

710 N. ESTES TOWNHOMES

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

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Project Overview

A residential development, known as 710 N. Estes Townhomes, is being proposed along Estes Drive near its intersection with Somerset Drive in Chapel Hill, NC. The project proposes to develop the existing vacant wooded site with 92 townhomes. **Figure ES-1** shows the general location of the site. The overall project is anticipated to be fully complete and occupied by 2024. This report analyzes the build-out scenario for the year 2025 (one year after anticipated completion), the no-build scenario for 2025, as well as 2022 existing year traffic conditions.

The proposed site concept plan shows a provision for two access driveways, one will be a full movement driveway connection to Somerset Drive directly adjacent to the site and one connecting to the proposed Aura development immediately to the west of the site that will link to an external connection as a right-turn in/right-turn out only (RIRO) driveway to NC 86 (Martin Luther King, Jr. Boulevard). No other external vehicular access connections are proposed. The site driveways are proposed to have internal connectivity with on-site townhome units and their respective parking areas for each unit, along with several on-street parallel parking spaces provided. **Figure ES-2** displays the preliminary concept plan of the 710 N. Estes Townhomes project and nearby land uses and roadways. This report analyzes and presents the transportation impacts that the 710 N. Estes Townhomes will have on the following intersections in the project study area:

- Estes Drive and NC 86 (Martin Luther King, Jr. Blvd)
- Estes Drive and Somerset Drive
- Estes Drive and Caswell Road
- Estes Drive and E. Franklin Street
- Somerset Drive and Proposed Site Driveway
- Estes Drive and Proposed Aura Development Full Access Driveway
- NC 86 (Martin Luther King, Jr. Blvd) and Proposed Aura Development Right-Turn In/Right-Turn Out Only (RIRO) Driveway

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 Estes Drive corridor east of NC 86. The study area contains three signalized intersections along Estes Drive at NC 86, Caswell Road, and E. Franklin Street. All future site traffic is expected use the two proposed site driveways along NC 86 or Somerset Drive. NC 86 is a principal north-south arterial providing connectivity throughout Chapel Hill and points beyond in Orange County. Estes Drive is a minor arterial east-west street for access to areas throughout 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*.



Table ES-1. Weekday Vehicle Trip Generation Summary

Land Use	ITE LUC	Units	Daily			AM Peak Hour			Noon Peak Hour*			PM Peak Hour		
			Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
Multi-family Low-Rise	220	92	328	328	656	10	34	44	23	27	50	35	20	55
Transit/Ped/Bike (5% Reduction)			-16	-16	-32	-1	-2	-3	-1	-1	-2	-2	-1	-3
Net Vehicle Trips			312	312	624	9	32	41	22	26	48	33	19	52
TOTALS			312	312	624	9	32	41	22	26	48	33	19	52

* Noon Peak - Uses 75% of Average of AM/PM Peak Hours

Background Traffic

Background traffic growth for the 2025 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 2022 traffic volumes, along with the inclusion of four nearby specific background traffic generating projects to estimate 2025 background traffic on study area roadways.

Impact Analysis

Peak Hour Intersection Level of Service

Existing 2022 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 2025 and cause the Estes Drive signalized intersections with NC 86 and E. Franklin Street to operate at deficient levels in the 2025 PM peak hour, even with proposed Town and development-related improvements. With the addition of peak hour site-generated trips to the projected 2025 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 traffic simulation Level-of-Service (LOS_s) is shown in **Table ES-2** on the following page.

Access Analysis

Vehicular site access is to be accommodated at two proposed access driveways. One full access driveway connection is located along Somerset Drive, the other will form an internal connection to the internal driveway network for the proposed adjacent Aura project to the west of the site, which will allow right-turn in/out access to NC 86 (Martin Luther King, Jr. Blvd). Driveway separation from existing intersections, corner clearances, and internal throat lengths are acceptable, based on standards found in the 2017 *Town of Chapel Hill Public Works Design Manual* and 2003 *NCDOT Policy on Street and Driveway Access to North Carolina Highways*.

