Rolesville Town Center
Traffic Impact Analysis

Rolesville, North Carolina

September 8, 2025

Prepared for:

Town of Rolesville
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Sign-off Sheet

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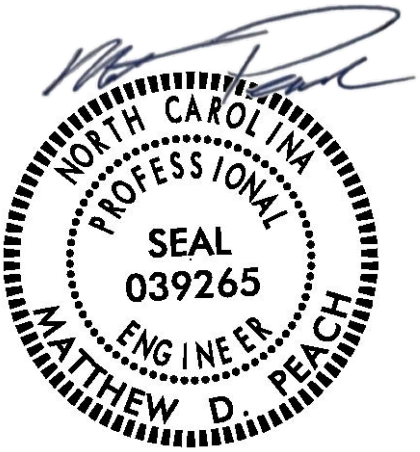

9/8/2025

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Executive Summary

The proposed Rolesville Town Center development is located on the west side of Young Street south of the intersection of Young Street and Main Street in Rolesville, NC. The site is anticipated to be completed in 2030 and consists of the following land uses:

- 34,000 SF Town Hall
- 26,200 SF Police Station
- 23,900 SF Fire Station
- 22,500 SF Community Center
- 12,000 SF County Library

It should be noted that the current site plan lists the fire station at 20,680 square feet, while the original scoping plan had 23,900 square feet. Trip generation and analysis use the larger, original figure for a conservative estimate of traffic. Using the Institute of Transportation Engineers (ITE) Trip Generation Manual along with local data, it is estimated that at full build-out the development is expected to generate 3,172 new trips per average weekday. In the AM and PM peak hours, the development is expected to generate 319 trips (193 entering and 126 exiting) and 378 trips (160 entering and 218 exiting); respectively.

Access to the site is envisioned to be provided by the proposed Young Street Connector. A two-lane facility that will extend from the approved Parker Ridge development eastward through the Rolesville Town Center site with a full-movement intersection onto Young Street. It should be noted that there is a gated access for the Police Station proposed along Young Street near the northern property line. This is intended to remain gated and provide access for Rolesville Police Department for safety and security purposes. As it is intended to remain gated, it is not included in the traffic analysis.

The purpose of this report is to evaluate the proposed development in terms of traffic conditions, evaluate the ability of the adjacent roadways to accommodate the additional traffic volumes, and recommend transportation improvements needed to mitigate congestion that may result from the additional site traffic. This report presents trip generation, trip distribution, traffic analysis, and recommendations for transportation improvements needed to meet anticipated traffic demands. This report examines the following scenarios for the AM and PM peak hours:

- 2025 Existing
- 2030 No-Build
- 2030 Build
- 2030 Build Improved

Capacity analysis for the AM and PM peak hours in each scenario was performed for the following existing intersections:

- US 401 Business (Main Street) at SR 1003 (Young Street)
- US 401 Bypass at SR 1003 (Young Street)
- US 401 Bypass U-Turn East of SR 1003 (Young Street)
- US 401 Bypass U-Turn West of SR 1003 (Young Street)

Additionally, this study includes capacity analysis for the AM and PM peak hours for the following planned intersections:

- Redford Place Drive at Young Street Connector
- Young Street at Young Street Connector

The results of the capacity analysis at these existing and planned intersections, in addition to the aforementioned driveways, are summarized in Tables ES-1:

Table ES-1: Level of Service Summary Table

Level of Service (Delay in seconds/vehicle)	**2025 Existing**		**2030 No-Build**		**2030 Build**		**2030 Build-Improved**	
	AM	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
Main Street at Young Street	D (36.0)	C (31.7)	E (61.8)	E (75.7)	E (67.0)	F (86.1)		
US 401 Bypass Eastbound at Young Street	A (8.9)	A (8.6)	B (15.6)	B (17.1)	B (13.1)	B (18.0)		
US 401 Bypass Westbound at Young Street	A (8.4)	A (6.5)	B (16.9)	A (8.2)	B (19.4)	B (10.6)		
US 401 Bypass U-Turn East of Young Street	A (4.1)	A (2.3)	C (34.2)	B (16.6)	D (36.1)	B (16.8)		
US 401 Bypass U-Turn West of Young Street	A (2.3)	A (3.5)	B (16.6)	D (37.9)	B (17.6)	D (47.4)		
Redford Place Drive at Young Street Connector			A (3.9)	A (4.3)	A (4.3)	A (4.7)		
Young Street at Young Street Connector			C (19.0)	C (19.8)	F (60.6)	F (174.6)	B (14.2)	B (16.2)

Signalized Intersection
Unsignalized Intersection
Intersection not Analyzed in Scenario

Rolesville's LDO[8], Section 8.E, establishes the following Level of Service Standards:

1. *The traffic impact analysis must demonstrate that the proposed development would not cause build-out-year, peak-hour levels of service on any arterial or collector road or intersection within the study area to fall below Level of Service (LOS) "D," as defined by the latest edition of the Highway Capacity Manual, or, where the existing level of service is already LOS "E" that the proposed development would not cause the LOS to fall to the next lower letter grade.*

2. *If the road segment or intersection is already LOS "F," the traffic impact analysis must demonstrate that the proposed development, with any proposed improvements, would not cause build-out year peak-hour operation to degrade more than five (5) percent of the total delay on any intersection approach.*

With the addition of traffic generated by the proposed development, the intersection of Main Street at Young Street increases in delay by greater than 5% in the AM and operates at LOS F in the PM peak hour. Per discussion with the Town of Rolesville, no mitigation is recommended at this intersection due to an ongoing project involving geometric improvements, U-6241, currently under construction. The improvements associated with the U-6241 are discussed in Section 2.4.5. As shown in Table ES-1, the proposed development also increases delay at the unsignalized intersection of Young Street at Young Street Connector to LOS F. The 2030 Build Improved scenario reflects the conversion of this intersection from stop controlled to signalized. With this conversion, it is also recommended to construct an eastbound left turn lane on Young Street Connector with 150 feet of full-width storage and appropriate taper.

Recommendations

Based on the findings of this study, specific improvements have been identified and should be completed as part of the proposed development. Intersections where no improvements are recommended are locations that do meet the LOS Standards specified in the LDO[8] or are not otherwise recommended. These recommendations are illustrated in Figure ES-1.

Main Street at Young Street

- No mitigation is recommended at this intersection due to an ongoing project involving geometric improvements, U-6241, currently under construction. The improvements associated with the U-6241 are discussed in Section 2.4.5.

US 401 Bypass at Young Street

- No improvements are recommended at this intersection.

US 401 Bypass U-Turn East of Young Street

- No improvements are recommended at this intersection.

US 401 Bypass U-Turn West of Young Street

- No improvements are recommended at this intersection.

Redford Place Drive at Young Street Connector

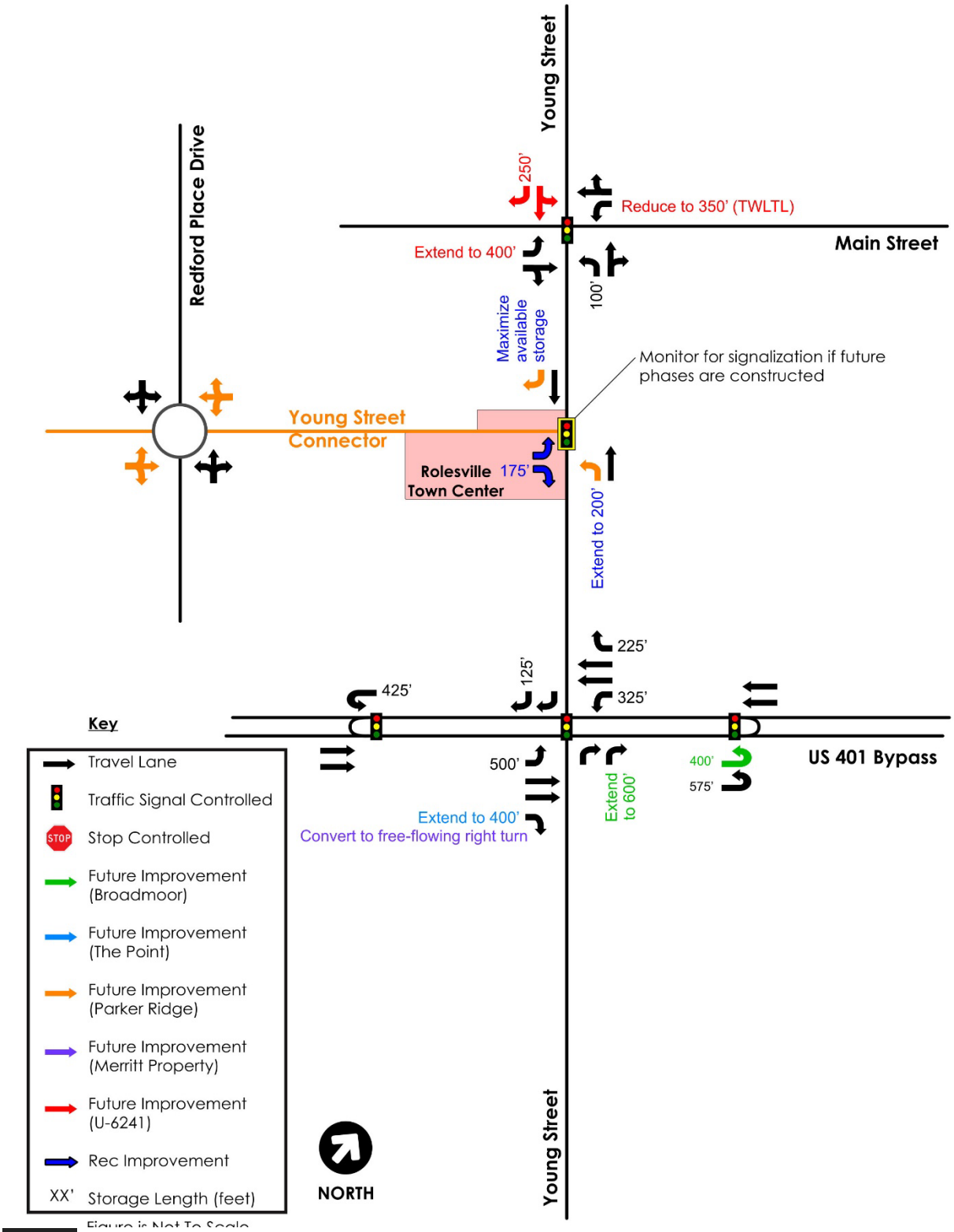
- No improvements are recommended at this intersection.

Young Street at Young Street Connector

- It is recommended that the intersection be considered for the installation of a traffic signal.
  - As the proposed development is shown to be constructed in phases, it is recommended that the signal be monitored if phases beyond the initial are to be constructed.
  - Before construction begins on future phases of development the intersection is recommended to be evaluated against the warrants for installation of a traffic signal as outlined in the Manual on Uniform Traffic Control Devices. If warranted and approved by NCDOT, a traffic signal is recommended to be installed.

- Construct an eastbound right turn lane on Young Street Connector with 175 feet of full-width storage and appropriate taper.
- Extend the northbound left turn lane on Young Street to 200 feet of full-width storage and appropriate taper.
- Maximize storage for the southbound right turn lane on Young Street with respect to the gated entrance shown on site plan.

