1200 MLK REDEVELOPMENT

TRAFFIC IMPACT STUDY

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

June 2019

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Project Overview

A redevelopment of an existing site parcel, known as the 1200 MLK Redevelopment, is being proposed along NC 86 (Martin Luther King Jr. Boulevard) at its intersection with Northfield Drive in Chapel Hill, NC. The project proposes to redevelop an existing gas station/convenience mart site with a new, larger 5,700 square foot facility along with a 100,000 square foot indoor storage facility. The site also currently features residential mobile homes which will continue to occupy existing areas in the rear of the property. **Figure ES-1** shows the general location of the site. The overall project is anticipated to be fully complete and occupied by 2021. This report analyzes the build-out scenario for the year 2022 (one year after anticipated completion), the no-build scenario for 2022, as well as 2019 existing year traffic conditions.

The proposed site concept plan shows a provision for two access driveways, one full movement and one right-turn in/right-turn out only (RIRO) that connect to NC 86 (Martin Luther King, Jr. Boulevard). The full movement driveway will form the fourth leg of the NC 86 signalized intersection with Northfield Drive. No other external vehicular access connections are proposed. The site driveways are proposed to have internal connectivity with on-site buildings and their respective parking areas as well as existing driveway aisles that serve the mobile home park. **Figure ES-2** displays the preliminary concept plan of the 1200 MLK Redevelopment and nearby land uses and roadways. The site is expected to provide approximately 75 parking spaces on surface lots. This report analyzes and presents the transportation impacts that the 1200 MLK Redevelopment will have on the following intersections in the project study area:

- NC 86 (Martin Luther King, Jr. Boulevard) and Homestead Road / Church Driveway
- NC 86 (Martin Luther King, Jr. Boulevard) and Proposed Right-In/Right-Out Site Driveway
- NC 86 (Martin Luther King, Jr. Boulevard) and Northfield Drive / Proposed Main Site Driveway
- NC 86 (Martin Luther King, Jr. Boulevard) and Piney Mountain Road / Municipal Drive

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

Existing Conditions

Study Area

The site is located in north Chapel Hill along the NC 86 (Martin Luther King, Jr. Boulevard) corridor. The study area contains three signalized intersections along NC 86 at Homestead Road, Northfield Drive and Piney Mountain Road. All future site traffic is expected use the two proposed site driveways along NC 86. Internal driveways shown on the preliminary site plan will circulate site traffic to designated parking areas and fuel pump locations. NC 86 is a principal north-south arterial providing connectivity throughout Chapel Hill and points beyond in Orange County. Homestead Road is a minor arterial street for access to areas in western Chapel Hill and Carrboro. Remaining study area network roadways are local neighborhood/commercial/institutional 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 10* and the most conservative estimates of potential trip generation yield taken from information on potential development land use types included in the *ITE Trip Generation Manual*.

Table ES-1. Weekday Vehicle Trip Generation Summary

TRIP TYPE	Daily			AM Peak Hour			Noon Peak Hour			PM Peak Hour		
	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
NEW SITE TRIPS	935	935	1,870	85	83	168	66	66	132	84	85	169
PASS-BY SITE TRIPS	1,235	1,235	2,470	129	129	258	84	84	168	97	97	194
TOTAL TRIPS	**2,170**	**2,170**	**4,340**	**214**	**212**	**426**	**150**	**150**	**300**	**181**	**182**	**363**

Trip generation estimates account for both new site trips and "pass-by" type trips that occur at the driveway entrances/exits and do not add new trips to the traffic stream. Existing trip generation data was also collected for the mobile home park and was included in the 2022 analysis year traffic volumes.

Background Traffic

Background traffic growth for the 2022 analysis year is expected to come from two sources - ambient regional traffic growth and specific development-related traffic growth. Historic growth patterns taken from daily traffic volume information do not indicate substantial increases in the project study area, however a number of development projects are occurring or are expected to occur just outside the project study area, which may contribute to future area-wide traffic growth. To conservatively account for this potential, a 0.5 percent per year ambient growth rate was applied to 2019 traffic volumes, along with the inclusion of four nearby specific background traffic generating projects to estimate 2022 background traffic on study area roadways.

