



PLANNING & INSPECTIONS DEPARTMENT  
Joshua L. Grant, Manager

To: Board of County Commissioners

From: Jeremiah Combs, Planner

Date: September 8, 2023

Re: SUP #488  
Claude Gagne, applicant  
Parcel ID# 53861

*The following information is for use by the Lincoln County Board of Commissioners at their meeting/public hearing on October 2, 2023.*

Request

The applicant is requesting a special use permit to construct a gas station and a restaurant in the ELDD (Eastern Lincoln Development District) overlay. Under the Unified Development Ordinance both of these are special uses in the ELDD if the parcel is located within 100 feet of a residential district.

Site Area and Description

The request involves a 5.34-acre parcel located on the south side of E. N.C. 150 and the west side of the N.C. 16 interchange in Catawba Springs Township. The subject property is located in the R-SF (Residential Single-Family) zoning district, but a concurrent rezoning request (ZMA #716) proposes to rezone this parcel to B-G (General Business). The subject property is adjoined by property zoned R-SF and R-T (Transitional Residential). Land uses in this area include business and residential uses.

This property is located in an area designated by the Lincoln County Land Use Plan as Walkable Activity Center, suitable for commercial uses where buildings are located on small blocks with streets designed to encourage pedestrian activities. The NC 16/NC 150 Small Area Plan calls for a mixture of uses in this area adjacent to the interchange to provide a multitude of options for housing, employment, and everyday living.



PLANNING & INSPECTIONS DEPARTMENT

Joshua L. Grant, Manager

## Additional Information

Below are the specific use standards for gas stations:

### **§4.4.9. Gas Station with Convenience Retail**

#### **A. General Standards**

1. Vehicle repair or service shall not be permitted.
2. All structures, including any attached canopy, shall conform to all setback requirements and be setback at least 200 feet from any residential district or use located on another lot.
3. Gasoline pumps, tanks and pump islands shall be located no closer than 20 feet to any side or rear property line or right-of-way.
4. No sign of any type or any gasoline pump or tank shall be located within 20 feet of a residential use.
5. A Class C buffer (see §3.4) shall be established along any side of the property where the gas station abuts a residential use, provided such buffer shall not restrict clear sight at any intersection or driveway.
6. Freestanding vents shall not be permitted.
7. Outdoor storage and display may be allowed subject to Board of Commissioners approval (see §3.10, Outdoor Storage and Display).

#### **B. Fuel Canopies**

1. The canopy shall be located no closer than 15 feet to any side or rear property line or right-of-way.
2. The canopy shall not exceed the height of the principal building, but in no case shall the canopy height exceed 20 feet.

#### **C. Single-Bay Automatic Car Wash**

An accessory single-bay automatic (not self-service) car wash completely enclosed except for openings necessary to allow entry and exit of vehicles shall be permitted subject to the following:

1. The car wash structure shall be located no closer than 20 feet to any side or rear property line or right-of-way.
2. The car wash structure shall not exceed a height of 20 feet or exceed an overall building dimension of 25 feet in width and 50 feet in length.
3. The car wash structure shall be located behind the rear building line of the principal building.
4. All car wash structures shall meet all applicable yard requirements.



## Special Use Permit Application

Lincoln County Planning and Inspections Department  
Zoning Administrator  
115 W. Main St., Lincolnton, NC 28092  
Phone: (704) 736-8440 Fax: (704) 732-9010

### PART I

Applicant Name Charles Cague

Applicant Address 471 14<sup>th</sup> AVE NE Hickory NC 28601

Applicant Phone Number 828 781 9875

Property Owner Name Darris Lee Turbyfill Jr And is Region PATE

Property Owner Address 4641 S. Oliver X-Ro 6715 E. NC Hwy 150  
MA 1000 NC 28650 MAIN NC 28650

Property Owner Phone Number 828 310 2569 980 241 2773

### PART II

Property Location ENC 150 Hwy 8 Hwy 16

Property ID (10 digits) 3686212750 Property size 5.343

Parcel # (5 digits) 538601 Deed Book(s) LC105-342 Page(s) 1

### PART III

Existing Zoning District ELDO A-SF

Briefly describe how the property is being used and any existing structures.

Open Land - No Structures

Briefly explain the proposed use and/or structure which would require a Special Use Permit.

Proposed Gas Station/Convenience Center

**APPLICATION FEE (less than 2 acres \$250, 2+ acres \$500)**  
**MUST BE RECEIVED BEFORE PROCESSING.**

I hereby certify that all knowledge of the information provided for this application and attachments is true and correct to the best of my knowledge.

Applicant's Signature

4-21-23

Date

## **APPLICANT'S PROPOSED FINDINGS OF FACT**

Application No. **SUP #488**

Applicant **Claude Gagne**

Property Location **E. N.C. 150 Hwy.**

Parcel ID# **53861**

Proposed Special Use **gas station and restaurant**

### **PROPOSED FINDINGS**

1. The use will not materially endanger the public health or safety if located where proposed and developed according to plan.

**The buildings will comply with all applicable building code and health code standards.**

2. The use meets all required conditions and specifications.

**The proposed facility will comply with standards of the Lincoln County Unified Development Ordinance, including the setback, parking, landscaping, and buffer requirements.**

3. The use will not substantially injure the value of adjoining or abutting property unless the use is a public necessity.

**The Small Area Plan for this area shows this property and the adjoining parcels as suitable for mixed use development. The proposed gas station and restaurant would be the first commercial development in this area since the adoption of that Small Area Plan.**

4. The location and character of use, if developed according to the plan as submitted and approved, will be in harmony with the area in which it is to be located and will be in general conformity with the Land Use Plan for the area in question.

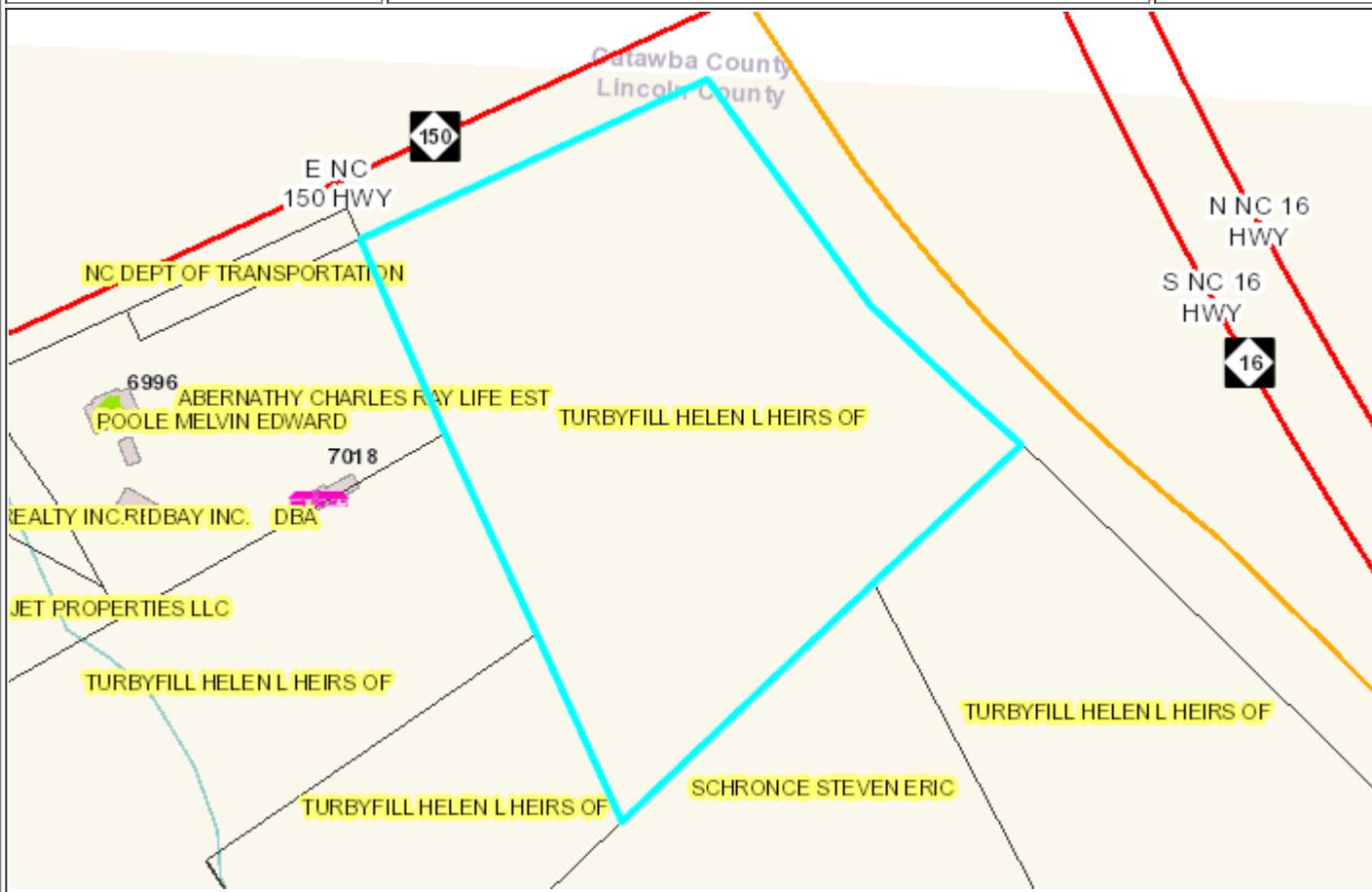
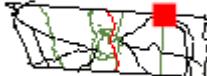
**The proposed gas station and restaurant will be located at the interchange of a controlled-access highway in an area of Lincoln County where an adopted Small Area Plan calls for mixed-use development.**



## Lincoln County, NC

### Office of the Tax Administrator, GIS Mapping Division

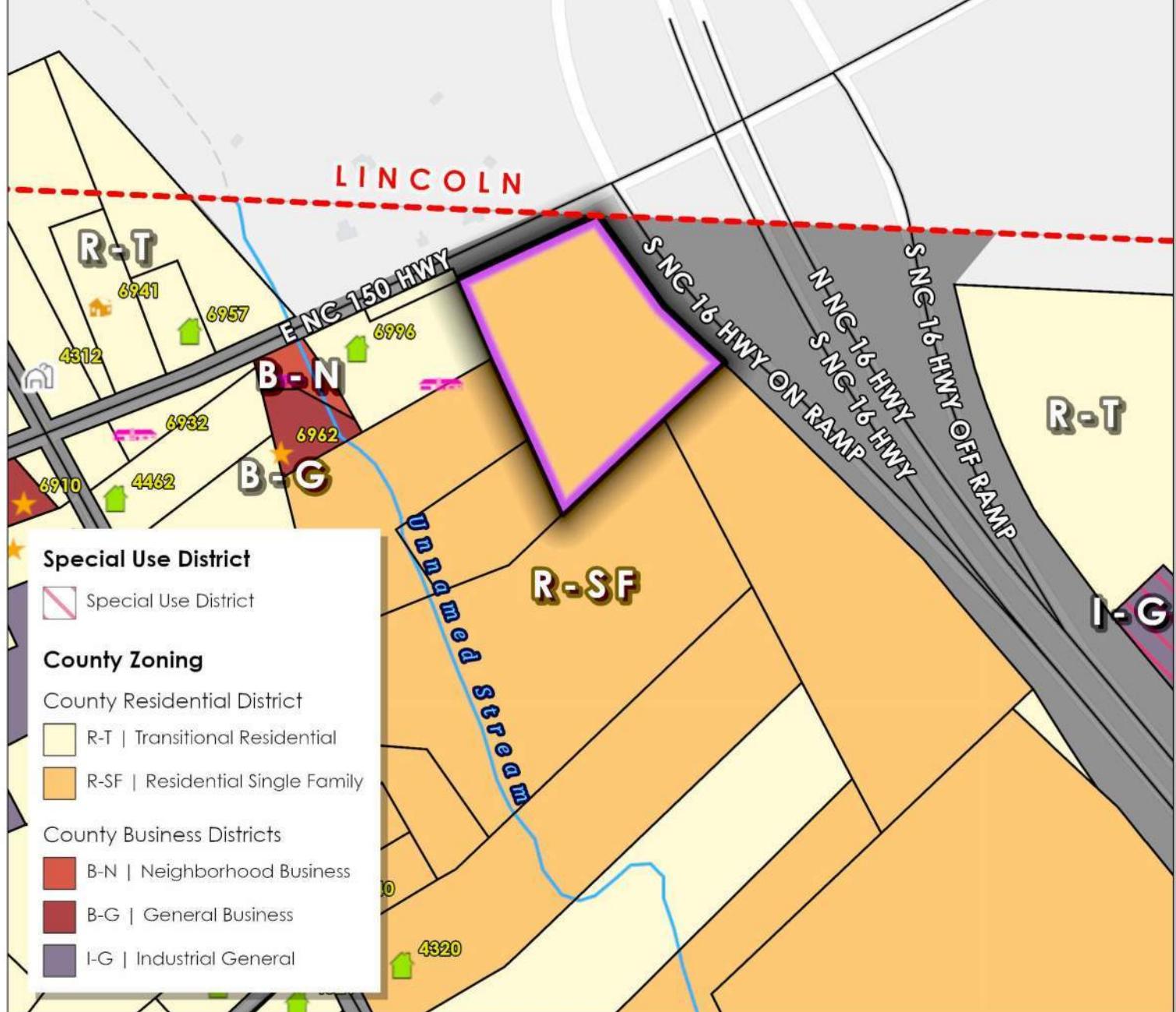
Lincoln County and its mapping contractors assume no legal responsibility for the information contained on this map. This map is not to be used for land conveyance. The map is based on NC State Plane Coordinate System 1983 NAD. Date: 5/16/2023 Scale: 1 Inch = 200 Feet



