



## LINCOLN COUNTY PLANNING & INSPECTIONS DEPARTMENT

115 W. MAIN ST., LINCOLNTON, NORTH CAROLINA 28092  
704-736-8440 OFFICE 704-736-8434 INSPECTION REQUEST LINE

To: Board of Commissioners  
Planning Board

From: Jeremiah Combs, Planner

Date: August 20, 2021

Re: PD #2021-3  
Springs at Westport Club, LLC, applicant  
Parcel ID# 93583

*The following information is for use by the Lincoln County Board of Commissioners and Planning Board at their joint meeting/public hearing on September 13, 2021.*

### Request

The applicant is requesting to amend the master plan for an 82-acre residential planned development for attached and detached homes to eliminate the amenity center, add another point of access from N.C. 16 Business, and reduce the setback of the attached housing portion of the development closest to the adjoining properties on N.C. 16 Business and Ron Howard Lane.

A site plan has been submitted as part of the rezoning application. Also included are the approved 2006 plan and the minutes from an August 10th community involvement meeting.

### Site Area & Description

The subject property is located on the east side of N.C. 16 Business near the end of Ron Howard Lane, in Catawba Springs Township. It is adjoined by property zoned R-SF (Residential-Single Family), B-G (General Business), B-N (Neighborhood Business), and PD-MU CU (Planned Development Mixed-Use Conditional Use). Land uses in this area include business, residential, religious, and institutional (school). The subject property is part of an area designated by the Lincoln County Land Use Plan as Walkable Activity Center, suitable for an interconnected mixture of commercial and residential uses.

## Additional Information

### **Adjoining zoning and uses**

*East: zoned PD-MU CU, residential subdivision.*

*South: zoned R-SF and B-G, residences and commercial strip.*

*West: zoned B-G and B-N, undeveloped tract.*

*North: zoned PD-R, residential subdivision and undeveloped portion of tract.*

## Staff's Recommendation

Staff recommends approval of the rezoning request. See proposed statement on following page.



## **LINCOLN COUNTY PLANNING & INSPECTIONS DEPARTMENT**

115 W. MAIN ST., LINCOLNTON, NORTH CAROLINA 28092  
704-736-8440 OFFICE 704-736-8434 INSPECTION REQUEST LINE

### **Zoning Amendment Staff's Proposed Statement of Consistency and Reasonableness**

Case No. **PD #2021-3**  
Applicant **Springs at Westport Club, LLC**  
Parcel ID# **93583**  
Location **east side of N. NC 16 Business Hwy at the end of Ron Howard Lane**  
Proposed amendment **Amend master plan for residential planned development**

This proposed amendment **is consistent** with the Lincoln County Land Use Plan and other adopted plans in that:

**This property is part of an area designated by the Land Use Plan as Walkable Activity Center. This residential development will be part of a larger network of residential and commercial uses with integrated vehicular and pedestrian access.**

This proposed amendment **is reasonable** in that:

**These amendments do not increase the density of the residential development. The second access off Highway 16 will provide two emergency access routes. The amenity center is not a requirement of the Lincoln County UDO.**



## **Application to Amend Planned Development Plan**

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

### **PART I**

Applicant Name Springs at Westport Club, LLC

Applicant Address 1400 Battleground Ave. #124 Greensboro NC 27408

Applicant Phone Number 336-255-1498

Property Owner Name McBee Apartments, LP / TGD 1, LLC

Property Owner Address 1400 Battleground Ave. #124 Greensboro NC 27408

Property Owner Phone Number 336-314-1494

### **PART II**

Property Location NC Hwy 16 Business Denver NC 28037

Property ID (10 digits) 4604556319 Property size 20.55 Acres

Parcel # (5 digits) 93583 Deed Book(s) 2658 Page(s) 859

### **PART III**

Zoning District PD-R CU

Briefly explain the proposed modification(s) to the Planned Development master plan.

Original Site Map Illustrated excessive building set back of 180'. Application to modify setbacks of the town-  
home product to reflect current SF rear set backs of 40'.

2. Amend the entry road: Provide 2nd Entry on Hwy 16 Bus. to provide for Emergency Access and Future Villiage Center.

3. Original Site Layout included Pool/Club Amenity to be removed as it is not a desired component for the Townhome Site  
due to excessive cost burden to HOA.

### **SEE PLANNING & INSPECTIONS DEPARTMENT FOR APPLICATION FEE**

*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

6/18/2021

Date



**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: 8/23/2021      Scale: 1 Inch = 300 Feet

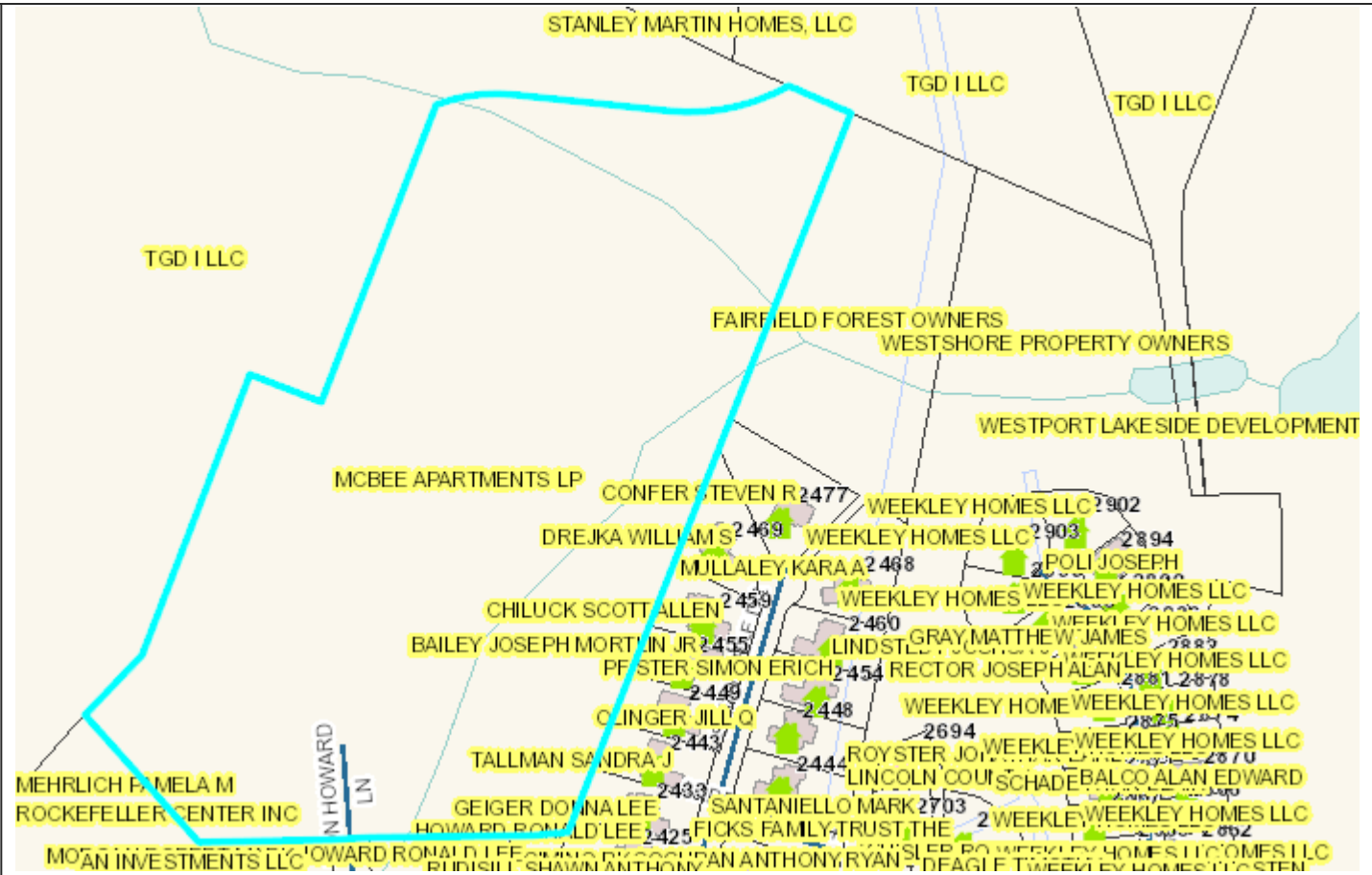


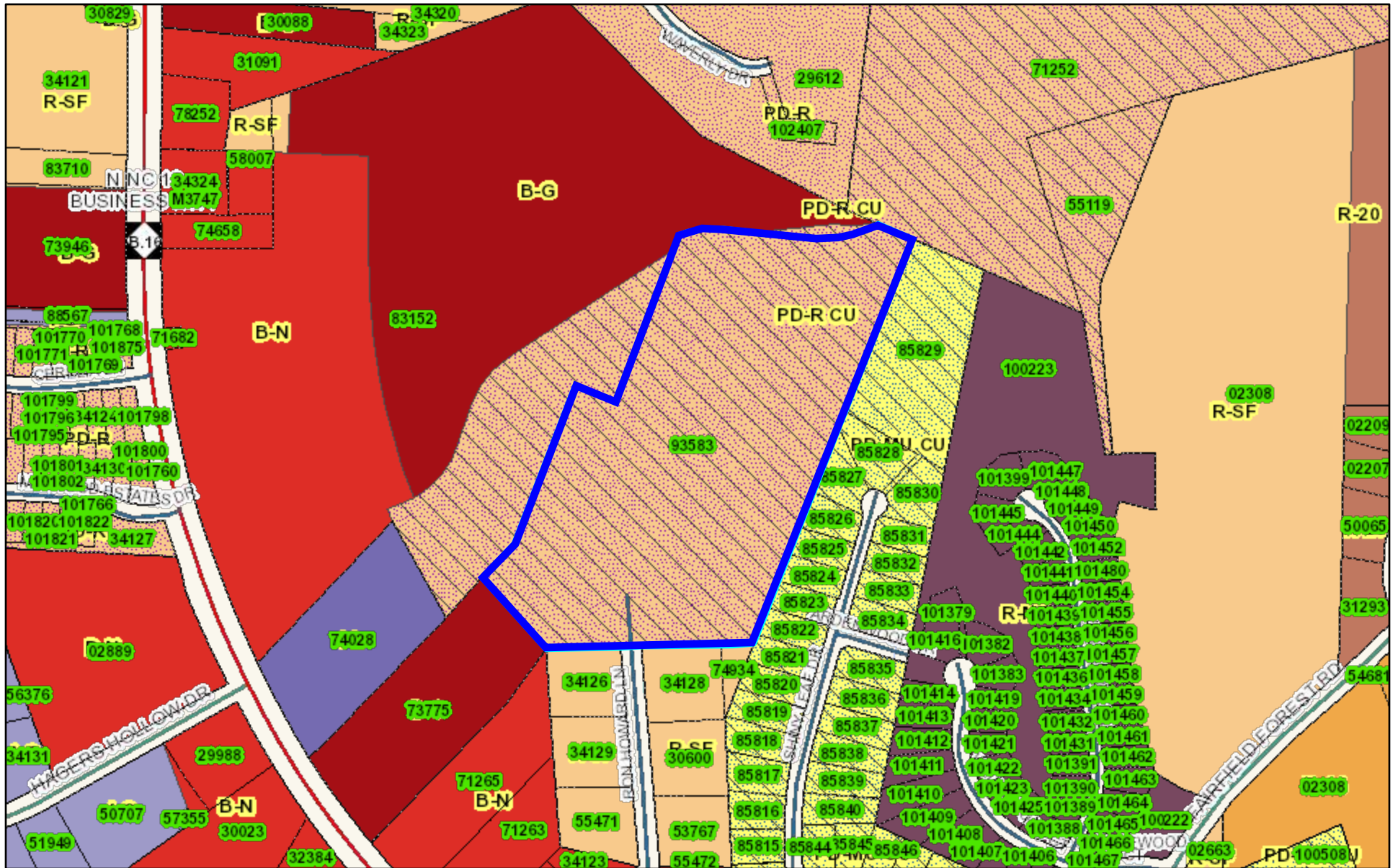
Photo Not  
Available

<b>Parcel ID</b>	93583	<b>Owner</b>	MCBEE APARTMENTS LP
<b>Map</b>	4604	<b>Mailing</b>	P O BOX 9007
<b>Account</b>	0262382	<b>Address</b>	GREENSBORO, NC 27429
<b>Deed</b>	2658 859	<b>Last Transaction Date</b>	04/13/2017
<b>Plat</b>		<b>Subdivision</b>	
<b>Land Value</b>	\$390,336	<b>Improvement Value</b>	\$0
<b>Previous Parcel</b>	83152	<b>Total Value</b>	\$390,336

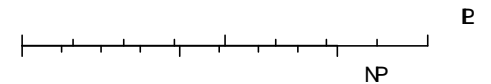
-----All values for Tax Year 2020 -----

<b>Description</b>	VACANT	<b>Deed Acres</b>	20.542
<b>Address</b>	N NC 16 BUSINESS HWY	<b>Tax Acres</b>	20.55
<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>	Calc Acres	<b>Voting Precinct</b>	Calc Acres
PD-R	20.55	WP32	20.55
<b>Watershed</b>		<b>Sewer District</b>	
	20.55		20.54
		SEWER	0.01
<b>Census County</b>		<b>Tract</b>	<b>Block</b>
109		071203	1057
			20.55
<b>Flood</b>	<b>Zone Description</b>	<b>Panel</b>	
X	NO FLOOD HAZARD	3710460400	20.55

PD #2021-3  
Subject property is outlined in blue



\$XWV



SCALE OF 1:10,000



PD #2021-3 Springs at Westport Club, LLC

1 in. = 300 ft.



WC

SFN

SFN

SFN

RON HOWARD LN

SHINY LEAF DR

### Land Use Plan

- Open Space (OS)
- Rural Living (RL)
- Industrial Center (IC)
- Large Lot Residential (LLR)
- Single-Family Neighborhood (SFN)
- Multifamily Neighborhood (MFN)
- Rural Crossroads (RC)
- Suburban Commercial (SC)
- Suburban Office (SO)
- Special District (SD)
- Walkable Neighborhood (WN)
- Walkable Activity Center (WC)
- Town Home Community (THC)



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

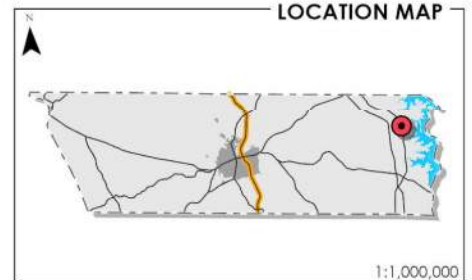
Parcel ID # 93583


 - Property Location(s)

See Attached Application for Parcel Information

Property Location(s) Outlined in Green.

### LOCATION MAP



 Property Location(s)

Community Involvement Meeting for Amendments to PCUR#147: Presented by Tom Daniel, Springs at  
Westport Club: Applicant

8/10/21 6:30 PM Lincoln County Community Center at Optimist Club Road

The meeting was started with the applicant displaying the Original, Approved plan from November 2006. It was stated that this property was part of a land assembly centered around the Westport Community and Golf Course. The acquisition and development of the surrounding property was intended to financially support the renovation and the reopening of Westport Golf Club.

The history of the project and the conditional use zoning approval was given:

November 2006: PCUR #147 was approved and represented 120 Townhomes and 69 Single Family. The zoning permit was extended by Lincoln County due to its moratorium on starting any approved projects due to its inability to provide sewer capacity. A two-year extension was granted by Lincoln County Planning. In 2009, the NC General Assembly passed the Permit Extension Act of 2009 and its subsequent amendment to extend approved permits. The zoning permit was extended to 2014, at which time a building permit applied for and was issued by Lincoln County. Per County planning, the pulling of a building permit solidified the zoning.

The applicant explained that it is actively working to complete the development of the approved zoning of the portion of property that is located on the South side of the golf course. With the completion of this portion of the planned community development, it is working to begin the development of the properties on the Northern side of the golf course.

The applicant explained that there are three proposed amendments to PCUR#147 and compared original plan with updated proposed plan:

1. Define a rear set back for the town home portion of the project that is equal to the approved set back established by the proposed single-family portion of the same plan. The original plan did not establish any setbacks to the townhome portion of the plan. Only the original conceptual plan allowed for the scaling and determining of setbacks for the townhome portion.

Using the approved setbacks established from the single-family portion of the zoning permit, 40' in the rear, the civil engineers were able to consolidate the impervious area of the original plan. The result is a reduction of the impervious area from the original plan from 11.026 acres to 5.59 acres.

2. The addition of a second driveway entry to the project from Highway 16 Business. This addition was a requirement of County planning. This was due to the delay in construction of the road that will connect to Golf Course North as shown on the original approved plan. The delay in constructing this road or secondary entrance for the project was due to the inability of the County to provide sewer capacity for the remaining 69 single family homes. (Water and Sewer Utilities are always installed prior to building of the roads). An updated Traffic Impact Analysis was requested by the County with the addition of the secondary access. This has been completed by the Applicant, and the applicant is agreeable to the recommendations that it provided.



3. The removal of a pool and clubhouse amenity that was for the townhome site on the original conceptual plan. The builder of the townhome units requested this amendment, as a pool and clubhouse will result in a financial burden to an HOA of 120 townhome units. The removal of this condition from the original zoning also helps to further reduce the impervious area created by the development.