Figure ES-1: Recommended Improvements



1.0 INTRODUCTION

The proposed Rolesville Town Center development is located on the west side of Young Street south of the intersection of Young Street and Main Street in Rolesville, NC. The site is anticipated to be completed in 2030 and consists of the following land uses:

- 34,000 SF Town Hall
- 26,200 SF Police Station
- 23,900 SF Fire Station
- 22,500 SF Community Center
- 12,000 SF County Library

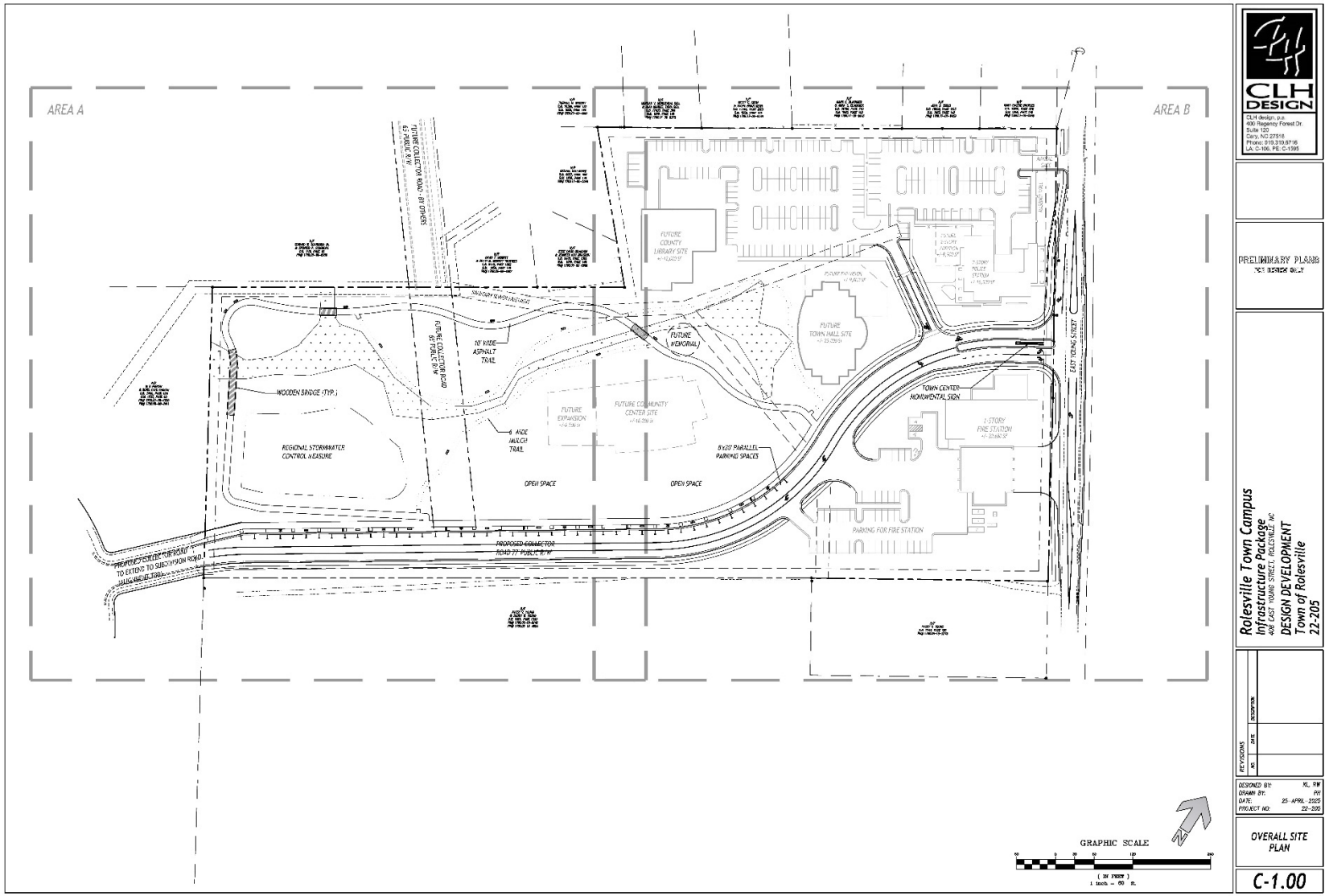
It should be noted that the current site plan lists the fire station at 20,680 square feet, while the original scoping plan had 23,900 square feet. Trip generation and analysis use the larger, original figure for a conservative estimate of traffic. The site location is shown in Figure 1. The site plan, prepared by CLH Design, can be found in Figure 2. The traffic analysis considers future build conditions during the build-out year (2030). The analysis scenarios are as follows:

- 2025 Existing
- 2030 No-Build
- 2030 Build
- 2030 Build Improved

The purpose of this report is to evaluate the development in terms of projected vehicular traffic conditions, evaluate the ability of the adjacent roadways to accommodate the additional traffic, and recommend transportation improvements needed to mitigate congestion that may result from additional site traffic. This report presents trip generation, trip distribution, traffic analyses, and recommendations for improvements needed to meet anticipated traffic demands. The analysis examines the AM and PM peak hours for the aforementioned analysis scenarios.

Figure 1: Site Location

Figure 2: Site Plan



2.0 INVENTORY OF TRAFFIC CONDITIONS

2.1 STUDY AREA

Stantec coordinated with the Town of Rolesville and the North Carolina Department of Transportation (NCDOT) to determine the appropriate study area and assumptions. The following existing intersections were agreed upon to be analyzed to determine the impacts associated with this development. These intersections are shown in Figure 1.

- US 401 Business (Main Street) at SR 1003 (Young Street)
- US 401 Bypass at SR 1003 (Young Street)
- US 401 Bypass U-Turn East of SR 1003 (Young Street)
- US 401 Bypass U-Turn West of SR 1003 (Young Street)

Additionally, this study includes the following planned intersections:

- Redford Place Drive at Young Street Connector
- Young Street at Young Street Connector

2.2 PROPOSED ACCESS

Access to the site is envisioned to be provided by the proposed Young Street Connector, a two-lane facility that will extend from the approved Parker Ridge development eastward through the Rolesville Town Center site with a full-movement intersection onto Young Street. This new full movement intersection is located approximately 1,300 feet south of the intersection of Main Street at Young Street. It should be noted that there is a gated access for the Police Station proposed along Young Street near the northern property line. This is intended to remain gated and provide access for Rolesville Police Department for safety and security purposes. As it is intended to remain gated, it is not included in the traffic analysis.

2.3 EXISTING CONDITIONS

Table 1 provides a detailed description of the existing study area roadway network. All functional classification[1] and average annual daily traffic (AADT)[2] information were obtained from NCDOT.

Table 1: Existing Conditions

Road Name	Road Number	Primary Cross-Section	Functional Classification[1]	AADT[2] (2023)	Speed Limit (mph)	Maintenance Agency
Main Street	US 401 Business	2-Lane with TWLTL*	Other Principal Arterial	12,000	35	NCDOT
Young Street	SR 1003	2-Lane Undivided	Minor Arterial	8,200	35	NCDOT
US 401 Bypass	US 401 Bypass	4-Lane Divided	Other Principal Arterial	20,000	55	NCDOT
Redford Place Drive	-	2-Lane Undivided	Local Road	-	25	Town of Rolesville

*TWLTL = Continuous Two-Way Left-Turn Lane

The existing lane configuration and traffic control for the study area intersections are illustrated in Figure 3.

2.4 FUTURE CONDITIONS

The following sub-sections discuss the projects that are anticipated to modify the study area intersections between 2025 and the future year 2030. The future year lane configuration and traffic control for the study area intersections are illustrated in Figure 4.

2.4.1 Broadmoor (aka Woodlief Assemblage)

The following improvements are currently proposed to be implemented in association with the development of the Broadmoor site:

US 401 Bypass at Young Street

- Extend the Northbound right-turn lane from 250 feet of full-width storage to 600 feet of full-width storage and appropriate taper.
- Restripe U-turn East of Young Street to provide a second Eastbound U-turn Lane with 400 feet of full-width storage and appropriate taper.

A copy of the TIA is contained in the Appendix. The Broadmoor development is discussed in more detail in Section 4.3.2

2.4.2 The Point

The following improvements are currently proposed to be implemented in association with the development of The Point:

US 401 Bypass at Young Street

- Extend the existing Eastbound right-turn lane to 400 feet of full-width storage and appropriate taper.

A copy of the TIA is contained in the Appendix. The Point development is discussed in more detail in Section 4.3.8.

2.4.3 Parker Ridge

The following improvements are currently proposed to be implemented in association with the development of the Parker Ridge subdivision:

Redford Place Drive at Young Street Connector

- Construct Parker Ridge Accesses A and B (Young Street Connector) as full-movement access points with one ingress lane and one egress lane.

Young Street at Young Street Connector

- Construct the proposed driveway as a full-movement access point with one ingress lane and one egress lane.
- Construct a Northbound left-turn lane with 150 feet of full-width storage and appropriate taper.
- Construct a Southbound right-turn lane with 50 feet of full-width storage and appropriate taper.

A copy of the TIA is contained in the Appendix. The Parker Ridge development is discussed in more detail in Section 4.3.6.

2.4.4 Merritt Property

The following improvements are currently proposed to be implemented in association with the development of the Merritt Property:

US 401 Bypass at Young Street

- Modify the Eastbound right-turn such that the movement is a free-flowing right-turn from the US 401 Bypass onto Southbound Young Street.

A copy of the TIA is contained in the Appendix. The Merritt Property development is discussed in more detail in Section 4.3.5.

