TOWN OF CORNELIUS

Cornelius Town Hall

BOARD OF COMMISSIONERS

November 19, 2018

Agenda

TOWN BOARD - 7:00 PM

1. **CALL TO ORDER**
2. **DETERMINATION OF QUORUM**
3. **APPROVAL OF AGENDA**
4. **MOMENT OF SILENCE AND PLEDGE OF ALLEGIANCE**
5. **NEW BUSINESS**
   - A. **Lake Cornelius Informal Canoe/Kayak Access Area**
6. **MAYOR/COMMISSIONERS/MANAGER REPORTS**
7. **CITIZEN CONCERNS/COMMENTS**
8. **PRESENTATIONS**
   - A. **Just Serve - Vickie Stevens**
   - B. **Dave and Diana Rochester Volunteer Recognition**
9. **CONSIDERATION OF APPROVAL**
   - A. **Southeastern Power Administration Agreement**
10. **PUBLIC HEARING AND CONSIDERATION OF APPROVAL**
    - A. **REZ 06-17 Catawba @ Knox**
    - B. **REZ 01-18 CD Nantz**
    - C. **TA 05-18 70% Glass Requirement**
    - D. **TA 06-18 Chapter 10 - Murals**
11. **CONSENT AGENDA**
    - A. **Approve Minutes - Closed Session**
    - B. **Approve Minutes - Regular Meeting**
12. **COMMISSIONER CONCERNS**
13. **ADJOURNMENT**

Please note that to speak during **CITIZENS CONCERNS/COMMENTS** or **PUBLIC COMMENT**, please use the signup sheet provided before the Board meeting and list your name, address and topic. Each speaker will be allowed 3 minutes to speak. A "hard stop" will occur after 3 minutes for each speaker. Any information displayed must be submitted to the Town Clerk within 48 hours prior meeting.

REQUEST FOR BOARD ACTION

Print

Date of Meeting: November 19, 2018

To: Mayor and Town Board

From: Troy Fitzsimmons, PARC Director

Action Requested:

Receive a report from John Crutchfield, Director of Public Safety & Recreation Strategy Planning Services Water Strategy, Hydro Licensing and Lake Services with Duke Energy for the proposed Lake Cornelius Informal Access Area. The proposed access area is part of the 2015 Federal Energy Regulatory Commission relicensing for the Catawba/Wateree River Basin.

Manager's Recommendation:

Receive report.

ATTACHMENTS:		
Name:	Description:	Type:
Lake_Norman_Lake_Cornelius_Recreation_Opportunties.pdf	Lake Cornelius Access Presentation	Presentation

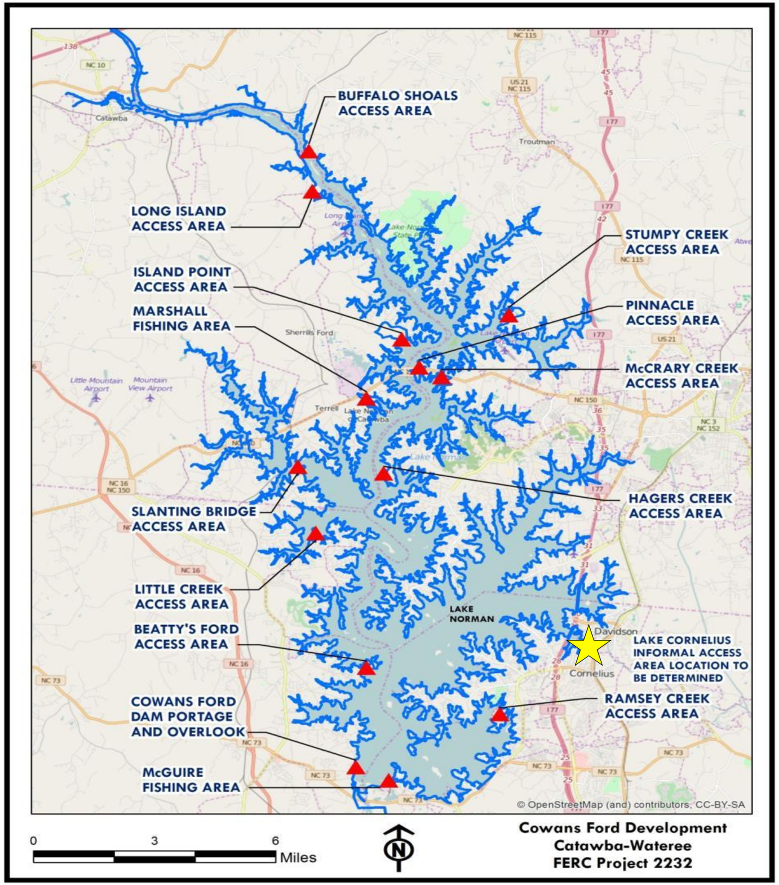
Lake Norman Recreation Opportunities—2018 and Beyond

DUKE ENERGY®

Catawba-Wateree Hydro Project—Relicensing Background

- Submitted license application to FERC in 2006 which included Stakeholder Comprehensive Relicensing Agreement conditions.
- FERC issued the 40-year license in November 2015 which required Duke Energy to file a Recreation Management Plan (RMP) within one year.
- RMP was submitted in November 2016 and subsequently approved by FERC in December 2017.
  - 89 planned recreation enhancements over 20 year period with majority planned in first 10 years.
  - Includes enhancements to 32 existing recreation sites and adding 26 new sites with a total investment approximately $45M in first 10 years.
  - 10 existing stakeholder access area leases to be renewed and potentially 23 new leases to be implemented with stakeholder partners throughout the river basin.
- Commenced RMP implementation in 2018 with five recreation projects completed:
  - Ramsey Creek Park Patriots Pier
  - Highway 73 Access Area
  - Lucia Access Area
  - Dutchman’s Creek Access Area
  - Gunpowder Access Area

Lake Norman Recreation Access Areas



Lake Norman—Recreation Access Area Enhancement Schedule

Project Access Area	Implementation Schedule
Beatty's Ford Access Area	5 years
Hagers Creek Access Area	5 years
Stumpy Creek Access Area	10 years
Little Creek Access Area	10 years
Lake Cornelius Informal Access Area	10 years
Island Point Access Area	15 years
Cowans Ford Dam Portage and Overlook	20 years

Lake Cornelius Informal Access Area

- FERC required License Article 407(6), Recreation Management Plan, “A provision to provide informal public access at the Lake Cornelius portion of Cowan’s Ford Development within 10 years of license issuance, developed after consultation with the Town of Cornelius, North Carolina.”
- Lake Cornelius is 125 acres separated from main body of Lake Norman by the I-77 causeway.
- Informal access consists of gravel parking lot for 10-15 cars, entrance sign, information kiosk, trail to the water, and launch area.
- Consultation with the Town began in January 2017 and ongoing discussion continues.

Lucia Access Area

Lucia Access Area

Lucia Access Area

DUKE ENERGY®

*BUILDING A **SMARTER** ENERGY FUTURE*℠

REQUEST FOR BOARD ACTION

Print

Date of Meeting: November 19, 2018

To:	Mayor and Board of Commissioners
From:	Andrew Grant, Town Manager

Action Requested:

Vickie Stevens will provide the Board with information on the organization Just Serve.

Manager's Recommendation:

Hear from Vickie Stevens.

ATTACHMENTS:		
Name:	Description:	Type:
No Attachments Available		

REQUEST FOR BOARD ACTION

Print

Date of Meeting: November 19, 2018

To: Mayor and Board of Commissioners

From: Andrew Grant, Town Manager

Action Requested:

David and Diana Rochester attended the Inaugural Citizen's Academy in 2008. They began volunteering while attending the academy and became official volunteers for the police department in May 2009.
Over the last ten years, they have volunteered thousands of hours for many events and tasks inside the Police Department. David has stripped down over 50 police surplus vehicles, while Diana has worked within the agency in many roles. These are two of the most selfless people in the Town and are a great representation of paying it forward.

They were recognized on Tuesday, November 13th at the Cornelius Police Department with awards recognizing their volunteer hours; **David: 5,827 hours Diana: 6,240 hours**.

This year, the Town has selected David and Diana to serve as the Grand Marshals for the 2018 North Mecklenburg Christmas Parade to be held on December 1, 2018.

Manager's Recommendation:

Recognize David and Diana Rochester for their ten years of volunteer service.

ATTACHMENTS:		
Name:	Description:	Type:
No Attachments Available		

REQUEST FOR BOARD ACTION

Print

Date of Meeting: November 19, 2018

To: Mayor and Board of Commissioners

From: Julie Niswonger, Finance Director

Action Requested:

Southeastern Power Administration notified all customers in the Georgia-Alabama-South Carolina System May 11, 2018, of Federal hydroelectric power available for supplemental allocation. The Town of Cornelius submitted a non-binding expression of interest for a supplemental award of power.

Southeastern staff has evaluated all supplemental allocation interests. Cornelius qualifies for a minimum supplemental award of 100 kW of additional power allocation. The total combined new allocation would be 461 kW.

This additional allocation of 100 kW provides for $1,281 in savings per year.

Manager's Recommendation:

Approve agreement.

ATTACHMENTS:		
Name:	Description:	Type:
SEPA_Agreement_FY19.pdf	Southeastern Power Administration Agreement	Cover Memo

Supplemental Agreement No. 4
To Contract No. 89-00-1501-1107
11/5/18

SUPPLEMENTAL CONTRACT

executed by

THE UNITED STATES OF AMERICA

DEPARTMENT OF ENERGY

acting by and through the

SOUTHEASTERN POWER ADMINISTRATION

and

TOWN OF CORNELIUS, NORTH CAROLINA

THIS SUPPLEMENTAL CONTRACT, executed as of ____________, 2018, by and between the UNITED STATES OF AMERICA, (hereinafter called the Government), Department of Energy, acting by and through the Administrator of the Southeastern Power Administration (hereinafter called the Administrator), and the TOWN OF CORNELIUS, NORTH CAROLINA (hereinafter called the Purchaser), a municipal corporation organized and existing under the laws of the State of North Carolina;

W I T N E S S E T H; That,

WHEREAS, the Administrator and the Purchaser (hereinafter called the Parties) executed a contract as of May 2, 1997, (designated as Contract No. 89-00-1501-1107), which provides for the sale and purchase of power from projects on the Etowah, Savannah, Alabama, Coosawattee, and Chattahoochee Rivers, known respectively as Allatoona, Buford, Carters, J. Strom Thurmond, Hartwell, West Point, Millers Ferry, Robert F. Henry, Walter F. George, and Richard B. Russell (the ten projects hereinafter collectively called the Projects); and

WHEREAS, Section 2 of said contract set forth the capacity and energy the Government will make available and sell to the Purchaser during the term of this contract; and

WHEREAS, the Government has capacity available and has offered the preference customers listed in the Georgia-Alabama-South Carolina System Power Marketing Policy, published in the Federal Register on December 28, 1994 (Vol.59, No. 248) a supplemental allocation of power; and

WHEREAS, it is the desire of the Parties to modify this section.

NOW, THEREFORE, the Parties mutually covenant and agree that said Contract No. 89-00-1501-1107, shall be amended in the following respect:

1. Section 2.1 shall be deleted and the following section shall be inserted in lieu thereof:

   "2.1 The Government will make available and sell to the Purchaser during the term of this Contract, and the Purchaser will purchase from the Government 100 kilowatts of additional capacity and associated energy. The total combined new capacity allocation will be 461 kilowatts which shall be the Purchaser's contract demand under this Contract. The delivery of the additional supplemental allocation is contingent upon the Government securing the necessary arrangements to facilitate such increase in deliveries. All allocated power made available hereunder shall be delivered to delivery points of the Purchaser located within 150 miles of the power station at any of the Hartwell, J. Strom Thurmond, or Richard B. Russell projects (hereinafter called the Savannah River Projects)."

2. This Supplemental Contract shall become effective as of midnight, December 31, 2018.

IN WITNESS WHEREOF, the Parties hereto have caused this Supplemental Contract to be executed as of the day of the year first above written.

UNITED STATES OF AMERICA
Department of Energy

By ______________________________
Administrator
Southeastern Power Administration
1166 Athens Tech Road
Elberton, GA 30635-6711

TOWN OF CORNELIUS, NORTH CAROLINA

By ______________________________
Town Manager
Town of Cornelius
Post Office Box 399
Cornelius, NC 28031-0399

(SEAL)

ATTEST:

____

REQUEST FOR BOARD ACTION

Print

Date of Meeting: November 19, 2018

To: Mayor and Board of Commissioners

From: Aaron Tucker, Assistant Planning Director

Action Requested:

The applicant, Charter Cornelius LP, is requesting a conditional rezoning for property located at the corner of West Catawba Av and One Norman Bv. for five commercial buildings including a grocery store, commercial retail building, and three restaurant with drive through fronting on West Catawba totaling 39,000 square feet of commercial buildings. Public Hearing #1 was held on October 16, 2017.

The Planning Board has unanimously recommended approval of this project at their October 29th, 2018 meeting.

Conduct Public Hearing #2 and consider approval of REZ 06-17.

Manager's Recommendation:

Conduct Public Hearing #2 and approve an Ordinance to amend the zoning map with conditions and a Resolution declaring that REZ 06-17 is consistent with the Town's Land Use Plan and reasonable in the public's interest.

ATTACHMENTS:

Name:	Description:	Type:
Application.pdf	Application	Cover Memo
Catawba-Knox_ZONING.pdf	Zoning Map	Cover Memo
Catawba-Knox_LU.pdf	Future Land Use Map	Cover Memo
Aerial_Property_Map.pdf	Aerial Property Map	Cover Memo
REZ_06-17(TB)_Catawba_at_Knox_Staff_ReportREV1.docx	Staff Report	Backup Material
2018-10-10_Catawba_at_Knox_TIA_REPORT.pdf	TIA Report	Cover Memo
2018-10-10_Catawba_at_Knox_TECH_MEMO.pdf	TIA Technical Memo	Cover Memo
3-B_Submission_4493_-_West_Catawba_-_Conditional_Rezoning_Plan_-_1112.pdf	Site Plan	Cover Memo
One_Norman_ARB_Revised_Submittal_02_22_18.pdf	Elevations	Cover Memo
Ordinance_on_Rezoning_Property_REZ_06-17_(Catawba_at_Knox).pdf	Ordinance	Cover Memo
RESOLUTION_OF_THE_TOWN_OF_CORNELIUS_BOARD_REZ_06-17_(Catawba_at_Knox)__Consistency_Statement.pdf	Resolution	Cover Memo

TOWN OF CORNELIUS
Planning Department
PO Box 399 | Cornelius, NC 28031 | Phone: 704-896-2461 | Fax: 704-896-2462

Staff Only:
Date Rec'd: 7-6-17
Rec'd by: Wayne
Case #: ______

LAND DEVELOPMENT APPLICATION FORM

1. Application Type

	✓	Fee		✓	Fee
• *Sketch Plan/Plat (Major Sub):*	☒		• *Conditional Zoning (CZ)*	☑	1,250
• *Preliminary Plat (Major Sub):*	☐		• *Special Use Permit (SUP)*	☐	
• *Final Plat (Major Sub):*	☐		• *Major Architectural Variation*	☐	
• *Construction Documents:*	☐		• *Minor Architectural Variation*	☐	
• *General Rezoning*	☐		• *Other:* Vested Rights	☐	250
			Fee Total:		$ 1,500 ~~1,250~~

2. Project Information 6/27/17

Date of Application: ~~4/3/17~~ Name of Project: Catawba at Knox

Location: NE Quad W. Catawba/One Norman Blvd. Property Size (acres): 11.061 # of Units/Lots: ______

Current Zoning: HC Proposed Zoning: ~~HC~~ CZ

Current Land Use: Vacant Proposed Land Use: Non-residential (HC uses) CZ

Tax Parcel Number(s): 001.145.22; 001.145.09

3. Contact Information

CHARTER CORNELIUS, LP c/o CHARTER REALTY & DEVELOPMENT CORP
Owner, Applicant, or Developer
75 HOLLY HILL LANE SUITE 305
Address
GREENWICH CT 06830
City, State Zip
203-689-7000 203-689-7777
Telephone Fax
[signature] PAUL S BRANDES
Signature Print Name Date
Email - psb@chartweb.com 3/30/17

ColeJenest & Stone, P.A.
Agent(s) (Engineer, Architect, Etc.)
200 S. Tryon St., Ste. 1400
Address
Charlotte, NC 28202
City, State Zip
704.376.1555 704.376.7851
Telephone Fax
Signature Print Name Date
Email - ______

4. The following items shall be considered as part of a complete application, please check this list to ensure all items are included:

☑ **Signed "Original" application**

☑ **Project Fee(s)** – See Fee Schedule

☑ **Written Summary/Description of Request** can be on company letterhead. Shall include requested use or uses, sq. feet of non-residential space, or density and number of units/lots for residential, or any other applicable information. For CZ's, must also describe any variations proposed from the Land Development Code

☑ **Property Survey** (at least one copy), including existing buildings, topography, wetlands, streams, vegetation (trees over 18" in diameter), and other natural features.

☑ **Site/sketch plan** (at least one copy), may contain multiple pages and must be drawn to scale by an engineer or landscape architect. Shall include locations of buildings and/or lots, streets, parking, proposed grading, landscaping/screening, open space, watershed/storm water information, associated storm water measures, and proposed utilities and lighting. Shall also include general information from adjoining lots per 13.5

☑ **Illustrative (color) site/sketch plan** for presentation purposes with same layers as described above per 13.5

☑ **Official hard copy of architectural elevations** (at least one copy), which may include multiple pages. Must be drawn to scale by a registered architect, and include all primary and accessory buildings (including all building sides), and any other architectural elements/features of the site such as gazebos, trellis's, garden walls, retaining walls, or other items over 4-feet in height (NOT APPLICABLE FOR SINGLE-FAMILY RESIDENTIAL DEVELOPMENTS). See 13.5

☑ **Illustrative (color) elevations** for presentation purposes for all items described above, as well as perspective (3D) renderings and photograph examples per 13.5

☑ **Digital Files** of all items listed above

IRVIN
LAW
PLLC

office: 19726 ZION AVENUE, CORNELIUS, NC 28031
mailing: P.O. BOX 2376, DAVIDSON, NC 28036
p: 704.896.0820 f: 704.896.0875

June 28, 2017

Via Hand Delivery
Mr. Wayne Herron
Planning Director
Town of Cornelius
21445 Catawba Avenue
Cornelius, NC 28031

RE: Written Summary of Request; Conditional Zoning Application for Catawba at Knox (the "Application"); Tax Parcels 001-145-22, 001-145-09, 20101 West Catawba Avenue, Cornelius, North Carolina (the "Property"); Charter Cornelius, LP ("Owner")

Dear Wayne:

Enclosed is a Land Development Application Form, along with a check in the amount of $1,250.00, for CZ rezoning of the Property and a check in the amount of $250.00 for the Vested Rights application. This letter will serve as the Owner's written summary of the request for approval of the Application in connection with the Property.

The written summary of the request is as follows: The Property comprises two (2) tracts as shown on the survey attached to the Application. The uses requested are those uses permitted in the HC Zoning District of the Town of Cornelius. The total acreage of the Property is approximately 11.067 acres as shown on the Plan that is a part of the Application. The total proposed non-residential square footage shown on the Plan is 48,225.

The Property Survey, Plan and Architectural Elevations have been submitted to you. Digital files have been emailed directly to you. Please let me know if you have any questions concerning the enclosed Application or the matters set forth herein. Thank you for your assistance.

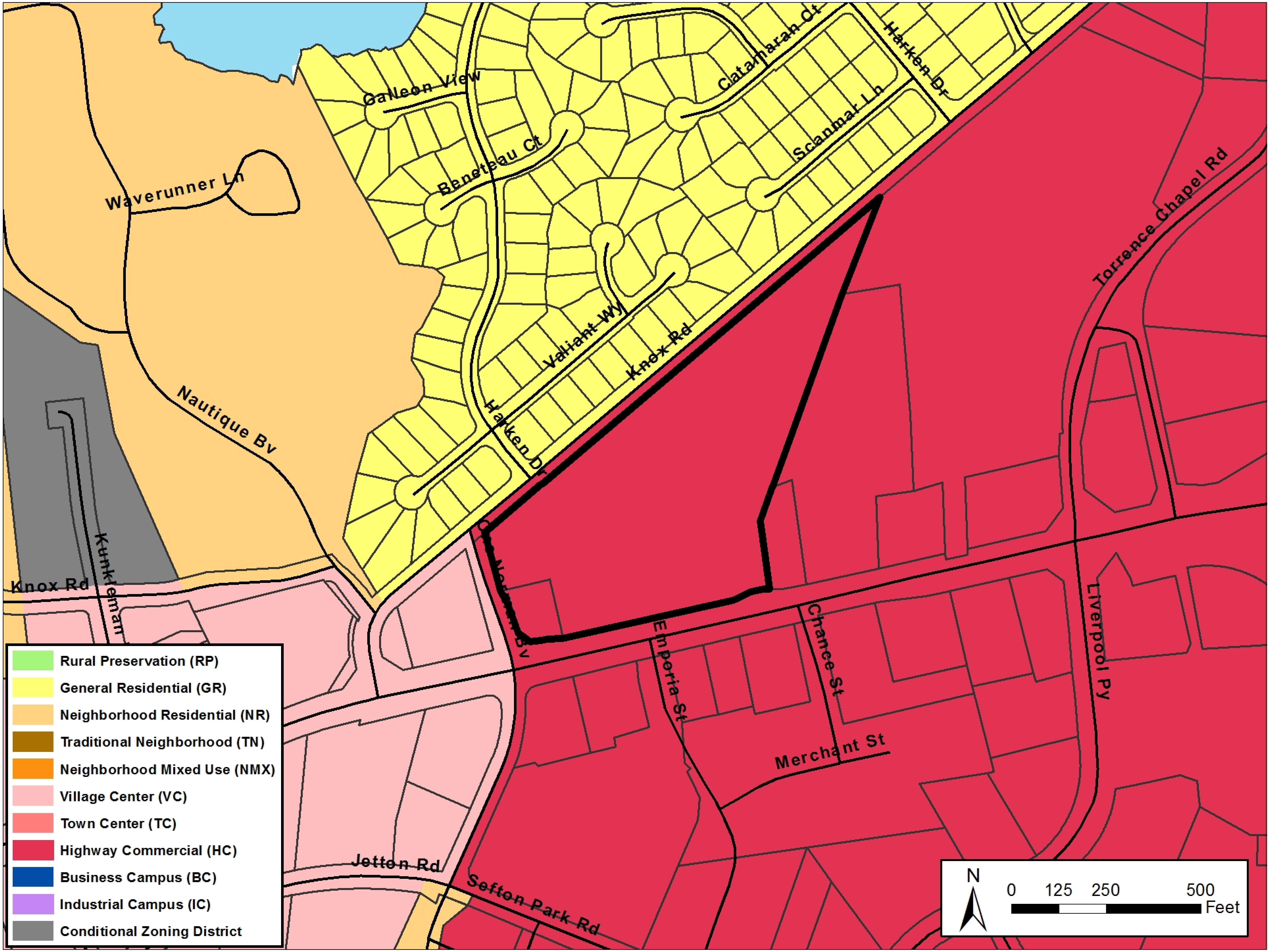
Very truly yours,

Irvin Law, PLLC

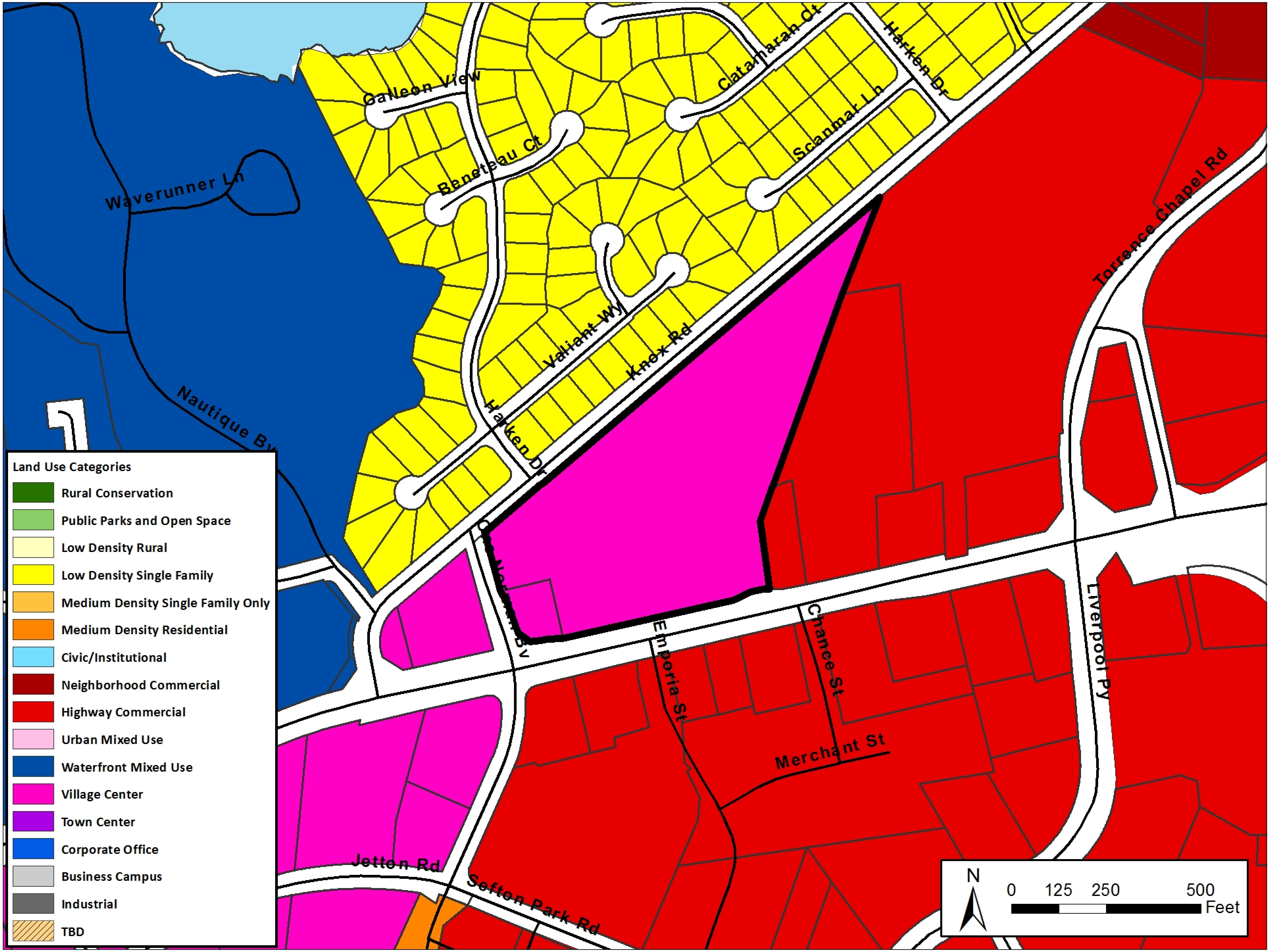
Susan Kendrey Irvin

By:___________________
Susan K. Irvin

Catawba-Knox Property



Catawba-Knox Property



11.05 acres
Mecklenburg
Cornelius
Knox Rd
Valiant Wy
Gulfstar Ct
Beneteau Ct
Waverunner Ln
Nautique Bv
One Norman Bv
West Catawba Av
Chance St
Emporia St
Merchant St
Torrence Chapel Rd
19700 - 19715
19508 - 19517
21418 - 21531
19700 - 19735
19736 - 19799
19652 - 19899
21532 - 21599
19600 - 19699
19560 - 19651
19412 - 19559
21034 - 21199
19350 - 19399
21000
21033
20110 - 20115
20012 - 20105
19900 - 20011
19830 - 19899
19704 - 19799
19710 - 19741
20130 - 20141
20102 - 20115
20214 - 20311
20312 - 20399
20544 - 20605
19600 - 19799

REZ 06-17
Catawba at Knox

Conditional Zoning Request

Town Board Meeting
November 19, 2018

OWNER/APPLICANT:	Paul Brandes Charter Cornelius LP 75 Holly Hill Lane, Suite 305 Greenwich, CT 06830
AGENT:	Jacob Bachman, PE ColeJenest & Stone, PA 200 S. Tryon Street, Suite 1400 Charlotte, NC 28202
PROPERTY LOCATION:	20101 West Catawba Avenue (PID#: 00114522 & 00114509)
PROPERTY SIZE:	11.067 acres total
CURRENT LAND USE:	Vacant
PROPOSED LAND USE:	Grocery store and commercial retail
EXISTING ZONING:	HC (Highway Commercial)
PROPOSED ZONING:	CZ (Conditional Zoning)

EXISTING CONDITIONS:

1. *Description of Adjoining Zoning and Land Uses* – This property has road frontage along West Catawba Avenue and Knox Road. To the north, these parcels directly touches existing Knox Road right-of-way and are across from a GR (General Residential) zoned residential neighborhood. To the east and south, the property abuts HC (Highway Commercial) properties that currently support commercial uses. To the west, the property is adjacent from VC (Village Center) zoned property that is currently occupied by a bank.

2. *Topography* – The property is relatively flat toward West Catawba Avenue but has a few areas of topographic relief towards the north and eastern boundaries.

3. *Vegetation* – The majority of this property is covered with tree canopy. The more significant trees are located toward the northeast boundary. The applicant has surveyed all significant trees and has made a good effort to save them. Most of the significant trees in the northeast portion of the property will remain.

4. *Infrastructure* – The applicant has been asked to provide a Charlotte Water Capacity Assurance form to ensure water and sewer capacity is available for the site. This development will include two internal private streets that will give access the variety of commercial retail and restaurant uses. Access to the site will be available from three driveways; one right in right out driveway off of West Catawba Avenue and two driveways will be located on Knox Road. There is an NCDOT road project adjacent to this development. U-5906 Torrence Chapel/West Catawba Avenue intersection improvements are currently in design and is estimated to start construction in FY 2020. This road project does impact the proposed development at Knox and One Norman and the applicant has incorporated the design into their site with the most recent NCDOT project plans. Connectivity to adjacent parcels is shown on the plan which will open up new ways to navigate the site as other properties develop.

STAFF COMMENTS:

1. *Project Overview* – Charter Cornelius, LP is requesting to rezone the property located at 20101 West Catawba Avenue to develop a 5 commercial buildings totaling over 39,000 square feet of commercial space. The commercial uses include restaurants with drive-through, a grocery store, and potentially a bank.

2. *Land Use Plan Consistency* – The Land Use Plan adopted by the Town Board on January 6th, 2014 designates this property as "Village Center," which allows for a mix of community serving commercial uses. The proposed uses are consistent with the 2014 Land Use Plan.

3. *Pre-Development Review Committee* – The sketch plan was presented to the PDRC on July 13, 2017. The PDRC was supportive of the proposed development.

4. *Community Meeting* – The applicant held the required community meeting on Wednesday, October 4, 2017. 29 people attended the meeting and most of the concerns were centered on traffic and congestion issues created by the site. There were other concerns about the driveway location proximity to one another and questions on what buffers the developer would install.

5. *Town Board Public Hearing #1* – The meeting was held on May 16, 2017. No significant issues were raised, but walkability and pedestrian access was noted as a priority for internal design.

6. *Architectural Review* – This project was presented to the ARB on August 25, 2017. The Board wanted to see more detail on how the drive-through areas would be screened from West Catawba Avenue. The Board was also concerned about the location of Building D. They made a general comment to make sure you don't see the back of parapets from other street fronts. The project was taken back to the ARB on September 28, 2018 and received approval.

7. *Planning Board* – The Planning Board unanimously recommended approval with conditions on October 29th.

8. *Traffic Impact Analysis* – The TIA for this project was started in the summer of 2017. Due to the unique arrangement of future funded NCDOT road projects in the study area and the high

volume of traffic on West Catawba Avenue, this TIA was required to be prepared using TransModeler. This is the first project in the state to use TransModeler for a TIA. Town staff received the draft report in June of 2018 and was quickly submitted to NCDOT for approval. NCDOT congestion management issued a conditional approval in August of 2018. Modifications have been made to the TIA at the request of the applicant and the Town. Traffic mitigation requirements will be included as conditions of this rezoning.

9. *Parking* – Currently parking exceeds Town minimum standards and is proposed to adequately meet customer needs for the commercial/restaurant uses being proposed..

STAFF RECOMMENDATIONS:

Staff approval with conditions. Please note the following conditions for potential approval.

1. Town approval is contingent on review and approval by other applicable local, state and federal agencies.

2. The development shall comply with all other applicable requirements of the Town of Cornelius Land Development Code.

3. Town approval incorporates and shall comply with any and all submittals in the case file and correspondence presented to the board in support of this application, including, but not limited to the following: The site/sketch plan, architectural elevations, and any other information related to this case or improvements recommended by the Town and/or other agencies.

4. The US Postal Service has notified the Town that all future subdivision approvals must utilize a community mail delivery system. Locations and details of the proposed community mailboxes must be included in the Construction Documents, and must be reviewed and approved by the Post Master for this area. The applicant(s) must provide the Town with written confirmation that the local Post Master is in agreement with the proposed box locations.

5. Commercial, retail, office, grocery store and restaurant with drive-through uses shall be permitted.

6. Applicant shall coordinate with NCDOT on additional right-of-way and all other required improvements on Knox Road for widening project U-5906.

7. Applicant and Town shall confirm site plan design for One Norman/Knox matches that of NCDOT's design for U-5906.

8. TIA mitigation items included in construction of U-5906:

   W Catawba Avenue at One Norman Boulevard
   - Construction of an additional southbound left-turn lane along One Norman Boulevard with 175 feet of storage, creating a three-lane approach that includes dual left-turn lanes and a shared through/right lane.
   - Reconfiguration of the northbound approach of One Norman Boulevard to provide an exclusive left-turn lane and a shared through-right lane (same as existing).

- Removal of the split phasing planned for the side-street northbound and southbound approaches.

Knox Road at Harken Drive/Private Street B (D/W #3)

- Eastbound right-turn lane along Knox Road with 100’ of storage
- Eastbound left-turn lane along Knox Road with 100’ of storage (as shown on the proposed plan)
- Westbound left-turn lane along Knox Road with 100’ of storage (as shown on proposed plan)

9. TIA mitigation items prior to CO and U-5906

W Catawba Avenue at One Norman Boulevard

- Extension of the westbound right-turn lane to provide 150’ of storage.

W Catawba Avenue at Private Street A (D/W #1)

- Allow for left-over access (right-in/right-out left-in only)
- Westbound right-turn lane along W Catawba Avenue with 100’ of storage
- Single southbound egress and single ingress lane along Private Street A
- Provide an internal protected stem of 100’ along Private Street A

Knox Road at Private Street A (D/W #2)

- Single northbound egress and single ingress lane along Private Street A
- Provide an internal protected stem of 75’ along Private Street A

Knox Road at Harken Drive/Private Street B (D/W #3)

- Single northbound egress and single ingress lane along Private Street B
- Provide an internal protected stem of 115’ along Private Street B

10. A crosswalk shall be provided at the Knox Road/Private Drive “A” intersection and shall be coordinated with NCDOT with regard to design for U-5906.

11. All parking spaces shall be located within 60 feet of an overstory tree.

12. The type “b” landscape buffer shall be provided along West Catawba and in the curve at One Norman/Knox. Masonry walls shall be provided along any drive-through facility as part of the type “b” buffer detail.

13. Buffer area along Knox Road is to be retained, but shall be supplemented, if necessary, to meet the type “a” buffer planting requirement.

14. Internal sidewalks shall be a minimum width of five feet and shall be provided as shown in the locations noted on the approved site plan.

15. The connectivity proposed for Lake Norman Realty shall be provided as shown. The connection shall either be paved to the property line or a performance guarantee provided. With regard to any additional connectivity access point, the applicant shall work with staff to evaluate connectivity to any adjacent parcel based on site traffic analysis and congestion impacts, adequacy of infrastructure, on street parking, traffic calming, types of uses proposed per Chapter 7.1 of the Land Development Code. The connectivity evaluation shall

involve the Town's traffic engineer for guidance in the evaluation and the applicant may choose to provide information regarding these items from qualified professionals for consideration. Mitigation may be required of the adjoining property owner for consideration of the easement as well as expenses relating to ongoing maintenance of the driveways and other improvements within the project that support the access point. If connectivity is deemed appropriate and is required, the applicant shall provide easements to the adjoining property owner for access and construction or may simply choose to pave the potential connection to the property line in a manner approved by the Town and Mecklenburg County LUESA.

16. A photometric lighting plan shall be provided during the construction document review and shall meet the requirements of Chapter 7.

17. The drive through menu boards as well as pick up windows shall have a minimum five food wide weather covering.

CATAWBA AT KNOX RETAIL

Traffic Impact Analysis

Cornelius, North Carolina

Prepared for:

Town of Cornelius

October 10, 2018 *(Updated)*

Kimley»Horn

Traffic Impact Analysis for
Catawba at Knox Retail
Cornelius, North Carolina

Prepared for:

Town of Cornelius
Cornelius, North Carolina

Prepared by:

Kimley-Horn and Associates, Inc.
NC License #F - 0102
200 South Tryon Street, Suite 200
Charlotte, North Carolina 28202
(704) 333-5131

October 2018 ***(Updated)***
015598018

NORTH CAROLINA
PROFESSIONAL
SEAL
039741
ENGINEER
BRADY R. FINKLEA

10/10/18

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1.0 Executive Summary

The purpose of this Traffic Impact Analysis (TIA) is to evaluate the vehicular traffic impacts on the surrounding transportation infrastructure as a result of the proposed Catawba at Knox Retail development. The primary objectives of the study are:

- To estimate trip generation and distribution for the proposed development.
- To perform vehicular operations analyses for each of the identified study intersections.
- To determine the potential traffic impacts of the proposed development.
- To identify improvements to mitigate the proposed development's traffic impacts.