Impact Analysis

Peak Hour Intersection Level of Service

Existing 2019 traffic operations at all study area intersections are acceptable during all three peak hours analyzed. Projected ambient and background development traffic growth will increase impacts in the study area by 2022, but not cause any intersection to operate at deficient levels in any peak hour. With the addition of peak hour site-generated trips to the projected 2022 background traffic volumes, no additional study area intersections are expected to experience deficient traffic operations in any peak hour. 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.

Access Analysis

Vehicular site access is to be accommodated at two proposed access driveways connecting to NC 86 (Martin Luther King, Jr. Blvd). The southern (main) site driveway will connect as a fourth leg to the NC 86 (Martin Luther King, Jr. Blvd) signalized intersection with Northfield Drive. The other driveway connection will be a limited access RIRO driveway located to the north of the signalized intersection. The main driveway connection would have a throat length of approximately 175 feet and the RIRO driveway would have a throat length of 50 feet prior to internal parking lot connections. Throat lengths are acceptable, based on 50 foot minimum throat length standards found on Page 69 of the 2019 *Town of Chapel Hill Public Works Design Manual*. 2003 *NCDOT Policy on Street and Driveway Access to North Carolina Highways* throat length recommendations are 100 feet, which is not provided for the RIRO driveway.

The distance between the proposed driveway connections is approximately 225 feet. Driveway connection separations from an intersection are acceptable, based on recommendations of 100 foot minimum corner clearance as set forth in the 2003 *NCDOT Policy on Street and Driveway Access to*

Table ES-2. Peak Hour Intersection Capacity Analysis Summary

Intersections	Peak Hour	2019 Existing		2022 No-Build		2022 Build		2022 Build – Mitigated	
		LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
NC 86 (Martin Luther King, Jr. Boulevard) & Homestead Road / Church Driveway	AM	C	24.5	C	26.2	C	25.6	N/A	N/A
	NOON	C	23.2	C	24.9	C	24.0	N/A	N/A
	PM	C	21.8	C	24.1	C	23.5	N/A	N/A
NC 86 (Martin Luther King, Jr. Boulevard) & Proposed RIRO Driveway#	AM	N/A	N/A	N/A	N/A	B	14.4	N/A	N/A
	NOON	N/A	N/A	N/A	N/A	B	12.8	N/A	N/A
	PM	N/A	N/A	N/A	N/A	D	26.6	N/A	N/A
NC 86 (Martin Luther King, Jr. Boulevard) & Northfield Drive / Proposed Main Site Driveway	AM	A	3.6	A	3.6	B	19.6	B	16.4
	NOON	A	4.2	A	4.0	B	15.4	B	14.1
	PM	A	9.9	B	10.6	B	18.8	B	16.7
NC 86 (Martin Luther King, Jr. Boulevard) & Piney Mountain Road / Municipal Drive	AM	B	12.7	B	12.7	B	11.6	N/A	N/A
	NOON	A	8.9	A	8.7	A	8.7	N/A	N/A
	PM	B	12.1	B	13.0	B	12.9	N/A	N/A

N/A – Not Applicable or No Improvements Necessary
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

North Carolina Highways and the recommended 150 foot spacing between a driveway and an intersection along arterial roadways found in Table 3.2 – Street Standards in the Town Design Manual. The driveway separation distance is less than the 500 foot minimum along arterial streets specified in the Town Design Manual, but the proposed design improves the current parcel driveway access alignment, where the two existing driveways are full access, separated by only 125 feet and do not align with the current signalized intersection at Northfield Drive.

Access for pedestrians and bicycles is lacking connectivity in the project study area. Sidewalk is present along the NC 86 (Martin Luther King, Jr. Blvd) corridor, but not continuously along both sides of the road south of Homestead Road. Bicycle lanes are present along the segment of NC 86 (Martin Luther King, Jr. Blvd) in the project study area north of Homestead Road, but no other bicycle facilities exist in the project study area.

Crash Analysis

A crash analysis of the NC 86 (Martin Luther King, Jr. Boulevard) corridor was completed using the NCDOT TEAAS crash data base for the last five years 2014-2019. Analysis results indicate that the study area corridor segment of NC 86 has lower crash rates for all reported crash types/categories than similar five-lane undivided urban North Carolina routes.