Question & Answer:

1. **What is expected to be built on the remaining commercial property outside of this project?**

The Applicant explained the vision for future mixed-use development on remainder of the property, including potential pedestrian and golf cart accessibility from Fairfield Forest Rd.

2. **Will there be apartments in the future mixed-use development?**

Currently multifamily units are expected to be a component of this plan. If multifamily becomes a portion of the plan, that plan will go through this same process, community involvement, public hearing, zoning approval at a later date.

3. **What would keep you from doing another high-density residential project instead of a mixed-use development?**

The property is currently zoned for commercial uses, and the Applicant has for many years expressed to the County its desire for a mixed use development on this property that could provide a destination center for the many rooftops of Westport and its surrounding communities.

4. **How are these amendments advantageous to the current and future residents?**

The builder of the townhome units does not want an amenity center, and the builder sees it as a maintenance burden on HOA. This will benefit the future residents of this project by keeping HOA fees at a minimum.

Traffic improvements of an added access will mitigate impacts by providing for and additional point of egress/ingress to the development.

Establishing a defined rear set back of the townhome units allows the civil engineers and designers to reduce the impervious area by half of the original approved concept plan.

5. **How long will it be before the through road is constructed?**

Hopefully in the very near future as the County can make additional sewer capacity for the remaining 69 single family lots. Currently that time frame is late 2022.

6. **Will a new traffic study be performed when school is in session?**

The updated Traffic Impact Analysis used traffic counts from 2019 school year and applied the expected growth in traffic to 2023 build out volumes.

**7. Where will the through road connect to Golf Course Dr?**

The connection will be made per approved plan to Golf Course North, just below the dam for the golf course irrigation pond.

**8. Will future roads connect to Stratford?**

Connectivity was discussed with the developers of the Stratford subdivision during their design process. With the envisioned mixed-use development of the remaining commercial property, a curb cut was designed by the Stratford Engineers for the potential future connectivity.

**9. If the 40' setback is denied, what would happen to the project?**

The project would have to be redesigned to either reduce units or adjust the site boundary.

**10. What has prevented you from building it before now?**

Economics. The Applicant has been actively developing their property on the South side of the Golf Course and will be moving to this property on the North side next. The Applicant has been actively working on the updated design for the Northern Property since 2015. Engineering for Water and Sewer Utilities was completed in 2018, in order to secure sewer availability. The market now is right for the builders, and the developer has the capacity to complete.

Several residents expressed concerns about existing traffic congestion and the impact of additional trips that will be produced by this development.

The applicant offered that in his experience with this type of product, townhomes, that the majority, greater than half of the residents, fit the demographic of the 55 year old and older residents. This is what has been experienced with the townhomes that have been developed and built on the South side of the Golf Course. This demographic of 55+ typically does not have school age children, and many are retired. This results in a majority of the residents not producing peak hour trips.

The applicant also commented that given this development was previously approved, and the zoning and plan has been on the books with the County since the end of 2006, as well as shown as such on the County's zoning maps, that the new developments that have been approved in close proximity would have taken into consideration this approved development, its impact, and its location.

**PD #2021-3 Springs at Westport Club, LLC, applicant  
08/10/21 community involvement meeting**

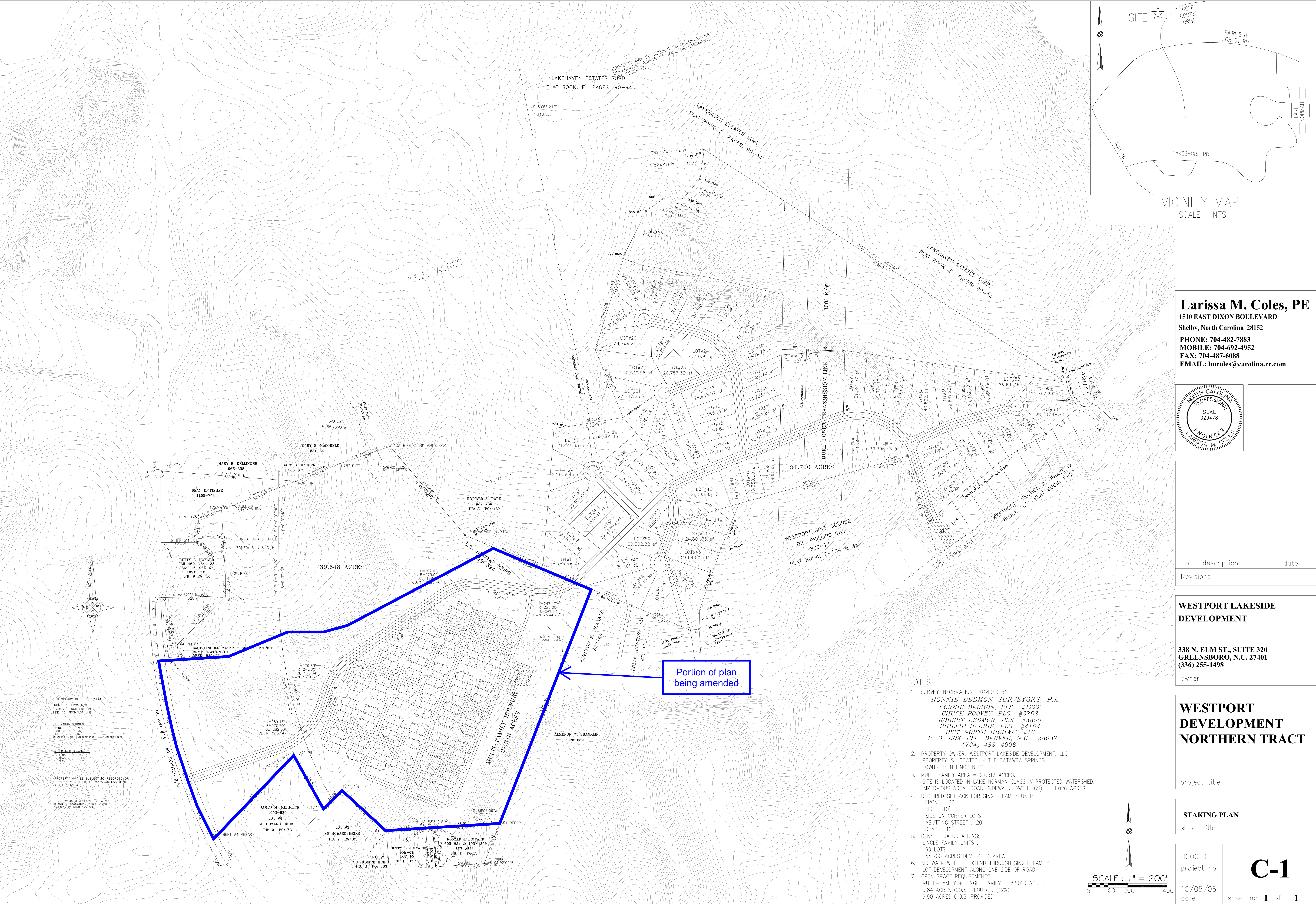
[illegible]

## 08/10/21 community involvement meeting

[illegible]



Approved 2006 plan



**Larissa M. Coles, PE**  
1510 EAST DIXON BOULEVARD  
Shelby, North Carolina 28152  
PHONE: 704-482-7883  
MOBILE: 704-692-4952  
FAX: 704-487-6088  
EMAIL: lancoles@carolina.rr.com



no.	description	date
Revisions		

**WESTPORT LAKESIDE  
DEVELOPMENT**

338 N. ELM ST., SUITE 320  
GREENSBORO, N.C. 27401  
(336) 255-1498

owner

**WESTPORT  
DEVELOPMENT  
NORTHERN TRACT**

project title

**STAKING PLAN**  
sheet title

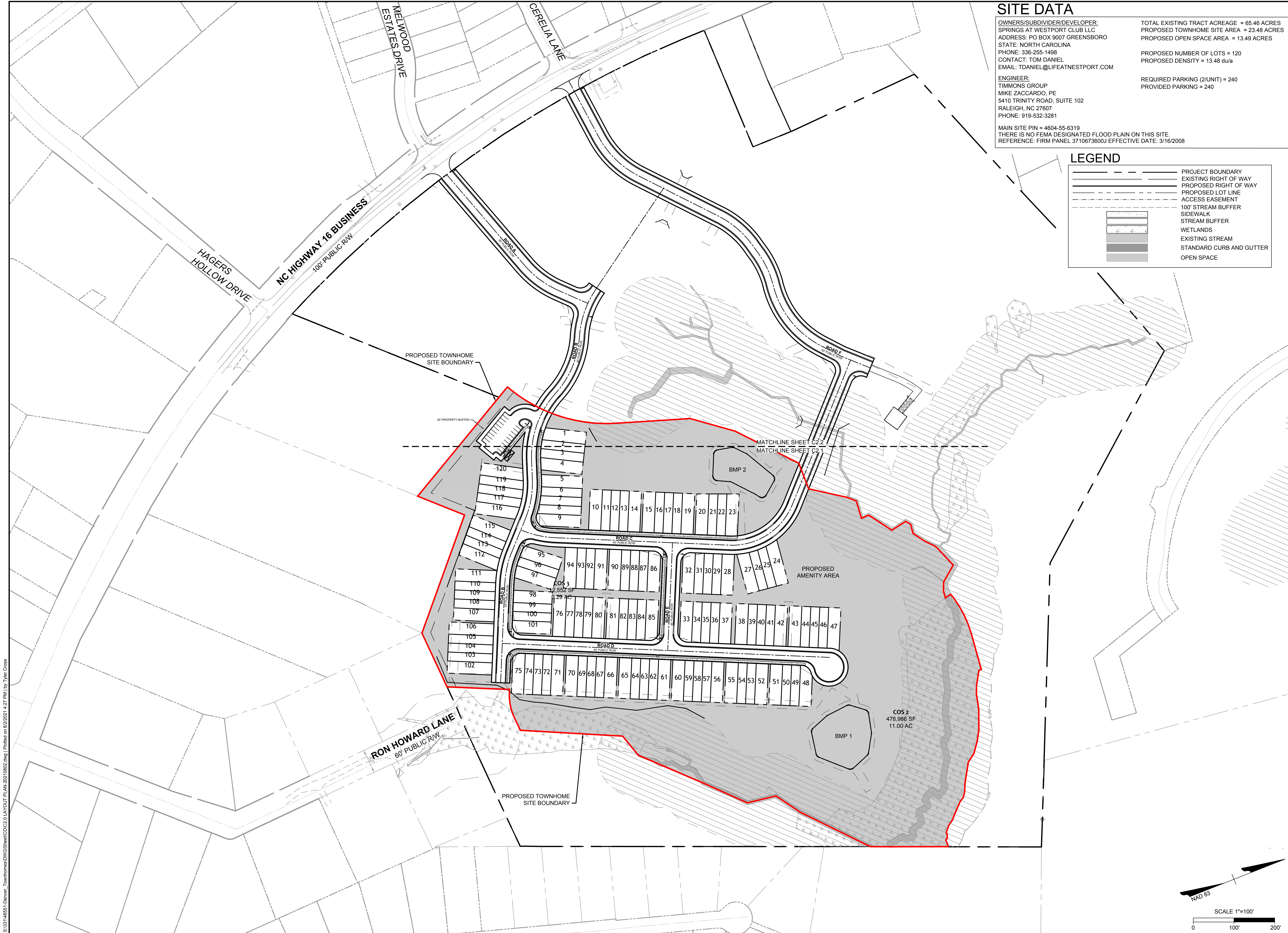
0000-0  
project no.  
10/05/06  
date

**C-1**  
sheet no. 1 of 1

- NOTES
- SURVEY INFORMATION PROVIDED BY:  
**RONNIE DEDMON SURVEYORS, P.A.**  
RONNIE DEDMON, PLS #1222  
CHUCK POOVEY, PLS #3762  
ROBERT DEDMON, PLS #3899  
PHILIP HARRIS, PLS #4164  
4837 NORTH HIGHWAY #16  
P. O. BOX 494 DENVER, N.C. 28037  
(704) 483-4908
  - PROPERTY OWNER: WESTPORT LAKESIDE DEVELOPMENT, LLC  
PROPERTY IS LOCATED IN THE CATAMBA SPRINGS  
TOWNSHIP IN LINCOLN CO., N.C.
  - MULTI-FAMILY AREA = 27.313 ACRES.  
SITE IS LOCATED IN LAKE NORMAN CLASS IV PROTECTED WATERSHED.  
IMPERVIOUS AREA (ROAD, SIDEWALK, DWELLINGS) = 11.026 ACRES
  - REQUIRED SETBACK FOR SINGLE FAMILY UNITS:  
FRONT : 30'  
SIDE : 10'  
SIDE ON CORNER LOTS  
ABUTTING STREET : 20'  
REAR : 40'
  - DENSITY CALCULATIONS:  
SINGLE FAMILY UNITS :  
69 LOTS  
54,700 ACRES DEVELOPED AREA  
SIDEWALK WILL BE EXTEND THROUGH SINGLE FAMILY  
LOT DEVELOPMENT ALONG ONE SIDE OF ROAD.
  - OPEN SPACE REQUIREMENTS:  
MULTI-FAMILY + SINGLE FAMILY = 82.013 ACRES  
9.84 ACRES C.O.S. REQUIRED (12%)  
9.90 ACRES C.O.S. PROVIDED



S:\31146551-Denver\_Townhomes\DWG\Sheet\C2.0 LAYOUT PLAN-20210802.dwg | Plotted on 8/2/2021 4:27 PM | by Tyler Cross



## SITE DATA

OWNERS/SUBDIVIDER/DEVELOPER:  
SPRINGS AT WESTPORT CLUB LLC  
ADDRESS: PO BOX 9007 GREENSBORO  
STATE: NORTH CAROLINA  
PHONE: 336-255-1498  
CONTACT: TOM DANIEL  
EMAIL: TDANIEL@LIFEATNESTPORT.COM

ENGINEER:  
TIMMONS GROUP  
MIKE ZACCARDO, PE  
5410 TRINITY ROAD, SUITE 102  
RALEIGH, NC 27607  
PHONE: 919-532-3281

MAIN SITE PIN = 4604-55-6319  
THERE IS NO FEMA DESIGNATED FLOOD PLAIN ON THIS SITE.  
REFERENCE: FIRM PANEL 3710673600J EFFECTIVE DATE: 3/16/2008

TOTAL EXISTING TRACT ACREAGE = 65.46 ACRES  
PROPOSED TOWNHOME SITE AREA = 23.48 ACRES  
PROPOSED OPEN SPACE AREA = 13.49 ACRES

PROPOSED NUMBER OF LOTS = 120  
PROPOSED DENSITY = 13.48 du/a

REQUIRED PARKING (2/UNIT) = 240  
PROVIDED PARKING = 240

## LEGEND

---	PROJECT BOUNDARY
---	EXISTING RIGHT OF WAY
---	PROPOSED RIGHT OF WAY
---	PROPOSED LOT LINE
---	ACCESS EASEMENT
---	100' STREAM BUFFER
---	SIDEWALK
---	STREAM BUFFER
---	WETLANDS
---	EXISTING STREAM
---	STANDARD CURB AND GUTTER
---	OPEN SPACE

**TIMMONS GROUP**

NORTH CAROLINA LICENSE NO. C-1652

**WESTPORT TOWNHOMES**

DENVER, LINCOLN COUNTY - NORTH CAROLINA

OVERALL SITE PLAN

JOB NO.  
**46551**

SHEET NO.  
**C2.0**

FOR REVIEW  
ONLY

THIS DRAWING PREPARED AT THE

**RALEIGH OFFICE**

5410 Trinity Road, Suite 112 | Raleigh, NC 27607  
TEL 919-866-4951 FAX 919-532-8124 www.timmons.com

YOUR VISION ACHIEVED THROUGH OURS.

DATE

08/02/2021

DRAWN BY

331

DESIGNED BY

331

CHECKED BY

MVZ

SCALE

1" = 100'

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# Westport Townhomes Development

## Traffic Impact Analysis

Denver, North Carolina

August 2021



*Prepared for:*

Springs at Westport Club, LLC



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## 1 INTRODUCTION

This report presents the findings of the traffic impact analysis (TIA) for the proposed Westport Townhomes Development. The development will be located off NC-16 Business in Denver, NC (see **Figure 1-1**) and will consist of 69 single-family detached housing units and 120 low-rise multifamily housing units.