 <b>Photo Not Available</b>	<b>Parcel ID</b>	53861	<b>Owner</b>	TURBYFILL HELEN L HEIRS OF TURBYFILL DARRIS LEE SR TRUSTB		
	<b>Map</b>	3686	<b>Mailing</b>	4641 S OLIVERS X RD		
	<b>Account</b>	274997	<b>Address</b>	MAIDEN, NC 28650-9175		
	<b>Deed</b>	LC105 342	<b>Last Transaction Date</b>	07/21/2019		
	<b>Plat</b>		<b>Subdivision</b>			
	<b>Land Value</b>	\$99,379	<b>Improvement Value</b>	\$0		
	<b>Previous Parcel</b>			<b>Total Value</b> \$99,379		
	<b>-----All values for Tax Year 2023 -----</b>					
	<b>Description</b>	(BLDG & 1.18 IN CATAWBA)		<b>Deed Acres</b> 0		
	<b>Address</b>	E NC 150 HWY		<b>Tax Acres</b> 5.343		
<b>Township</b> CATAWBA SPRINGS				<b>Tax/Fire District</b> DENVER		
<b>Main Improvement</b>				<b>Value</b>		
<b>Main Sq Feet</b>				<b>Year Built</b>		
<b>Zoning District</b>				<b>Census County</b>		
<b>Calc Acres</b>				<b>Tract</b>		
R-SF 6.52				<b>Block</b>		
<b>Watershed</b>				<b>Panel</b>		
6.52				3710368600		
<b>Census County</b>				<b>Flood</b>		
109				X		
<b>Zone Description</b>				<b>Zone Description</b>		
NO FLOOD HAZARD				NO FLOOD HAZARD		



# CATAWBA COUNTY



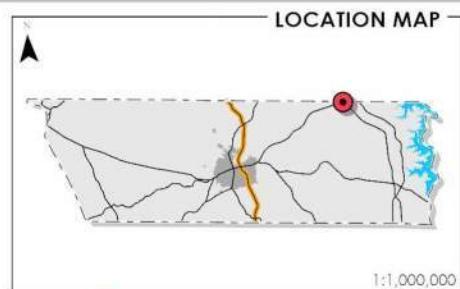
Parcel ID # 53861

- Property Location(s)

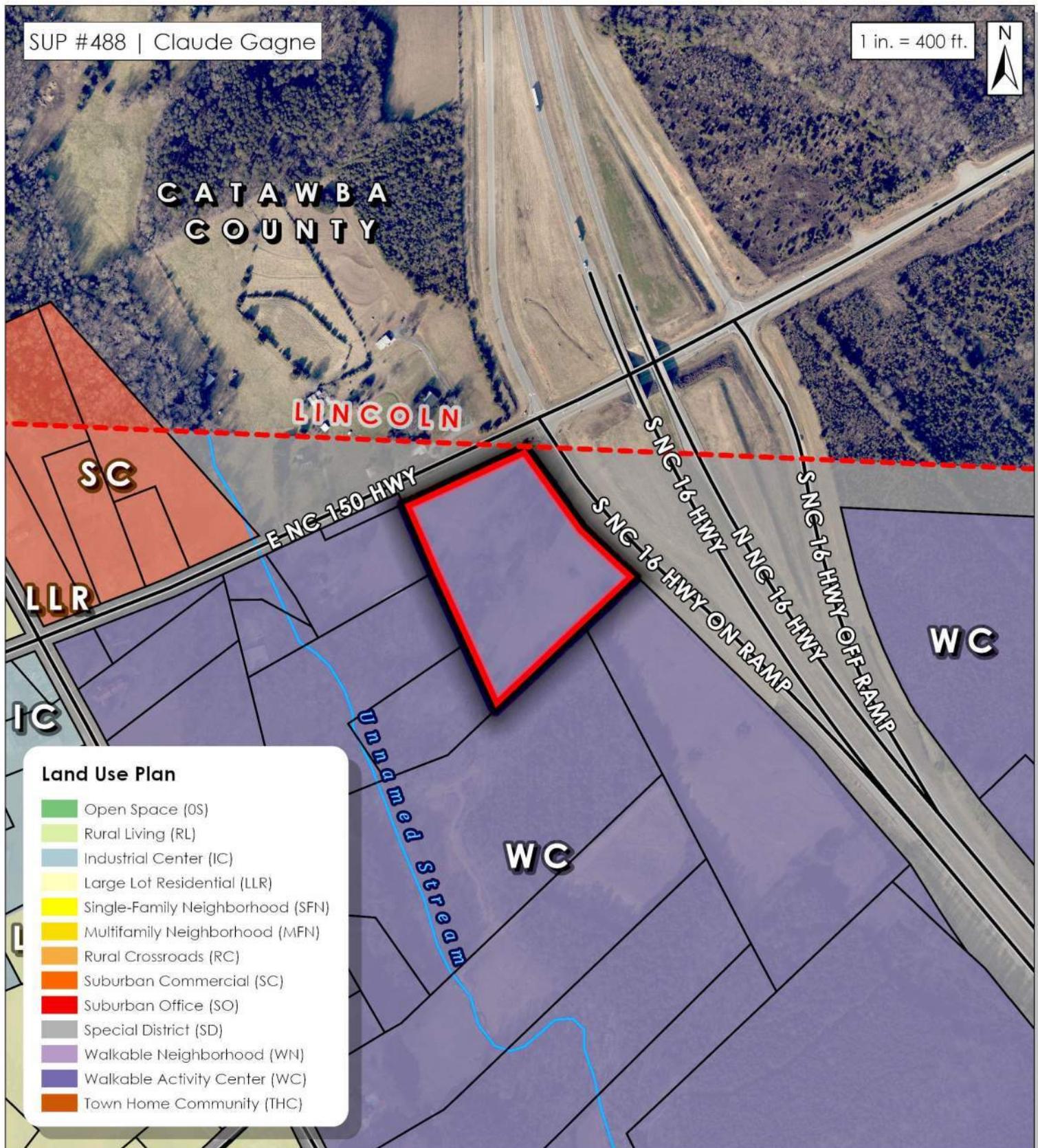


Lincoln County  
Planning & Inspections  
115 W. Main St  
3rd Floor  
Lincolnton, NC 28092

See Attached Application for Parcel Information



Property Location(s)



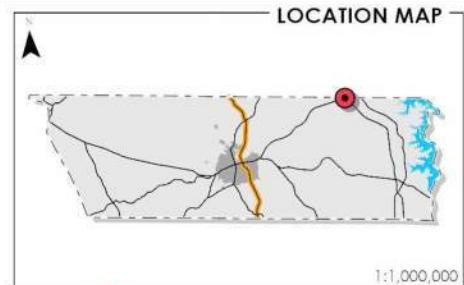
Parcel ID # 53861

- Property Location(s)

See Attached Application for Parcel Information



Lincoln County  
Planning & Inspections  
115 W. Main St.  
3rd Floor  
Lincolnton, NC 28092



Property Location(s)



# Lincoln County Project Reviews

Project Number: **ZONE23-00120**

Description: **SUP #488 Claude Gagne (gas station and restaurant in ELDD)**

Project Type: **ZONING CASE**

Parcel ID: **53861**

Sub Type: **SPECIAL USE PERMIT**

Applicant: **Claude Gagne**

Applied: **4/21/2023**

Approved:

Owner: **TURBYFILL HELEN L HEIRS OF**

Status: **UNDER REVIEW**

Balance: **\$ 0.00**

Surveyor: **<NONE>**

Details:

## LIST OF REVIEWS

SENT DATE	RETURNED DATE	DUUE DATE	TYPE	CONTACT	STATUS	REMARKS
Review Group: ALL						
4/24/2023	4/24/2023	4/28/2023	ENVIRONMENTAL HEALTH ON - SITE	Jonathan Harris	COMPLETE	
Notes:						
May require engineer design, will be based on flow rate when applying for septic system.						
Review Group: TRC						
4/24/2023	5/16/2023	4/28/2023	PUBLIC WORKS - COUNTY	Jonathan Drazenovich	COMPLETE	
Notes:						
1) The County has a 12" water main along NC Hwy 150 that is available for tapping. 2) The Developer is responsible for hiring a licensed utility contractor to make the tap at their expense. 3) All taps shall be per all State and Local Standards. 4) A NCDOT three party encroachment will be required.						
4/24/2023	4/27/2023	4/28/2023	NATURAL RESOURCES	Danielle Rudisill	COMPLETE	See Notes
Notes:						
Drainage area from Hwy 16 overflows through center of project. How will stormwater be handled? All slopes will be required to be benched according to the State Design Manual or retaining walls designed. Soils seem adequate for proposed project.						
4/24/2023	5/10/2023	4/28/2023	FIRE MARSHAL - COUNTY	Rodney Emmett	COMPLETE	
Notes:						
4/24/2023	4/27/2023	4/28/2023	NCDOT	Michael Watson	COMPLETE	
Notes:						

# Traffic Impact Analysis (TIA)



# Transportation Impact Analysis

NC 150 Turbyfill Site  
Lincoln County, NC

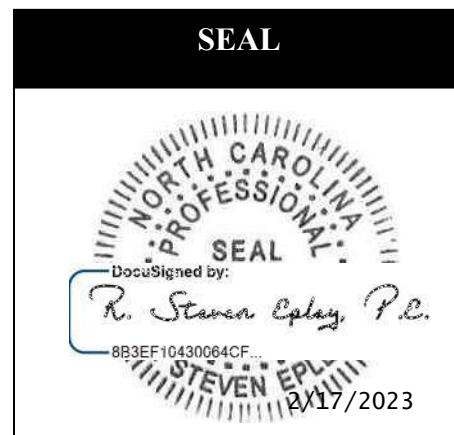
Prepared for DL Turbyfill & Ardis Regina Pate  
February 17, 2023

Analysis by: Steven Epley, P.E.  
Samuel Starks

Drafting/Graphics by: Samuel Starks

Reviewed by: R. Steven Epley, P.E.  
Nick Liguori, P.E.

Sealed by: R. Steven Epley, P.E.



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## Executive Summary

The proposed NC 150 Turbyfill site is located on the south side of NC 150, approximately 450 feet west of the intersection of NC 150 and NC 16 Southbound Ramps in Lincoln County, North Carolina. The development proposes a 2,000 square-foot fast-food restaurant with a drive-through window and a 5,000-square-foot convenience store with ten (10) fueling pumps. One limited movement access point (left-in/right-in/right-out) is proposed on NC 150. The expected build-out year for this development is 2024. Information regarding the property was provided by Claude Gagne.

DAVENPORT was retained to determine the potential traffic impacts of this development and to identify transportation improvements that may be required to accommodate the impacts of the new development traffic.

The Transportation Impact Analysis (TIA) was performed based on the scope agreed upon with the North Carolina Department of Transportation (NCDOT) and Lincoln County. This site has a trip generation potential of 4,437 daily trips, 182 net trips in the AM peak hour, and 125 net trips in the PM peak hour.

In conclusion, this study has determined the potential traffic impacts of this development. Recommendations have been given to accommodate these impacts. The analysis indicates that with the recommended improvements in place, the proposed site is not expected to have a detrimental effect on transportation capacity and mobility in the study area. The recommendations in Exhibit A and in Table A should be constructed to comply with applicable NCDOT Policy on Street and Driveway Access to North Carolina Highways and local standards.