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 Synchro and HCM 95th percentile (max) queue length estimates for all analyzed scenarios. At the intersection of NC 86 (Martin Luther King, Jr. Blvd) and Northfield Drive/Main Site Driveway, projected 95th percentile queue lengths may exceed the driveway stem length in the 2022 AM and PM peak hours for with site redevelopment. A recommended improvement to provide separate left-turn and through/right-turn lanes would mitigate this issue.
Appropriateness of Acceleration / Deceleration Lanes	The site concept plan shows no specific related to new acceleration/deceleration lanes along NC 86. It is assumed that the existing two-way center left-turn lane would be utilized for southbound left-turns into the site at the Northfield Drive intersection. Auxiliary turn lanes are provided at most locations along NC 86 (Martin Luther King, Jr. Blvd) and at select minor street approaches. No other specific acceleration or deceleration lane issues were analyzed in the project study area
Pedestrian and Bicycle Analysis	Existing pedestrian access and connectivity currently lacking along NC 86 on the east side of the road adjacent to the site, but some pedestrian connections and crosswalk/pedestrian signals are present along the NC 86 corridor. Striped bicycle lanes are present along the facility, but only to the north of Homestead Road. Pedestrian sidewalk is shown along a portion of the site frontage with NC 86, but additional sidewalk connections should be considered along the entirety of the site frontage as well as to areas internal to the site to connect to the mobile home park and directly to the convenience store site.
Public Transportation Analysis	Public transportation service to the study area, and to the proposed site is excellent, with bus stops directly serving the site parcel and multiple local CHT T bus routes along NC 86 (Martin Luther King, Jr. Blvd) in both directions proximate to the site.

Mitigation Measures/Recommendations

Planned Improvements

There are no planned transportation improvement projects by NCDOT or the Town of Chapel Hill expected to be complete between 2019 and 2022 in the immediate project study area. The Town is currently moving forward on planning for bus rapid transit (BRT) service along the NC 86 corridor but no specific changes or improvements to the facility were analyzed for 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 2019 and 2022.

Applicant Committed Improvements

Based on the preliminary site plans and supporting development information provided, the Applicant is proposing to reconfigure driveways that access the site. The two existing full access driveways will be closed, and a full access driveway is proposed to align with Northfield Drive and utilize the existing traffic signal. A second proposed RIRO driveway is to be located to the north of the signalized intersection. Additional reconfiguration of existing internal driveways that serve the mobile home park are also proposed to allow better traffic circulation throughout the site development. The two proposed site driveways along NC 86 and initial laneage assumptions are schematically shown in **Figure ES-3**, based on the preliminary concept plans shown in **Figure ES- 2**.

Necessary Improvements

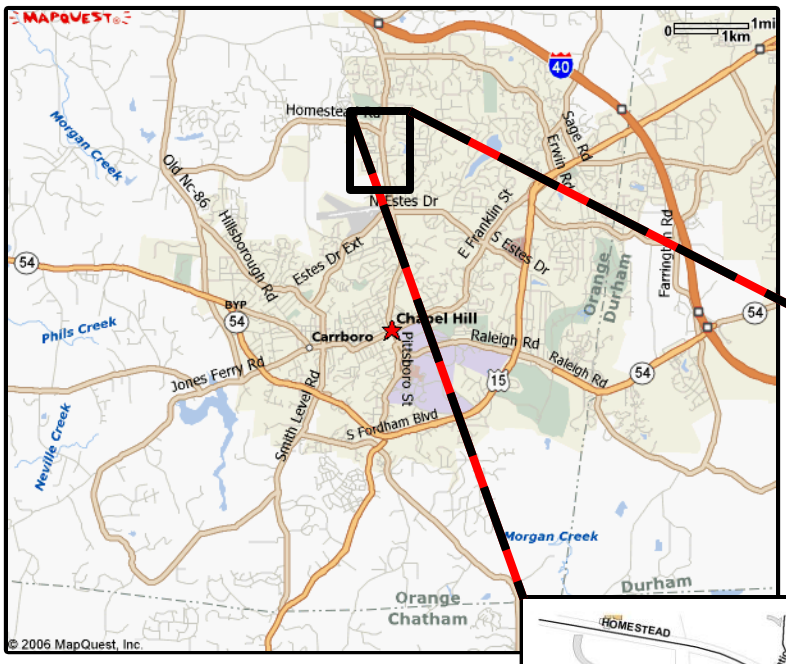
Based on traffic capacity analyses for the 2022 design year, and analyses of existing study area turning bay storage lengths and site access, the following improvements are recommended as being necessary for adequate transportation network operations (see **Figure ES-3**).

