

**EAST ROSEMARY STREET
TOWN PARKING DECK & OFFICE BUILDING
REDEVELOPMENTS**

TRANSPORTATION IMPACT ANALYSIS

EXECUTIVE SUMMARY



Prepared for:

The Town of Chapel Hill
Public Works Department - Engineering

Prepared by:

HNTB North Carolina, PC

*343 East Six Forks Road
Suite 200
Raleigh, NC 27609*

NCBELS License #: C-1554

October 2020



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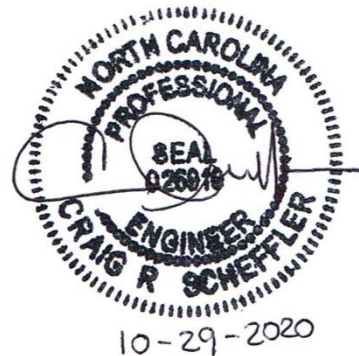
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Project Overview

A new office building and parking deck are being proposed as a combined redevelopment project along E. Rosemary Street, just east of its intersection with NC 86 (N. Columbia Street) in Chapel Hill, NC. This report details the initial impacts of the proposed parking deck and then the subsequent impacts of the office building development after the new parking deck is complete. The overall project proposes to replace the current Town-owned Wallace Parking Deck with a 200,000 square foot office building and to create a new parking deck (with 1,100 spaces) where the existing Rosemary Deck (and adjacent private surface parking lot) are located, just east of PNC Bank. **Figure ES-1** shows the general location of the site. The project is anticipated to be completed in two stages – with the new Parking Deck constructed by 2021 and the office building by 2022. This report analyzes the full build-out scenarios for the year 2022 and 2023 (one year after full build-out of each redevelopment project), the no-build scenarios for 2022 and 2023, as well as 2020 existing year traffic conditions.

The initial site concept plan for the proposed parking deck showed a provision for two full movement access driveways that connect the new parking deck to E. Rosemary Street. Several additional access points have been analyzed in the study process and a full access connection from the deck to North Street is included in this report. **Figure ES-2A** displays the initial preliminary concept plan of the new Rosemary Parking Deck. **Figure ES-2B** displays an initial concept plan for the proposed office building, that will accommodate 200 on-site parking spaces in an underground garage. This report analyzes and presents the transportation impacts that the redevelopment projects will have on the following intersections in the project study area:

- W. Rosemary Street and Church Street
- W. Rosemary Street and NC 86 (N. Columbia Street)
- E. Rosemary Street and Henderson Street
- E. Rosemary Street and Hillsborough Street
- SR 1010 (W. Franklin Street) and Church Street
- SR 1010 (Franklin Street) and NC 86 (Columbia Street)
- SR 1010 (E. Franklin Street) and Henderson Street
- SR 1010 (E. Franklin Street) and Hillsborough Street / Raleigh Street
- NC 86 (N. Columbia Street / MLK Jr. Boulevard) and N. Columbia Street / North Street
- NC 86 (MLK Jr. Boulevard) and Longview Street / Mill Creek Condominiums
- W. Cameron Avenue and NC 86 SB (Pittsboro Street)
- Cameron Avenue and NC 86 (S. Columbia Street)
- E. Cameron Avenue / Country Club Road and Raleigh Street

The impacts of the proposed sites at the study area intersections were evaluated during the AM, noon, and PM peak hours of an average weekday. Additional existing and future parking deck and office building access driveway locations were also analyzed as part of the study.

Existing Conditions

The sites are located in downtown Chapel Hill along E. Rosemary Street east of the NC 86 corridor. The study area contains 12 signalized intersections in the downtown area. All future site traffic is expected use access points along E. Rosemary Street, or potentially on North Street. The NC 86 and Franklin Street corridors are major arterials providing both regional and local access. Rosemary Street is a minor arterial/collector street that provides connectivity throughout the downtown and into Carrboro. Remaining study area network roadways are local neighborhood / commercial / institutional access



streets. The downtown/UNC Main Campus area features moderate to high traffic activity throughout the day, as well as high levels of pedestrian, bicycle and transit activity.

Site Traffic Generation

Table ES-1 shows the site trip generation details, with generation rates taken from field collected data at the existing parking facility access points along E. Rosemary Street and the projected growth ratio of peak hour activity based on the increased in parking supply offered by the new deck compared to existing conditions, along with ITE Trip Generation Manual estimates for the proposed office building.