The proposed Catawba at Knox Retail development is located on approximately 11 acres in the northeast quadrant of the W Catawba Avenue at One Norman Boulevard intersection, in the Town of Cornelius. Based on the site plan provided by the applicant, the proposed development is currently envisioned to consist of the following land uses and intensities:

- Fast Food Restaurant with Drive-Through Window – 4,995 square feet (SF)
- Coffee/Donut Shop with Drive-Through Window – 2,200 SF
- Shopping Center – 18,630 SF
- Supermarket – 22,400 SF

For the purposes of this TIA, the development is assumed to be completed (built-out) in 2019. Based on the site plan provided by the applicant for the purposes of this TIA, the proposed development is assumed to be accessed via the following access points:

1. West Catawba Avenue at Private Street A (unsignalized left-over)
2. Knox Road at Private Street A (unsignalized full-movement)
3. Knox Road at Harkin Drive/Private Street C (unsignalized full-movement)
    - Note that the median from the signal at W Catawba Avenue for the future Knox Road realignment may extend beyond this driveway, restricting this access to a right-in/right-out. For the purposes of this study, this driveway was analyzed as full-movement.
4. One Norman Boulevard at Private Street B (unsignalized right-in/right-out)*

**Note that since the July 2018 TIA submittal, the site plan has been modified to remove the Private Street B access to One Norman Boulevard (unsignalized right-in/right-out). The analysis in this TIA is based on the initial site plan that included this driveway. However, the final recommendations reflect consideration for this driveway being removed, and is based on the modified site plan that includes only three proposed driveways (all three at the same locations proposed in the initial site plan). This approach has been coordinated with both Town of Cornelius and North Carolina Department of Transportation (NCDOT) staff.*

Based on the trip generation potential, the proposed development meets both the Town of Cornelius and NCDOT thresholds for requiring a TIA. A TIA scoping meeting was held with the Town of Cornelius, NCDOT and representatives of the applicant in Cornelius on July 25, 2017, to obtain background information and to ascertain the scope and parameters to be included in this TIA. A Memorandum of Understanding (MOU) was developed based on discussions from this meeting that documented all scoping parameters to be used for the TIA, and was reviewed and agreed upon by the Town of Cornelius, NCDOT and the applicant on September 25, 2017. The approved MOU is included in the **Appendix**.

Three funded Transportation Improvement Program (TIP) projects expected to have impacts to the identified study area, U-5906, C-5621, and R-2555B, were discussed at the TIA scoping meeting.

U-5906 is currently being designed to improve the W Catawba Avenue at Torrence Chapel Road/Liverpool Parkway intersection and is currently approved for funding through a combination of Bonus Allocation and Surface Transportation Block Grant-Direct Attributable (STBG-DA) funds. Based on coordination with NCDOT, this project will realign Knox Road, construct a roundabout at the intersection of Knox Road at Torrence Chapel Road, and construct an additional northbound right-turn lane on Liverpool Parkway with an additional receiving lane on Catawba Avenue that will extend to the I-77 Southbound Ramp. Based on the current NCDOT State Transportation Improvement Program (STIP) as of June 2018, this project is planned for construction in FY 2019 (the construction date has been modified since the MOU was approved); therefore, it was included in all future year analyses *(Note that based on coordination with NCDOT since the July 2018 TIA submittal, construction is now planned for FY 2020. A Technical Memorandum is being submitted along with this updated TIA that addresses the timing between the required mitigation improvements and the U-5906 improvements at Knox Road/One Norman Boulevard)*. Note that there is an additional phased improvement that is planned to remove the side-street lefts at this intersection. However, based on discussions with NCDOT, removal of the lefts is not part of the current project; therefore, was not included in this analysis. Final intersection configurations under TIP Project U-5906 may differ from the improvements outlined in this TIA.

C-5621 is currently being designed to improve the Catawba Avenue at US 21 (Statesville Road)/Holiday Lane intersection and is currently approved for funding through a combination of Bonus Allocation, Congestion Mitigation and Air Quality (CMAQ) and local funds. At the time of the TIA scoping meeting, this intersection was planned to be improved via the construction of a roundabout. However, since then, the preferred alternative to improve this intersection has been modified from a roundabout to a quadrant left configuration, which includes a new connection in the southeast quadrant of this intersection with new traffic signals at both ends of the connection at Catawba Avenue/Burton Lane and US 21 (Statesville Road). The benefit of this configuration is the removal of left-turn movements from the current intersection of Catawba Avenue at US 21 (Statesville Road)/Holiday Lane, which is expected to reduce queueing into the closely-spaced diverging diamond interchange (DDI) west of this intersection. An approved analysis model depicting the planned improvements was developed by WSP and provided by NCDOT. Based on the current NCDOT STIP as of June 2018, this project is planned for construction in FY 2019; therefore, it was included in all future year analyses. *(Note that based on coordination with NCDOT since the July 2018 TIA submittal, construction is now planned for FY 2020.)* Final intersection configurations under TIP Project C-5621 may differ from the improvements outlined in this TIA.

R-2555B is currently being designed to convert W Catawba Avenue to a four-lane divided roadway between Sam Furr Road (NC 73) and Jetton Road and is currently approved for funding through a combination of state highway trust funds and local funds. With the northern terminus of this STIP project located at Jetton Road, which is the western-most intersection within this TIA's study area, this project is planned to only impact the intersection of W Catawba Avenue at Jetton Road. Based on coordination with NCDOT, this project is currently planned to add a second northbound left-turn lane along W Catawba Avenue at Jetton Road. Based on the current NCDOT STIP as of June 2018, this project is planned for construction in FY 2020; therefore, as requested by NCDOT and Town staff, this project was only included in the 2024 analyses (and was not included in the 2019 analyses) for the purposes of this TIA. Final intersection configurations under TIP Project R-2555B may differ from the improvements outlined in this TIA.

Given the expected timing of the proposed development's build-out (2019) in coordination with the opening year of the funded TIP projects, the following AM and PM peak-hour scenarios were analyzed to determine the proposed development's transportation impacts on the surrounding network:

- 2017 Existing Conditions
- 2019 Background Conditions (with U-5906 and C-5621)
- 2019 Build-out Conditions (with U-5906 and C-5621)
- 2024 Build-out Conditions + 5 years (with U-5906, C-5621, and R-2555B)

Based on coordination with the Town, NCDOT and the applicant, along with review of the TIA requirements documented within the *Town of Cornelius Land Development Code*, this TIA evaluated the vehicular operations under each of the AM and PM peak-hour scenarios above for the following study area intersections:

1. W Catawba Avenue at Jetton Road
2. W Catawba Avenue at Bethel Church Road
3. W Catawba Avenue at Knox Road
4. W Catawba Avenue at One Norman Boulevard
5. W Catawba Avenue at Torrence Chapel Road/Liverpool Parkway
6. Catawba Avenue at I-77 SB Ramps
7. Catawba Avenue at I-77 NB Ramps
8. Catawba Avenue at US 21 (Statesville Road)/Holiday Lane
9. Catawba Avenue at S Hill Street/Burton Lane
10. Catawba Avenue at Smith Circle
11. Knox Road at Torrence Chapel Road
12. Knox Road at One Norman Boulevard
13. W Catawba Avenue at Private Street A (unsignalized left-over)
14. Knox Road at Private Street A (unsignalized full movement)
15. Knox Road at Harken Drive/Private Street C (unsignalized full movement)
16. One Norman Boulevard at Private Street B (unsignalized right-in/right-out)

Kimley-Horn was retained to determine the potential vehicular traffic impacts of this development (in accordance with the traffic study guidelines in the *NCDOT Policy on Street and Driveway Access to North Carolina Highways* and set forth by the *Town of Cornelius Land Development Code*) and to identify transportation improvements that may be required to mitigate these impacts. This report presents trip generation, distribution, capacity analyses, and recommendations for transportation improvements required to mitigate anticipated traffic demands produced by the subject development.

Based on the capacity analyses performed for each of the identified study intersections, along with review of the auxiliary turn-lane warrants and crash analyses contained herein, the following improvements are recommended to mitigate the impact of the proposed development on the adjacent street network:

W Catawba Avenue at One Norman Boulevard

- Construction of an additional southbound left-turn lane along One Norman Boulevard with 175 feet of storage, creating a three-lane approach that includes dual left-turn lanes and a shared through/right lane

- Reconfiguration of the northbound approach of One Norman Boulevard to provide an exclusive left-turn lane and a shared through-right lane (same as existing)
- Removal of the split phasing planned for the side-street northbound and southbound approaches
- Extension of the westbound right-turn lane to provide 150’ of storage

W Catawba Avenue at Private Street A (D/W #1)

- Allow for left-over access (right-out only)
- Westbound right-turn lane along W Catawba Avenue with 100’ of storage
- Single southbound egress and single ingress lane along Private Street A
- Provide an internal protected stem of 100’ along Private Street A

Knox Road at Private Street A (D/W #2)

- Single northbound egress and single ingress lane along Private Street A
- Provide an internal protected stem of 100’ along Private Street A

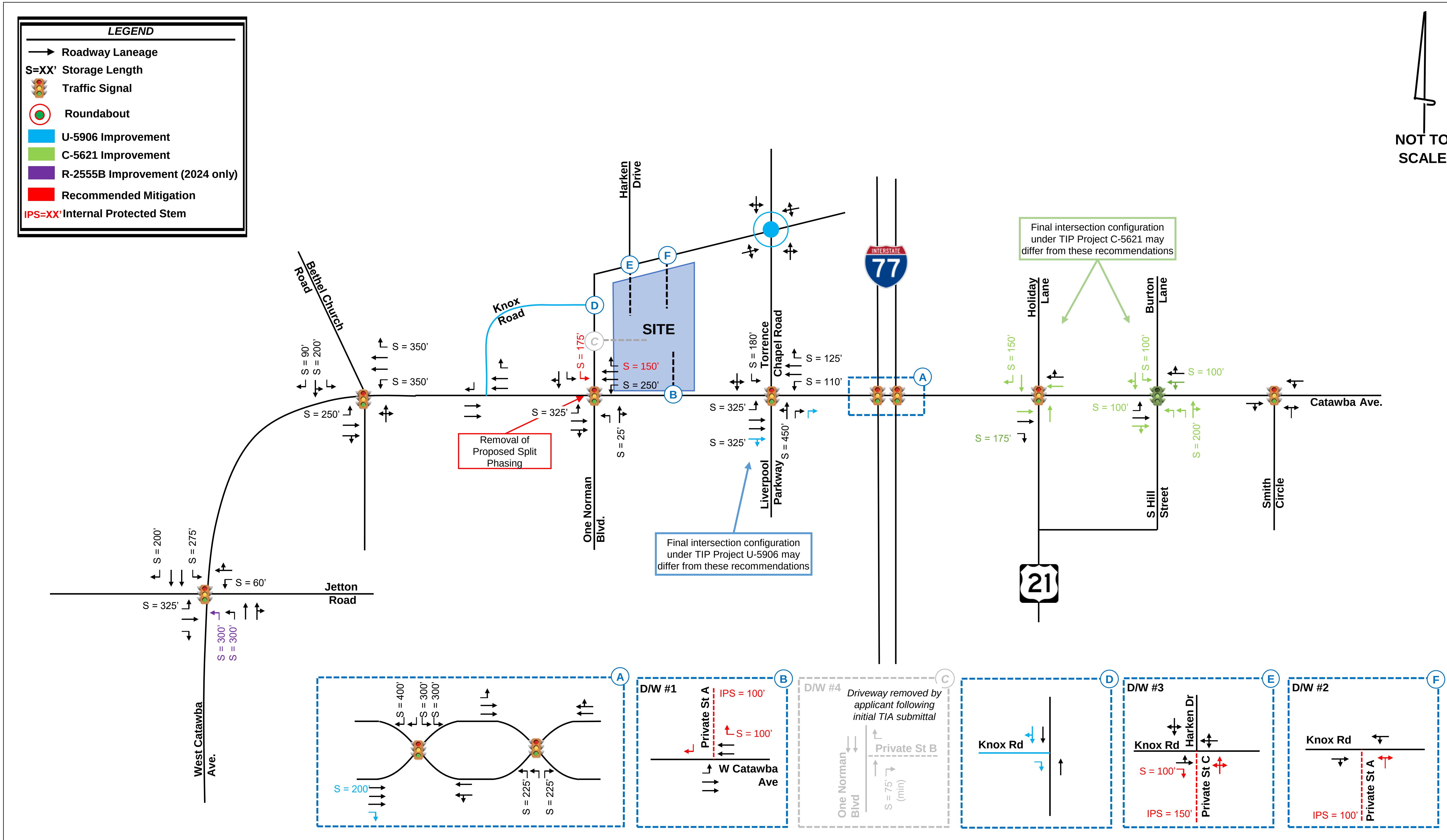
Knox Road at Harken Drive/Private Street C (D/W #3)

- Single northbound egress and single ingress lane along Private Street C
- Provide an internal protected stem of 150’ along Private Street C
- Eastbound right-turn lane along Knox Road with 100’ of storage

~~One Norman Boulevard at Private Street B (D/W #4)~~

- *Since the July 2018 TIA submittal, the site plan has been modified to remove this driveway*

The recommended improvements within the study area are shown in **Figure 1.1**. The recommendations shown on this figure are subject to approval by NCDOT and the Town of Cornelius. All additions and attachments to the State and Town roadway system shall be properly permitted, designed and constructed in conformance to standards maintained by the agencies.



Catawba at Knox Retail
Traffic Impact Analysis

Recommended Mitigation Improvements

Figure 1.1

2.0 Introduction

The proposed Catawba at Knox Retail development is located on approximately 11 acres in the northeast quadrant of the W Catawba Avenue at One Norman Boulevard intersection, in the Town of Cornelius. Based on the site plan provided by the applicant, the proposed development is currently envisioned to consist of the following land uses and intensities:

- Fast Food Restaurant with Drive-Through Window – 4,995 SF
- Coffee/Donut Shop with Drive-Through Window – 2,200 SF
- Shopping Center – 18,630 SF
- Supermarket – 22,400 SF

For the purposes of this TIA, the development is assumed to be completed (built-out) in 2019. Based on the site plan provided by the applicant for the purposes of this TIA, the proposed development is assumed to be accessed via the following access points:

1. West Catawba Avenue at Private Street A (unsignalized left-over)
2. Knox Road at Private Street A (unsignalized full-movement)
3. Knox Road at Harkin Drive/Private Street C (unsignalized full-movement)
    - Note that the median from the signal at W Catawba Avenue for the future Knox Road realignment may extend beyond this driveway, restricting this access to a right-in/right-out. For the purposes of this study, this driveway was analyzed as full-movement.
4. One Norman Boulevard at Private Street B (unsignalized right-in/right-out)*

**Note that since the July 2018 TIA submittal, the site plan has been modified to remove the Private Street B access to One Norman Boulevard (unsignalized right-in/right-out). The analysis in this TIA is based on the initial site plan that included this driveway. However, the final recommendations reflect consideration for this driveway being removed, and is based on the modified site plan that includes only three proposed driveways (all three at the same locations proposed in the initial site plan). This approach has been coordinated with both Town of Cornelius and NCDOT staff.*

Based on the trip generation potential, the proposed development meets both the Town of Cornelius and NCDOT thresholds for requiring a TIA. A TIA scoping meeting was held with the Town of Cornelius, NCDOT and representatives of the applicant in Cornelius on July 25, 2017, to obtain background information and to ascertain the scope and parameters to be included in this TIA. A Memorandum of Understanding (MOU) was developed based on discussions from this meeting that documented all scoping parameters to be used for the TIA, and was reviewed and agreed upon by the Town of Cornelius, NCDOT and the applicant on September 25, 2017. The approved MOU is included in the **Appendix**.

Kimley-Horn was retained to determine the potential vehicular traffic impacts of this development (in accordance with the traffic study guidelines in the *NCDOT Policy on Street and Driveway Access to North Carolina Highways* and set forth by the *Town of Cornelius Land Development Code*) and to identify transportation improvements that may be required to mitigate these impacts. This report presents trip generation, distribution, capacity analyses, and recommendations for transportation improvements required to mitigate anticipated traffic demands produced by the subject development.

3.0 Existing Traffic Conditions

Existing traffic conditions were coordinated with Town of Cornelius and NCDOT staff and collected through field observations and turning-movement counts to establish the existing conditions baseline analysis.

3.1 STUDY AREA

Based on coordination with the Town, NCDOT and the applicant, along with review of the TIA requirements documented within the *Town of Cornelius Land Development Code*, the study area for this TIA includes the following existing intersections:

1. W Catawba Avenue at Jetton Road
2. W Catawba Avenue at Bethel Church Road
3. W Catawba Avenue at Knox Road
4. W Catawba Avenue at One Norman Boulevard
5. W Catawba Avenue at Torrence Chapel Road/Liverpool Parkway
6. Catawba Avenue at I-77 SB Ramps
7. Catawba Avenue at I-77 NB Ramps
8. Catawba Avenue at US 21 (Statesville Road)/Holiday Lane
9. Catawba Avenue at S Hill Street/Burton Lane
10. Catawba Avenue at Smith Circle
11. Knox Road at Torrence Chapel Road
12. Knox Road at One Norman Boulevard
13. Knox Road at Harken Drive

Figure 3.1 shows the study area intersections and the site location, **Figure 3.2** shows the proposed site plan used in the analyses of this TIA as initially provided by the applicant and **Figure 3.3** shows the existing roadway geometry at the study intersections. Site visit intersection inventory forms are included in the **Appendix**.

The primary roadways in the vicinity of the site based on NCDOT's functional classification data are W Catawba Avenue, US 21 and I-77. The information below describes existing conditions for portions of these roadways within the vicinity of the site.

W Catawba Avenue is a four-lane, divided roadway with a posted speed limit of 35 miles per hour (mph) in the vicinity of the site. W Catawba Avenue is classified as a minor arterial west of US 21 according to NCDOT functional classification data, with an average daily traffic (ADT) volume of 28,000 vehicles per day (vpd) in the vicinity of the site based on 2016 NCDOT ADT maps.

US 21 (Statesville Road) is a two-lane, undivided roadway with a posted speed limit of 35 mph south of Catawba Avenue. US 21 (Statesville Road) is classified as a minor arterial throughout the study area according to NCDOT functional classification data, with an ADT volume of 15,000 vpd south of Catawba Avenue based on 2016 NCDOT ADT maps.

I-77 is currently a four-lane, divided interstate facility with a posted speed limit of 65 mph through the study area. I-77 has an ADT of 93,000 vpd north of W Catawba Avenue (Exit 28) and 82,000 vpd south of W Catawba Avenue (Exit 28) based on 2016 NCDOT ADT maps.

The remaining network streets within the study area are classified as local roadways.

3.2 EXISTING INTERSECTION VOLUME DEVELOPMENT

Intersection turning-movement and heavy-vehicle counts were performed by National Data & Surveying Services, LLC, on Wednesday, September 6, 2017, for the AM (7:00-9:00 AM) and PM (4:30-6:30 PM) peak periods at the following intersections:

1. W Catawba Avenue at Jetton Road
2. W Catawba Avenue at Bethel Church Road
3. W Catawba Avenue at Knox Road
4. W Catawba Avenue at One Norman Boulevard
5. W Catawba Avenue at Torrence Chapel Road/Liverpool Parkway
6. Catawba Avenue at Smith Circle
7. Knox Road at Torrence Chapel Road
8. Knox Road at One Norman Boulevard
9. Knox Road at Harken Drive

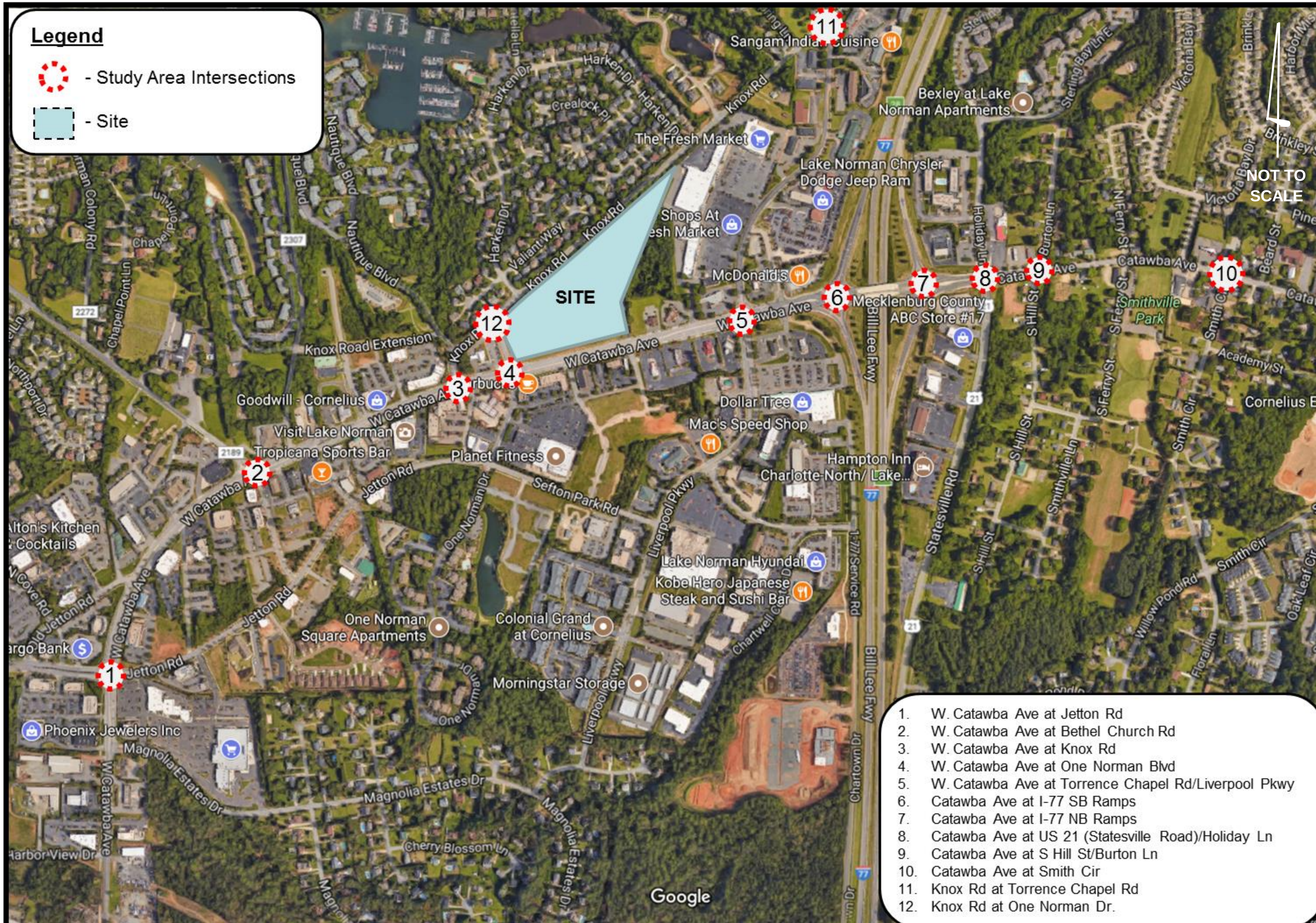
Peak-hour intersection turning-movement volumes were obtained from the *QuikTrip TIA* (AMT, April 2017), and were performed on Wednesday, November 30, 2016, for the AM and PM peak periods at the following intersections:

1. Catawba Avenue at I-77 SB Ramps
2. Catawba Avenue at I-77 NB Ramps
3. Catawba Avenue at US 21 (Statesville Road)/Holiday Lane
4. Catawba Avenue at S Hill Street/Burton Lane

These volumes were grown by 1% to reflect 2017 existing traffic volumes.

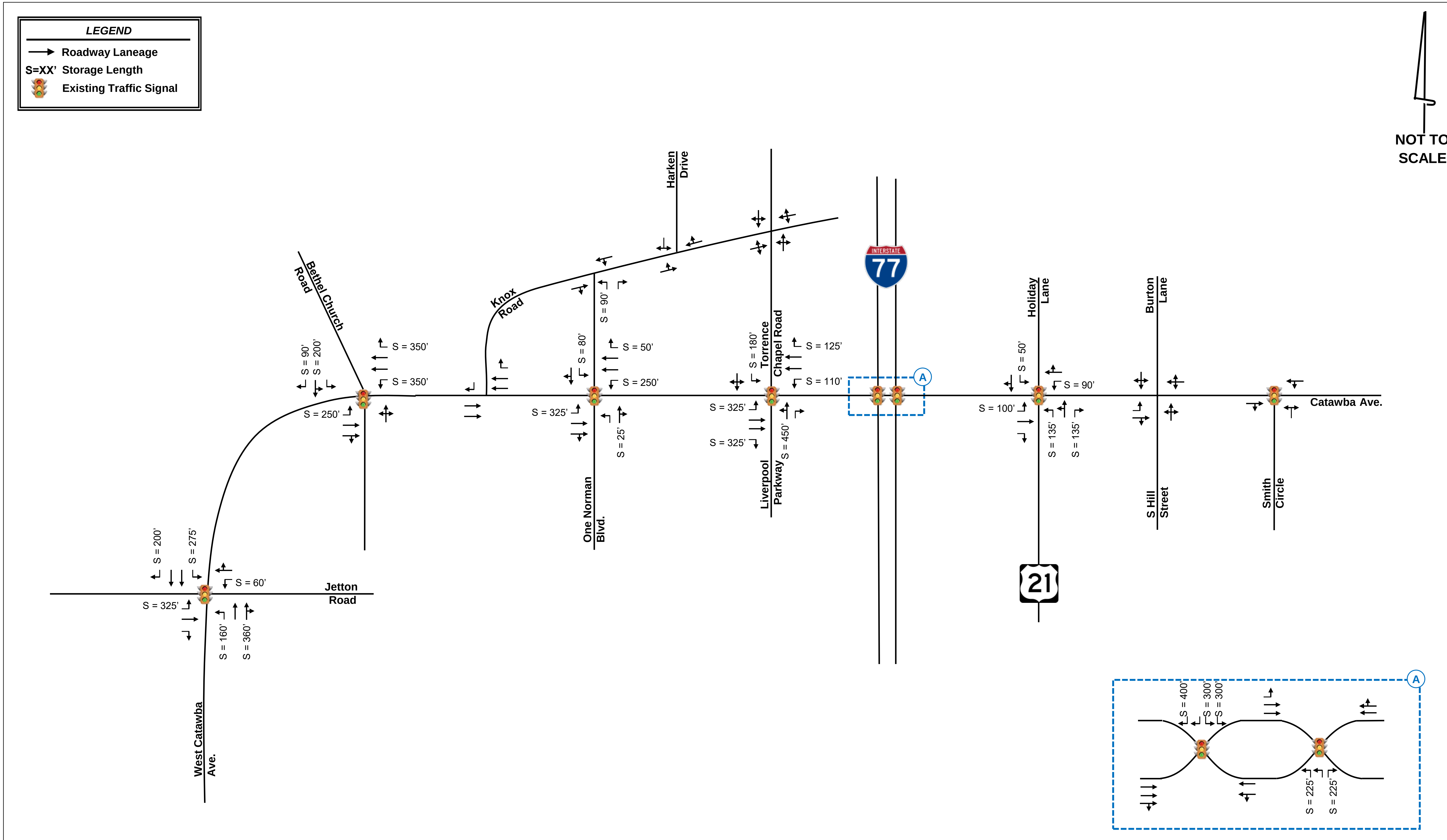
Based on these counts, the network peak hours were determined to be 7:45-8:45 AM and 4:45-5:45 PM. Traffic volumes were balanced throughout the study area and converted to AM and PM peak-hour Origin-Destination (O-D) Matrices. Peak-hour intersection count data is provided in the **Appendix**.

Figure 3.4 illustrates the 2017 existing AM and PM peak-hour traffic volumes generated by the simulation model. Note that the simulation model redistributed existing traffic volumes (which were balanced from the collected counts) through the model's dynamic traffic assignment (DTA).



Kimley»Horn	**Catawba at Knox Retail Traffic Impact Analysis**	**Study Area /Site Location**	**Figure 3.1**

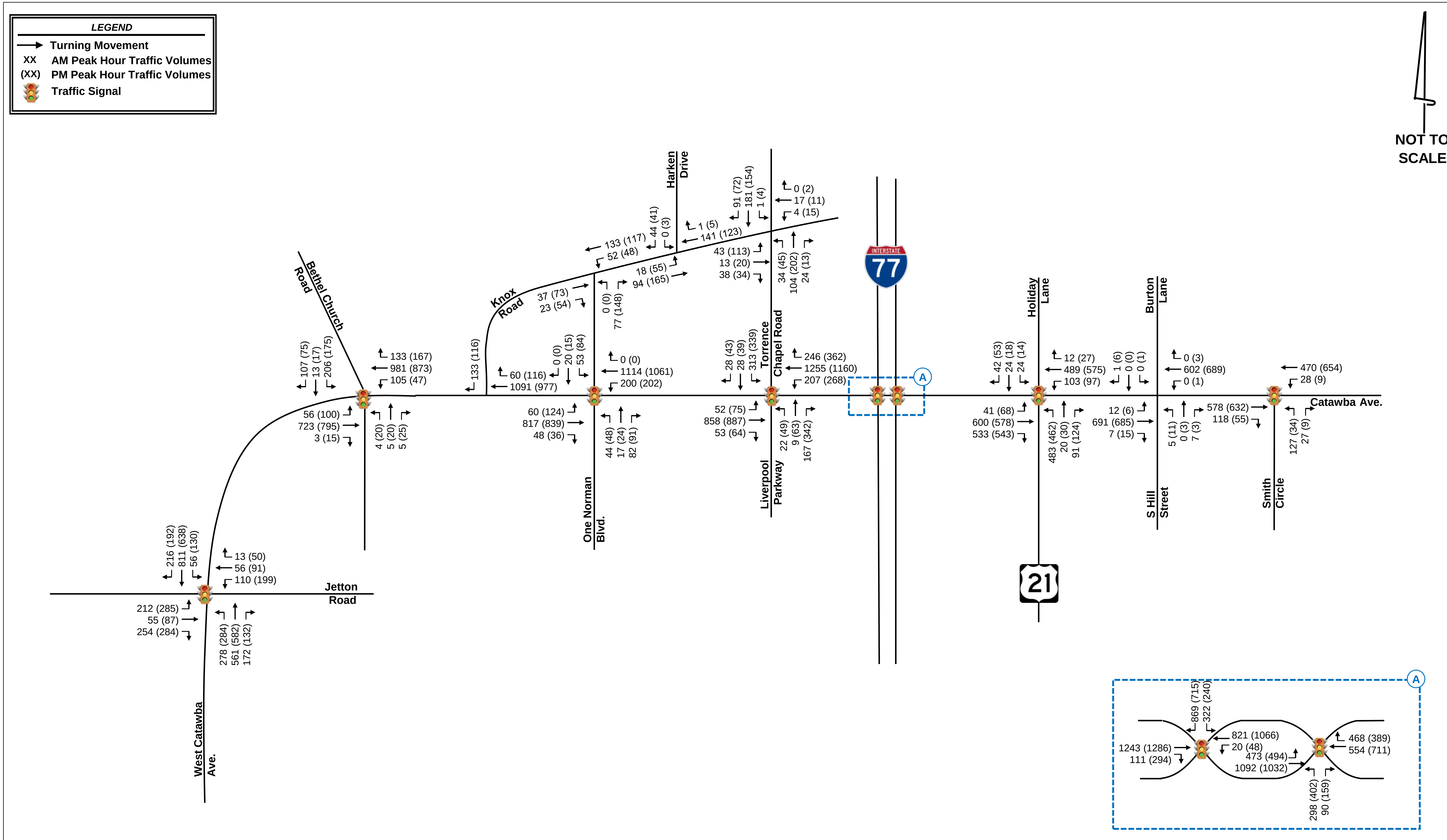
Kimley»Horn	**Catawba at Knox Retail Traffic Impact Analysis**	**Proposed Site Plan**	**Figure 3.2**



Catawba at Knox Retail
Traffic Impact Analysis

Existing Roadway Laneage

Figure 3.3



Kimley»Horn

Catawba at Knox Retail Traffic Impact Analysis

2017 Existing AM & PM Peak Hour Traffic Volumes

Figure 3.4

4.0 Background Intersection Volume Development

Projected background (non-project) traffic is defined as the expected growth or change in traffic volumes on the surrounding roadway network between the year the existing counts were collected (2017) and the expected build-out year (2019) absent the construction and opening of the proposed project. This includes non-specific general growth based on historical increase in local traffic volumes (historical background growth), along with specific growth and/or change in traffic volumes caused by either approved, but not yet fully-constructed, off-site developments and/or planned transportation projects specifically identified within the vicinity of the proposed development.

4.1 HISTORICAL BACKGROUND GROWTH TRAFFIC

Historical background growth is the increase in existing traffic volumes due to usage increases and non-specific growth throughout the area, and accounts for growth that is independent of specific off-site developments or planned transportation projects. Historical background growth traffic is calculated using an annual growth rate, which is applied to the existing traffic volumes up to the future horizon years. As shown in the approved MOU, an annual growth rate of one percent (1%) was applied to the 2017 existing peak-hour traffic-volume O-D matrix to calculate base 2019 and 2024 background traffic volumes. This growth rate was determined based on review of historical NCDOT AADT maps along with coordination with Town of Cornelius and NCDOT staff.

4.2 APPROVED DEVELOPMENTS

At the direction of the Town of Cornelius and NCDOT staff, two approved developments that are expected to impact traffic volumes within the study area were included in the background traffic volumes for this TIA. These developments, land uses/intensities, and approximate build-out percentages at the time the counts were collected are outlined in **Table 4.1**, along with the improvements shown as being required within these respective studies.

Table 4.1 – Approved Developments

Development	Land Use/Intensity	% Build-out	TIA Included?	Required Improvements
CATS Park and Ride	415 Parking Spaces	50%	Yes	No required improvements at study intersections
QuikTrip	20 Fueling Positions	0%	Yes	**Catawba Avenue at US 21*** - Extend NBR storage to 225' **Catawba Avenue at Burton Lane*** - SBL w/ 125' of storage - RTL drop on EB Catawba at S Ferry St

*These improvements are assumed to be incorporated into NCDOT's adjacent C-5621 STIP project.

Volumes for both developments were assigned to the background and build-out networks using the TransModeler TIA Toolbox, which used the development inputs shown in **Table 4.1** along with the distribution provided for each of these developments documented in the *Cornelius Park and Ride Facility Technical Memorandum* (Kimley-Horn, October 2013) and the *QT TIA* (AMT, April 2017). Since the study areas for these developments differed from the study area included for the Catawba at Knox Retail development, the distributions from those studies were appropriately extrapolated to the remaining study area intersections. Note that a trip reduction was applied to the trip generation of the approved convenience store for the *QT TIA* (AMT, April 2017) to account for the previous restaurant and gas station that is being replaced by the future QuikTrip. At the time the counts were collected for that study, the restaurant was open and operational. However, for the purposes of this study, this reduction was not applied since the previous restaurant and gas station were no longer operational at the time the new counts were collected at the majority of intersections for this TIA.

As noted in **Table 4.1**, the improvements committed by the QuikTrip development overlap with planned improvements for the adjacent TIP project; therefore, based on information provided by NCDOT, QuikTrip's improvements were assumed to be incorporated into C-5621.

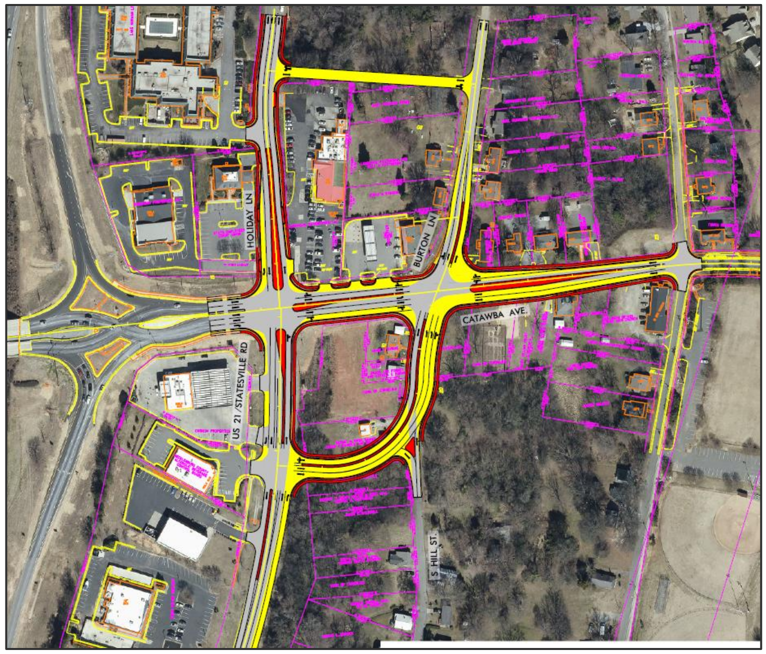
Figure 4.1 shows the 2019 background AM and PM peak-hour traffic volumes, which include the historical growth traffic and future off-site development trips. Site trip figures from both approved TIAs are included in the **Appendix**.