1) To provide adequate traffic operations and improve pedestrian safety and connectivity, the existing traffic signal at NC 86 and Northfield Drive should be upgraded to allow the Main Site Driveway to operate as a concurrent signal phase with Northfield Drive. The southbound and westbound approaches at the intersection include crosswalk and pedestrian signalization. The northbound and southbound left-turn lanes along NC 86 should operate with protected+permitted signal phasing. The signal should be retimed for all peak periods to maximize efficiency along the NC 86 corridor. These improvements are recommended for the 1200 MLK Redevelopment project.

2) Capacity analysis results indicate that a single westbound lane exiting at the Main Site Driveway may have maximum queues that exceed the proposed driveway stem length in 2022 AM and PM peak hours. To mitigate this issue, separate westbound left-turn and through/right-turn lanes are recommended to improve overall queue storage. This improvement is recommended for the 1200 MLK Redevelopment project.

3) The concept plan design for the RIRO driveway along NC 86 has limited driveway stem length and the nearby driveway aisle along the frontage of the convenience store may cause safety issues with turning traffic into/exiting this driveway in the vicinity of the external RIRO driveway. To mitigate this issue, extension of the proposed concrete median island at the RIRO driveway past the adjacent internal driveway is recommended, along with making this driveway aisle a one-way southbound movement. **Figure ES-4** schematically shows these proposed changes. This improvement is recommended for the 1200 MLK Redevelopment project.

4) An extension of sidewalk along the site frontage with NC 86 north of the proposed RIRO Driveway will allow better pedestrian connectivity along the corridor. In addition, provision of a sidewalk connection from the NC 86 sidewalk directly to the convenience store would improve safety. This improvement is recommended for the 1200 MLK Redevelopment project.