Table ES-1. Weekday Vehicle Trip Generation Summary

Facility	Units	Daily Estimate			AM Peak Hour			Noon Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total
Existing Parking Trips (Reallocated to new deck)	726 spaces	1,416	1,416	2,832	190	17	207	148	113	261	75	206	281
Proposed Lot Growth Ratio (1,100 / 726) = "Net" New Trips	0.515	729	729	1,458	98	9	107	76	58	134	39	106	145
Total Trips To/From New Deck		2,145	2,145	4,290	288	26	314	224	171	395	114	312	426
General Office Building	200kSF	883	883	1,766	229	31	260	102	87	189	43	199	242

Background Traffic

Background traffic growth for the 2022 and 2023 analysis years is expected to come from two sources - ambient regional traffic growth and specific development-related traffic growth. Historic growth patterns do not indicate sustained growth in the project study area, however a number of development projects are occurring or are expected to occur outside the project study area which may contribute to future area-wide traffic growth. To conservatively account for this potential, a 1.0 percent per year ambient growth rate was applied to 2020 traffic volumes to estimate 2022 and 2023 background traffic on study area roadways. One specific development, Union Chapel Hill Apartments, set to open in fall 2020, was included as a specific background development traffic generator.

Impact Analysis

Peak Hour Intersection Level of Service

Existing 2020 traffic operations at all study area intersections are acceptable during all three peak hours analyzed, except for the westbound stop-controlled approach at the NC 86 intersection with North Street/N. Columbia Street in the PM peak hour. Projected ambient and background development traffic growth and planned transportation projects will increase impacts at many study area locations by 2022, but will only cause one other intersection to operate at deficient levels in any peak hour. The Franklin Street/NC 86 (N. Columbia Street) intersection will drop from a LOS D to LOS E in the 2022 PM peak hour. With the addition of peak hour parking deck site-generated trips to the projected 2022 background traffic volumes, one additional study area intersection (NC 86 and Cameron Avenue) is expected to experience deficient traffic operations in the PM peak hour. The effect of site traffic is a "net" increase across the study area network that causes minor variations in traffic operational results. The proposed North Street access scenario produces beneficial operational results at the NC 86/Rosemary Street intersection. The 2023 analysis scenarios that include proposed office building site trip effects cause no additional intersections to operate over capacity in the PM peak hour, with or without the additional office building redevelopment. 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 Level-of-Service (LOS) is shown in **Table ES-2** on the following page.



Town of Chapel Hill: Transportation Impact Analysis
E Rosemary Street - Proposed Town Parking Deck & Office Building Redevelopments

Table ES-2. Peak Hour Intersection Capacity Analysis Summary

Intersections	Peak Hour	2020 Existing		2022 No-Build		2022 Build		2022 Build Mitigated		2023 No-Build		2023 Build	
		LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
W. Rosemary Street & Church Street	AM	B	11.3	A	9.2	A	9.4			A	9.4	A	9.6
	NOON	B	10.8	A	9.5	A	9.5			A	9.4	A	9.5
	PM	B	15.8	B	13.9	B	13.8			B	13.8	B	13.7
W. Rosemary Street & NC 86	AM	C	25.4	C	26.6	C	26.7	C	24.5	C	24.2	C	24.6
	NOON	C	32.3	C	29.6	C	32.8	C	26.3	C	26.5	C	27.8
	PM	C	34.6	D	35.9	D	51.2	C	33.4	C	34.3	D	41.6
E. Rosemary Street & Henderson Street	AM	A	8.0	A	8.5	A	9.4	<i>No change to projected traffic volumes – Little to Marginal Change in Operations Expected Compared to the 2022 Build – Original Access Scenario</i>		A	9.5	B	10.3
	NOON	B	12.7	B	12.4	B	12.7		B	12.8	B	13.6	
	PM	B	13.4	B	11.3	B	11.2		B	12.5	B	12.7	
E. Rosemary Street & Hillsborough Street	AM	B	14.8	B	15.0	B	15.0		B	15.4	B	15.1	
	NOON	B	18.8	B	15.5	B	15.3		B	15.7	B	15.7	
	PM	B	17.5	B	17.4	B	17.6		B	17.6	B	17.5	
W. Franklin Street & Church Street	AM	A	6.4	A	7.8	A	7.7		A	7.7	A	7.7	
	NOON	B	10.7	B	11.8	B	12.9		B	13.1	B	13.5	
	PM	B	15.0	B	18.3	B	18.6		B	18.9	B	19.1	
Cameron Ave/Country Club Rd & Raleigh Street	AM	C	22.8	C	23.7	C	23.2		C	23.4	C	24.0	
	NOON	C	20.4	C	21.0	C	20.8		C	20.9	C	21.1	
	PM	C	29.6	C	30.7	C	30.4		C	30.6	C	30.9	
Franklin Street & NC 86 (Columbia Street)	AM	C	33.1	C	30.5	C	31.1		C	30.3	C	30.5	
	NOON	D	40.8	D	41.0	D	40.9		D	40.7	D	41.0	
	PM	D	49.8	E	58.7	E	58.0		E	59.5	E	59.7	
E. Franklin Street & Henderson Street	AM	A	7.4	A	7.8	A	7.9	A	7.9	A	7.5		
	NOON	B	12.7	B	12.6	B	12.4	B	12.5	B	13.2		
	PM	B	15.8	B	13.5	B	12.4	B	12.3	B	13.2		
E. Franklin Street & Hillsborough Street / Raleigh Street	AM	C	32.0	C	22.6	C	22.6	C	22.5	C	22.6		
	NOON	C	29.9	C	23.6	C	24.2	C	24.0	C	23.7		
	PM	C	31.9	C	21.6	C	21.4	C	21.5	C	21.7		
NC 86 (MLK Jr. Blvd) & N. Columbia Street / North Street [#] @	AM	C	15.1	C	15.7	C	16.4	B	11.7	B	11.5	B	11.6
	NOON	B	14.6	C	15.3	C	16.0	B	18.7	B	19.8	B	19.6
	PM	F	85.5	F	119.6	F	181.3	C	23.5	C	23.7	C	24.1
NC 86 (MLK Jr. Blvd) & Longview Street	AM	A	9.4	A	9.5	A	9.6	A	9.6	A	9.7		
	NOON	A	5.5	A	5.6	A	5.6	A	5.6	A	5.6		
	PM	A	8.0	A	8.1	A	8.1	A	8.1	A	8.1		
W. Cameron Avenue & NC 86 (Pittsboro Street)	AM	C	24.0	B	17.1	B	17.3	B	17.4	B	17.5		
	NOON	C	21.5	B	19.9	C	20.3	C	20.4	C	20.5		
	PM	C	30.8	C	21.0	C	20.4	C	20.3	C	20.1		
Cameron Avenue & NC 86 (S. Columbia St)	AM	C	32.1	C	27.9	C	28.3	C	28.5	C	28.8		
	NOON	C	33.4	C	32.6	C	33.3	C	33.5	C	33.8		
	PM	D	47.9	D	45.5	E	55.8	E	59.3	E	65.5		
E. Rosemary St & Recommended Parking Deck Primary Driveway [#]	AM	N/A	N/A	N/A	N/A	N/A	N/A	B	14.0	B	14.1	C	20.0
	NOON	N/A	N/A	N/A	N/A	N/A	N/A	C	15.5	C	15.6	C	16.4
	PM	N/A	N/A	N/A	N/A	N/A	N/A	C	15.5	C	15.5	C	16.5
E. Rosemary St & Recommended Office Bldg Primary Driveway [#]	AM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	B	13.1
	NOON	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	B	12.6
	PM	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	C	15.6