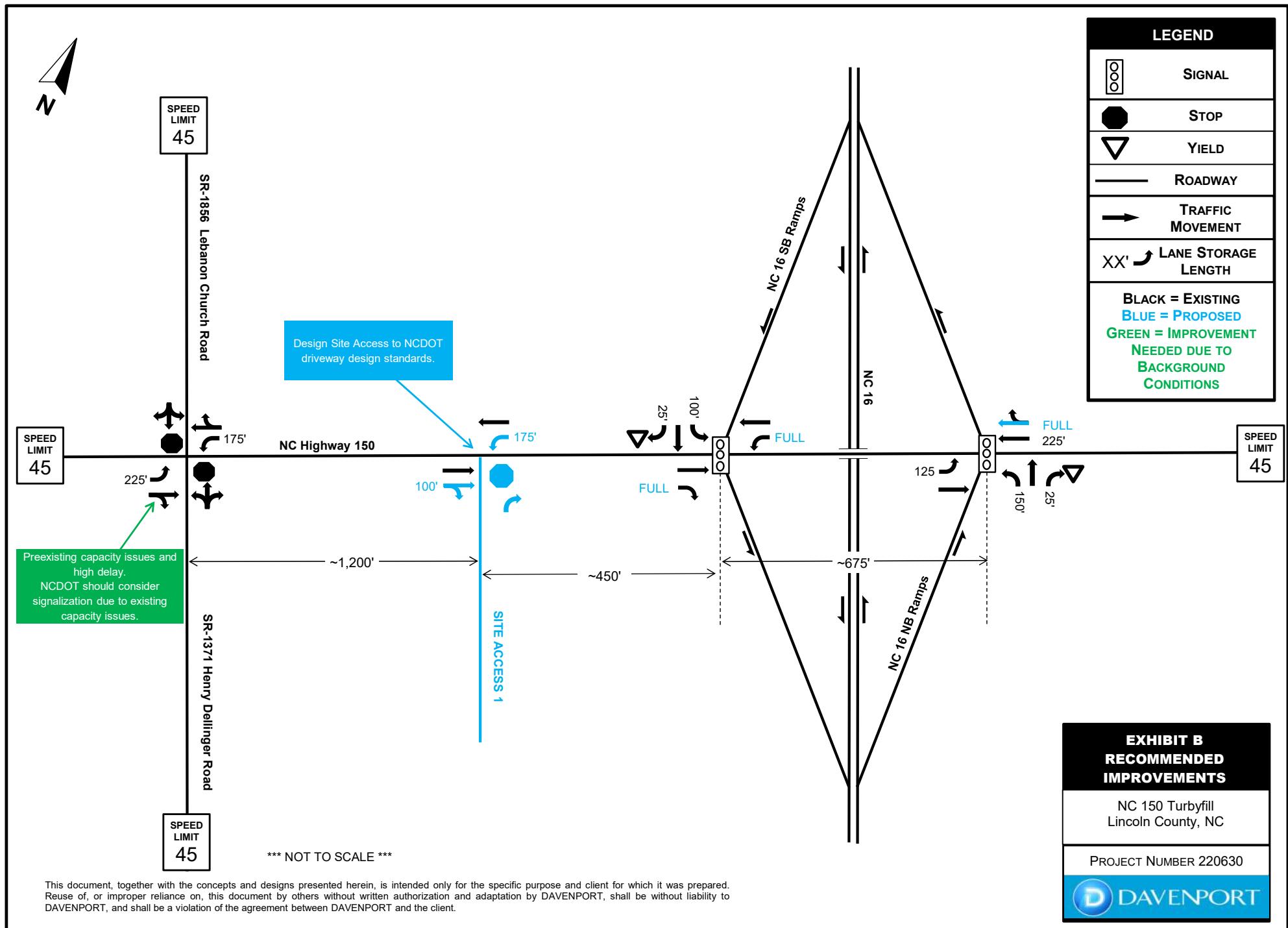
**Exhibit A – Conceptual Design**





**Table A – Recommended Improvements Summary**

Intersection	Improvements
NC 150 at Henry Dellinger Road and Lebanon Church Road	<ul style="list-style-type: none"> <li>• NCDOT should consider signalization due to the existing capacity issues.</li> </ul>
NC 150 at NC 16 Southbound Ramps	<ul style="list-style-type: none"> <li>• Extend the eastbound right-turn lane on NC 150 to Site Access 1.</li> <li>• Restripe the westbound NC 150 approach to extend the left turn lane storage to the northbound ramps and provide adequate signage.</li> <li>• Widen westbound NC 150 to provide a through lane from the northbound ramps.</li> </ul>
NC 150 at NC 16 Northbound Ramps	<ul style="list-style-type: none"> <li>• Reconfigure the westbound NC 150 right turn lane as a shared through/right turn lane with full length storage and stripe the inside through lane with 225 feet of storage. This improvement may require restriping existing pavement and constructing additional pavement.</li> </ul>
NC 150 at Site Access 1	<ul style="list-style-type: none"> <li>• Provide a westbound left turn lane on NC 150 with 175 feet of storage and appropriate deceleration/taper.</li> <li>• Provide an eastbound through/right turn lane on NC 150 with 100 feet of storage and appropriate deceleration/taper.</li> <li>• Design site access according to NCDOT driveway design standards.</li> </ul>
NCDOT STIP project R-2307A	<ul style="list-style-type: none"> <li>• Consideration should be given to extend project to SR-1371 (Henry Dellinger Road)/SR 1853 (Lebanon Church Road).</li> </ul>





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## 1.0 Introduction

The proposed NC 150 Turbyfill site is to be located on the south side of NC 150, approximately 450 feet west of the intersection of NC 150 and NC 16 Southbound Ramps in Lincoln County, North Carolina. The development proposes a 2,000 square foot fast-food restaurant with a drive-through window and a 5,000 square foot convenience store with ten (10) fueling pumps. One limited movement access point (left-in/right-in/right-out) is proposed on NC 150. The expected build-out year for this development is 2024. Information regarding the property was provided by Claude Gagne.

A conceptual site plan is shown in Figure 1, and a site location map and a vicinity map are provided in Figures 2A and 2B, respectively.

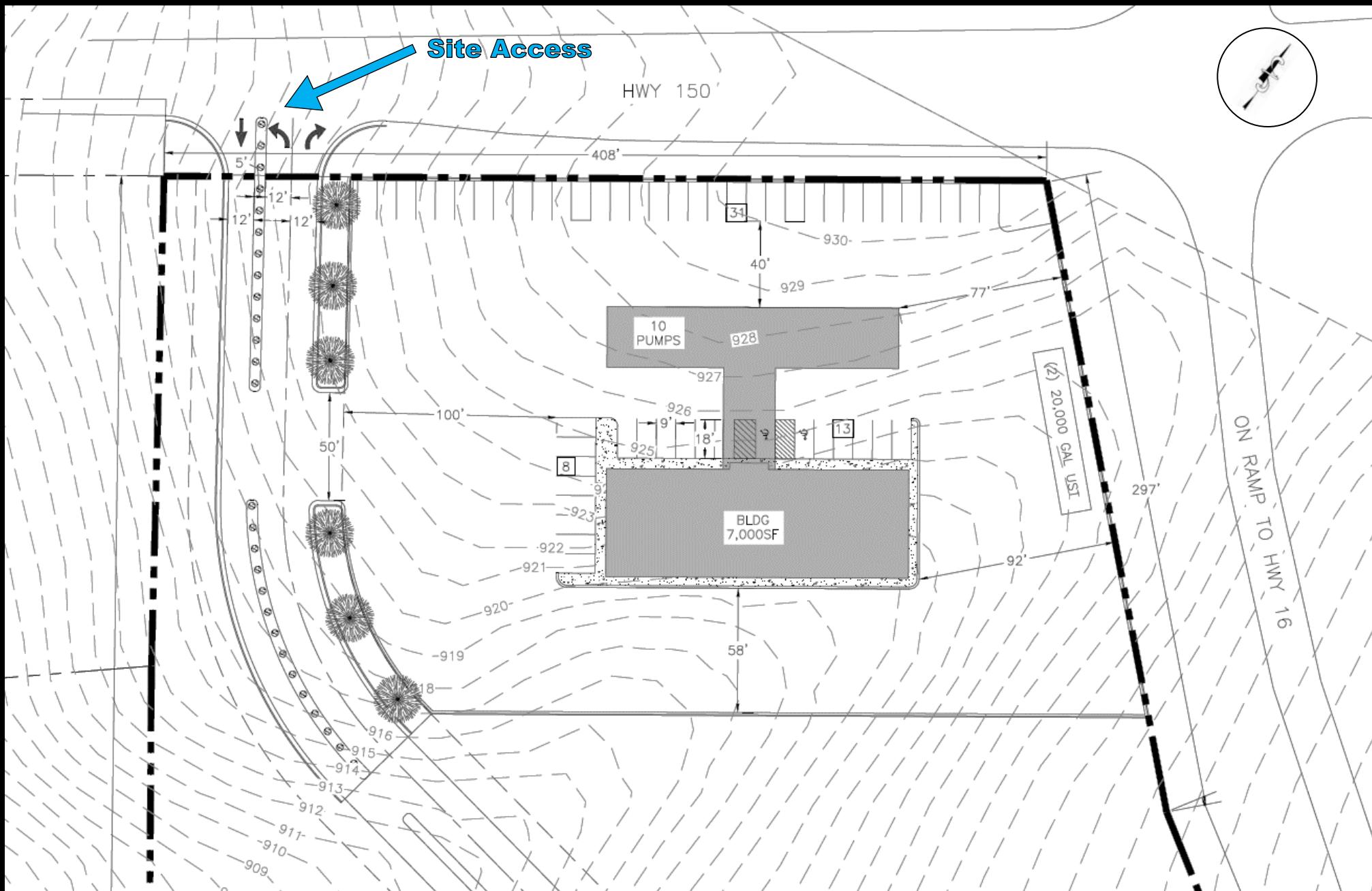
DAVENPORT was retained to determine the potential traffic impacts of this development and to identify transportation improvements that may be required to accommodate the impacts of the new development traffic. The following intersections were included in the study:

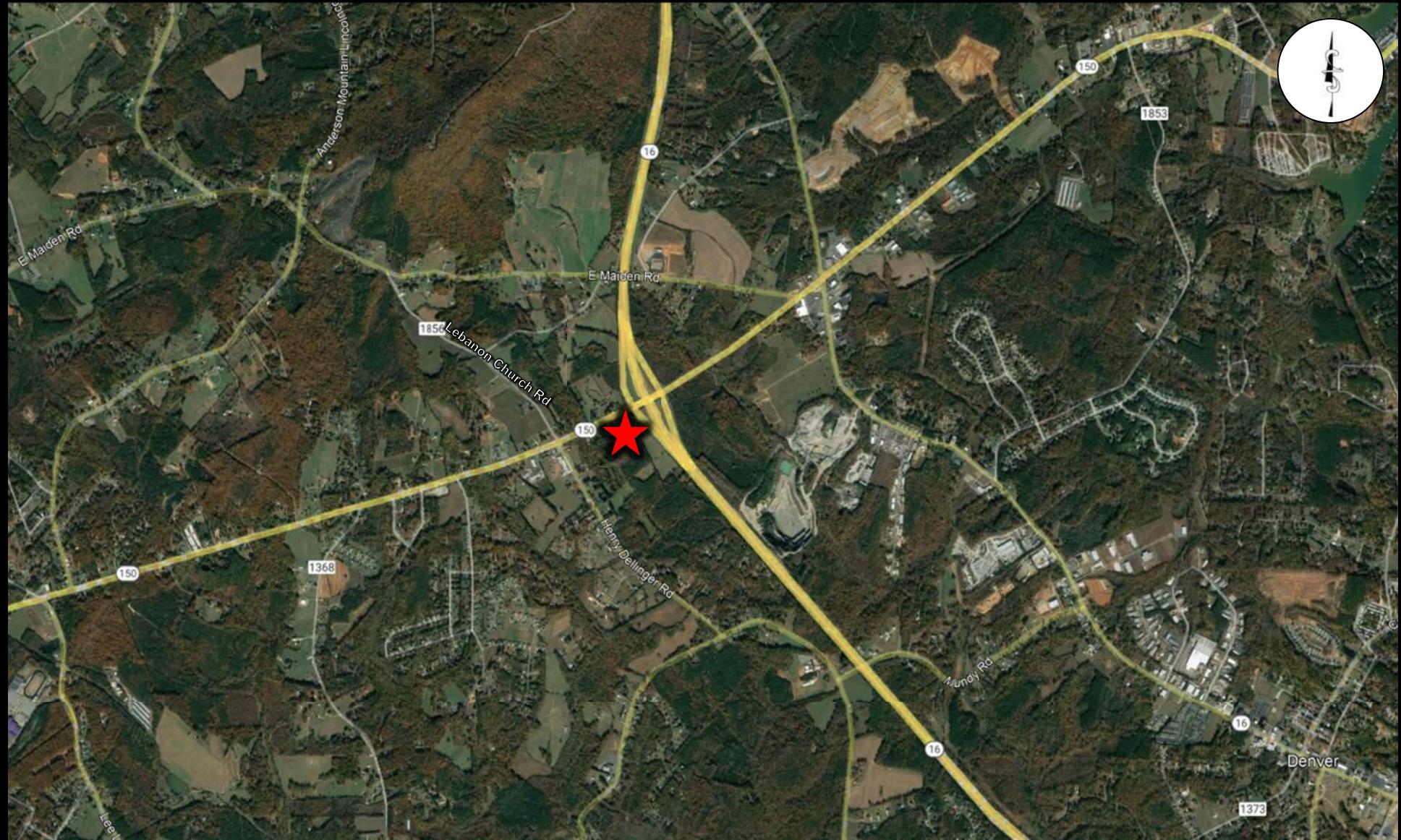
1. NC 150 at SR-1371 (Henry Dellinger Road)/SR 1853 (Lebanon Church Road) (unsignalized)
2. NC 150 at NC 16 Southbound Ramps (signalized)
3. NC 150 at NC 16 Northbound Ramps (signalized)
4. NC 150 at Proposed Site Access 1 (future right-in/right-out/left-in)