Access for pedestrians and bicycles is currently lacking connectivity in the project study area. Sidewalk is present along the NC 86 (Martin Luther King, Jr. Blvd) and Estes Drive corridors, but not continuously along both sides of the road. Bicycle sharrows are present along the segment of NC 86 (Martin Luther



King, Jr. Blvd) in the project study area south of Estes Drive and a paved shoulder exists along the southbound lanes north of Estes Drive, but no other bicycle facilities exist in the project study area

Table ES-2. Peak Hour Intersection Capacity Analysis Summary

Intersections	Peak Hour	2022 Existing		2025 No-Build		2025 Build		2025 Build – Mitigated	
		LOS _s	Delay	LOS _s	Delay	LOS _s	Delay	LOS _s	Delay
Estes Drive and NC 86 (Martin Luther King, Jr. Blvd)	AM	C	33.9	D	36.6	D	36.4	C	33.3
	NOON	C	33.9	C	26.5	C	26.6	C	26.0
	PM	D	51.5	E	67.7	E	71.0	D	46.9
Estes Drive and Somerset Drive [#]	AM	B	10.7	B	12.4	B	12.4	N/A	N/A
	NOON	A	8.6	A	5.9	B	10.1	N/A	N/A
	PM	C	16.3	B	12.1	C	15.7	N/A	N/A
Estes Drive and Caswell Road	AM	B	13.8	B	12.4	B	12.0	N/A	N/A
	NOON	B	10.8	A	8.7	A	9.0	N/A	N/A
	PM	B	17.2	B	14.4	B	14.5	N/A	N/A
Estes Drive and E. Franklin Street	AM	C	30.1	D	40.6	D	40.2	D	36.2
	NOON	C	30.1	D	38.8	D	38.3	C	29.8
	PM	D	41.8	E	55.5	E	55.8	D	50.5
Somerset Drive and Proposed Site Driveway [#]	AM	N/A	N/A	N/A	N/A	A	4.4	N/A	N/A
	NOON	N/A	N/A	N/A	N/A	A	4.3	N/A	N/A
	PM	N/A	N/A	N/A	N/A	A	4.3	N/A	N/A
Estes Drive and Proposed Aura Full Access Driveway [#]	AM	N/A	N/A	C	16.2	C	17.0	N/A	N/A
	NOON	N/A	N/A	B	13.7	B	15.0	N/A	N/A
	PM	N/A	N/A	D	30.3	D	26.2	N/A	N/A
NC 86 (Martin Luther King, Jr. Blvd) and Proposed Aura (RIRO) Driveway [#]	AM	N/A	N/A	A	7.0	A	6.9	N/A	N/A
	NOON	N/A	N/A	A	6.4	A	6.4	N/A	N/A
	PM	N/A	N/A	C	15.7	C	17.1	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

Crash Analysis

A crash analysis of the NC 86 (Martin Luther King, Jr. Boulevard) and Estes Drive corridors was completed as part of the Aura Chapel Hill TIA and used for this study. Analysis results indicate that the study area corridor segments of NC 86 and Estes Drive near the project site have higher crash rates for all reported crash types/categories than similar urban North Carolina facilities, with the preponderance of crashes reported at the NC 86 / Estes Drive intersection.