Analyses were completed for the 2021 Existing traffic volumes, 2023 Background traffic volumes, and 2023 Build traffic volumes (Background + site trips). The purpose of this assessment is as follows:

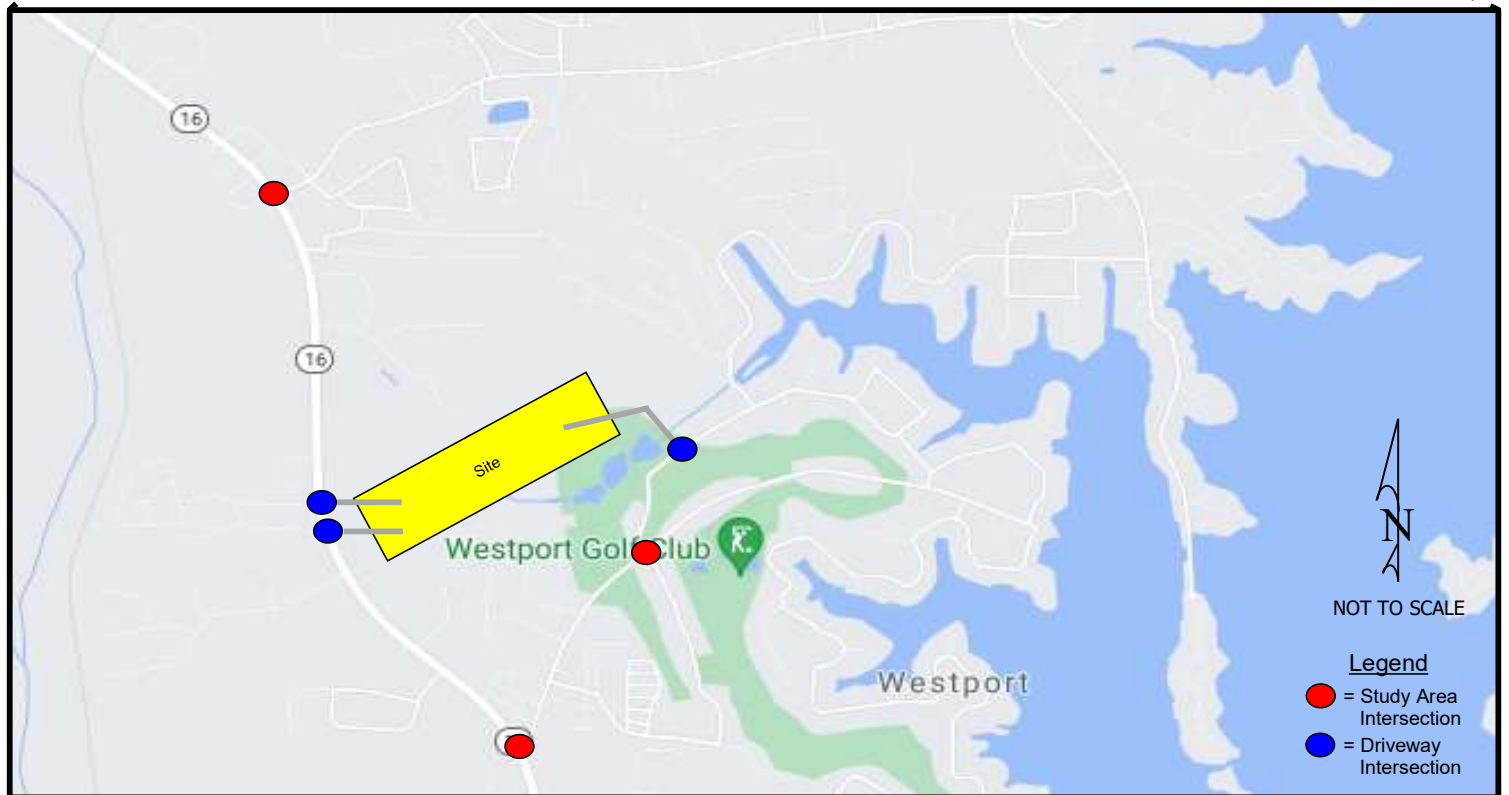
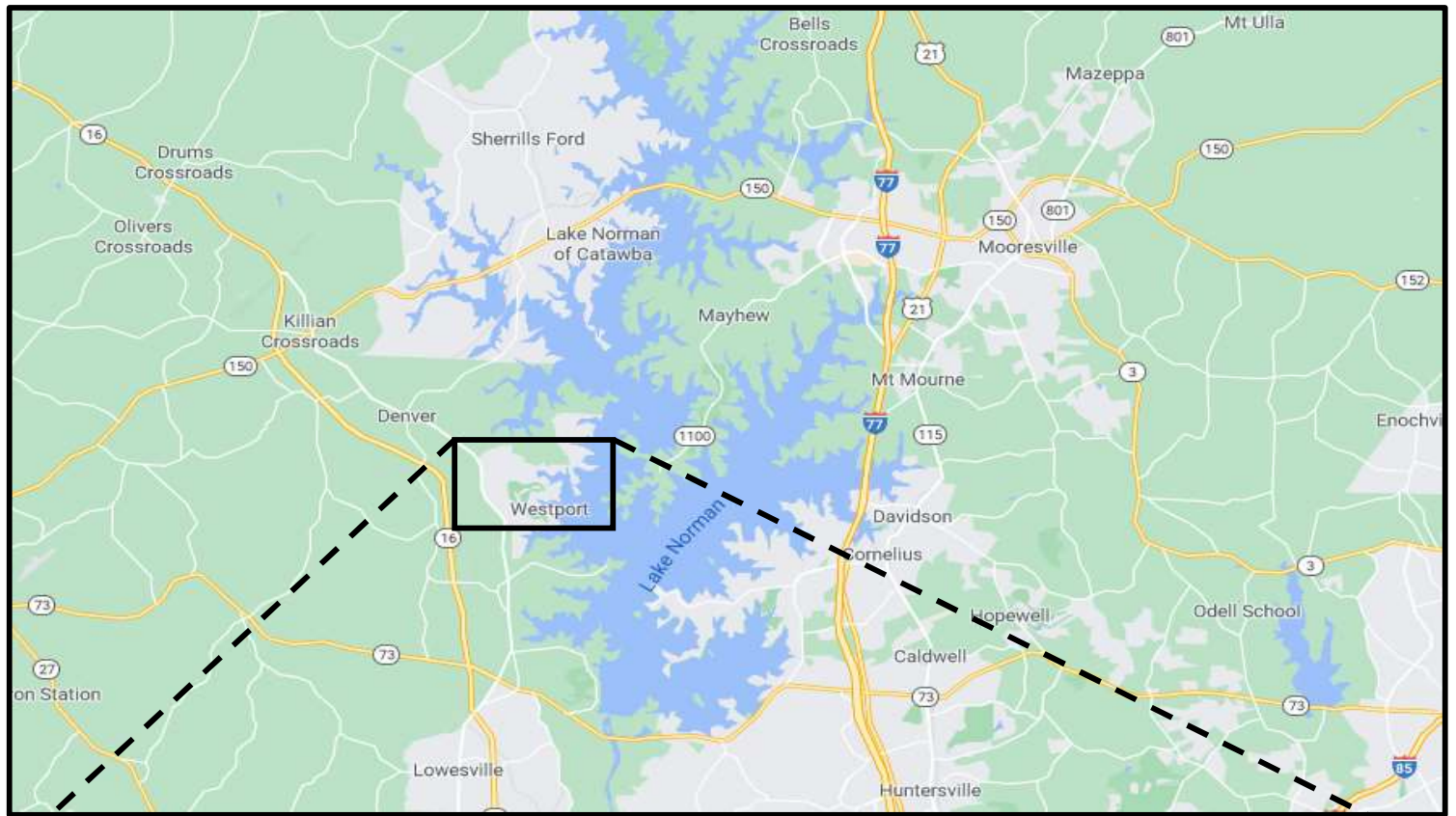
1. Verify that the existing geometry provided within the study area is sufficient to accommodate the projected traffic volumes; and
2. Determine what, if any, improvements are necessary at the proposed site access connections.

The following steps were taken to determine the potential traffic impacts associated with this project:

1. Data Collection – AM (7:00 – 9:00) and PM (4:00 – 6:00) peak hour turning movement counts provided by Lincoln County were collected on May 16, 2019 at the following intersections:
  - NC-16 Business / SR 1379 (Webbs Road); and
  - NC-16 Business / SR 1389 (Fairfield Forest Road) / Wallace Lane.

AM (7:00 – 9:00) and PM (4:00 – 6:00) peak hour turning movement counts were collected by Timmons Group on July 13, 2021 at the following intersection:

  - SR 1389 (Fairfield Forest Road) / SR 1754 (Golf Course Drive).
2. Trip Generation/Future Traffic – Traffic generated by the proposed development was estimated using the 10<sup>th</sup> Edition of the Institute of Transportation Engineer's (ITE) *Trip Generation Manual*. Trip generation was calculated for the development following the NCDOT standards and practices for trip generation. Projected traffic volumes were calculated using a 3% ambient growth rate. Per the scoping document (see **Appendix A**), traffic from two (2) approved area developments (Melwood Subdivision and Stratford Subdivision) were included in all projected traffic volumes.
3. Trip Distribution and Projections – The distribution of site-generated trips was based on the distribution of existing area traffic and engineering judgement. It was assumed, for purposes of analysis, that projected trips would follow similar patterns as existing area traffic.
4. Traffic Capacity Analysis – Level of service analyses were performed using Synchro Version 10.3 for the following intersections:
  - NC-16 Business / SR 1379 (Webbs Road) - Signalized;
  - NC-16 Business / Cerelia Lane / Site Access 1 - Unsignalized;
  - NC-16 Business / Melwood Estates Drive / Site Access 2 - Unsignalized;
  - SR 1754 (Golf Course Drive) / Site Access 3 – Unsignalized;
  - NC-16 Business / SR 1389 (Fairfield Forest Road) / Wallace Lane - Signalized; and
  - SR 1389 (Fairfield Forest Road) / SR 1754 (Golf Course Drive) - Unsignalized.
5. Review of Proposed Improvements – Roadway improvements proposed to accommodate projected site-generated traffic were evaluated.



## 2 EXISTING INFORMATION

The development will be located off NC-16 Business in Denver, NC (see **Figure 1-1**) and will consist of 69 single-family detached housing units and 120 low-rise multifamily housing units.

### 2.1 STUDY LIMITS

Access to the proposed site will be provided via three (3) full movement site access connections. Site Access 1 will be located off NC-16 Business, opposite Cerelia Lane. Site Access 2 will be located off NC-16 Business, opposite Melwood Estates Drive. Site Access 3 will be located off Golf Course Drive, approximately 1,000' (C/L to C/L) west of Blades Trail.

The entrances are shown graphically on **Figure 1-1** and on the preliminary site layout for the residential development on **Figure 2-1** (all figures located at the end of their respective chapter).

The study limits include the following six (6) intersections:

- NC-16 Business / Webbs Road;
- NC-16 Business / Cerelia Lane / Site Access 1;
- NC-16 Business / Melwood Estates Drive / Site Access 2;
- Golf Course Drive / Site Access 3;
- NC-16 Business / Fairfield Forest Road / Wallace Lane; and
- Fairfield Forest Road / Golf Course Drive.

All study area intersections and project assumptions were approved by the NCDOT and are outlined in the scoping document (see **Appendix A**).

### 2.2 EXISTING ROADWAYS

**SR 1379 (Webbs Road)** is a two-lane undivided facility that runs approximately east-west in the project study area. The facility is located north of the proposed development and has a posted 45-mph speed limit east of NC-16 Business and an assumed 25-mph speed limit west of NC-16 Business. Webbs Road connects residential developments in the east to NC-16 Business in the west. The facility primarily services residential land uses. Per 2015 NCDOT Average Annual Daily Traffic (AADT) count maps, Webbs Road carries 8,100 Vehicles Per Day (VPD) east of NC-16 Business.

**NC-16 Business** is a two-lane undivided facility that runs approximately north-south in the project study area. The facility is located west of the proposed development and has a posted 45-mph speed limit. NC-16 Business provides access to Denver, NC. The facility primarily services residential and commercial land uses in the project study area. Per 2019 AADT maps, NC-16 Business carries 12,500 VPD north of Fairfield Forest Road.

**Cerelia Lane** is a two-lane unstriped facility that runs approximately east-west in the project study area. The facility provides access to the Melwood Subdivision via NC-16 Business and has a posted 25-mph speed limit.

**Melwood Estates Drive** is a two-lane unstriped facility that runs approximately east-west in the project study area. The facility provides access to the Melwood Subdivision via NC-16 Business and has a posted 25-mph speed limit.

**SR 1754 (Golf Course Drive)** is a two-lane undivided facility that runs approximately north-south in the project study area. The facility is located east of the proposed development and has a posted 25-mph

speed limit. Golf Course Drive connects residential developments in the north to Fairfield Forest Road in the south. The facility primarily services residential land uses.

**Wallace Lane** is a two-lane unstriped facility that runs approximately east-west in the project study area. The facility provides access to Cedarbrook Estates via NC-16 Business and has a 25-mph speed limit.

**SR 1389 (Fairfield Forest Road)** is a two-lane undivided facility that runs approximately east-west in the project study area. The facility is located south of the proposed development and has a posted 45-mph speed limit. Fairfield Forest Road connects residential developments in the east to NC-16 Business in the west. The facility primarily services residential land uses. Per 2015 NCDOT AADT count maps, Fairfield Forest Road carries 4,400 VPD east of NC-16 Business.

### **2.3 EXISTING INTERSECTIONS**

Using available aerial imagery and site visits, Timmons Group compiled the existing geometry for each of the study area intersections. The existing intersection geometry is shown on **Figure 2-2** and used throughout all analyses.

NC-16 Business / Webbs Road is a five-phase signalized intersection with protected-permitted left-turn phasing on the northbound and southbound approaches and permitted-only left-turn phasing on the eastbound and westbound approaches. The northbound approach consists of an exclusive left-turn lane, an exclusive through lane, and an exclusive right-turn lane. The southbound, eastbound, and westbound approaches consist of an exclusive left-turn lane and a shared through / right-turn lane.

NC-16 Business / Cerelia Lane is an unsignalized T-intersection with the eastbound Cerelia Lane approach encountering the stop condition. The northbound approach includes an exclusive through lane and an exclusive left-turn lane. The southbound approach consists of a shared through / right-turn lane. The eastbound approach consists of an exclusive left-turn lane and an exclusive right-turn lane.

NC-16 Business / Melwood Estates Drive is an unsignalized T-intersection with the eastbound Melwood Estates Drive approach encountering the stop condition. The northbound approach includes an exclusive through lane and an exclusive left-turn lane. The southbound approach consists of a shared through / right-turn lane. The eastbound approach consists of a shared left / right-turn lane.

NC-16 Business / Fairfield Forest Road / Wallace Lane is a two-phase signalized intersection with permitted-only left-turn phasing on all approaches. The northbound approach consists of an exclusive left-turn lane, an exclusive through lane, and an exclusive right-turn lane. The southbound approach consists of an exclusive left-turn lane and a shared through / right-turn lane. The eastbound approach consists of a shared left / through / right-turn lane. The westbound approach consists of a shared through / left-turn lane and an exclusive right-turn lane.

Fairfield Forest Road / Golf Course Drive is an unsignalized intersection with the northbound and southbound Golf Course Drive approaches encountering the stop condition. All intersection approaches consist of a shared left / through / right-turn lane.

### **2.4 TRAFFIC VOLUMES**

Timmons Group calculated peak hour volumes for the following existing study area intersections using the AM (7:00 – 9:00 a.m.) and PM (4:00 – 6:00 p.m.) peak period turning movement counts (provided by Lincoln County – see **Appendix B**) undertaken on May 16, 2019 (see **Figure 2-3**).

- NC-16 Business / Webbs Road

- NC-16 Business / Fairfield Forest Road / Wallace Lane

Additionally, Timmons Group calculated peak hour volumes for the following existing study area intersection using the AM (7:00 – 9:00 a.m.) and PM (4:00 – 6:00 p.m.) peak period turning movement counts undertaken on June 13, 2021.

- Fairfield Forest Road / Golf Course Drive

The 2019 counts were then grown to 2021 using a 3% growth rate for two (2) years. The 2021 grown and 2021 collected traffic volumes are shown in **Figure 2-4**. Counts at Fairfield Forest Road / Golf Course Drive were then balanced with counts at NC-16 Business / Fairfield Forest Road / Wallace Lane (see **Figure 2-5**).

Per discussions with the NCDOT, it was determined that two (2) approved developments (Melwood Subdivision and Stratford Subdivision) were partially constructed between 2019 and 2021\*. To account for this, trips generated by the portion of the developments constructed between 2019 and 2021 were totaled and found in **Figure 2-6**. It should be noted that Cerelia Lane and Melwood Estates Drive are site accesses to the Melwood Subdivision. As such, 2021 traffic volumes were estimated at their respective intersections with NC-16 Business using the 2021 approved development traffic volumes and adjacent intersection volumes. 2021 approved development trips were then added to the 2021 balanced traffic volumes to get the 2021 Existing traffic volumes (see **Figure 2-7**).

\*Further information regarding the approved developments is provided in **Section 3.2**.

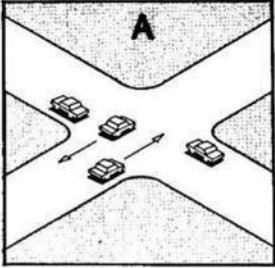
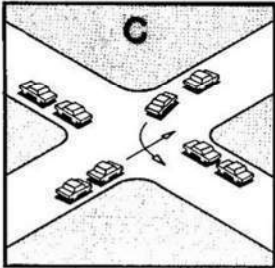
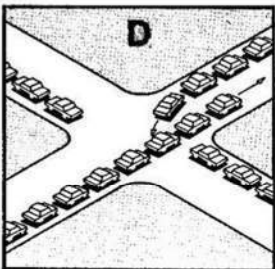
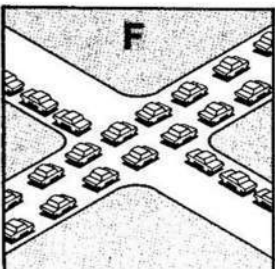
## **2.5 CAPACITY ANALYSIS**

Using field observations, aerial photography, and traffic count data, traffic operations were analyzed during 2021 (existing) and 2023 (without and with the proposed development site trips).

