

# CHAPEL HILL CROSSING

## TRANSPORTATION IMPACT ANALYSIS

### EXECUTIVE SUMMARY



**Prepared for:**

The Town of Chapel Hill  
Public Works Department - Engineering

**Prepared by:**

***HNTB North Carolina, PC***

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Suite 200  
Raleigh, NC 27609*

*NCBELS License #: C-1554*

June 2023



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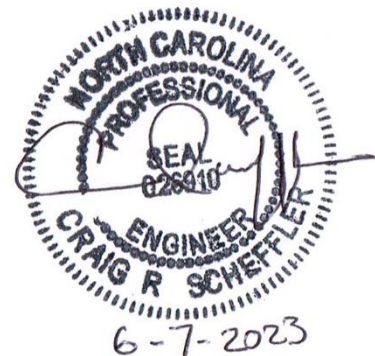
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## EXECUTIVE SUMMARY

### Project Overview

This study analyzes the development Chapel Hill Crossing, a mixed-use development located along Old Chapel Hill Road and Pope Road. The project proposes to demolish existing residential buildings on parcels on either side of Old Chapel Hill Road in this vicinity and construct several multi-family residential buildings, single family housing, office space, retail space and a fitness center with a total of 148 residential units north of Old Chapel Hill Road and 370 residential units and 24,000 square feet of commercial space south of Old Chapel Hill Road. **Figure ES-1** shows the general location of the site. The entire project is anticipated to be fully complete by 2027. This report analyzes the transportation impacts for the year 2028 build-out scenario (one year after anticipated completion), the no-build scenario for the 2028 analysis year, as well as 2022 base year traffic conditions. The analysis also includes two future background traffic scenarios, one with assumed background traffic generating developments complete by 2028 and one with two potential additional adjacent residential developments included.

The preliminary site plans show internal transportation network connections and external access points. Site driveways are proposed to align along Old Chapel Hill Road for the northern and southern parcels, with the Site Driveway (Huse Street) also connecting to Pope Road and providing access throughout the southern development parcel. The north parcel also has an auxiliary additional driveway connection to Old Chapel Hill Road. Parking on both sites will include structured garages, surface lots and private lots/garages. **Figure ES-2** displays the preliminary site plan for the Chapel Hill Crossing development, transportation network changes, and nearby land uses and roadways. This report analyzes and presents the transportation impacts that the Chapel Hill Crossing development is expected to have on the following existing and future intersections in the project study area:

- US 15-501 and Sage Road / Old Durham Road
- US 15-501 and Eastowne Drive (South) / Service Road
- US 15-501 and Eastowne Drive (North) / Lakeview Drive
- US 15-501 and I-40 Eastbound Ramps
- US 15-501 and I-40 Westbound Ramps
- Lakeview Drive / Nova Apartments Driveway & Old Durham Road
- Old Chapel Hill Road and White Oak Drive
- Old Chapel Hill Road and Proposed Site Access West Driveway (Future access to North Parcel)
- Old Chapel Hill Road and Huse Street (Future access to North and South parcels)
- Old Chapel Hill Road and Pope Road
- Old Chapel Hill Road and Mount Moriah Road
- Lakeview Drive and W. Lakeview Drive / Red Roof Inn Driveway
- Pope Road and Old Coach Road / Future Huse Street Site Driveway (Future access to South Parcel)

The impacts of the proposed site at the study area intersections were evaluated during the AM, noon, and PM peak hours of an average weekday.

### Existing Conditions

#### **Study Area**

The site is located in northeast Chapel Hill along Old Chapel Hill Road. The study area contains four unsignalized intersections along Old Chapel Hill Road, two of which are roundabouts at Pope Road and Mt. Moriah Road, and the signalized intersections along US 15-501 between Sage Road/Old Durham



Road and the I-40 interchange. US 15-501 is a major arterial facility providing connectivity between Chapel Hill, Durham and the I-40 corridor. Old Chapel Hill Road is a minor arterial facility providing connectivity between the US 15-501 corridor and southwest Durham. Remaining study area network roadways are minor collector or local access streets.