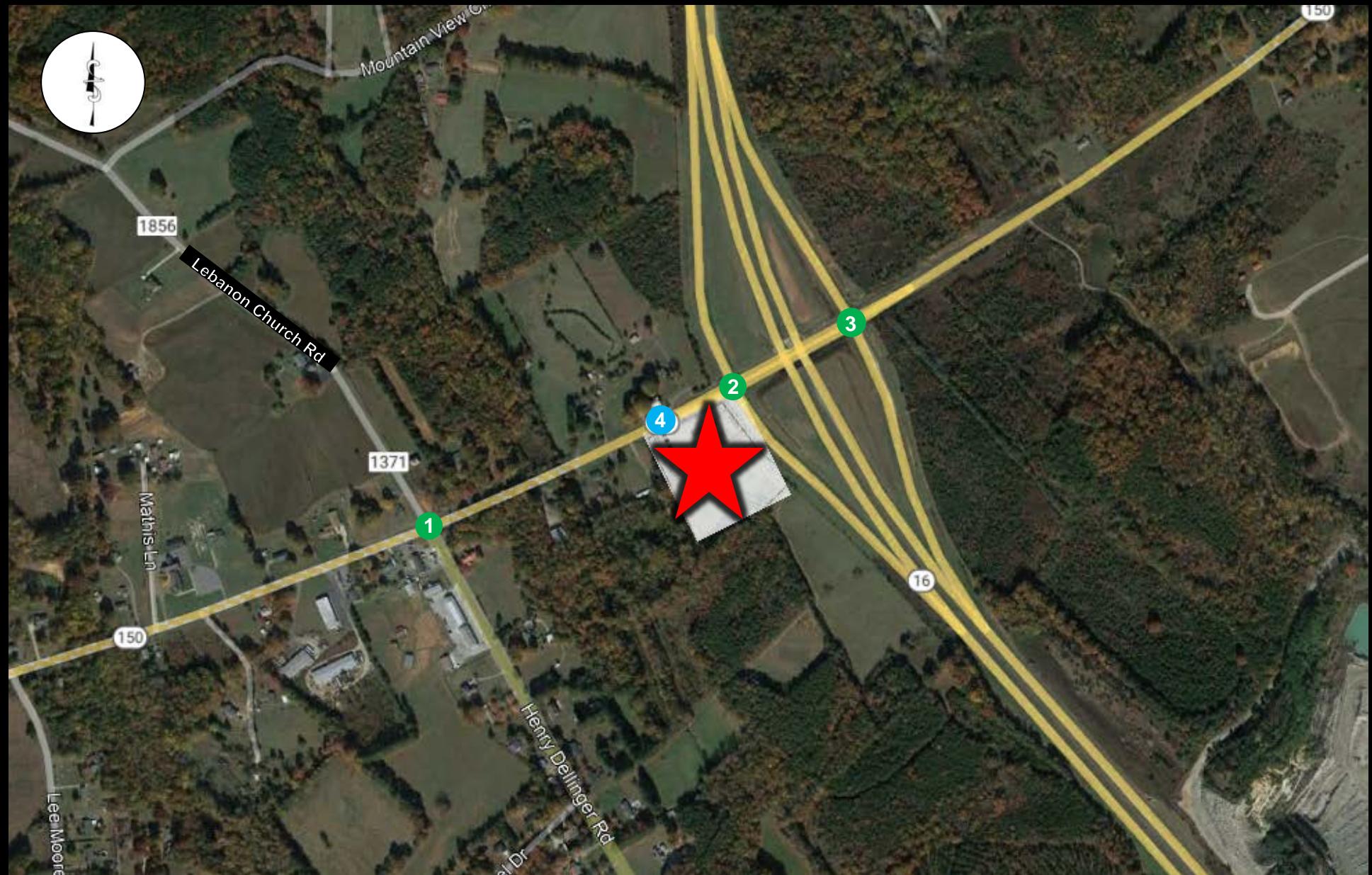
The intersections were analyzed during the AM (7-9 am) and PM (4-6 pm) peaks for the following conditions:

- 2022 Existing Conditions
- 2024 Future No Build Conditions
- 2024 Future Build Conditions
- 2024 Future Build Conditions with Improvements

The Transportation Impact Analysis (TIA) was performed based on the scope agreed upon with Lincoln County and North Carolina Department of Transportation (NCDOT). It was conducted according to the standards and best practices of the transportation engineering profession.







DAVENPORT

FIGURE 2B  
VICINITY MAP

STUDY INTERSECTIONS  
EXISTING  
PROPOSED





## 2.0 Existing Conditions

### 2.1 Inventory

Table 2.1 presents a summary of the study area roadway conditions. Figure 3 shows the existing lane geometry.

**Table 2.1 - Street Inventory**

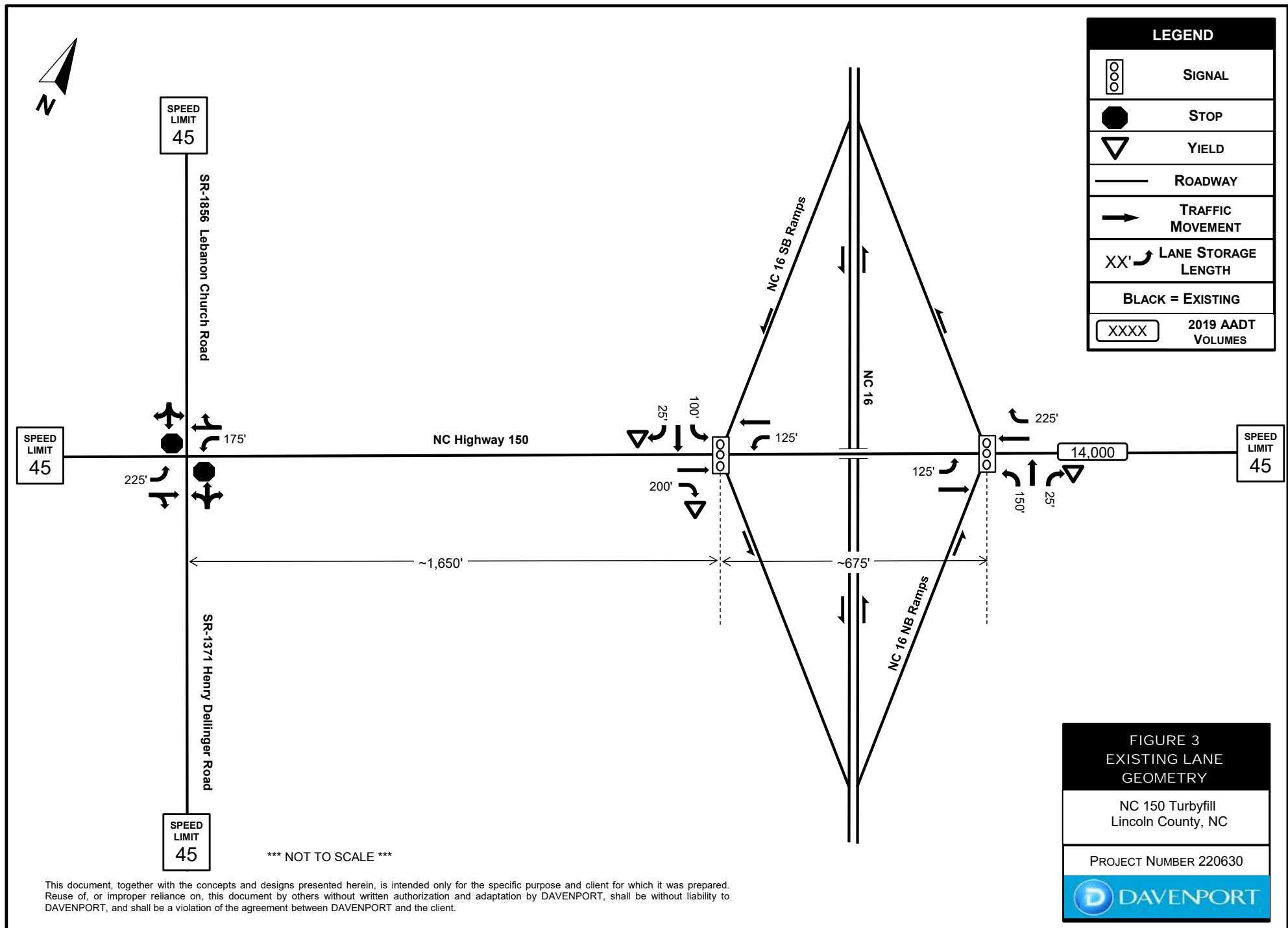
Facility Name	Route #	Typical Cross Section	Pavement Width	Speed Limit (MPH)	Maintained By
NC 150	NC 150	2-Lane Undivided	Approx. 25'	45 MPH	NCDOT
Lebanon Church Road	SR 1371	2-Lane Undivided	Approx. 20'	45 MPH	NCDOT
Henry Dellinger Road	SR 1371	2-Lane Undivided	Approx. 20'	45 MPH	NCDOT
NC 16	NC 16	4-lane Divided Diamond Interchange	Varies	55 MPH	NCDOT

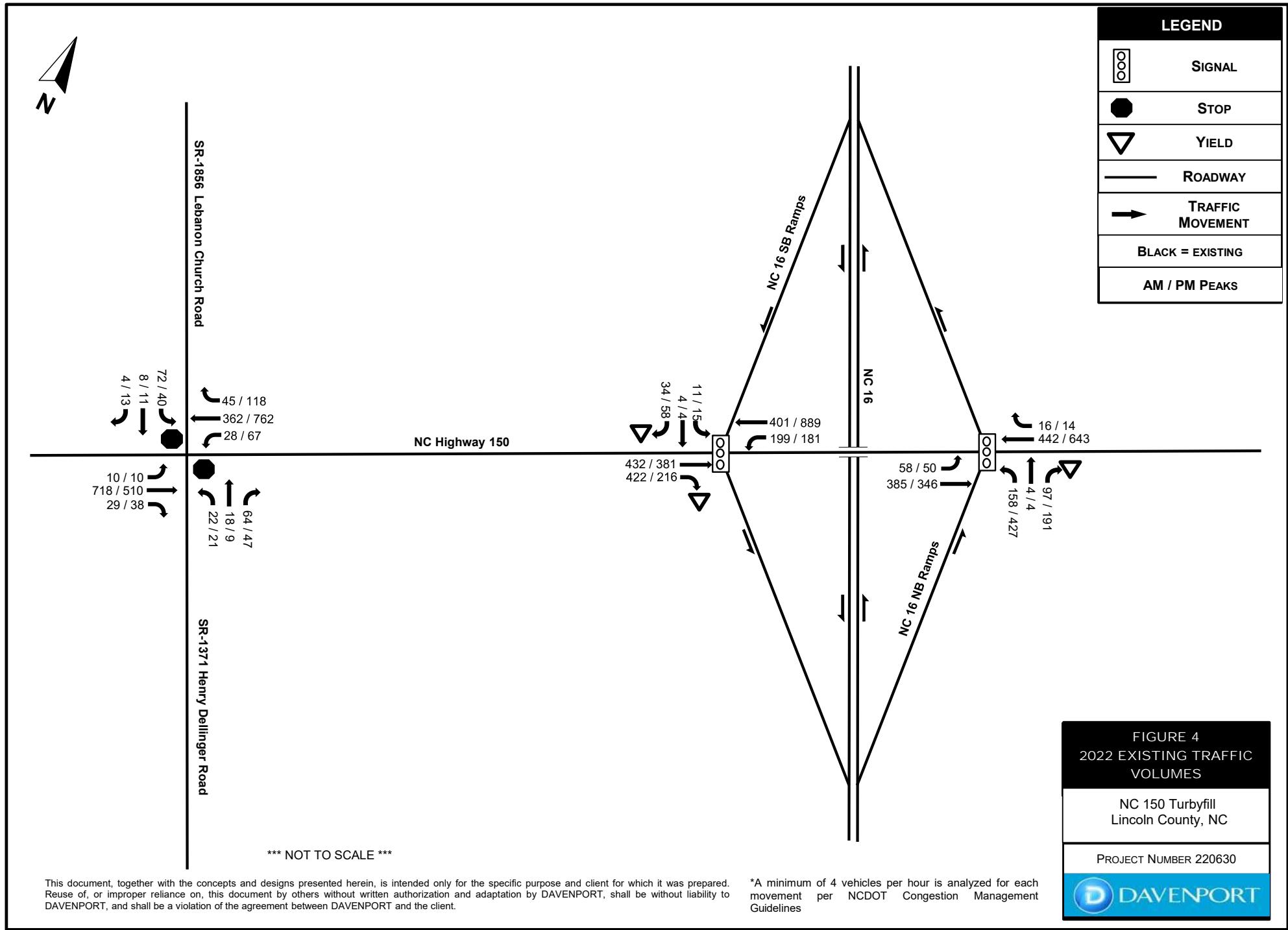
### 2.2 Existing Traffic Volumes

Existing traffic volumes for this project were collected by BSI Services. Table 2.2 the location, dates, and times these counts were conducted. The traffic volumes were balanced between the study intersections. Additionally, a minimum of four vehicles per hour were assigned to all movements in the analysis, per NCDOT Congestion Management standards. The existing AM and PM peak hour volumes are shown in Figure 4. Traffic count data are provided in the Appendix. Schools were in session at the time of traffic counts. A system peak hour was used for the traffic analysis. The peak hour occurred at approximately 7:15 to 8:15 AM, and 4:45 to 5:45 PM.

**Table 2.2 - Traffic Volume Data**

Count Location	Date Taken	Hours
NC 150 at Lebanon Church Road and Henry Dellinger Road	10/18/2022	7-9 AM, 4-6 PM
NC 150 at NC 16 Southbound Ramps	10/18/2022	7-9 AM, 4-6 PM
NC 150 at NC 16 Northbound Ramps	10/18/2022	7-9 AM, 4-6 PM







## 3.0 Approved Developments and Committed Improvements

### 3.1 Approved Developments

Approved developments are developments that have been recently approved in the area, but not yet constructed. Per NCDOT staff, there are three (3) approved developments to be considered in this analysis. The site trips generated from the approved developments were added into the future No Build volumes. Relevant information is provided in the Appendix.

Shannon Woods is a residential development consisting of up to 739 single family units located northeast of the intersection of NC 150 and NC 16 Business. The planned development has a buildout year of 2026. An approved TIA was prepared by Design Resource Group in August 2019.

Gabriel Village is a residential development that is to be constructed northwest of the intersection of NC 150 and Sherrills Ford Road. It was assumed that this development will be constructed by 2024. Information for this development was obtained from the Shannon Woods TIA.