Capacity analysis allows traffic engineers to determine the impacts of traffic on the surrounding roadway network. The Transportation Research Board's (TRB) *Highway Capacity Manual* (HCM) methodologies govern how the capacity analyses are conducted and how the results are interpreted. There are six letter grades of Levels of Service (LOS) from A to F, with LOS A representing the best operating conditions and LOS F the worst operating conditions. At signalized intersections, an overall intersection LOS E is generally considered unacceptable. At unsignalized intersections, a LOS E is generally considered acceptable only if the side street encounters delay. Nevertheless, side streets typically function at a LOS F during peak traffic periods, because the traffic volumes often do not warrant a traffic signal to assist side street traffic. **Table 2-1** shows in detail how each of these levels of service are interpreted.



**Table 2-1: Level of Service Definitions**

Level of Service	Roadway Segments or Controlled Access Highways	Intersections	
A	Free flow, low traffic density.	No vehicle waits longer than one signal indication.	
B	Delay is not unreasonable, stable traffic flow.	On a rare occasion motorists wait through more than one signal indication.	
C	Stable condition, movements somewhat restricted due to higher volumes, but not objectionable for motorists.	Intermittently drivers wait through more than one signal indication, and occasionally backups may develop behind left turning vehicles, traffic flow still stable and acceptable.	
D	Movements more restricted, queues and delays may occur during short peaks, but lower demands occur often enough to permit clearing, thus preventing excessive backups.	Delays at intersections may become extensive with some, especially left-turning vehicles waiting two or more signal indications, but enough cycles with lower demand occur to permit periodic clearance, thus preventing excessive backups.	
E	Actual capacity of the roadway involves delay to all motorists due to congestion.	Very long queues may create lengthy delays, especially for left-turning vehicles.	
F	Forced flow with demand volumes greater than capacity resulting in complete congestion. Volumes drop to zero in extreme cases.	Backups from locations downstream restrict or prevent movement of vehicles out of approach creating a storage area during part or all of an hour.	

SOURCE: "A Policy on Design of Design of Urban Highways and Arterial Streets" - AASHTO, 1973 based upon material published in "Highway Capacity Manual", National Academy of Sciences, 1965.

For signalized and unsignalized intersections, level of service is defined in terms of **delay**, a measure of driver discomfort, frustration, fuel consumption and lost travel time. **Table 2-2** summarizes the delay associated with each LOS category:

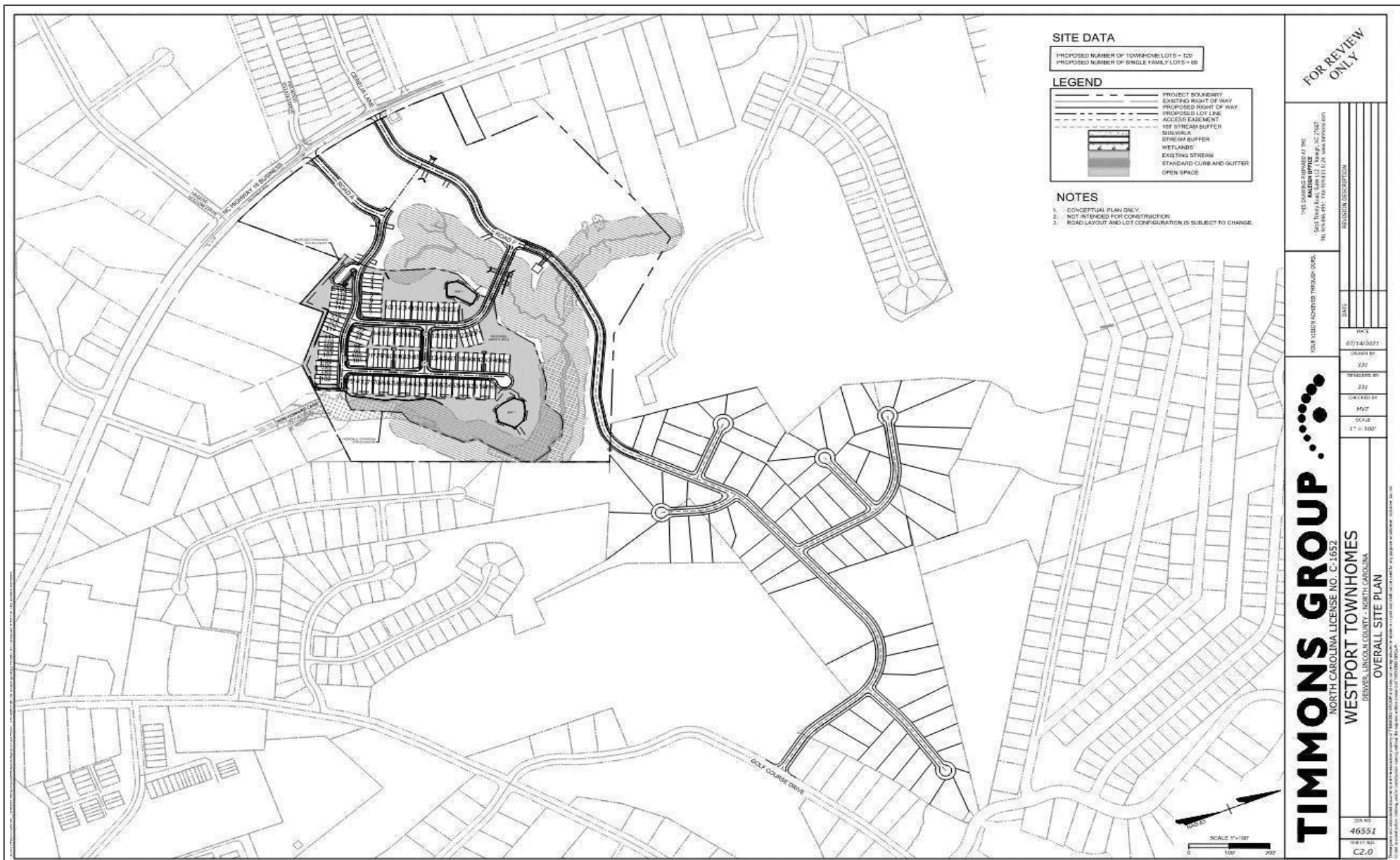
**Table 2-2: Signalized and Unsignalized Intersection Level of Service Criteria**

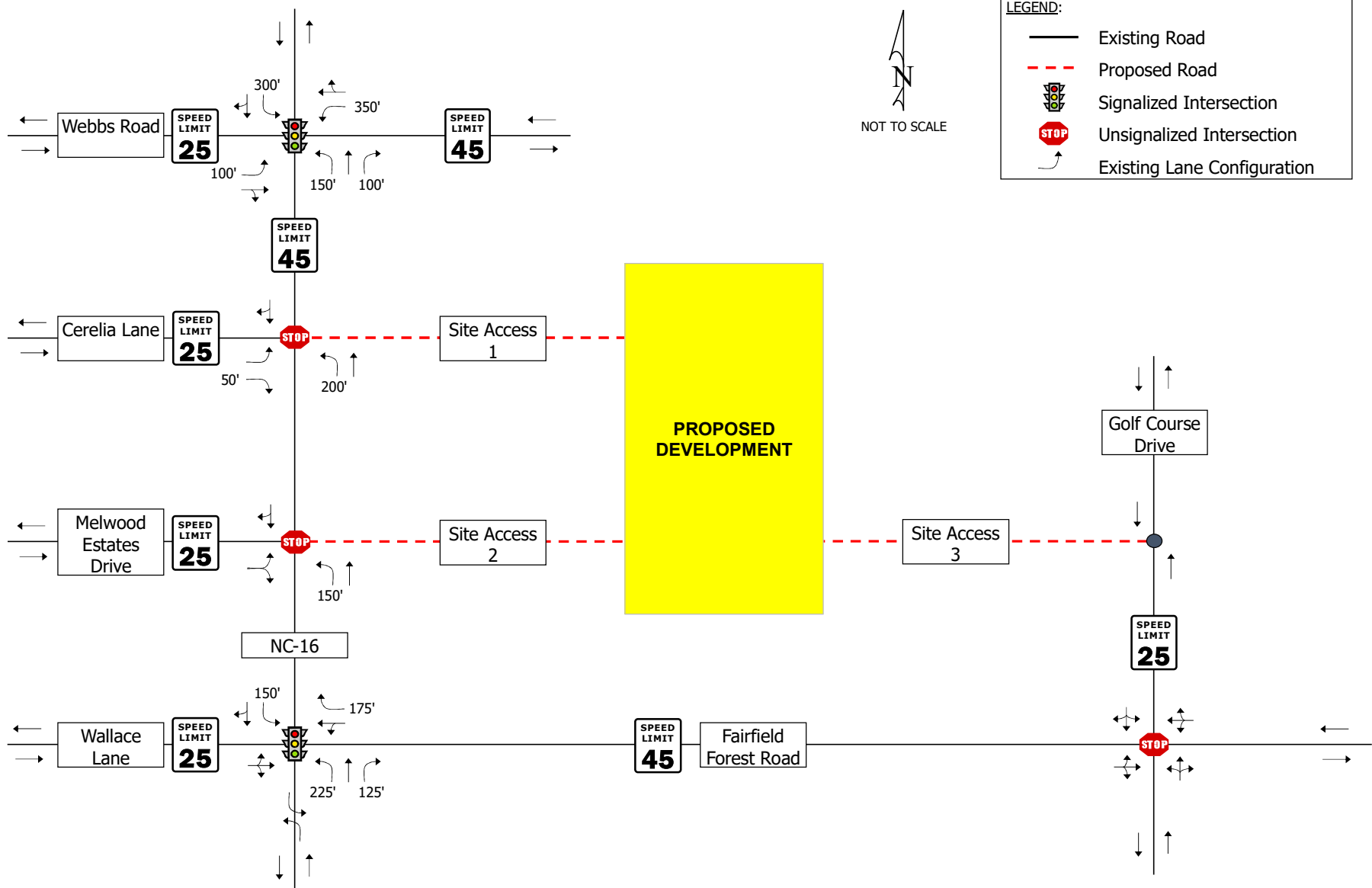
Signalized Intersections		Unsignalized Intersections	
Level of Service	Control Delay per Vehicle (sec/veh)	Level of Service	Average Control Delay (sec/veh)
A	$\leq 10$	A	0 to 10
B	$> 10$ to $\leq 20$	B	$> 10$ to $\leq 15$
C	$> 20$ to $\leq 35$	C	$> 15$ to $\leq 25$
D	$> 35$ to $\leq 55$	D	$> 25$ to $\leq 35$
E	$> 55$ to $\leq 80$	E	$> 35$ to $\leq 50$
F	$> 80$	F	$> 50$

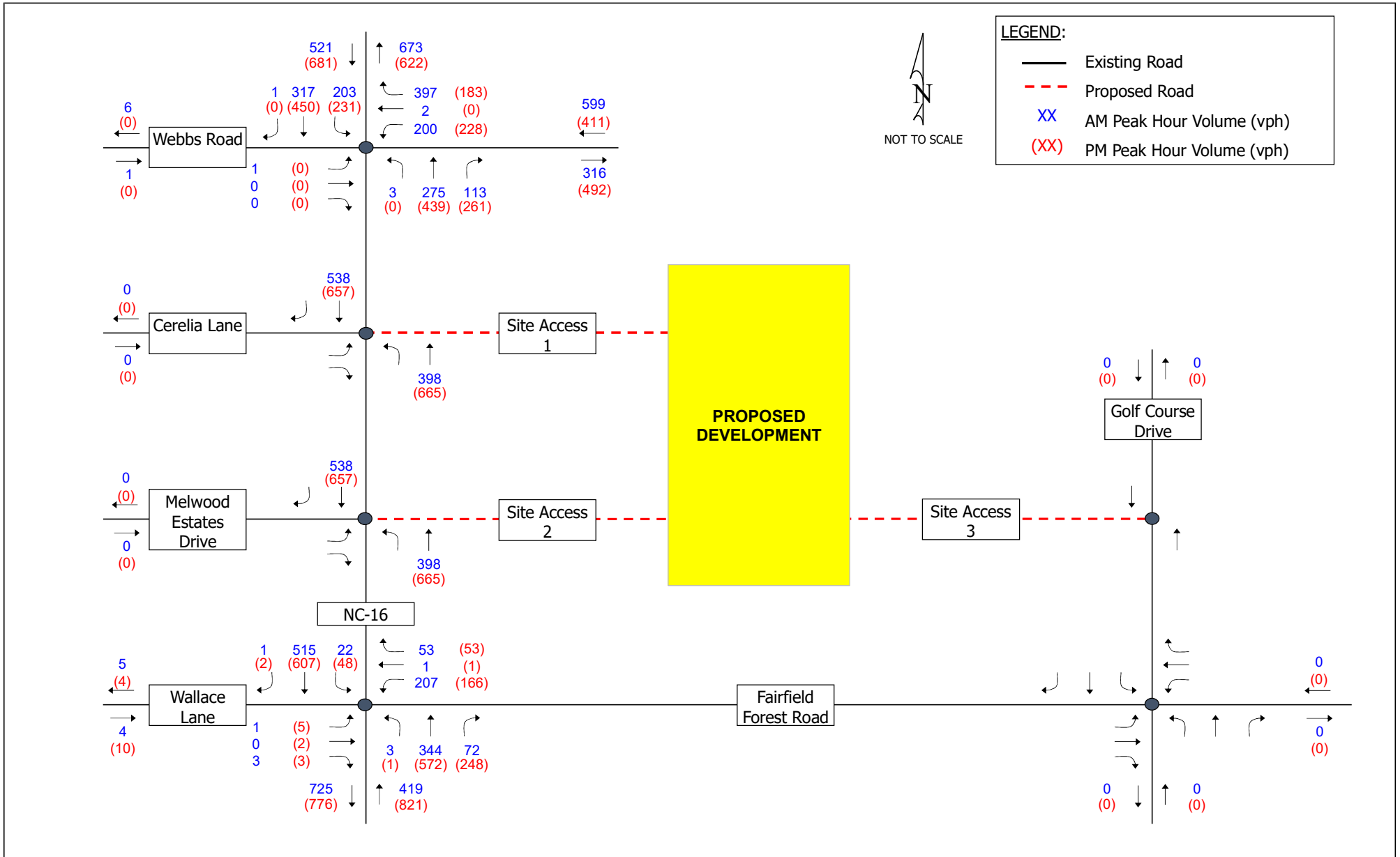
*Source: Exhibit 16-2 and Exhibit 17-2 from TRB's "Highway Capacity Manual 2000"*

Capacity analyses were performed to assess operational conditions. Study area intersections were analyzed using SYNCHRO Version 10.3 based on Highway Capacity Manual (HCM) methodologies with the following assumptions:

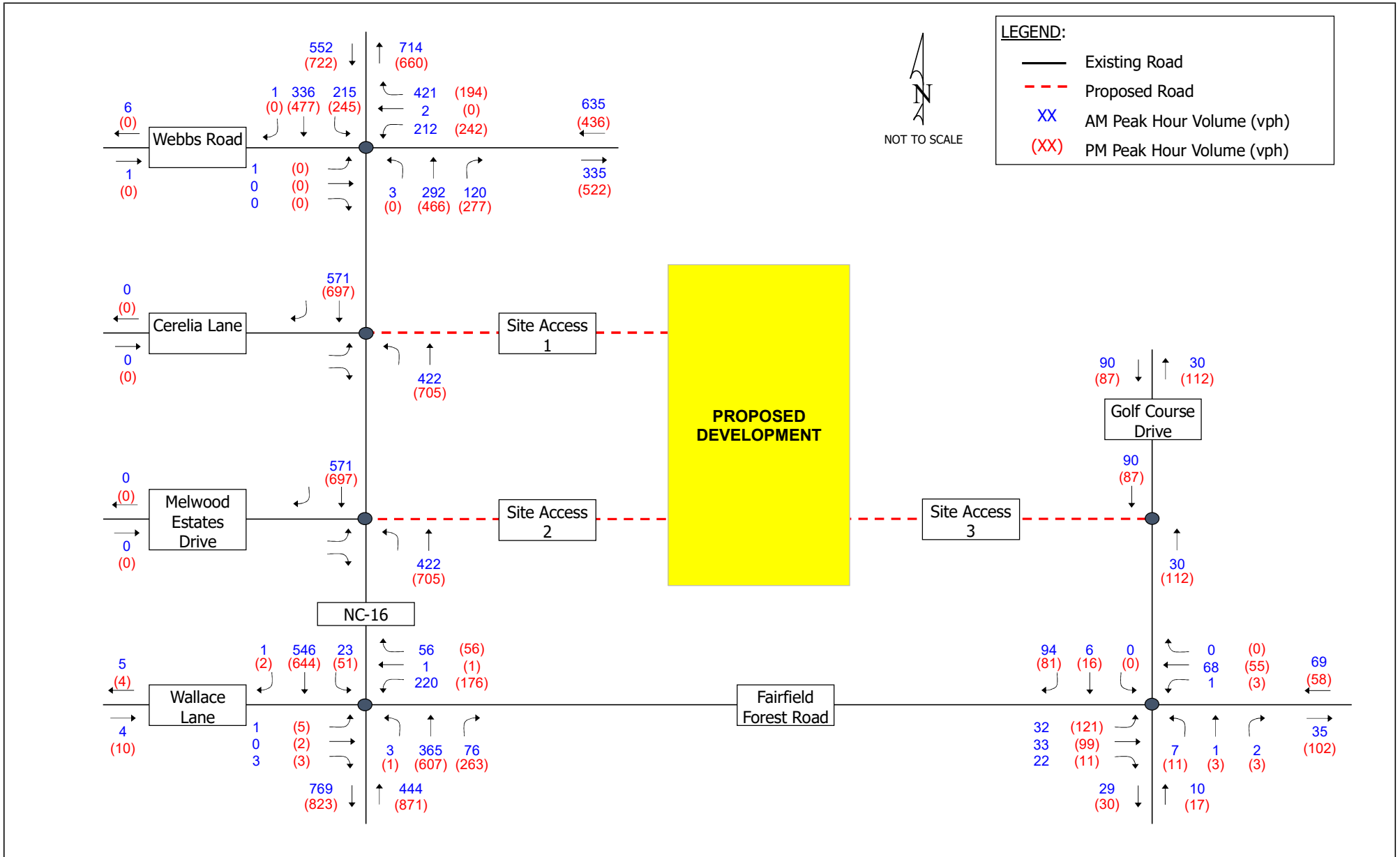
- Existing grades;
- 12-foot lane widths;
- No parking activity, bus stops, or pedestrians;
- PHFs of 0.90 were used for all analyses;
- A minimum of four (4) vehicles per analyzed intersection movement;
- Heavy vehicle percentages 2%; and
- Existing signal data / timing values found in the traffic signal plans (see **Appendix C**).

