (31.1)	A (0.0)		A (0.0)
	Synchro 95th Q	32'	0'	0'	0'
PM Peak Hour					
2026 Build-out	LOS (Delay)	C (23.0)	A (0.0)		A (0.0)
	Synchro 95th Q	20'	0'	0'	0'
2026 Build-out IMP	LOS (Delay)	C (20.9)	A (0.0)		A (0.0)
	Synchro 95th Q	18'	0'	0'	0'

As shown in Table 6.10, the stop-controlled RIRO approach of Access 3 is expected to operate with moderate delays during the AM peak hour and short delays during the PM peak hour. The following laneage was identified to improve capacity for the westbound approach:

- Northbound right-turn lane

With this improvement in place, Access 3 is expected to operate with moderate delays during the AM peak hour and short delays during the PM peak hour, with slightly less control delay. As discussed in Section 7, this lane is also warranted based on the SCDOT Auxiliary Turn Lane Warrants.

Based on review of the SimTraffic microsimulation, the maximum westbound queue was reported as 131 feet. Therefore, the IPS provided for Access 3 should be a minimum of 130 feet.

7.0 Auxiliary Turn Lane Warrants

Warrants for additional turn-lane improvements for unsignalized intersections beyond those necessary for capacity were determined based on a review of the figures 9.5-B and 9.5-E found on pages 9.5 (3) and 9.5 (7) in the *2017 SCDOT Roadway Design Manual*. The results of the warrants for left and right-turn lanes under 2026 background and build-out conditions are summarized below and included in the **Appendix**.

The following turn lanes are warranted under 2026 build-out conditions:

US 521 and Laurel Hills Road (Access 2)

- Northbound right-turn lane should be considered (warranted in both peaks)

Based on review of the SimTraffic simulation with the northbound right-turn lane included, the maximum left-turn queue is expected to be 52 feet. Therefore, based on review of the SimTraffic queues and SCDOT ARMS minimum storage lengths for right-turn lanes, a northbound right-turn lane with 100 feet of storage is recommended.

US 521 and Access 3

- Northbound right-turn lane should be considered (warranted in both peaks)

Based on review of the SimTraffic simulation with the northbound right-turn lane included, no maximum right-turn queue is reported. Therefore, based on review of the SimTraffic queues and SCDOT ARMS minimum storage lengths for right-turn lanes, a northbound right-turn lane with 100 feet of storage is recommended.

The following turn lanes are warranted under 2026 alternative build-out conditions:

US 521 and Laurel Hills Road (Access 2)

- Northbound right-turn lane should be considered (warranted in both peaks)

Based on review of the SimTraffic simulation with the northbound right-turn lane included, the maximum left-turn queue is expected to be 5 feet. Therefore, based on review of the SimTraffic queues and SCDOT ARMS minimum storage lengths for right-turn lanes, a northbound right-turn lane with 100 feet of storage is recommended.

US 521 and Access 3

- Northbound right-turn lane should be considered (warranted in both peaks)

Based on review of the SimTraffic simulation with the northbound right-turn lane included, no maximum right-turn queue is reported. Therefore, based on review of the SimTraffic queues and SCDOT ARMS minimum storage lengths for right-turn lanes, a northbound right-turn lane with 100 feet of storage is recommended.

8.0 Traffic Signal Warrants

13-hour traffic signal warrant analyses were conducted in accordance with the *Manual on Uniform Traffic Control Devices for Streets and Highways* (MUTCD, 2009 edition) at the intersection of US 521 and Laurel Hills Road (Access 2) under 2026 build-out conditions.

The hourly background traffic projections were prepared for the 2026 build condition with the following elements:

- Existing traffic based on 13 hours of traffic counts collected
- Historical growth traffic
- Approved development traffic
- Proposed site traffic

13-hour intersection turning-movement counts were collected on Tuesday, April 5, 2022 at the intersection of US 521 and Laurel Hills Road (Access 2).

Consistent with the methodology described in Section 4.1, an annual growth rate of 3.4 percent was applied to the 13-hour traffic counts to calculate base 2026 background traffic volumes.

Approved development traffic was developed using the following methodology:

- Daily traffic volumes for the approved developments were taken from the associated TIAs where available. In cases where daily traffic volumes were not provided in the TIA, daily volumes were calculated using the trip generation rates published in the version of *Trip Generation* (Institute of Transportation Engineers) consistent with the associated TIA.
- The daily traffic volumes were distributed over the 13-hour period using k-factors provided in *Trip Generation* (Institute of Transportation Engineers, Tenth Edition, 2017) for each land use.
- The site trips for the developments were assigned to the intersection by comparing the peak hour approved development site trips assigned to this intersection in the associated TIAs to the total peak hour trips generated by the approved development.