2.4.5 U-6241

The U-6241 project will realign Burlington Mills Road near Main Street as well as make streetscape and multimodal improvements along Main Street. As part of the project, the following geometric improvements will be made in the study area:

Main Street at Young Street

- Remove the dedicated Southbound left turn lane and re-stripe the existing Southbound through lane to a shared thru-left turn lane.
- Extend the existing Eastbound left-turn lane to 400 feet of full-width storage and appropriate taper
- Reduce the existing Westbound left-turn lane to 350’ feet of full-width storage and appropriate taper

Figure 3: 2025 Existing Lanes and Traffic Control

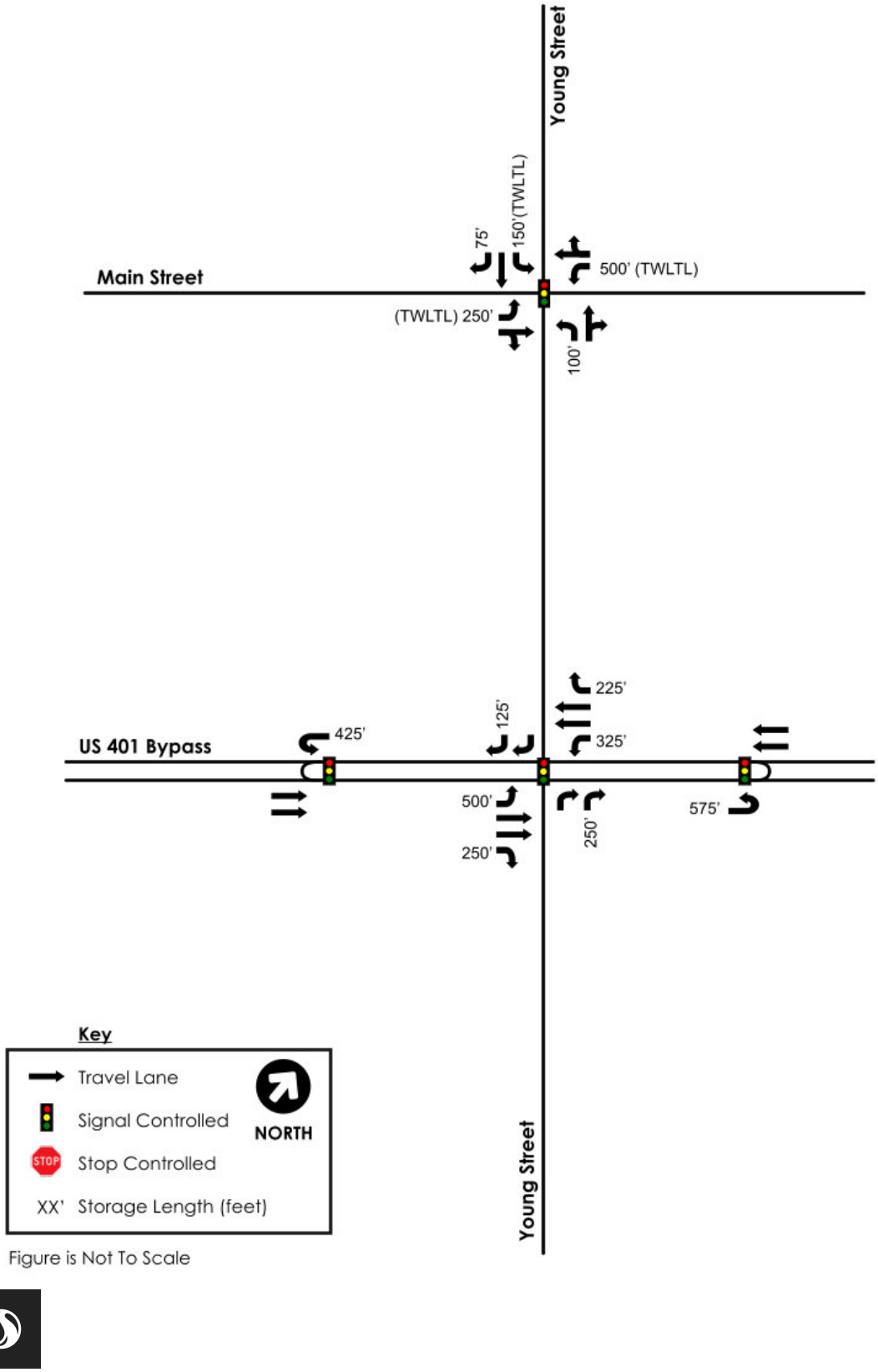
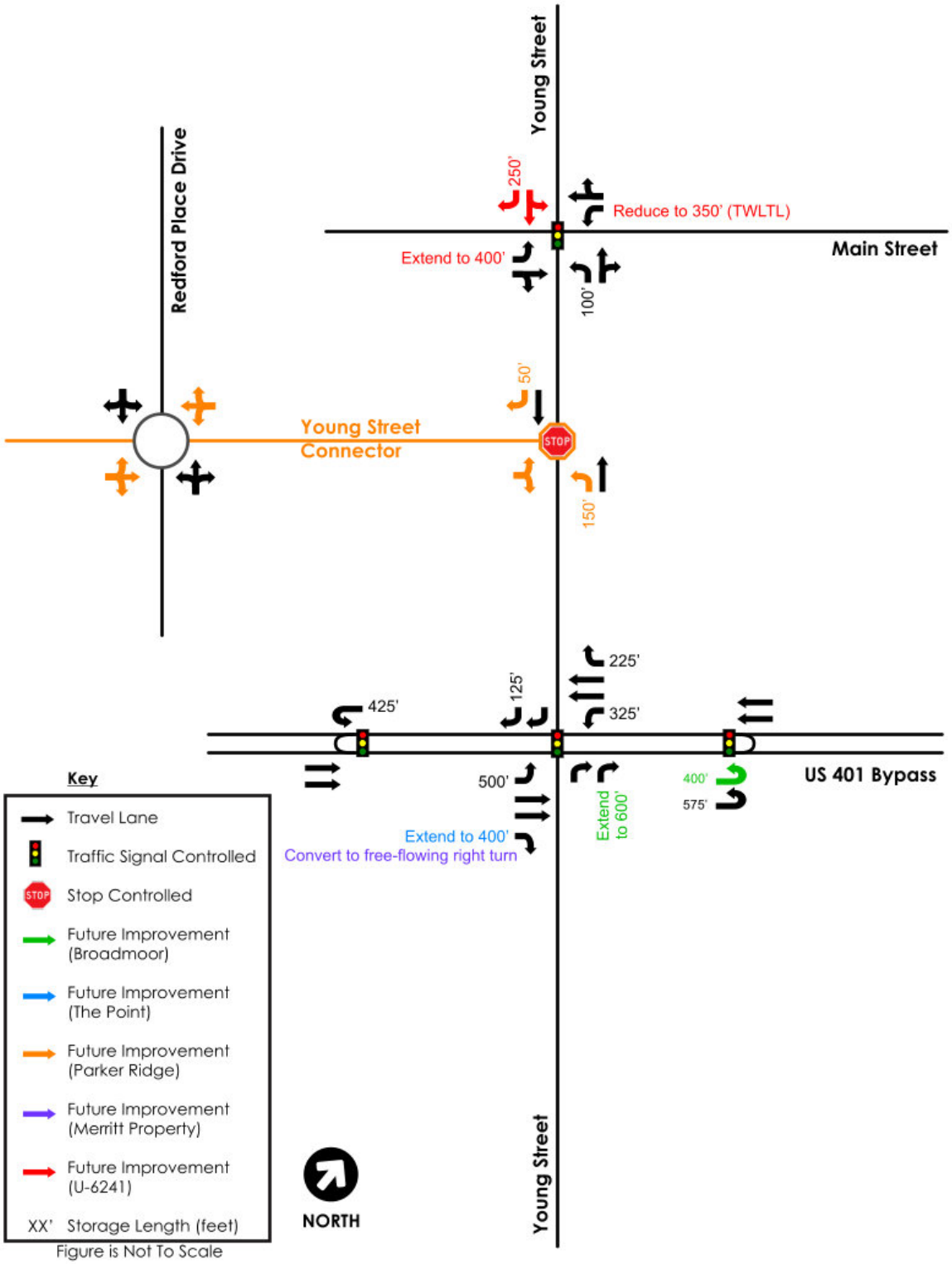


Figure 4: 2030 No-Build Lanes and Traffic Control



3.0 TRIP GENERATION AND DISTRIBUTION

3.1 TRIP GENERATION

Trip generation for the proposed development was performed using the 11th Edition of the Institute of Transportation Engineers (ITE) Trip Generation Manual[3] in addition to collecting local data. The Rate Versus Equation spreadsheet published by NCDOT[4] was used to supplement the ITE methodology. It should be noted that exceptions to these methodologies were necessary for the Fire Station and Police Station land uses and are discussed in sections 3.1.1 and 3.1.2; respectively. Trip generation for the proposed development is shown in Table 2.

Table 2: Trip Generation

Land Use	Size (SF)	Daily	AM Peak			PM Peak		
		Total	Total	Enter	Exit	Total	Enter	Exit
Community Center (LUC 495)	22,500	646	43	28	15	92	43	49
Fire Station (LUC 575)	23,900	110	11	8	3	11	3	8
Library (LUC 590)	12,000	846	72	35	37	103	53	50
Town Hall (LUC 730)	34,000	768	114	85	29	57	14	43
Police Station (Local Data)	26,200	802	79	37	42	115	47	68
Total Trips Generated		**3172**	**319**	**193**	**126**	**378**	**160**	**218**

It should be noted that this study analyzes the full buildout of the site and all future uses shown on the site plan. The site plan shown in Figure 2 has the following future uses that are not anticipated to be constructed in the initial phase (2030).

- Expansion of Police Station (9,900 SF)
- Expansion of Town Hall (9,000 SF)
- County Library (12,000 SF)
- Future Community Center (16,000 SF) and expansion (6,500 SF)

3.1.1 Fire Station Trip Generation

It should be noted that the current site plan lists the fire station at 20,680 square feet, while the original scoping plan had 23,900 square feet. Trip generation and analysis use the larger, original figure for a conservative estimate of traffic.

To estimate traffic generated by the fire station, the rate provided in ITE Trip Generation for the PM peak was calculated. The AM peak hour trips were determined using the PM peak hour trip rate, and the percent of the traffic entering and exiting during the AM peak was assumed to be the converse of the PM peak. Daily trips were estimated as ten (10) times the PM peak hour trips.

3.1.2 Police Station Trip Generation

To estimate traffic generated by the police station, data was collected at the existing Rolesville Police Department located at 204 Southtown Circle. The police station shares a driveway with other uses, so a pedestrian grouping study was conducted. On February 4, 2025, data of the number of groups of pedestrians entering and exiting the police station was collected over a 24-hour period.

Each pedestrian group was assumed to be a trip either entering or exiting the police station. And resulted in the results shown in Table 3.

Table 3: Rolesville Police Department Collected Data

Land Use	Size (SF)	Daily	AM Peak			PM Peak		
		Total	Total	Enter	Exit	Total	Enter	Exit
Police Station	5,000	153	15	7	8	22	9	13

These trips were extrapolated to estimate the traffic to and from the planned police station within the proposed development. This methodology was submitted to NCDOT and subsequently approved during scoping. The methodology and further discussion are contained in the NCDOT TIA Checklist in the appendix.

3.2 SITE TRIP DISTRIBUTION

To accurately determine the effect of the proposed development on the surrounding roadway network, an estimate of the expected distribution of traffic entering and exiting the site is needed. These percentages were developed using a combination of existing traffic volume counts, historic AADTs provided by NCDOT, and engineering judgment. This trip distribution was submitted as part of NCDOT's TIA Scoping Checklist contained in the Appendix. All traffic volume calculations can be found in the Appendix.

- 30% to/from the west on US 401 Bypass
- 20% to/from the north on Redford Place Drive
- 15% to/from the north on Young Street
- 10% to/from the south on Young Street
- 10% to/from the east on US 401 Bypass
- 5% to/from the south on Redford Place Drive
- 5% to/from the east on Main Street
- 5% to/from the west on Main Street

The trip distribution for the proposed development is shown in Figure 5. The trip assignment is shown in Figure 6.