**Site Traffic Generation**

With the addition of new peak hour trips during the weekday AM, noon, and PM peak hours, there are potential site traffic impacts to the study area intersections. **Table ES-1** shows the site trip generation details, with generation rates taken from the Institute of Transportation Engineers (ITE) *Trip Generation Manual, Version 11*. Trips for the existing residential units to be demolished as part of the site redevelopment were included in the trip generation estimates, with data taken from field traffic counts.

**Table ES-1. Weekday Vehicle Trip Generation Summary**

Description	Density	Daily			AM Peak			Noon Peak			PM Peak		
		Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
Northern Parcel Multi-Family	148 Units	330	330	660	12	42	54	18	24	42	35	23	58
Multi-Modal Reduction 10%		-33	-33	-66	-1	-4	-5	-2	-2	-4	-4	-2	-6
<b>North Parcel - Total Vehicle Trips</b>		<b>297</b>	<b>297</b>	<b>594</b>	<b>11</b>	<b>38</b>	<b>49</b>	<b>16</b>	<b>22</b>	<b>38</b>	<b>31</b>	<b>21</b>	<b>52</b>
Southern Parcel Mixed Use	370 Units + 24k Office/Commercial	1,328	1,328	2,656	72	162	234	85	106	191	158	120	278
Multi-Modal + Internal + Existing Development Trip Reduction 15% + 9 Residences		-218	-218	-435	-21	-29	-50	-16	-18	-34	-25	-26	-51
<b>South Parcel - Total Vehicle Trips</b>		<b>1,110</b>	<b>1,110</b>	<b>2,221</b>	<b>51</b>	<b>133</b>	<b>184</b>	<b>69</b>	<b>88</b>	<b>157</b>	<b>133</b>	<b>94</b>	<b>227</b>
<b>Total Overall Vehicle Trips Added to Network</b>		<b>1,407</b>	<b>1,407</b>	<b>2,815</b>	<b>62</b>	<b>171</b>	<b>233</b>	<b>85</b>	<b>110</b>	<b>195</b>	<b>164</b>	<b>115</b>	<b>279</b>

**Background Traffic**

Background traffic growth for the 2028 analysis year is expected to come from two sources - ambient regional traffic growth and specific development-related traffic growth. Three developments in the project study area that are currently in the Town planning review process were included to contribute to specific background traffic generator growth, with two background scenarios studied. One scenario included the UNC Health Care Medical Office Building #2 development and the other included Gateway Residential and White Oak Apartments in addition to the UNC Health Care development. All remaining estimated traffic volume increases are assumed to occur due to overall region-wide ambient growth (assumed 1.75 percent per year based on NCDOT/Town provided historic growth data and data related to peak hour traffic conditions rebounding from the effects of COVID-19).

**Impact Analysis**

**Peak Hour Intersection Level of Service**

Existing traffic operations at all study area intersections are acceptable during all three peak hours analyzed, though the intersection of US 15-501 and Sage Road/Old Durham Road is congested and nearing capacity during peak travel periods. No unsignalized intersection along Old Durham/Old Chapel Hill Road has existing operational issues. The projected ambient and background development traffic growth will increase intersection delay and queue impacts by 2028. With the addition of peak hour site-



generated trips to the projected 2028 background traffic volumes, several study area intersections are expected to experience deficient traffic operations in the PM peak hour, particularly for the scenario where the additional two background adjacent developments are constructed. Proposed geometric and signal timing improvements are expected to mitigate anticipated deficient LOS conditions throughout the study area and improve queue storage and safety, as well. A summary of the traffic operations for each intersection, related to vehicular delays (intersection average as a whole if signalized, critical movement if stop-controlled) and the corresponding traffic microsimulation Level-of-Service (LOS<sub>S</sub>) is shown in **Table ES-2**.