4.3 PLANNED TRANSPORTATION PROJECTS

Three funded TIP projects expected to have impacts to the identified study area, U-5906, C-5621 and R-2555B, were discussed at the TIA scoping meeting and included in the analyses for this study.

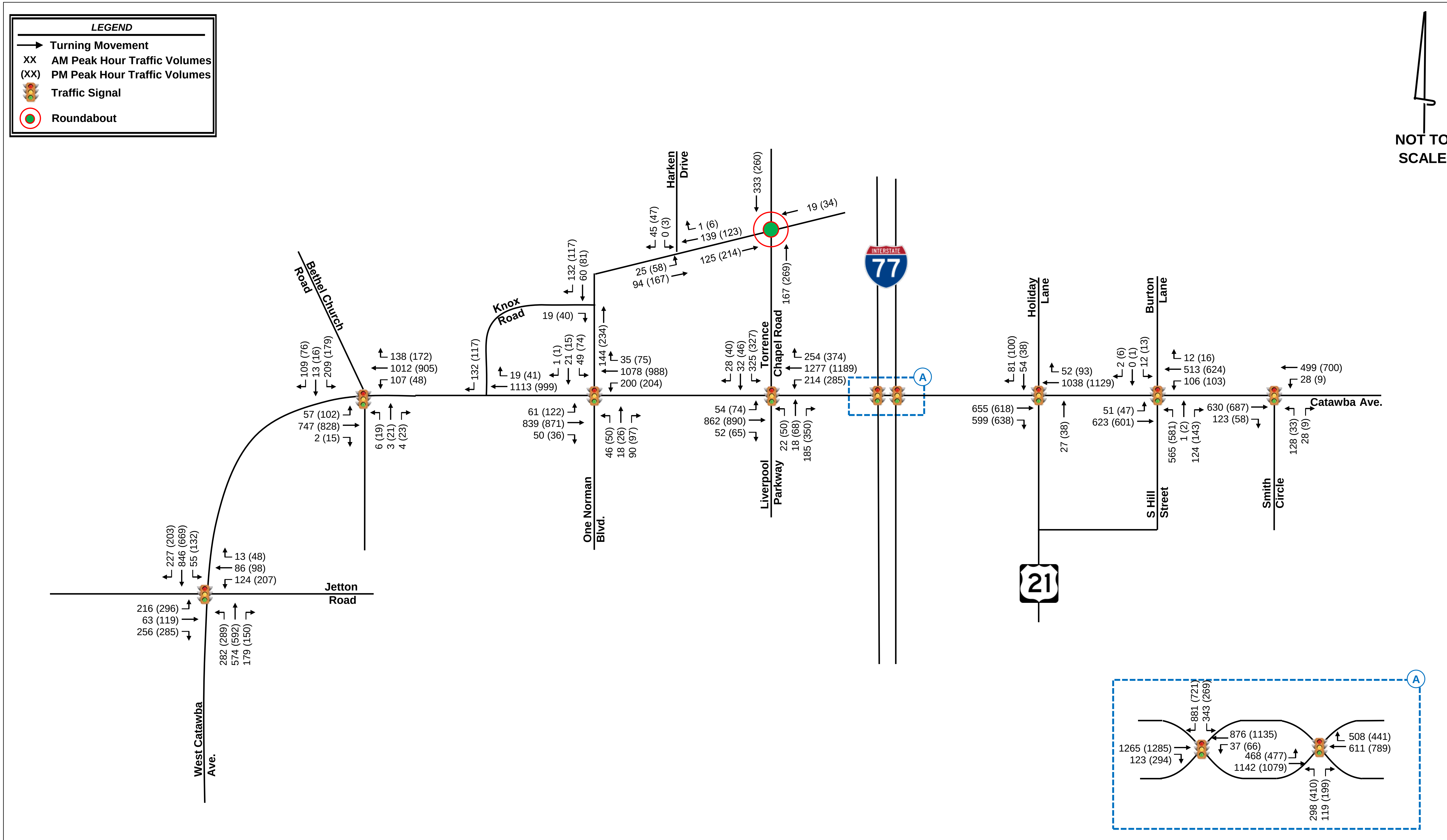
U-5906 is currently being designed to improve the W Catawba Avenue at Torrence Chapel Road/Liverpool Parkway intersection and is currently approved for funding through a combination of Bonus Allocation and STBG-DA funds. Based on coordination with NCDOT, this project will realign Knox Road, construct a roundabout at the intersection of Knox Road at Torrence Chapel Road, and construct an additional northbound right-turn lane on Liverpool Parkway with an additional receiving lane on Catawba Avenue that will extend to the I-77 Southbound Ramp. Based on the current NCDOT STIP as of June 2018, this project is planned for construction in FY 2019 (the construction date has been modified since the MOU was approved); therefore, U-5906 was included in all future year analyses *(Note that based on coordination with NCDOT since the July 2018 TIA submittal, construction is now planned for FY 2020. A Technical Memorandum is being submitted along with this updated TIA that addresses the timing between the required mitigation improvements and the U-5906 improvements at Knox Road/ One Norman Boulevard)*. Note that there is an additional phased improvement that is planned to remove the side-street lefts at this intersection. However, based on discussions with NCDOT, removal of the lefts is not part of the current project; therefore, was not included in this analysis. The concept for U-5906 current at the time of this analysis is shown to the right and also included in the **Appendix**. Final intersection configurations under TIP Project U-5906 may differ from the improvements outlined in this TIA.

C-5621 is currently being designed to improve the Catawba Avenue at US 21 (Statesville Road)/Holiday Lane intersection and is approved for funding through a combination of Bonus Allocation, CMAQ and local funds. At the time of the TIA scoping meeting, this intersection was planned to be improved via the construction of a roundabout. However, since then, the preferred alternative to improve this intersection has been modified from a roundabout to a quadrant left configuration, which includes a new connection in the southeast quadrant of this intersection with new traffic signals at both ends of the connection at Catawba Avenue/Burton Lane and US 21 (Statesville Road). The benefit of this configuration is the removal of left-turn movements from the current intersection of Catawba Avenue at US 21 (Statesville Road)/Holiday Lane, which is expected to reduce queueing into the closely-spaced DDI west of this intersection. An approved analysis model depicting the planned improvements was developed by WSP and provided by NCDOT. Based on the current NCDOT STIP as of June 2018, this project is planned for construction in FY 2019; therefore, it was included in all future year analyses *(Note that based on coordination with NCDOT since the July 2018 TIA submittal, construction is now planned for FY 2020.)* The concept for C-5621 current at the time of this analysis is shown to the right and also included in the **Appendix**. Final intersection configurations under TIP Project C-5621 may differ from the improvements outlined in this TIA.



R-2555B is currently being designed to convert W Catawba Avenue to a four-lane divided roadway between Sam Furr Road (NC 73) and Jetton Road and is currently approved for funding through a combination of state highway trust funds and local funds. With the northern terminus of this STIP project located at Jetton Road, which is the western-most intersection within this TIA's study area, this project is planned to only impact the intersection of W Catawba Avenue at Jetton Road. Based on coordination with NCDOT, this project is currently planned to add a second northbound left-turn lane along W Catawba Avenue at Jetton Road. Based on the current NCDOT STIP as of June 2018, this project is planned for construction in FY 2020; therefore, as requested by NCDOT and Town staff, this project was only included in the 2024 analyses (and was not included in the 2019 analyses) for the purposes of this TIA. The concept for R-2555B current at the time of this analysis is shown to the right (north is to the right) and is also included in the **Appendix**. Final intersection configurations under TIP Project R-2555B may differ from the improvements outlined in this TIA.

Future planned roadway laneage without the site is shown in **Figure 4.2**.

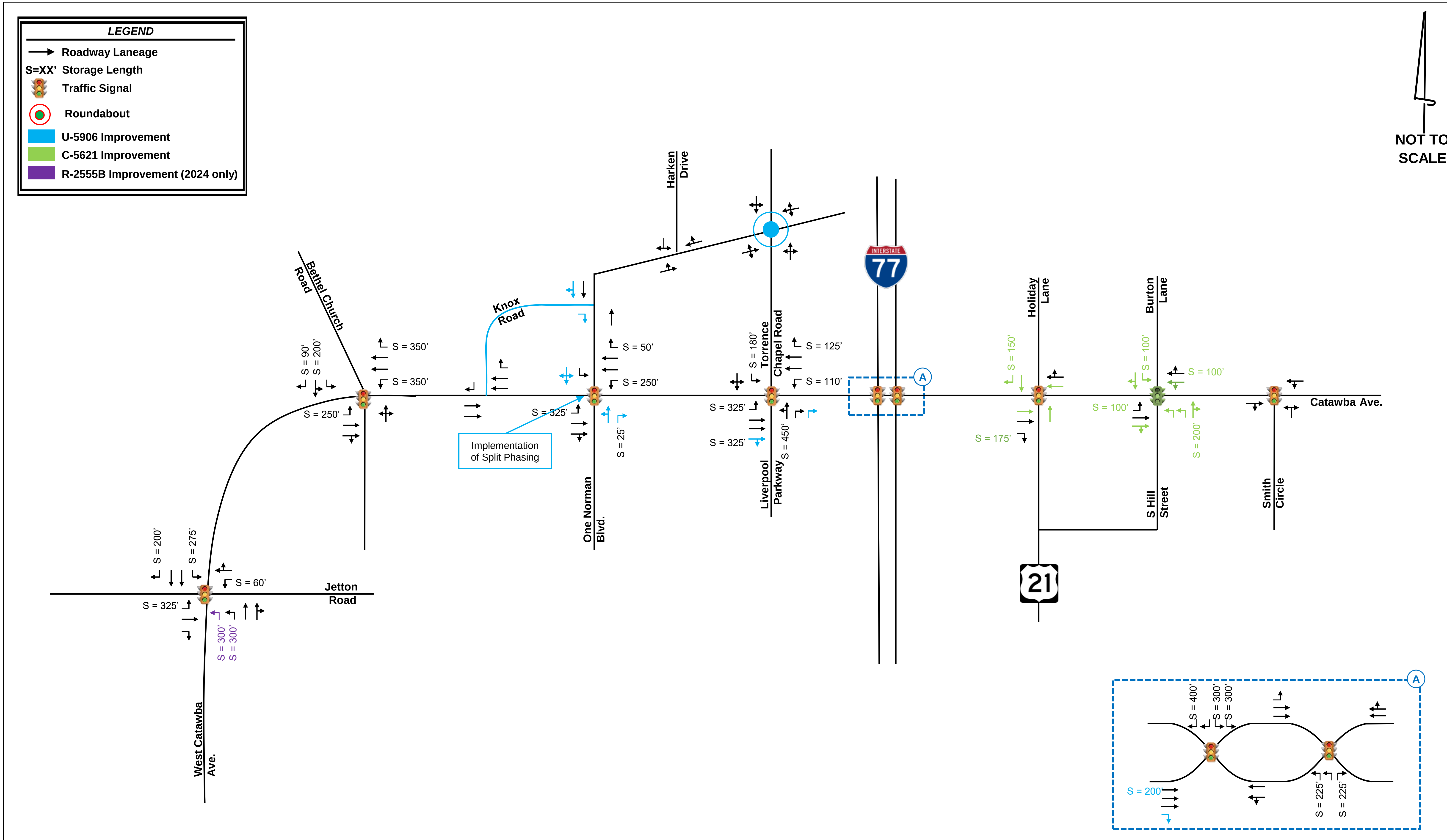


Kimley»Horn

Catawba at Knox Retail
Traffic Impact Analysis

2019 Background AM & PM Peak Hour Traffic Volumes

Figure 4.1



Catawba at Knox Retail
Traffic Impact Analysis

Future Roadway Laneage
Planned Laneage Without Site
2019 and 2024

Figure 4.2

5.0 Site Traffic Volume Development

Site traffic developed for this TIA is defined as vehicle trips expected to be generated and added to the study area by the construction of the proposed development, and the distribution and assignment of that traffic throughout the surrounding network.

5.1 SITE ACCESS

Based on the site plan provided by the applicant for the purposes of this TIA, the proposed development is assumed to be accessed via the following access points:

1. West Catawba Avenue at Private Street A (unsignalized left-over)
2. Knox Road at Private Street A (unsignalized full-movement)
3. Knox Road at Harkin Drive/Private Street C (unsignalized full-movement)
    - Note that the median from the signal at W Catawba Avenue for the future Knox Road realignment may extend beyond this driveway, restricting this access to a right-in/right-out. For the purposes of this study, this driveway was analyzed as full-movement.
4. One Norman Boulevard at Private Street B (unsignalized right-in/right-out)*

**Note that since the July 2018 TIA submittal, the site plan has been modified to remove the Private Street B access to One Norman Boulevard (unsignalized right-in/right-out). The analysis in this TIA is based on the initial site plan that included this driveway. However, the final recommendations reflect consideration for this driveway being removed, and is based on the modified site plan that includes only three proposed driveways (all three at the same locations proposed in the initial site plan). This approach has been coordinated with both Town of Cornelius and NCDOT staff.*

5.2 TRAFFIC GENERATION

The traffic generation potential of the proposed development was determined using the TransModeler TIA Toolbox based on trip generation rates published in *Trip Generation* (Institute of Transportation Engineers, Ninth Edition, 2012) for all land uses.

Based on the site plan provided by the applicant, the proposed development is currently envisioned to consist of the following land uses and intensities:

- Fast Food Restaurant with Drive-Through Window – 4,995 SF
- Coffee/Donut Shop with Drive-Through Window – 2,200 SF
- Shopping Center – 18,630 SF
- Supermarket – 22,400 SF

Table 5.1 summarizes the projected trip generation for the proposed development. During a typical weekday, the proposed development has the potential to generate 450 and 333 net new external trips during the AM and PM peak hours, respectively.

Table 5.1 - Trip Generation									
Land Use	Intensity		Daily	AM Peak Hour			PM Peak Hour		
				Total	In	Out	Total	In	Out
Fast Food Restaurant with Drive-Through Window	4,995	SF	2,478	227	116	111	163	85	78
Coffe/Donut Shop with Drive Through Window	2,200	SF	1,801	221	113	108	94	47	47
Shopping Center	18,630	SF	2,278	56	35	21	194	93	101
Supermarket	22,400	SF	2,290	76	47	29	212	108	104
Subtotal			**8,847**	**580**	**311**	**269**	**663**	**333**	**330**
Internal Capture			**2,136**	**24**	**12**	**12**	**180**	**90**	**90**
ITE 934 Pass-By - 49% AM / 50% PM			*152*	*106*	*53*	*53*	*46*	*23*	*23*
ITE 820 Pass-By - 0% AM / 34% PM			*46*	*0*	*0*	*0*	*46*	*23*	*23*
ITE 850 Pass-By - 0% AM / 36% PM			*58*	*0*	*0*	*0*	*58*	*29*	*29*
Pass-By			**256**	**106**	**53**	**53**	**150**	**75**	**75**
Net New External Trips			**6,455**	**450**	**246**	**204**	**333**	**168**	**165**

5.3 SITE TRAFFIC DISTRIBUTION AND ASSIGNMENT

The proposed development's trips were distributed to the surrounding network based on surrounding land uses, locations of similar land uses, and population densities in the area and evaluation of the future TIP projects as discussed in Section 4.3. The following site traffic distribution was developed and approved as part of the MOU by Town of Cornelius, NCDOT and the applicant:

- 10% to/from the south along W Catawba Avenue
- 10% to/from the west along Jetton Avenue
- 10% to/from the north along Bethel Church Road
- 5% to/from the south along One Norman Boulevard
- 5% to/from the north along Harken Drive
- 10% to/from the north along Torrence Chapel Road
- 2% to/from the south along Liverpool Parkway
- 15% to/from the north along I-77
- 10% to/from the south along I-77
- 10% to/from the south along US 21 (Statesville Road)
- 3% to/from the south along Smith Circle
- 10% to/from the east along Catawba Avenue

The overall site traffic distribution is shown in **Figure 5.1**.

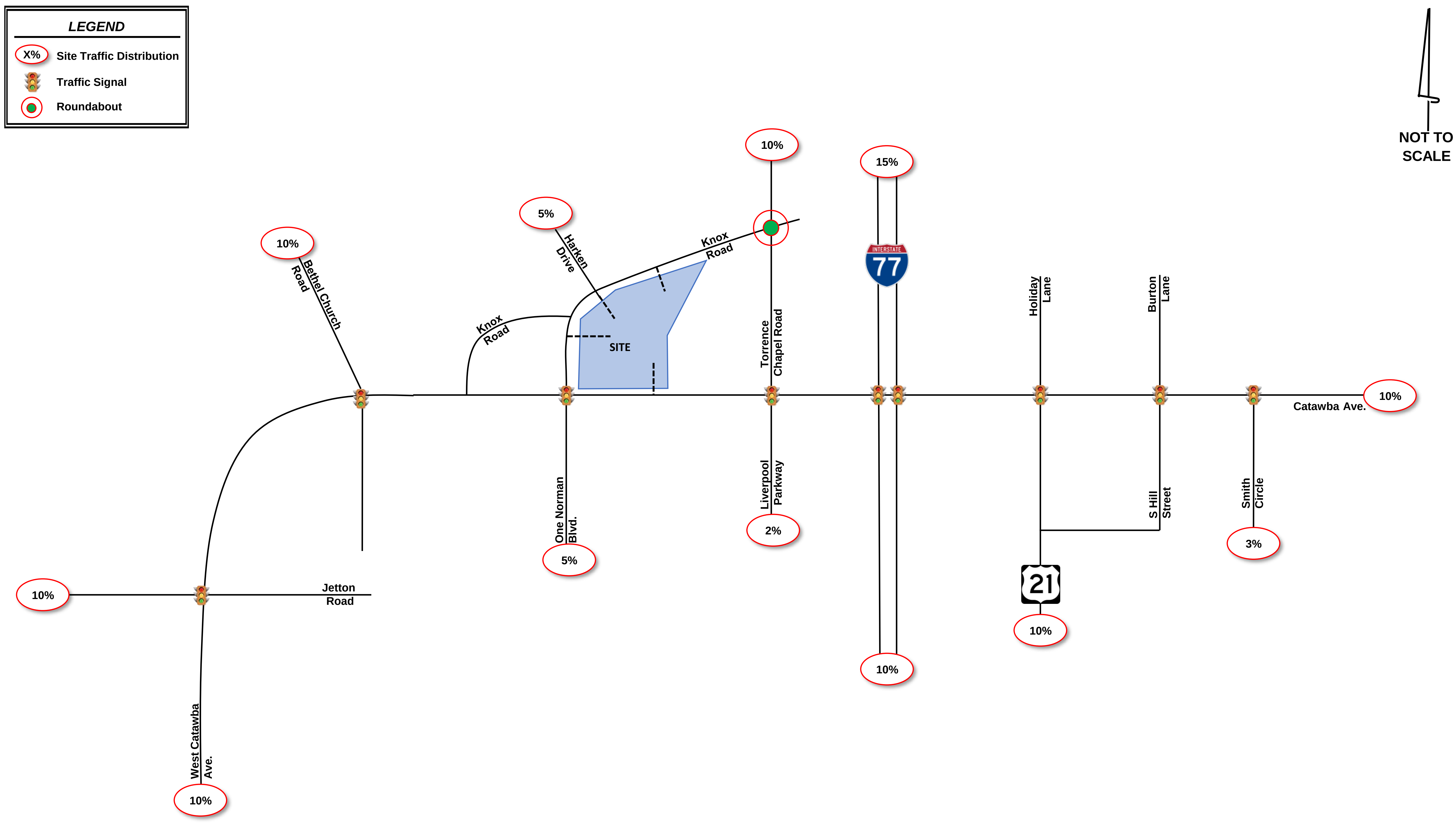
5.4 2019 BUILD-OUT TRAFFIC VOLUMES

The 2019 build-out traffic volumes include the assignment of the projected site traffic generation added to the 2019 background traffic volumes. Build-out traffic volumes were assigned to the network based on the external distribution described above using the TransModeler TIA Toolbox. **Figure 5.2** shows the projected 2019 build-out traffic volumes for the AM and PM peak hours.

5.5 2024 BUILD-OUT TRAFFIC VOLUMES

As required by the *Town of Cornelius Land Development Code – Section 13.1.M Procedures for Traffic Impact Analysis (TIA),* an analysis scenario of five years after the build-out year was performed. The 2024 build-out traffic volumes include approved development traffic and the assignment of the proposed site traffic generation added to the 2024 base background traffic volumes. **Figure 5.3** shows the projected 2024 AM and PM peak-hour build-out traffic volumes.

O-D matrices and volume development for all analysis scenarios are provided in the **Appendix**.

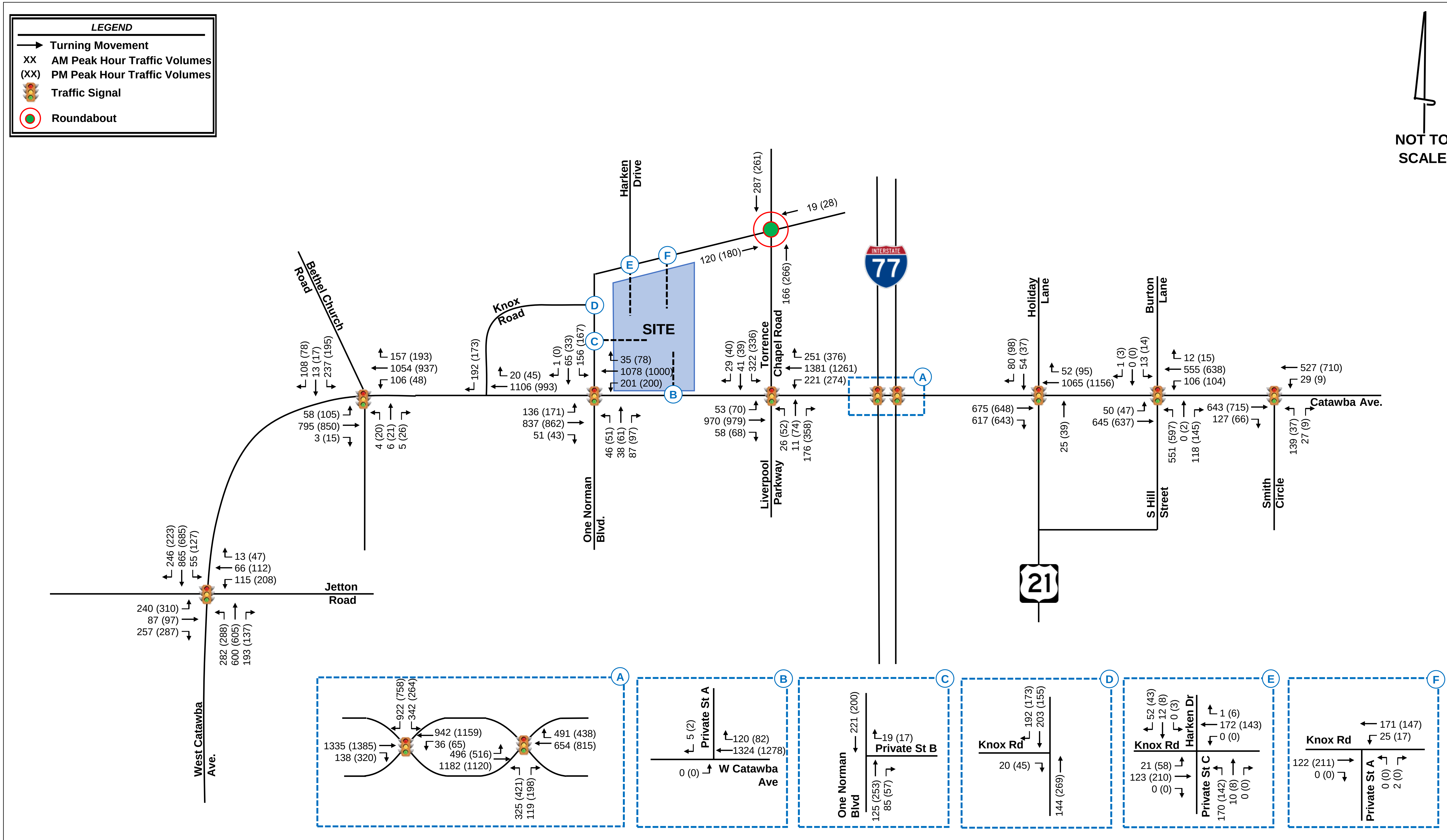


Kimley»Horn

Catawba at Knox Retail
Traffic Impact Analysis

Site Trip Distribution

Figure 5.1

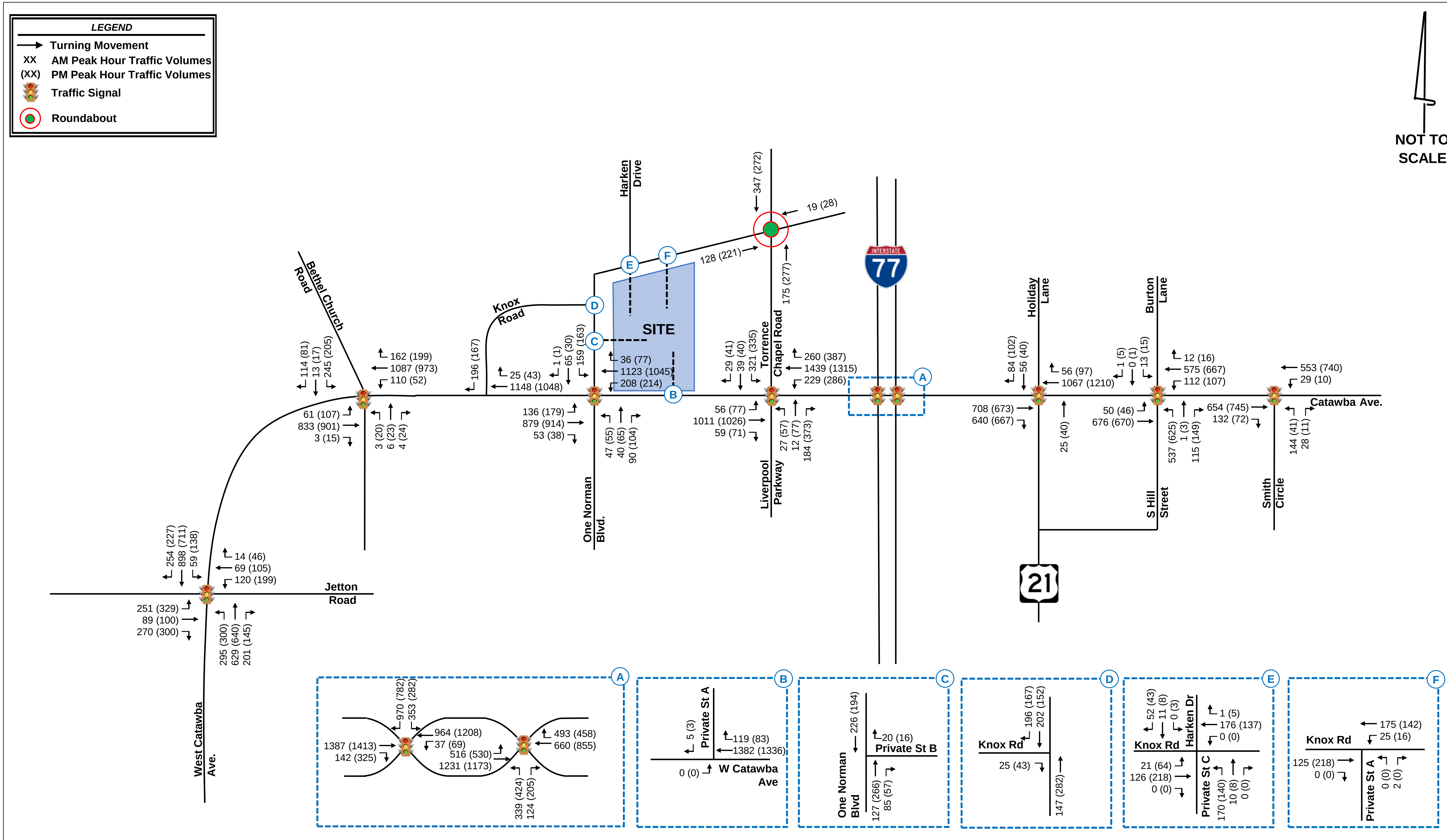


Kimley»Horn

Catawba at Knox Retail
Traffic Impact Analysis

2019 Build-out AM & PM Peak Hour Traffic Volumes

Figure 5.2



Kimley»Horn	Catawba at Knox Retail Traffic Impact Analysis	2024 Build-out AM & PM Peak Hour Traffic Volumes	Figure 5.3

6.0 Capacity Analysis

Based on the requirements set forth by the *Town of Cornelius Land Development Code - Section 13.1.M Procedures for Traffic Impact Analysis (TIA)* and in accordance with the traffic study guidelines in the *NCDOT Policy on Street and Driveway Access to North Carolina Highways*, capacity analyses were performed at the study area intersections for each of the following AM and PM peak-hour scenarios:

- 2017 Existing Conditions
- 2019 Background Conditions (with U-5906 and C-5621)
- 2019 Build-out Conditions (with U-5906 and C-5621)
- 2024 Build-out Conditions + 5 years (with U-5906, C-5621, and R-2555B)

As required by NCDOT given the complexity of the corridor that includes an unconventional interchange with closely spaced signalized intersections, TransModeler 4.0 microscopic simulation modeling software was used in the capacity analyses to analyze the AM and PM peak hours at the study area intersections to determine the operating characteristics of the adjacent street network and to evaluate the impacts of the proposed development. Capacity is defined as the maximum number of vehicles that can pass over a particular road segment, or through a particular intersection, within a specified period of time under prevailing operational, geometric and controlling conditions within a set time duration. This software program uses methodologies contained in the *2010 Highway Capacity Manual* (HCM) to determine the operating characteristics of an intersection.

The *Highway Capacity Manual* (HCM) defines level-of-service (LOS) as a "quantitative stratification of a performance measure or measures representing quality of service", and is used to "translate complex numerical performance results into a simple A-F system representative of travelers' perceptions of the quality of service provided by a facility or service". The HCM defines six levels of service, LOS A through LOS F, with A having the best operating conditions from the traveler's perspective and F having the worst. However, it must be understood that "the LOS letter result hides much of the complexity of facility performance", and that "the appropriate LOS for a given system element in the community is a decision for local policy makers". According to the HCM, "for cost, environmental impact, and other reasons, roadways are typically designed not to provide LOS A conditions during peak periods but instead to provide some lower LOS that balances individual travers' desires against society's desires and financial resources. Nevertheless, during low-volume periods of the day, a system element may operate at LOS A."

LOS for a two-way stop-controlled (TWSC) intersection is determined by the control delay at the side-street approaches, typically during the highest volume periods of the day, the AM and PM peak periods. Control delay includes initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. With respect to field measurements, control delay is defined as the total elapsed time from the time a vehicle stops at the end of the queue to the time the vehicle departs from the stop line. It is typical for stop sign-controlled side streets and driveways intersecting major streets to experience long delays during peak hours, particularly for left-turn movements. The majority of the traffic moving through the intersection on the major street experiences little or no delay.

LOS for signalized intersections is reported for the intersection as a whole, and typically during the highest volume periods of the day, the AM and PM peak periods. One or more movements at an intersection may experience a low level-of-service, while the intersection as a whole may operate acceptably.

LOS for roundabout intersections is also reported for the intersection as a whole, but uses the same control delay thresholds as the stop-controlled intersections. However, if the volume-to-capacity ratio on an approach of the intersection is greater than 1.0, that approach or intersection is reported as LOS F regardless of the reported control delay.

Based on *NCDOT Congestion Management Simulation Guidelines for TransModeler*, NCDOT has determined that the most appropriate application to report the traffic performance Measures of Effectiveness (MOE) is to report the worst-case predicted performance. Therefore, the 95th percentile average delay and max queue results provided in this section were calculated based on the mean (*m*) and standard deviation (*s*) from an average of 10 model runs based on the following equation:

$$95th\ Percentile\ Worst\ Result = m + 1.64s$$

Tables 6.0-A and **6.0-B** list the LOS control delay thresholds published in the HCM for unsignalized (TWSC and roundabout) and signalized intersections, respectively, as well as the unsignalized operational descriptions assumed herein.

Table 6.0-A
Vehicular LOS Control Delay Thresholds for <u>Unsignalized</u> Intersections

Level-of-Service	Average Control Delay per Vehicle [sec/veh]	
A	≤ 10	Short Delays
B	> 10 – 15	
C	> 15 – 25	
D	> 25 – 35	Moderate Delays
E	> 35 – 50	
F	> 50	Long Delays

Table 6.0-B
Vehicular LOS Control Delay Thresholds for <u>Signalized</u> Intersections

Level-of-Service	Average Control Delay per Vehicle [sec/veh]
A	≤ 10
B	> 10 – 20
C	> 20 – 35
D	> 35 – 55
E	> 55 – 80
F	> 80

NCDOT staff provided the signal geometric plans and time of day plans for the currently signalized study area intersections, which were used in the development of the existing conditions TransModeler network. With the addition of U-5906 and C-5621 improvements, the cycle lengths and splits along the W Catawba Avenue corridor were optimized in the background conditions network and in accordance with NCDOT Congestion Management guidelines. The cycle lengths, splits, and offsets were maintained between the 2019 background and build-out scenarios. In the build improved scenarios, the cycle lengths and offsets were maintained, and only the splits were optimized at intersections with improvements since they were considered relatively minor modifications to the overall corridor. Note that both permitted-protected left-turn phasing and right-turn-on-red (RTOR) operations were not allowed in the model based on Congestion Management guidelines. Signal geometric plans and time of day plans are included in the **Appendix**.

Global model and driver behavior parameters were defined based on the NCDOT level terrain default parameters. Vehicle and roadway classification data was also based on NCDOT default values. Dynamic Traffic Assignment (DTA) was performed for the 2019 background, 2019 build-out, and 2024 build-out conditions due to the modifications to the roadway network and traffic assignments. DTA was not performed for the build-improved scenarios.

It should be noted that due to the nature of the model and the use of DTA, some variation of traffic volumes between scenarios was observed. Similarly, due to delay and queueing results being calculated based on an average of 10 model simulations, some variability was expected and observed between scenarios.

Mitigation for traffic impacts caused by the proposed development were noted and identified based on Town of Cornelius and NCDOT mitigation requirements. When determining the proposed development's traffic impact to the study area intersections, the 2019 build-out conditions were compared to 2019 background conditions. Based on the *Town of Cornelius Land Development Code*, mitigation shall be recommended "to improve and/or maintain the future background year no-build LOS conditions through phasing and build-out of the project." The LOS threshold used for mitigation is based on the adjacent zoning district, as shown in Table 6.0-C. Where an intersection or approach is located within more than one zoning district, the less restrictive LOS shall apply to the entire intersection or approach. For zoning districts not included in the table, LOS D will be the LOS designation requiring mitigation.

Table 6.0-C
Town of Cornelius LOS Thresholds

Zoning District	LOS Threshold
RP, GR, NR	C
NMX, VC, HC, WMX	D
BC, IC, CO	D
TC, TRD-O, TND	E

Based on the *NCDOT Policy on Street and Driveway Access to North Carolina Highways*, "the applicant shall be required to identify mitigation improvements to the roadway network if at least one of the following conditions exists when comparing base network conditions to project conditions:

- the total average delay at an intersection or individual approach increases by 25% or greater, while maintaining the same LOS,
- the LOS degrades by at least one level,
- or LOS is 'F'"

NCDOT Congestion Management Simulation Guidelines for TransModeler state that lane queues should be reported by each lane group, spill back queues should be reported by each approach, and control delay should be reported for the overall intersection and by lane group. However, at the time of this TIA, NCDOT has not yet developed TransModeler guidelines specific for TIA analyses, as shown in the current *NCDOT Congestion Management Simulation Guidelines for TransModeler*. The current document states “This section will be developed in a future version of these Guidelines” under the Traffic Impact Analysis section. Therefore, it is assumed that some of the current TransModeler guidelines were developed to provide guidance specifically for traffic analyses performed for TIP and other capital projects and reports.

Given that, the most appropriate governing documents for this TIA would be the *NCDOT Policy on Street and Driveway Access to North Carolina Highways* along with the *NCDOT Congestion Management Capacity Analysis Guidelines*. As discussed above, this policy requires mitigation to be identified based on overall intersection and approach delays. Additionally, the *Town of Cornelius Land Development Code* states that the TIA shall summarize “the methodology and measured conditions at the intersections reported in level of service (LOS A-F), intersection and approach signal delay for signalized intersections, approach delay for unsignalized intersections, and 95th percentile queue lengths for all movements.” Therefore, for the purposes of this analysis to identify site traffic mitigation, the delay and LOS is summarized and reported by overall intersection and approach in the following sections.

Capacity analysis reports generated by TransModeler 4.0 software are included in the **Appendix**.

Existing Conditions Model Validation

As requested by NCDOT, the existing conditions TransModeler simulation model was validated by comparing the key measures of effectiveness at the following signalized intersections to a deterministic analysis using Synchro Version 9 traffic analysis software.