Proposed site traffic was developed by applying k-factors provided in *Trip Generation* (Institute of Transportation Engineers, Tenth Edition, 2017) to the daily traffic volumes. Site trips were assigned to the intersection using the trip assignment shown in Figure 5.1.

The analysis addresses the following warrants:

- Warrant 1, Eight-Hour Peak Volume
- Warrant 2, Four-Hour Peak Volumes
- Warrant 3, Peak Hour

Warrant 1 Condition A is intended for application at locations where a large volume of intersecting traffic is the principal reason to consider installing a traffic signal. Warrant 1 Condition B is intended for application where Condition A is not satisfied and where the traffic volume on a major street is so heavy that traffic on a minor intersecting street suffers excessive delay or conflict in entering or crossing the major street. If Conditions A and B are not satisfied, Warrant 1 may be satisfied by Condition C.

Warrant 2 is intended to be applied where the volume of intersecting traffic is the principal reason to consider installing a traffic signal.

Warrant 3 is intended for use at a location where traffic conditions are such that for a minimum of one hour of an average day, the minor-street traffic suffers undue delay when entering or crossing the major street.

Table 9.1 shows the results for the signal warrant analyses, along with the number of hours satisfied versus hours required for the intersection under 2026 build-out conditions. This analysis assumes the following approach laneage and volumes:

- Two approach lanes along US 521 and two approach lanes along Laurel Hills Road (Access 2).
- Major street approach (US 521) includes 100% of left-, through, and right-turn volume and minor street approach [Laurel Hills Road (Access 2)] includes 100% of left-turn and through volume and 50% of the right-turn volumes.

Table 9.1 – Traffic Signal Warrant Analysis Results	
Criteria satisfied/not satisfied (hours satisfied/required)	
1A (Eight Hour)	Satisfied (8/8)
1B (Eight Hour)	Satisfied (13/8)
1C (Eight Hour)	Satisfied (8/8, 13/8)
2 (Four Hour)	Satisfied (12/4)
3 (Peak Hour)	Satisfied (12/1)

Based on the results in Table 9.1, a traffic signal is warranted. As mentioned in Section 6.9 under signalized conditions, three egress lanes are needed for capacity purposes. If two egress lanes are constructed along Access 2, traffic signal warrants are expected to be met. It is also noted that dual southbound left-turn lanes and dual westbound left-turn lanes are called for capacity and queuing; this configuration instigates the need for protected traffic signal phasing.

9.0 Conclusions

Based on the analyses contained herein, the following transportation improvements are recommended as developer mitigation:

US 521 and River Road/Collins Road

- Construction of a southbound right-turn lane along US 521 with 125 feet of storage.
- Implementation of Dallas Permitted + Protected phasing on the westbound approach during the PM peak hour.

US 521 and Ridgeline Lane/Shelley Mullis Road

- Reconfiguration of the westbound through lane to an additional left-turn lane along Shelley Mullis Road to create dual left-turn lanes with 250 feet of storage and conversion of the right-turn lane to a shared through-right lane.

US 521 and Del Webb Boulevard

- Reconfigure the westbound dual-left approach to include an exclusive left-turn lane, through lane, and right-turn lane and remove the associated dual-left protected phase if conditions allow permissive phasing.

US 521 and Halifax Drive/Access 1

- Construction of Access 1 to include a single right-in ingress lane, single right-out egress lane, and a 270-foot minimum IPS with stop control.

US 521 and Laurel Hills Road (Access 2)

- Construction of Access 2 to include dual ingress lanes, dual left-turn lanes with 175 feet of storage each and a right-turn lane, and a 180-foot minimum IPS.
- Construction of a northbound right-turn lane along US 521 with 100 feet of storage.
- Construction of dual southbound left-turn lanes along US 521 with 275 feet of storage.
- Installation of a traffic signal.

US 521 and Access 3

- Construction of Access 3 to include a single right-in ingress lane, single right-out egress lane, and a 130-foot minimum IPS with stop control.
- Construction of a northbound right-turn lane along US 521 with 100 feet of storage.

It is noted that a future traffic signal is also proposed at the main US 521 access point for the Shelley Mullis Mixed-Use development to the north (Access D). Therefore, an alternative access scenario was also studied based on SCDOT and County request, involving a combined singular traffic signal to serve both developments located at Halifax Drive. Results of the alternative build scenario render the same recommendations above with the following exceptions:

US 521 and Halifax Drive/Access 1

- Construction of Access 1 to include dual ingress lanes, dual left-turn lanes with 275 feet of storage each and a shared through-right lane, and a 275-foot minimum IPS.
- Construction of a northbound left-turn lane along US 521 with 150 feet of storage.
- Construction of dual southbound left-turn lanes along US 521 with 225 feet of storage each.
- Construction of an eastbound left-turn lane along Halifax Drive with 125 feet of storage.
- Installation of a traffic signal.