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 all analyzed scenarios. At the intersection of NC 86 (Martin Luther King, Jr. Blvd) and Estes Drive, even with proposed improvements from the Town Estes Drive project and Aura project, queues may exceed turn bay storage for the eastbound left-turn and southbound left-turn. Additional laneage improvements for these movements are recommended. At the Estes Drive and E. Franklin Street intersection, additional laneage improvements and signal re-optimization is necessary to prevent queue spillbacks for the Estes Drive approaches.
Appropriateness of Acceleration / Deceleration Lanes	The site concept plan shows no specific related to new acceleration/deceleration lanes along Estes Drive or Somerset Drive. Somerset Drive is a low volume, low speed neighborhood street that would not require auxiliary lanes. The Town's Estes Drive Improvements project and the adjacent Aura project will add new auxiliary turn lanes or extend existing turn lanes. No other specific acceleration or deceleration lane issues were analyzed in the project study area.
Pedestrian and Bicycle Analysis	Existing pedestrian access and connectivity is currently provided along the NC 86 and Estes Drive corridors but will be substantially enhanced with the Town Estes Drive Improvements project and Aura project. Bicycle facilities will be included in the Town project but are limited beyond the project improvements area. A marked pedestrian crossing with rectangular rapid flashing beacons (RRFB) will be included at the Somerset Drive and Estes Drive intersection.
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 that will be accessible through pedestrian connections within the Aura development.

Mitigation Measures/Recommendations

Planned Improvements

There are no planned transportation improvement projects by NCDOT expected to be complete between 2022 and 2025 in the immediate project study area. The Town has two projects planned in the project study area, as described below:

- **Estes Drive Bicycle and Pedestrian Improvements**
This project will enhance pedestrian and bicycle connectivity along the Estes Drive corridor on both sides of the facility with sidewalks, bike lanes and additional pedestrian crossings. It will also provide improvements to auxiliary turn lanes at the NC 86 and Estes Drive intersection. It is expected to be complete prior to the 2025 analysis year.
- **North-South Bus Rapid Transit Project (N-S BRT)**
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, as the proposed completion date is after the 2025 analysis year.

Background Committed Improvements

There are several specific transportation network improvements to study area roadway intersections related to the Aura Chapel Hill private development project that are expected to be completed between 2022 and 2025. These are shown in combination with the Town's Estes Drive Improvement project on **Figure ES-3**.



- The Aura site plans include a limited access driveway connection to NC 86 north of Estes Drive with stop-control. This access point includes a northbound deceleration lane along NC 86 and concrete islands to prevent both left-turn out of the site and into it. The 701 N. Estes Townhomes site has a proposed street connection with internal Aura roadways that will provide access to the NC 86 driveway, as well as the full access Aura Driveway along Estes Drive.
- Along the Aura site frontage on Estes Drive, improvements to westbound Estes Drive auxiliary lanes and pedestrian/bicycle facilities are planned. A primary, full access driveway will be created with stop-control for the southbound approach with left and right-turn lanes, an eastbound left-turn lane and a protected pedestrian crosswalk with Rapid-Rectangular Flashing Beacons (RRFBs).