#### Access Analysis

Vehicular site access for the north site parcel is to be accommodated by two proposed access driveways connecting to Old Chapel Hill Road for entry/exit to the proposed on-site surface parking lot, as shown on **Figure ES-2**. The south site parcel features an internal local street (known as Huse Street for this study) that connects to Old Chapel Hill Road immediately across from the western site driveway for the north site parcel. Huse Street also accesses Pope Road. Design details related to driveway throat lengths shown on the site plan and driveway spacing from existing intersections and adjacent driveways adhere to NCDOT *Policy on Street and Driveway Access to North Carolina Highways* and the Town of Chapel Hill Design Manual.

Access for pedestrians and bicyclists in the immediate project study area along Old Chapel Hill Road is excellent, as marked bicycle lanes and sidewalk facilities on both sides of the road provided by the recent NCDOT STIP project. Both parcels feature internal sidewalk connectivity.

#### Signal Warrant Analysis

Based on projected 2028 traffic volumes and proposed access plans, no unsignalized intersection in the project study area would warrant the installation of a traffic signal, based on the methodology found in the *2009 Manual on Uniform Traffic Control Devices (MUTCD)*. The intersection of Lakeview Drive and Old Durham Road continues the need to be monitored, as it is projected to experience PM peak queuing issues with additional background and site-related traffic growth.

#### Crash Analysis

Data from the NCDOT Traffic Safety Unit was extracted for the five-year period 12/1/2017 to 11/30/2022 for the Old Durham Road/Old Chapel Hill Road and Pope Road segments in the vicinity of the proposed site. There were 32 crashes reported along the Old Durham Road/Old Chapel Hill Road study area corridor between Lakeview Drive and Mount Moriah Road over the five year period, with 3 crashes on Pope Road in the vicinity of the site. The primary crash type was rear end crashes and crashes were primarily clustered near the higher volume intersections. Overall, the number and severity of crashes along Old Durham Road/Old Chapel Hill Road in the project study area are higher than state-wide averages for similar urban North Carolina secondary roadway facilities. This may, in part, be due to on-going construction over several years during the crash data collection period that is now complete, with the finished project along the corridor expected to provide some multi-modal safety benefits.