US 521 and Laurel Hills Road (Access 2)

- Construction of Access 2 to include a single ingress lane, a single right-out egress lane, and a 250-foot minimum IPS with stop control.
- Construction of a northbound right-turn lane with 100 feet of storage along US 521.

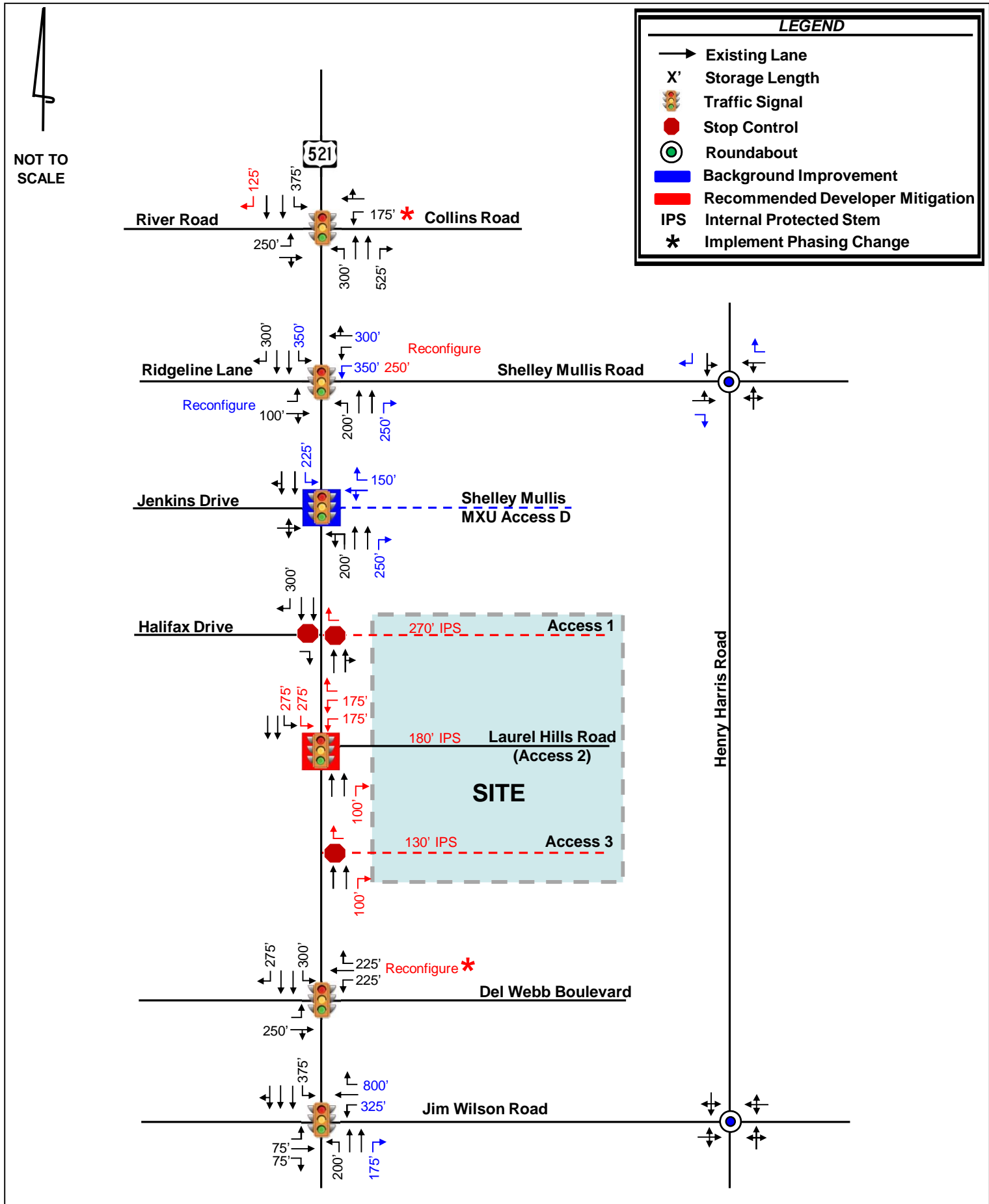
- Extension of the existing southbound left-turn lane along US 521 from 175 feet to 350 feet.