BOLD/ITALICS – Critical Movement or Overall Intersection Requires Mitigation Analysis Per Town TIS Guidelines
 # - Worst-Case LOS/Delay for Two-Way Unsignalized/Stop-Controlled Critical Movement @ - Mitigation Scenario Signalized



Access Analysis

Vehicular site access is to be accommodated in the current parking deck site access plan at two proposed parking deck access driveways connecting to E. Rosemary Street. As conceptually shown in **Figure ES-2A**, the western driveway access point is approximately 275 feet from the NC 86 (N. Columbia Street) intersection and the eastern driveway access point has approximately 200 feet of separation from the western access point. No specific throat lengths are shown on the concept plan and should be part of the detailed design of the parking deck to provide a 50 foot minimum throat length found on Page 69 of the 2017 *Town of Chapel Hill Public Works Design Manual*. Current schematic drawings indicate that additional throat length may be needed depending on the desired internal circulation pattern and location of entry/exit gates. Driveway distances along E. Rosemary Street from the signalized intersections at NC 86 and Henderson Street are approximately 275 feet from the western driveway and 500 feet from the eastern driveway respectively are meet acceptable NCDOT and Town standards. No formal access design for the proposed Office Building on-site parking facilities was available at the time of this study. Per information from the Applicant and shown in **Figure ES-2B**, two potential access locations may occur along E. Rosemary Street, with no direct access from Henderson Street. The current alley serving the Wallace Deck entry and service access for adjacent commercial buildings behind the Wallace Deck is expected to be retained after the proposed Office Building is constructed.

Signal Warrant Analysis

Based on projected 2023 traffic volumes and proposed access plans, one unsignalized intersection 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 NC 86 and N. Columbia Street/North Street is expected to experience deficient operations for stop-controlled movements in the future and should be monitored for signalization, based on satisfaction of Peak Hour Warrants in the 2023 PM peak hour and potential safety and operational issues due to increased traffic volumes to and from the proposed parking deck.

Crash Analysis

Crash analysis of the E. Rosemary Street and NC 86 corridors was compiled from the NCDOT TEAAS software for the last five years and results indicate that both corridors experience crash rates considerably higher than North Carolina statewide averages for similar roadway facilities, with most crashes located near high volume intersections.

Other Transportation-Related Analyses

Other transportation-related analyses relevant to the 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 Synchro and HCM 95 th percentile (max) queue length estimates for all analyzed scenarios. The original parking deck access concept's western access point on E. Rosemary would likely be blocked by westbound queues on E. Rosemary Street at the NC 86 intersection. The modified access scenario removes some site-related traffic from E. Rosemary Street, thus reducing queue lengths. Providing a single access point for the deck farther to the east of the NC 86 intersection provide adequate separation to manage left-turn queues and avoid deck access blockage. This impact of this recommendation would become more important with additional traffic generated by the proposed office building redevelopment.