Table ES-2. Peak Hour Intersection Capacity Analysis Summary

Intersections	Peak Hour	2022 Existing		Assumed Background Traffic						Potential Additional Background Traffic from Two Adjacent Developments					
				2028 No-Build		2028 Build		2028 Mitigated		2028 No-Build		2028 Build		2028 Mitigated	
		LOS <sub>s</sub>	Delay	LOS <sub>s</sub>	Delay	LOS <sub>s</sub>	Delay	LOS <sub>s</sub>	Delay	LOS <sub>s</sub>	Delay	LOS <sub>s</sub>	Delay	LOS <sub>s</sub>	Delay
US 15-501 and Sage Road / Old Durham Road	AM	D	38.0	D	44.3	D	46.1	D	39.2	D	45.3	D	46.6	D	39.9
	PM	D	36.9	D	41.3	<b>E</b>	<b>62.1</b>	D	40.7	D	41.5	D	54.3	D	52.1
US 15-501 and Eastowne Drive (South) / Service Road	AM	B	15.7	C	22.5	C	23.0	C	21.5	C	25.2	C	24.6	C	22.5
	PM	B	12.9	B	18.7	C	24.7	C	20.7	C	20.1	<b>E</b>	<b>55.5</b>	D	50.8
US 15-501 and Eastowne Drive (North) / Lakeview Drive	AM	B	10.4	B	17.3	B	19.9	B	17.9	B	19.7	C	20.4	B	19.1
	PM	B	11.4	C	21.5	D	45.2	C	31.3	C	28.4	<b>E</b>	<b>61.1</b>	D	50.3
US 15-501 and I-40 Westbound Ramps	AM	C	24.2	C	31.9	C	32.7	C	32.5	C	32.8	C	32.4	C	33.2
	PM	C	28.5	D	35.7	<b>E</b>	<b>57.9</b>	C	29.1	D	35.5	<b>E</b>	<b>58.0</b>	C	32.0
US 15-501 and I-40 Eastbound Ramps	AM	C	33.2	D	37.6	D	38.0	D	37.2	D	38.1	D	37.3	D	37.3
	PM	C	28.5	C	34.4	<b>E</b>	<b>60.4</b>	C	34.4	D	35.4	<b>F</b>	<b>83.6</b>	D	53.3
Old Durham Road and Lakeview Drive#	AM	A	8.9	A	9.8	B	13.4	n/a	n/a	A	9.1	B	10.5	n/a	n/a
	PM	B	13.0	B	14.9	D	30.3	n/a	n/a	C	15.3	D	31.9	n/a	n/a
Old Chapel Hill Road and White Oak Road#	AM	A	5.1	A	6.8	A	6.0	n/a	n/a	A	7.0	A	9.2	A	8.1
	PM	A	7.9	A	8.4	B	11.3	n/a	n/a	B	10.8	C	15.7	B	14.4
Old Chapel Hill Road and Pope Road	AM	B	10.9	B	11.1	B	12.0	n/a	n/a	B	11.2	B	12.0	n/a	n/a
	PM	B	11.9	B	12.5	B	13.9	n/a	n/a	B	12.8	C	18.1	n/a	n/a
Old Chapel Hill Road and Mount Moriah Road	AM	A	9.9	B	10.2	B	10.4	n/a	n/a	B	10.2	B	10.5	n/a	n/a
	PM	B	10.9	B	11.3	B	11.6	n/a	n/a	B	11.6	B	12.4	n/a	n/a
Old Chapel Hill Road and Huse St / North Site Driveway#	AM	n/a	n/a	n/a	n/a	A	6.3	A	5.3	n/a	n/a	A	6.5	A	6.0
	PM	n/a	n/a	n/a	n/a	A	7.6	A	7.2	n/a	n/a	A	8.2	A	8.3
Pope Road and Olde Coach Road / Huse St Site Driveway#	AM	A	4.9	A	5.1	A	6.6	n/a	n/a	A	4.8	A	6.8	n/a	n/a
	PM	A	5.1	A	5.1	A	6.4	n/a	n/a	A	4.8	A	7.0	n/a	n/a

**BOLD/ITALICS** – Critical Movement or Overall Intersection Requires Mitigation Per Town TIA Guidelines # - Worst-Case LOS/Delay for Unsignalized Critical Movement



**Other Transportation-Related Analyses**

Other transportation-related analyses relevant to the 2001 Town of Chapel Hill Guidelines for the preparation of Traffic Impact Studies were completed as appropriate. The following topics listed in **Table ES-3** are germane to the scope of this study.

**Table ES-3. Other Transportation-Related Analyses**

Analysis	Comment
Turn Lane Storage Requirements	Storage bay lengths at study area intersections were analyzed using TransModeler maximum queue length estimates for the 2028 Build Scenarios. One unsignalized intersection (Old Durham Road/Lakeview Drive) is expected to have excessive peak hour queues or conditions that exceed existing turn lane storage. Recommendations to improve turn lane storage were made for the US 15-501 and Eastowne Drive/Lakeview Drive intersection – as this location will have a high degree of site traffic and background development traffic impact. Storage issues not due to site-related traffic impacts are not easily correctable at other upstream/downstream intersections, given the high traffic volumes along the US 15-501 corridor, but adjustments to signal timing are shown to potentially reduce side street queues at critical locations..
Appropriateness of Acceleration/Deceleration Lanes	The site concept plan shows no specifics related to acceleration/deceleration lanes. Due to the speed limit on Old Chapel Hill Road (35 mph) and the potential blockages and safety issues caused by left-turn traffic entering Chapel Hill Crossing, left-turn lanes are recommended for site access in both directions at the Huse Street four-legged intersection. Low projected site traffic volumes and lower volumes on Pope Road would not necessitate left-turn lanes at the Huse Street/Olde Coach Road intersection. Existing intersections along US 15-501 currently have left-turn and right-turn auxiliary deceleration lanes. No other specific acceleration/deceleration lane issues were analyzed in the project study area.
Pedestrian and Bicycle Analysis	Pedestrian access exists in the project study area, with excellent connectivity along the Old Chapel Hill Road/Old Durham Road corridor and is limited directly along the US 15-501 corridor. Bicycle lanes extend along Sage Road, Old Durham Road / Old Chapel Hill Road, and a short section of Eastowne Drive. Very limited bicycle facilities exist along/parallel to the US 15-501 corridor within the project study area. The site plan shows additional sidewalk developed along site frontage on both sides of Old Chapel Hill Road. A pedestrian crosswalk should be provided at the Huse Street intersection with Old Chapel Hill Road.
Public Transportation Analysis	Public transportation service to the study area, and to the proposed site, is excellent, with bus stops and multiple local and regional bus routes on both Old Chapel Hill Road and US 15-501 proximate to the site. Additional bus stops on both sides of Old Chapel Hill Road should be provided to serve Chapel Hill Crossing.