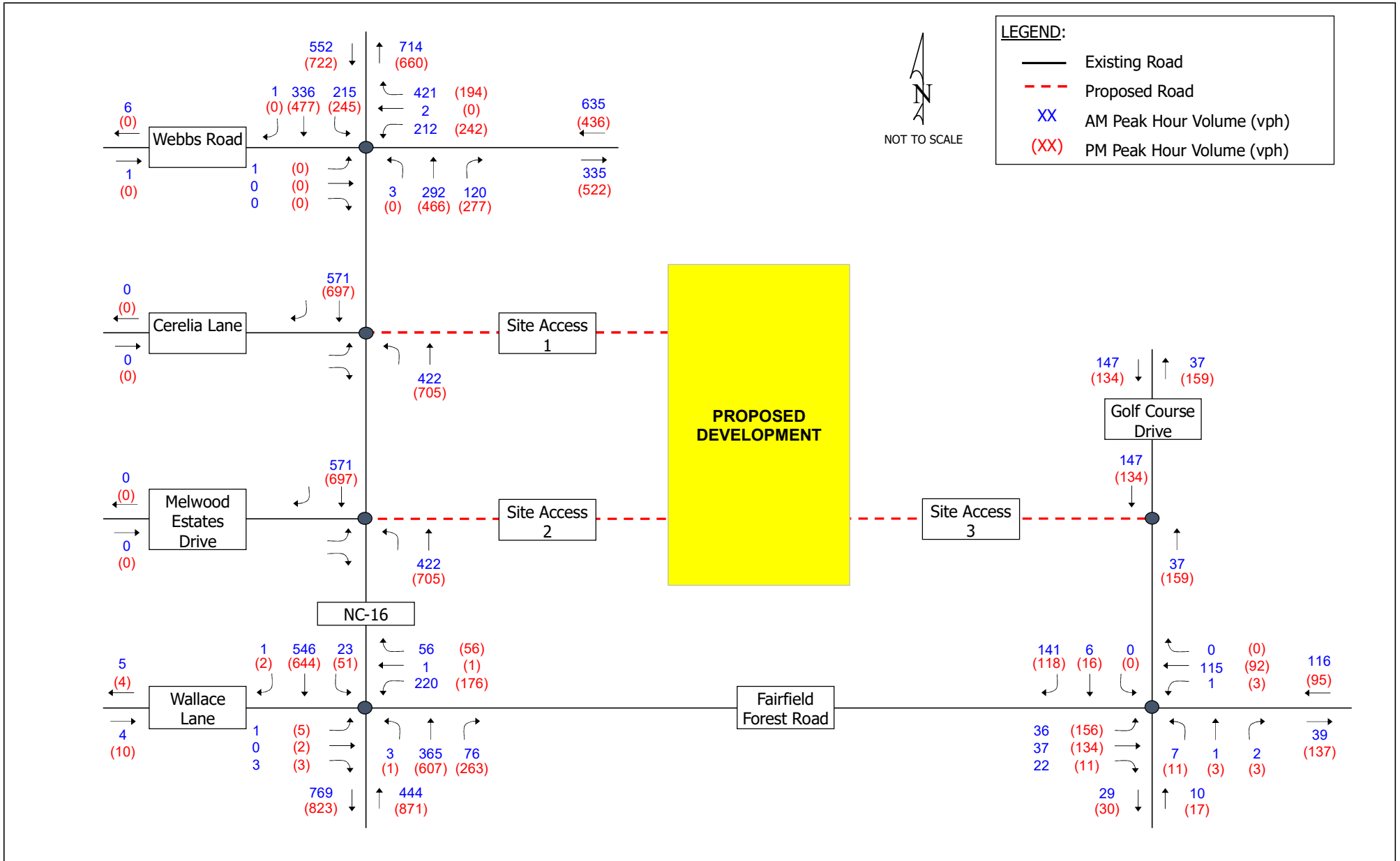


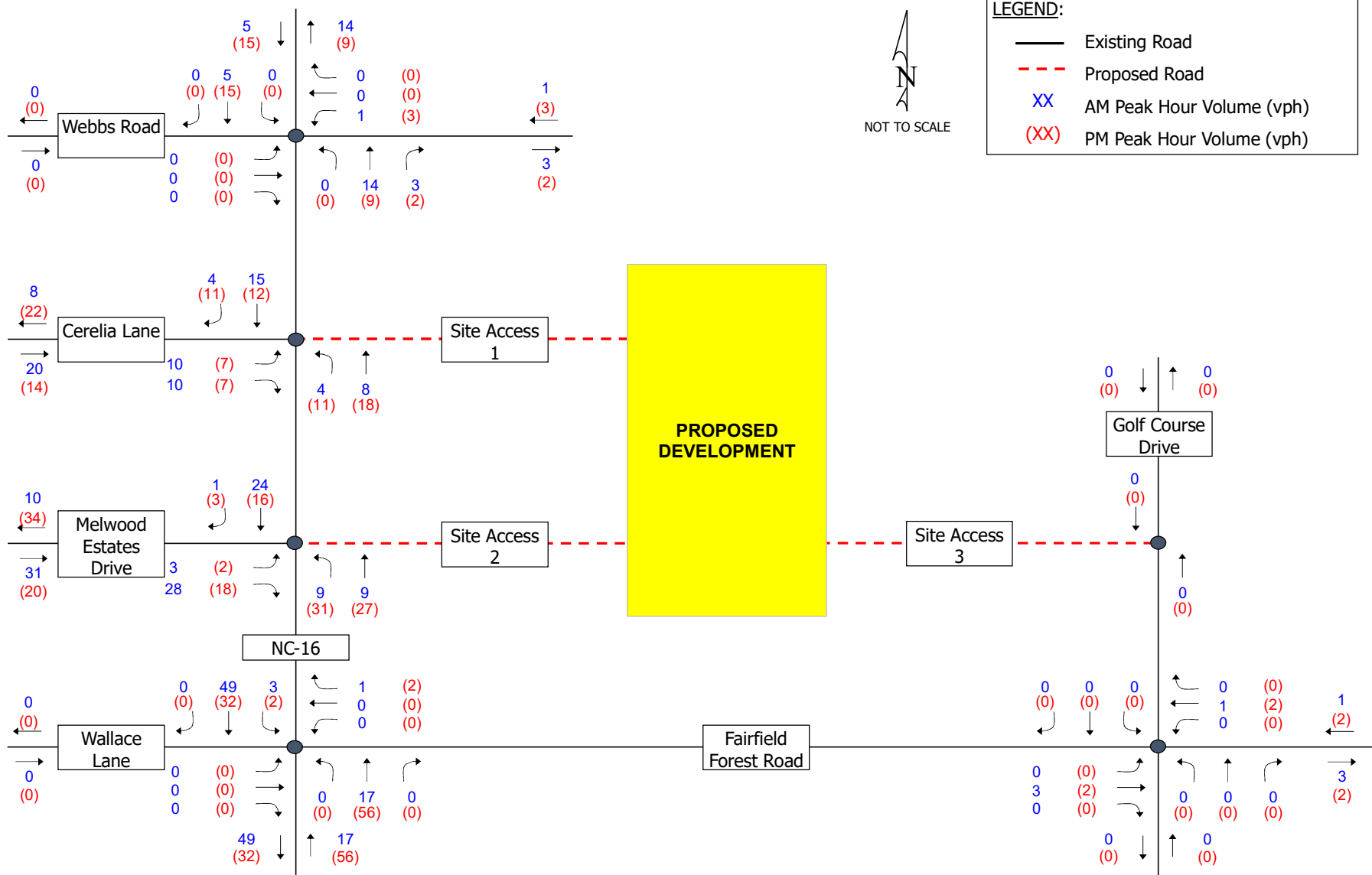


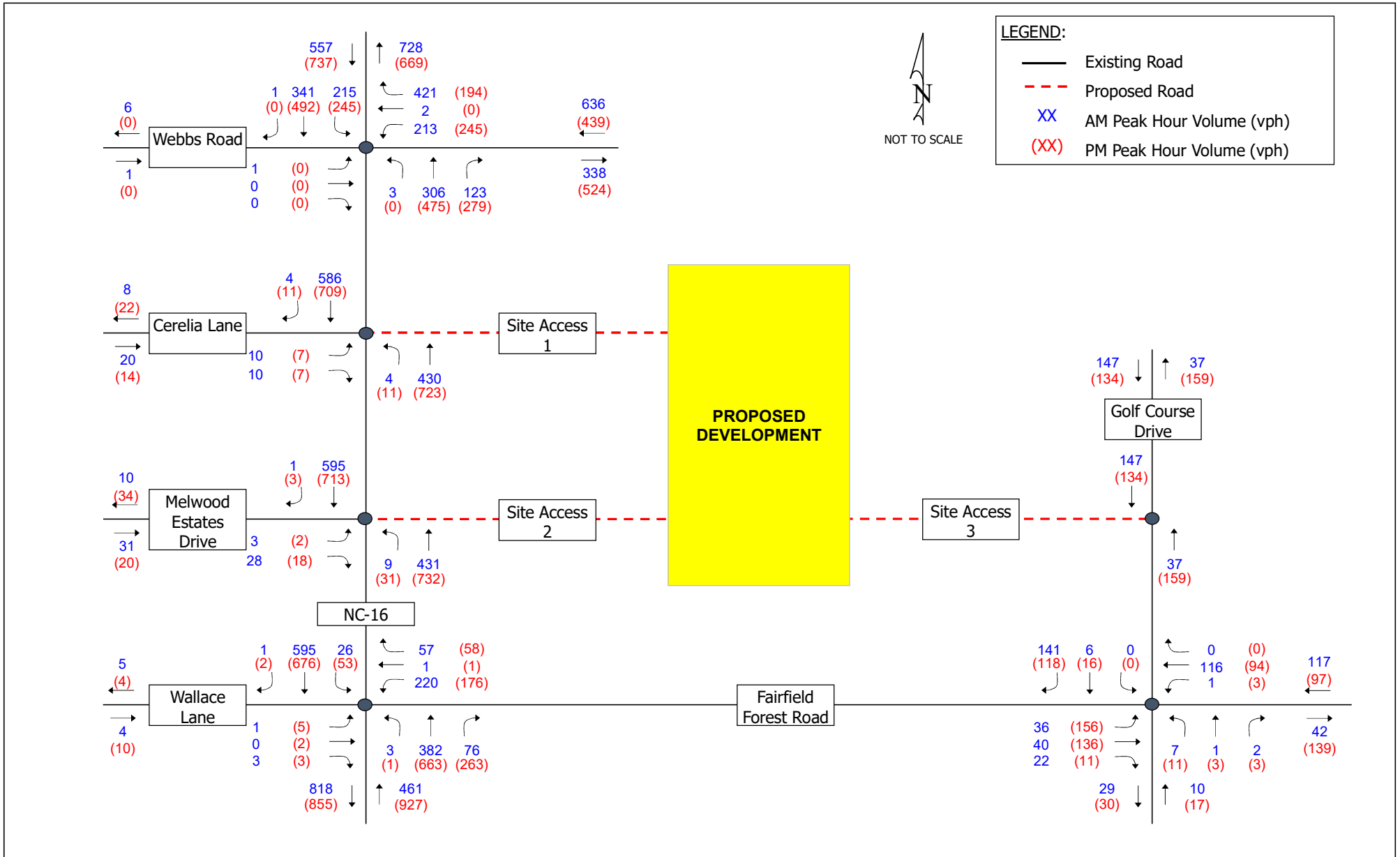












### **3 EXISTING AND BACKGROUND CONDITIONS AND ANALYSIS**

#### **3.1 2021 EXISTING ANALYSES**

**Table 3-1** summarizes the 2021 Existing intersection LOS, delay, and queue lengths based on the geometry shown on **Figure 2-2** and the 2021 traffic volumes shown on **Figure 2-7**. The corresponding Synchro output is included in **Appendix D**.

The signalized intersection of NC-16 Business / Webbs Road is currently operating at an overall LOS C during both 2021 Existing AM and PM peak hours. All intersection approaches are currently operating at LOS C or better during both peak hours.

All approaches at the unsignalized intersection of NC-16 Business / Cerelia Lane are currently operating at a LOS D or better during both 2021 Existing AM and PM peak hours.

All approaches at the unsignalized intersection of NC-16 Business / Melwood Estates Drive are currently operating at a LOS C or better during both 2021 Existing AM and PM peak hours.

The signalized intersection of NC-16 Business / Fairfield Forest Road / Wallace Lane is currently operating at an overall LOS B during both 2021 Existing AM and PM peak hours. All intersection approaches are currently operating at LOS C or better during both peak hours.

All approaches at the unsignalized intersection of Fairfield Forest Road / Golf Course Drive are currently operating at a LOS C or better during both 2021 Existing AM and PM peak hours.

**Table 3-1: Intersection Level of Service and Delay Summary  
2021 Existing Traffic Volumes**

Intersection and Type of Control	Movement and Approach	Turn Lane Storage (ft)	AM PEAK HOUR				PM PEAK HOUR			
			Delay <sup>1</sup> (sec/veh)	LOS <sup>1</sup>	*95th Percentile Queue Length	Sim Traffic Max Queue Length (ft)	Delay <sup>1</sup> (sec/veh)	LOS <sup>1</sup>	*95th Percentile Queue Length	Sim Traffic Max Queue Length (ft)
1: NC-16 & Webbs Road	EB Left	100	16.0	B	8	34	22.0	C	10	31
	EB Thru/Right		15.4	B	11	29	21.7	C	14	33
	EB Approach		15.6	B	--	--	21.8	C	--	--
	WB Left	350	20.1	C	154	228	30.4	C	#246	222
	WB Thru/Right		31.4	C	#377	319	25.5	C	176	162
	WB Approach		27.6	C	--	--	28.2	C	--	--
	NB Left	150	8.8	A	5	26	7.2	A	5	46
	NB Thru		32.4	C	215	261	34.9	C	359	381
	NB Right	100	22.8	C	92	182	25.0	C	202	200
	NB Approach		29.5	C	--	--	31.1	C	--	--
	SB Left	300	16.3	B	95	150	22.7	C	113	181
	SB Thru/Right		16.5	B	221	177	16.4	B	334	202
	SB Approach		16.4	B	--	--	18.5	B	--	--
	Overall		24.2	C	--	--	25.6	C	--	--
2: NC-16 & Cerelia Lane	EB Left		22.1	C	0.2	29	39.9	F	0.2	32
	EB Right	50	12.9	B	0.1	31	14.5	B	0.1	28
	EB Approach		17.5	C	--	--	27.2	D	--	--
	NB Left	200	8.9	A	0	24	9.4	A	0	28
	NB Thru		0.0	A	0	0	0.0	A	0	0
	NB Approach		0.1	A	--	--	0.1	A	--	--
	SB Thru/Right		0.0	A	0	0	0.0	A	0	0
	SB Approach		0.0	A	--	--	0.0	A	--	--
3: NC-16 & Melwood Estates Drive	EB Left/Right		14.8	B	0.3	60	20.5	C	0.3	36
	EB Approach		14.8	B	--	--	20.5	C	--	--
	NB Left	150	8.9	A	0	27	9.5	A	0.1	34
	NB Thru		0.0	A	0	0	0.0	A	0	0
	NB Approach		0.2	A	--	--	0.4	A	--	--
	SB Thru/Right		0.0	A	0	0	0.0	A	0	0
	SB Approach		0.0	A	--	--	0.0	A	--	--
5: NC-16 & Wallace Lane/Fairfield Forest Road	EB Left/Thru/Right		14.9	B	13	38	17.8	B	16	48
	EB Approach		14.9	B	--	--	17.8	B	--	--
	WB Left/Thru		25.5	C	#172	157	26.4	C	#147	174
	WB Right	175	15.5	B	41	65	18.6	B	48	92
	WB Approach		23.5	C	--	--	24.5	C	--	--
	NB Left	225	6.0	A	4	18	5.5	A	4	22
	NB Thru		9.9	A	124	127	14.4	B	269	177
	NB Right	125	6.7	A	28	47	8.0	A	84	115
	NB Approach		9.3	A	--	--	12.5	B	--	--
	SB Left	150	6.5	A	13	30	9.4	A	27	56
	SB Thru/Right		14.7	B	229	176	14.4	B	275	170
	SB Approach		14.4	B	--	--	14.0	B	--	--
	Overall		14.5	B	--	--	14.6	B	--	--
6: Golf Course Drive & Fairfield Forest Road	EB Left/Thru/Right		2.8	A	0.1	29	4.0	A	0.4	54
	EB Approach		2.8	A	--	--	4.0	A	--	--
	WB Left/Thru/Right		0.2	A	0	3	0.3	A	0	10
	WB Approach		0.2	A	--	--	0.3	A	--	--
	NB Left/Thru/Right		11.2	B	0.1	36	16.5	C	0.2	36
	NB Approach		11.2	B	--	--	16.5	C	--	--
	SB Left/Thru/Right		10.0	B	0.7	80	10.9	B	0.8	77
	SB Approach		10.0	B	--	--	10.9	B	--	--

<sup>1</sup> Overall intersection LOS and delay reported for signalized intersections and roundabouts only.