North State is a residential development consisting of up to 240 multifamily apartment units located along NC 150 southwest of NC 150 and Maiden Road. It was assumed that this development will be constructed by 2024. Information for this development was obtained through a site plan and standard engineering practices.

### 3.2 Committed Improvements

Committed Improvements are improvements that are planned by NCDOT or a developer in the area, but not yet constructed. There is one (1) committed improvement in the study area. Under NCDOT STIP project R-2307A, NC 150 east of NC 16 is planned to be widened to four lanes. This project is planned to be completed by 2029. The completion of the project was out of the study year for this analysis, so any committed improvements were not included.

## 4.0 Methodology

### 4.1 Base Assumptions and Standards

In general, the analysis for this project was conducted utilizing commonly accepted NCDOT standards. The following table contains a summary of the base assumptions:

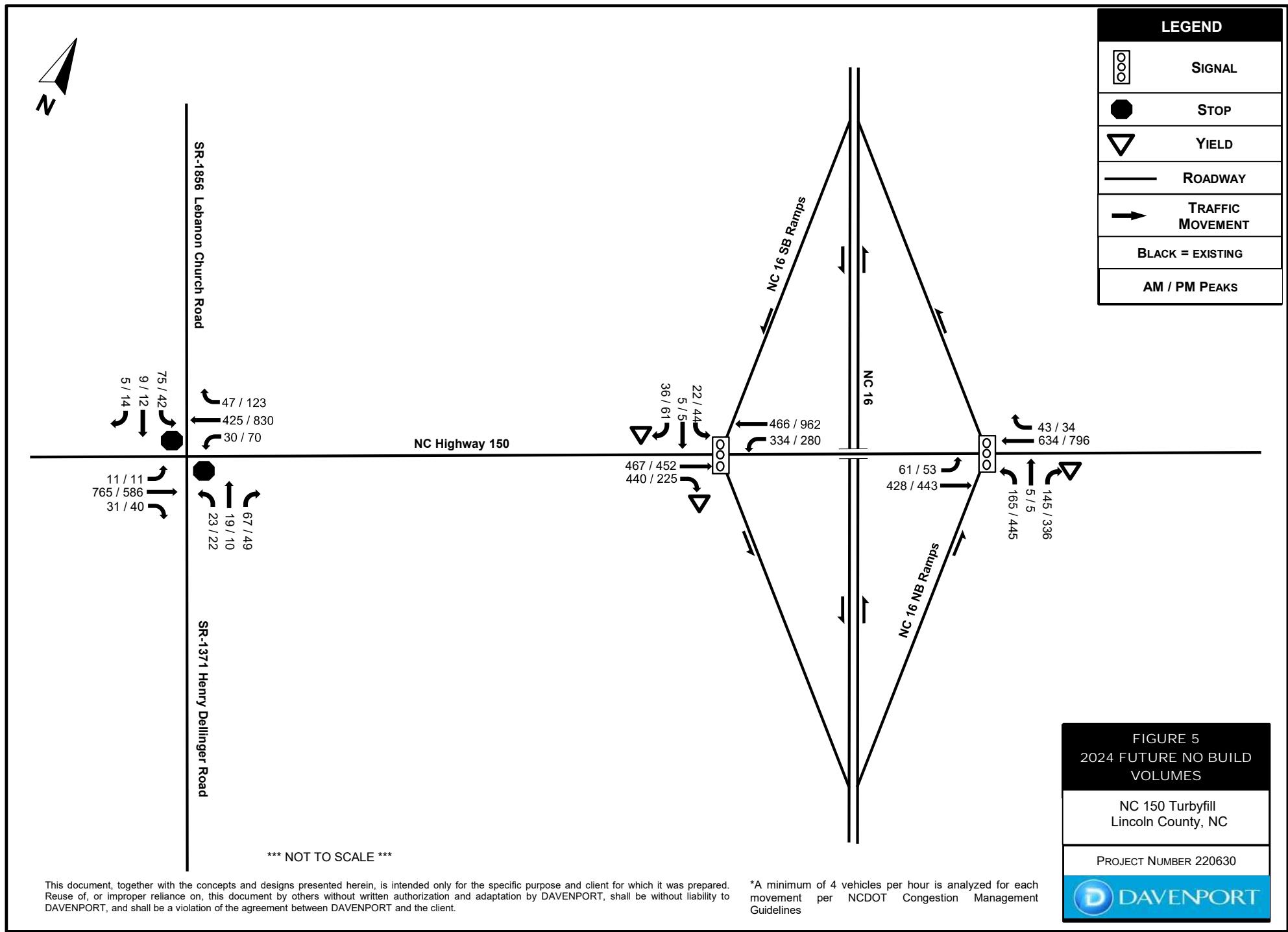
**Table 4.1 - Assumptions**

Annual Growth Rate	2%
Analysis Software	Synchro/SimTraffic
Lane Widths	12 feet
Peak Hour Factor	0.90
Truck Percentage	2%



#### **4.2 2024 Future No Build Traffic**

The 2024 future No Build traffic volumes were computed by applying a two percent (2.0%) compounded annual growth rate to the 2022 existing traffic volumes and adding approved development trips. Figure 5 shows 2024 future No Build traffic volumes for AM and PM peaks.





### 4.3 Trip Generation

The NC 150 Turbyfill site will contain 2,000 square feet of fast-food restaurant with a drive-through window and a 5,000-square-foot convenience store with ten (10) fueling pumps. The trip generation potential of this site was projected based on the 11<sup>th</sup> edition of *ITE Trip Generation Manual* and guidance from NCDOT Congestion Management on the selection of appropriate variables. Table 4.2 presents the results.

**Table 4.2 - ITE 11 Trip Generation**

Average Weekday Driveway Volumes				Weekday 24 Hour	AM Peak Hour		PM Peak Hour			
				Two-Way						
<u>Land Use</u>	<u>ITE Land Code</u>	<u>Size</u>	<u>Data Source</u>	<u>Volume</u>	<u>Enter</u>	<u>Exit</u>	<u>Enter</u>	<u>Exit</u>		
Fast-food Restaurant with Drive-Thru	934	2.0	Th.Sq.Ft. GLA	Rate - Adjacent	935	45	44	34	32	
10 Fueling Position Gas Station with Convenience Store	945	5.0	Th.Sq.Ft. GLA	Rate - Adjacent	3,502	141	142	136	137	
<b>Total Unadjusted Trips</b>				<b>4,437</b>	<b>186</b>	<b>186</b>	<b>170</b>	<b>169</b>		
<b>Pass By Trips</b>										
Fast Food Pass By		50% AM, 55% PM		--	-23	-22	-19	-18		
Convenience Store with Gas Station Pass By		76% AM, 75% PM		--	-107	-108	-102	-103		
Total Pass-by Reduction				--	-130	-130	-121	-120		
<b>Pass By: 10% Cap of Adjacent Street</b>				-	<b>-70</b>	<b>-70</b>	<b>-85</b>	<b>-85</b>		
<b>Internal Capture</b>										
Restaurant (LUC 934): AM (40% Entering, 15% Exiting), PM (30% Entering, 40% Exiting)				-	-18	-7	-10	-13		
Retail (LUC 945): AM (5% Entering, 13% Exiting), PM (9% Entering, 7% Exiting)				-	-7	-18	-12	-10		
<b>Total Adjusted (Primary) Trips</b>				<b>4,437</b>	<b>91</b>	<b>91</b>	<b>63</b>	<b>62</b>		

\*Pass-By capped at 10%

\*\*Per NCHRP 684 Internal Trip Capture Estimation Tool (See worksheets for more information)

Developments of this type also generate what are called “pass-by” trips. The ITE Trip Generation Manual defines “pass-by” trips as trips that are generated by the development but are already on the adjacent roadway. These trips are not new trips but are a part of the existing background traffic. Diverted link trips are defined as trips that exit a nearby freeway to visit the site and then resume traveling on that freeway. Pass-by and diverted link reductions were applied during the AM and PM peak hours as per NCDOT standards. A 10% of adjacent roadway cap reduction for total pass-by trips was applied.

Internal capture is defined as trips that visit different land uses while remaining within the site. The NCHRP 684 Internal Trip Capture Estimation Tool was used to calculate the reduction in the number of primary (external) trips. Primary trips are new trips on the roadway.

The reductions were calculated into the total unadjusted trips to obtain the total adjusted (primary) trips.



#### **4.4 Trip Distribution**

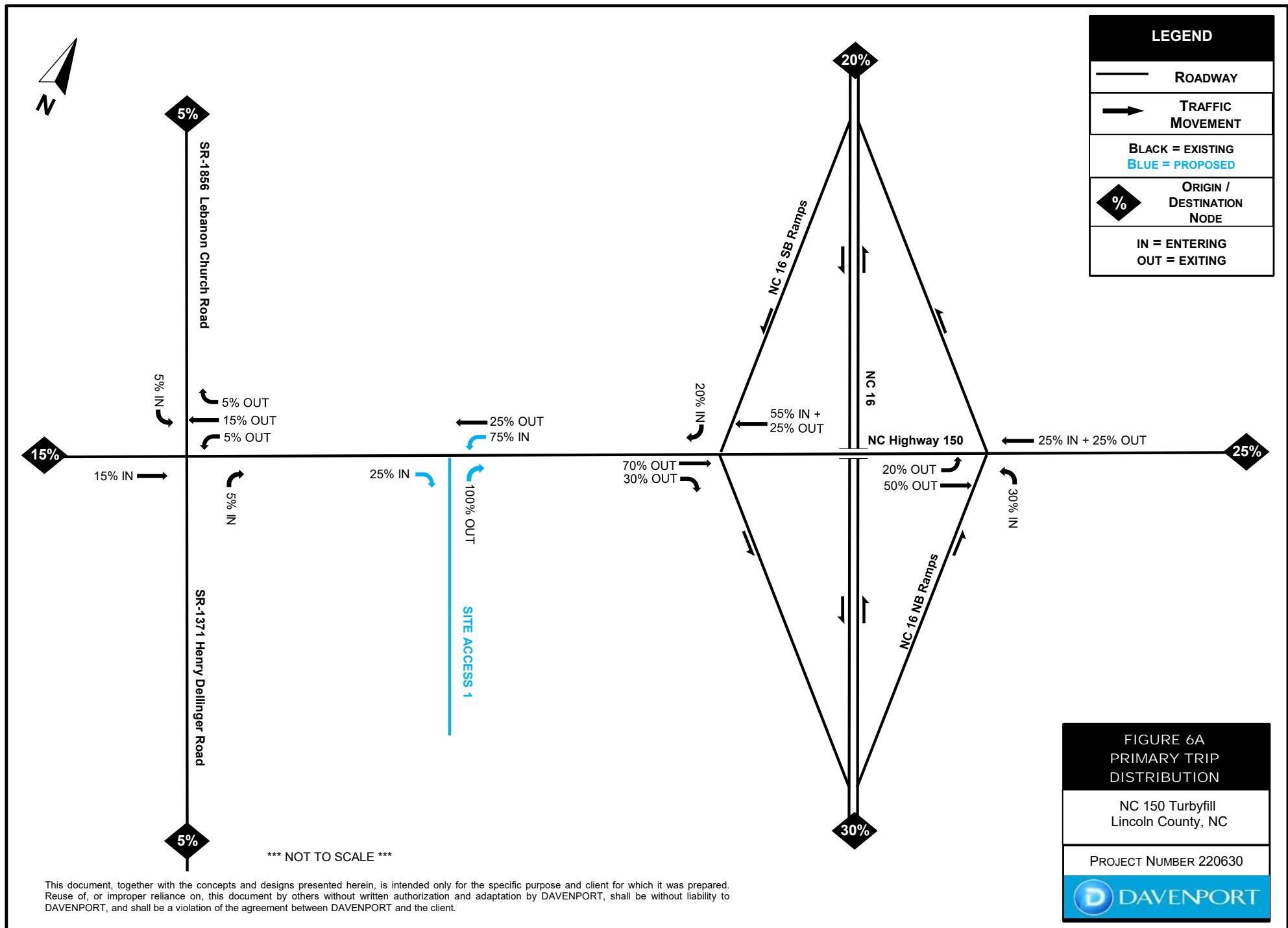
Site trips for this proposed development were distributed based on the existing ADTs, traffic patterns and engineering judgment. The primary trip distribution model is shown in Figure 6A, and the directional distributions for site trips are as follows:

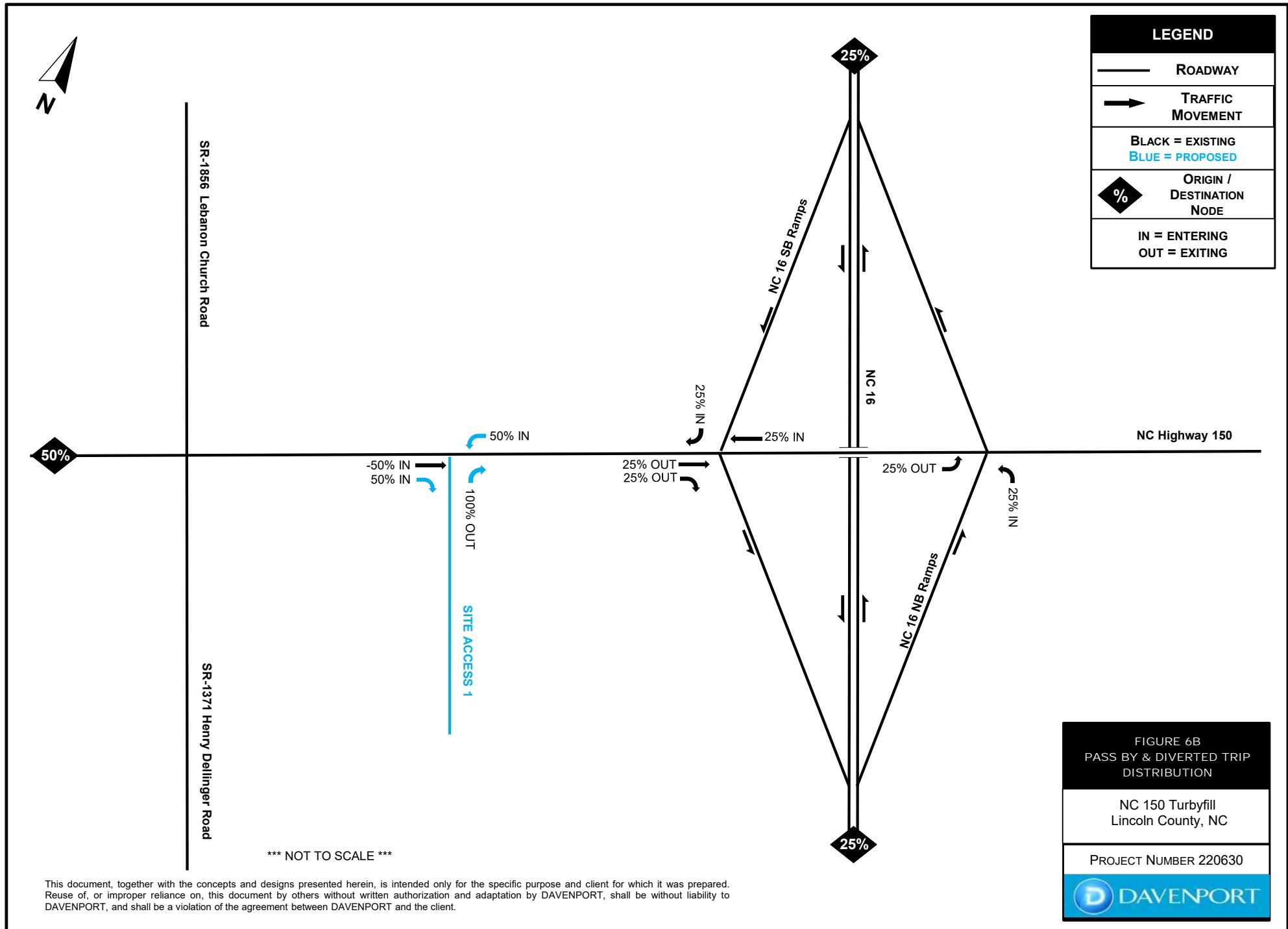
- 30% to and from the south on NC 16
- 25% to and from the east on NC 150
- 20% to and from the north on NC 16
- 15% to and from the west on NC 150
- 5% to and from the north on Lebanon Church Road
- 5% to and from the south on Henry Dellinger Road

Pass-by trips and diverted link trips for the proposed development were also distributed based on the existing ADTs, traffic patterns and engineering judgment. The pass-by trip distribution models are shown in Figure 6B.

#### **4.5 2024 Future Build Volumes**

The 2024 build-out traffic volumes were obtained by summing the 2024 future No Build volumes, site trips, and pass-by/diverted link trips due to the proposed development. Primary trips and pass-by/diverted link trips are shown in Figure 7A and 7B, respectively. The 2024 future Build volumes are shown in Figure 8.





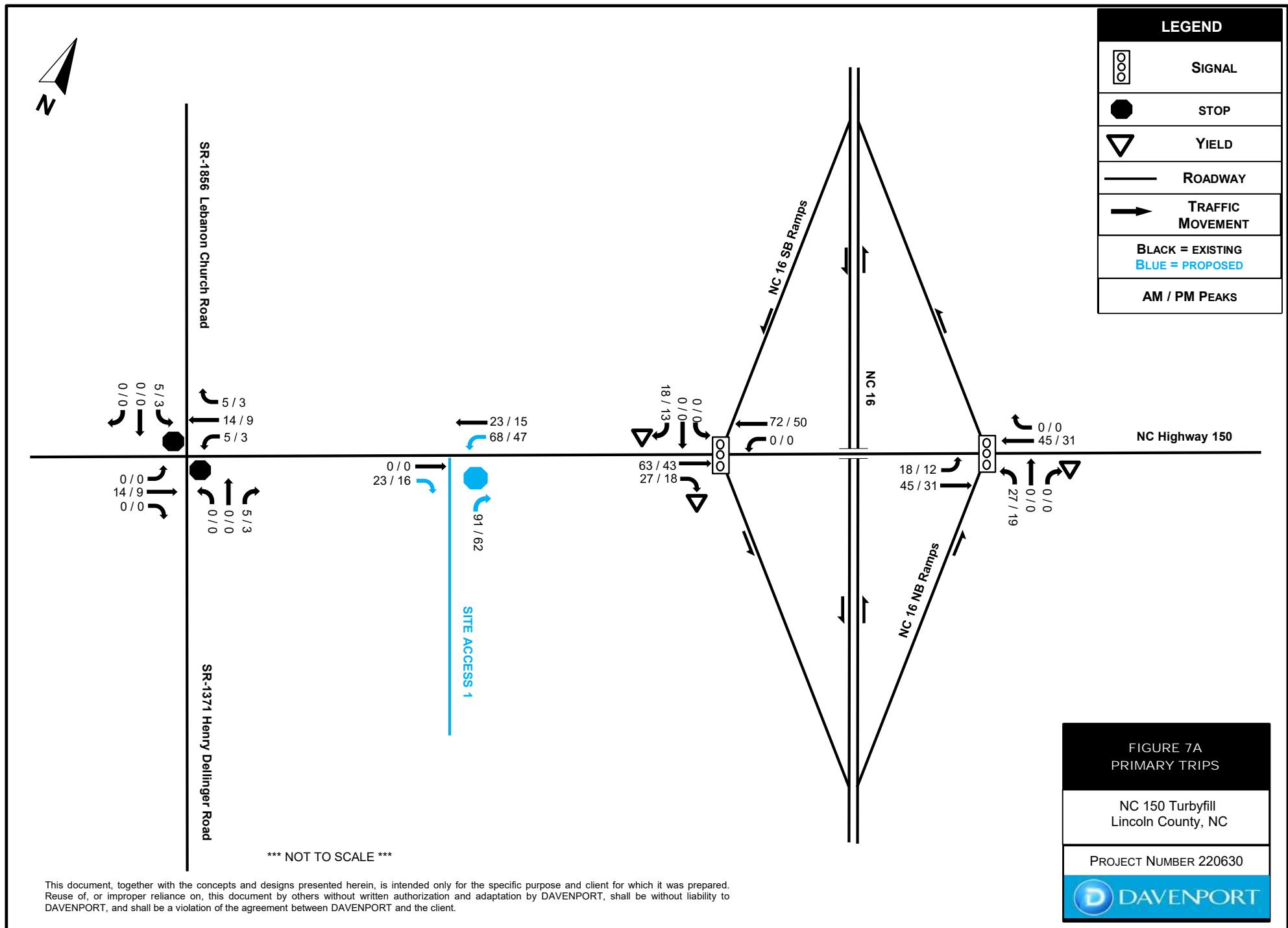
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FIGURE 6B  
PASS BY & DIVERTED TRIP  
DISTRIBUTION