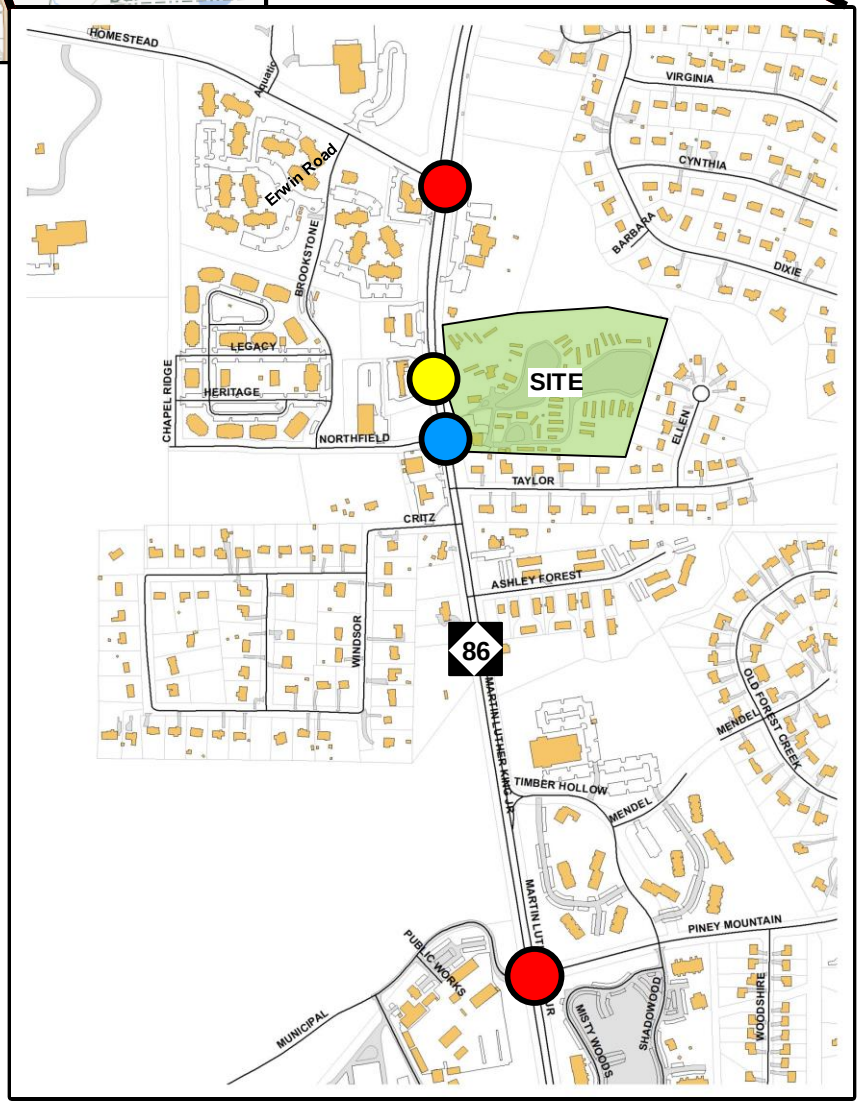


LEGEND

- = Existing Building Footprint
- = Proposed Site Parcel
- = Existing Study Area Intersection
- = Proposed Full Access Site Driveway
- = Proposed Future RIRO Driveway

N

NOT TO SCALE



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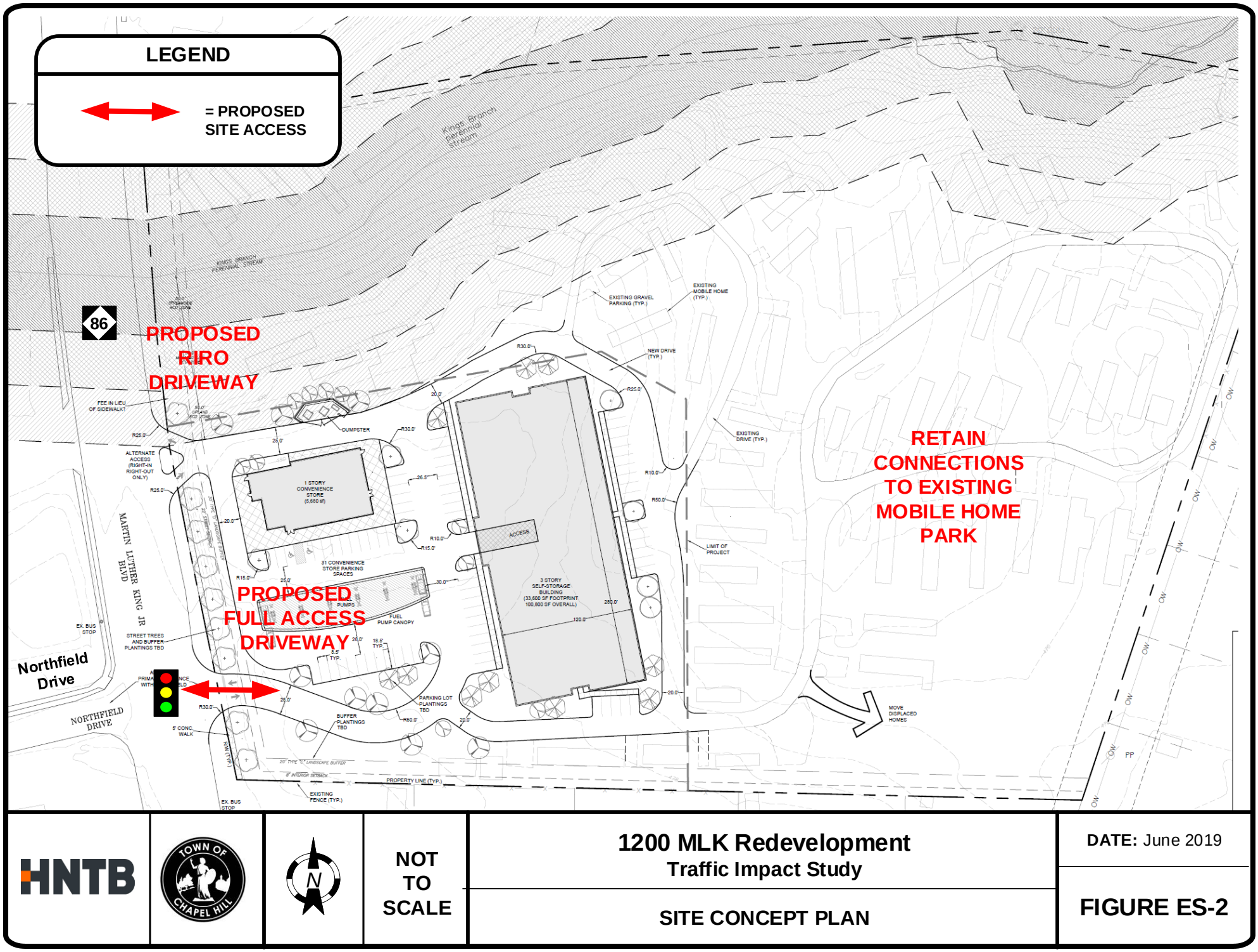
TOWN OF CHAPEL HILL