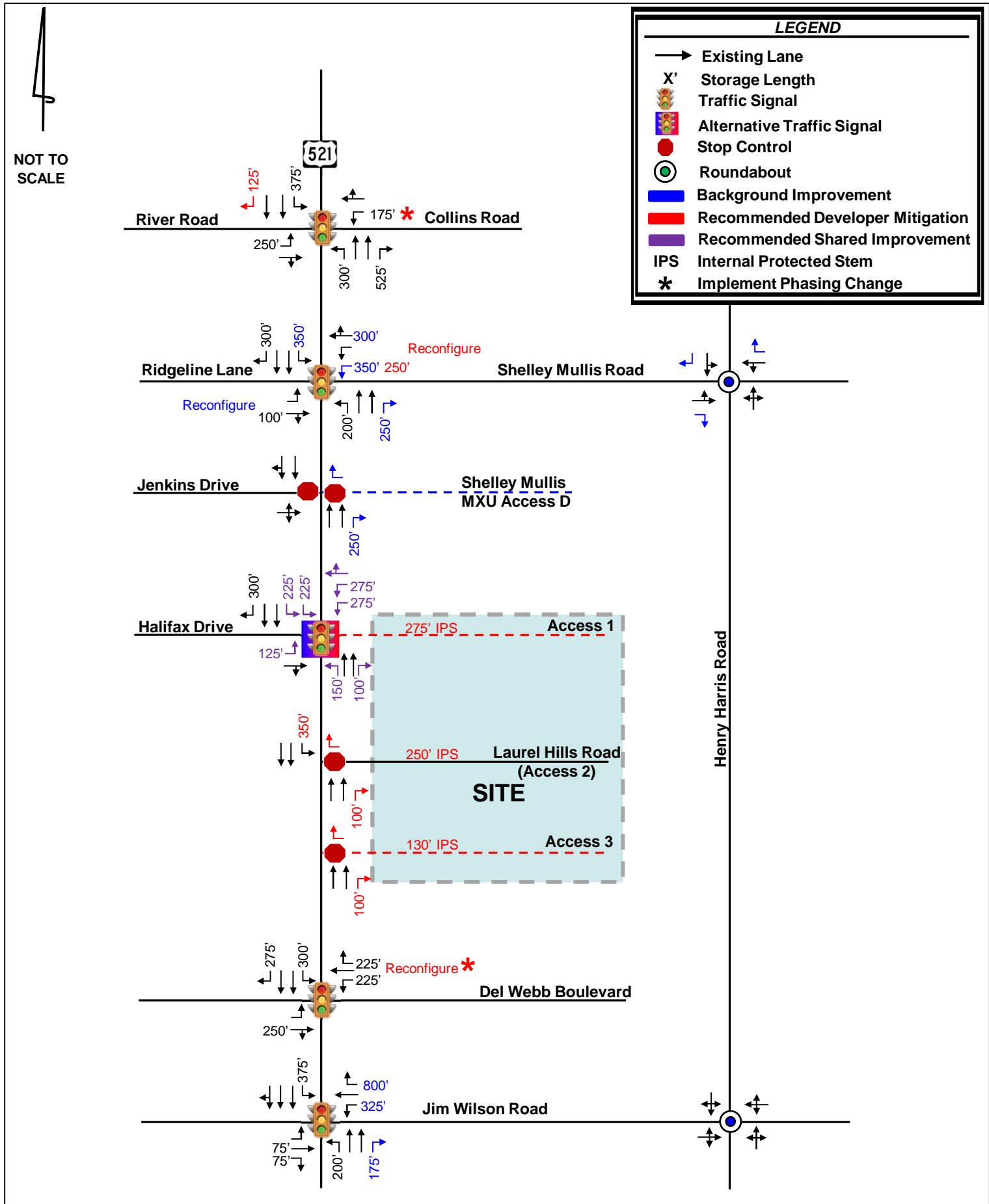
A cycle length increase was accounted for at the US 521 intersections of River Road/Collins Road, Ridgeline Lane/Shelley Mullis Road, and US 521 and Del Webb Boulevard. System adjustments are assumed to be performed by SCDOT; therefore, it is not recommended as a developer mitigation.

In the alternative build scenario, the construction-related costs for the US 521 and Halifax Drive/Access 1 intersection would be shared between the Promenade Phase II and Shelley Mullis Mixed-Use developments. The Shelley Mullis Mixed Use Access D would be limited to stop-controlled RIRO operation with a 250-foot northbound right-turn lane on US 521.

The recommended developer mitigation is shown in **Figure 9.1**. The recommended developer mitigation for the alternative build-out scenario is shown in **Figure 9.2**.

The transportation improvements for the study intersections are subject to approval by SCDOT and Lancaster County. All additions and attachments to State and County roadway system shall be properly permitted, designed, and constructed in conformance to standards maintained by the agencies.





Appendix