\*\* Delay greater than 9999.99 seconds cannot be calculated by SYNCHRO for signalized intersections.

+ Delay greater than 9999.99 seconds cannot be calculated by SYNCHRO for unsignalized intersections.

SYNCHRO does not provide level of service or delay for unsignalized movements with no conflicting volumes.

\* - 95th percentile queues for unsignalized intersections reported in number of vehicles.



### 3.2 BACKGROUND TRAFFIC VOLUMES

**Figure 3-1** shows the ambient traffic volumes for 2023 calculated using a 3% growth rate for two (2) years.

Per discussions with the NCDOT, there are no public improvement projects scheduled for construction in the project study area.

Currently there are two (2) approved area developments that are assumed to be fully constructed by 2023: Melwood Subdivision and Stratford Subdivision (see **Appendix E**). Listed below are the approved developments, site trip distribution assumptions, and proposed offsite improvements.

- Melwood Subdivision
  - Located off NC-16 Business
    - Accessed via Cerelia Lane and Melwood Estates Drive
  - Trip generation and distribution found in the Howard Property TIA (see **Appendix E**)
  - 200 single-family detached houses
  - Construction Schedule
    - 0% constructed by 2019
    - Approximately 45% constructed by 2021 (per Lincoln County GIS map)
    - 100% constructed by 2023
  - All offsite improvements are constructed (per aerial imagery)
- Stratford Subdivision
  - Located off NC-16 Business
    - Accessed via Chelsea Drive
  - Trip distribution found in the Stratford Subdivision TIA (see **Appendix E**)
  - Updated trip generation found in the Stratford Subdivision Memo (see **Appendix E**)
  - Originally 200 single-family detached houses per the TIA
  - Updated to 249 single-family detached houses per the memo
  - Construction Schedule
    - 0% constructed by 2019
    - Approximately 14% constructed by 2021 (per Lincoln County GIS map)
    - 100% constructed by 2023
  - All offsite improvements are constructed (per aerial imagery)

Projected and distributed trips from the 2023 approved developments (see **Appendix E**) were totaled and are found in **Figure 3-2**. Approved development trips were then added to the ambient traffic volumes to determine the 2023 Background traffic volumes (see **Figure 3-3**).

### 3.3 2023 BACKGROUND ANALYSIS

**Table 3-2** summarizes the 2023 Background intersection LOS, delay, and queue lengths based on the geometry shown in **Figure 2-2** and the 2023 Background traffic volumes shown in **Figure 3-3**. The corresponding Synchro output is included in **Appendix D**.

The signalized intersection of NC-16 Business / Webbs Road is projected to operate at an overall LOS C during both 2023 Background AM and PM peak hours. All intersection approaches are projected to operate at LOS C or better during both peak hours.

The eastbound approach at the unsignalized intersection of NC-16 Business / Cerelia Lane is projected to operate at a LOS C and E during the 2023 Background AM and PM peak hours, respectively. All other intersection approaches are projected to operate at a LOS A during both peak hours.

All approaches at the unsignalized intersection of NC-16 Business / Melwood Estates Drive are projected to operate at a LOS D or better during both 2023 Background AM and PM peak hours.

The signalized intersection of NC-16 Business / Fairfield Forest Road / Wallace Lane is projected to operate at an overall LOS B during both 2023 Background AM and PM peak hours. All intersection approaches are projected to operate at LOS D or better during both peak hours.

All approaches at the unsignalized intersection of Fairfield Forest Road / Golf Course Drive are projected to operate at a LOS C or better during both 2023 Background AM and PM peak hours.

**Table 3-2: Intersection Level of Service and Delay Summary  
2023 Background Traffic Volumes**

Intersection and Type of Control	Movement and Approach	Turn Lane Storage (ft)	AM PEAK HOUR				PM PEAK HOUR			
			Delay <sup>1</sup> (sec/veh)	LOS <sup>1</sup>	*95th Percentile Queue Length	Sim Traffic Max Queue Length (ft)	Delay <sup>1</sup> (sec/veh)	LOS <sup>1</sup>	*95th Percentile Queue Length	Sim Traffic Max Queue Length (ft)
1: NC-16 & Webbs Road	EB Left	100	18.0	B	8	33	25.0	C	10	26
	EB Thru/Right		17.1	B	12	31	24.6	C	15	27
	EB Approach		17.4	B	--	--	24.7	C	--	--
	WB Left	350	22.9	C	176	236	36.4	D	#309	269
	WB Thru/Right		40.5	D	#438	384	29.2	C	206	193
	WB Approach		34.6	C	--	--	33.2	C	--	--
	NB Left	150	8.2	A	5	26	7.0	A	4	46
	NB Thru		34.2	C	259	300	35.6	D	414	457
	NB Right	100	22.1	C	98	200	24.0	C	216	200
	NB Approach		30.8	C	--	--	31.3	C	--	--
	SB Left	300	17.6	B	100	165	30.2	C	#151	225
	SB Thru/Right		16.3	B	244	177	16.8	B	395	239
	SB Approach		16.8	B	--	--	21.0	C	--	--
	Overall		27.4	C	--	--	27.7	C	--	--
2: NC-16 & Cerelia Lane	EB Left		31.3	D	0.5	46	74.3	F	0.9	40
	EB Right	50	15.0	C	0.2	42	16.6	C	0.2	40
	EB Approach		23.2	C	--	--	45.5	E	--	--
	NB Left	200	9.4	A	0	30	10.1	B	0.1	40
	NB Thru		0.0	A	0	0	0.0	A	0	0
	NB Approach		0.2	A	--	--	0.3	A	--	--
	SB Thru/Right		0.0	A	0	0	0.0	A	0	2
	SB Approach		0.0	A	--	--	0.0	A	--	--
3: NC-16 & Melwood Estates Drive	EB Left/Right		19.1	C	0.9	62	25.6	D	0.8	58
	EB Approach		19.1	C	--	--	25.6	D	--	--
	NB Left	150	9.6	A	0.1	36	10.5	B	0.4	61
	NB Thru		0.0	A	0	0	0.0	A	0	0
	NB Approach		0.4	A	--	--	0.8	A	--	--
	SB Thru/Right		0.0	A	0	0	0.0	A	0	0
	SB Approach		0.0	A	--	--	0.0	A	--	--
5: NC-16 & Wallace Lane/Fairfield Forest Road	EB Left/Thru/Right		19.9	B	17	40	25.0	C	22	48
	EB Approach		19.9	B	--	--	25.0	C	--	--
	WB Left/Thru		39.7	D	#240	158	40.5	D	#229	203
	WB Right	175	20.8	C	55	78	25.9	C	70	114
	WB Approach		35.8	D	--	--	36.7	D	--	--
	NB Left	225	5.2	A	4	28	4.5	A	3	24
	NB Thru		8.9	A	145	132	17.5	B	410	217
	NB Right	125	5.6	A	27	48	6.7	A	84	124
	NB Approach		8.4	A	--	--	14.8	B	--	--
	SB Left	150	5.6	A	14	40	14.8	B	38	70
	SB Thru/Right		16.4	B	336	191	14.4	B	352	202
	SB Approach		16.0	B	--	--	14.5	B	--	--
	Overall		17.2	B	--	--	17.2	B	--	--
6: Golf Course Drive & Fairfield Forest Road	EB Left/Thru/Right		2.7	A	0.1	34	4.0	A	0.4	55
	EB Approach		2.7	A	--	--	4.0	A	--	--
	WB Left/Thru/Right		0.2	A	0	3	0.3	A	0	10
	WB Approach		0.2	A	--	--	0.3	A	--	--
	NB Left/Thru/Right		11.5	B	0.1	33	18.0	C	0.2	40
	NB Approach		11.5	B	--	--	18.0	C	--	--
	SB Left/Thru/Right		10.1	B	0.8	85	11.3	B	0.8	90
	SB Approach		10.1	B	--	--	11.3	B	--	--

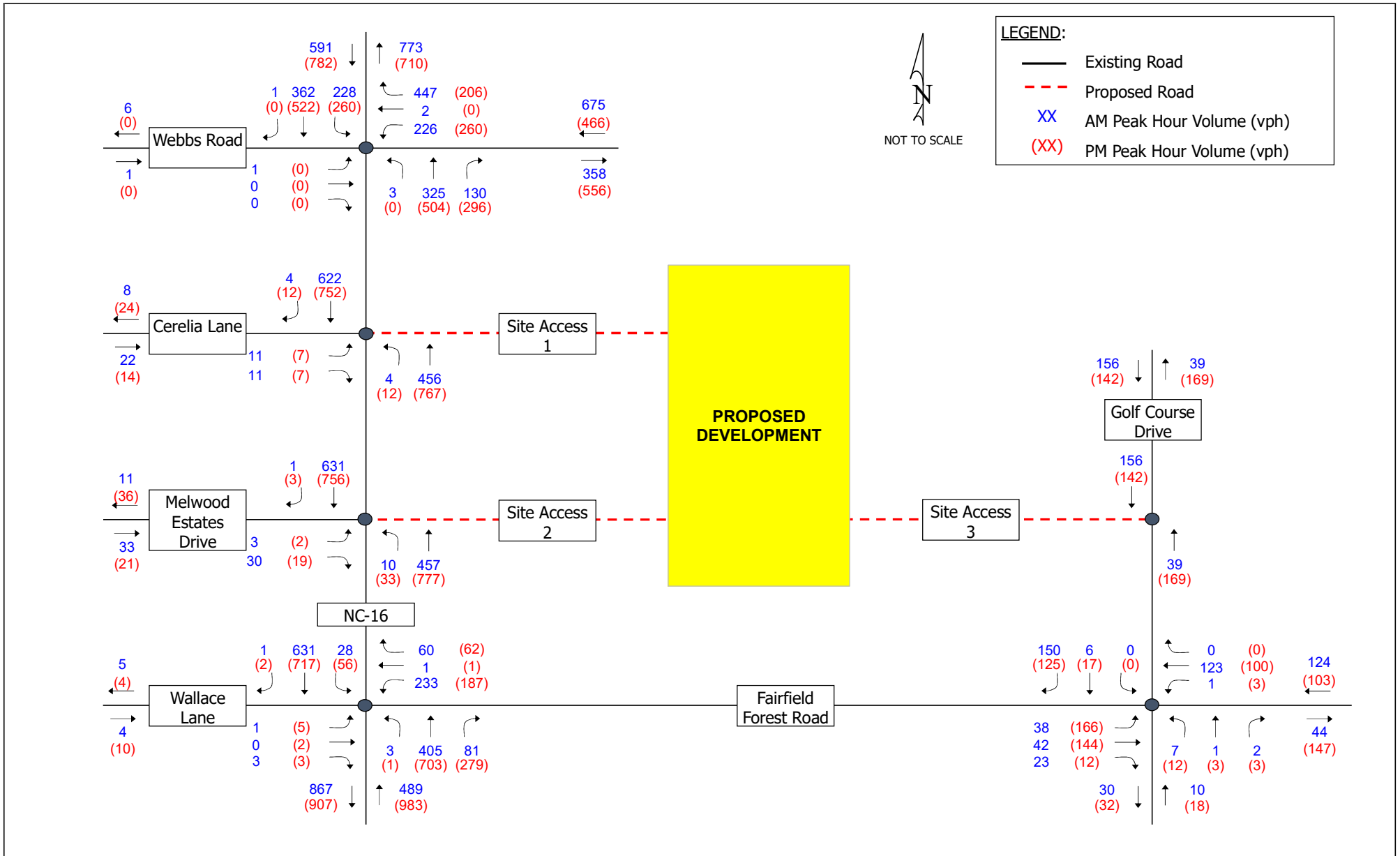
<sup>1</sup> Overall intersection LOS and delay reported for signalized intersections and roundabouts only.

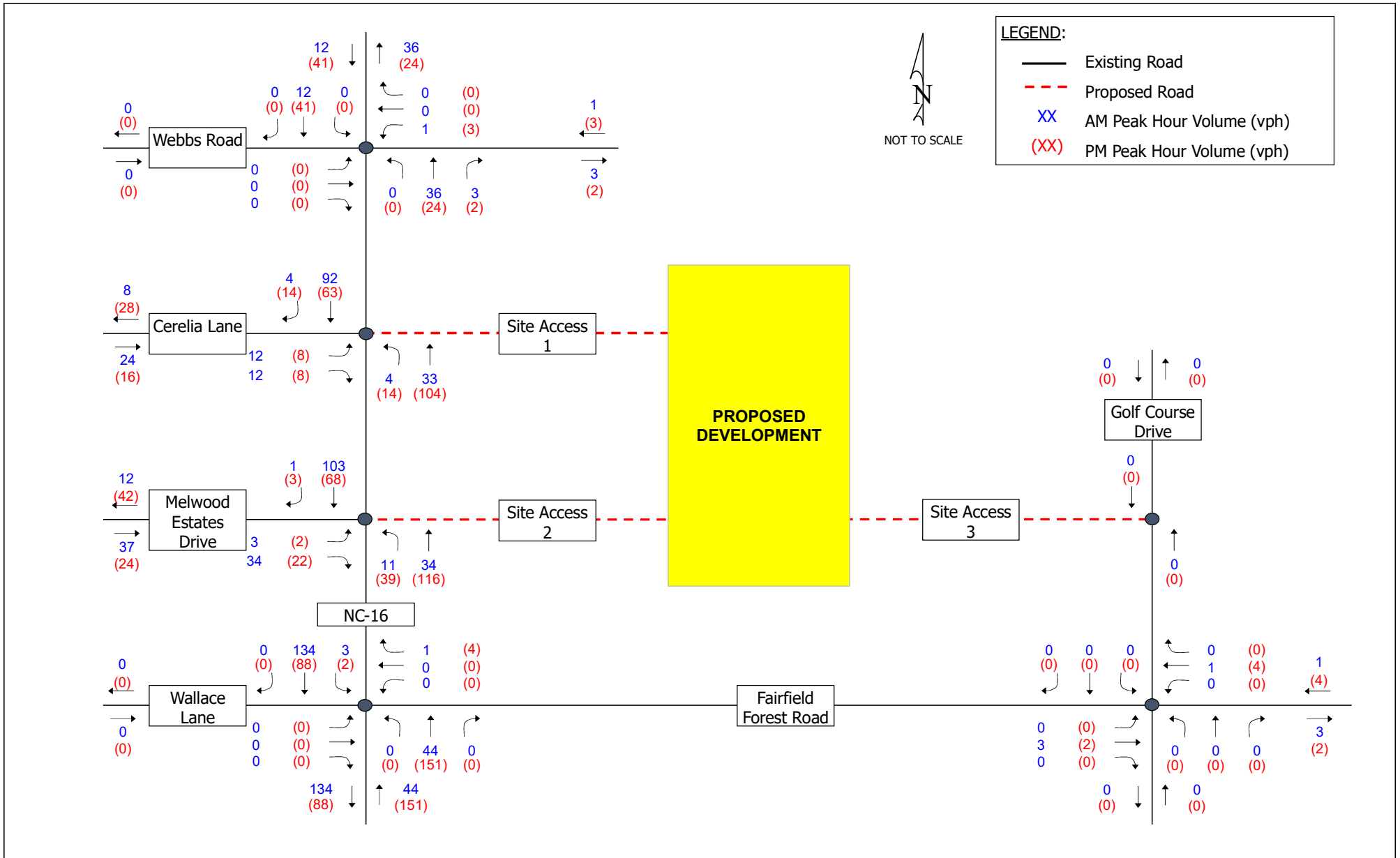
\*\* Delay greater than 9999.99 seconds cannot be calculated by SYNCHRO for signalized intersections.

+ Delay greater than 9999.99 seconds cannot be calculated by SYNCHRO for unsignalized intersections.

SYNCHRO does not provide level of service or delay for unsignalized movements with no conflicting volumes.