1200 MLK Redevelopment
Traffic Impact Study

DATE: June 2019

PROJECT STUDY AREA MAP

FIGURE ES-1



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TOWN OF CHAPEL HILL

N

NOT TO SCALE

1200 MLK Redevelopment
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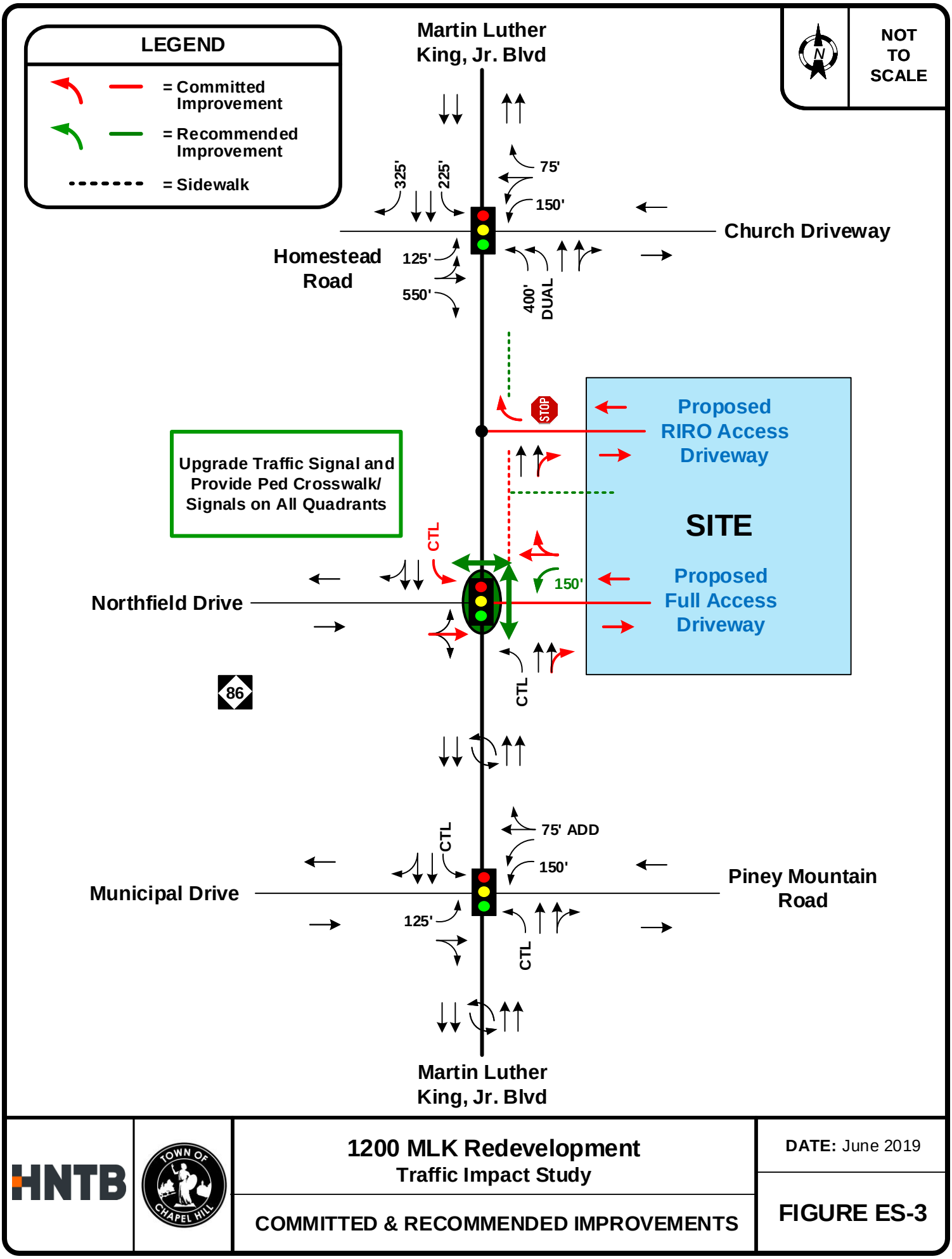
SITE CONCEPT PLAN