**Mitigation Measures/Recommendations**

**Planned Improvements**

There are no Town of Chapel Hill / North Carolina Department of Transportation improvement projects affecting study area roadway facilities within the analysis year time frame of 2022-2028. NCDOT STIP project EB-4707B has completed construction along Old Durham Road/Old Chapel Hill Road east of the project study area and included pedestrian and bicycle improvements connecting to the US 15-501 corridor at the Sage Road/Scarlett Drive intersection. The US 15-501 corridor is currently being studied for capacity improvements as part of NCDOT STIP U-5304F, but these improvements are not known at this time and were not considered to be complete by the 2028 analysis year.

**Background Committed Improvements**

The UNC Health Care Eastowne Medical Office Building #2 project is currently under review by the Town of Chapel Hill and for the purposes of this study, was considered to be complete in all analysis scenarios





by the 2028 Build-Out+1 year. As part of recommended mitigation in the TIA for that project, the southbound left-turn lane for the Eastowne Drive / US 15-501 intersection was recommended to be lengthened and the three traffic signals along US 15-501 (Sage Road/Eastowne Drive – Service Road/Eastowne Drive – Lakeview Drive) were recommended for reoptimization.

The intersection of Old Chapel Hill Road and Lakeview Drive, as part of the Wegman's permitting process, will be monitored for the need to make traffic control (signalization/roundabout) improvements, depending on it meeting signal warrant thresholds or exhibiting excessive observed delay/queuing from field data. The study results for this TIA indicate that the 2028 projected future peak hour traffic volumes will not meet MUTCD peak hour signal warrants and do not cause excessive delays. Data indicates that PM peak southbound queues on Lakeview Drive may exceed the right-turn storage bay space.

#### **Applicant Committed Improvements**

Based on the preliminary site plans and supporting development information provided, there are several minor specific transportation-related improvements proposed internal to the site or related to site access. These improvements include the following:

- Extension of existing sidewalk along the site frontage on both sides of Old Chapel Hill Road and extending down Pope Road.
- Provision of two access driveways along Old Chapel Hill Road for the north site parcel and a direct adjacent connection to the eastern driveway that would serve the south parcel with an internal roadway (Huse Street) that would connect to Pope Road directly across from Olde Coach Road.

#### **Necessary Improvements**

Based on traffic capacity analyses for the 2028 design year, and analyses of existing study area turning bay storage lengths, site access and multi-modal mobility, the following improvements (see **Figure ES-3A**) are recommended as being necessary for adequate transportation network operations for the Condition 4 Build Scenario with assumed background traffic:

- 1) To improve safety and remove turning traffic from the through traffic stream on Old Chapel Hill Road, particularly near the Pope Road roundabout, it is recommended that left-turn lanes in each direction with 100 feet of vehicle storage be constructed along Old Chapel Hill Road at the main site access intersection (Huse Street).
- 2) Per NCDOT TIA review and recommendation, a westbound right-turn lane on Old Chapel Hill Road, with 25 feet of storage and appropriate taper, should be constructed at the main site access intersection (Huse Street).
- 3) To reduce the number of vehicular conflicts in this vicinity, the western driveway for the north site parcel should be limited to right-turn in/right-turn out (RIRO) access only.
- 4) To better manage potential internal site queuing at the Old Chapel Hill Road / Huse Street intersection, a northbound left-turn lane with 75 feet of minimum storage should be constructed. This provides an exclusive left-turn lane for potentially the majority of site traffic egress and a shared through/right-turn lane.
- 5) No improvements are recommended at the Huse Street access intersection with Pope Road/Olde Coach Road. Site traffic volumes and local traffic volumes to/from Olde Coach Road are expected to be low, with no operational issues.



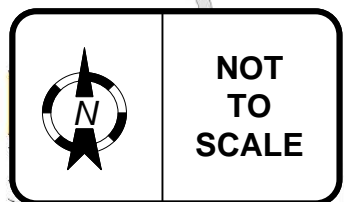


- 6) Designated bus stops should be provided on both sides of Old Chapel Hill Road in front of the north and south site parcels.
- 7) Signal timings at all five study area intersections should be reoptimized after the site is complete to account for the effects of site-related traffic in the AM, noon, and PM peak hours. Particular attention needs to be made to the US 15-501 intersection with Lakeview Drive / Eastowne Drive, where site traffic impact along the corridor is expected to be the greatest.

Based on traffic capacity analyses for the 2028 design year that includes the effects of the potential future background Gateway Residential and White Oak apartment developments, the following improvements (see **Figure ES-3B**) are recommended as being necessary for adequate transportation network operations for the Condition 7 Build Scenario with assumed background traffic. This is in addition to the improvements previously identified above for Condition 4.