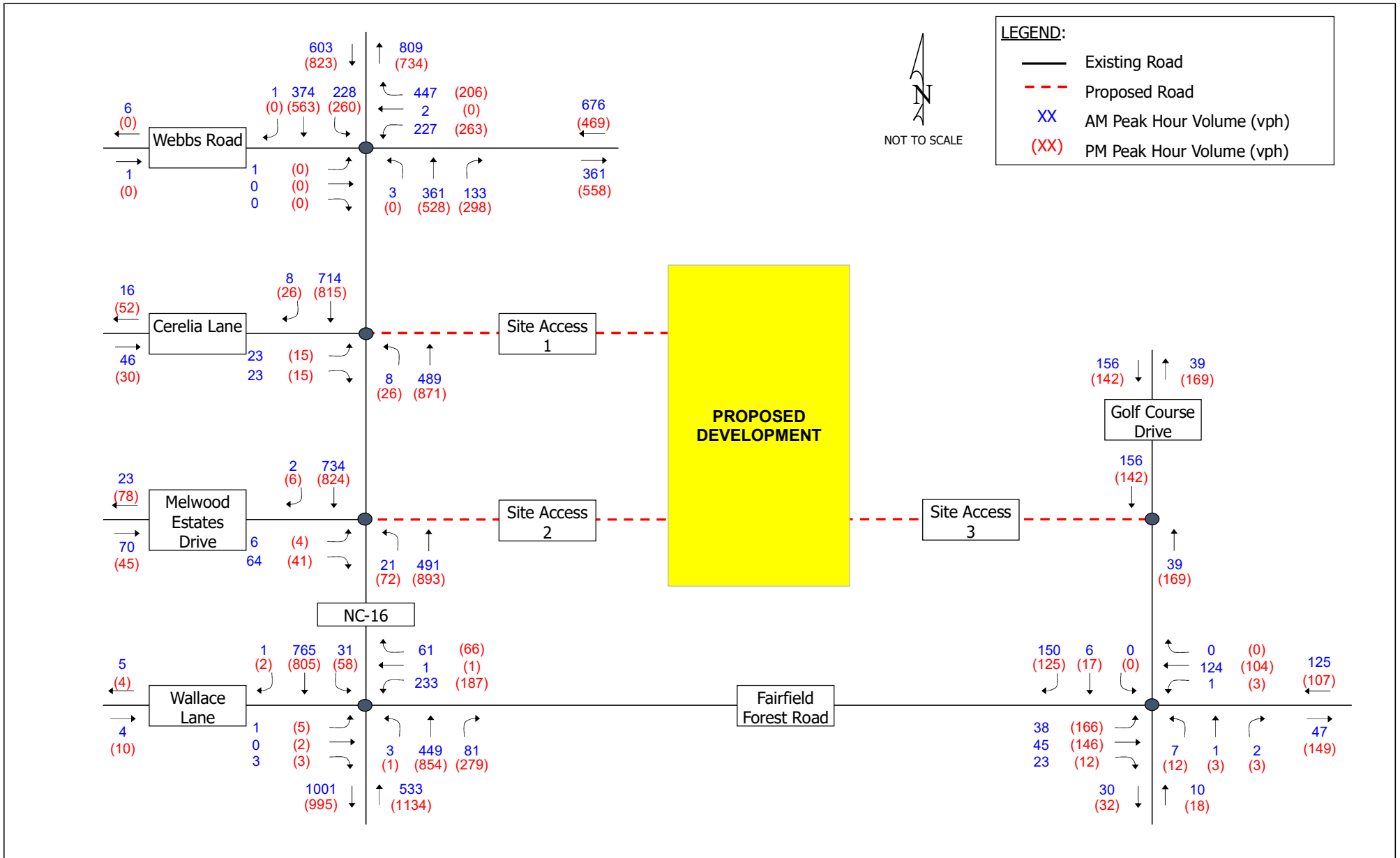
\* - 95th percentile queues for unsignalized intersections reported in number of vehicles.





# **Westport Townhomes** **Traffic Impact Analysis** 2023 Approved Development Traffic Volumes

Figure 3-2





## 4 SITE TRIP GENERATION AND DISTRIBUTION

Site trips for the Westport Townhomes Development were estimated based on the proposed land use supplied by the developer and subsequently distributed onto the surrounding roadway network.

### 4.1 TRIP GENERATION

The site-generated trips shown in **Table 4-1** are based on trip generation information provided in the 10<sup>th</sup> Edition of the ITE's *Trip Generation Manual* and the anticipated development of the residential land use. Trip generation was calculated using the provided equation and the proposed number of residential units as the independent variable (per NCDOT standards).

**Table 4-1: Trip Generation Summary**

ITE Land Use Code	Independent Variable	Daily	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
210 – Single Family Detached Housing	69 Units	740	14	40	54	45	26	71
220 – Multifamily Detached Housing	120 Units	866	13	44	57	43	26	69
Total:		1,606	27	84	111	88	52	140

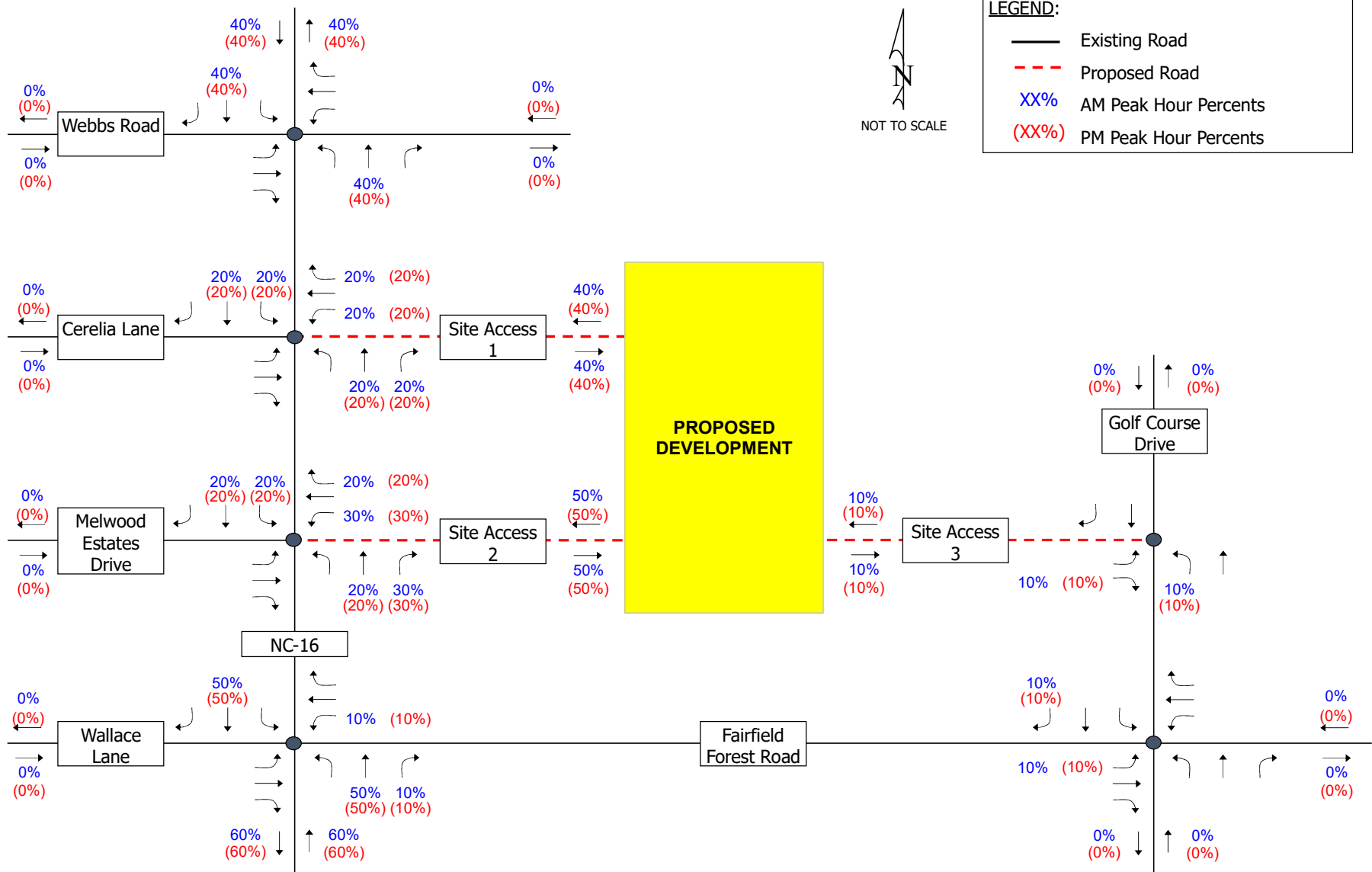
SOURCE: Institute of Transportation Engineers' *Trip Generation Manual* 10<sup>th</sup> Edition (2017)

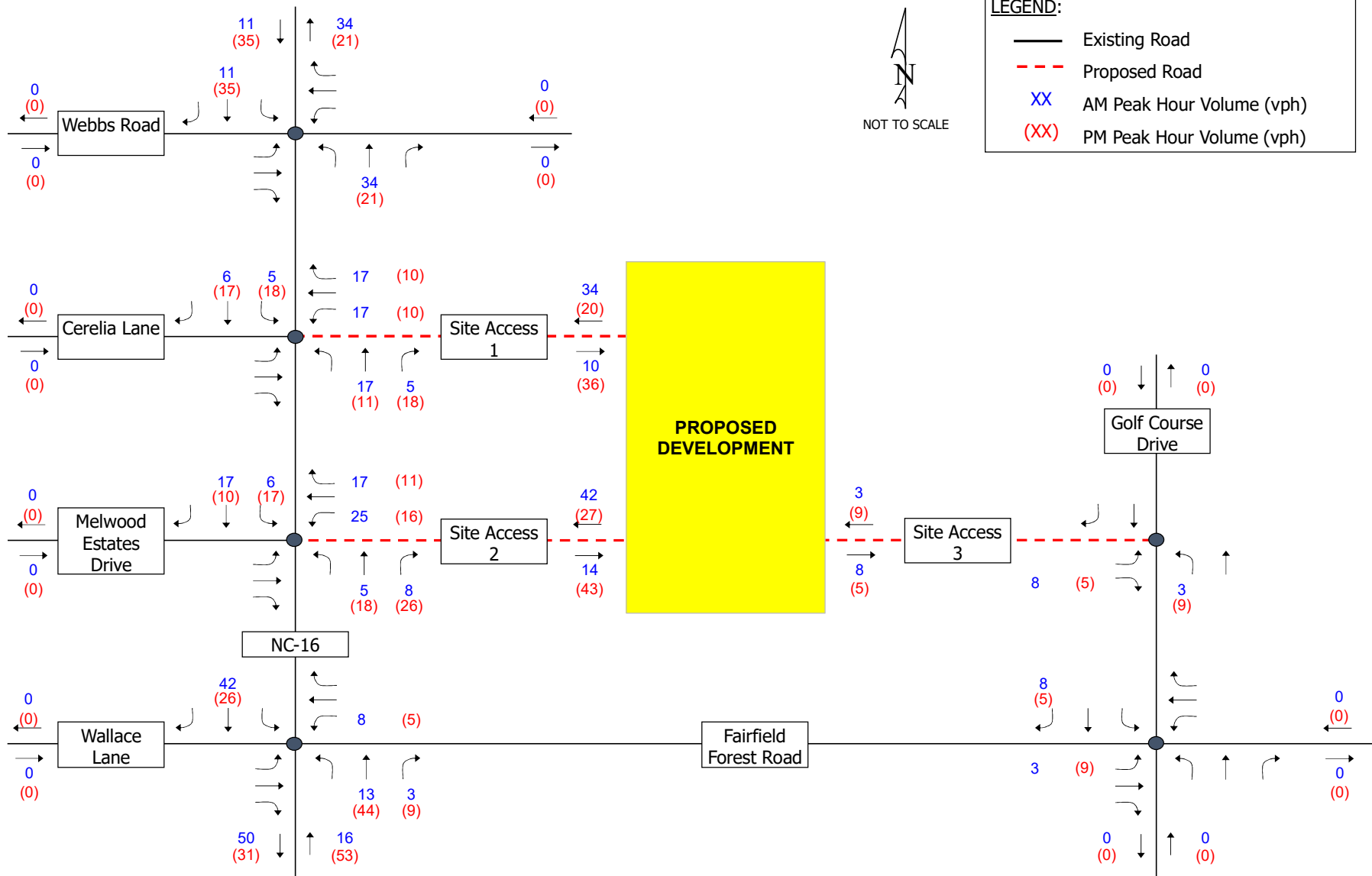
AM peak hour trips generated totaled 27 incoming and 84 outgoing where PM peak hour trips totaled 88 incoming and 52 outgoing. Average daily traffic (ADT) volumes generated by the development totaled 1,606 vehicles per day. No reduction in trips was included due to internal capture and/or pass-by trips.

### 4.2 TRIP DISTRIBUTION

The directional traffic patterns, or trip distribution, of the site-generated traffic was determined using the existing AM and PM peak hour traffic characteristics and engineering judgement. It was assumed, for the purposes of this study, that all site traffic would enter and exit the study area in a similar manner as the existing traffic. Area trip distribution is based on traffic counts performed by Lincoln County and Timmons Group. Total trips into and out of the study area using NC-16 Business form the basis for the percentage distribution. Distribution percentages into and out of the study area were calculated using existing volumes entering and exiting the study area and engineering judgement. The distribution percentages were routed, via shortest path, to and from the proposed development. The distribution percentages were then applied to the generated trips to predict routes and project traffic volumes for the 2023 Build scenario.

**Figure 4-1** shows the trip distribution percentages. **Figure 4-2** shows the trip distribution volumes. 2023 Build traffic volumes were determined by applying the site trip distribution volumes to the Background traffic volumes (see **Figure 3-3**).





## 5 BUILD CONDITION AND ANALYSIS

To complete the 2023 Build analyses (including the proposed development), the estimated site trips were added to the 2023 Background traffic volumes. The projected total volumes, along with the existing intersection geometry, were used to complete the capacity and turn lane warrant analyses. Per Lincoln County's Unified Development Ordinance (UDO), acceptable level of service for all study area intersections / approaches is defined as a LOS C. Under NCDOT guidelines, acceptable level of service is defined as a LOS D.

### 5.1 BUILD TRAFFIC VOLUMES

The 2023 Background traffic volumes shown on **Figure 3-3** were added to the projected site trips from the Westport Townhomes Development (see **Figure 4-2**) to generate the 2023 Build traffic volumes (background + site) shown on **Figure 5-1**.

To summarize, the 2023 Build traffic volumes shown on **Figure 5-1** contain the following:

- Existing 2021 traffic volumes (calculated using collected / provided counts and traffic from 2 approved developments) grown exponentially for 2 years at a 3% ambient growth rate;
- Approved development traffic from 2 approved area developments; and
- Site trips generated by the proposed development.

### 5.2 2023 BUILD ANALYSIS

All 2023 Build analyses are based on the 2023 Build traffic volumes shown in **Figure 5-1**. **Tables 5-1** and **5-2** summarize the intersection LOS, delay, and queue lengths based on: existing lane geometry (**Figure 2-2**) and recommended lane geometry (**Figure 6-1**), respectively. The corresponding Synchro output is included in **Appendix D**.

The signalized intersection of NC-16 Business / Webbs Road is projected to operate at an overall LOS C during both 2023 Build AM and PM peak hours. The eastbound, northbound, and southbound approaches are all projected to operate at a LOS C or better during both peak hours. The westbound approach is projected to operate at a LOS D or better during both peak hours. Despite the fact that the westbound approach is projected to violate Lincoln County's UDO criteria, no improvements are recommended due to the construction of the proposed development. As mentioned earlier, the intersection is projected to operate acceptably per NCDOT's standards. Additionally, projected trips from the proposed development are anticipated to be less than 3% of the overall intersection volume during both the AM and PM peak hours. It should be noted that the subject development is projected to add no traffic to the westbound approach.

The eastbound and westbound approaches at the unsignalized intersection of NC-16 Business / Cerelia Lane / Site Access 1 are projected to operate at a LOS D and F during the 2023 Build AM and PM peak hours, respectively. All other intersection approaches are projected to operate at a LOS A during both peak hours. Per the NCDOT Policy on Street and Driveway Access to North Carolina Highways Manual:

*"Generally left and right turn lanes and tapers shall be considered when:*

- *In accordance with G.S. 136-18(29), the average daily traffic meets or exceeds 4,000 vehicles per day on any secondary route (the average daily traffic should include both the existing traffic plus traffic generated by the proposed development)"*

With the AADT along NC-16 Business projected to exceed 4,000 VPD, a southbound left-turn lane is recommended at Site Access 1. Per the NCDOT nomograph (see **Appendix F**), it is recommended that a 50-foot southbound left-turn lane (with appropriate taper) be constructed. Additionally, it is recommended that the westbound approach be constructed to include two egress lanes. Per **Table 5-2**, following these improvements, the eastbound and westbound approaches are still projected to operate unacceptably. Despite this, no additional improvements are recommended due to the construction of the proposed development. Outside of signalization, there are no geometric improvements that will cause the subject intersection to operate acceptably. Based on projected side street volumes and peaking characteristics of developments in the area, traffic signal warrants will likely not be met for both the MUTCD's 4-hour and 8-hour volume warrants (which the NCDOT typically requires for signalization).