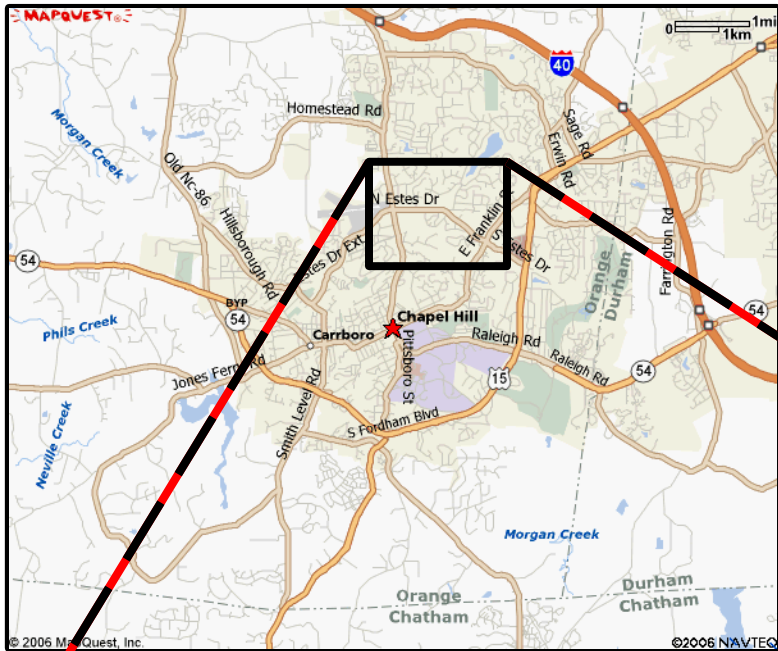
Applicant Committed Improvements

Based on the preliminary site plans and supporting development information provided, the Applicant is proposing to provide two access connections – one to Somerset Drive and one to tie into the Aura development internal roadway plans. The two proposed site driveways and initial laneage assumptions are schematically shown in **Figure ES-3**, based on the preliminary concept plans shown in **Figure ES-2**. The site will also provide sidewalk connection to the Town’s Estes Drive Improvement Project and a sidewalk along the frontage with Estes Drive to tie into sidewalk improvements for the Aura project.






Necessary Improvements

Based on traffic capacity analyses for the 2025 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 reduce projected vehicle queuing, the future improvements at NC 86 and Estes Drive should be augmented with an additional eastbound left-turn lane to provide dual left-turn lanes with at least 225 feet of storage each. The signal should be retimed for all peak periods to maximize efficiency of both corridors and feature protected-only left-turn phasing for both eastbound and westbound approaches. These improvements are recommended whether or not the 710 N. Estes Townhomes project is constructed.
- 2) Maximum projected queue results indicate that the southbound approach at the NC 86 and Estes Drive intersection may spillback into through travel lanes if the proposed median island constructed for the proposed Aura development RIRO driveway connection is extended beyond the proposed driveway location. It is recommended that the design of the median island allow as much southbound left-turn storage downstream as possible downstream of the driveway location. This improvement is recommended whether or not the 710 N. Estes Townhomes project is constructed.
- 3) The intersection of Estes Drive and E. Franklin Street, even with proposed signal re-optimization is expected to operate at or over capacity in the 2025 PM peak hour with or without site-related traffic from the 710 N. Estes Townhomes project. To address high volume existing and future traffic demands for the southbound E. Franklin Street right-turn movement, it is recommended to construct a right-turn auxiliary lane with at least 350 feet of storage at this approach. This lane can feature a right-turn overlap signal phase which will help with overall signal efficiency and reduce queues for other movements. This improvement is recommended whether or not the 710 N. Estes Townhomes project is constructed.