Analysis	Comment
	There are several intersections in the study area that are currently near capacity and are expected to continue to be in the 2022 and 2023 analysis years where one or multiple left-turn storage bays do not provide adequate storage to accommodate existing or projected maximum peak hour queues. As roadway capacity improvements in these situations would generally be difficult, given right-of-way constraints in the downtown and UNC Main Campus area, and the fact that the proposed parking deck and office building site trips are expected to marginally contribute to queuing issues beyond the immediate intersections adjacent to the sites, no additional recommendations were made for turn lane storage requirements for this study.
Appropriateness of Acceleration / Deceleration Lanes	The site concept plans do not show any provision for additional acceleration or deceleration lanes. With the proposed sites located in the downtown Chapel Hill central business district, most area roadways have low posted speeds and do not require additional acceleration / deceleration lanes. E. Rosemary Street has a three-lane cross section with center left-turn lane that will provide separation for turning traffic into the proposed parking deck and on-site office building parking garage. The parking deck North Street full access scenario also utilizes the center left-turn lane along NC 86 for safe separation of turning traffic onto North Street from the southbound through travel lanes.
Pedestrian and Bicycle Analysis	Existing pedestrian access and connectivity is currently well implemented throughout downtown Chapel Hill that would be served by the proposed deck and office building. A mid-block delineated pedestrian crossing with raised central median on E. Rosemary Street would reduce likelihood of jay-walking from the deck to the south side of the street. Bicycle facilities (bike lanes and roadway “sharrows” and activity are prevalent in the downtown area as well and the proposed deck design could incorporate opportunities for bicycle parking convenient to E. Rosemary Street frontage.

Mitigation Measures/Recommendations

Planned Improvements

There are no planned transportation improvement projects by NCDOT expected to be complete between 2020 and 2023 in the immediate project study area. The Town of Chapel Hill is in the process of designing and implementing the West Franklin Street Lane Reallocation project to reduce the number of through travel lanes on West Franklin Street west of NC 86. The reallocated lanes will be used for parking, loading zones, bicycle lanes and other amenities. This project was expected to be complete by the 2022 analysis year and was also assumed to include signal retiming throughout the downtown area to account for vehicular flow changes in the lane reallocation vicinity. Details are shown on **Figure ES-3**.

The Town also has the North-South Bus Rapid Transit Project, which will provide dedicated lanes for transit along the NC 86 corridor, along with other transit amenity improvements scheduled for construction in 2022. As final design details are not complete as of the submittal of this TIA, no specific lane usage changes were analyzed as part of this study.

Background Committed Improvements

There are no specific transportation network improvements to study area roadway intersections related to background private development projects that are expected to be completed between 2020 and 2023.



Applicant Committed Improvements

Based on the preliminary site concept plans and supporting development information provided, there are no specific transportation-related improvements proposed external to the East Rosemary Parking Deck or Office Building sites. The current plans and preliminary deck design incorporate two full movement access points along E. Rosemary Street only, with single lane entry/exits to the deck.

There are currently no specific conceptual plan designs for the Office Building parking deck access points or internal/external assumed circulation. Per agreement with the Applicant, two access points were assumed along E. Rosemary Street, with no direct access to Henderson Street and retaining the possibility of providing access from the rear of the building to the existing alley that will continue to have ingress and egress access connections with E. Rosemary Street.

Necessary Improvements

Parking Deck

Based on traffic capacity analyses for the 2022 design year, and analyses of existing study area turning bay storage lengths and site access, the following improvements are recommended as being necessary for adequate transportation network operations (see **Figure ES-3A**).

- 1) To reduce potential conflicts and provide better separation for left-turning vehicles along E. Rosemary Street approaching the NC 86 intersection westbound and the parking deck eastbound, close the currently proposed western deck access location during peak traffic periods and provide a single primary deck access location where the current eastern deck access is proposed that would operate as the primary access point during the peak hours. At this primary access point, provide separate left-turn and right-turn exit lanes. Depending on method of parking deck space management (gates/ticketing), provide adequate internal queue storage for entry flows that may reach 200 vehicles in a single hour. This improvement is recommended for the East Rosemary Parking Deck development.
- 2) Due to potential peak hour queuing issues for the westbound left-turn and through travel lanes at the E. Rosemary Street intersection with NC 86 (N. Columbia Street), reoptimize the traffic signal timings to allow adequate green time to reduce westbound queuing for this movement in all peak hours. This improvement is recommended for the East Rosemary Parking Deck development.
- 3) To reduce site-related traffic volumes at the critical E. Rosemary Street intersection with NC 86, provide alternate access using North Street to connect to a two-way inbound/outbound parking deck connection. This should remove most parking deck related traffic flow to/from the NC 86 corridor north of the site. A full access connection may add some site-related traffic that may cut-through the North Street neighborhood and potentially additional traffic calming measures may be needed to reduce as much cut-through traffic as possible. It is recommended that a traffic calming study for the segments of North Street to the east of the proposed parking deck access point and Henderson Street between North Street and E. Rosemary Street be conducted after the parking deck is complete and opened to traffic. These improvements are recommended for the East Rosemary Parking Deck development.
- 4) To reduce projected queues along North Street westbound that would include parking deck egress traffic, the provision of a right-turn bay (making the westbound approach a stop-controlled shared left-turn/through lane and right-turn lane) with at least 50 feet of vehicle storage is recommended to reduce overall approach delays and queues at this location. The