Figure 5: Trip Distribution

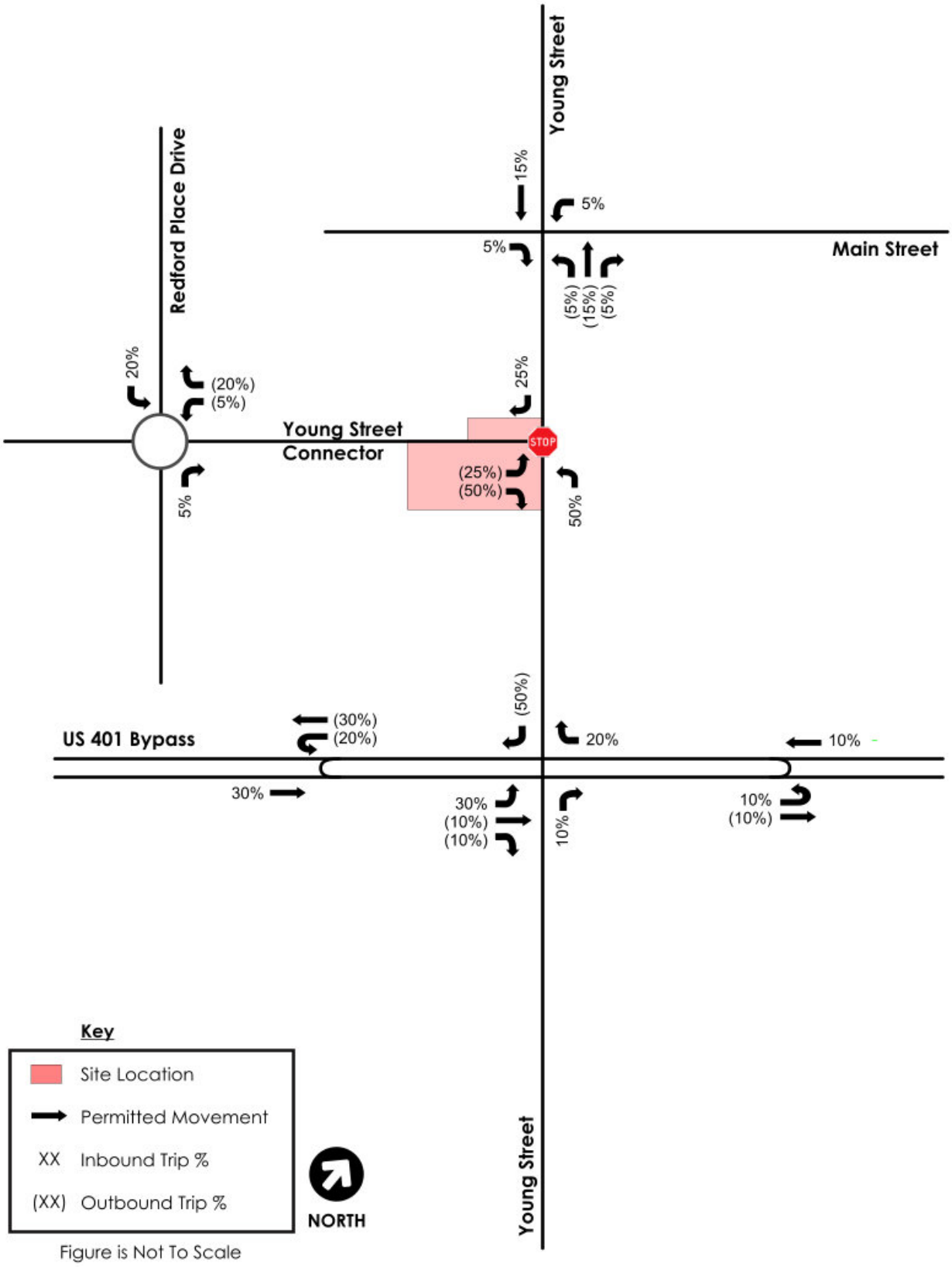
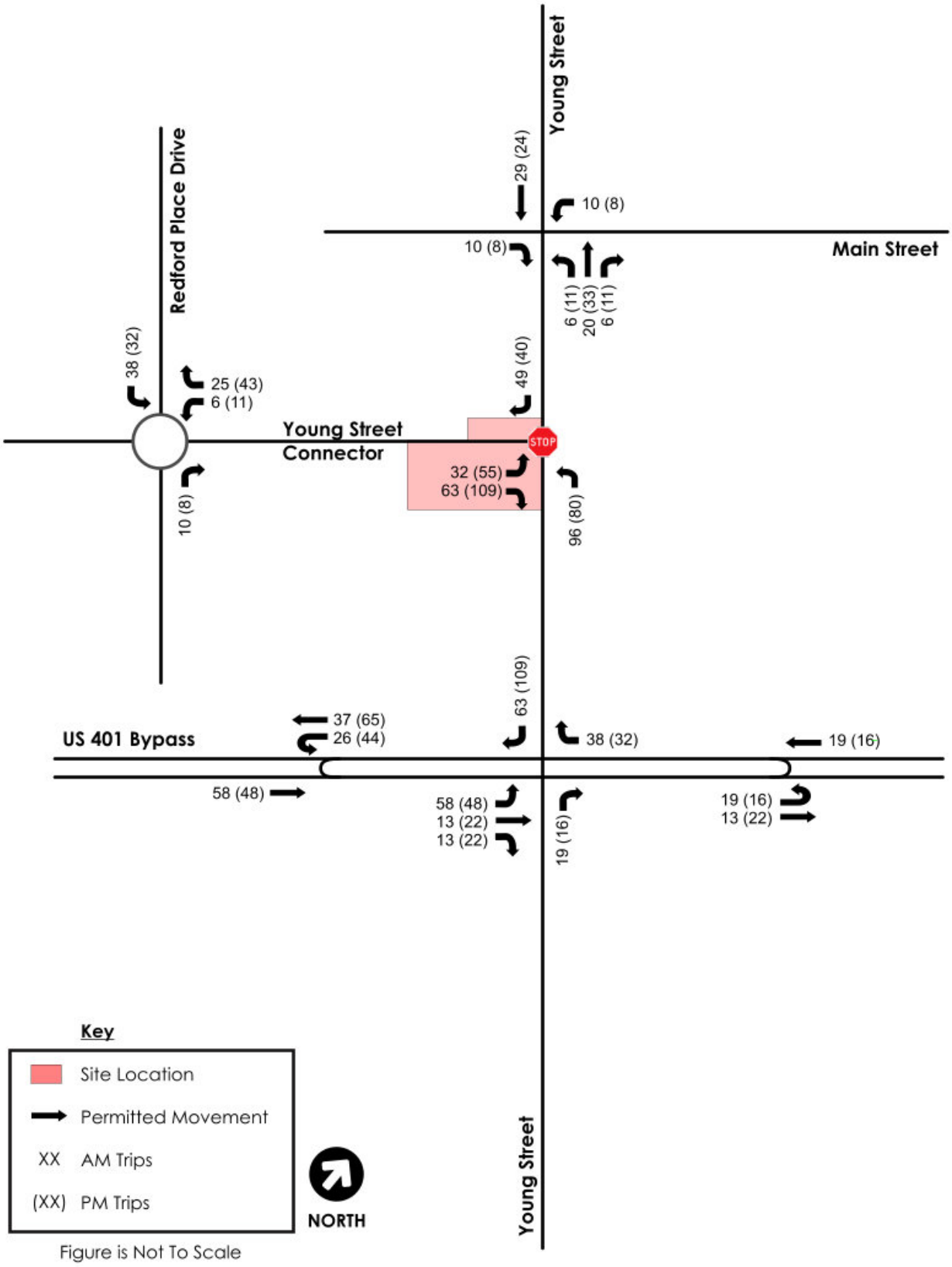


Figure 6: Trip Assignment



4.0 TRAFFIC VOLUMES

All traffic volume calculations can be found in the Appendix.

4.1 DATA COLLECTION

On Wednesday, May 22nd, 2024, AM (7:00 – 9:30 AM) and PM (4:00 – 6:00 PM) turning movement counts were collected at the following intersections:

- Main Street at Young Street
- Main Street at Redford Place Drive

Rolesville Elementary School was in session and operating with a normal bell schedule on the day of collection. While the intersection of Main Street at Redford Place Drive is not included in this study, the traffic counts obtained at this intersection are used to determine traffic counts at the existing roundabout on Redford Place Drive.

On Wednesday, December 11, 2024, AM (6:30 – 9:00 AM) and PM (4:00 – 6:00 PM) turning movement counts were collected at the following intersections:

- US 401 Bypass at Young Street
- US 401 Bypass U-turn East of Young Street
- US 401 Bypass U-turn West of Young Street

Rolesville High School was in session and operating with a normal bell schedule on the day of collection. Traffic counts were not balanced due to the distance between study intersections and the number of driveways between them. The 2024 counts were grown by a 2.0 percent annual rate to estimate the 2025 existing traffic volumes, shown in Figure 7. All traffic count data can be found in the appendix.

4.2 BACKGROUND TRAFFIC GROWTH

Background traffic growth is the increase in traffic volumes due to usage growth and non-specific growth throughout the area. The 2024 counts were grown by a 2.0 percent annual rate to estimate the 2030 volumes. The growth in vehicles because of this future traffic growth is shown in Figure 8.

4.3 ADJACENT DEVELOPMENT TRAFFIC

There are ten (10) developments proposed to be constructed within and nearby the study area: 1216 Rolesville Road, Broadmoor, Cobblestone, Kalas Falls, Merritt Property, Parker Ridge, Rolesville Crossing, The Point, The Preserve at Moody Farm, and Tucker-Wilkins. The total trips associated with these developments are shown in Figure 9. The following subsections highlight salient data for each of the approved developments.

4.3.1 1216 Rolesville Road

1216 Rolesville Road is a mixed-use development project located along the west side of Rolesville Road between Rolesville High School and Fowler Road. The proposed development is expected to consist of 68 units of single-

family attached housing and 30,000 square feet of retail. The development is anticipated to be fully built-out by 2029. A copy of the traffic study prepared by Ramey Kemp Associates, can be found in the Appendix.

4.3.2 Broadmoor (aka Woodlief Assemblage)

Broadmoor is a residential development project located along the east side of Rolesville Road between Fowler Road and Mitchell Mill Road. The proposed development is expected to consist of 158 units of single-family detached housing and 95 units of multifamily housing. The development is anticipated to be fully built-out by 2029. The improvements associated with the Broadmoor development are discussed in Section 2.4.1. A copy of the traffic study prepared by Stantec, can be found in the Appendix.

4.3.3 Cobblestone

Cobblestone is a mixed-use development proposed in the Northwest quadrant of the intersection of Main Street and Young Street. The proposed development is expected to consist of 180 apartments, 18,200 square feet of municipal flex space, and 50,000 square feet of retail space. The development is currently under construction and not yet completed. A copy of the traffic study prepared by Ramey Kemp & Associates, Inc., can be found in the Appendix.

4.3.4 Kalas Falls

Kalas Falls is a residential development project located along the west side of Rolesville Road between Fowler Road and Mitchell Mill Road. The proposed development is expected to consist of 487 units of single-family detached housing and 108 units of low-rise multifamily housing. The development is currently under construction and not yet completed. A copy of the traffic study prepared by Stantec, can be found in the Appendix.

4.3.5 Merritt Property

The Merritt Property is a mixed-use development along the west side of Rolesville Road near the intersection with Fowler Road. The proposed development is expected to consist of 227 units of senior adult single-family (detached) homes, 278 units of senior adult multi-family (attached) homes, 21,000 square feet of retail, and a 15,000 square foot pharmacy with a drive thru. The development is anticipated to be fully built-out by 2028. The improvements associated with the Merritt Property development are discussed in Section 2.4.4. A copy of the traffic study prepared by Stantec, can be found in the Appendix.