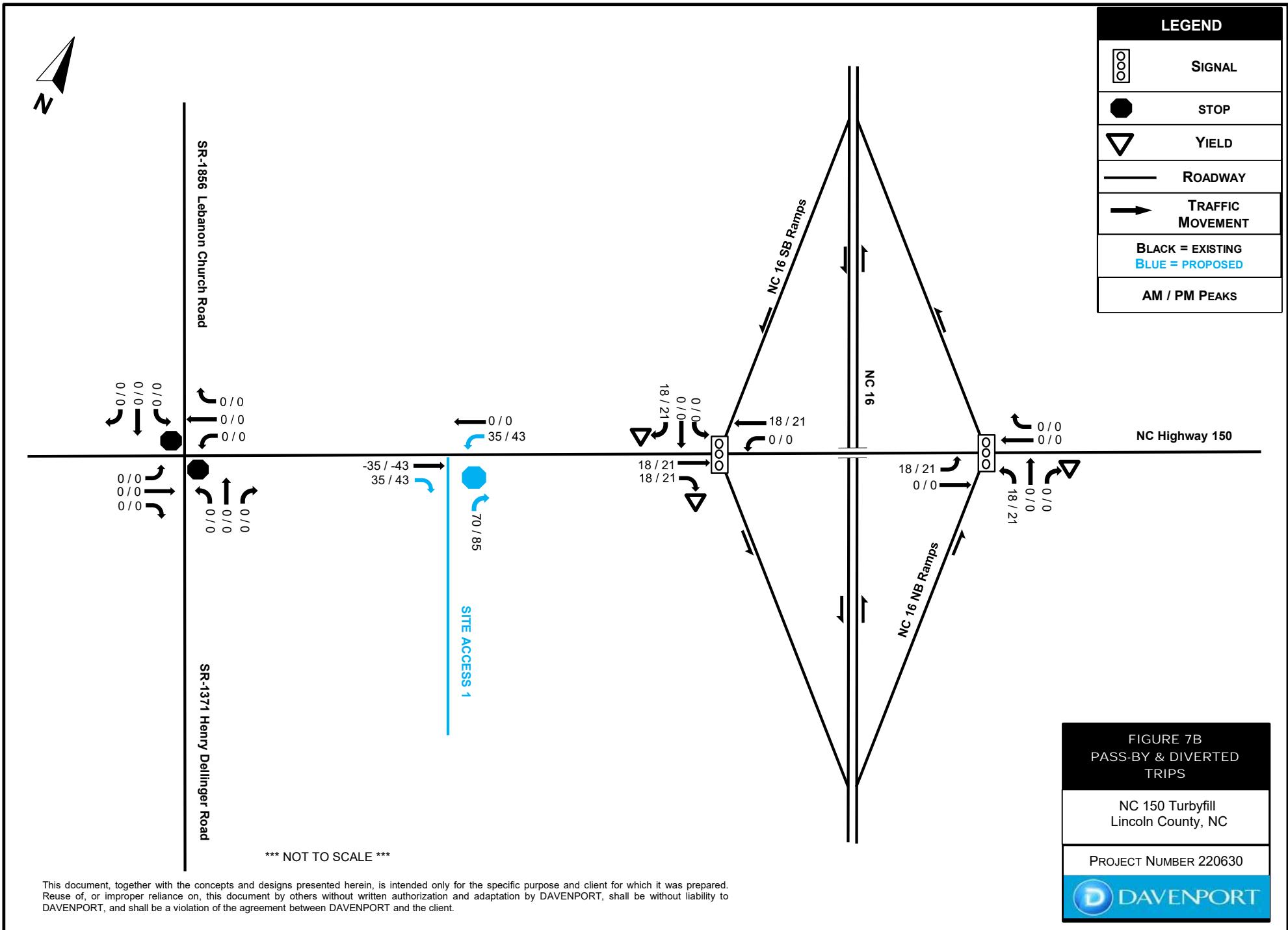
NC 150 Turbyfill  
Lincoln County, NC

PROJECT NUMBER 220630

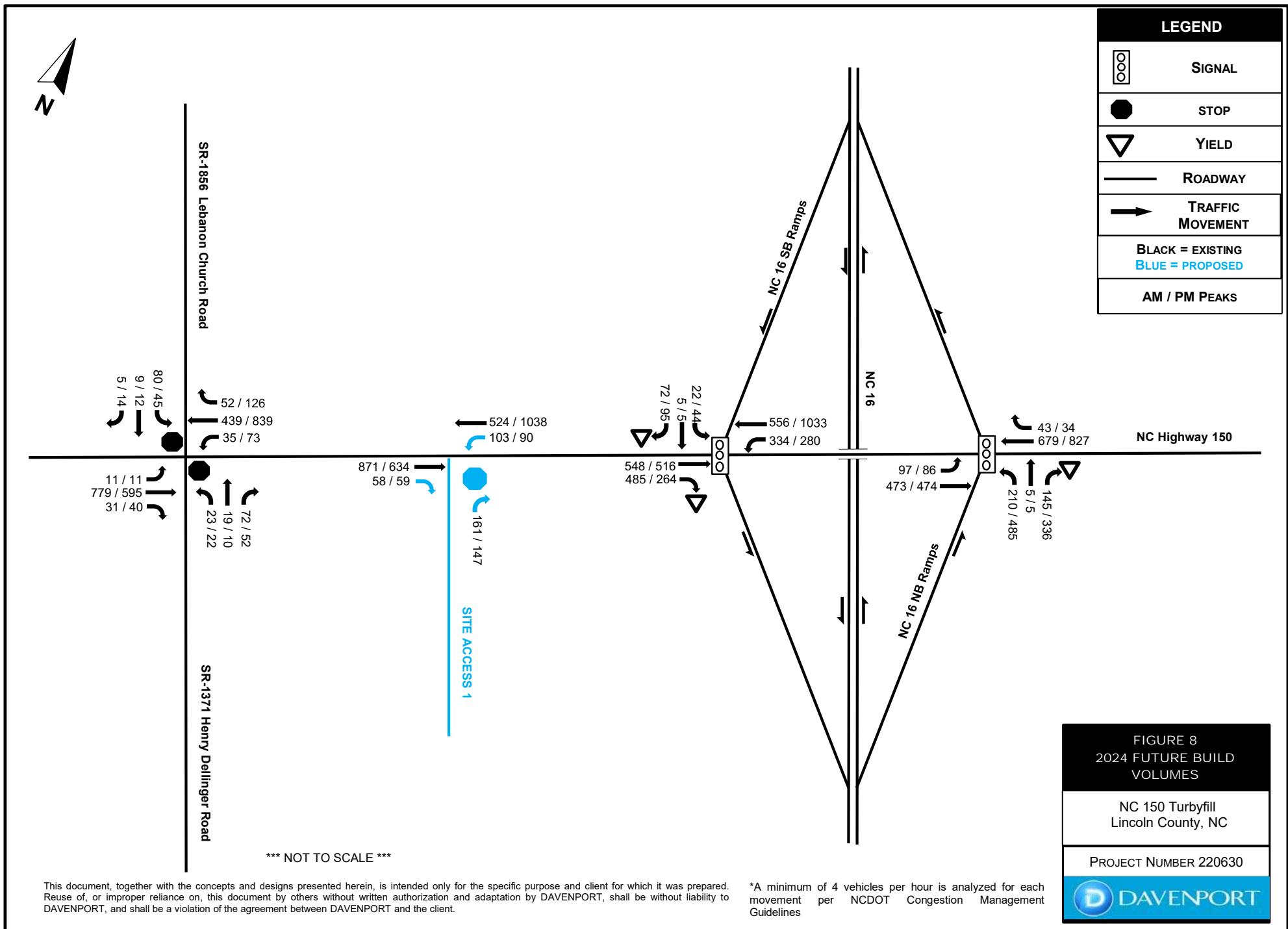




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## 5.0 Capacity Analysis

### 5.1 Level of Service Evaluation Criteria

The Transportation Research Board's *Highway Capacity Manual* (HCM) utilizes a term "level of service" (LOS) to measure how traffic operates in intersections and on roadway segments. There are six levels of service ranging from A to F as shown in Table 5.1. Level of service "A" represents low-volume traffic operations and Level of Service "F" represents high-volume, oversaturated traffic operations. Synchro Traffic Modeling software was used to determine the level of service for studied intersections. Synchro analysis worksheet reports are provided in the Appendix.

**Table 5.1 – Highway Capacity Manual**

Levels of Service and Control Delay Criteria			
Signalized Intersection		Unsignalized Intersection	
Level of Service	Control Delay Per vehicle (seconds)	Level of Service	Delay Range (seconds)
A	$\leq 10$	A	$\leq 10$
B	$> 10$ and $\leq 20$	B	$> 10$ and $\leq 15$
C	$> 20$ and $\leq 35$	C	$> 15$ and $\leq 25$
D	$> 35$ and $\leq 55$	D	$> 25$ and $\leq 35$
E	$> 55$ and $\leq 80$	E	$> 35$ and $\leq 50$
F	$> 80$	F	$> 50$



## 5.2 Level of Service Results

The results of the level of service analysis are discussed by intersection below. Figure 9 illustrates the recommendations at each intersection.

### NC 150 at Lebanon Church Road and Henry Dellinger Road

This unsignalized intersection currently operates at LOS F in the AM and PM peaks. This intersection is expected to remain at LOS F in No Build and Build conditions for both peak hours with a significant increase in delay between Existing, No Build, and Build conditions. LOS F is attributed to the difficulty of left turn traffic entering the major roadway (NC 150) from the north and south. Traffic turning left from the minor approaches have difficulty finding an acceptable gap in traffic along the major roadway, which leads to a high delay. NCDOT should consider signalization due to the existing capacity issues. A signalized intersection would have an overall LOS B in the AM and PM peak hours. However, no improvements are recommended to be mitigated by the proposed development due the following reasons:

- Existing LOS F at intersection.
- Adding less than three and half percent (3.5%) of traffic to the overall intersection
- Adding less than six percent (6%) to any approach.

**Table 5.2.1 - LOS for NC 150 at Henry Dellinger Road and Lebanon Church Road**

AM Peak Hour					
Scenario	Overall LOS or Worst Approach	Level of Service (Delay) per Movement & by Approach (Delay in seconds/vehicle)			
		Eastbound	Westbound	Northbound	Southbound
<b>2022 Existing</b>	F (86.0) SB Approach	A (0.1)	A (0.6)	E (35.5)	F (86.0)
<b>2024 No Build</b>	F (157.7) SB Approach	A (0.1)	A (0.6)	E (48.7)	F (157.7)
<b>2024 Build</b>	F (224.6) SB Approach	A (0.1)	A (0.7)	F (55.9)	F (224.6)
<b>2024 Build + Improvements</b>	B (14.9)	B (16.5)	A (8.9)	C (24.0)	C (23.8)
PM Peak Hour					
<b>2022 Existing</b>	F (98.3) SB Approach	A (0.2)	A (0.6)	F (54.9)	F (93.8)
<b>2024 No Build</b>	F (186.1) SB Approach	A (0.2)	A (0.6)	F (103.2)	F (186.1)
<b>2024 Build</b>	F (235.0) SB Approach	A (0.2)	A (0.7)	F (111.1)	F (235.0)
<b>2024 Build + Improvements</b>	B (15.6)	A (7.5)	B (17.9)	C (34.9)	C (34.1)



## NC 150 at NC 16 Southbound Ramps

This signalized intersection currently operates at LOS A in the AM and PM peak hours. In No Build and Build conditions, the intersection is expected to operate at LOS B in the No Build and Build conditions for both peak hours. It was observed in SimTraffic that queueing issues occurred on the east and westbound approaches along NC 150. The following improvements are recommended:

- Extend the eastbound right-turn lane on NC 150 to Site Access 1.
- Restripe the westbound NC 150 approach to extend the left turn lane storage to the northbound ramps.
- Restripe and extend the westbound NC 150 through lane approach to the northbound ramps. Additional pavement needed.

With these improvements in place, the intersection is expected to remain at LOS B for both peak hours with this improvement in place. See Figure 9 for an illustration of the improvement.

Table 5.2.2 - LOS for NC 150 at NC 16 Southbound Ramps

AM Peak Hour				
Scenario	Overall LOS or Worst Approach	Level of Service (Delay) per Movement & by Approach (Delay in seconds/vehicle)		
		Eastbound	Westbound	Southbound
<b>2022 Existing</b>	A (3.6)	A (3.2)	A (1.5)	D (35.4)
<b>2024 No Build</b>	B (17.1)	B (13.9)	C (20.2)	C (24.9)
<b>2024 Build</b>	B (17.2)	B (15.7)	B (18.6)	C (20.4)
<b>2024 Build + Improvements</b>	B (17.0)	B (15.7)	B (18.0)	C (21.7)
PM Peak Hour				
<b>2022 Existing</b>	A (4.3)	A (3.5)	A (2.8)	C (32.3)
<b>2024 No Build</b>	B (13.3)	B (13.1)	B (12.3)	C (26.1)
<b>2024 Build</b>	B (14.3)	B (14.2)	B (13.1)	C (25.9)
<b>2024 Build + Improvements</b>	B (13.4)	B (14.2)	B (11.9)	C (22.9)



## NC 150 at NC 16 Northbound Ramps

This signalized intersection currently operates at LOS B in the AM peak hour and LOS E in the PM peak hour. In No Build conditions, the intersection is expected to operate at LOS B in the AM peak hour and LOS D in the PM peak hour. In Build conditions, the intersection is expected to remain at LOS B in the AM peak hour and LOS D in the PM peak hour. It was observed in SimTraffic that queueing issues occurred on the westbound approach along NC 150 and in the PM peak and a high delay was observed along the northbound approach. The following improvements are recommended:

- Reconfigure the westbound NC 150 right turn lane as a shared through/right turn lane with full length storage and stripe the inside through lane with 225 feet of storage. This improvement may require restriping existing pavement and constructing additional pavement.

With these improvements in place, this intersection is expected to operate at LOS B in the AM peak and LOS C in the PM peak. It was observed in SimTraffic that queueing issues occurred on the westbound approaches along NC 150. It should be noted that traffic was not evenly distributed between the dual through lanes but heavily favored one lane due to the lane continuing past the next intersection. Traffic patterns may equalize after implementation, but consideration should be given to the STIP project R-2307A for adding additional through lanes to NC 150 to the SR-1371 (Henry Dellinger Road)/SR 1853 (Lebanon Church Road).

Table 5.4 - LOS for NC 150 at NC 16 Northbound Ramps				
AM Peak Hour				
Scenario	Overall LOS or Worst Approach	Level of Service (Delay) per Movement & by Approach (Delay in seconds/vehicle)		
		Eastbound	Westbound	Northbound
<b>2022 Existing</b>	B (15.8)	A (1.4)	A (9.4)	D (51.8)
<b>2024 No Build</b>	B (16.3)	A (8.7)	B (16.3)	C (28.3)
<b>2024 Build</b>	B (20.0)	B (12.5)	B (19.2)	C (33.5)
<b>2024 Build + Improvements</b>	B (17.4)	B (11.8)	B (16.1)	C (28.9)
PM Peak Hour				
<b>2022 Existing</b>	E (78.4)	A (2.8)	B (14.6)	F (194.1)
<b>2024 No Build</b>	*D (40.4)	B (13.0)	D (45.7)	D (52.1)
<b>2024 Build</b>	D (46.5)	B (17.5)	D (50.4)	E (62.1)
<b>2024 Build + Improvements</b>	C (26.4)	C (23.1)	C (27.8)	C (27.3)

**\*Note:** The intersection reduces delay in the 2024 future No Build scenario in PM peak due to applying congestion management protocols to future models in Synchro.



## NC 150 at Site Access 1

This proposed right-in/right-out/left-in intersection is expected to operate at LOS D and LOS C in the AM and PM peak hours, respectively, in Build conditions. Based on NCDOT turn lane warrants criteria and projected volumes, the following improvement(s) are recommended:

- Provide a westbound left turn lane with 175 feet of storage and appropriate deceleration/taper on NC 150.
- Provide an eastbound shared through/right turn lane with 100 feet of storage and appropriate deceleration taper on NC 150.
- Design Site Access 1 to NCDOT driveway design standards.

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

Table 5.2.4 - LOS for NC 150 at Site Access 1				
AM Peak Hour				
Scenario	Overall LOS or Worst Approach	Level of Service (Delay) per Movement & by Approach (Delay in seconds/vehicle)		
		Eastbound	Westbound	Northbound
2024 Build	D (34.3) NB Approach	A (0.0)	A (1.9)	D (34.3)
2024 Build + Improvements	C (16.0) NB Approach	A (0.0)	A (1.9)	C (16.0)
PM Peak Hour				
2024 Build	C (19.0) NB Approach	A (0.0)	A (0.8)	C (19.0)
2024 Build + Improvements	B (13.0) NB Approach	A (0.0)	A (0.8)	C (13.0)

### 5.3 Internal Protected Stream

The NCDOT Driveway Manual recommends a 100-foot internal protected stem (IPS) on any site driveway, measured from the right of way of the adjacent street to the nearest on-site parking entrance or other conflict point. Based on the site plan shown in Figure 1, Site Access 1 has an IPS of approximately 125 feet.

Based on the site layout and the queue analysis, it is recommended that Site Access 1 be designed with 150 feet of stem length with no left turn conflicts. It is also recommended that the driveway be located to the maximum IPS that the property will allow if any future development(s) are planned. Any additional development would increase the IPS from NC 150 and could possibly close left-turn access at the site.



## 6.0 Queue Results

The adequacy of turn lane lengths was reviewed with a queuing analysis using SimTraffic software. This simulation utilized an NCDOT-standard simulation with 10-minute seeding time and 60-minute recording time. The results are shown in Tables 6.0.1 through 6.0.4 below for all exclusive turn lanes. Recommended improvements are illustrated in Figure 9.