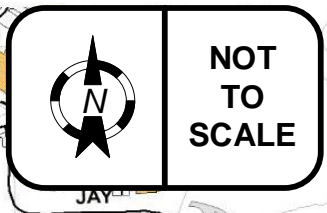
currently skewed minor street intersection approaches for North Street and N. Columbia Street should be realigned to better align through movements. This intersection also may meet MUTCD Warrants for signalization after the parking deck and office building projects are complete and should be monitored for signalization if operational or safety issues results from the additional traffic produced by the two projects. These improvements are recommended for the East Rosemary Parking Deck development.

- 5) Additional wayfinding signage on external roadways and internal to the proposed parking deck is recommended to fully utilize the proposed North Street and N. Columbia Street access points, as well as identify routes to E. Franklin Street, US 15-501, and NC 54 (make a left-turn exiting the deck) and NC 86 South, Carrboro, Pittsboro (make a right-turn exiting the deck). These improvements are recommended for the East Rosemary Parking Deck development.
- 6) To provide direct, safe, and convenient pedestrian access from the parking deck to commercial developments south of the E. Rosemary Street corridor, it is recommended that at street level, a mid-block raised pedestrian crosswalk, with appropriate signage and potentially a raised median refuge island depending on its location should be included, along with pedestrian activated Rectangular Rapid Flashing Beacons (RRFB). These improvements are recommended for the East Rosemary Parking Deck development.

Office Building

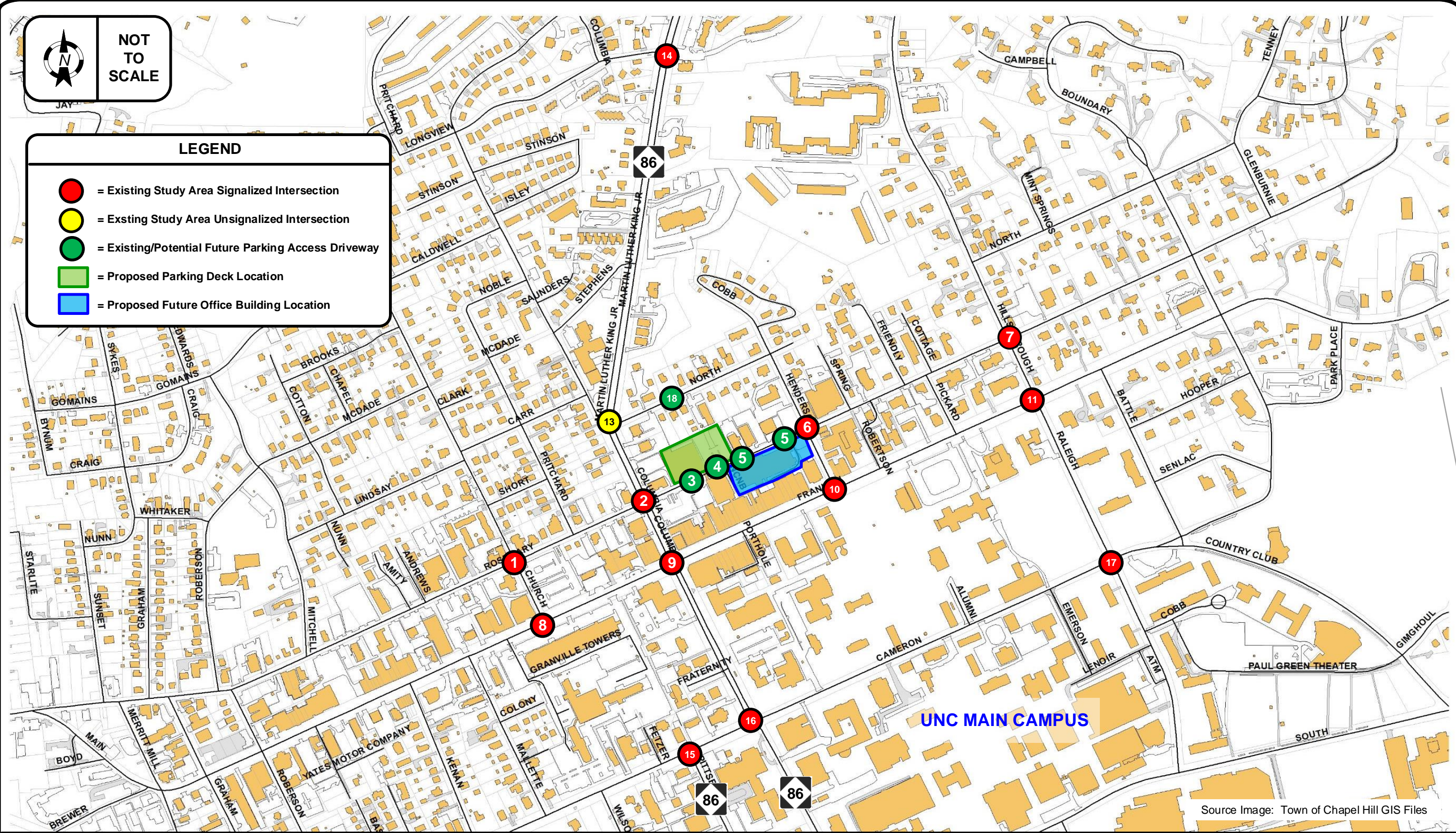
Based on traffic capacity analyses for the 2023 design year, and analyses of existing study area turning bay storage lengths and Office Building potential site access issues, the following improvements are recommended as being necessary for adequate transportation network operations (see **Figure ES-3A**). These improvements are made with the assumptions that the 2022 Parking Deck analysis year Necessary Improvements listed above are all completed by the 2023 analysis year for the proposed Office Building.