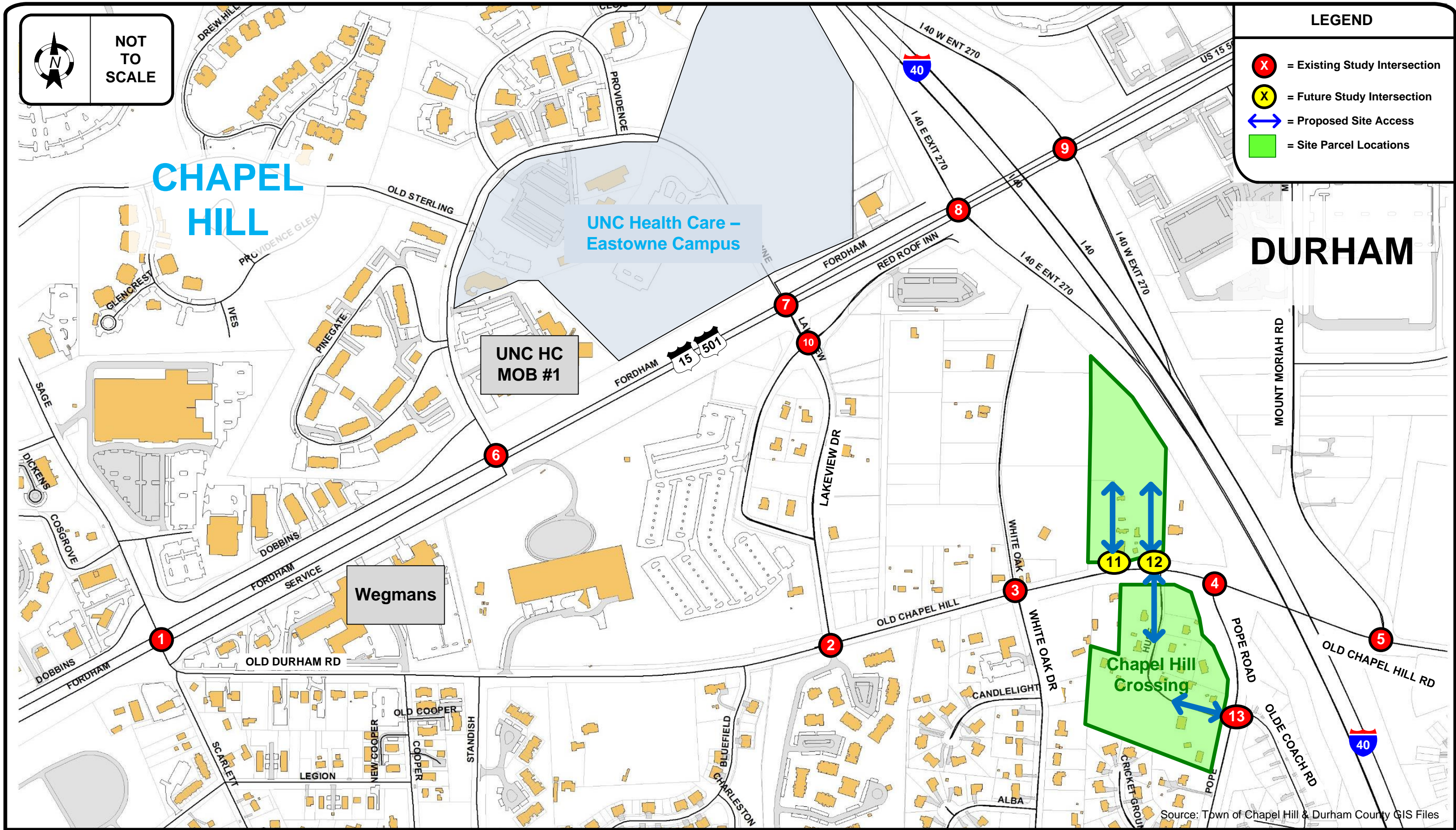
- 1) To reduce congestion and traffic conflicts and better manage access in the vicinity of the US 15-501/Lakeview Drive intersection, it is recommended to install a concrete median from the intersection northbound approach back to the proposed Gateway Residential access street connection to Lakeview Drive, restricting both side streets to RIRO operation.
- 2) In addition, to provide adequate vehicle storage for the northbound approach on Lakeview Drive to US 15-501, the left-turn lane should be extended to provide 300 feet of storage.
- 3) To allow traffic to/from W. Lakeview Drive and the Red Roof Inn Driveway to make u-turn movements to access these roadway facilities, it is recommended that a single-lane roundabout be designed for the future access street intersection with Lakeview Drive.
- 4) To improve operations for the eastbound direction of US 15-501, particularly at the Lakeview Drive/Eastowne Drive intersection, it is recommended to extend the eastbound outer shared through/right-turn lane to provide 600 feet of storage to help accommodate a high volume of traffic using the downstream outer lane to turn right onto I-40.
- 5) In Condition 7, with all potential background traffic generating sites complete, the US 15-501 corridor traffic signals in the project study area should be reoptimized for all peak periods.
- 6) To reduce blockages caused by left-turns and improve safety for through traffic movements on Old Chapel Hill Road at the White Oak Drive intersection, it is recommended that left-turn lanes in both directions with 100 feet of vehicular storage be constructed.





**LEGEND**

- X = Existing Study Intersection
- X = Future Study Intersection
- ↕ = Proposed Site Access
- = Site Parcel Locations