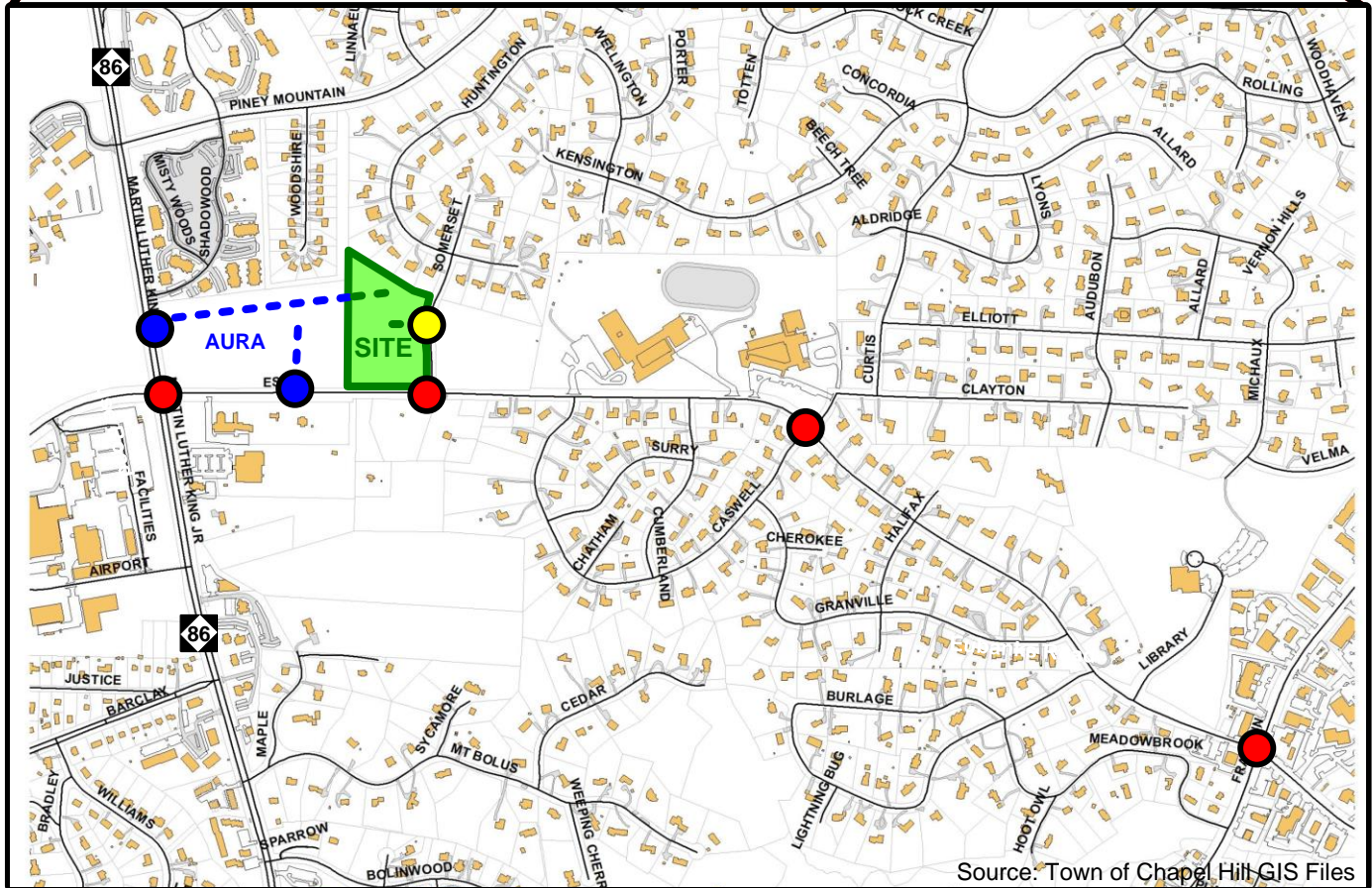


LEGEND

-  = Existing Building Footprint
-  = Existing Study Area Intersection
-  = Proposed Site Driveway
-  = Future Development Driveway
-  = Proposed Site