**Table 6.0.1 - Queues for NC 150 at Henry Dellinger Road and Lebanon Church Road**

AM PEAK						
Scenario	Lane Configuration					
2022 Existing	EBL	EBTR	WBL	WBTR	NBLTR	SBLTR
Max Queue (Ft)	25	2	38	2	106	107
95th Percentile Queue (Ft)	0	0	3	0	65	103
Storage Bay	225	FULL	175	FULL	FULL	FULL
2024 Future No Build	EBL	EBTR	WBL	WBTR	NBLTR	SBLTR
Max Queue (Ft)	25	2	51	4	129	132
95th Percentile Queue (Ft)	0	0	3	0	88	148
Storage Bay	225	FULL	175	FULL	FULL	FULL
2024 Future Build	EBL	EBTR	WBL	WBTR	NBLTR	SBLTR
Max Queue (Ft)	23	3	55	7	160	162
95th Percentile Queue (Ft)	0	0	5	0	100	180
Storage Bay	225	FULL	175	FULL	FULL	FULL
2024 Future Build + Improvements	EBL	EBTR	WBL	WBTR	NBLTR	SBLTR
Max Queue (Ft)	27	303	51	218	94	112
95th Percentile Queue (Ft)	8	#444	23	186	85	74
Storage Bay	225	FULL	175	FULL	FULL	FULL
PM PEAK						
Scenario	Lane Configuration					
2022 Existing	EBL	EBTR	WBL	WBTR	NBLTR	SBLTR
Max Queue (Ft)	29	2	45	7	83	86
95th Percentile Queue (Ft)	0	0	5	0	70	88
Storage Bay	225	FULL	175	FULL	FULL	FULL
2024 Future No Build	EBL	EBTR	WBL	WBTR	NBLTR	SBLTR
Max Queue (Ft)	28	2	48	6	96	146
95th Percentile Queue (Ft)	3	0	8	0	113	130
Storage Bay	225	FULL	175	FULL	FULL	FULL
2024 Future Build	EBL	EBTR	WBL	WBTR	NBLTR	SBLTR
Max Queue (Ft)	37	2	57	11	122	137
95th Percentile Queue (Ft)	3	0	8	0	120	148
Storage Bay	225	FULL	175	FULL	FULL	FULL
2024 Future Build + Improvements	EBL	EBTR	WBL	WBTR	NBLTR	SBLTR
Max Queue (Ft)	71	234	94	344	182	95
95th Percentile Queue (Ft)	8	245	31	#762	43	37
Storage Bay	225	FULL	175	FULL	FULL	FULL

Notes: m Volume for queue is metered by upstream signal

# Indicates 95th-percentile volume exceeds capacity, queue may be longer



Table 6.0.2 - Queues for NC 150 at NC 16 Southbound Ramps

AM PEAK						
Scenario	Lane Configuration					
2022 Existing	EBT	EBR	WBL	WBT	SBL	SBTR
Max Queue (Ft)	472	372	82	80	53	58
95th Percentile Queue (Ft)	173	24	25	49	33	43
Storage Bay	FULL	200	125	FULL	100	FULL
2024 Future No Build	EBT	EBR	WBL	WBT	SBL	SBTR
Max Queue (Ft)	292	296	310	252	60	45
95th Percentile Queue (Ft)	348	110	322	72	37	35
Storage Bay	FULL	200	125	FULL	100	FULL
2024 Future Build	EBT	EBR	WBL	WBT	SBL	SBTR
Max Queue (Ft)	303	293	330	302	68	113
95th Percentile Queue (Ft)	417	149	321	135	37	46
Storage Bay	FULL	200	125	FULL	100	FULL
2024 Future Build + Improvements	EBT	EBR	WBL	WBT	SBL	SBTR
Max Queue (Ft)	290	328	353	182	52	89
95th Percentile Queue (Ft)	430	157	290	246	39	48
Storage Bay	FULL	FULL	FULL	FULL	100	FULL
PM PEAK						
Scenario	Lane Configuration					
2022 Existing	EBT	EBR	WBL	WBT	SBL	SBTR
Max Queue (Ft)	92	127	78	99	56	92
95th Percentile Queue (Ft)	152	20	m15	m78	40	52
Storage Bay	FULL	200	125	FULL	100	FULL
2024 Future No Build	EBT	EBR	WBL	WBT	SBL	SBTR
Max Queue (Ft)	241	128	264	274	88	92
95th Percentile Queue (Ft)	312	40	m197	m242	61	43
Storage Bay	FULL	200	125	FULL	100	FULL
2024 Future Build	EBT	EBR	WBL	WBT	SBL	SBTR
Max Queue (Ft)	267	125	338	408	84	148
95th Percentile Queue (Ft)	380	42	m202	m291	66	55
Storage Bay	FULL	200	125	FULL	100	FULL
2024 Future Build + Improvements	EBT	EBR	WBL	WBT	SBL	SBTR
Max Queue (Ft)	348	197	268	220	94	115
95th Percentile Queue (Ft)	373	43	m172	532	61	52
Storage Bay	FULL	FULL	FULL	FULL	100	FULL
Notes: m Volume for queue is metered by upstream signal						
# Indicates 95th-percentile volume exceeds capacity, queue may be longer						



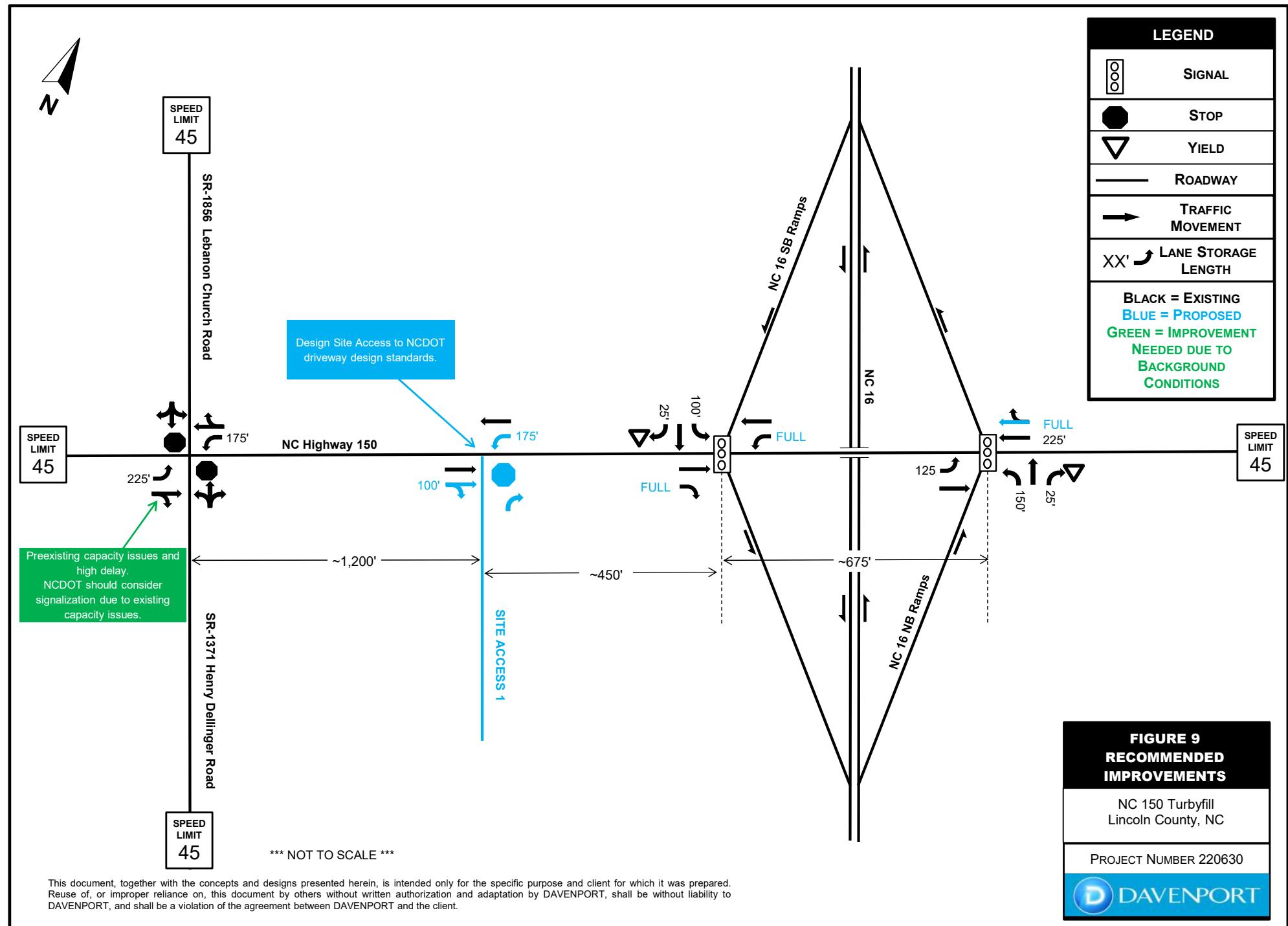
Table 6.0.3 - Queues for NC 150 at NC 16 Northbound Ramps

AM PEAK						
Scenario	Lane Configuration					
2022 Existing	EBL	EBT	WBT	WBR	NBL	NBTR
Max Queue (Ft)	51	131	178	0	244	208
95th Percentile Queue (Ft)	3	13	264	14	229	57
Storage Bay	125	FULL	FULL	225	150	FULL
2024 Future No Build	EBL	EBT	WBT	WBR	NBL	NBTR
Max Queue (Ft)	112	126	302	33	195	159
95th Percentile Queue (Ft)	m74	47	411	28	163	55
Storage Bay	125	FULL	FULL	225	150	FULL
2024 Future Build	EBL	EBT	WBT	WBR	NBL	NBTR
Max Queue (Ft)	149	155	337	16	269	237
95th Percentile Queue (Ft)	m102	97	476	29	#221	55
Storage Bay	125	FULL	FULL	225	150	FULL
2024 Future Build + Improvements	EBL	EBT	WBT	WBTR	NBL	NBTR
Max Queue (Ft)	116	110	225	230	226	239
95th Percentile Queue (Ft)	m92	1	250	0	193	51
Storage Bay	125	FULL	225	FULL	150	FULL
PM PEAK						
Scenario	Lane Configuration					
2022 Existing	EBL	EBT	WBT	WBR	NBL	NBTR
Max Queue (Ft)	65	157	286	0	350	1197
95th Percentile Queue (Ft)	4	19	450	13	#815	76
Storage Bay	125	FULL	FULL	225	150	FULL
2024 Future No Build	EBL	EBT	WBT	WBR	NBL	NBTR
Max Queue (Ft)	108	238	822	349	350	1192
95th Percentile Queue (Ft)	m71	176	#769	28	#497	71
Storage Bay	125	FULL	FULL	225	150	FULL
2024 Future Build	EBL	EBT	WBT	WBR	NBL	NBTR
Max Queue (Ft)	143	212	979	350	350	1161
95th Percentile Queue (Ft)	m#115	167	#872	30	#590	80
Storage Bay	125	FULL	FULL	225	150	FULL
2024 Future Build + Improvements	EBL	EBT	WBT	WBTR	NBL	NBTR
Max Queue (Ft)	127	386	1113	350	350	571
95th Percentile Queue (Ft)	m80	430	339	0	388	111
Storage Bay	125	FULL	225	FULL	150	FULL
Notes: m Volume for queue is metered by upstream signal						
# Indicates 95th-percentile volume exceeds capacity, queue may be longer						



Table 6.0.4 - Queues for NC 150 at Site Access 1

AM PEAK					
Scenario	Lane Configuration				
2024 Future Build	EBTR		WBLT		NBR
Max Queue (Ft)	34		388		214
95th Percentile Queue (Ft)	0		15		93
Storage Bay	FULL		FULL		FULL
2024 Future + Improvements	EBT	EBTR	WBL	WBT	NBR
Max Queue (Ft)	0	20	92	0	158
95th Percentile Queue (Ft)	0	0	15	0	40
Storage Bay	FULL	100	175	FULL	FULL
PM PEAK					
Scenario	Lane Configuration				
2024 Future Build	EBTR		WBLT		NBR
Max Queue (Ft)	23		444		108
95th Percentile Queue (Ft)	0		10		45
Storage Bay	FULL		FULL		FULL
2024 Future + Improvements	EBT	EBTR	WBL	WBT	NBR
Max Queue (Ft)	0	31	74	0	99
95th Percentile Queue (Ft)	0	0	10	0	28
Storage Bay	FULL	100	175	FULL	FULL



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## 7.0 Summary and Conclusion

The proposed NC 150 Turbyfill site is to be located on the south side of NC 150, approximately 450 feet west of the intersection of NC 150 and NC 16 Southbound Ramps in Lincoln County, North Carolina. The development proposes a 2,000 square foot fast-food restaurant with a drive-through window and a 5,000-square-foot convenience store with ten (10) fueling pumps. The expected build-out year for this development is 2024. Information regarding the property was provided by Claude Gagne.

The Transportation Impact Analysis (TIA) was performed based on the scope agreed upon with the North Carolina Department of Transportation (NCDOT) and Lincoln County. This site has a trip generation potential of 4,437 daily trips, 182 net trips in the AM peak hour, and 125 net trips in the PM peak hour.

In conclusion, this study has determined the potential traffic impacts of this development. Improvements are recommended to accommodate the impacts of new development traffic. Table 7.1 summarizes the recommended improvements, which are also reflected in Figure 9. With the recommended improvements in place, the anticipated transportation impacts of the proposed development can be accommodated.

**Table 7.1 – Recommended Improvements Summary**

Intersection	Improvements
NC 150 at Henry Dellinger Road and Lebanon Church Road	<ul style="list-style-type: none"> <li>NCDOT should consider signalization due to the existing capacity issues.</li> </ul>
NC 150 at NC 16 Southbound Ramps	<ul style="list-style-type: none"> <li>Extend the eastbound right-turn lane on NC 150 to Site Access 1.</li> <li>Restripe the westbound NC 150 approach to extend the left turn lane storage to the northbound ramps and provide adequate signage.</li> <li>Widen westbound NC 150 to provide a through lane from the northbound ramps.</li> </ul>
NC 150 at NC 16 Northbound Ramps	<ul style="list-style-type: none"> <li>Reconfigure the westbound NC 150 right turn lane as a shared through/right turn lane with full length storage and stripe the inside through lane with 225 feet of storage. This improvement may require restriping existing pavement and constructing additional pavement.</li> </ul>
NC 150 at Site Access 1	<ul style="list-style-type: none"> <li>Provide a westbound left turn lane on NC 150 with 175 feet of storage and appropriate deceleration/taper.</li> <li>Provide an eastbound through/right turn lane on NC 150 with 100 feet of storage and appropriate deceleration/taper.</li> <li>Design site access according to NCDOT driveway design standards.</li> </ul>
NCDOT STIP project R-2307A	<ul style="list-style-type: none"> <li>Consideration should be given to extend project to SR-1371 (Henry Dellinger Road)/SR 1853 (Lebanon Church Road).</li> </ul>