Source: Town of Chapel Hill & Durham County GIS Files

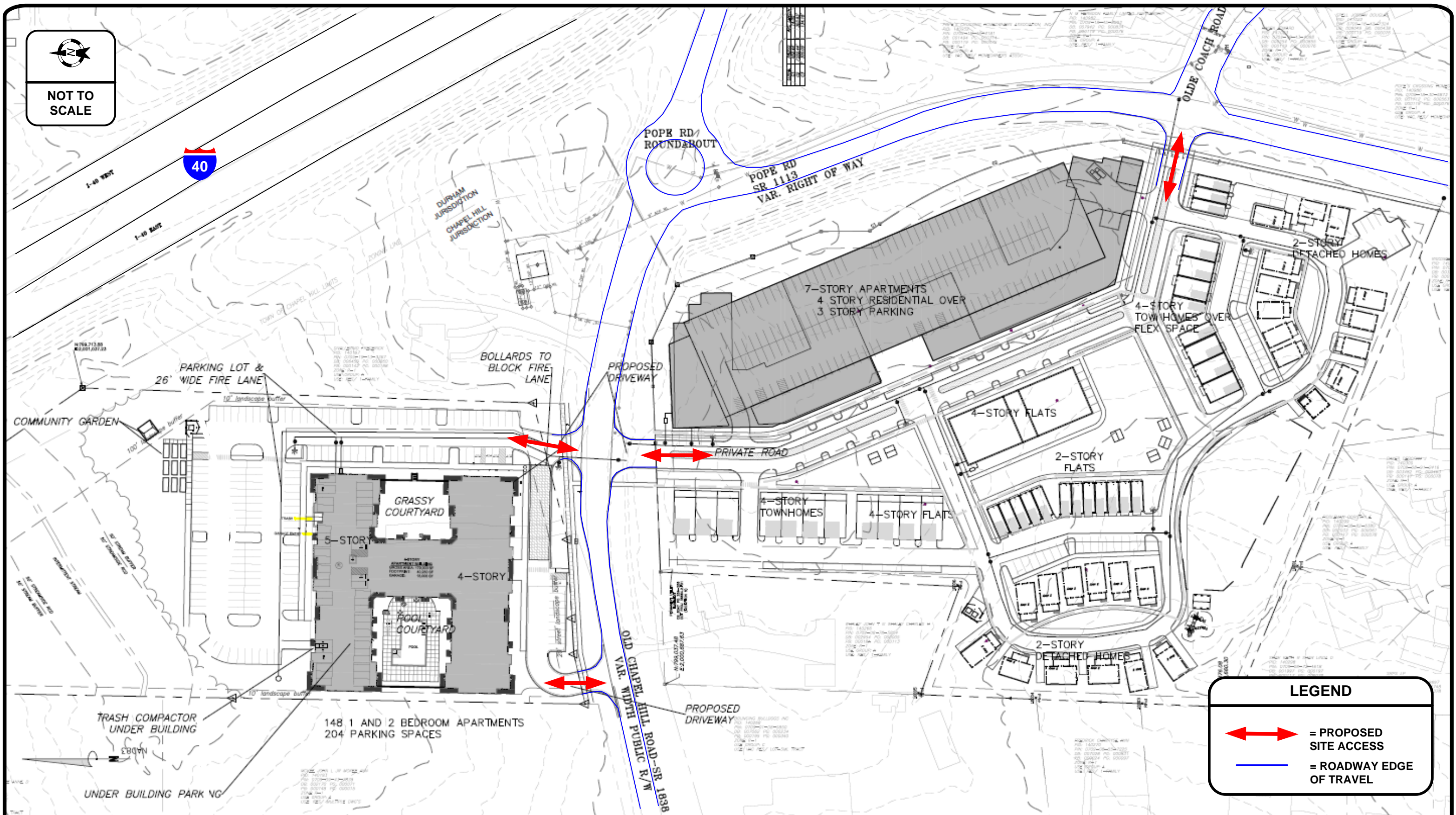
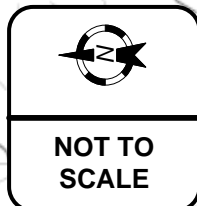


**Chapel Hill Crossing  
Transportation Impact Analysis  
PROJECT STUDY AREA**


DATE: June 2023


**FIGURE ES-1**





**LEGEND**

 = PROPOSED SITE ACCESS

 = ROADWAY EDGE OF TRAVEL



**Chapel Hill Crossing  
Transportation Impact Analysis**

**PRELIMINARY SITE PLAN**

DATE: June 2023

**FIGURE ES-2**