- W Catawba Avenue at One Norman Boulevard
- W Catawba Avenue at Torrence Chapel Road/Liverpool Parkway

Results were used to validate TransModeler results by comparing deterministic measures of effectiveness (LOS and delay for the overall intersection and intersection approaches) calculated by each software package. The comparative results for this validation are shown for each intersection in **Table 6.0-D** and **6.0-E**.

These tables were shared with NCDOT Division 10, NCDOT Congestion Management Unit and Town of Cornelius staff in a conference call held on January 3, 2018, that indicated that similar average delays and LOS were seen between both software programs for the overall intersection, and were also generally similar for the approaches. As a follow-up to this conference call, NCDOT performed a peer review of the existing conditions analyses of both the TransModeler and Synchro networks, and approved Kimley-Horn to continue forward with the future year analyses.

Kimley»Horn

Table 6.0-D
W Catawba Ave at One Norman
TransModeler/Synchro Comparison

		AM											
		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Synchro	Overall LOS	B											
	Overall Delay	10.8											
	Approach LOS	A			A			D			F		
	Approach Delay	9.6			3			43.7			82.2		
	Movement LOS	A	B	-	A	A	A	E	C	-	F	E	-
	Movement Delay	4.6	10.1		4.2	2.9	0.1	77.8	27.8		104.1	60.9	
	Movement Queue	23	270		m34	16	m0	90	81		87	79	
	Movement Queue	23	270		34	16	0	90	81		87	79	
TransModeler	Overall LOS	B											
	Overall Delay	12.9											
	Average Delay	11.9											
	Standard Deviation	0.6											
	Approach LOS	A			A			E			E		
	Approach Delay	8.4			8			65.1			65.4		
	Average Delay	7.7			6.9			56.1			56.1		
	Standard Deviation	0.4			0.7			5.5			5.7		
	Movement LOS	A	A	-	B	A	A	E	E	-	E	E	-
	Movement Delay	9.6	8.5	-	15.6	6.9	6.4	74.5	62.3	-	65.7	69.3	-
	Average Delay	7.8	7.8	-	12.5	5.9	5.1	61.2	53.9	-	56	56.2	-
	Standard Deviation	1.1	0.4		1.9	0.6	0.8	8.1	5.1		5.9	8	
	Movement Queue	296.3			288.9			282.6			128.3		
	Average Delay	231.8			157.2			217.5			109.8		
	Standard Deviation	39.3			80.3			39.7			11.3		
	Link #	358			136			326			335		
% Difference	Overall LOS	No Change											
	Overall Delay	19%											
	Approach	-13%			167%			49%			-20%		
	Movement Delay	109%	-16%	-	271%	138%	6300%	-4%	124%	-	-37%	14%	-
	Movement Queue	10%			750%			214%			47%		

		PM											
		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Synchro	Overall LOS	B											
	Overall Delay	18.5											
	Approach LOS	B			B			D			F		
	Approach Delay	11.4			14.4			41.8			92.8		
	Movement LOS	A	B	-	A	B	A	E	C	-	F	E	-
	Movement Delay	7.5	12.1		5.3	16.5	5.6	67.5	29		113.5	57	
	Movement Queue	56	303		m126	m574	m29	99	98		126	74	
	Movement Queue	56	303		126	574	29	99	98		126	74	
TransModeler	Overall LOS	B											
	Overall Delay	14.4											
	Average Delay	13.6											
	Standard Deviation	0.5											
	Approach LOS	B			A			E			E		
	Approach Delay	10.4			7.7			71.2			61.7		
	Average Delay	9.7			6.9			61			54.8		
	Standard Deviation	0.4			0.5			6.2			4.2		
	Movement LOS	B	B	-	B	A	A	E	E	-	E	E	-
	Movement Delay	13.6	10.3	-	13.3	6.9	8.4	75.2	70.4	-	62.3	71	-
	Average Delay	11.5	9.6		10.7	6.1	7.1	63.2	60.1		54.4	56.4	
	Standard Deviation	1.3	0.4		1.6	0.5	0.8	7.3	6.3		4.8	8.9	
	Movement Queue	389.8			242.5			381.1			136.7		
	Average Delay	278.1			180.7			265.2			120.3		
	Standard Deviation	68.1			37.7			70.7			10		
	Link #	358			136			326			335		
% Difference	Overall LOS	No Change											
	Overall Delay	-22%											
	Approach	-9%			-47%			70%			-34%		
	Movement Delay	81%	-15%	-	151%	-58%	50%	11%	143%	-	-45%	25%	-
	Movement Queue	29%			-58%			285%			8%		

Table 6.0-E
W Catawba Ave at Torrence Chapel Road/Liverpool Parkway
TransModeler/Synchro Comparison

		AM												PM											
		EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Synchro	Overall LOS	D												D											
	Overall Delay	36.2												54.5											
	Approach LOS	D			C			B			F			D			D			D			F		
	Approach Delay	50.6			20.6			18			80.2			52.6			35.4			52.7			137.9		
	Movement LOS	E	D	A	D	B	A	-	E	A	F	E	-	D	E	A	E	D	A	-	F	C	F	F	-
	Movement Delay	66.3	52.7	1.9	47.4	19.8	2		72.3	8.3	81.6	78.9		47.3	57	5.3	77.1	35.7	3.1		121.3	28.3	144.7	130.9	
	Movement Queue	96	541	19	#282	473	29		67	48	#360	#353		98	489	41	#470	516	60		#258	296	#446	#428	
	Movement Queue	96	541	19	282	473	29		67	48	360	353		98	489	41	470	516	60		258	296	446	428	
TransModeler	Overall LOS	D												D											
	Overall Delay	46.2												54.9											
	Average Delay	34.2												49.2											
	Standard Deviation	7.3												3.5											
	Approach LOS	E			B			D			F			D			B			E			F		
	Approach Delay	75.9			13.1			44.1			114.3			45.4			19.4			57.4			269.8		
	Average Delay	47.7			11.5			39			86.6			38.5			18.4			46.1			216.5		
	Standard Deviation	17.2			1			3.1			16.9			4.2			0.6			6.9			32.5		
	Movement LOS	D	F	C	C	B	A	-	E	D	F	F	-	D	D	B	D	B	A	-	F	C	F	F	-
	Movement Delay	54.9	80.1	30.1	31.1	12	6.2	-	74.8	39.3	115.3	113	-	49.3	47.3	18	42.5	17.7	9.2	-	133	34	266.8	272.8	-
	Average Delay	38	50.1	18.5	25	10.4	5.5		65.6	34.4	86.8	86.3		45.9	39.6	13.7	39.2	16.7	8.4		88.7	32	215.6	217.2	
	Standard Deviation	10.3	18.3	7.1	3.7	1	0.4		5.6	3	17.4	16.3		2.1	4.7	2.6	2	0.6	0.5		27	1.2	31.2	33.9	
	Movement Queue	956.5			535.5			230.8			582.7			702.9			650.5			375.3			1315.9		
	Average Delay	642.6			366.1			184.1			425.9			562.5			471.2			286.6			1043.7		
	Standard Deviation	191.4			103.3			28.5			95.6			85.6			109.3			54.1			166		
	Link #	327			162			173			176			327			162			173			176		
% Difference	Overall LOS	No Change												No Change											
	Overall Delay	28%												1%											
	Approach	50%			-36%			145%			43%			-14%			-45%			9%			96%		
	Movement Delay	-17%	52%	1484%	-34%	-39%	210%	-	3%	373%	41%	43%	-	4%	-17%	240%	-45%	-50%	197%	-	10%	20%	84%	108%	-
	Movement Queue	77%			13%			244%			62%			44%			26%			27%			195%		

6.1 W CATAWBA AVENUE AT JETTON ROAD

Table 6.1 summarizes the LOS, control delay (seconds per vehicle) and 95th percentile queue lengths at the signalized intersection of W Catawba Avenue at Jetton Road.

Table 6.1 - W Catawba Avenue at Jetton Road						
Condition	Measure	EB	WB	NB	SB	Intersection
AM Peak Hour						
2017 Existing	LOS (Delay)	D (43.1)	D (54.9)	C (28.3)	B (13.2)	C (26.1)
	95th Max Q	260'	153'	534'	284'	
2019 Background	LOS (Delay)	D (42.9)	E (59.2)	C (32.1)	A (9.5)	C (26.5)
	95th Max Q	276'	241'	431'	324'	
2019 Build-out	LOS (Delay)	D (42.3)	E (55.2)	C (32.8)	B (10.2)	C (26.2)
	95th Max Q	296'	182'	671'	357'	
2024 Build-out	LOS (Delay)	D (43.7)	E (57.3)	D (37.6)	A (9.4)	C (28.5)
	95th Max Q	321'	219'	675'	350'	
PM Peak Hour						
2017 Existing	LOS (Delay)	D (46)	F (313.2)	D (43.8)	B (16.1)	E (61.6)
	95th Max Q	333'	1144'	801'	297'	
2019 Background	LOS (Delay)	D (40.6)	F (330.1)	C (32.8)	B (11.5)	E (58.8)
	95th Max Q	361'	1229'	456'	332'	
2019 Build-out	LOS (Delay)	D (48.4)	F (333)	D (39)	B (12.8)	E (62.5)
	95th Max Q	471'	1123'	706'	333'	
2024 Build-out	LOS (Delay)	D (41.2)	F (365.7)	D (42.1)	B (11.8)	E (64.7)
	95th Max Q	315'	1131'	523'	168'	

The Town of Cornelius mitigation threshold at this intersection is LOS D based on the Village Center zoning district. With the addition of site traffic, the overall intersection is expected to continue to operate at LOS C and LOS E during the AM and PM peak hours, respectively. Note that the decrease in delay shown between 2017 existing and 2019 background conditions is due to the planned improvements along the corridor discussed in **Section 4.3**, in which the corridor timings were assumed to be optimized to accommodate the improvements.

Table 6.1 shows that NCDOT's mitigation threshold is met with the addition of site traffic on the southbound approach where the LOS is expected to drop from LOS A to LOS B during the AM peak hour, and on the northbound approach where the LOS is expected to drop from LOS C to LOS D during the PM peak hour.

As discussed in **Section 4.3**, future improvements are planned at this intersection as part of TIP project R-2555B. This TIP project is currently planned to add a second northbound left-turn lane along W Catawba Avenue at Jetton Road. Based on the current NCDOT STIP as of June 2018 (and September 2018), this construction is currently scheduled for FY 2020. Given the planned improvement shortly after the assumed build-out of the proposed site along with the relatively minor operational impacts from the proposed site, no additional improvements are recommended at this intersection.

Note that final intersection configurations under TIP Project R-2555B may differ from the improvements outlined in this TIA.

6.2 W CATAWBA AVENUE AT BETHEL CHURCH ROAD

Table 6.2 summarizes the LOS, control delay (seconds per vehicle) and 95th percentile queue lengths at the signalized intersection of W Catawba Avenue at Bethel Church Road.

Table 6.2 - W Catawba Avenue at Bethel Church Road						
Condition	Measure	EB	WB	NB	SB	Intersection
AM Peak Hour						
2017 Existing	LOS (Delay)	A (2.9)	A (8.8)	F (93.3)	E (59.7)	B (13.8)
	95th Max Q	141'	465'	73'	243'	
2019 Background	LOS (Delay)	A (3.2)	B (15.5)	F (83.6)	E (59.5)	B (16.9)
	95th Max Q	210'	525'	76'	261'	
2019 Build-out	LOS (Delay)	A (4)	B (14.1)	F (83.3)	E (61.6)	B (17)
	95th Max Q	169'	621'	56'	300'	
2024 Build-out	LOS (Delay)	A (3.6)	C (20.4)	F (89.3)	E (64)	C (20.5)
	95th Max Q	193'	614'	71'	372'	
PM Peak Hour						
2017 Existing	LOS (Delay)	A (4.7)	A (6.7)	E (69.5)	E (58.3)	B (13.1)
	95th Max Q	138'	254'	150'	222'	
2019 Background	LOS (Delay)	A (3.7)	B (11.5)	E (61.8)	D (48.6)	B (13.6)
	95th Max Q	170'	462'	128'	203'	
2019 Build-out	LOS (Delay)	A (4.2)	B (11.8)	E (63.5)	D (49.2)	B (13.7)
	95th Max Q	157'	398'	127'	200'	
2024 Build-out	LOS (Delay)	A (4.8)	B (11.3)	E (68.1)	D (48.9)	B (14.1)
	95th Max Q	125'	308'	104'	180'	

The Town of Cornelius mitigation threshold at this intersection is LOS D based on the Village Center zoning district. Note that this intersection is also within the Neighborhood Residential zoning district, which has a LOS threshold of LOS C. Based on the *Town of Cornelius Land Development Code*, the less restrictive LOS shall apply, which is LOS D in this case. With the addition of site traffic, the overall intersection is expected to continue to operate at LOS B during both the AM and PM peak hours under 2019 conditions. Note that the decrease in delay shown at some of the approaches between 2017 existing and 2019 background conditions is due to the planned improvements along the corridor discussed in **Section 4.3**, in which the corridor timings were assumed to be optimized to accommodate the improvements.

Table 6.2 shows that the Town of Cornelius mitigation threshold is met with the addition of site traffic on the southbound approach during the AM peak hour and the northbound approach during the PM peak hour where the approach is expected to be impacted while remaining at LOS E. However, given that the increase in delay is approximately 2 seconds of average delay per vehicle on these approaches, and less than one second of delay to the overall intersection, the operational impacts caused by the proposed site is considered relatively minor. Since the proposed development is not expected to have a significant adverse impact on operations at this intersection, no improvements are recommended.

6.3 W CATAWBA AVENUE AT KNOX ROAD

Table 6.3 summarizes the LOS, control delay (seconds per vehicle) and 95th percentile queue lengths at the unsignalized intersection of W Catawba Avenue at Knox Road. The overall intersection is not reported for unsignalized intersections.

Table 6.3 - W Catawba Avenue at Knox Road				
Condition	Measure	EB	WB	SB
AM Peak Hour				
2017 Existing	LOS (Delay)	A (0)	A (0.1)	C (18.5)
	95th Max Q	0'	0'	133'
2019 Background	LOS (Delay)	A (0)	A (0.1)	C (18.4)
	95th Max Q	0'	0'	113'
2019 Build-out	LOS (Delay)	A (0)	A (0.1)	C (21)
	95th Max Q	0'	0'	196'
2024 Build-out	LOS (Delay)	A (0)	A (0.1)	C (22.1)
	95th Max Q	0'	101'	205'
PM Peak Hour				
2017 Existing	LOS (Delay)	A (0)	A (0.1)	C (15.8)
	95th Max Q	0'	0'	103'
2019 Background	LOS (Delay)	A (0)	A (0.1)	C (16.3)
	95th Max Q	0'	0'	121'
2019 Build-out	LOS (Delay)	A (0)	A (0.1)	C (17.2)
	95th Max Q	0'	0'	161'
2024 Build-out	LOS (Delay)	A (0)	A (0.1)	C (18.7)
	95th Max Q	0'	0'	124'

The Town of Cornelius mitigation threshold at this intersection is LOS D based on the Village Center zoning district. Since access to Knox Road is restricted to right-in/right-out access only by a monolithic island, there was no delay nor queuing reported for the eastbound approach of W Catawba Avenue. With the addition of site traffic, the southbound stop-controlled approach is expected to continue to operate at LOS C with short delays. Since the proposed development is not expected to have a significant adverse impact on operations at this intersection, no improvements are recommended for capacity purposes.

6.4 W CATAWBA AVENUE AT ONE NORMAN BOULEVARD

Table 6.4 summarizes the LOS, control delay (seconds per vehicle) and 95th percentile queue lengths at the signalized intersection of W Catawba Avenue at One Norman Boulevard.

Table 6.4 - W Catawba Avenue at One Norman Boulevard						
Condition	Measure	EB	WB	NB	SB	Intersection
AM Peak Hour						
2017 Existing	LOS (Delay)	A (9.5)	A (5.7)	E (59.9)	E (67.6)	B (11.8)
	95th Max Q	289'	250'	237'	105'	
2019 Background	LOS (Delay)	B (13.5)	C (25.4)	E (56)	E (66)	C (23.4)
	95th Max Q	415'	480'	220'	115'	
2019 Build-out	LOS (Delay)	B (15)	C (26.2)	E (68.8)	E (77.5)	C (30.6)
	95th Max Q	421'	595'	294'	271'	
2019 Build-out Improved	LOS (Delay)	B (16.6)	C (23.6)	E (64.5)	E (55.7)	C (27.6)
	95th Max Q	353'	542'	252'	173'	
2024 Build-out	LOS (Delay)	B (16.3)	C (24.9)	E (63.3)	E (58.1)	C (27.5)
	95th Max Q	398'	485'	280'	177'	
PM Peak Hour						
2017 Existing	LOS (Delay)	B (11.1)	A (7.1)	E (59.3)	E (70.7)	B (14)
	95th Max Q	307'	226'	240'	123'	
2019 Background	LOS (Delay)	B (12.8)	B (10.4)	D (52.3)	D (48)	B (14.7)
	95th Max Q	334'	322'	214'	124'	
2019 Build-out	LOS (Delay)	B (13.3)	B (12.3)	F (91.3)	E (58.6)	C (29.5)
	95th Max Q	360'	324'	347'	166'	
2019 Build-out Improved	LOS (Delay)	B (15.8)	B (13.6)	D (54.3)	D (47.6)	C (24.8)
	95th Max Q	362'	394'	261'	173'	
2024 Build-out	LOS (Delay)	B (16)	B (15.1)	D (53.2)	D (48.7)	C (25)
	95th Max Q	34'	311'	211'	133'	

The Town of Cornelius mitigation threshold at this intersection is LOS D based on both the Village Center and Highway Commercial zoning districts. As discussed in **Section 4.3**, future improvements are planned at this intersection as part of TIP project U-5906. The purpose of this TIP project is to reduce congestion and improve safety along W Catawba Avenue near the intersection of Torrence Chapel Road/Liverpool Parkway, particularly to reduce impacts to the closely-spaced DDI interchange. The ultimate preferred alternative includes the restriction of side-street lefts from Torrence Chapel Road and Liverpool Parkway onto W Catawba Avenue (this is a phased improvement), which would force much of this existing left-turn volume to the One Norman Boulevard intersection. Therefore, improvements are also planned at this intersection as a part of U-5906 to accommodate the future left-turn restrictions from Torrence Chapel Road and Liverpool Parkway. Based on the current NCDOT STIP as of June 2018, construction is currently scheduled for FY 2019 *(Note that based on coordination with NCDOT since the July 2018 TIA submittal, construction is now planned for FY 2020. A Technical Memorandum is being submitted along with this updated TIA that addresses the timing between the required mitigation improvements and the U-5906 improvements along Knox Road and One Norman Boulevard)*. U-5906 improvements at this intersection include:

- Realignment of Knox Road to tie directly into the southbound approach of this intersection (One Norman Blvd).
- Conversion of the existing southbound through/right lane along One Norman Blvd to a shared left/through/right lane (creating dual left-turn lanes).
- Extension of the existing storage for the southbound left-turn lane along One Norman Blvd.

- Modification of the existing side-street left-turn phasing to operate under split phasing.
- Reconfiguration of the northbound approach of One Norman Blvd to provide a shared through/left lane and an exclusive right-turn lane.

With these improvements in place, the overall intersection is expected to operate at LOS C during the AM peak hour and LOS B during the PM peak hour under 2019 background conditions. Note that the improvements to this intersection are planned to be installed to accommodate the future restriction of side-street lefts from Torrence Chapel Road and Liverpool Parkway onto W Catawba Avenue. As shown in **Table 6.4**, the installation of these improvements between the existing and background conditions is expected to improve the delay on the northbound and southbound approaches during both peak hours. However, with the addition of site traffic, the proposed laneage and phasing under U-5906 at this intersection is not expected to have the ability to acceptably process the side-street traffic. **Table 6.4** shows that NCDOT's mitigation threshold is met for the overall intersection during the AM peak hour where the delay is increased by more than 25% and during the PM peak hour where the LOS degrades from LOS B to LOS C. The Town's mitigation threshold is met for both the northbound and southbound approaches during the AM peak hour, where the approach is expected to be impacted while remaining at LOS E. Further, both the Town of Cornelius and NCDOT's mitigation thresholds are met during the PM peak hour where the northbound and southbound approach LOS degrades from LOS D to LOS F and LOS D to LOS E, respectively.

Given the impact caused by the project, identification of mitigation improvements is required. The following improvements were identified to mitigate the added delay caused by the addition of site traffic:

- Construction of an additional southbound left-turn lane along One Norman Boulevard with 175 feet of storage, creating a three-lane approach that includes dual left-turn lanes and a shared through/right lane
- Reconfiguration of the northbound approach of One Norman Boulevard to provide an exclusive left-turn lane and a shared through-right lane (same as existing)
- Removal of the split phasing planned for the side-street northbound and southbound approaches
- Extension of the westbound right-turn lane to provide 150' of storage

Although split phasing is shown to operate acceptably without the site in **Table 6.4**, the proposed site is expected to add a significant amount of volume on the southbound approach. Split phasing typically limits the amount of green time that can be allowed for the side streets, particularly with heavy mainline volumes. When the side-street demand increases upon build-out of the site, the limited green time results in poor LOS on the side streets. Removal of split phasing is expected to allow additional green time to be given to the side streets without significantly reducing green time from the mainline along W Catawba Avenue. Thus, with these improvements in place, delay is expected to be reduced, and all approaches and overall intersection are expected to operate at LOS D or better during the PM peak hour.

Additionally, there is currently a westbound right-turn lane along W Catawba Avenue with approximately 50 feet of storage. The analysis shows that during the AM peak hour, the westbound approach (through lanes) 95th percentile maximum queue is 542' and the 95th percentile average queue is 202' under the build-out improved condition. Therefore, due to its short length, the added capacity of this turn lane is not being fully utilized since right-turning vehicles cannot typically reach the turn lane until the westbound approach is green. Based on the projected queues, along with consideration that the site is not expected to directly add significant volume to this particular movement (because of the proposed access along W Catawba Ave), the westbound right-turn lane is recommended to be extended to provide the NCDOT minimum of 150' of storage.

Note that the final intersection configurations under TIP Project U-5906 may differ from the improvements outlined in this TIA.

6.5 W CATAWBA AVE AT TORRENCE CHAPEL RD/ LIVERPOOL PKWY

Table 6.5 summarizes the LOS, control delay (seconds per vehicle) and 95th percentile queue lengths at the signalized intersection of W Catawba Avenue at Torrence Chapel Road/Liverpool Parkway.

Table 6.5 - W Catawba Avenue at Torrence Chapel Road/Liverpool Parkway						
Condition	Measure	EB	WB	NB	SB	Intersection
AM Peak Hour						
2017 Existing	LOS (Delay)	C (22.8)	B (13.4)	D (37.1)	E (67.2)	C (22.8)
	95th Max Q	395'	560'	159'	409'	
2019 Background	LOS (Delay)	D (38.9)	B (18.3)	C (23.3)	F (132.3)	D (36.5)
	95th Max Q	509'	549'	116'	731'	
2019 Build-out	LOS (Delay)	D (37.7)	B (19.9)	C (26.2)	F (179)	D (41.2)
	95th Max Q	526'	782'	120'	841'	
2024 Build-out	LOS (Delay)	D (43.3)	B (20)	C (27.4)	F (253.1)	D (50.5)
	95th Max Q	565'	838'	142'	1257'	
PM Peak Hour						
2017 Existing	LOS (Delay)	D (41.8)	C (23.3)	D (38.8)	F (135.4)	D (41.5)
	95th Max Q	837'	734'	291'	731'	
2019 Background	LOS (Delay)	D (36.1)	B (16.8)	D (35.9)	F (257)	D (49)
	95th Max Q	406'	428'	268'	1223'	
2019 Build-out	LOS (Delay)	C (33)	B (18.5)	D (49.8)	F (270.3)	D (51.2)
	95th Max Q	382'	453'	336'	1203'	
2024 Build-out	LOS (Delay)	D (42.8)	B (19.6)	F (122.4)	F (272.7)	E (61)
	95th Max Q	445'	405'	637'	1215'	

The Town of Cornelius mitigation threshold at this intersection is LOS D based on the Highway Commercial zoning district. As discussed in **Section 4.3**, future improvements are planned at this intersection as part of TIP project U-5906. The purpose of this TIP project is to reduce congestion and improve safety along W Catawba Avenue near the intersection of Torrence Chapel Road/Liverpool Parkway, particularly to reduce impacts to the closely-spaced DDI interchange. The ultimate preferred alternative includes the restriction of side-street lefts from Torrence Chapel Road and Liverpool Parkway onto W Catawba Avenue. However, based on discussions with NCDOT, removal of the lefts is not part of the current project, but instead will be a phased project in the future; therefore, left turns at this intersection were allowed in this analysis. Based on the current NCDOT STIP as of June 2018, construction is currently scheduled for FY 2019 *(Note that based on coordination with NCDOT since the July 2018 TIA submittal, construction is now planned for FY 2020)*. U-5906 improvements at this intersection include:

- Construction of an additional northbound right-turn lane along Liverpool Parkway (creating dual right-turn lanes).

- Conversion of the existing eastbound right-turn lane along W Catawba Avenue to a shared through/right lane.
- Construction of an additional receiving lane along W Catawba Avenue that will extend to the I-77 SB Ramp.

With these improvements in place, the overall intersection is expected to operate at LOS D during both the AM and PM peak hours under 2019 background conditions. As shown in **Table 6.5**, delay is expected to significantly increase on the southbound approach. The future phased improvement to restrict side-street lefts from Torrence Chapel Road and Liverpool Parkway onto W Catawba Avenue is expected to provide operational benefits to this approach and the overall intersection.

With the addition of site traffic, **Table 6.5** shows that NCDOT's mitigation threshold is met for the northbound approach during the PM peak hour where the delay is increased by more than 25%. The Town of Cornelius and NCDOT's mitigation thresholds are met for the southbound approach during both peak hours where the approach is expected to be impacted while already at LOS F.

Given the impact caused by the project that meets the Town and NCDOT's mitigation criteria, identification of potential mitigation improvements is required. The following laneage improvements were evaluated at this intersection to mitigate the increase in delay and accommodate the added site traffic, while minimizing disruption to the background traffic:

- Construction of an additional southbound left-turn lane along Torrence Chapel Rd, creating a three-lane approach that includes dual left-turn lanes and a shared through/right lane
- Reconfiguration of the northbound approach of Liverpool Parkway to provide an exclusive left-turn lane, a shared through-right, and an exclusive right-turn lane
- Removal of the current split phasing on the side-street northbound and southbound approaches

Similar to the discussion in **Section 6.4**, the current split phasing at this intersection limits the green time that can be given to the side streets. To remove the split phasing and potentially improve the side street approaches, this mitigation alternative included modified laneage on the side streets to allow for permitted phasing. However, with these improvements in place, along with optimization of the signal splits, both the overall intersection and southbound approach delays were shown to increase. Unlike the volumes shown for the One Norman Boulevard intersection, the side-street volumes along Torrence Chapel Road and Liverpool Parkway both carry a significant amount of volume. With the heavy side-street volume conflicting with the heavy mainline volume, the demand at this intersection makes it difficult to acceptably serve each approach. Without split phasing, the side streets are forced to yield to one another, particularly the heavy southbound left-turn volume yielding to the heavy northbound right-turn volume, resulting in long delays. As previously discussed, the future phased improvement as a part of U-5906 to restrict side-street lefts from Torrence Chapel Road and Liverpool Parkway onto W Catawba Avenue is expected to provide operational benefits to this intersection. Therefore, no additional mitigation improvements are recommended at this intersection.

Note that the final intersection configurations under TIP Project U-5906 may differ from the improvements outlined in this TIA.

6.6 CATAWBA AVENUE AT I-77 SB RAMPS

Table 6.6 summarizes the LOS, control delay (seconds per vehicle) and 95th percentile queue lengths at the signalized intersection of Catawba Avenue at I-77 SB Ramps.

Table 6.6 - Catawba Avenue at I-77 SB Ramps				
Condition	Measure	EB	WB	Intersection
AM Peak Hour				
2017 Existing	LOS (Delay)	C (27.5)	E (57.1)	D (37.9)
	95th Max Q	561'	481'	
2019 Background	LOS (Delay)	D (36.7)	D (54.8)	D (43)
	95th Max Q	735'	626'	
2019 Build-out	LOS (Delay)	D (37.8)	D (54.2)	D (43.5)
	95th Max Q	638'	634'	
2024 Build-out	LOS (Delay)	D (41.2)	D (54.1)	D (44.7)
	95th Max Q	1411'	661'	
PM Peak Hour				
2017 Existing	LOS (Delay)	D (35.8)	E (66.3)	D (48.1)
	95th Max Q	867'	718'	
2019 Background	LOS (Delay)	C (31.7)	E (64.7)	D (46.6)
	95th Max Q	414'	1104'	
2019 Build-out	LOS (Delay)	D (38.1)	E (66.7)	D (50.3)
	95th Max Q	1103'	1094'	
2024 Build-out	LOS (Delay)	D (50.3)	E (65)	E (55.9)
	95th Max Q	880'	926'	

The Town of Cornelius mitigation threshold at this intersection is LOS D based on the Highway Commercial zoning district. Given the complex modeling of the diverging diamond interchange (DDI), **Table 6.6** reflects the approach and overall intersection results for the crossover intersection only. With the addition of site traffic, the overall intersection is expected to continue to operate at LOS D during both and AM and PM peak hours. Note that the decrease in delay shown between 2017 existing and 2019 background conditions is due to the planned improvements along the corridor discussed in **Section 4.3**, in which the corridor timings were assumed to be optimized to accommodate the improvements. Additionally, an eastbound right-turn lane along W Catawba Avenue that will extend from the I-77 SB Ramp to Liverpool Parkway is planned to be constructed as part of TIP project U-5906.

Table 6.6 shows that NCDOT's mitigation threshold is met for the eastbound approach during the PM peak hour where the LOS is expected to drop from LOS C to LOS D. The Town's mitigation thresholds are met for the westbound approach where the approach is expected to be impacted while remaining at LOS E. The proposed site is expected to add approximately four percent of the overall traffic to this intersection during the PM peak hour, and the overall intersection is expected to remain at LOS D, which is considered an adequate LOS based on the Highway Commercial zoning designation under the Town of Cornelius TIA procedures. Given this, along with the cost and associated impacts to construct modifications at this interchange, no additional improvements are recommended at this intersection.

6.7 CATAWBA AVENUE AT I-77 NB RAMPS

Table 6.7 summarizes the LOS, control delay (seconds per vehicle) and 95th percentile queue lengths at the signalized intersection of Catawba Avenue at I-77 NB Ramps.

Table 6.7 - Catawba Avenue at I-77 NB Ramps

Condition	Measure	EB	WB	Intersection
AM Peak Hour				
2017 Existing	LOS (Delay)	D (53.9)	B (16.8)	D (41.4)
	95th Max Q	75'	1804'	
2019 Background	LOS (Delay)	D (52.1)	C (25)	D (41.6)
	95th Max Q	943'	526'	
2019 Build-out	LOS (Delay)	D (52.5)	C (26.9)	D (42.8)
	95th Max Q	770'	650'	
2024 Build-out	LOS (Delay)	D (55)	C (30.1)	D (45.2)
	95th Max Q	895'	623'	
PM Peak Hour				
2017 Existing	LOS (Delay)	E (61.1)	C (22.5)	D (44.9)
	95th Max Q	290'	1348'	
2019 Background	LOS (Delay)	D (53.6)	D (36.4)	D (45.9)
	95th Max Q	686'	783'	
2019 Build-out	LOS (Delay)	E (56)	D (38.4)	D (48.4)
	95th Max Q	852'	755'	
2024 Build-out	LOS (Delay)	E (61.3)	D (38.4)	D (51.4)
	95th Max Q	652'	576'	

The Town of Cornelius mitigation threshold at this intersection is LOS D based on the Highway Commercial zoning district. Given the complex modeling of the DDI, **Table 6.7** reflects the approach and overall intersection results for the crossover intersection only. Note that based on the site visit notes included in the **Appendix**, a second eastbound left-turn lane along Catawba Avenue to turn onto the I-77 NB Ramp has recently been installed. As previously discussed, an approved TransModeler analysis model developed for C-5621 was developed by WSP and provided by NCDOT. For schedule purposes and to maintain consistency with the C-5621 analysis, direction was given to utilize the approved model. Note that this model was initially developed prior to installation of the second eastbound left-turn lane at this intersection. Therefore, the results in **Table 6.7** do not reflect the additional eastbound left-turn lane. However, identification of proposed site traffic impacts is still achieved and represented in the table above.

With the addition of site traffic, the overall intersection is expected to continue to operate at LOS D during both the AM and PM peak hours. Note that the decrease in delay shown between 2017 existing and 2019 background conditions is due to the planned improvements along the corridor discussed in **Section 4.3**, in which the corridor timings were assumed to be optimized to accommodate the improvements. The Town and NCDOT's mitigation threshold is met for the eastbound approach during the PM peak hour where the LOS is expected to drop from LOS D to LOS E. However, this approach delay is expected to increase by less than 3 seconds, and with the corridor and timing improvements, this delay is expected to be lower than the existing eastbound approach delay. Additionally, the overall intersection is expected to remain at LOS D, which is considered an adequate LOS based on the Highway Commercial zoning designation under the Town of Cornelius TIA procedures. Given this, along with the cost and associated impacts to construct modifications at this interchange, no improvements are recommended at this intersection.

6.8 CATAWBA AVE AT US 21 (STATESVILLE RD)/ HOLIDAY LN

Table 6.8 summarizes the LOS, control delay (seconds per vehicle) and 95th percentile queue lengths at the signalized intersection of Catawba Avenue at US 21 (Statesville Road)/Holiday Lane.

Table 6.8 - Catawba Avenue at US 21 (Statesville Road)/Holiday Lane						
Condition	Measure	EB	WB	NB	SB	Intersection
AM Peak Hour						
2017 Existing	LOS (Delay)	A (6.2)	C (29.8)	F (236.7)	E (68.4)	E (67.2)
	95th Max Q	349'	575'	1852'	139'	
2019 Background	LOS (Delay)	A (2.2)	A (5.5)	F (81.2)	E (68.2)	A (7.1)
	95th Max Q	342'	991'	1593'	156'	
2019 Build-out	LOS (Delay)	A (2.5)	A (6.4)	F (89.7)	E (64.5)	A (7.7)
	95th Max Q	350'	720'	1314'	164'	
2024 Build-out	LOS (Delay)	A (3)	A (7.3)	F (96.9)	E (66)	A (8.5)
	95th Max Q	373'	1079'	1339'	169'	
PM Peak Hour						
2017 Existing	LOS (Delay)	B (13.7)	D (36.9)	F (146.7)	E (70.6)	D (51.4)
	95th Max Q	660'	2109'	1263'	142'	
2019 Background	LOS (Delay)	B (12.1)	A (9.7)	E (72.1)	E (70)	B (14.3)
	95th Max Q	690'	641'	633'	263'	
2019 Build-out	LOS (Delay)	B (12)	B (11.4)	E (69.4)	F (86.2)	B (15.7)
	95th Max Q	846'	704'	725'	345'	
2024 Build-out	LOS (Delay)	B (12.4)	B (13.3)	E (75.7)	F (135.2)	B (19)
	95th Max Q	679'	402'	484'	288'	

The Town of Cornelius mitigation threshold at this intersection is LOS E based on the Transitional Residential District Overlay zoning district. Note that this intersection is also within the Highway Commercial zoning district, which has a LOS threshold of LOS D. Based on the *Town of Cornelius Land Development Code*, the less restrictive LOS shall apply, which is LOS E in this case.

As discussed in **Section 4.3**, future improvements are planned at this intersection as part of TIP project C-5621. At the time of the TIA scoping meeting, this intersection was planned to be improved via the construction of a roundabout. Since then, the preferred alternative to improve this intersection has been modified from a roundabout to a quadrant left configuration, which includes a new connection in the southeast quadrant of this intersection with new traffic signals at both ends of the connection at Catawba Avenue/Burton Lane and US 21 (Statesville Road). The benefit of this configuration is removal of left-turn movements from the current intersection of Catawba Avenue at US 21 (Statesville Road)/Holiday Lane, which is expected to reduce queueing into the closely-spaced DDI west of this intersection. An approved analysis model depicting the planned improvements was developed by WSP and provided by NCDOT. Based on the current NCDOT STIP as of June 2018, this project is planned for construction in FY 2019 *(Note that based on coordination with NCDOT since the July 2018 TIA submittal, construction is now planned for FY 2020.)* C-5621 improvements at this intersection include:

- Removal of all left-turn movements at this intersection.
- Conversion of the existing eastbound left-turn lane along Catawba Avenue to a through lane, creating two eastbound through lanes.
- Conversion of the existing westbound left-turn lane along Catawba Avenue to a through lane, creating two westbound through lanes.

- Reconfiguration of the northbound approach of US 21 (Statesville Road) to provide a single through lane.
- Reconfiguration of the southbound approach of Holiday Lane to provide one through lane and one right-turn lane.

With these improvements in place, the overall intersection is greatly improved and is expected to operate at LOS A during the AM peak hour and LOS B during the PM peak hour under 2019 background conditions.