FIGURE ES-2



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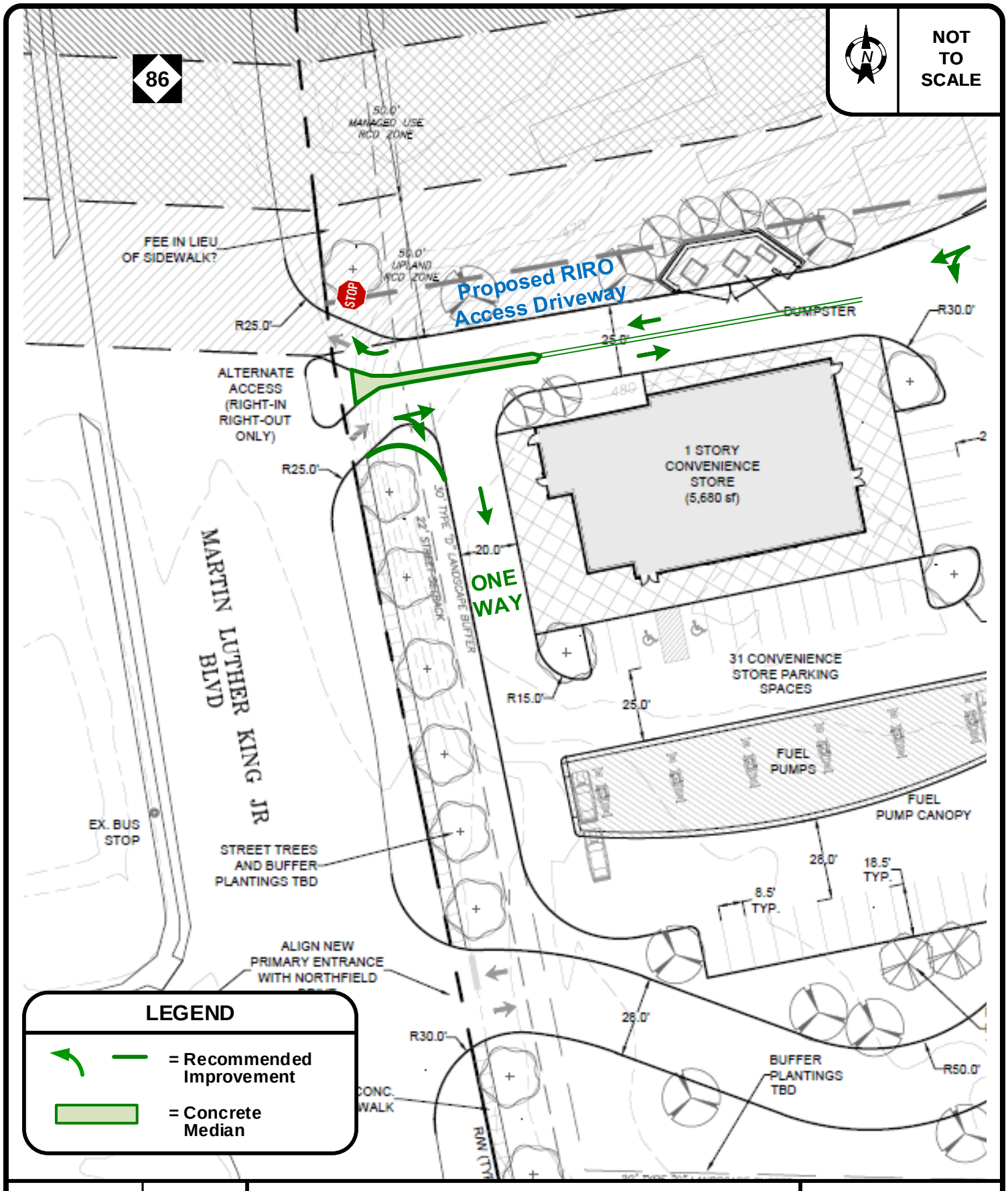
COMMITTED & RECOMMENDED IMPROVEMENTS

FIGURE ES-3



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RECOMMENDED RIRO DRIVEWAY IMPROVEMENTS SCHEMATIC

FIGURE ES-4