4.3.6 Parker Ridge

Parker Ridge is a residential development located on both sides of Redford Place Drive south of Main Street. It is expected to consist of 162 single-family homes and 114 townhomes. The development is anticipated to be fully build-out by 2028. The improvements associated with the Parker Ridge development are discussed in Section 2.4.3. A copy of the traffic study prepared by Stantec, can be found in the Appendix.

4.3.7 Rolesville Crossing

Rolesville Crossing is a residential development project located in the Northeast quadrant of the intersection of Rolesville Road and Mitchell Mill Road. The proposed development is expected to consist of 233 units of single-family

detached housing and 125 units of low-rise multifamily housing. The development is anticipated to be fully built-out by 2026. A copy of the traffic study prepared by Ramey Kemp & Associates, Inc., can be found in the Appendix.

4.3.8 The Point

The Point is a proposed mixed-use development project located along the west side of Young Street near the US 401 Bypass. The proposed development is expected to consist of up to 621 units of single-family detached housing, 320 units of low-rise multifamily housing, and 112,800 square-feet of retail space. The development is expected to be built in phases and is currently under construction and not yet completed. The improvements associated with The Point development are discussed in Section 2.4.2. A copy of the traffic study prepared by Kimley-Horn and Associates, can be found in the Appendix.

4.3.9 The Preserve at Moody Farm

Moody Farm is a residential development project located along the west side of Rolesville Road between Fowler Road and Mitchell Mill Road. The proposed development is expected to consist of 82 units of single-family detached housing. The development is anticipated to be fully built-out by 2028. A copy of the traffic study prepared by Stantec, can be found in the Appendix.

4.3.10 Tucker-Wilkins

The Tucker-Wilkins property is a residential development project located along the west side of Rolesville Road between Fowler Road and Mitchell Mill Road. The proposed development is expected to consist of 27 units of single-family detached housing and 64 units of low-rise multifamily housing. The development is anticipated to be fully built-out by 2028. A copy of the traffic study prepared by Stantec, can be found in the Appendix.

4.4 NO-BUILD TRAFFIC VOLUMES

The 2030 No-Build traffic volumes consist of the sum of the 2025 Existing traffic volumes (Figure 7), the Background traffic growth (Figure 8), and the adjacent development growth (Figure 9). The 2030 No-Build traffic volumes are shown in Figure 10.

4.5 BUILD TRAFFIC VOLUMES

The 2030 Build traffic volumes include the 2030 No-Build traffic, and the proposed development traffic discussed in Section 3.0. The 2030 Build traffic volumes are shown in Figure 11.