With the addition of site traffic, **Table 6.8** shows that the overall intersection is expected to continue to operate at LOS A during the AM peak hour and LOS B during the PM peak hour. NCDOT's mitigation threshold is met for the westbound approach during the PM peak hour where the LOS drops from LOS A to LOS B, yet is less than a two second increase. Further, both the Town of Cornelius and NCDOT's mitigation thresholds are met for the northbound approach during the AM peak hour and the southbound approach during the PM peak hour where the approaches are expected to be impacted while already at LOS F. However, note that in both cases, the delay on the opposite side-street approach is expected to decrease, as reflected in the relatively minor increases in delay for the overall intersection. As shown in **Figure 5.2**, with the reconfiguration of the intersection planned as part of C-5621, the majority of the volume for the side-street approaches are moved to the adjacent intersection to the east via the quadrant left connection. Therefore, the northbound and southbound volume is relatively minor, and a high percentage of the green time for the traffic signal will be given to the mainline to reduce queueing into the DDI. Therefore, long delays on the side streets would be expected; yet due to the low amount of volume, the overall intersection operations are still expected to operate well below capacity. Given this, no additional improvements are recommended at this intersection.

Note that the final intersection configurations under TIP Project C-5621 may differ from the improvements outlined in this TIA.

6.9 CATAWBA AVENUE AT S HILL STREET/BURTON LANE

Table 6.9 summarizes the LOS, control delay (seconds per vehicle) and 95th percentile queue lengths at the currently unsignalized intersection of Catawba Avenue at S Hill Street/Burton Lane. This intersection is assumed to be signalized with laneage improvements under 2019 and 2024 conditions.

Table 6.9 - Catawba Avenue at S Hill Street/Burton Lane

Condition	Measure	EB	WB	NB	SB	Intersection
AM Peak Hour						
2017 Existing	LOS (Delay)	A (0.5)	A (1.6)	E (42.5)	C (22.3)	-
	95th Max Q	24'	395'	50'	0'	
2019 Background	LOS (Delay)	C (27.1)	C (26.8)	F (81.4)	F (87.2)	D (45)
	95th Max Q	456'	580'	1862'	0'	
2019 Build-out	LOS (Delay)	C (27.1)	C (27.7)	F (82.3)	F (81.8)	D (44)
	95th Max Q	501'	551'	2322'	0'	
2024 Build-out	LOS (Delay)	C (27.2)	C (32.9)	F (87.9)	F (87.3)	D (47.2)
	95th Max Q	515'	659'	2360'	0'	
PM Peak Hour						
2017 Existing	LOS (Delay)	A (0.6)	F (101)	F (387.9)	F (100.8)	-
	95th Max Q	26'	2012'	159'	57'	
2019 Background	LOS (Delay)	B (10.3)	C (33.1)	E (63.8)	E (68.1)	D (35.3)
	95th Max Q	159'	532'	889'	0'	
2019 Build-out	LOS (Delay)	B (10.8)	D (41.4)	E (70.1)	E (72.5)	D (40.1)
	95th Max Q	135'	588'	1124'	0'	
2024 Build-out	LOS (Delay)	B (10.2)	F (92.3)	E (69.2)	E (66)	E (56.3)
	95th Max Q	113'	909'	859'	17'	

The Town of Cornelius mitigation threshold at this intersection is LOS E based on the Transitional Residential District Overlay zoning district. Note that this intersection is also within the Neighborhood Mixed-Use zoning district, which has a LOS threshold of LOS D. Based on the *Town of Cornelius Land Development Code*, the less restrictive LOS shall apply, which is LOS E in this case.

As discussed in **Section 4.3** and **Section 6.8**, future improvements are planned at this intersection as part of TIP project C-5621. At the time of this analysis, the preferred alternative is a quadrant left configuration, which includes a new connection in the southeast quadrant of the Catawba Avenue/US 21 (Statesville Road) intersection with new traffic signals at both ends of the connection at Catawba Avenue/Burton Lane and US 21 (Statesville Road). The benefit of this configuration is removal of left-turn movements from the current intersection of Catawba Avenue at US 21 (Statesville Road)/Holiday Lane, which is expected to reduce queueing into the closely-spaced DDI west of this intersection. Those lefts get redistributed to the intersection at Burton Lane. An approved analysis model depicting the planned improvements was developed by WSP and provided by NCDOT. Based on the current NCDOT STIP as of June 2018, this project is planned for construction in FY 2019 *(Note that based on coordination with NCDOT since the July 2018 TIA submittal, construction is now planned for FY 2020).* C-5621 improvements at this intersection include:

- Installation of a traffic signal
- Additional eastbound through lane along Catawba Avenue
- Additional westbound shared through/left lane along Catawba Avenue
- Addition of northbound dual left-turn lanes along Burton Lane

- Addition of a southbound left-turn lane along S Hill Street

With these improvements in place, the overall intersection is expected to operate at LOS D during both the AM and PM peak hours under 2019 background conditions.

With the addition of site traffic, **Table 6.9** shows that the overall intersection is expected to continue to operate at LOS D during both peak hours. NCDOT's mitigation threshold is met for the westbound approach during the PM peak hour where the LOS drops from LOS C to LOS D. Further, both the Town of Cornelius and NCDOT's mitigation thresholds are met for the northbound approach during the AM peak hour where the approach is expected to be impacted while already at LOS F. Note that the increase in delay is less than one second, while the delay on the opposite side-street approach is expected to decrease. Additionally, the overall intersection is expected to remain at LOS D during both peak hours upon build-out of the site, which is considered an adequate LOS based on the Transitional Residential District Overlay zoning designation under the Town of Cornelius TIA procedures. Given this, along with the significant modifications already planned for this intersection as part of C-5621, no additional improvements are recommended at this intersection.

Note that the final intersection configurations under TIP Project C-5621 may differ from the improvements outlined in this TIA.

6.10 CATAWBA AVENUE AT SMITH CIRCLE

Table 6.10 summarizes the LOS, control delay (seconds per vehicle) and 95th percentile queue lengths at the signalized intersection of Catawba Avenue at Smith Circle.

Table 6.10 - Catawba Avenue at Smith Circle					
Condition	Measure	EB	WB	NB	Intersection
AM Peak Hour					
2017 Existing	LOS (Delay)	C (24.7)	C (21.4)	B (12.7)	C (21.7)
	95th Max Q	812'	414'	98'	
2019 Background	LOS (Delay)	C (32.3)	C (26.3)	B (11.6)	C (27)
	95th Max Q	848'	513'	153'	
2019 Build-out	LOS (Delay)	C (31.4)	C (31.7)	B (13.4)	C (27.8)
	95th Max Q	907'	563'	132'	
2024 Build-out	LOS (Delay)	D (43.3)	D (51.2)	B (13.6)	D (39.6)
	95th Max Q	878'	921'	114'	
PM Peak Hour					
2017 Existing	LOS (Delay)	A (8.8)	D (54.9)	B (18.6)	C (29.3)
	95th Max Q	616'	934'	59'	
2019 Background	LOS (Delay)	A (6.3)	A (5.8)	B (10.3)	A (5.8)
	95th Max Q	587'	569'	55'	
2019 Build-out	LOS (Delay)	A (6.8)	A (7.6)	B (11.1)	A (7.1)
	95th Max Q	680'	578'	58'	
2024 Build-out	LOS (Delay)	A (8)	E (55.6)	B (14.5)	C (29)
	95th Max Q	541'	531'	44'	

The Town of Cornelius mitigation threshold at this intersection is LOS D based on the Neighborhood Mixed-Use zoning district. The overall intersection currently operates at LOS C during both the AM and PM peak hours. However, note that the decrease in delay shown for the PM peak hour between 2017 existing and 2019 background conditions is due to the planned improvements along the corridor discussed in **Section 4.3**. Currently, due to the congestion around the I-77 interchange and closely-spaced signalized intersections, significant traffic queues extend westbound from the interchange beyond Smith Circle. The congestion causes large variability in the results between the simulation model runs, as evidenced by the large standard deviation. However, with the planned TIP projects in place, the current congestion is expected to be reduced, and the corridor timings were assumed to be optimized to accommodate the improvements.

With the addition of site traffic, **Table 6.10** shows that the overall intersection and its approaches are expected to continue to remain at the same LOS. NCDOT's mitigation threshold is met for the westbound approach during the PM peak hour since the delay increases by more than 25%. However, given that the approach remains at LOS A, the operational impacts caused by the proposed site is considered relatively minor. Since the proposed development is not expected to have a significant adverse impact on operations at this intersection, no improvements are recommended.

Note that as background traffic continues to increase between 2019 and 2024, congestion is expected to increase along Catawba Avenue, as evidenced by the increase in expected delay shown in **Table 6.10**. This should be monitored by the Town of Cornelius once the planned TIP projects are in place.

6.11 KNOX ROAD AT TORRENCE CHAPEL ROAD

Table 6.11 summarizes the LOS, control delay (seconds per vehicle) and 95th percentile queue lengths at the currently unsignalized, two-way, stop-controlled intersection of Knox Road at Torrence Chapel Road. This intersection is assumed to be converted to a roundabout under 2019 and 2024 conditions.

Table 6.11 - Knox Road at Torrence Chapel Road						
Condition	Measure	EB	WB	NB	SB	Intersection
AM Peak Hour						
2017 Existing	LOS (Delay)	B (11.6)	B (13.5)	A (1.5)	A (0.2)	-
	95th Max Q	105'	56'	64'	0'	
2019 Background	LOS (Delay)	A (3.6)	A (8.8)	A (9.9)	B (10.2)	A (8.6)
	95th Max Q	0'	0'	0'	0'	
2019 Build-out	LOS (Delay)	A (3.3)	A (8.3)	B (10.1)	B (10.4)	A (8.8)
	95th Max Q	0'	0'	0'	0'	
2024 Build-out	LOS (Delay)	A (3.8)	A (8.5)	A (10)	B (10.4)	A (8.9)
	95th Max Q	78'	0'	0'	0'	
PM Peak Hour						
2017 Existing	LOS (Delay)	C (17)	B (14.1)	A (1.4)	A (0.3)	-
	95th Max Q	168'	28'	56'	0'	
2019 Background	LOS (Delay)	A (3.7)	A (9.6)	B (10.3)	B (10.3)	A (8.6)
	95th Max Q	40'	0'	27'	0'	
2019 Build-out	LOS (Delay)	A (4.3)	A (9.6)	B (10.6)	B (10.3)	A (8.5)
	95th Max Q	71'	0'	44'	0'	
2024 Build-out	LOS (Delay)	A (4.9)	A (10)	B (10.5)	B (10.3)	A (8.7)
	95th Max Q	16'	1'	0'	0'	

The Town of Cornelius mitigation threshold at this intersection is LOS D based on both the Neighborhood Mixed-Use and Highway Commercial zoning districts. As discussed in **Section 4.3**, future improvements are planned at this intersection as part of TIP project U-5906. The purpose of this TIP project is to reduce congestion and improve safety along W Catawba Avenue near the intersection of Torrence Chapel Road/Liverpool Parkway, particularly to reduce impacts to the closely-spaced DDI interchange. The ultimate preferred alternative includes the restriction of side-street lefts from Torrence Chapel Road and Liverpool Parkway onto W Catawba Avenue (this is a phased improvement), which would force some drivers to use Knox Road to access W Catawba Avenue instead of Torrence Chapel Road. Therefore, improvements are also planned at this intersection as a part of U-5906 to accommodate the future change in travel patterns. Based on the current NCDOT STIP as of June 2018, construction is currently scheduled for FY 2019 (*Note that based on coordination with NCDOT since the July 2018 TIA submittal, construction is now planned for FY 2020)*. U-5906 improvements at this intersection include:

- Installation of a single-lane roundabout.

With the roundabout in place, the overall intersection is expected to operate at LOS A during both the AM and PM peak hours under 2019 background conditions.

With the addition of site traffic, **Table 6.11** shows that the overall intersection is expected to continue to operate at LOS A. NCDOT's mitigation threshold is met for the northbound approach during the AM peak hour where the LOS drops from LOS A to LOS B. However, given that the increase in delay is less than one second, the operational impacts caused by the proposed site is considered relatively minor. Since the proposed development is not expected to have a significant adverse impact on operations at this intersection, no additional improvements are recommended.

6.12 KNOX ROAD AT ONE NORMAN BOULEVARD

Table 6.12 summarizes the LOS, control delay (seconds per vehicle) and 95th percentile queue lengths at the unsignalized intersection of Knox Road at One Norman Boulevard. This intersection currently operates with the northbound approach of One Norman Boulevard as the stop-controlled approach. However, under 2019 and 2024 conditions, the intersection is assumed to be realigned where the eastbound approach of Knox Road becomes the stop-controlled approach.

Table 6.12 - Knox Road at One Norman Boulevard

Condition	Measure	EB	WB	NB	SB
AM Peak Hour					
2017 Existing	LOS (Delay)	A (0.3)	A (0.9)	A (7.2)	-
	95th Max Q	0'	38'	105'	
2019 Background	LOS (Delay)	A (7.5)	-	A (0)	A (0)
	95th Max Q	33'		0'	0'
2019 Build-out	LOS (Delay)	A (8.6)	-	A (0)	A (0)
	95th Max Q	0'		0'	65'
2024 Build-out	LOS (Delay)	A (9.8)	-	A (0)	A (0)
	95th Max Q	39'		0'	0'
PM Peak Hour					
2017 Existing	LOS (Delay)	A (0.4)	A (1.1)	A (8.2)	-
	95th Max Q	0'	100'	123'	
2019 Background	LOS (Delay)	A (8)	-	A (0)	A (0)
	95th Max Q	0'		0'	0'
2019 Build-out	LOS (Delay)	A (8.5)	-	A (0)	A (0)
	95th Max Q	59'		0'	0'
2024 Build-out	LOS (Delay)	A (7.9)	-	A (0)	A (0)
	95th Max Q	0'		0'	0'

The Town of Cornelius mitigation threshold at this intersection is LOS D based on the Village Center zoning district. Note that this intersection is also within the Neighborhood Residential zoning district, which has a LOS threshold of LOS C. Based on the *Town of Cornelius Land Development Code*, the less restrictive LOS shall apply, which is LOS D in this case. As discussed in **Section 4.3**, future improvements are planned at this intersection as part of TIP project U-5906. The ultimate preferred alternative includes the restriction of side-street lefts from Torrence Chapel Road and Liverpool Parkway onto W Catawba Avenue (this is a phased improvement), which would force some drivers to use Knox Road to access W Catawba Avenue instead of Torrence Chapel Road. Therefore, improvements are also planned at this intersection as a part of U-5906 to accommodate the future change in travel patterns. Based on the current NCDOT STIP as of June 2018, construction is currently scheduled for FY 2019 (*Note that based on coordination with NCDOT since the July 2018 TIA submittal, construction is now planned for FY 2020)*. U-5906 improvements at this intersection include:

- Realign Knox Road to tie directly into One Norman Boulevard
- Allow the northbound/southbound approaches of Knox Road and One Norman Boulevard to operate as the uncontrolled, free-flow movements
- Additional southbound through lane along One Norman Boulevard that serves as an extension of the laneage downstream at the W Catawba Avenue signalized intersection
- Provide a monolithic island that extends from W Catawba Avenue
- Provide stop-controlled operations for the eastbound approach of Knox Road
- Right-in/right-out only access for the eastbound approach of Knox Road

With these modifications in place, **Table 6.12** shows that all approaches are expected to operate at LOS A with short delays during both the AM and PM peak hours under 2019 background conditions, and are expected to continue to operate with short delays upon build-out of the site. Since the proposed development is not expected to have a significant adverse impact on operations at this intersection, no improvements are recommended for capacity purposes.

6.13 W CATAWBA AVENUE AT PRIVATE STREET A (D/W #1)

Table 6.13 summarizes the LOS, control delay (seconds per vehicle) and 95th percentile queue lengths at the proposed unsignalized, left-over driveway of W Catawba Avenue at Private Street A.

Table 6.13 - W Catawba Avenue at Private Street A				
Condition	Measure	EB	WB	SB
AM Peak Hour				
2019 Build-out	LOS (Delay)	A (0)	A (0.4)	B (12.9)
	95th Max Q	0'	49'	0'
2024 Build-out	LOS (Delay)	A (0)	A (0.5)	B (13.2)
	95th Max Q	0'	74'	0'
PM Peak Hour				
2019 Build-out	LOS (Delay)	A (0)	A (0.3)	C (15.2)
	95th Max Q	0'	0'	0'
2024 Build-out	LOS (Delay)	A (0)	A (0.4)	B (11.3)
	95th Max Q	0'	0'	4'

The Town of Cornelius mitigation threshold at this intersection is LOS D based on the Highway Commercial zoning district. This driveway is proposed at a location where a median cut and U-turn bulb-out currently exists with 175 feet of eastbound left-turn storage. **Table 6.13** shows that the stop-controlled southbound approach proposed to exit the site is expected to operate with short delays during both the AM and PM peak hours under 2019 build-out conditions. Based on a review of crash data at this existing U-turn bulb-out (discussed in more detail in **Section 8.0**), no crashes were reported at this location within the three-year review period.

It should be noted that due to the nature of the DTA routing of the TransModeler software, all the site traffic entering from the west used the signal at One Norman Boulevard to turn left to access the site rather than making the eastbound left turn from W Catawba Avenue into the site at Private Street A. Upon build-out of the site, some drivers would be expected to use the proposed left-over at Private Street A to access the site, particularly during off-peak hours. However, what this shows is that if westbound traffic along W Catawba Avenue limits adequate gaps to turn left at this access, the traffic signal at One Norman would be expected to accommodate the increase in left turns during the peak hours.

Given the existing eastbound left-turn lane along with the short delays shown in **Table 6.13,** no additional improvements beyond construction of the driveway are recommended at this intersection for capacity purposes. Based on NCDOT input, a minimum of 100-foot internal protected stem should be provided along Private Street A. Auxiliary turn-lane warrants are described in Section 7.0.

6.14 KNOX ROAD AT PRIVATE STREET A (D/W #2)

Table 6.14 summarizes the LOS, control delay (seconds per vehicle) and 95th percentile queue lengths at the proposed unsignalized, full-movement driveway of Knox Road at Private Street A.

Table 6.14 - Knox Road at Private Street A				
Condition	Measure	EB	WB	NB
AM Peak Hour				
2019 Build-out	LOS (Delay)	A (0)	A (0.4)	A (8.9)
	95th Max Q	0'	0'	0'
2024 Build-out	LOS (Delay)	A (0)	A (0.4)	A (7.5)
	95th Max Q	0'	69'	0'
PM Peak Hour				
2019 Build-out	LOS (Delay)	A (0)	A (0.6)	A (0)
	95th Max Q	0'	40'	0'
2024 Build-out	LOS (Delay)	A (0)	A (0.6)	N/A
	95th Max Q	0'	13'	N/A

N/A – Zero volume approach; see discussion below.

The Town of Cornelius mitigation threshold at this intersection is LOS D based on the Highway Commercial zoning district. Note that this intersection is also within the General Residential zoning district, which has a LOS threshold of LOS C. Based on the *Town of Cornelius Land Development Code*, the less restrictive LOS shall apply, which is LOS D in this case. **Table 6.14** shows that the stop-controlled northbound approach proposed to exit the site is expected to operate with short delays during both the AM and PM peak hours under 2019 build-out conditions. The driveway was assumed to include a single ingress and single egress lane.

It should be noted that due to the nature of the DTA routing of the TransModeler software, some of the movements in and out of the site at this driveway were recorded with zero volume. Upon build-out of the site, some drivers would be expected to make these movements to access the site. Since each of the proposed driveways are expected to operate acceptably, utilization of these “unused” driveway movements in the model would not be expected to significantly impact operations.

Given the short delays shown in **Table 6.14,** no additional improvements beyond construction of the driveway are recommended at this intersection for capacity purposes. Based on NCDOT input, a minimum of 100-foot internal protected stem should be provided along Private Street A.

6.15 KNOX RD AT HARKEN DR/PRIVATE STREET C (D/W #3)

Table 6.15 summarizes the LOS, control delay (seconds per vehicle) and 95th percentile queue lengths at the unsignalized, full-movement intersection of Knox Road at Harken Drive/Private Street C.

Table 6.15 - Knox Road at Harken Drive/Private Street C					
Condition	Measure	EB	WB	NB	SB
AM Peak Hour					
2017 Existing	LOS (Delay)	A (0.5)	A (0.1)	-	A (6.8)
	95th Max Q	0'	0'		0'
2019 Background	LOS (Delay)	A (0.7)	A (0)	-	A (5.3)
	95th Max Q	23'	0'		51'
2019 Build-out	LOS (Delay)	A (0.6)	A (0.1)	A (7.3)	A (7.5)
	95th Max Q	50'	0'	112'	50'
2024 Build-out	LOS (Delay)	A (0.6)	A (0.1)	A (7.3)	A (7.9)
	95th Max Q	0'	0'	132'	54'
PM Peak Hour					
2017 Existing	LOS (Delay)	A (0.8)	A (0.1)	-	A (6.3)
	95th Max Q	46'	0'		0'
2019 Background	LOS (Delay)	A (0.8)	A (0)	-	A (5.8)
	95th Max Q	0'	0'		47'
2019 Build-out	LOS (Delay)	A (0.7)	A (0.1)	A (7.9)	A (7.7)
	95th Max Q	106'	0'	119'	72'
2024 Build-out	LOS (Delay)	A (0.8)	A (0.1)	A (8.8)	A (8.4)
	95th Max Q	24'	0'	68'	14'

The Town of Cornelius mitigation threshold at this intersection is LOS D based on the Highway Commercial zoning district. Note that this intersection is also within the General Residential zoning district, which has a LOS threshold of LOS C. Based on the *Town of Cornelius Land Development Code*, the less restrictive LOS shall apply, which is LOS D in this case. **Table 6.15** shows that the stop-controlled northbound and southbound approaches are expected to operate with short delays during both the AM and PM peak hours under 2019 build-out conditions. Note that based on information provided by NCDOT, the median planned along the realigned One Norman Boulevard/Knox Road as part of TIP project U-5906 could potentially extend beyond this intersection, forcing access to both Harken Drive and Private Street C to operate as a right-in/right out. However, per NCDOT direction, this intersection was analyzed as full-movement to determine the operations if allowed full-movement access.

It should be noted that due to the nature of the DTA routing of the TransModeler software, some of the movements in and out of the site at this driveway were recorded with zero volume. Upon build-out of the site, some drivers would be expected to make these movements to access the site. Since each of the proposed driveways are expected to operate acceptably, utilization of these "unused" driveway movements in the model would not be expected to significantly impact operations.

Given the short delays shown in **Table 6.15,** no additional improvements beyond construction of the driveway are recommended at this intersection for capacity purposes. Based on NCDOT input, a minimum of 150-foot internal protected stem should be provided along Private Street C. Auxiliary turn-lane warrants are described in Section 7.0.

6.16 ONE NORMAN BOULEVARD AT PRIVATE STREET B (D/W #4)

Table 6.16 summarizes the LOS, control delay (seconds per vehicle) and 95th percentile queue lengths at the proposed unsignalized, right-in/right-out driveway of One Norman Boulevard at Private Street B.

Note that since the July 2018 TIA submittal, the site plan has been modified to remove the Private Street B access to One Norman Boulevard (D/W #4). The analysis in this TIA and in this section is based on the initial site plan that included this driveway. However, the final recommendations reflect consideration for this driveway being removed, and is based on the modified site plan that includes only three proposed driveways (all three at the same locations proposed in the initial site plan). This approach has been coordinated with both Town of Cornelius and NCDOT staff.

Table 6.16 - One Norman Boulevard at Private Street B				
Condition	Measure	WB	NB	SB
AM Peak Hour				
2019 Build-out	LOS (Delay)	A (4.8)	A (0)	A (0.1)
	95th Max Q	0'	0'	80'
2024 Build-out	LOS (Delay)	A (5.3)	A (0)	A (0)
	95th Max Q	0'	0'	0'
PM Peak Hour				
2019 Build-out	LOS (Delay)	A (6.2)	A (0)	A (0.1)
	95th Max Q	0'	0'	0'
2024 Build-out	LOS (Delay)	A (5.6)	A (0)	A (0)
	95th Max Q	1'	0'	0'

The Town of Cornelius mitigation threshold at this intersection is LOS D based on both the Village Center and Highway Commercial zoning districts. **Table 6.16** shows that the stop-controlled westbound approach proposed to exit the site is expected to operate with short delays during both the AM and PM peak hours under 2019 build-out conditions. The driveway was assumed to include a single ingress and single egress lane. Note that based on information provided by NCDOT, the median planned along the realigned One Norman Boulevard/Knox Road as part of TIP project U-5906 is planned to extend beyond this intersection, forcing access to Private Street B to operate as a right-in/right out.

It should be noted that due to the nature of the DTA routing of the TransModeler software, some of the movements in and out of the site at this driveway were recorded with zero volume. Upon build-out of the site, some drivers would be expected to make these movements to access the site. Since each of the proposed driveways are expected to operate acceptably, utilization of these “unused” driveway movements in the model would not be expected to significantly impact operations.

Given the short delays shown in **Table 6.16,** no additional improvements beyond construction of the driveway are recommended at this intersection for capacity purposes.

7.0 Auxiliary Turn Lane Warrants

Warrants for additional turn-lane improvements for unsignalized intersections beyond those necessary for capacity were determined based on a review of the figure titled 'Warrant for Left and Right-Turn Lanes' found on page 80 in the *NCDOT Policy On Street And Driveway Access to North Carolina Highways*. The results of the warrants for left and right-turn lanes under 2019 build-out conditions are summarized by intersection below and included in the **Appendix**.

W Catawba Avenue at Private Street A (D/W #1)

- Westbound right-turn lane along W Catawba Avenue with a minimum storage length of 100'

~~One Norman Boulevard at Private Street B (D/W #4)~~*

- Northbound right-turn lane along One Norman Boulevard with a minimum storage length of 75'

**Note that since the July 2018 TIA submittal, the site plan has been modified to remove the Private Street B access to One Norman Boulevard (D/W #4). Without this access, the site traffic assigned to enter at D/W #4 will likely use D/W #3 to access the site. Therefore, an eastbound right-turn lane is recommended along Knox Road at Private Street C (D/W #3) with 100 feet of storage. This modified improvement has been coordinated with both Town of Cornelius and NCDOT staff.*

8.0 Crash Data Analysis

NCDOT provided recent crash data at study intersections for crashes that occurred between August 1, 2014 and July 31, 2017. Over this three-year period, 146 total crashes were reported along the Catawba Avenue Corridor (from Jetton Road to Smith Circle) and 5 total crashes were reported along Knox Road from One Norman Boulevard to Torrence Chapel Road. A breakdown of incidents per intersection can be seen in **Table 8.1**.

Table 8.1 – Crash Frequency by Location

Intersection	Frequency
W Catawba Avenue at Jetton Road	16
W Catawba Avenue at Bethel Church Road	7
W Catawba Avenue at Knox Road	2
W Catawba Avenue at One Norman Boulevard	10
W Catawba Avenue at Torrence Chapel Road/Liverpool Parkway	29
Catawba Avenue at I-77 SB Ramps	3
Catawba Avenue at I-77 NB Ramps	8
Catawba Avenue at US 21 (Statesville Road)/Holiday Lane	13
Catawba Avenue at S Hill Street/Burton Lane	4
Catawba Avenue at Smith Circle	3
Knox Road at Torrence Chapel Road	4
Knox Road at One Norman Boulevard	0

This number of crashes resulted in a weighted average crash rate of 301.41 crashes per 100 million vehicle miles traveled (MVMT) along Catawba Avenue and 417.77 crashes per MVMT along Knox Road. The breakdown of these incidents by severity and accident type along each corridor can be seen in **Table 8.2** and **Table 8.3**, respectively.

Table 8.2 – Crash Severity Summary

Crash Type	W Catawba Avenue Corridor	Knox Road Corridor
Fatal Crashes	1	0
Class A	0	0
Class B	6	0
Class C	30	1
Property Damage Only	109	4
Total	***146***	***5***

Table 8.2 above displays the total number of crashes by severity type from most to least severe. As shown, there was one fatal crash reported in the study area over the past three years. 'Class A' incidents are crashes in which serious injury is suspected, which can include significant loss of blood or broken bones, and 'Class B' incidents are crashes in which minor injury is suspected, such as bruises or minor cuts. There were no 'Class A' crashes reported, but six 'Class B' crashes reported within the study area over the three-year period. There were 31 'Class C' crashes reported, which are defined as crashes wherein possible injuries occur, which are injuries reported by the person or indicated by his/her behavior, but no wounds or injuries are physically present, such as limping or complaint of neck pain. There were 113 crashes in which only property damage occurred, meaning no injury was reported in 75% of the recorded crashes at the study intersections.

Table 8.3 – Crash Type Summary

Accident Type	W Catawba Avenue Corridor	Knox Road Corridor
Angle	26	2
Animal	1	0
Backing Up	3	0
Fixed Object	4	0
Head On	2	0
Left-Turn, Different Roadways	4	0
Left-Turn, Same Roadways	14	0
Other Non-Collision	2	0
Pedestrian	2	0
Ran Off Road – Right	4	0
Rear End, Slow or Stop	59	3
Right-Turn, Same Roadways	5	0
Right-Turn, Different Roadways	2	0
Sideswipe, Opposite Direction	2	0
Sideswipe, Same Direction	16	0
Total	***146***	***5***

Along the two corridors, the most common crash types were angle, left-turn, and rear-end collisions. Rear-end collisions are often associated with congestion and signalized intersections. Angle crashes are typically caused by vehicles turning left across through traffic without an appropriate gap. The highest accident frequency location was shown to be at the signalized intersection of W Catawba Avenue at Torrence Chapel Road/Liverpool Parkway.

As previously discussed, there are several TIP projects in the area planned for construction beginning FY 2019 and FY 2020. These TIP projects are expected to address both safety and operational deficiencies along the corridor.

9.0 Recommendations

Based on the capacity analyses performed for each of the identified study intersections, along with review of the auxiliary turn-lane warrants and crash analyses contained herein, the following improvements are recommended to mitigate the impact of the proposed development on the adjacent street network:

W Catawba Avenue at One Norman Boulevard

- Construction of an additional southbound left-turn lane along One Norman Boulevard with 175 feet of storage, creating a three-lane approach that includes dual left-turn lanes and a shared through/right lane
- Reconfiguration of the northbound approach of One Norman Boulevard to provide an exclusive left-turn lane and a shared through-right lane (same as existing)
- Removal of the split phasing planned for the side-street northbound and southbound approaches
- Extension of the westbound right-turn lane to provide 150' of storage

W Catawba Avenue at Private Street A (D/W #1)

- Allow for left-over access (right-out only)
- Westbound right-turn lane along W Catawba Avenue with 100' of storage
- Single southbound egress and single ingress lane along Private Street A
- Provide an internal protected stem of 100' along Private Street A

Knox Road at Private Street A (D/W #2)

- Single northbound egress and single ingress lane along Private Street A
- Provide an internal protected stem of 100' along Private Street A

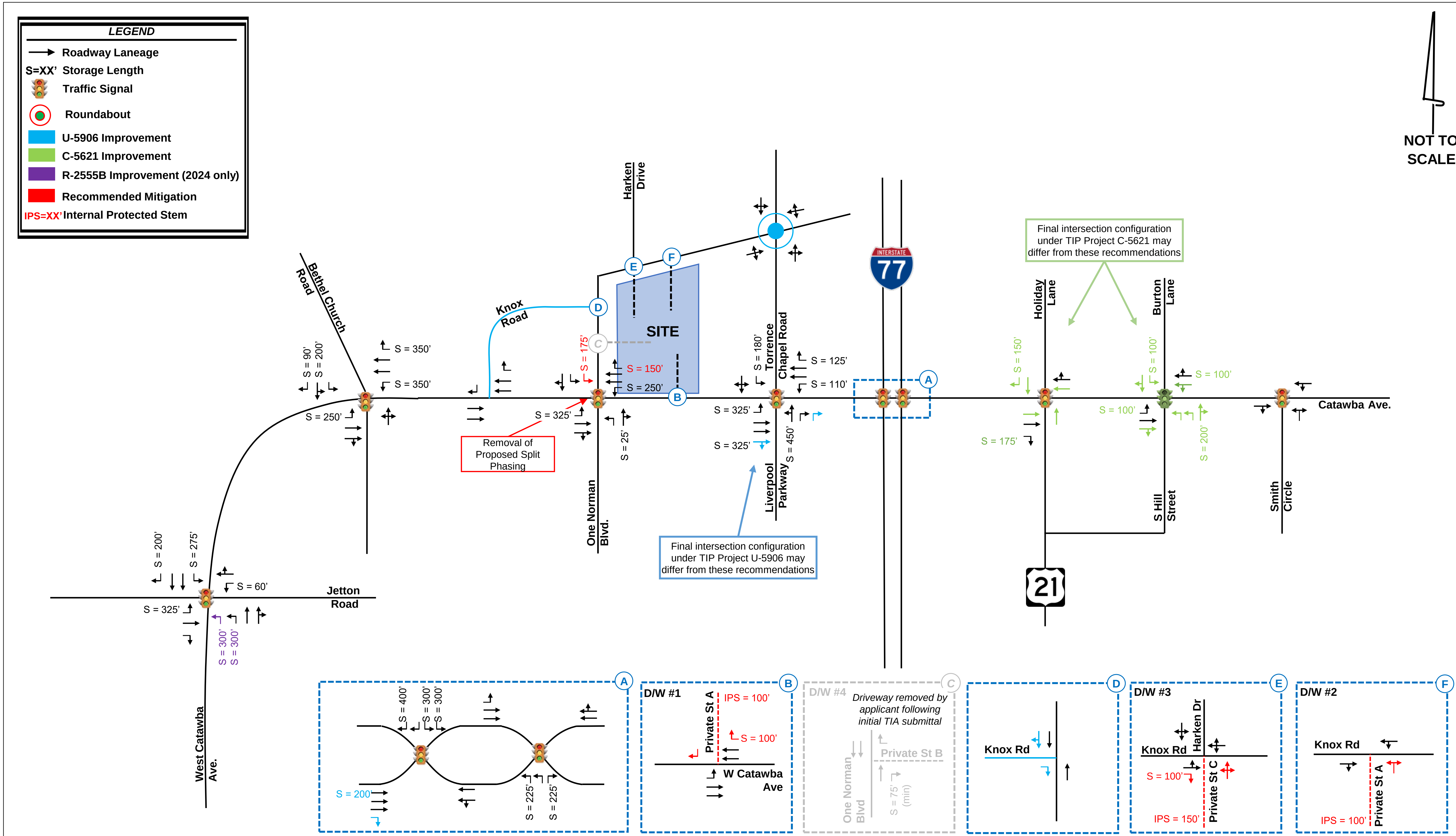
Knox Road at Harken Drive/Private Street C (D/W #3)

- Single northbound egress and single ingress lane along Private Street C
- Provide an internal protected stem of 150' along Private Street C
- Eastbound right-turn lane along Knox Road with 100' of storage

~~One Norman Boulevard at Private Street B (D/W #4)~~

- *Since the July 2018 TIA submittal, the site plan has been modified to remove this driveway*

The recommended improvements at study intersections are shown in **Figure 9.1**. The recommendations shown on this figure are subject to approval by NCDOT and the Town of Cornelius. All additions and attachments to the State and Town roadway system shall be properly permitted, designed and constructed in conformance to standards maintained by the agencies.



Catawba at Knox Retail
Traffic Impact Analysis

Recommended Mitigation Improvements

Figure 9.1

APPENDIX

Kimley»Horn

TECHNICAL MEMORANDUM

To: Mr. Wayne Herron, AICP
Deputy Town Manager, Director of Planning
Town of Cornelius

From: Brady Finklea, PE
Kimley-Horn

Date: October 10, 2018

Subject: ***Catawba at Knox Retail TIA - Addendum***
Cornelius, North Carolina

The proposed Catawba at Knox retail development is located on approximately 11 acres in the northeast quadrant of the W Catawba Avenue at One Norman Boulevard intersection, in the Town of Cornelius. A Traffic Impact Analysis (TIA) was performed by Kimley-Horn and submitted to the Town of Cornelius and North Carolina Department of Transportation (NCDOT) in June 2018. The Town and NCDOT reviewed the June 2018 TIA and final review comments/recommendations were issued by NCDOT on August 13, 2018. Since then, the proposed site plan has been modified by the applicant to remove Driveway #4 (unsignalized right-in/right-out Private Street B access to One Norman Boulevard). An updated TIA is being submitted concurrently with this technical memorandum to include the final mitigation requirements that reflects the modified access plan.

In addition to updating the TIA (which was based on a set of assumptions and parameters that were agreed upon by the agencies in the approved Memorandum of Understanding), the Town of Cornelius has requested a separate technical memorandum to address issues or concerns that have been discussed, yet are not specifically documented in the TIA. This technical memorandum specifically addresses the following:

- Sight distance at the proposed driveways along Knox Road
- Pedestrian crossing on Knox Road
- Interim phasing of mitigation improvements prior to U-5906

SIGHT DISTANCE

Knox Road is currently being designed to realign and tie directly into One Norman Boulevard as a part of TIP project U-5906. The new curve to create this realignment is planned to begin just west of proposed Driveway #3 at Harken Drive based on the plans provided. Given the future curvature, Town and NCDOT staff has requested a sight distance evaluation at the proposed driveways along Knox Road (Driveway #'s 2 and 3).