NOT TO SCALE

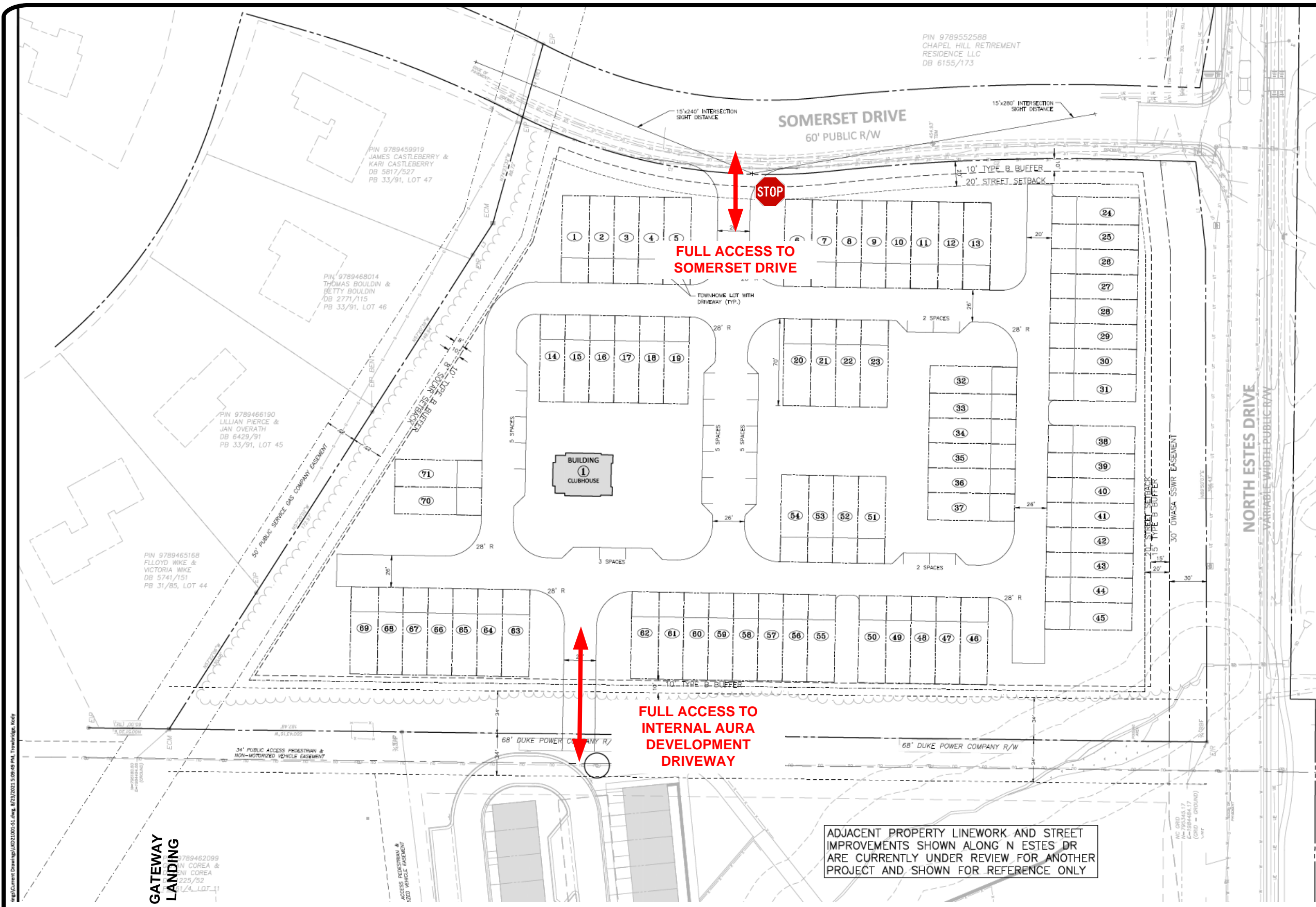


710 N Estes Townhomes Transportation Impact Analysis

PROJECT STUDY AREA

DATE: April 2022

FIGURE ES-1



- LEGEND**
- SIGNAGE
 - YARD LIGHTS
 - LIGHT POLE
 - POWER POLE
 - TRAFFIC DIRECTIONAL ARROW
 - ACCESSIBLE PARKING STALL
 - VAN ACCESSIBLE PARKING STALL
 - PARKING SPACE COUNT
 - ACCESSIBLE RAMPS
 - ACCESSIBLE ROUTE
 - PHASE LINE
 - PROPERTY LINE
 - RIGHT-OF-WAY LINE
 - LOT LINE
 - EASEMENT LINE
 - CENTERLINE
 - HEAVY DUTY ASPHALT PAVEMENT

LEGEND

= PROPOSED SITE ACCESS

ADJACENT PROPERTY LINEWORK AND STREET IMPROVEMENTS SHOWN ALONG N ESTES DR ARE CURRENTLY UNDER REVIEW FOR ANOTHER PROJECT AND SHOWN FOR REFERENCE ONLY



NOT TO SCALE

**710 N Estes Townhomes
Transportation Impact Analysis**

PRELIMINARY SITE PLAN

DATE: April 2022

FIGURE ES-2