Figure 7: 2025 Existing Traffic Volumes

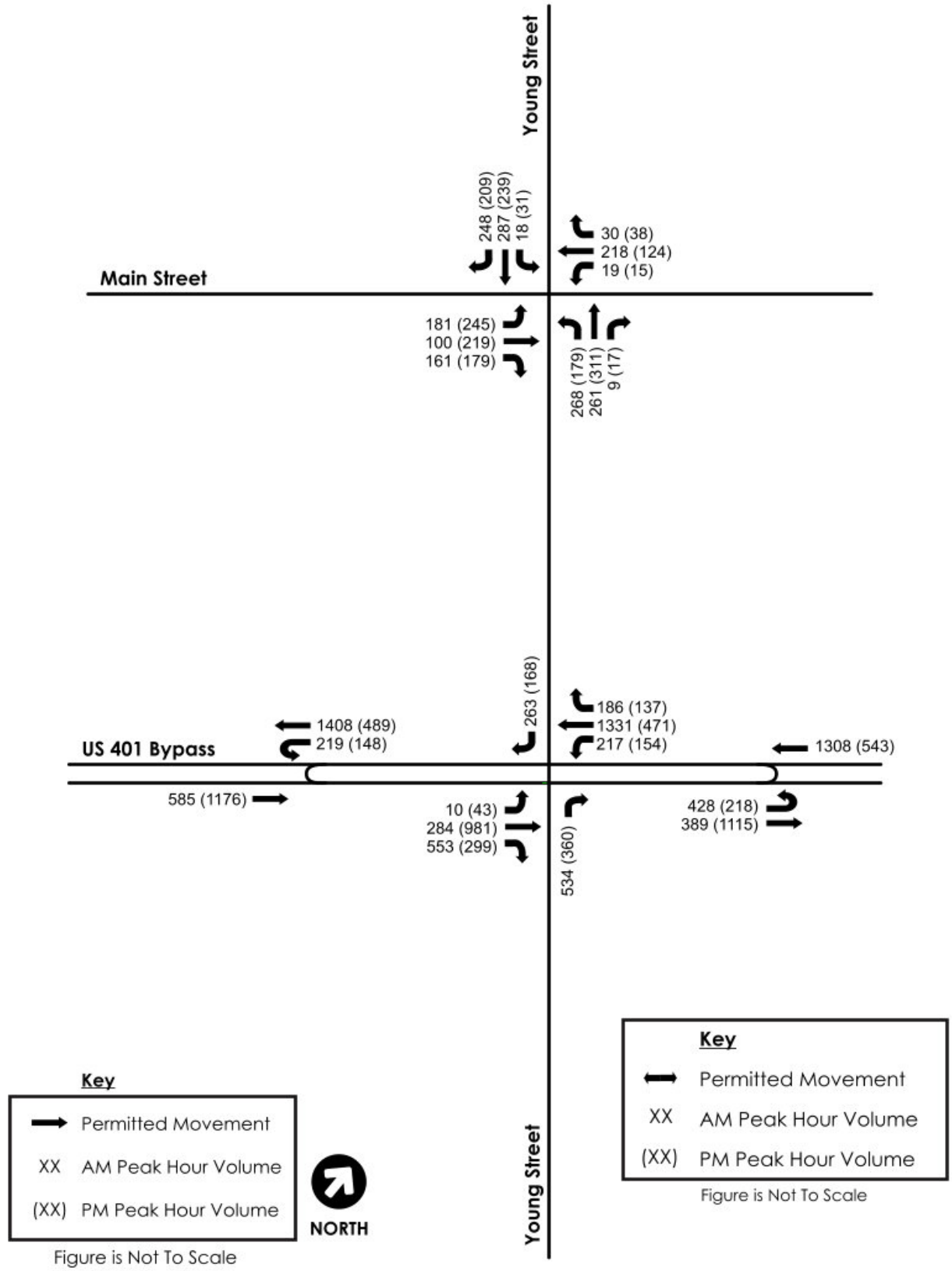


Figure 8: Background Traffic Growth

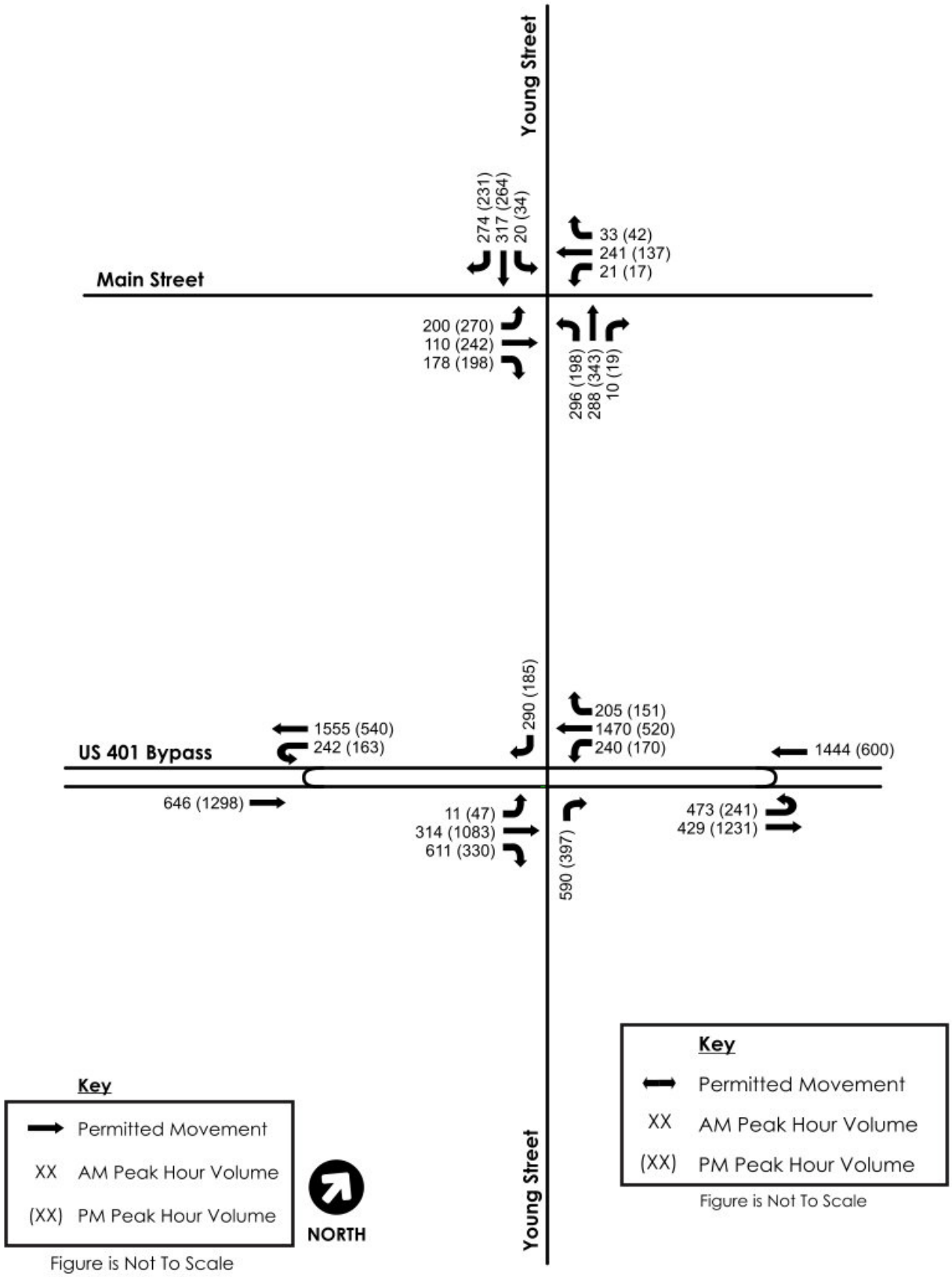


Figure 9: Adjacent Development Traffic Volumes

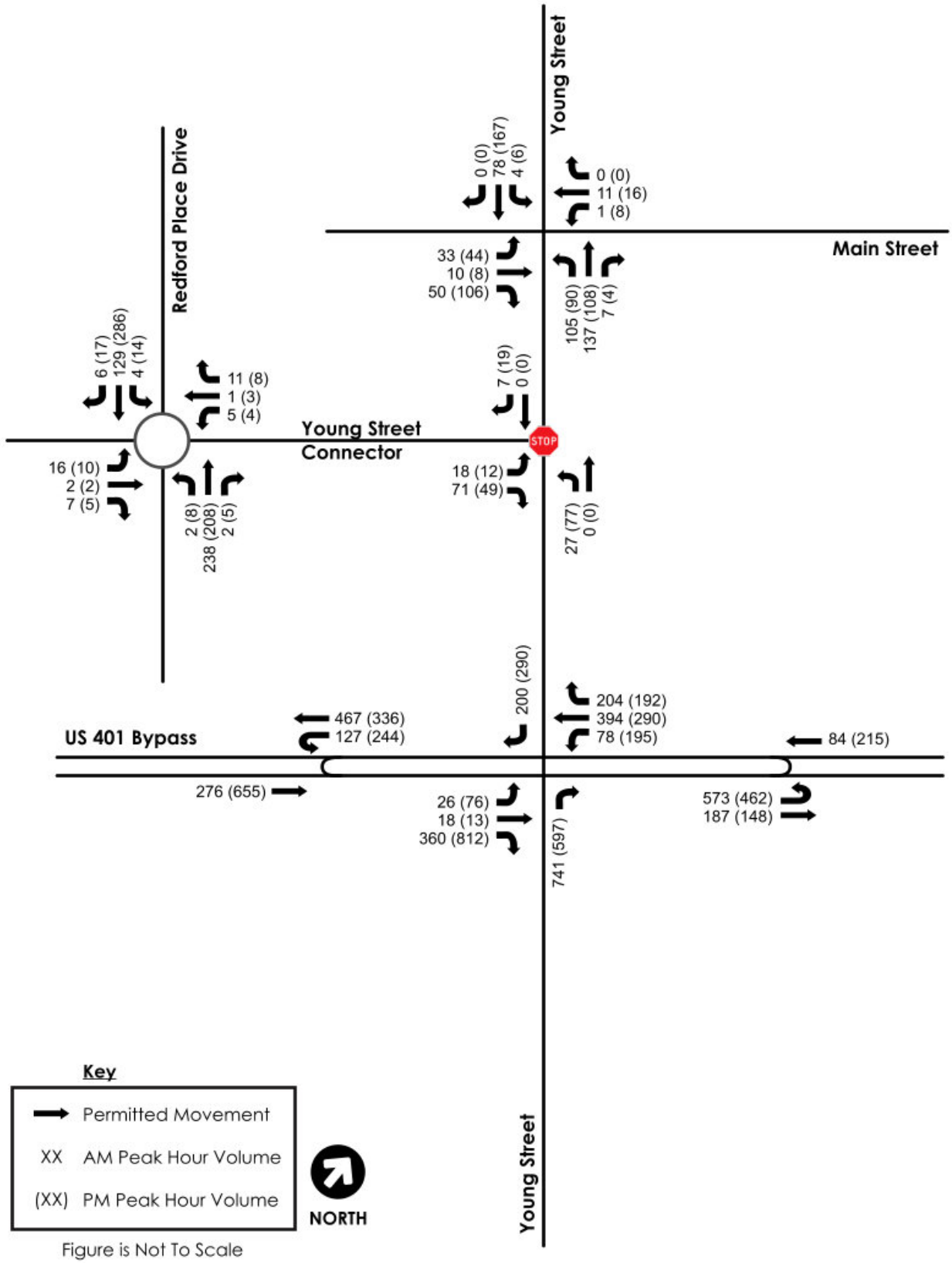


Figure 10: 2030 No-Build Traffic Volumes

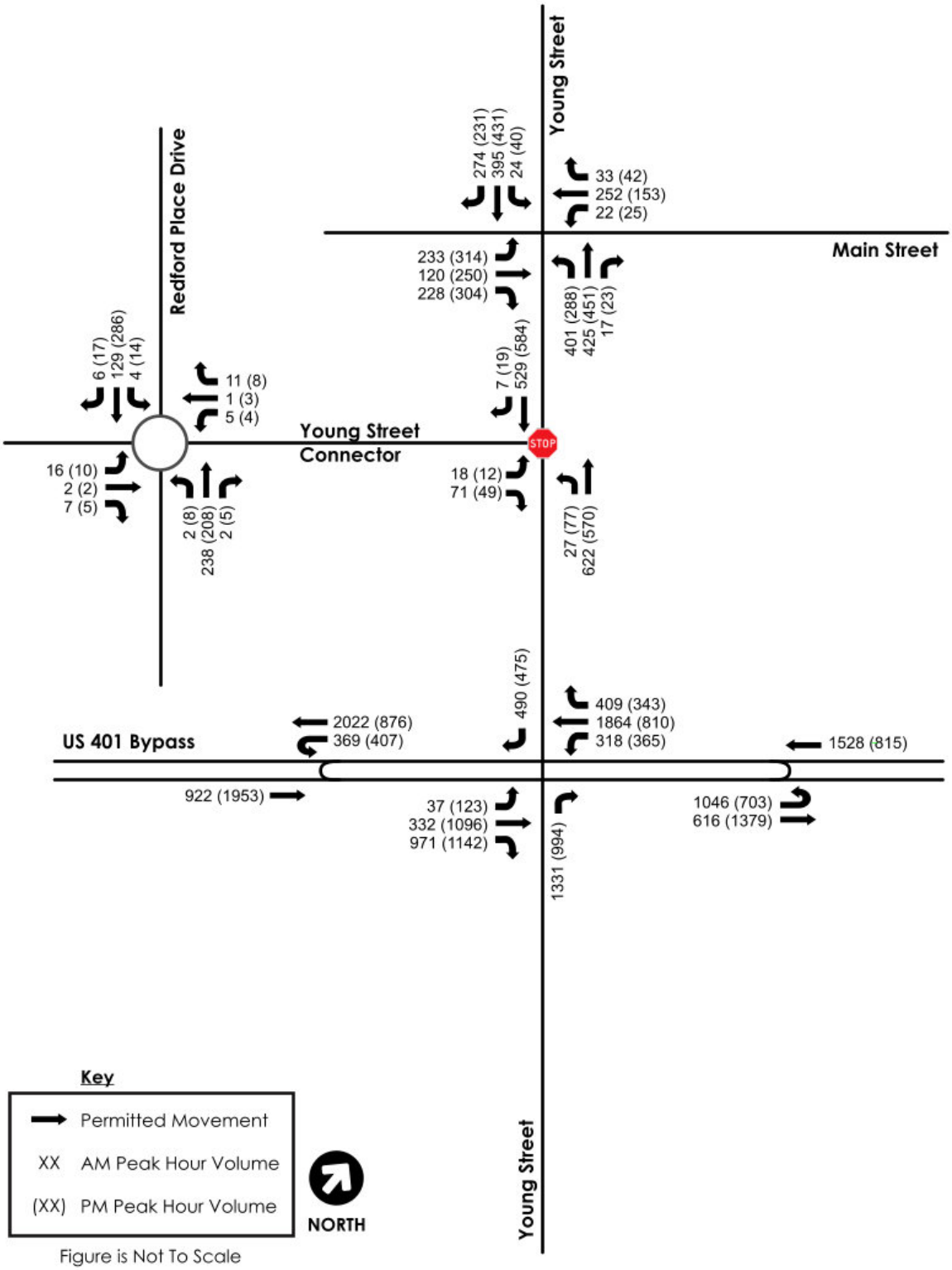
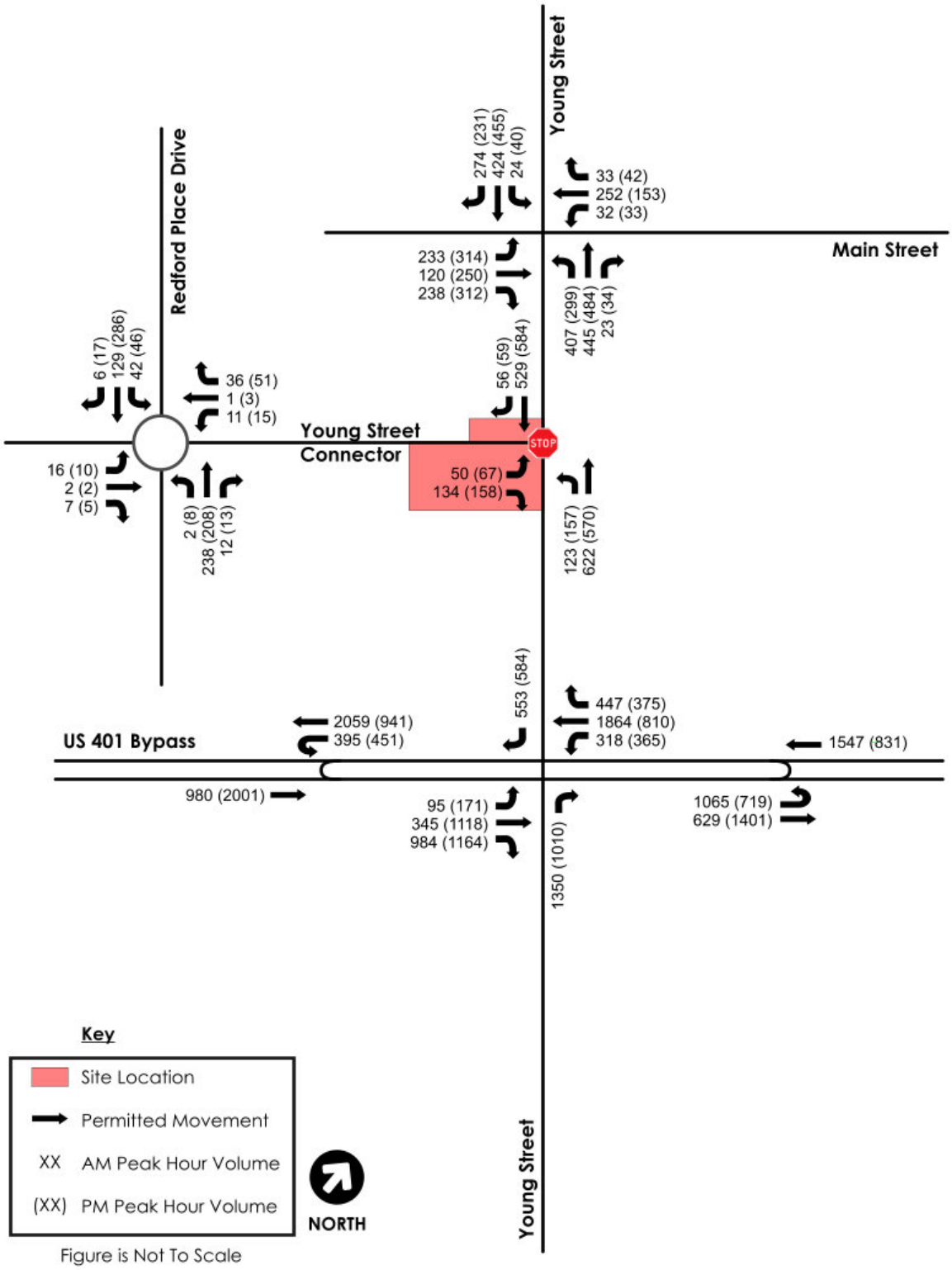


Figure 11: 2030 Build Traffic Volumes



5.0 CAPACITY ANALYSIS

Capacity analyses were performed for the roadway network in the study area. The traffic analysis program Synchro Version 12 was used to analyze all signalized and stop-controlled intersections according to methods put forth by the Transportation Research Board's Highway Capacity Manual[6] (HCM). The HCM defines capacity as the "maximum rate or flow at which persons or vehicles can be reasonably expected to traverse a point or uniform section of a line or roadway during a specified period under prevailing roadway, traffic, and control conditions, usually expressed as vehicles per lane per hour."