AutoCAD files for the proposed Catawba at Knox retail development were provided by ColeJenest & Stone, P.A. on September 27, 2018. These files included the realigned Knox Road planned as part of U-5906. Based on the curvature shown for Knox Road, the design speed was assumed to be 30 mph with a 25-mph posted speed limit per American Association of State Highway and Transportation Officials (AASHTO) guidelines for low-speed urban streets. Existing Knox Road has a posted speed limit of 35 mph. Given the new realignment with the curvature of the road, the proximity to the traffic signal at W Catawba Avenue, and the proposed commercial driveways, the speed limit along Knox Road is recommended to be posted at 25 mph between W Catawba Avenue and the eastern end of the proposed Catawba at Knox retail site. East of the proposed site, Knox Road should remain at the currently posted 35 mph.

Review of horizontal sight distance at both proposed driveways along Knox Road is illustrated in the attached Catawba at Knox Sight Distance Profiles. Note that sight distance lines are provided for 25, 30 and 40 mph design speeds. The text and sight distance lines on the exhibits in red reflect the recommended 30 mph design speed as discussed above.

Note that a vertical surface file was not available for existing Knox Road or the U-5906 realigned Knox Road. Vertical sight distance was therefore not reviewed in detail, only horizontal sight distance. However, given that both driveways are proposed to tie into Knox Road on its existing alignment (the curve for the realignment is shown to begin west of Driveway #3/Harken Drive), it does not appear that there would be vertical sight distance issues based on review of existing Knox Road. Driveway #3 is proposed to tie into the existing intersection of Knox Road at Harken Drive, which is located near the crest of a hill, which currently appears to have adequate sight distance.

Knox Road and Harken Dr/Private Street C (Driveway #3)

As shown in the attached exhibit, the proposed driveway location does not currently meet horizontal sight distance requirements at a 30 mph design speed based on the current parking lot layout. The parking lot currently shown on the western frontage of the site should be modified to not fall within the sight distance triangle. All proposed trees, berms, walls, fences, and/or identification signs must not interfere with sight distance at the entrance.

Knox Road and Private Street A (Driveway #2)

As shown in the attached exhibit, the proposed driveway location does meet horizontal sight distance requirements as shown at a 30 mph design speed. All proposed trees, berms, walls, fences, and/or identification signs must not interfere with sight distance at the entrance. The existing vegetation along Knox Road was not provided in the provided site plan; therefore, as shown in the aerial exhibit (page 2 of the exhibit), tree removal may be required along Knox Road as not to interfere with sight distance at this driveway.

PEDESTRIAN CROSSING ON KNOX ROAD

The Town and neighboring residents have expressed the desire to provide safe pedestrian facilities to connect the existing residential on the north side of Knox Road to the proposed retail on the south side of Knox Road. Currently, there is an existing sidewalk and bike lane on the north side of Knox Road from Harken Drive to Torrence Chapel Road. Crossing locations along Knox Road were considered at two locations:

- Knox Road and Harken Dr/Private Street C (Driveway #3)
- Knox Road and Private Street A (Driveway #2)

Providing a pedestrian crossing at the intersection of Knox Road and Harken Drive/Private Street C (Driveway #3) would provide the most direct connection for residents in the Blue Stone Harbor community. However, this location is not recommended due to its presence in the curve of realigned Knox Rd, proximity to the signal at W Catawba Ave, and the proposed turn lanes at this intersection; all of which would limit visibility of, and for, pedestrians. During peak hours and other high-volume times of the day, queues from the W Catawba Ave signal would be expected to extend near this location, further impeding sight distance for pedestrians. Additionally, with added turn lanes at this intersection as shown on the proposed site plan, a longer pedestrian crossing would be required.

Instead, a pedestrian crossing is recommended at the intersection of Knox Road and Private Street A (Driveway #2). Based on the current site plan along with the recommendations outlined in the TIA, no turn lanes are planned at this driveway. Therefore, a shorter crossing distance would be required. Additionally, this location is further removed from the proximity of curves and projected queueing. The existing sidewalk located on the north side of Knox Road would provide a safe connection between the Blue Stone Harbor community at Harken Drive to this recommended crossing to the retail driveway. In addition to a crosswalk, an activated, solar-powered, roadside rectangular rapid flashing beacon (RRFB) should be provided. RRFBs are user-actuated amber LEDs that supplement warning signs at unsignalized intersections or mid-block crosswalks. They can be manually activated by pedestrians by use of a push button or passively by a pedestrian detection system. Two examples of the application of this type of pedestrian treatment can be seen to the right. The first example is located in Union County on Lawyers Road, connecting the Emerald Lake neighborhood to the both the Country Woods East neighborhood and the sidewalk that runs along the south side of Lawyers Road.

INTERIM PHASING OF MITIGATION IMPROVEMENTS

As further described in the Catawba at Knox TIA, TIP project U-5906 includes improvements immediately adjacent to the proposed site along Knox Road and at the signalized intersection of W Catawba Avenue and One Norman Boulevard. When the TIA was initially scoped, U-5906 was planned for construction in FY 2018. When the June 2018 TIA was submitted, the STIP showed construction for U-5906 beginning in FY 2019. Since the proposed build-out of the site was also planned for 2019, U-5906 was assumed to be in place in all future-year analyses, and recommendations for site mitigation were made based on this assumption. However, since the June

2018 TIA submittal, the schedule for U-5906 has again been modified, and construction is now anticipated to begin in spring 2020 according to NCDOT staff. However, the proposed Catawba at Knox retail development is currently scheduled to open some of the outparcels along the frontage of W Catawba Avenue by summer 2019. Based on these schedules as currently known, there may be a gap of approximately nine months between opening of some of the retail along the W Catawba Avenue frontage and start of construction for U-5906. Given this change in schedule, coordination has occurred with NCDOT and Town staff related to which required improvements should be installed in advance of issuance of the first certificate of occupancy (CO) for the site, and which improvements should be included in the design and construction of U-5906.

Note that no interim phase capacity analysis has been performed. However, based on review of both the site's mitigation improvements and the 25% plans provided for U-5906, it appears that the site's mitigation improvements along W Catawba Avenue, as well as the three proposed driveway connections could be installed prior to issuance of the first CO for the site and prior to construction of U-5906.

Prior to Issuance of First CO and U-5906

The following mitigation improvements should be installed prior to issuance of the first CO for the site and prior to construction of U-5906:

W Catawba Avenue at One Norman Boulevard

- Extension of the westbound right-turn lane to provide 150' of storage

W Catawba Avenue at Private Street A (D/W #1)

- Allow for left-over access (right-out only)
- Westbound right-turn lane along W Catawba Avenue with 100' of storage
- Single southbound egress and single ingress lane along Private Street A
- Provide an internal protected stem of 100' along Private Street A

Knox Road at Private Street A (D/W #2)

- Single northbound egress and single ingress lane along Private Street A
- Provide an internal protected stem of 100' along Private Street A

Knox Road at Harken Drive/Private Street C (D/W #3)

- Single northbound egress and single ingress lane along Private Street C
- Provide an internal protected stem of 150' along Private Street C

Included in Construction of U-5906

Given the overlap of some of the site's mitigation improvements with the U-5906 improvements, a payment in lieu should be provided to the Town and/or NCDOT for the following mitigation improvements, of which should be included in the design and construction of NCDOT's U-5906 project:

W Catawba Avenue at One Norman Boulevard

- Construction of an additional southbound left-turn lane along One Norman Boulevard with 175 feet of storage, creating a three-lane approach that includes dual left-turn lanes and a shared through/right lane
- Reconfiguration of the northbound approach of One Norman Boulevard to provide an exclusive left-turn lane and a shared through-right lane (same as existing)
- Removal of the split phasing planned for the side-street northbound and southbound approaches

Knox Road at Harken Drive/Private Street C (D/W #3)

- Eastbound right-turn lane along Knox Road with 100' of storage
- Eastbound left-turn lane along Knox Road with 100' of storage (as shown on proposed site plan)
- Westbound left-turn lane along Knox Road with 100' of storage (as shown on proposed site plan)

The applicant should coordinate with NCDOT staff to provide a payment in lieu for the improvements listed above that is recommended to be included in the design and construction of U-5906.

Please contact me if you have any questions (704) 333-5131.

Attachments:

- Updated Site Plan
- Catawba at Knox Sight Distance Profiles
- Phasing of Recommended Mitigation Improvements

cc:	Wendy Taylor, PE	NCDOT
	Sean Epperson, PE	NCDOT

MASTER PLAN DEVELOPMENT NOTES:

1. Definition of Master Plan. The property shown on the Master Plan described as "By Right Master Plan, Catawba at Knox" (the "Plan"), and any amendments thereto, will be governed by the standards of the Town of Cornelius Land Development Code as of 5:00 p.m. on April 3, 2017 (the "LDC").

2. Subdivision. The Property is one development and will be subdivided to allow buildings as principal uses on individual parcels as depicted on the Plan. However, recombination, condominiumization, reconfiguration or reduction of parcels may occur. Subdivision for conveyance purposes, as well as final subdivision plat or plats once final building and improvement locations are determined, may be approved administratively.

3. Building Parcels. This Plan is a conceptual Plan. Exact sizes, footprints and locations of buildings shall be determined during the construction drawing phase of development and may be administratively approved, so long as the total square footage of improvements does not exceed the total amount shown on the Plan.

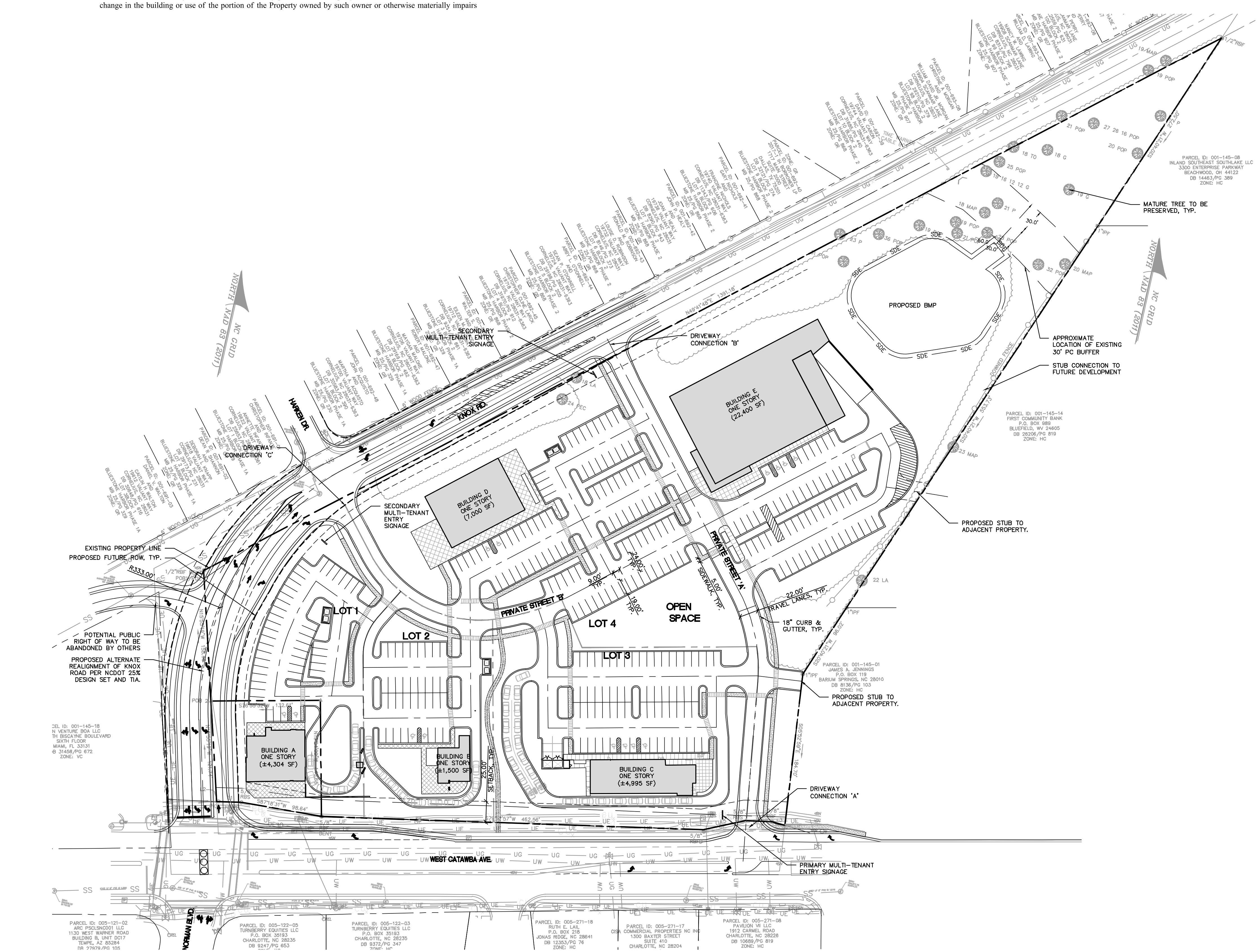
4. Modifications. Applicant may voluntarily agree to apply for future amendments to the Plan in a manner consistent with the LDC as it changes from time to time. Such modifications to the LDC shall in no way impact the Applicant's vested rights established per the LDC once the Plan is approved. Applicant, or it's designated successor in interest of the specific right to amend the Plan as set forth herein, may request an amendment to this Plan without the written consent of any other owners of all or any portion of the Property unless such amendment constitutes a change in the building or use of the portion of the Property owned by such owner or otherwise materially impairs any other property rights of such owner. Minor adjustments to driveway locations, curbs and curb cuts may be made administratively during the construction drawing phase of development. Any future rezoning initiated by the owner(s) of any lots shown on the Plan shall not affect the vested rights status of the lots not rezoned.

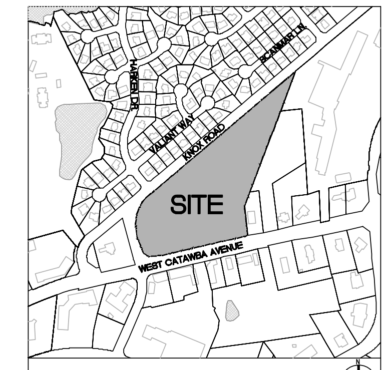
5. Phasing. The development may be phased. Grading of the Property may be completed per phase of the development.

6. Permitted Uses. The Property may be devoted to the uses permitted in the HC zoning district as set forth in the LDC.

7. High Density Option. The high density option as shown on the Development Plan is approved by the Cornelius Town Board upon approval of the Plan.

8. Vested Rights. Applicant has requested vested rights approval pursuant to Section 12.10 of the LDC and G.S.160A-385.1 of the North Carolina General Statutes. The approved Plan is vested for a period of five (5) years from the date of the approval of the Plan by the Cornelius Town Board.





VICINITY MAP N.T.S.

LEGEND

SYMBOL		DETAIL
	PROPOSED SIDEWALK	–
	PROPOSED BUILDING ENVELOPE	–
	PROPOSED 18" CURB & GUTTER	–

ZONING CODE SUMMARY

PROJECT NAME: CATAWBA AT KNOX
OWNER/APPLICANT: CHARTER REALTY & DEVELOPMENT CORP.
JURISDICTION: TOWN OF CORNELIUS ETJ MECKLENBURG COUNTY, NC

ZONING: HIGHWAY COMMERCIAL (HC)

PARCEL ID: 001-14-509
001-14-522

EXISTING USE: VACANT

PROPOSED USE: COMMERCIAL

SITE ACREAGE: 11.039 AC±

ESTIMATED ROW TO BE ACQUIRED BY NCDOT: .406 AC±

TOTAL BUILDING SQUARE FOOTAGE: 40,199 SF±

WATERSHED PROTECTION: HIGH DENSITY (LAKE NORMAN CA)
MAX. ALLOWED IMPERVIOUS AREA: 5.52 AC (50%)
PROPOSED IMPERVIOUS AREA: 5.52 AC (50%)

LOT AREAS
LOT 1: 1.125 AC±
LOT 2: 0.905 AC±
LOT 3: 1.662 AC±
LOT 4: 6.941 AC±

SETBACKS

FRONT (WEST CATAWBA): 25'
FRONT (ONE NORMAN/FUTURE KNOX): 10'
SIDE: –
REAR: 30'

ESTIMATED CONSTRUCTION DATE: 12/2018

PLANTING AND TREE REQUIREMENTS PER CHAPTER 9 OF TOWN OF CORNELIUS LAND DEVELOPMENT CODE.

PARKING SUMMARY:
LOT 1: 44 SPACES
LOT 2: 36 SPACES
LOT 3: 69 SPACES
LOT 4: 163 SPACES
TOTAL PROVIDED 312 SPACES

ALL USES PERMITTED UNDER HC.

TREE PRESERVATION SUMMARY:

TOTAL NUMBER OF TREES (18" OR GREATER): 41

TREES TO REMAIN: 20

TREES TO REMOVE: 21

PERCENT OF TREES TO REMAIN 48.7%

North Carolina 811 www.nc811.org

1. CONTRACTOR IS FULLY RESPONSIBLE FOR CONTACTING APPROPRIATE PARTIES AND ASSURING THAT EXISTING UTILITIES ARE LOCATED PRIOR TO CONSTRUCTION.
2. CONTRACTOR IS RESPONSIBLE FOR PLACING BARRICADES USING FLAG MEN, ETC. AS NECESSARY TO INSURE SAFETY TO THE PUBLIC.
3. ALL PAVEMENT CUTS, CONCRETE OR ASPHALT, ARE TO BE REPLACED ACCORDING TO STANDARDS OF THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION AND CHARLOTTE-MECKLENBURG UTILITIES SPECIFICATIONS.
4. SHORING WILL BE ACCORDING TO OSHA TRENCHING STANDARDS PART 1926 SUBPART P, OR AS AMENDED.

ColeJenest & Stone

Shaping the Environment
Realizing the Possibilities

Land Planning
+
Landscape Architecture
+
Civil Engineering
+
Urban Design

200 South Tryon Street, Suite 1400
Charlotte, North Carolina 28202

p+ 704 376 1555 f+ 704 376 7851
url+ www.colejeneststone.com

CHARTER CORNELIUS, LP

75 Holly Hill Lane, Suite 305
Greenwich, Connecticut 06830

ONE NORMAN

20101 West Catawba Avenue
Cornelius
North Carolina, 28031

BY-RIGHT MASTER PLAN AND VESTED RIGHTS PLAN

Project No.
4493

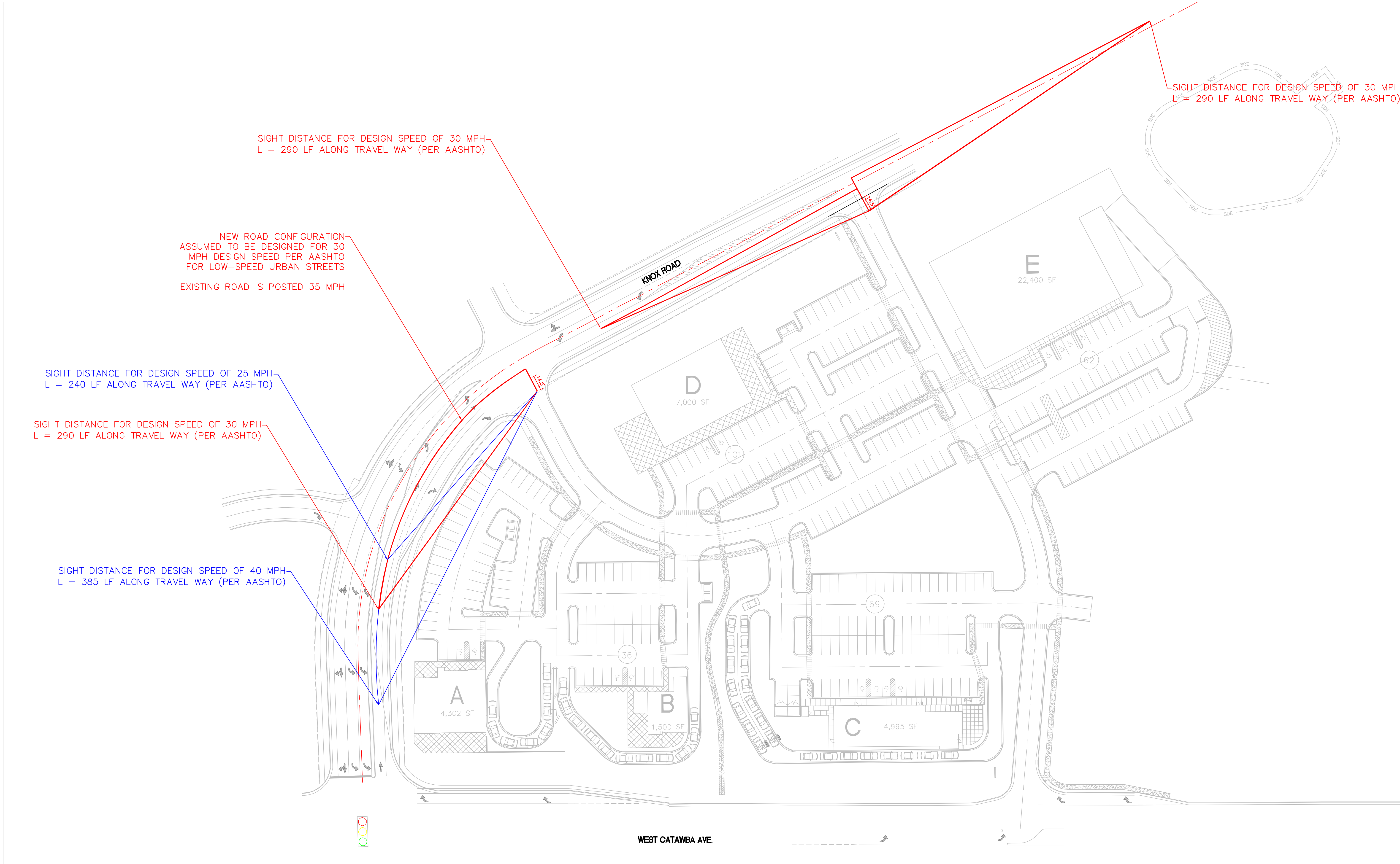
Issued
08/31/2018

Revised

COLEJENEST & STONE, P.A. CORPORATE SEAL C-1361 C-103 NORTH CAROLINA

SCALE: 1"=60'
0 30 60 120

MP-001



Kimley»Horn

NC LICENSE #F-0102
200 SOUTH TRYON STREET SUITE 200
CHARLOTTE, NORTH CAROLINA 28202
PHONE 704-333-5131

CATAWBA AT KNOX SIGHT DISTANCE PROFILES

DATE:10-10-2018

GRAPHIC SCALE IN FEET
0 20 40 80

NORTH

Plotted By:Racer, Joey Sheet Set:Kha Layout:Layout1 October 10, 2018 10:51:58pm K:\CHL_PRJ\015598 Town of Cornelius\ON-CALL TIA\PO #4_CATAWBA AT KNOX COMMERCIAL\13_EXHIBITS\2018-10-03_Sight Distance Profiles.dwg

Kimley»Horn

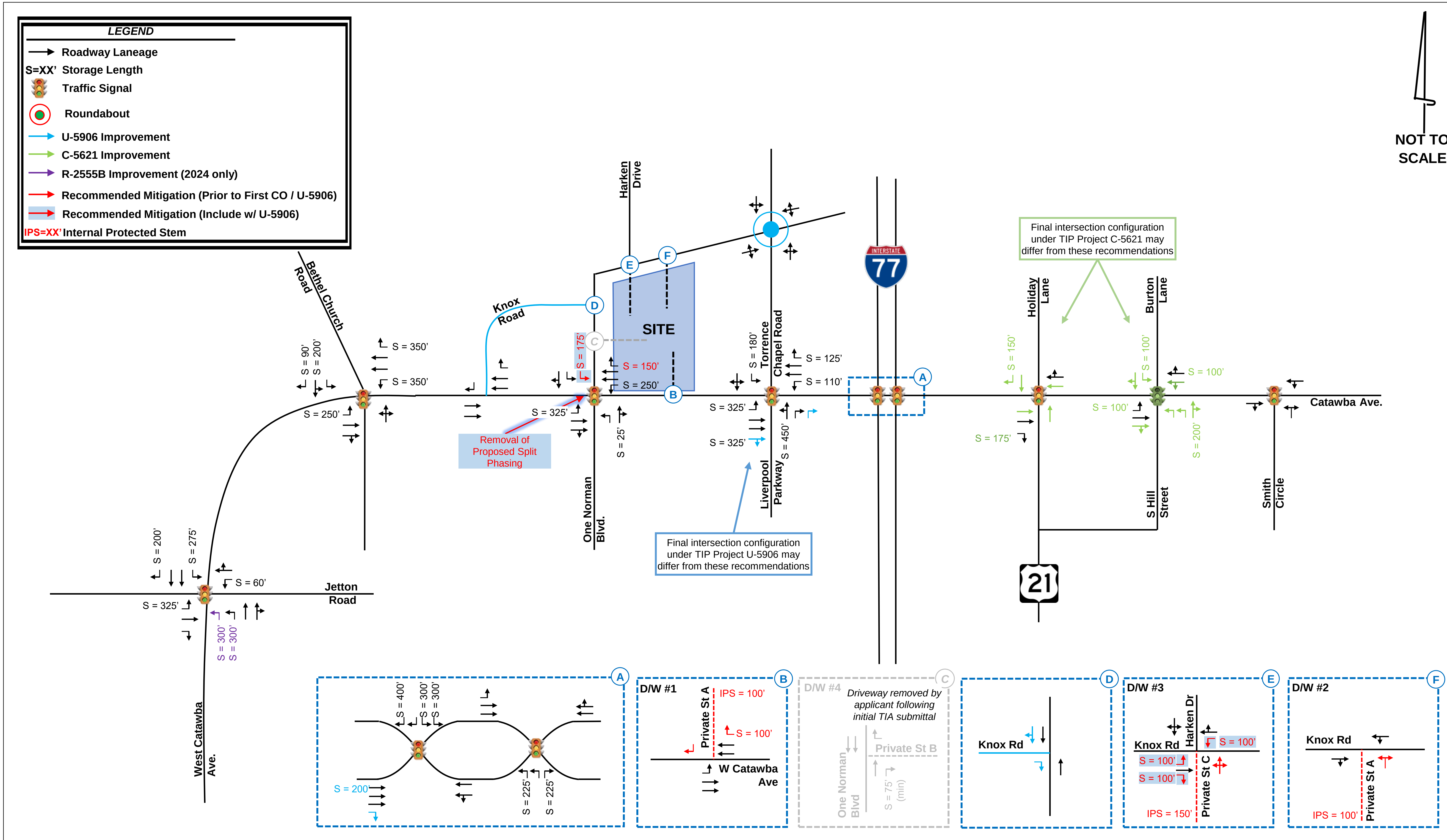
NC LICENSE #F-0102
200 SOUTH TRYON STREET SUITE 200
CHARLOTTE, NORTH CAROLINA 28202
PHONE 704-333-5131

CATAWBA AT KNOX SIGHT DISTANCE PROFILES

DATE:10-10-2018

GRAPHIC SCALE IN FEET
0 20 40 80

NORTH



Kimley»Horn

Catawba at Knox Retail Traffic Impact Analysis

Phasing of Recommended Mitigation Improvements

Figure 1

MASTER PLAN DEVELOPMENT NOTES:

1. Subdivision. The Property is one development and will be subdivided to allow buildings as principal uses on individual parcels as depicted on the Plan. However, recombination, condominiumization, reconfiguration or reduction of parcels may occur. Subdivision for conveyance purposes, as well as final subdivision plat or plats once final building and improvement locations are determined, may be approved administratively.

2. Building Parcels. This Plan is a conceptual Plan. Exact sizes, footprints and locations of buildings shall be determined during the construction drawing phase of development and may be administratively approved, so long as the total square footage of improvements does not exceed the total amount shown on the Plan.

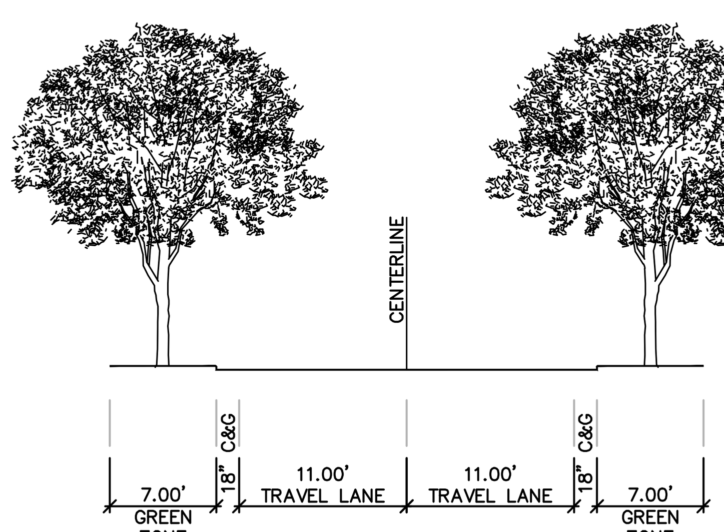
3. Modifications. Applicant may voluntarily agree to apply for future amendments to the Plan in a manner consistent with the LDC as it changes from time to time. Such modifications to the LDC shall in no way impact the Applicant's vested rights established per the LDC once the Plan is approved. Applicant, or it's designated successor in interest of the specific right to amend the Plan as set forth herein, may request an amendment to this Plan without the written consent of any other owners of all or any portion of the Property unless such amendment constitutes a change in the building or use of the portion of the Property owned by such owner or otherwise materially impairs any other property rights of such owner. Minor adjustments to driveway locations, curbs and curb cuts may be made administratively during the construction drawing phase of development. Any future rezoning initiated by the owner(s) of any lots shown on the Plan shall not affect the vested rights status of the lots not rezoned.

4. Phasing. The development may be phased. Grading of the Property may be completed per phase of the development.

5. Permitted Uses. The Property may be devoted to the uses permitted in the HC zoning district as set forth in the LDC.

6. High Density Option. The high density option as shown on the Development Plan is approved by the Cornelius Town Board upon approval of the Plan.

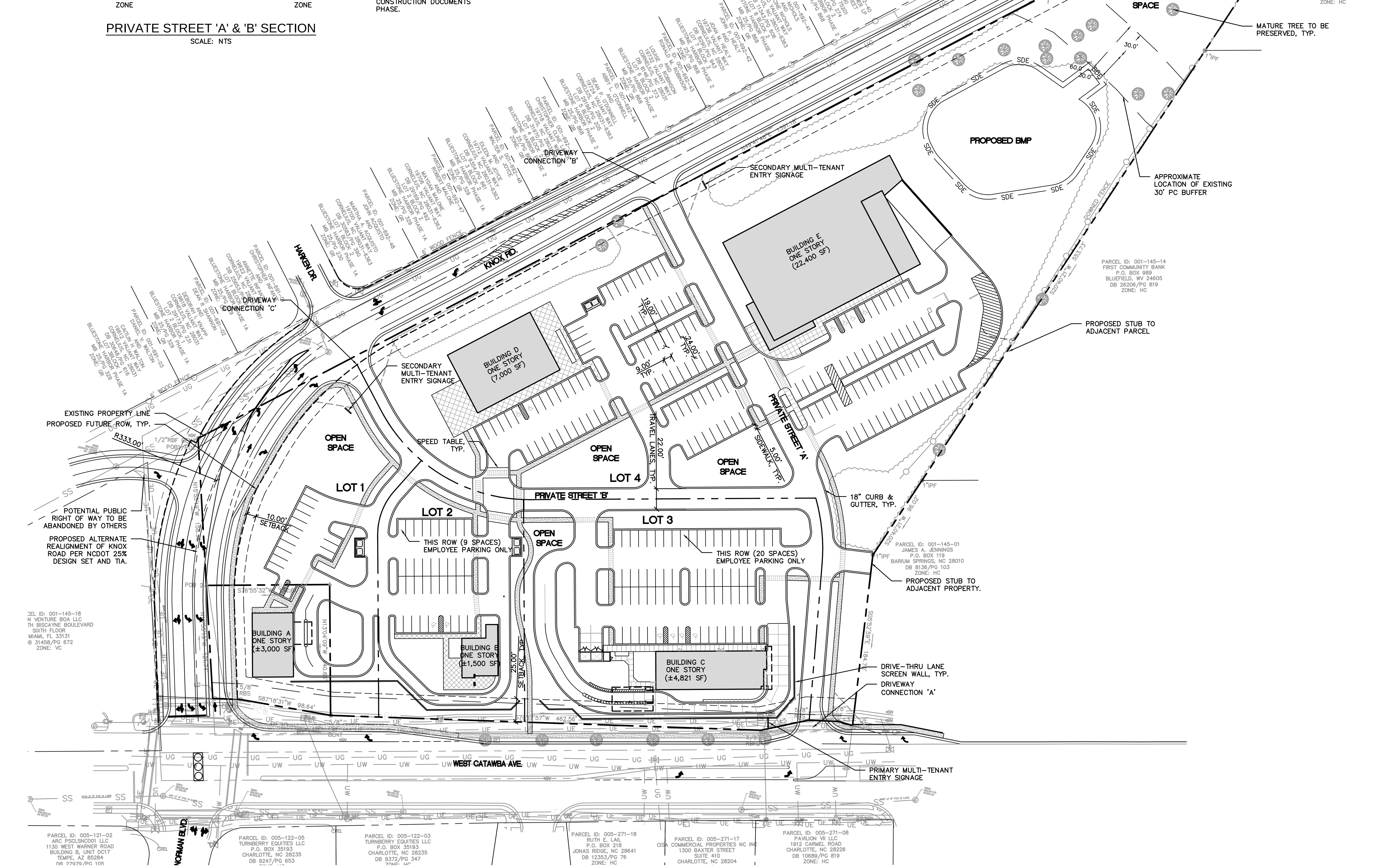
7. Vested Rights. Applicant has requested vested rights approval pursuant to Section 12.10 of the LDC and G.S.160A-385.1 of the North Carolina General Statutes. The approved Plan is vested for a period of five (5) years from the date of the approval of the Plan by the Cornelius Town Board.

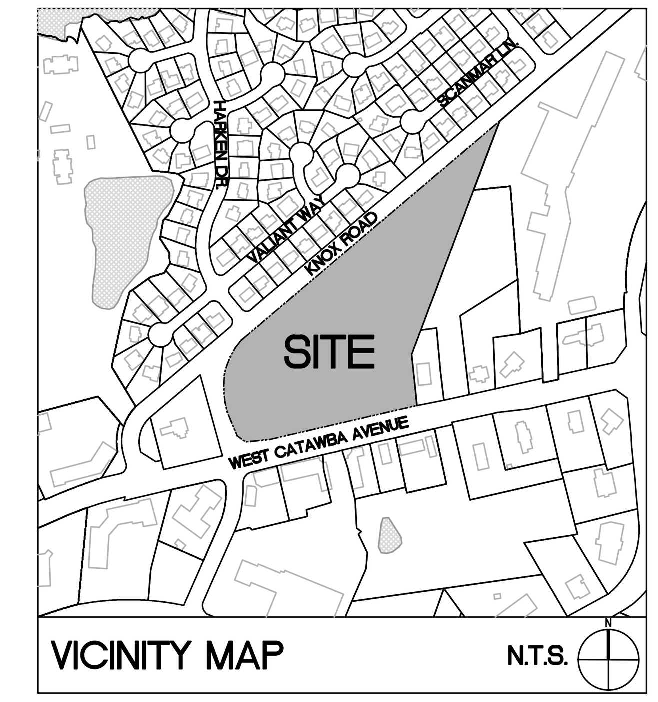


PRIVATE STREET 'A' & 'B' SECTION

SCALE: NTS

NOTE:
ACTUAL FIELD CONDITIONS AT THE CONNECTION TO PROPOSED PUBLIC STREETS TO ADJACENT STREETS MAY VARY. FINAL DESIGN OF STREET CONNECTIONS SHALL BE DETERMINED DURING CONSTRUCTION DOCUMENTS PHASE.





LEGEND

SYMBOL		DETAIL
	PROPOSED SIDEWALK	–
	PROPOSED BUILDING ENVELOPE	–
	PROPOSED 18" CURB & GUTTER	–

ZONING CODE SUMMARY

PROJECT NAME: CATAWBA AT KNOX
OWNER/APPLICANT: CHARTER REALTY & DEVELOPMENT CORP.
JURISDICTION: TOWN OF CORNELIUS ETJ MECKLENBURG COUNTY, NC

ZONING: HIGHWAY COMMERCIAL (HC)

PARCEL ID: 001-14-509
001-14-522

EXISTING USE: VACANT

PROPOSED USE: COMMERCIAL

SITE ACREAGE: 11.039 AC±

ESTIMATED ROW TO BE ACQUIRED BY NCDOT: .406 AC±

TOTAL BUILDING SQUARE FOOTAGE: 38,721 SF±

WATERSHED PROTECTION: HIGH DENSITY (LAKE NORMAN CA)
MAX. ALLOWED IMPERVIOUS AREA: 5.52 AC (50%)
PROPOSED IMPERVIOUS AREA: 5.52 AC (50%)

LOT AREAS
LOT 1: 1.127 AC±
LOT 2: 0.903 AC±
LOT 3: 1.766 AC±
LOT 4: 6.838 AC±

OPEN SPACE
REQUIRED (20% OF SITE AREA): 2.13 AC
PROPOSED TOTAL: 2.20 AC
REQUIRED IMPROVED OPEN SPACE (50%): 1.10 AC
PROPOSED IMPROVED OPEN SPACE: 1.10 AC

SETBACKS
FRONT (WEST CATAWBA): 25'
FRONT (ONE NORMAN/FUTURE KNOX): 10'
SIDE: –
REAR: 30'

ESTIMATED CONSTRUCTION DATE: 12/2018

PLANTING AND TREE REQUIREMENTS PER CHAPTER 9 OF TOWN OF CORNELIUS LAND DEVELOPMENT CODE.