- 1) To reduce potential conflicts and provide better separation for left-turning vehicles along E. Rosemary Street approaching the parking deck access driveway westbound and Henderson Street eastbound, provide a single primary on-site underground parking garage access location approximately 225 feet west of the Henderson Street intersection and aligning with the current driveway to 151 E. Rosemary. This improvement is recommended for the East Rosemary Office Building development.
- 2) Maintain the existing one-way alley access configuration behind the proposed Office Building. A secondary enter-only access point for vehicles parking beneath the proposed Office Building could be located along the alley, but all structured parking egress should be directly onto E. Rosemary Street at the recommended single primary location described above. Egress should not be permitted for parking garage vehicles along the alley, as additional traffic access to E. Rosemary Street near the Henderson Street intersection may cause operational and safety issues.



LEGEND

- = Existing Study Area Signalized Intersection
- = Existing Study Area Unsignalized Intersection
- = Existing/Potential Future Parking Access Driveway
- = Proposed Parking Deck Location
- = Proposed Future Office Building Location



Source Image: Town of Chapel Hill GIS Files

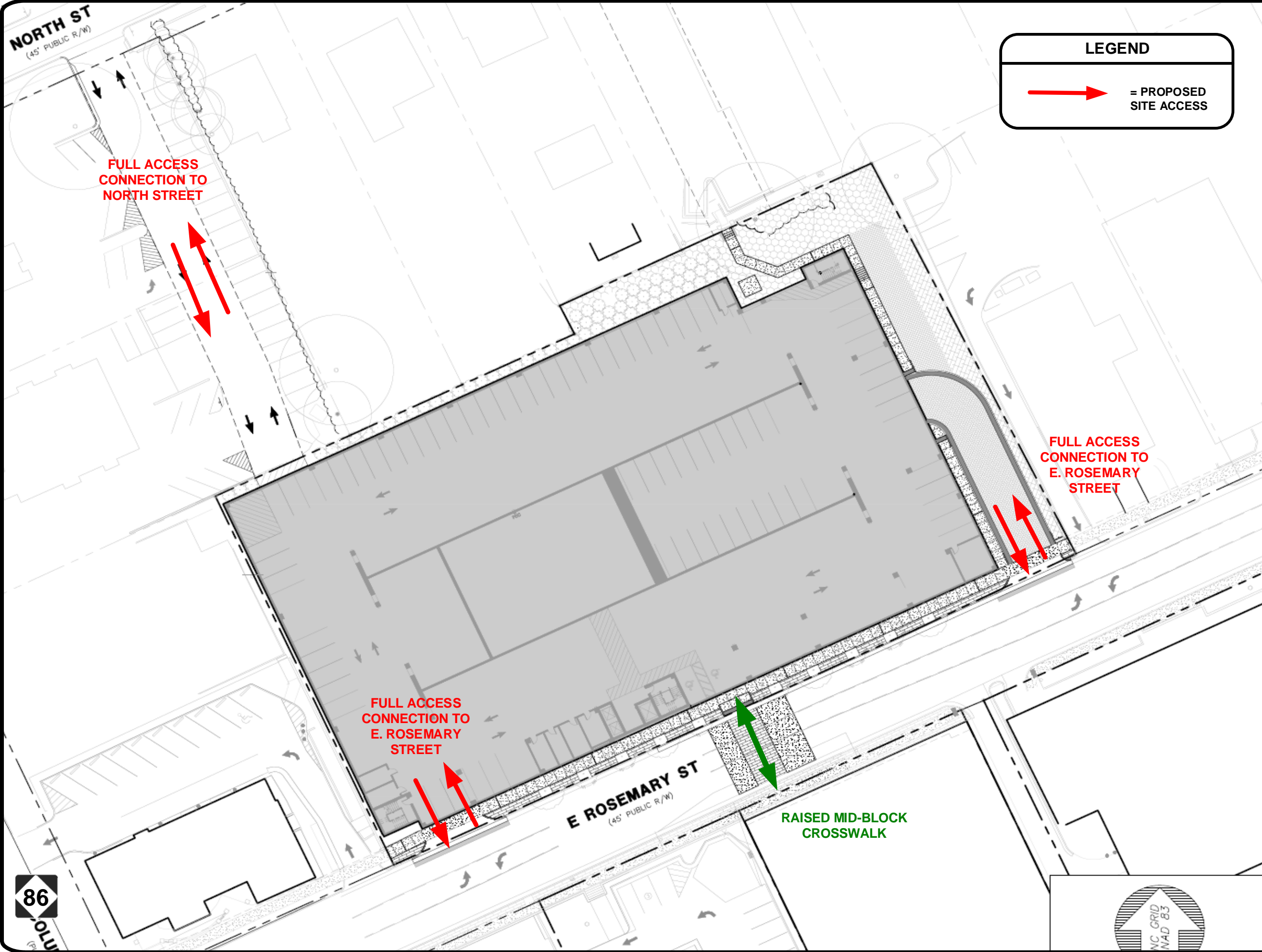


**East Rosemary Street Parking Deck & Office Building
Transportation Impact Analysis**

PROJECT STUDY AREA

DATE: October 2020

FIGURE ES-1



HNTB



East Rosemary Street Parking Deck & Office Building
Transportation Impact Analysis