Level of service (LOS) is a term used to describe different traffic conditions and is defined as a "qualitative measure describing operational conditions within a traffic stream, and their perception by motorists or passengers." LOS varies from Level A, representing free flow, to Level F where traffic breakdown conditions are evident. At an unsignalized intersection, the primary traffic on the main roadway is uninterrupted. Therefore, the overall delay for the intersection is usually less than what is calculated for minor street movements. The overall intersection delay and the delay for the intersections' minor movement(s) are reported in the summary tables of this report. LOS D is acceptable for signalized intersections in suburban areas during peak periods. For unsignalized intersections, it is common for some of the minor street movements or approaches to be operating at LOS F during peak hour conditions and that is not necessarily indicative of an area that requires improvements.

Capacity analyses were completed following *NCDOT Capacity Analysis Guidelines*[6] as well as the *Draft NCDOT Capacity Analysis Guidelines Best Practices*[7]. Table 4 presents the criteria of each LOS as indicated in the HCM.

Table 4: Level of Service Criteria

Level of Service (LOS)	Signalized Intersection Control Delay (seconds/vehicle)	Unsignalized Intersection Control Delay (seconds/vehicle)
A	≤ 10	≤ 10
B	>10 and ≤ 20	>10 and ≤ 15
C	>20 and ≤ 35	>15 and ≤ 25
D	>35 and ≤ 55	>25 and ≤ 35
E	>55 and ≤ 80	>35 and ≤ 50
F	>80	>50

The Town of Rolesville's Land Development Ordinance (LDO)[8], Section 8.E, establishes the following Level of Service Standards:

1. *The traffic impact analysis must demonstrate that the proposed development would not cause build-out-year, peak-hour levels of service on any arterial or collector road or intersection within the study area to fall below Level of Service (LOS) "D," as defined by the latest edition of the Highway Capacity Manual, or, where the existing level of service is already LOS "E" that the proposed development would not cause the LOS to fall to the next lower letter grade.*

2. *If the road segment or intersection is already LOS "F," the traffic impact analysis must demonstrate that the proposed development, with any proposed improvements, would not cause build-out year peak-hour operation to degrade more than five (5) percent of the total delay on any intersection approach.*

All Synchro files and detailed printouts can be found in the Appendix.

5.1 2025 EXISTING

In the base year, under the existing geometric conditions, all study intersections and approaches operate at acceptable levels of delay with one exception. That is the southbound thru movement at the intersection of Main Street and Young Street operates at LOS E during both peak hours. The remaining study area intersections and movements operate at an acceptable level in both peak hours. The results from the 2025 Existing analysis are shown in Table 5. Instances where the overall intersection or lane group operate at LOS E are highlighted in the table.

Table 5: 2025 Existing Level of Service and Delay

Intersection		Approach	Lane Group	Delay (sec./veh.)		Level of Service (LOS)		95th % Queue (feet)		Max. Obs. Queue (feet)	
				AM	PM	AM	PM	AM	PM	AM	PM
	Main Street & Young Street	Overall		36.0	31.7	D	C				
		EB	L	20.6	16.5	C	B	156	189	201	233
			TR	20.4	18.1	C	B	229	330	223	309
		WB	L	18.9	15.3	B	B	26	21	39	33
			TR	33.9	28.8	C	C	281	186	289	159
		NB	L	46.8	39.3	D	D	236	150	200	200
			TR	26.3	35.6	C	D	213	279	427	348
		SB	L	35.3	24.2	D	C	32	37	230	234
			T	64.7	64.0	E	E	324	275	729	462
			R	32.6	30.5	C	C	219	168	125	125
	US 401 Bypass Eastbound at Young Street	Overall		8.9	8.6	A	A				
		EB	T	7.1	6.6	A	A	37	94	117	154
			R	1.0	0.3	A	A	0	0	227	59
		NB	R	21.7	24.5	C	C	133	106	273	198
		WB	L	0.1	0.1	A	A	0	0	138	142
	US 401 Bypass Westbound at Young Street	Overall		8.4	6.5	A	A				
		WB	T	6.0	3.7	A	A	126	46	158	74
			R	0.2	0.1	A	A	0	0	0	0
		EB	L	0.0	0.0	A	A	0	0	38	64
		SB	R	26.9	21.1	C	C	107	51	138	115
	US 401 Bypass U-Turn East of Young Street	Overall		4.1	2.3	A	A				
		WB	T	5.4	3.2	A	A	148	43	192	65
		EB	U	0.4	0.1	A	A	0	0	433	83
	US 401 Bypass U-Turn West of Young Street	Overall		2.3	3.5	A	A				
		EB	T	3.2	4.0	A	A	46	114	73	70
		WB	U	0.1	0.1	A	A	0	0	89	113

*Maximum queue extends off the SimTraffic network and may be longer than recorded

Intersection or Lane Group Operates at LOS E

5.2 2030 NO-BUILD

In the 2030 No-Build conditions, the analysis assumes the improvements associated with the adjacent developments and NCDOT projects are constructed. These improvements, discussed in Section 2.4, are listed below:

US 401 Bypass at Young Street

- Extend the existing Eastbound right-turn lane to 400 feet of full-width storage and appropriate taper.
- Modify the Eastbound right-turn such that the movement is a free-flowing right-turn from the US 401 Bypass onto Southbound Young Street.
- Extend the Northbound right-turn lane from 250 feet of full-width storage to 600 feet of full-width storage and appropriate taper.
- Restripe the U-Turn East of Young Street to provide a second Eastbound U-turn Lane with 400 feet of full-width storage and appropriate taper.

Main Street at Young Street

- Remove the dedicated Southbound left turn lane and re-stripe the existing Southbound through lane to a shared thru-left turn lane.
- Extend the storage of the existing Southbound right-turn lane from 75 feet to 250 feet
- Extend the storage of the existing Eastbound left-turn lane from 250 feet to 400 feet
- Reduce the storage of the existing Westbound left-turn lane from 500 feet to 350 feet

Young Street at Young Street Connector

- Construct the proposed driveway as a full-movement access point with one ingress lane and one egress lane.
- Construct a Northbound left-turn lane with 150 feet of full-width storage and appropriate taper.
- Construct a Southbound right-turn lane with 50 feet of full-width storage and appropriate taper.

Redford Place Drive at Young Street Connector

- Construct Parker Ridge Accesses A and B (Young Street Connector) as full-movement access points with one ingress lane and one egress lane.

In the future year of 2030 without the proposed development in-place, the signalized intersection of Main Street at Young Street operates at LOS E in both the AM and PM peak hour, with several movements operating at LOS E or F. Due to the long delays, these movements operating at LOS E and F also show long queues developing. These movements include the Northbound thru/right lane, the Southbound left/thru, and the Eastbound thru/right lane. All other study area intersections operate at an overall acceptable LOS.

Observation of the simulation runs showed lengthy queues along Eastbound thru movements on US 401 Bypass approaching its intersection with Young Street, as well as at the U-Turn West of Young Street in both AM and PM peak hours. Additionally, lengthy queues were observed in the Northbound movement along Young Street approaching US 401 Bypass in the AM peak hour.

Synchro LOS and delay results for the 2030 No-Build analysis scenario are listed in Table 6. Instances where the overall intersection or lane group operate at LOS E or F are highlighted in the table.

Table 6: 2030 No-Build Level of Service and Delay

Intersection		Approach	Lane Group	Delay (sec./veh.)		Level of Service (LOS)		95th % Queue (feet)		Max. Obs. Queue (feet)	
				AM	PM	AM	PM	AM	PM	AM	PM
	Main Street & Young Street	Overall		61.8	75.7	E	E				
		EB	L	67.2	52.6	E	D	275	390	357	500
			TR	38.7	67.3	D	E	348	704	400	1306*
		WB	L	26.5	48.1	C	D	33	51	59	178
			TR	56.6	52.0	E	D	321	219	368	249
		NB	L	67.9	50.2	E	D	540	335	200	200
			TR	75.9	111.7	E	F	603	684	1170	1198
		SB	LT	69.8	106.0	E	F	582	670	898	1597*
			R	50.8	46.8	D	D	349	269	350	350
	US 401 Bypass Eastbound at Young Street	Overall		15.6	17.1	B	B				
		EB	T	19.0	24.8	B	C	96	345	165	346
			R	5.3	4.6	A	A	169	0	88	340
		NB	R	25.9	29.3	C	C	434	355	1340*	403
		WB	L	0.2	0.3	A	A	0	0	138	217
	US 401 Bypass Westbound at Young Street	Overall		16.9	8.2	B	A				
		WB	T	12.7	7.6	B	A	390	137	266	155
			R	0.2	0.3	A	A	0	0	0	24
		EB	L	0.0	0.1	A	A	0	0	0	124
		SB	R	48.3	17.1	D	B	244	159	258	176
	US 401 Bypass U-Turn East of Young Street	Overall		34.2	16.6	C	B				
		WB	T	28.6	10.8	C	B	573	171	397	176
		EB	U	42.3	23.5	D	C	414	161	326	274
	US 401 Bypass U-Turn West of Young Street	Overall		16.6	37.9	B	D				
		EB	T	11.6	29.6	B	C	207	798	358	1372
		WB	U	28.9	77.9	C	E	190	454	310	475
	Redford Place Drive at Young Street Connector / Parker Ridge Driveways	Overall		3.9	4.3	A	A				
		EB	LTR	3.6	4.2	A	A	4	3	34	35
		WB	LTR	4.0	3.9	A	A	3	3	34	32
		NB	LTR	4.2	4.1	A	A	31	28	51	57
		SB	LTR	3.4	4.4	A	A	16	39	19	46
	Young Street at Young Street Connector	Overall		1.5	1.5						
		EB	LR	19.0	19.8	C	C	28	20	77	75
		NB	L	8.8	9.3	A	A	3	8	40	65

*Maximum queue extends off the SimTraffic network and may be longer than recorded

Intersection or Lane Group Operates at LOS E

Intersection or Lane Group Operates at LOS F

5.3 2030 BUILD

As part of the 2030 Build analysis, the proposed driveway was added to the network as detailed in Section 2.2.

With the proposed development in place, the intersection of Main Street at Young Street experiences longer delays, with several approaches and movements operating at LOS E or F.

The intersection of US 401 Bypass at Young Street operates similarly to the no-build scenario. However, the westbound U-turn is shown to operate at LOS F in the PM peak hour whereas in the no-build scenario, the movement was shown to operate at LOS E.

The eastbound approach of the Young Street Connector at Young Street is projected to operate at LOS F during both peak hours. At unsignalized intersections, it is common for minor streets to experience higher delays due to the difficulty in making left-turn movements with the uninterrupted main street traffic.

SimTraffic simulation runs showed significant queues along the US 401 bypass; despite operating LOS B. The queueing stems from the eastbound thru movement. In the no-build scenario, this movement extended off the network (i.e. approximately 2,000 feet west of the western u-turn intersection) 66% of the PM peak hour where as this movement extended off the network 72% of the PM peak hour.

Synchro LOS and delay results for the 2030 Build scenario are listed in Table 7. Instances where the overall intersection or lane group operate at LOS E or F are highlighted in the table.