PARKING SUMMARY:
LOT 1: 16 SPACES
LOT 2: 36 SPACES
LOT 3: 68 SPACES
LOT 4: 148 SPACES
TOTAL PROVIDED 268 SPACES

ALL USES PERMITTED UNDER HC.

TREE PRESERVATION SUMMARY:
TOTAL NUMBER OF TREES (18" OR GREATER): 41
TREES TO REMAIN: 20
TREES TO REMOVE: 21
PERCENT OF TREES TO REMAIN 48.7%

LIGHTING PER SECTION 7.5 OF TOWN OF CORNELIUS LAND DEVELOPMENT CODE.

North Carolina 811 www.nc811.org

1. CONTRACTOR IS FULLY RESPONSIBLE FOR CONTACTING APPROPRIATE PARTIES AND ASSURING THAT EXISTING UTILITIES ARE LOCATED PRIOR TO CONSTRUCTION.
2. CONTRACTOR IS RESPONSIBLE FOR PLACING BARRICADES USING FLAG MEN, ETC. AS NECESSARY TO INSURE SAFETY TO THE PUBLIC.
3. ALL PAVEMENT CUTS, CONCRETE OR ASPHALT, ARE TO BE REPLACED ACCORDING TO STANDARDS OF THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION AND CHARLOTTE-MECKLENBURG UTILITIES SPECIFICATIONS.
4. SHORING WILL BE ACCORDING TO OSHA TRENCHING STANDARDS PART 1926 SUBPART P, OR AS AMENDED.

ColeJenest & Stone

Shaping the Environment
Realizing the Possibilities

Land Planning
+
Landscape Architecture
+
Civil Engineering
+
Urban Design

200 South Tryon Street, Suite 1400
Charlotte, North Carolina 28202

p+ 704 376 1555 f+ 704 376 7851
url+ www.colejeneststone.com

CHARTER CORNELIUS, LP

75 Holly Hill Lane, Suite 305
Greenwich, Connecticut 06830

ONE NORMAN

20101 West Catawba Avenue
Cornelius
North Carolina, 28031

CONDITIONAL REZONING PLAN

Project No.
4493

Issued
11/12/2018

Revised

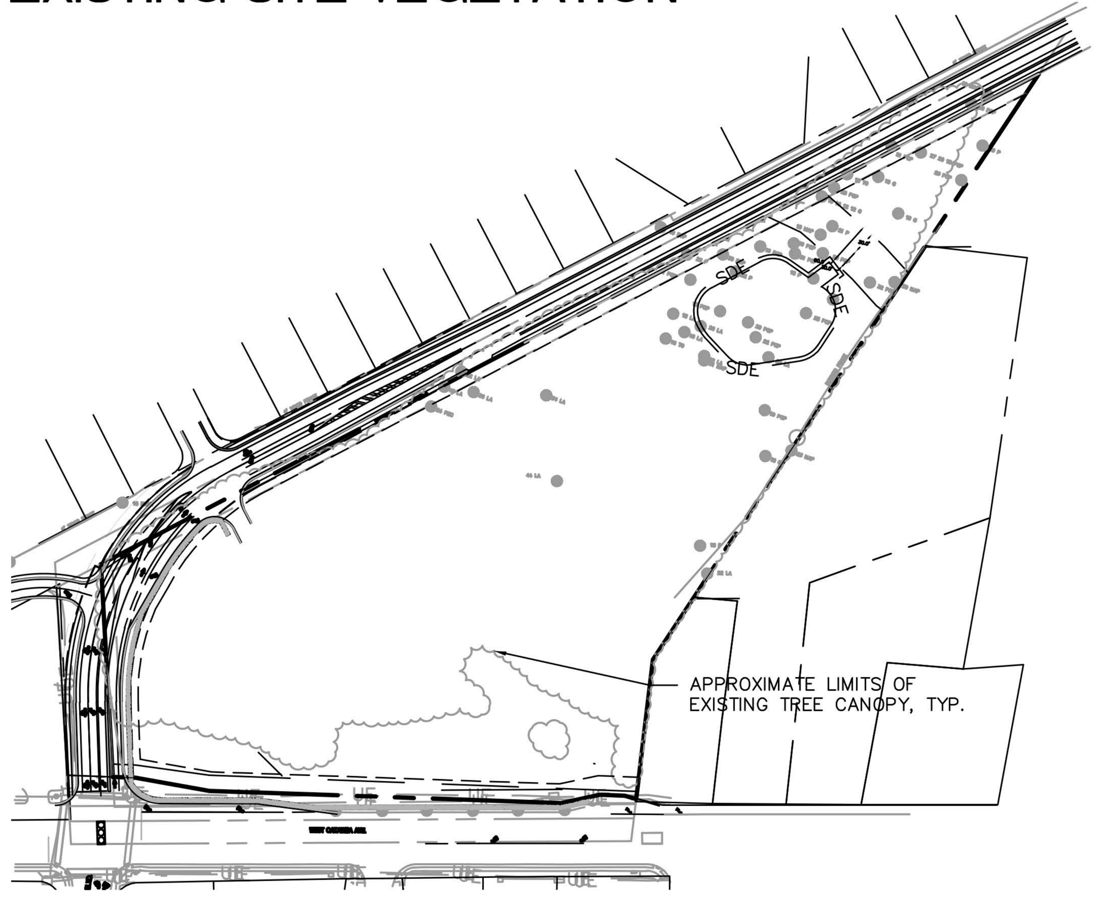
COLEJENEST & STONE, P.A. CORPORATE SEAL C-1361 C-103 NORTH CAROLINA

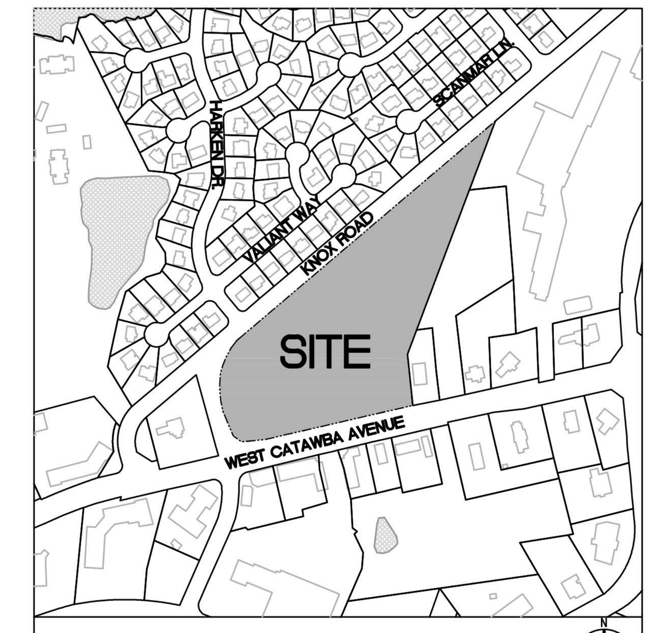
SCALE: 1"=60'
0 30 60 120

N

MP-001

EXISTING SITE VEGETATION





VICINITY MAP N.T.S.

1. CONTRACTOR IS FULLY RESPONSIBLE FOR CONTACTING APPROPRIATE PARTIES AND ASSURING THAT EXISTING UTILITIES ARE LOCATED PRIOR TO CONSTRUCTION.
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COLEJENEST & STONE, P.A. CORPORATE SEAL C-1361 C-103 NORTH CAROLINA

SCALE: 1"=60'
0 30 60 120

MP-002

3D View of W Catawba Ave Looking Towards Corner at One Norman BLVD

3D View Building at Corner of W Catawba Ave & One Norman BLVD

3D View of Catawba Ave Opposite One Norman BLVD Corner

Elevation at One Norman BLVD

3D View at Corner of W Catawba Ave & One Norman BLVD

1 W Catabawa Ave Elevation
1" = 20'-0"

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08/18/17
Revised

10/18/17
Revised

02/22/18
Revised

Note: Elevations are conceptual and may be revised prior to final construction. All images shown are for purposes of showing building architecture only. Site layout is under a separate submission.

One Norman
Elevations

A101

3D View of Small Shops on Knox Rd Facing Parking

3D View of Grocery Facing Parking

2 Parking Side Elevation of Knox Rd Buildings
1" = 20'-0"

1 Grocery Rear Elevation on Knox Rd
1" = 20'-0"

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One Norman
Elevations

A102

3D View on W Catawba Ave Opposite One Norman Blvd Corner with Monument Sign and Gateway Icon

3D View of Building on the Corner of W Catawba Ave and One Norman Blvd Looking Towards Parking

1 Catawba Rd Building Elevations Toward Parking
1" = 20'-0"

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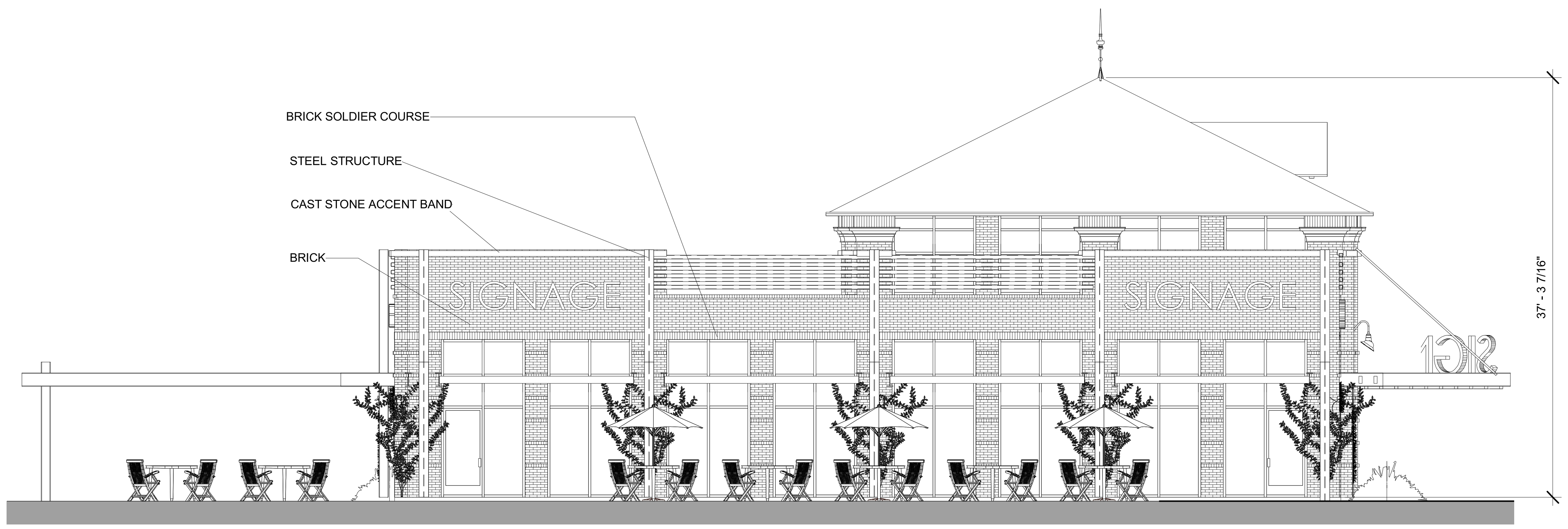
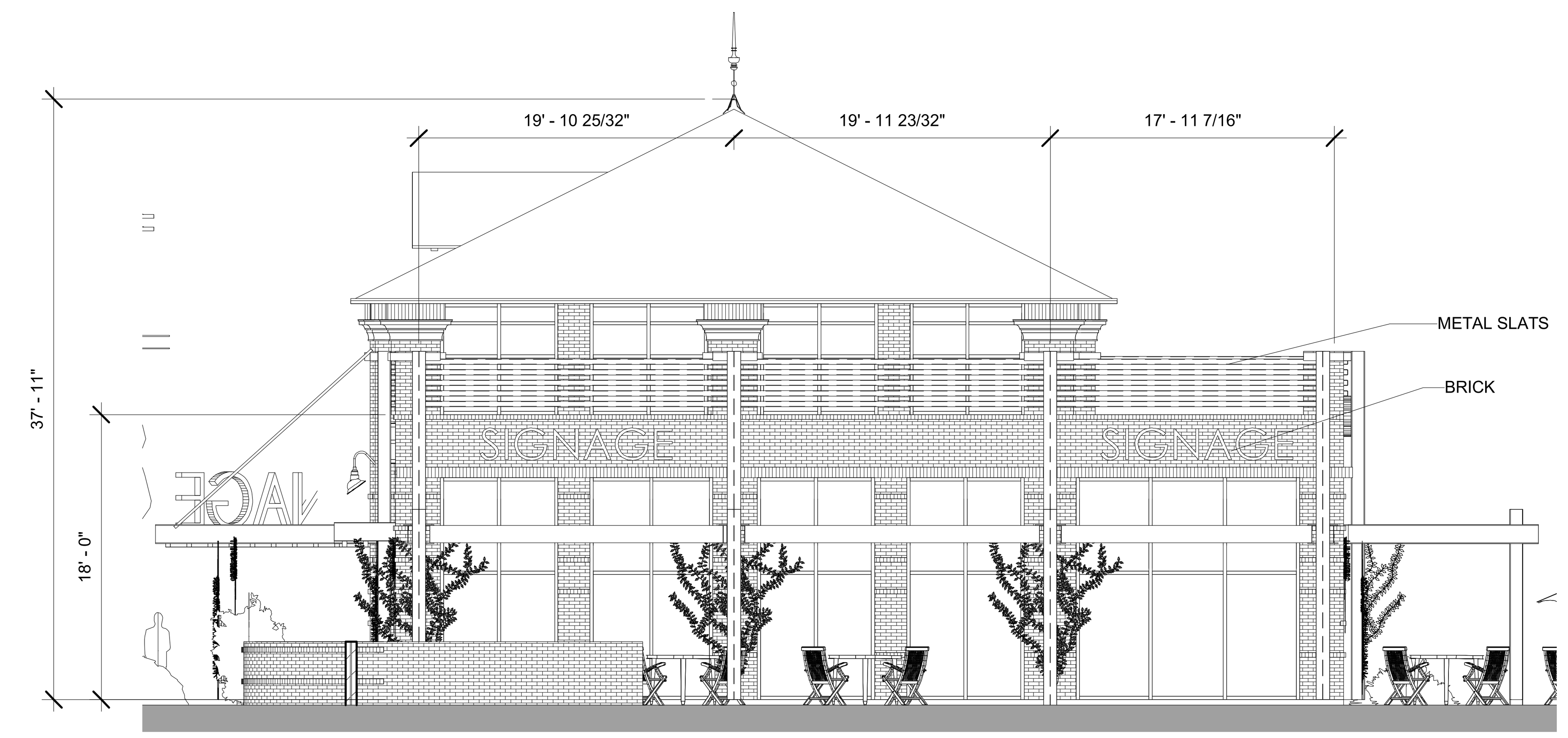
One Norman
Elevations

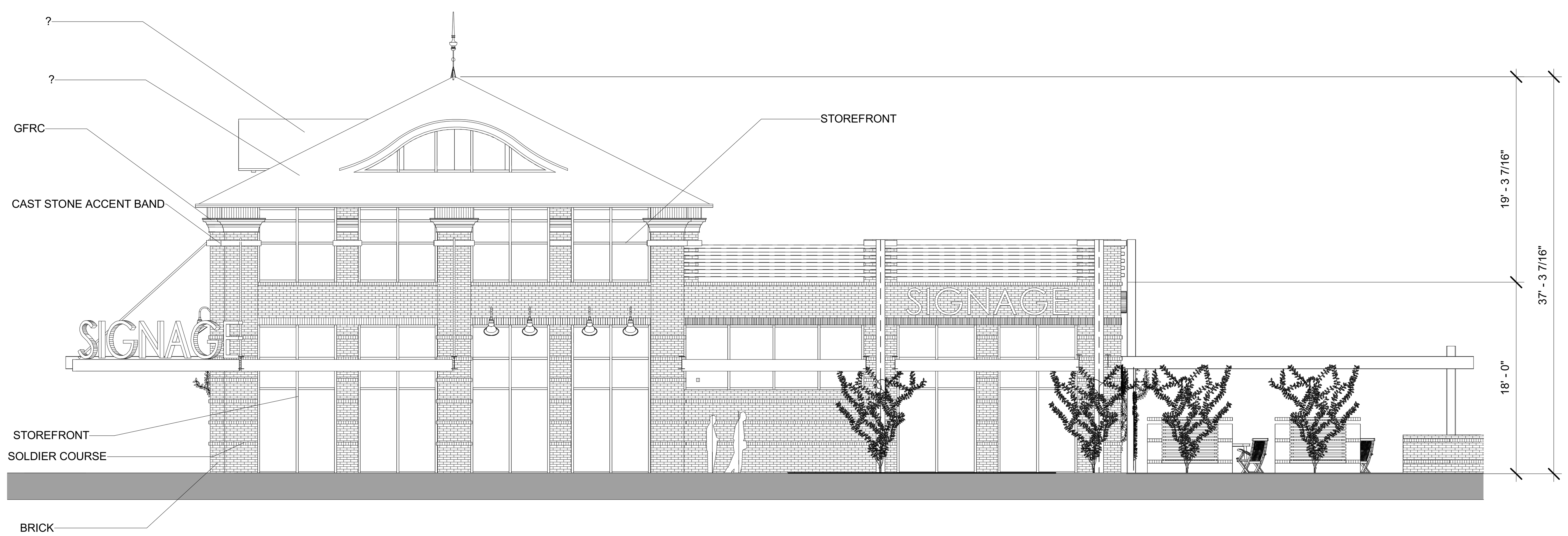
A103



2 Building A - North Elevation
1/8" = 1'-0"

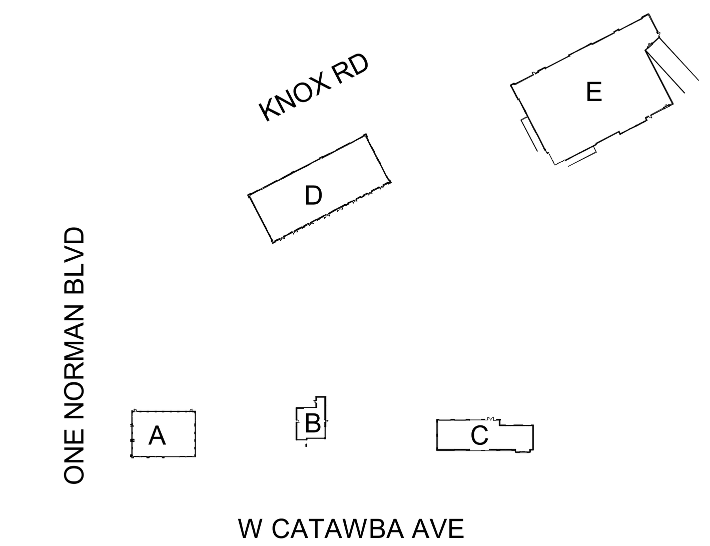


1 Building A - East Elevation
1/8" = 1'-0"



3 Building A - South Elevation
1/8" = 1'-0"

4 Building A - West Elevation
1/8" = 1'-0"



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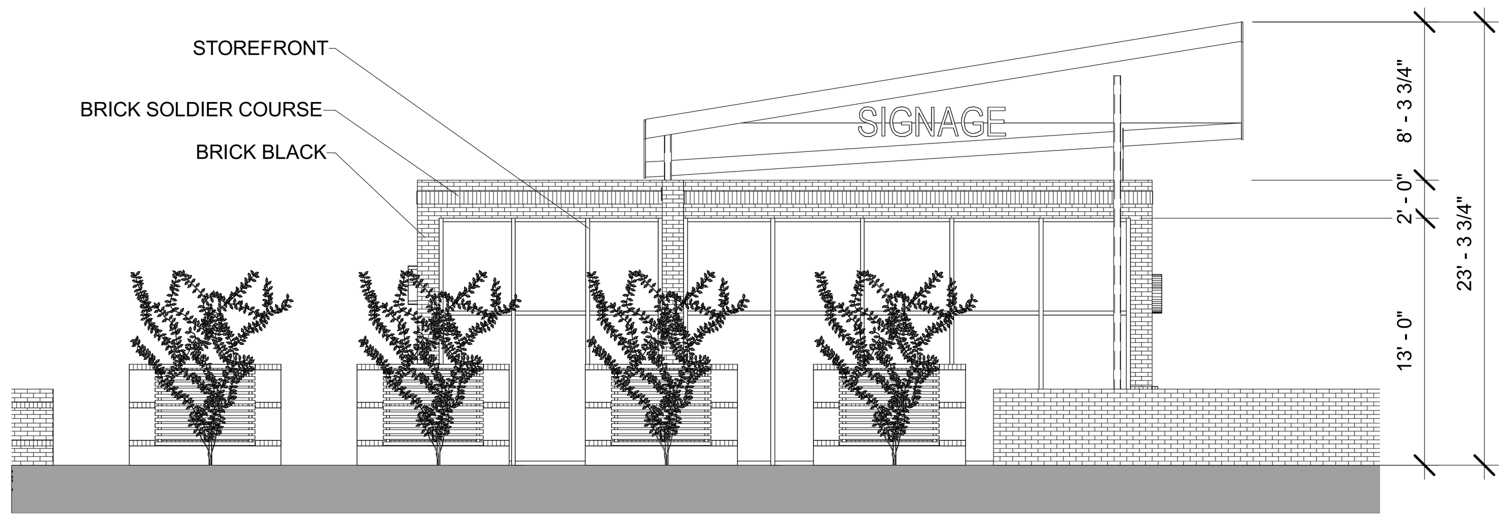
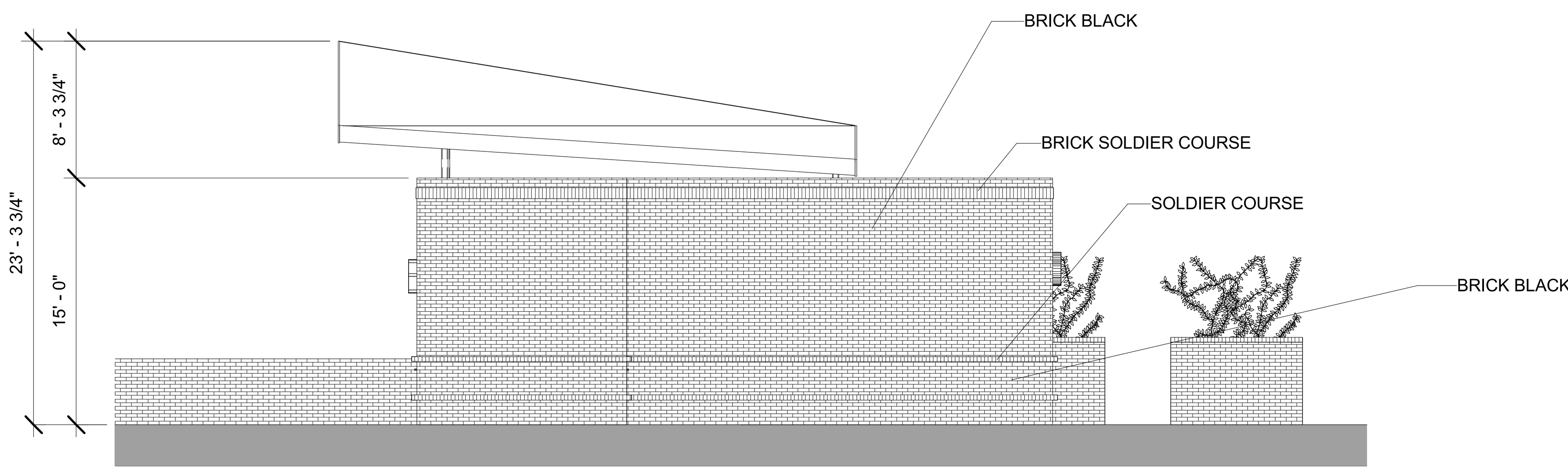
One Norman
Building A Elevations

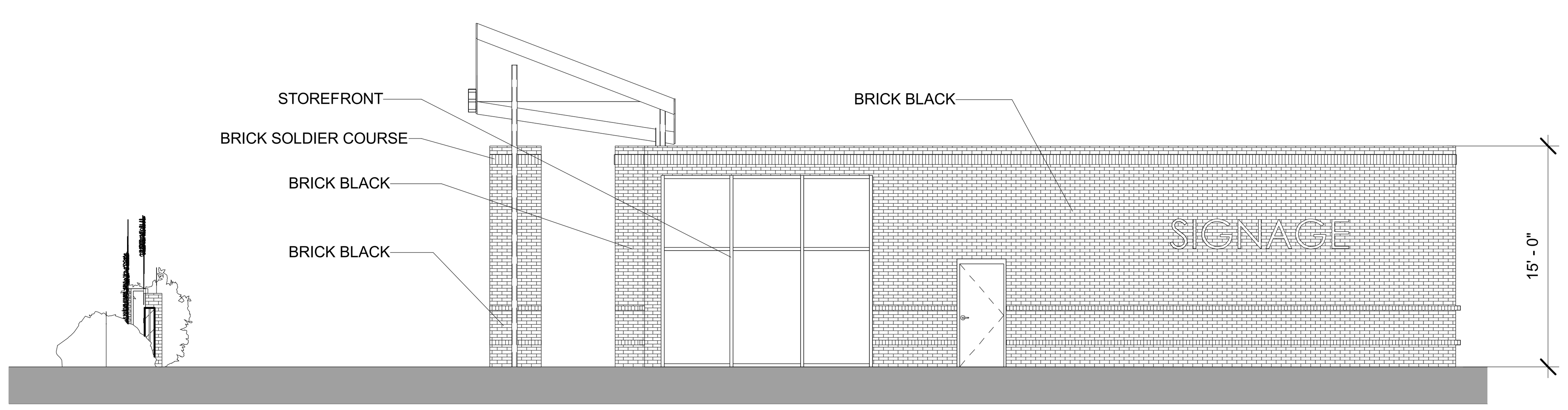
A104



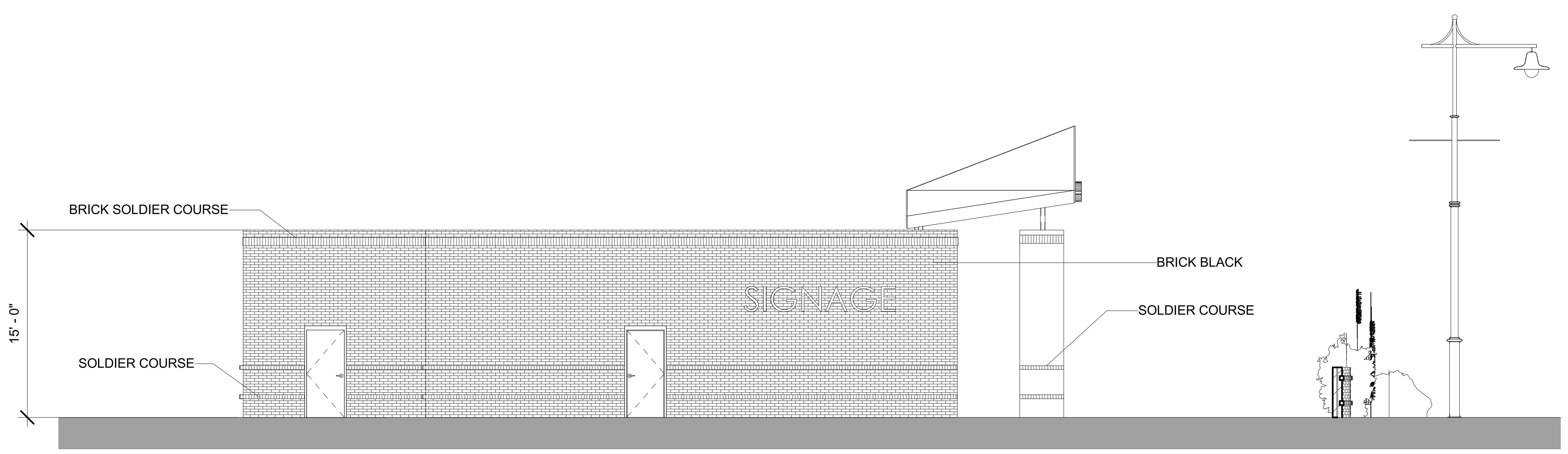
3 Building B - South Elevation
1/8" = 1'-0"



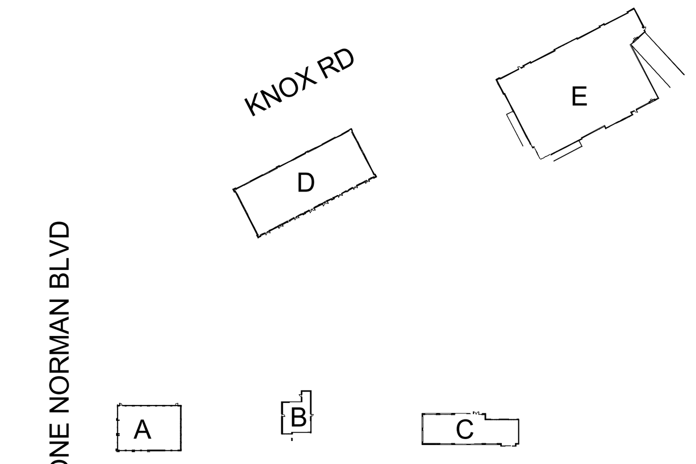
2 Building B - North Elevation
1/8" = 1'-0"



1 Building B - East Elevation
1/8" = 1'-0"



4 Building B - West Elevation
1/8" = 1'-0"



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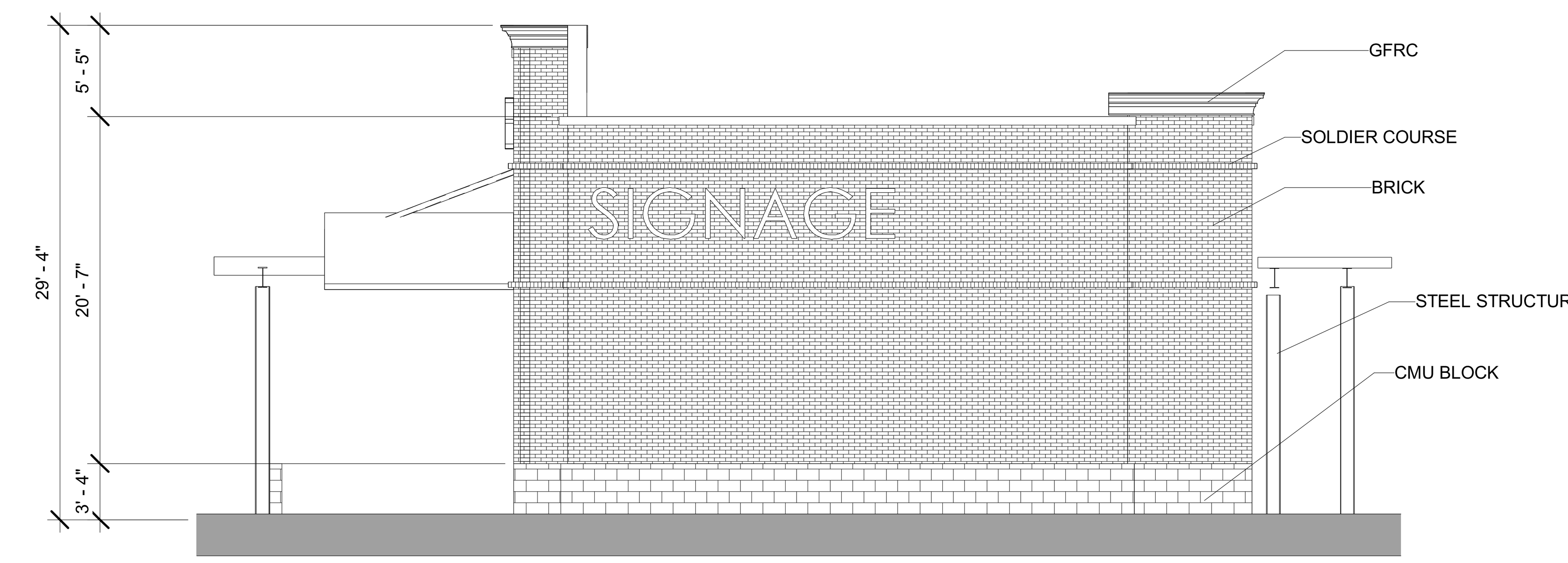
One Norman

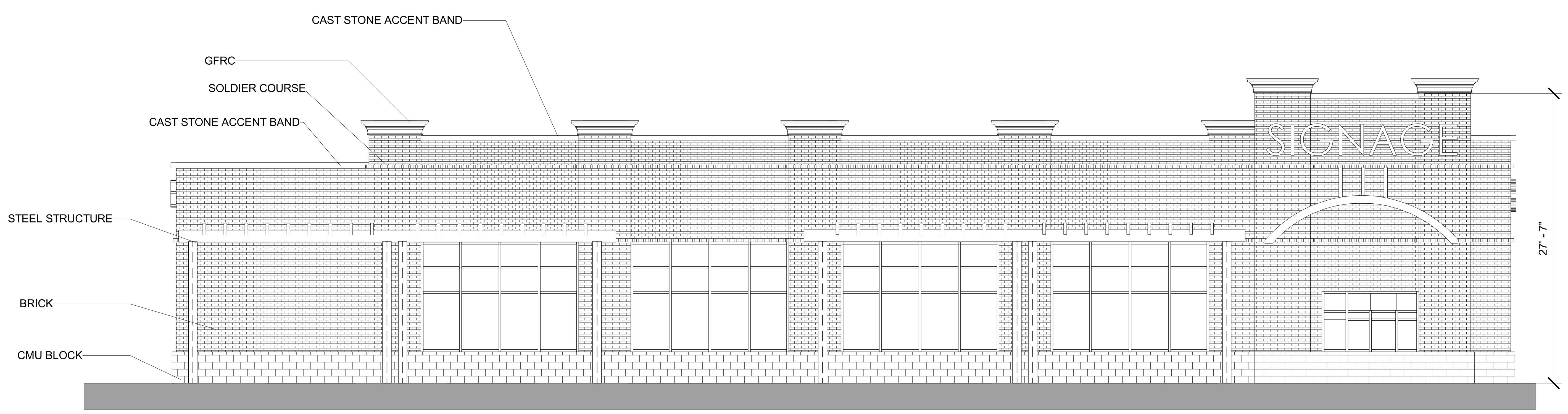
Building B Elevation

A105

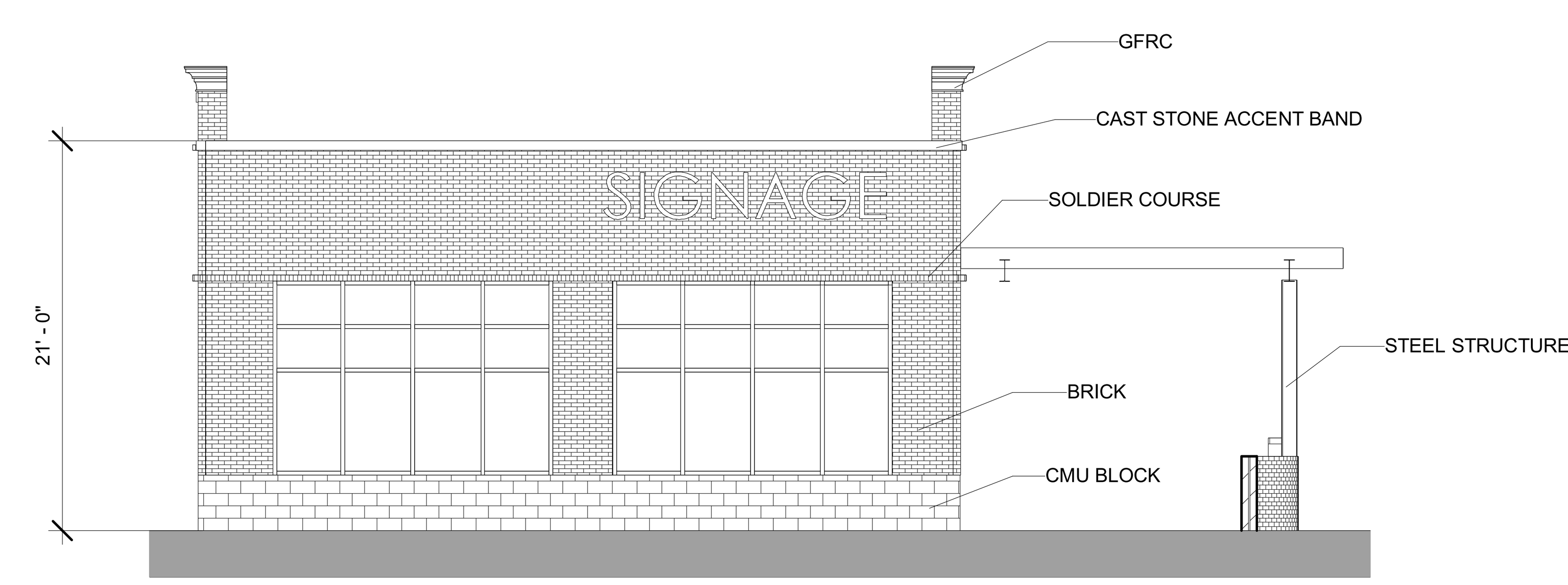
2 Building C - North Elevation
1/8" = 1'-0"