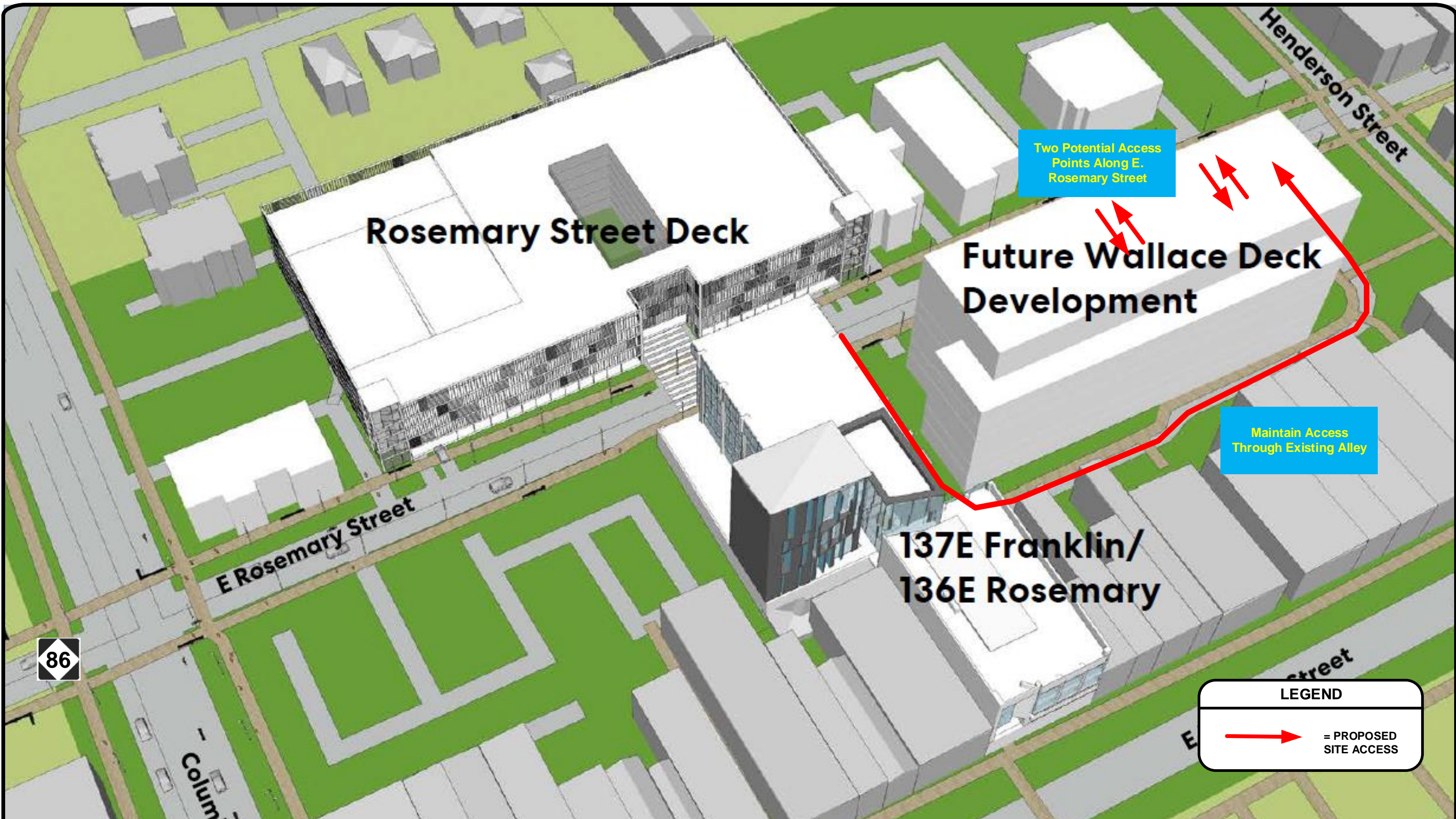
SITE CONCEPT PLAN – PARKING DECK



NOT TO SCALE

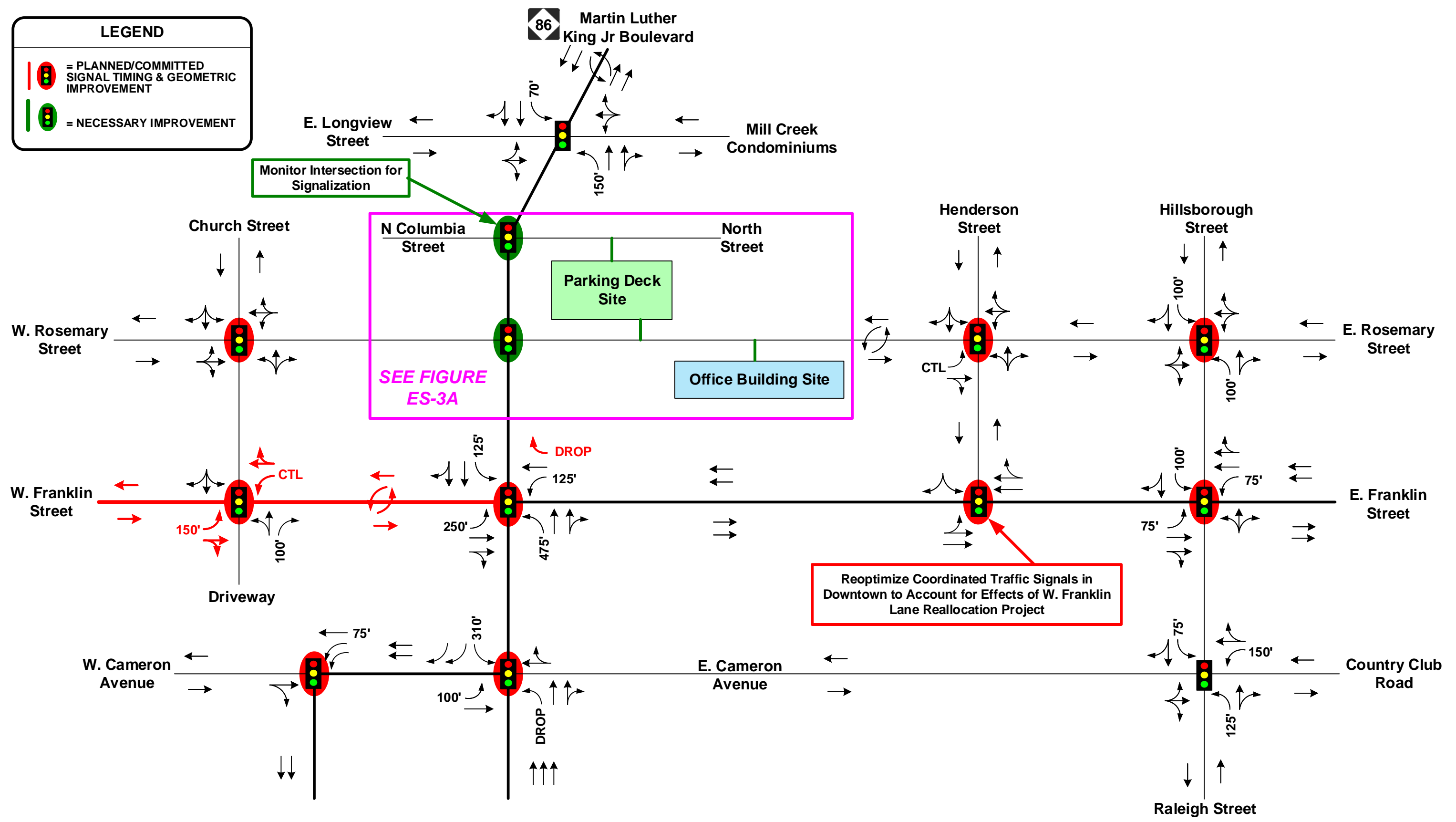
DATE: October 2020

FIGURE ES-2A



LEGEND

- = PLANNED/COMMITTED SIGNAL TIMING & GEOMETRIC IMPROVEMENT
- = NECESSARY IMPROVEMENT



NOT TO SCALE

**East Rosemary Street Parking Deck & Office Building
Transportation Impact Analysis**

PLANNED, COMMITTED AND RECOMMENDED IMPROVEMENTS

DATE: October 2020

FIGURE ES-3