The eastbound and westbound approaches at the unsignalized intersection of NC-16 Business / Melwood Estates Drive / Site Access 2 are projected to operate unacceptably during at least one of the 2023 Build AM and PM peak hours. All other intersection approaches are projected to operate at a LOS A during both peak hours. Per NCDOT standards, a southbound left-turn lane is recommended at Site Access 2. As depicted on the NCDOT nomograph (see **Appendix F**), a 50-foot southbound left-turn lane is warranted at the subject intersection; however, it is recommended that the storage length for the proposed southbound left-turn be maximized via restriping (see **Figure 6-1**). The final storage length should be agreed to by all parties (NCDOT, County, development team, etc.) prior to construction. Additionally, it is recommended that the westbound approach be constructed to include two egress lanes. Per **Table 5-2**, following these improvements, the eastbound and westbound approaches are still projected to operate unacceptably during at least one peak hour. Despite this, no additional improvements are recommended due to the construction of the proposed development. Outside of signalization, there are no geometric improvements that will cause the subject intersection to operate acceptably. Based on projected side street volumes and peaking characteristics of developments in the area, traffic signal warrants will likely not be met for both the MUTCD's 4-hour and 8-hour volume warrants (which the NCDOT typically requires for signalization).

All approaches at the unsignalized intersection of Golf Course Drive / Site Access 3 are projected to operate at a LOS A during both 2023 Build AM and PM peak hours. Based on 2023 Build peak hour volumes, traffic volumes along Golf Course Drive are not projected to exceed 4,000 VPD. As such, turn lanes were not considered at the subject intersection. No improvements are recommended at this intersection due to the construction of the proposed development.

The signalized intersection of NC-16 Business / Fairfield Forest Road / Wallace Lane is projected to operate at an overall LOS B during both 2023 Build AM and PM peak hours. The eastbound, northbound, and southbound approaches are all projected to operate at a LOS C or better during both peak hours. The westbound approach is projected to operate at a LOS D or better during both peak hours. Despite the fact that the westbound approach is projected to violate Lincoln County's UDO criteria, no improvements are recommended due to the construction of the proposed development. As mentioned earlier, the subject intersection is projected to operate acceptably per NCDOT standards. Additionally, projected trips from the proposed development are anticipated to be 4% or less of the overall intersection volume during both the AM and PM peak hours. It should be noted that the proposed development is projected to add minimal traffic (less than 10 vehicles) to the westbound approach during either peak hour.

All approaches at the unsignalized intersection of Fairfield Forest Road / Golf Course Drive are projected to operate at a LOS C or better during both 2023 Build AM and PM peak hours. No improvements are recommended at this intersection due to the construction of the proposed development.

It is recommended that all site accesses be constructed to include 100-feet of internally protected storage (IPS).

**Table 5-1: Intersection Level of Service and Delay Summary  
2023 Build Traffic Volumes**

Intersection and Type of Control	Movement and Approach	Turn Lane Storage (ft)	AM PEAK HOUR				PM PEAK HOUR			
			Delay <sup>1</sup> (sec/veh)	LOS <sup>1</sup>	*95th Percentile Queue Length	Sim Traffic Max Queue Length (ft)	Delay <sup>1</sup> (sec/veh)	LOS <sup>1</sup>	*95th Percentile Queue Length	Sim Traffic Max Queue Length (ft)
1: NC-16 & Webbs Road	EB Left	100	19.2	B	9	25	25.8	C	11	28
	EB Thru/Right		18.3	B	13	38	25.6	C	16	36
	EB Approach		18.6	B	--	--	25.6	C	--	--
	WB Left	350	24.3	C	188	210	37.9	D	#320	260
	WB Thru/Right		44.3	D	#467	370	30.3	C	213	205
	WB Approach		37.6	D	--	--	34.5	C	--	--
	NB Left	150	8.0	A	5	28	6.8	A	4	68
	NB Thru		34.8	C	285	314	35.8	D	436	468
	NB Right	100	21.2	C	97	191	23.3	C	215	200
	NB Approach		31.2	C	--	--	31.3	C	--	--
	SB Left	300	18.2	B	99	161	32.9	C	#173	220
	SB Thru/Right		15.8	B	249	182	17.3	B	431	248
	SB Approach		16.7	B	--	--	22.0	C	--	--
	Overall		28.6	C	--	--	28.3	C	--	--
2: NC-16 & Cerelia Lane/Site Access 1	EB Left/Thru		49.0	E	1	59	190.9	F	2	52
	EB Right	50	15.1	C	0.2	42	16.9	C	0.2	38
	EB Approach		33.4	D	--	--	114.1	F	--	--
	WB Left/Thru/Right		33.5	D	0.9	53	108.9	F	1.7	60
	WB Approach		33.5	D	--	--	108.9	F	--	--
	NB Left	200	9.5	A	0	29	10.2	B	0.1	48
	NB Thru/Right		0.0	A	0	0	0.0	A	0	0
	NB Approach		0.1	A	--	--	0.3	A	--	--
	SB Left/Thru/Right		0.1	A	0	50	0.2	A	0.1	266
	SB Approach		0.1	A	--	--	0.2	A	--	--
3: NC-16 & Melwood Estates Drive/Site Access 2	EB Left/Thru/Right		23.5	C	1.2	75	52.5	F	1.8	76
	EB Approach		23.5	C	--	--	52.5	F	--	--
	WB Left/Thru/Right		55.6	F	1.8	64	289.2	F	3.4	76
	WB Approach		55.6	F	--	--	289.2	F	--	--
	NB Left	150	9.7	A	0.1	31	10.5	B	0.4	71
	NB Thru/Right		0.0	A	0	0	0.0	A	0	0
	NB Approach		0.4	A	--	--	0.8	A	--	--
	SB Left/Thru/Right		0.1	A	0	42	0.2	A	0.1	268
4: Golf Course Drive & Site Access 3	SB Approach		0.1	A	--	--	0.2	A	--	--
	EB Left/Right		9.4	A	0	37	9.9	A	0	34
	EB Approach		9.4	A	--	--	9.9	A	--	--
	NB Left/Thru		0.7	A	0	27	0.4	A	0	35
	NB Approach		0.7	A	--	--	0.4	A	--	--
	SB Thru/Right		0.0	A	0	0	0.0	A	0	0
	SB Approach		0.0	A	--	--	0.0	A	--	--
5: NC-16 & Wallace Lane/Fairfield Forest Road	EB Left/Thru/Right		21.5	C	18	33	27.5	C	23	44
	EB Approach		21.5	C	--	--	27.5	C	--	--
	WB Left/Thru		46.4	D	#269	182	46.2	D	#259	257
	WB Right	175	22.3	C	59	91	28.4	C	76	136
	WB Approach		41.6	D	--	--	41.7	D	--	--
	NB Left	225	5.2	A	4	21	4.2	A	3	24
	NB Thru		8.6	A	148	131	18.2	B	450	250
	NB Right	125	5.4	A	28	46	6.4	A	85	168
	NB Approach		8.1	A	--	--	15.3	B	--	--
	SB Left	150	5.4	A	14	38	16.9	B	42	66
	SB Thru/Right		17.2	B	369	224	14.2	B	368	220
	SB Approach		16.8	B	--	--	14.3	B	--	--
	Overall		18.5	B	--	--	17.9	B	--	--
6: Golf Course Drive & Fairfield Forest Road	EB Left/Thru/Right		2.9	A	0.1	32	4.1	A	0.5	55
	EB Approach		2.9	A	--	--	4.1	A	--	--
	WB Left/Thru/Right		0.2	A	0	2	0.3	A	0	8
	WB Approach		0.2	A	--	--	0.3	A	--	--
	NB Left/Thru/Right		11.6	B	0.1	38	18.6	C	0.2	35
	NB Approach		11.6	B	--	--	18.6	C	--	--
	SB Left/Thru/Right		10.2	B	0.8	81	11.4	B	0.9	90
	SB Approach		10.2	B	--	--	11.4	B	--	--

<sup>1</sup> Overall intersection LOS and delay reported for signalized intersections and roundabouts only.

\*\* Delay greater than 9999.99 seconds cannot be calculated by SYNCHRO for signalized intersections.

+ Delay greater than 9999.99 seconds cannot be calculated by SYNCHRO for unsignalized intersections.

SYNCHRO does not provide level of service or delay for unsignalized movements with no conflicting volumes.

\* - 95th percentile queues for unsignalized intersections reported in number of vehicles.



**Table 5-2: Intersection Level of Service and Delay Summary  
2023 Build + Recommended Improvements Traffic Volumes**

Intersection and Type of Control	Movement and Approach	Turn Lane Storage (ft)	AM PEAK HOUR				PM PEAK HOUR			
			Delay <sup>1</sup> (sec/veh)	LOS <sup>1</sup>	*95th Percentile Queue Length	Sim Traffic Max Queue Length (ft)	Delay <sup>1</sup> (sec/veh)	LOS <sup>1</sup>	*95th Percentile Queue Length	Sim Traffic Max Queue Length (ft)
2: NC-16 & Cerelia Lane/Site Access 1	EB Left/Thru		<b>48.5</b>	<b>E</b>	1	50	<b>176.1</b>	<b>F</b>	1.9	58
	EB Right	50	15.1	C	0.2	42	16.9	C	0.2	37
	EB Approach		33.1	D	--	--	<b>105.9</b>	<b>F</b>	--	--
	WB Left	50	<b>47.6</b>	<b>E</b>	0.6	40	<b>149.9</b>	<b>F</b>	1	38
	WB Thru/Right		16.3	C	0.2	44	<b>37.3</b>	<b>E</b>	0.4	36
	WB Approach		30.3	D	--	--	<b>84.2</b>	<b>F</b>	--	--
	NB Left	200	9.5	A	0	29	10.2	B	0.1	45
	NB Thru/Right		0.0	A	0	0	0.0	A	0	2
	NB Approach		0.1	A	--	--	0.3	A	--	--
	SB Left	50	8.6	A	0	24	10.4	B	0.1	32
	SB Thru/Right		0.0	A	0	5	0.0	A	0	9
	SB Approach		0.1	A	--	--	0.2	A	--	--
3: NC-16 & Melwood Estates Drive/Site Access 2	EB Left/Thru/Right		23.4	C	1.2	72	<b>50.2</b>	<b>F</b>	1.8	70
	EB Approach		23.4	C	--	--	<b>50.2</b>	<b>F</b>	--	--
	WB Left	50	<b>74.8</b>	<b>F</b>	1.4	58	<b>349.3</b>	<b>F</b>	2.3	49
	WB Thru/Right		16.8	C	0.2	44	<b>42.7</b>	<b>E</b>	0.5	40
	WB Approach		<b>48.3</b>	<b>E</b>	--	--	<b>200.9</b>	<b>F</b>	--	--
	NB Left	150	9.7	A	0.1	40	10.5	B	0.4	61
	NB Thru/Right		0.0	A	0	7	0.0	A	0	8
	NB Approach		0.4	A	--	--	0.8	A	--	--
	SB Left	50	8.6	A	0	20	10.5	B	0.1	34
	SB Thru/Right		0.0	A	0	0	0.0	A	0	0
	SB Approach		0.1	A	--	--	0.2	A	--	--

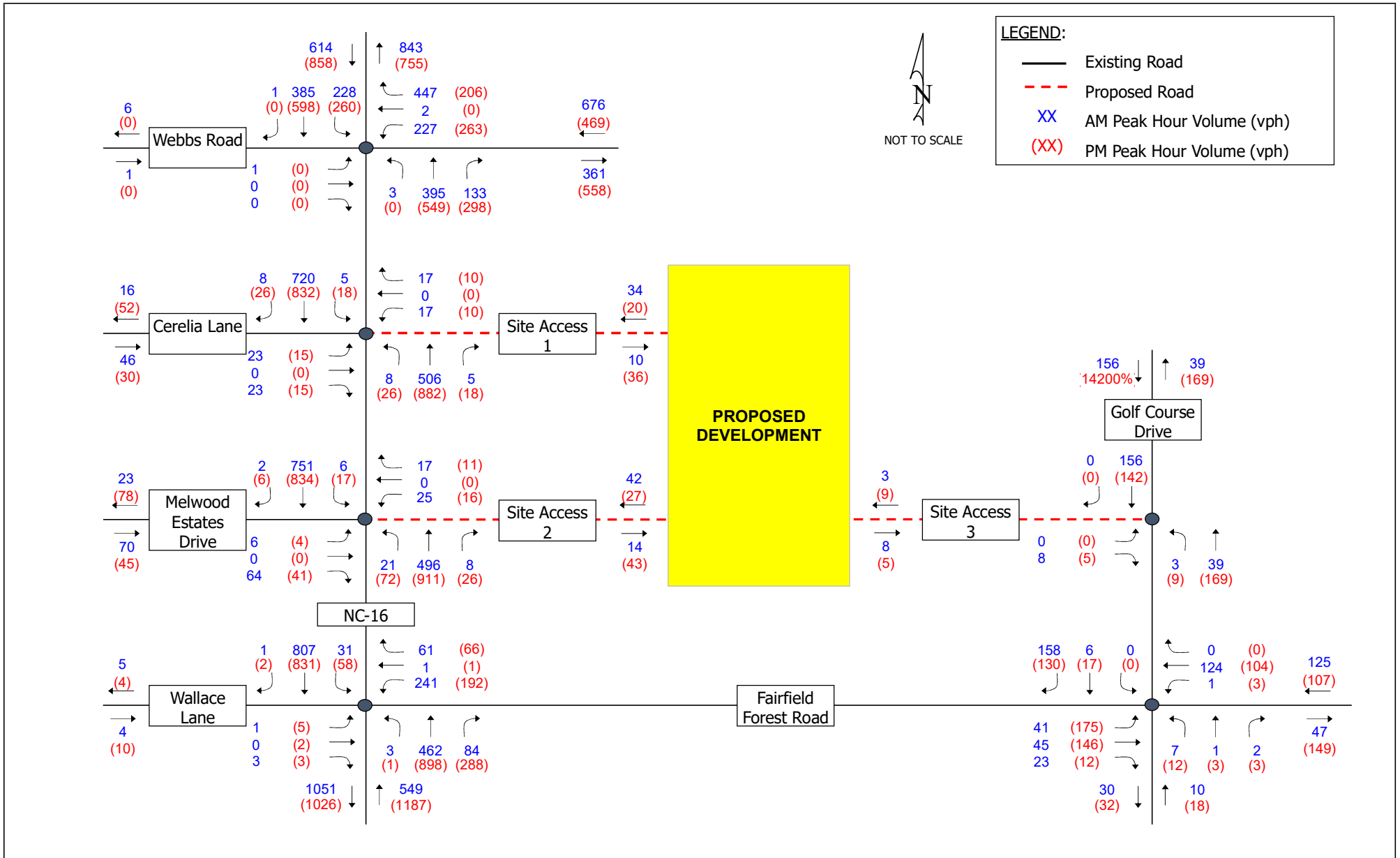
<sup>1</sup> Overall intersection LOS and delay reported for signalized intersections and roundabouts only.

\*\* Delay greater than 9999.99 seconds cannot be calculated by SYNCHRO for signalized intersections.

+ Delay greater than 9999.99 seconds cannot be calculated by SYNCHRO for unsignalized intersections.

SYNCHRO does not provide level of service or delay for unsignalized movements with no conflicting volumes.

\* - 95th percentile queues for unsignalized intersections reported in number of vehicles.



## 6 CONCLUSIONS AND RECOMMENDATIONS

Capacity analyses were performed for 2021 Existing, 2023 Background, and 2023 Build (Background + site trips) traffic volumes. **Figure 6-1** shows the recommended improvements discussed below.

- The signalized intersection of NC-16 Business / Webbs Road is projected to operate at an overall LOS C during both 2023 Build AM and PM peak hours. All intersection approaches are projected to operate at a LOS D or better during both peak hours. No improvements are recommended at this intersection due to the construction of the proposed development.
- The eastbound and westbound approaches at the unsignalized intersection of NC-16 Business / Cerelia Lane / Site Access 1 are projected to operate at a LOS F during at least one 2023 Build peak hour. All other intersection approaches are projected to operate at a LOS D or better during both peak hours. Per NCDOT requirements, the following intersection improvements are recommended:
  - 50-foot southbound left-turn lane (with appropriate taper)
  - Construction of dual westbound egress lanes
- The eastbound and westbound approaches at the unsignalized intersection of NC-16 Business / Melwood Estates Drive / Site Access 2 are projected to operate at a LOS F during at least one 2023 Build peak hour. All other intersection approaches are projected to operate at a LOS C or better during both peak hours. Per NCDOT requirements, the following intersection improvements are recommended:
  - Restripe center lane to maximize storage
  - Construction of dual westbound egress lanes
- All approaches at the unsignalized intersection of Golf Course Drive / Site Access 3 are projected to operate at a LOS A during both 2023 Build AM and PM peak hours. No improvements are recommended at this intersection due to the construction of the proposed development.
- The signalized intersection of NC-16 Business / Fairfield Forest Road / Wallace Lane is projected to operate at an overall LOS B during both 2023 Build AM and PM peak hours. All approaches are projected to operate at a LOS D or better during both peak hours. No improvements are recommended at this intersection due to the construction of the proposed development.
- All approaches at the unsignalized intersection of Fairfield Forest Road / Golf Course Drive are projected to operate at a LOS C or better during both 2023 Build AM and PM peak hours. No improvements are recommended at this intersection due to the construction of the proposed development.
- All site accesses should be constructed to include 100-feet of internally protected storage (IPS).