Table 7: 2030 Build Level of Service and Delay

Intersection		Approach	Lane Group	Delay (sec./veh.)		Level of Service (LOS)		95th % Queue (feet)		Max. Obs. Queue (feet)	
				AM	PM	AM	PM	AM	PM	AM	PM
	Main Street & Young Street	Overall		67.0	86.1	E	F				
		EB	L	86.4	72.0	F	E	339	469	464	500
			TR	45.7	98.4	D	F	404	813	874	1908*
		WB	L	34.1	72.8	C	E	51	85	100	252
			TR	64.9	54.4	E	D	355	243	370	348
		NB	L	63.7	48.0	E	D	559	354	200	200
			TR	77.9	110.4	E	F	668	774	1230	1209*
		SB	LT	78.4	110.0	E	F	650	744	1014	1652*
			R	51.8	47.7	D	D	342	282	350	350
	US 401 Bypass Eastbound at Young Street	Overall		13.1	18.0	B	B				
		EB	T	22.4	26.8	C	C	104	378	181	382
			R	2.5	5.2	A	A	0	0	148	347
		NB	R	21.6	29.5	C	C	453	379	1262	406
		WB	L	0.2	0.3	A	A	0	0	126	215
	US 401 Bypass Westbound at Young Street	Overall		19.4	10.6	B	B				
		WB	T	14.9	9.4	B	A	502	154	275	151
			R	0.2	0.3	A	A	0	0	57	77
		EB	L	0.1	0.1	A	A	0	0	124	150
		SB	R	53.7	21.8	D	C	301	151	307	229
	US 401 Bypass U-Turn East of Young Street	Overall		36.1	16.8	D	B				
		WB	T	29.4	11.0	C	B	635	174	410	188
		EB	U	45.9	23.6	D	C	466	166	370	275
	US 401 Bypass U-Turn West of Young Street	Overall		17.6	47.4	B	D				
		EB	T	12.3	38.7	B	D	217	1141	394	1386
		WB	U	30.9	85.6	C	F	214	655	315	533
	Redford Place Drive at Young Street Connector / Parker Ridge Driveways	Overall		4.3	4.7	A	A				
		EB	LTR	3.8	4.4	A	A	4	3	33	35
		WB	LTR	4.4	4.4	A	A	8	11	44	44
		NB	LTR	4.8	4.6	A	A	34	30	54	61
		SB	LTR	3.7	4.9	A	A	22	47	39	64
	Young Street at Young Street Connector	Overall		8.2	25.6						
		EB	LR	60.6	174.6	F	F	158	318	211	442
		NB	L	9.5	10.1	A	B	13	18	92	112

*Maximum queue extends off the SimTraffic network and may be longer than recorded

Intersection or Lane Group Operates at LOS E

Intersection or Lane Group Operates at LOS F

5.4 2030 BUILD IMPROVED

5.4.1 Proposed Improvements

The 2030 Build Improved capacity analysis results are shown in Table 8. Instances where the overall intersection or lane group operate at LOS E or F are highlighted in the table. Based on the findings of this study, specific improvements have been identified and should be completed as part of the proposed development.

Main Street at Young Street

- No mitigation is recommended at this intersection due to an ongoing project involving geometric improvements, U-6241, currently under construction. The improvements associated with the U-6241 are discussed in Section 2.4.5.

US 401 Bypass at Young Street

- No improvements are recommended at this intersection.

US 401 Bypass U-Turn East of Young Street

- No improvements are recommended at this intersection.

US 401 Bypass U-Turn West of Young Street

- No improvements are recommended at this intersection.

Redford Place Drive at Young Street Connector

- No improvements are recommended at this intersection.

Young Street at Young Street Connector

- It is recommended that the intersection be considered for the installation of a traffic signal.
  - As the proposed development is shown to be constructed in phases, it is recommended that the signal be monitored if phases beyond the initial are to be constructed.
  - Before construction begins on future phases of development the intersection is recommended to be evaluated against the warrants for installation of a traffic signal as outlined in the Manual on Uniform Traffic Control Devices. If warranted and approved by NCDOT, a traffic signal is recommended to be installed.
- Construct an eastbound right turn lane on Young Street Connector with 175 feet of full-width storage and appropriate taper.
- Extend the northbound left turn lane on Young Street to 200 feet of full-width storage and appropriate taper.
- Maximize storage for the southbound right turn lane on Young Street with respect to the gated entrance shown on site plan.

Table 8: 2030 Build Improved Level of Service and Delay

Intersection		Approach	Lane Group	Delay (sec./veh.)		Level of Service (LOS)		95th % Queue (feet)		Max. Obs. Queue (feet)	
				AM	PM	AM	PM	AM	PM	AM	PM
	Young Street at Young Street Connector	Overall		14.2	16.2	B	B				
		EB	L	39.4	42.5	D	D	65	84	88	141
			R	24.9	24.9	C	C	105	127	148	151
		NB	L	42.8	42.3	D	D	127	155	166	195
			T	4.7	4.1	A	A	174	128	212	229
		SB	T	14.6	16.8	B	B	323	359	326	342
			R	3.7	4.3	A	A	19	22	208	177

6.0 RECOMMENDATIONS

Based on the findings of this study, specific improvements have been identified and should be completed as part of the proposed development. Intersections where no improvements are recommended are locations that do meet the LOS Standards specified in the LDO[8]. These recommendations are shown in Figure 12.

Main Street at Young Street

- No mitigation is recommended at this intersection due to an ongoing project involving geometric improvements, U-6241, currently under construction. The improvements associated with the U-6241 are discussed in Section 2.4.5.

US 401 Bypass at Young Street

- No improvements are recommended at this intersection.

US 401 Bypass U-Turn East of Young Street

- No improvements are recommended at this intersection.

US 401 Bypass U-Turn West of Young Street

- No improvements are recommended at this intersection.

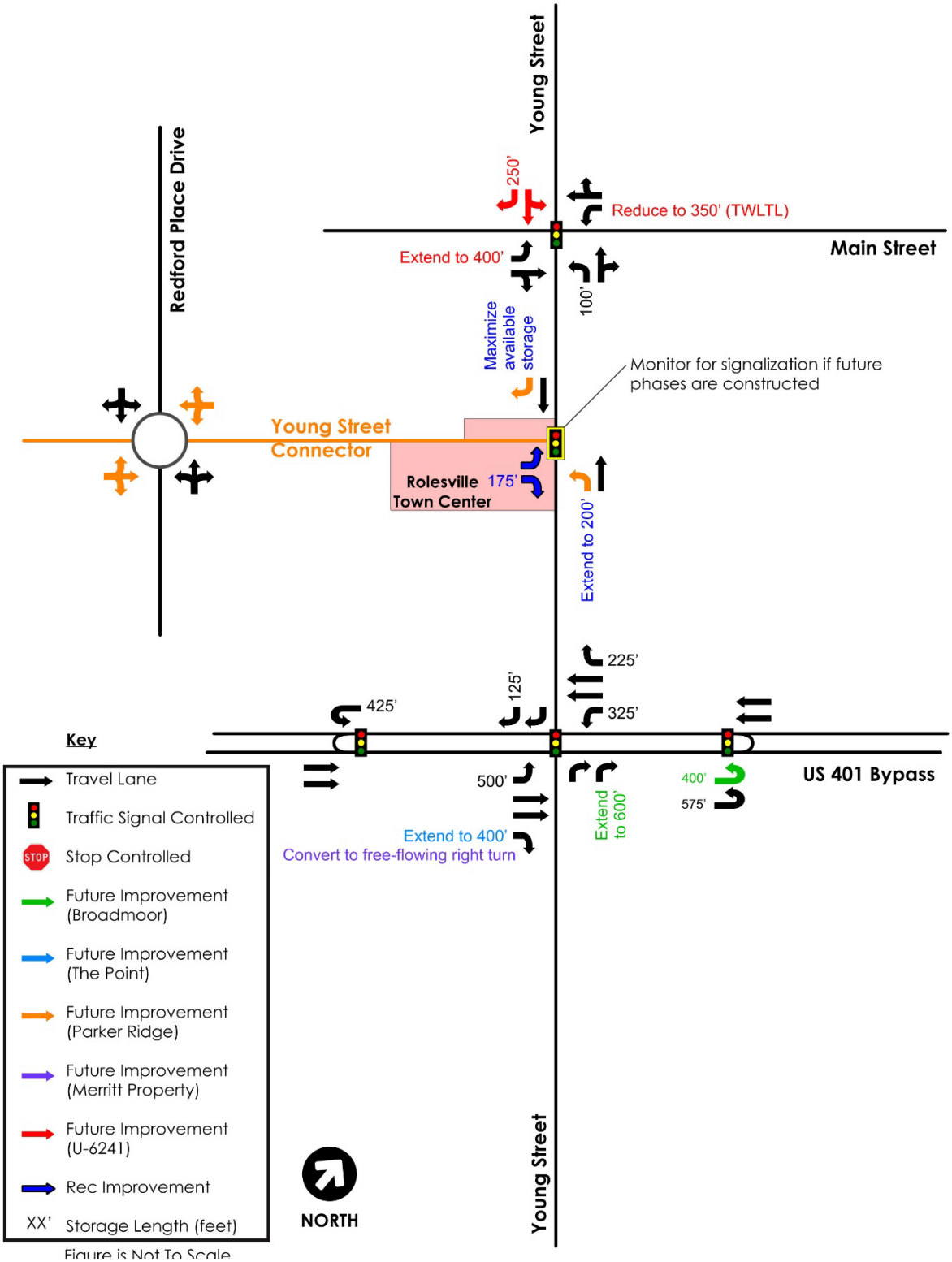
Redford Place Drive at Young Street Connector

- No improvements are recommended at this intersection.

Young Street at Young Street Connector

- It is recommended that the intersection be considered for the installation of a traffic signal.
  - As the proposed development is shown to be constructed in phases, it is recommended that the signal be monitored if phases beyond the initial are to be constructed.
  - Before construction begins on future phases of development the intersection is recommended to be evaluated against the warrants for installation of a traffic signal as outlined in the Manual on Uniform Traffic Control Devices. If warranted and approved by NCDOT, a traffic signal is recommended to be installed.
- Construct an eastbound right turn lane on Young Street Connector with 175 feet of full-width storage and appropriate taper.
- Extend the northbound left turn lane on Young Street to 200 feet of full-width storage and appropriate taper.
- Maximize storage for the southbound right turn lane on Young Street with respect to the gated entrance shown on site plan.

Figure 12: Recommended Improvements



7.0 REFERENCES

[1] ***NCDOT Functional Classification Map***,
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[2] ***2020 NCDOT Average Daily Traffic Volumes***,
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[5] ***Highway Capacity Manual 6th Edition: A Guide for Multimodal Mobility Analysis***. Washington D.C.: Transportation Research Board, 2016.

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[8] ***Land Development Ordinance***. Town of Rolesville, June 1, 2021, https://www.rolesvillenc.gov/code-ordinances

8.0 APPENDIX

- Scoping Correspondence
- Site Plan
- Raw Traffic Count Data
- Existing Rolesville Police Department Traffic Data
- Adjacent Development Information
- Traffic Volume Calculations
- Synchro Files
- Synchro & SimTraffic Reports