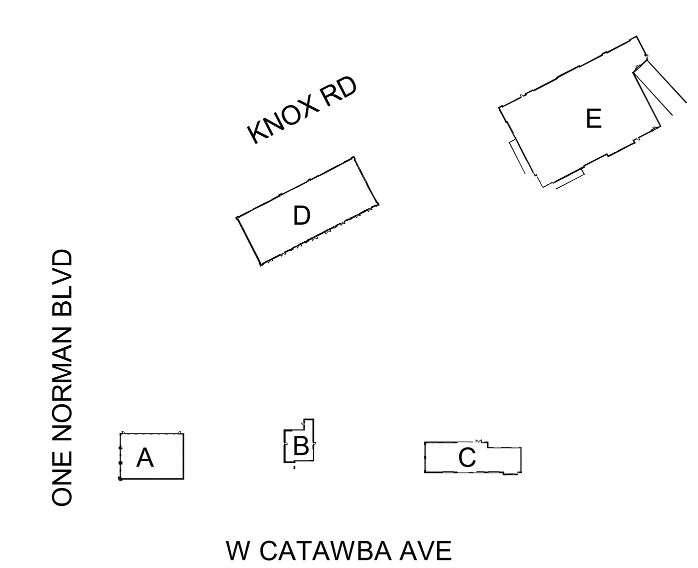
1 Building C - East Elevation
1/8" = 1'-0"



3 Building C - South Elevation
1/8" = 1'-0"



4 Building C - West Elevation
1/8" = 1'-0"



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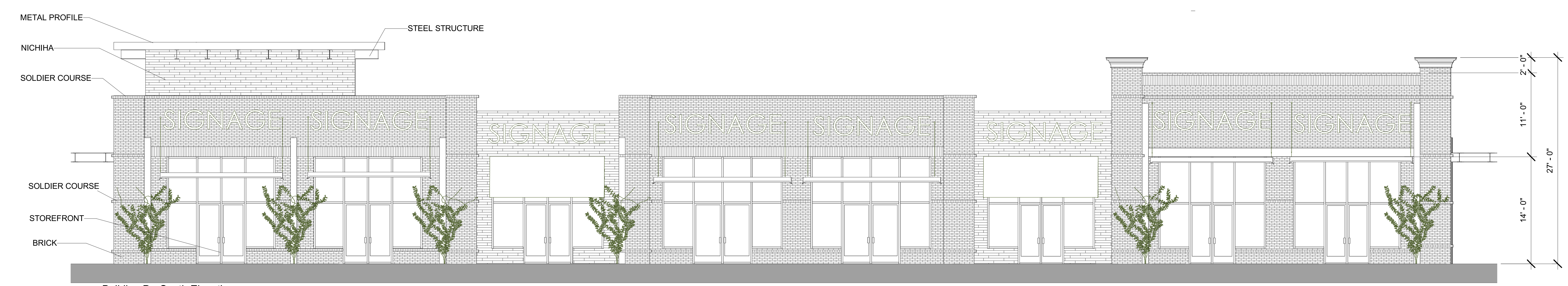
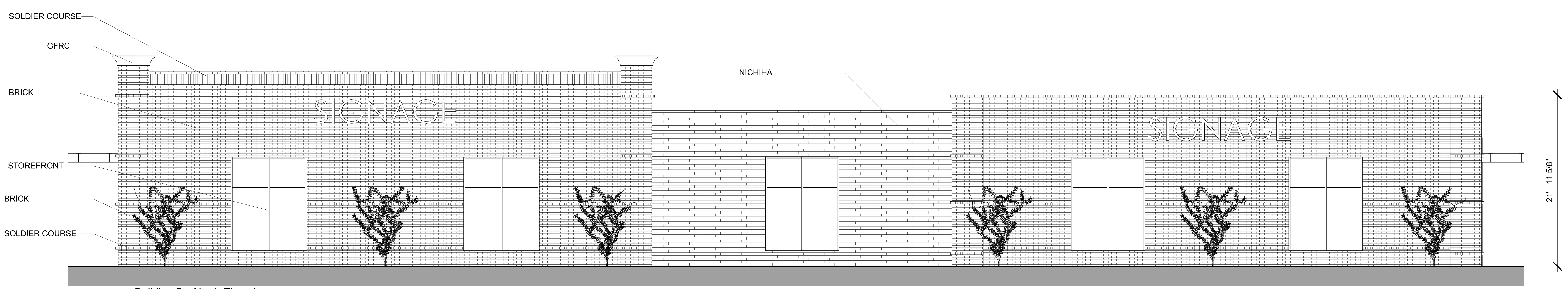
One Norman

Building C Elevations

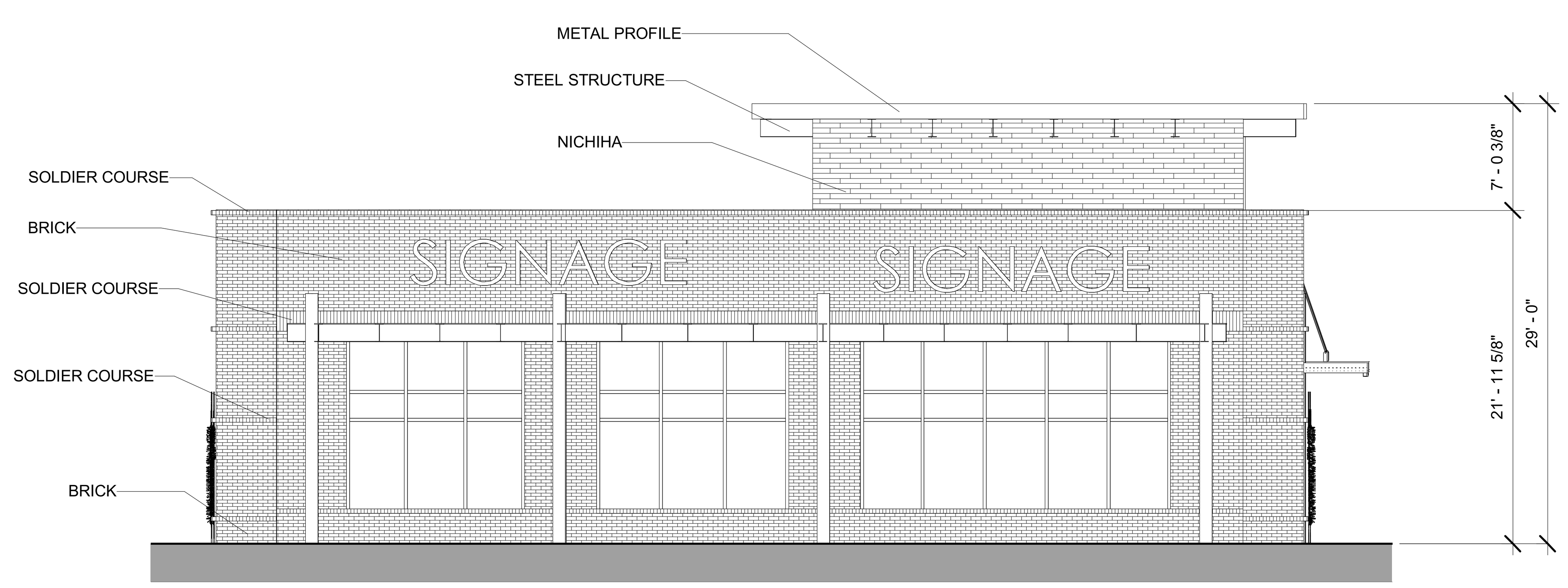
A106



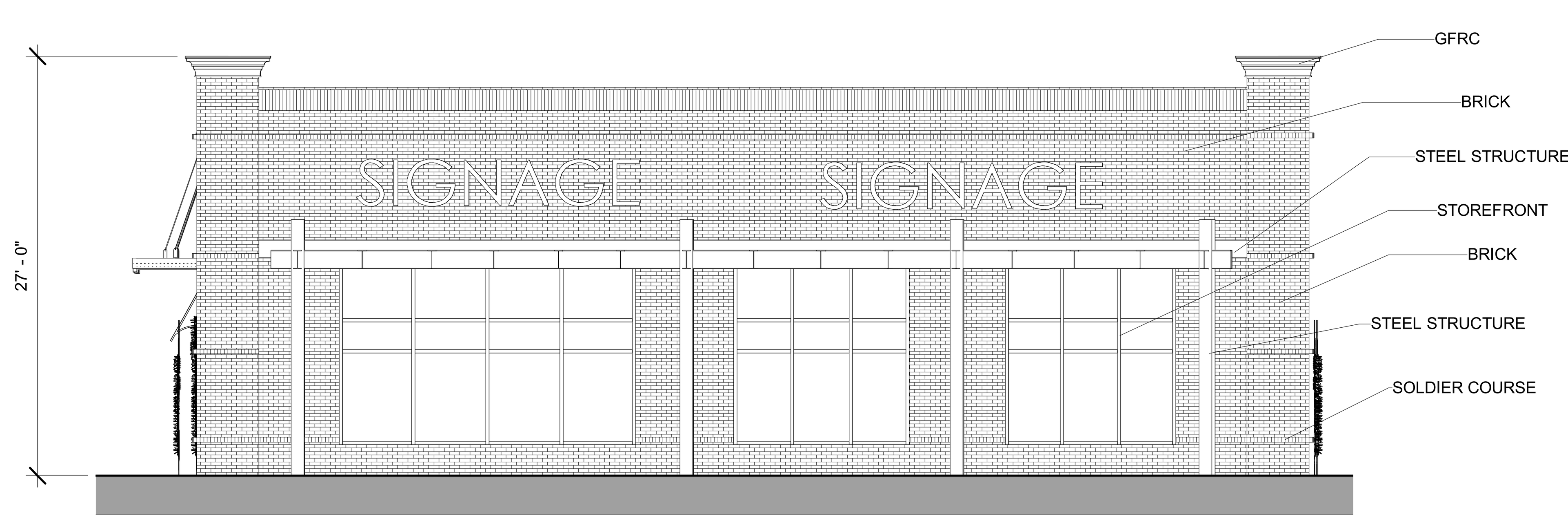
3 Building D - South Elevation
1/8" = 1'-0"



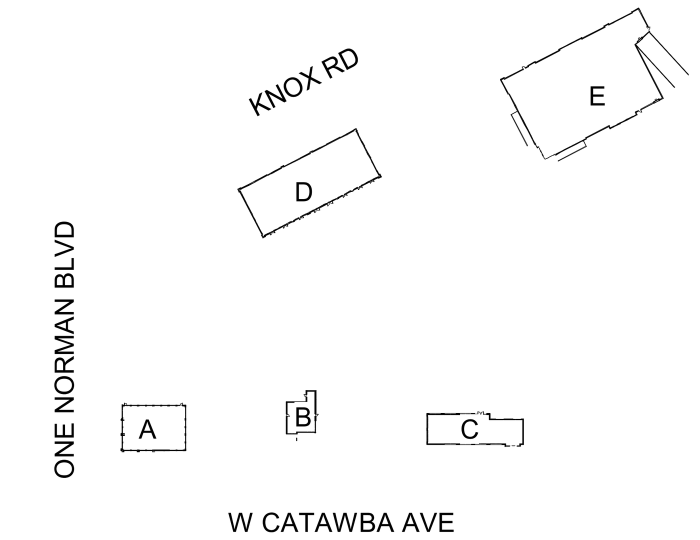
2 Building D - North Elevation
1/8" = 1'-0"



1 Building D - East Elevation
1/8" = 1'-0"



4 Building D - West Elevation
1/8" = 1'-0"



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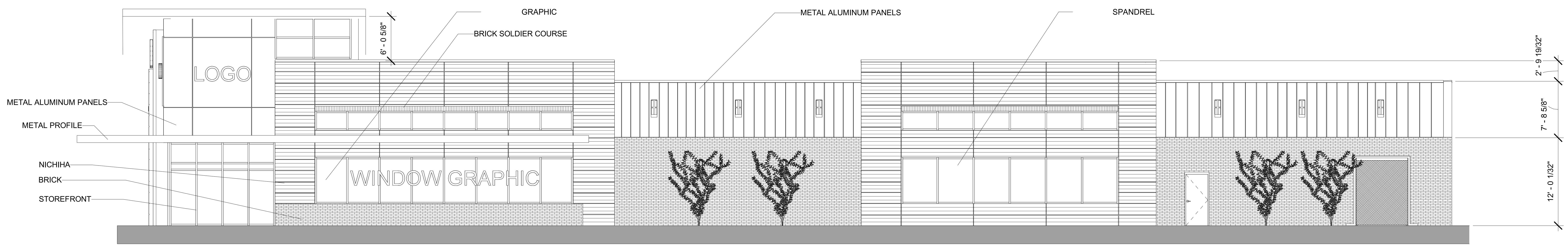
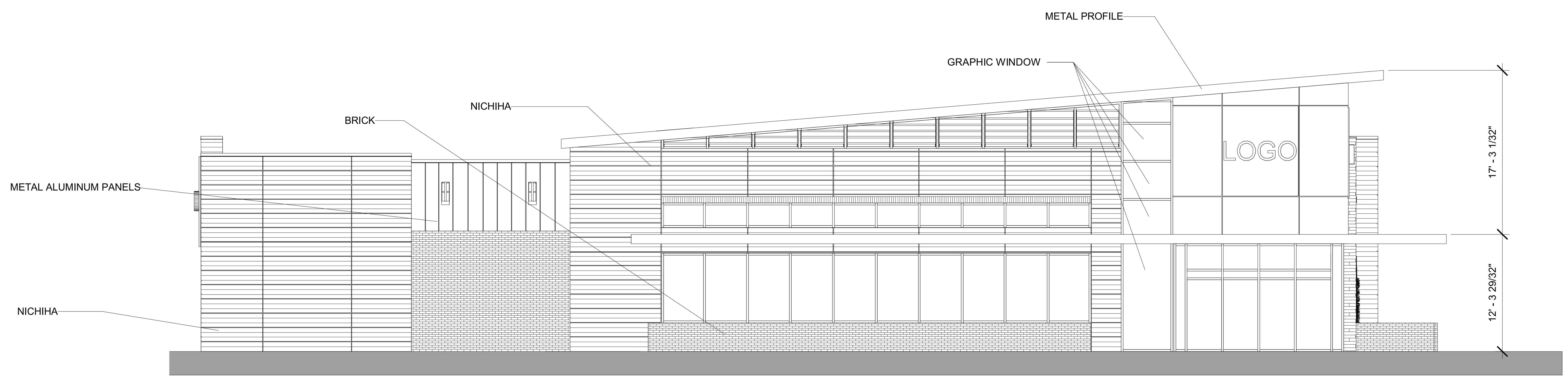
One Norman
Building D Elevations

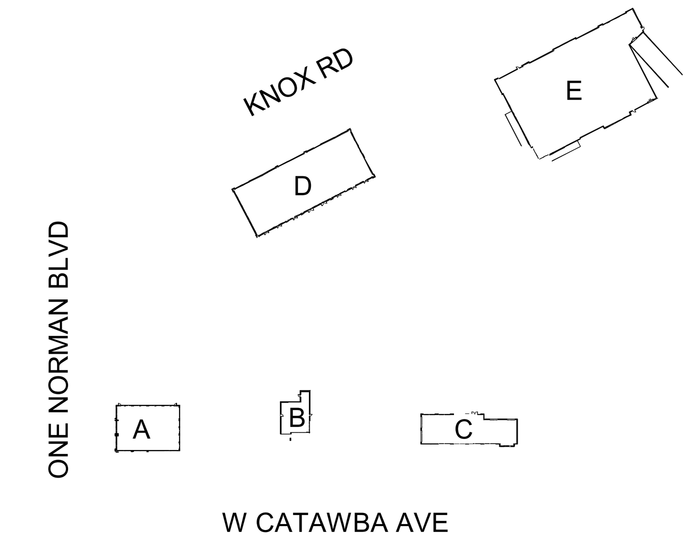
A107



1 Building E - South Elevation
1/8" = 1'-0"



3 Building E - East Elevation
1/8" = 1'-0"



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Revised

02/22/18
Revised

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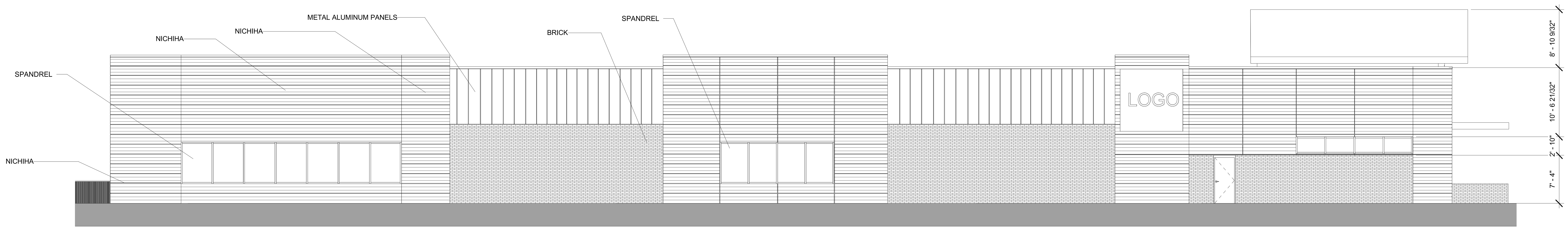
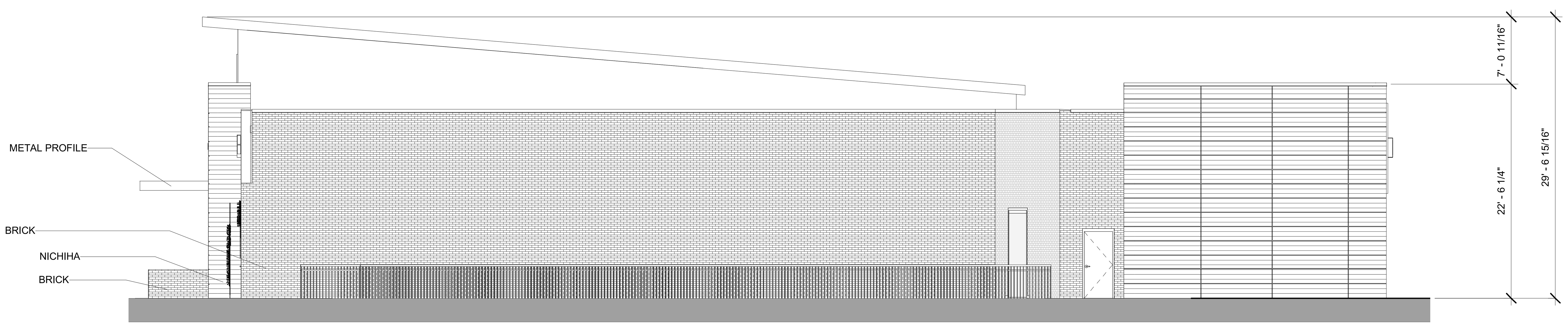
One Norman

Building E Elevations

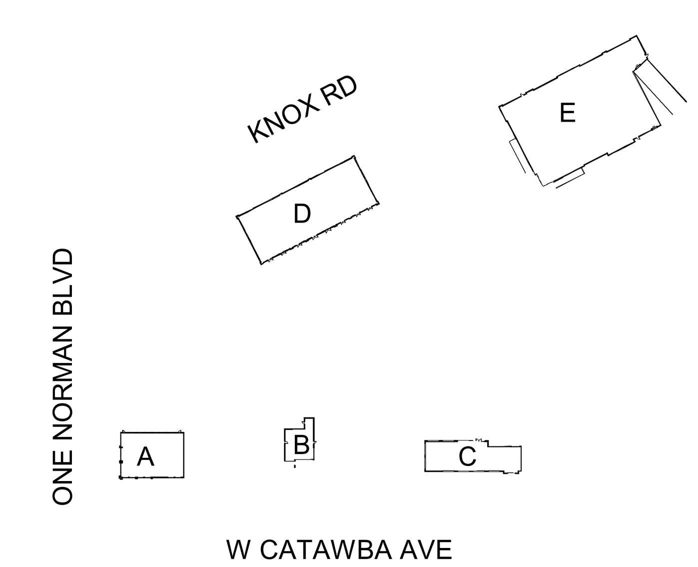
A108



1 Building E - North Elevation
1/8" = 1'-0"



2 Building E - West Elevation
1/8" = 1'-0"



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One Norman
Building E Elevations

A109

Ordinance No. 2018- _____

AN ORDINANCE TO AMEND THE TOWN OF CORNELIUS ZONING MAP

REZ 06-17 Catawba at Knox

WHEREAS, the Town of Cornelius has received an application requesting that the zoning classification of parcels of land subject to the zoning regulations of the Town be reclassified; and

WHEREAS, notice of public hearing on the question of the reclassification of the subject parcels has been provided through posting of the property; and

WHEREAS, notice of public hearing on the question of the reclassification of the subject parcels has been provided through advertisement in a newspaper of general circulation in the Town; and

WHEREAS, property owners contiguous to the subject parcels have been notified by first class mail of the public hearing on the question of the reclassification; and

WHEREAS, a public hearing on the question of the reclassification of the subject parcel has been held by the Board of Commissioners of the Town of Cornelius; and

NOW, THEREFORE, BE IT ORDAINED BY THE BOARD OF COMMISSIONERS OF THE TOWN OF CORNELIUS THAT:

Tax Parcel Number 00114509 and 00114522 consisting of approximately 11.067 acres located at 20101 West Catawba Avenue, be reclassified as *Conditional Zoning (CZ) District* as shown on *Exhibit A* and as further subject to the conditions shown on *Exhibit B* attached hereto and incorporated herein by reference.

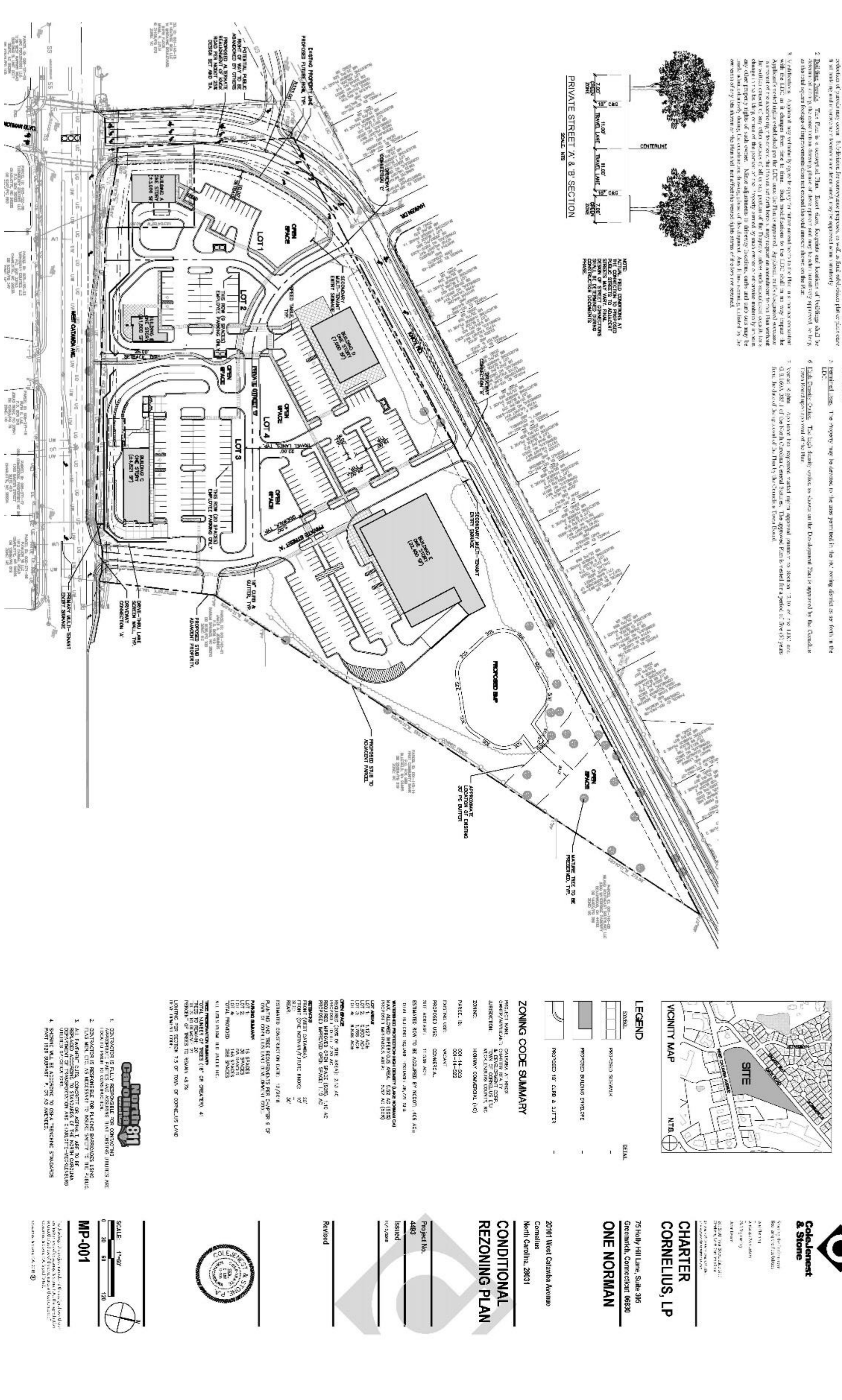
Adopted this the 19th day of November, 2018.

____
Woody T. Washam, Jr., Mayor

ATTEST: APPROVED AS TO FORM:

________________________________ ________________________________
Lori A. Harrell, Town Clerk Town Attorney

Exhibit A



MASTER PLAN DEVELOPMENT NOTES
PRIVATE STREET 'A' & 'B' SECTION
LOT 1
LOT 2
LOT 3
LOT 4
OPEN SPACE
PROPOSED BMP
VICINITY MAP
SITE
LEGEND
ZONING CODE SUMMARY
Cole Jenest & Stone
CHARTER CORNELIUS, LP
75 Holly Hill Lane, Suite 305
Greenwich, Connecticut 06830
ONE NORMAN
20161 West Catawba Avenue
Cornelius
North Carolina, 28031
CONDITIONAL REZONING PLAN
Project No.
Issued
Revised
MP-001

Exhibit B

Conditions of REZ 06-17

1. Town approval is contingent on review and approval by other applicable local, state and federal agencies.

2. The development shall comply with all other applicable requirements of the Town of Cornelius Land Development Code.

3. Town approval incorporates and shall comply with any and all submittals in the case file and correspondence presented to the board in support of this application, including, but not limited to the following: The site/sketch plan, architectural elevations, and any other information related to this case or improvements recommended by the Town and/or other agencies.

4. The US Postal Service has notified the Town that all future subdivision approvals must utilize a community mail delivery system. Locations and details of the proposed community mailboxes must be included in the Construction Documents, and must be reviewed and approved by the Post Master for this area. The applicant(s) must provide the Town with written confirmation that the local Post Master is in agreement with the proposed box locations.

5. Commercial, retail, office, grocery store and restaurant with drive-through uses shall be permitted.

6. Applicant shall coordinate with NCDOT on additional right-of-way and all other required improvements on Knox Road for widening project U-5906.

7. Applicant and Town shall confirm site plan design for One Norman/Knox matches that of NCDOT's design for U-5906.

8. TIA mitigation items included in construction of U-5906:

   W Catawba Avenue at One Norman Boulevard
   - Construction of an additional southbound left-turn lane along One Norman Boulevard with 175 feet of storage, creating a three-lane approach that includes dual left-turn lanes and a shared through/right lane.
   - Reconfiguration of the northbound approach of One Norman Boulevard to provide an exclusive left-turn lane and a shared through-right lane (same as existing).
   - Removal of the split phasing planned for the side-street northbound and southbound approaches.

   Knox Road at Harken Drive/Private Street B (D/W #3)
   - Eastbound right-turn lane along Knox Road with 100' of storage
   - Eastbound left-turn lane along Knox Road with 100' of storage (as shown on the proposed plan)
   - Westbound left-turn lane along Knox Road with 100' of storage (as shown on proposed plan)

9. TIA mitigation items prior to CO and U-5906

   W Catawba Avenue at One Norman Boulevard
   - Extension of the westbound right-turn lane to provide 150' of storage.

   W Catawba Avenue at Private Street A (D/W #1)
   - Allow for left-over access (right-in/right-out left-in only)
   - Westbound right-turn lane along W Catawba Avenue with 100' of storage
   - Single southbound egress and single ingress lane along Private Street A
   - Provide an internal protected stem of 100' along Private Street A

   Knox Road at Private Street A (D/W #2)
   - Single northbound egress and single ingress lane along Private Street A
   - Provide an internal protected stem of 75' along Private Street A

   Knox Road at Harken Drive/Private Street B (D/W #3)
   - Single northbound egress and single ingress lane along Private Street B
   - Provide an internal protected stem of 115' along Private Street B

10. A crosswalk shall be provided at the Knox Road/Private Drive "A" intersection and shall be coordinated with NCDOT with regard to design for U-5906.

11. All parking spaces shall be located within 60 feet of an overstory tree.

12. The type "b" landscape buffer shall be provided along West Catawba and in the curve at One Norman/Knox. Masonry walls shall be provided along any drive-through facility as part of the type "b" buffer detail.

13. Buffer area along Knox Road is to be retained, but shall be supplemented, if necessary, to meet the type "a" buffer planting requirement.

14. Internal sidewalks shall be a minimum width of five feet and shall be provided as shown in the locations noted on the approved site plan.

15. The connectivity proposed for Lake Norman Realty shall be provided as shown. The connection shall either be paved to the property line or a performance guarantee provided. With regard to any additional connectivity access point, the applicant shall work with staff to evaluate connectivity to any adjacent parcel based on site traffic analysis and congestion impacts, adequacy of infrastructure, on street parking, traffic calming, types of uses proposed per Chapter 7.1 of the Land Development Code. The connectivity evaluation shall involve the Town's traffic engineer for guidance in the evaluation and the applicant may choose to provide information regarding these items from qualified professionals for consideration. Mitigation may be required of the adjoining property owner for consideration of the easement as well as expenses relating to ongoing maintenance of the driveways and other improvements within the project that support the access point. If connectivity is deemed appropriate and is required, the applicant shall provide easements to the adjoining property owner for access and construction or may simply choose to pave the potential connection to the property line in a manner approved by the Town and Mecklenburg County LUESA.

16. A photometric lighting plan shall be provided during the construction document review and shall meet the requirements of Chapter 7.

17. The drive through menu boards as well as pick up windows shall have a minimum five food wide weather covering.

Resolution No. 2018-______

RESOLUTION OF THE TOWN OF CORNELIUS BOARD OF COMMISSIONERS PERTAINING TO THE REASONABLENESS AND CONSISTENCY OF PROPOSED ZONING MAP AMENDMENTS

REZ 06-17 Catawba at Knox

WHEREAS, David Smith, applicant, initiated the process to rezone the property located at 20101 West Catawba Avenue (PID #: 00114509 & 00114522), which consists of 11.067 acres, to *Conditional Zoning District* as shown in *Exhibit A*, and to use the property in accordance with the conditions set forth in *Exhibit B*; and

WHEREAS, in accordance with the provisions of North Carolina General Statutes 160A-382 and 383, the Town Board has considered the reasonableness and consistency of rezoning the above described property and adopts the following statement.

NOW, THEREFORE, BE IT RESOLVED, by the Town of Cornelius Board of Commissioners that the rezoning _____ IS _____ IS NOT consistent with the Town's adopted comprehensive land use plan as proposed and _____ IS ____ IS NOT reasonable and in the public interest.

Adopted this 19th day of November, 2018.

____
Woody T. Washam, Jr., Mayor

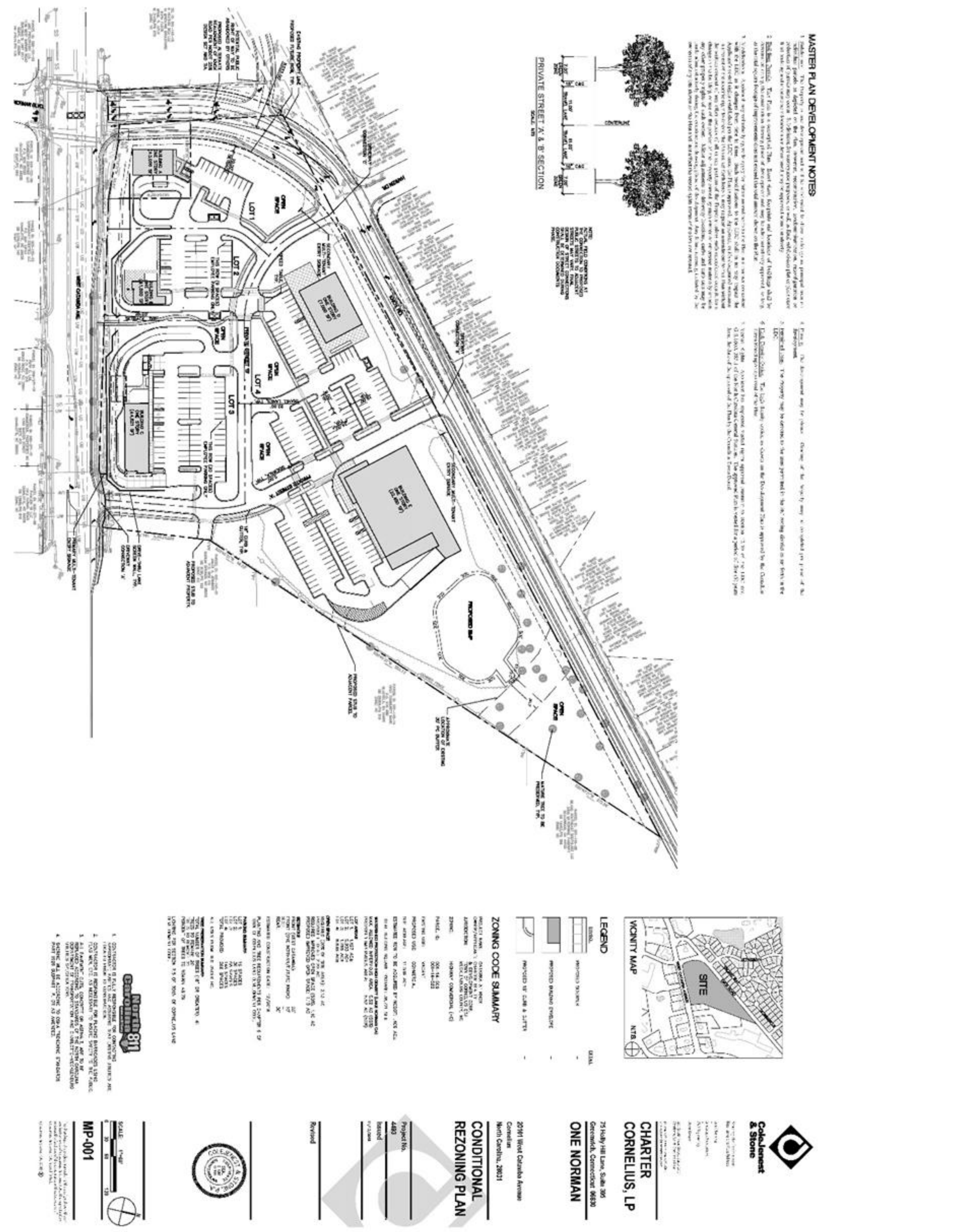
ATTEST:

____
Lori A. Harrell, Town Clerk

APPROVED AS TO FORM:

____
Town Attorney

Exhibit A


MASTER PLAN DEVELOPMENT NOTES
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16. A photometric lighting plan shall be provided during the construction document review and shall meet the requirements of Chapter 7.

17. The drive through menu boards as well as pick up windows shall have a minimum five food wide weather covering.

REQUEST FOR BOARD ACTION

Print

Date of Meeting: November 19, 2018

To: Mayor and Board of Commissioners

From: Aaron Tucker, Assistant Planning Director

Action Requested:

Convenience Development Partners, LLC is requesting to rezone the property located at 18808 and 18830 West Catawba Avenue to develop a convenience store with gas pumps and car wash, two commercial buildings totaling 9,400 square feet fronting West Catawba Avenue, and an office building housing 45,000 square feet of office space. Also included with this proposal is the extension of Nantz Road east of West Catawba Avenue.

Public Hearing #1 was held on May 21, 2018.

The Planning Board recommended approval of this project at their October 29th meeting.

Conduct Public Hearing #2 and consider approval REZ 01-18.

Manager's Recommendation:

Conduct Public Hearing #2 and approve an Ordinance to amend the zoning map with conditions and a Resolution declaring that REZ 01-18 is consistent with the Town's Land Use Plan and reasonable in the public's interest.

ATTACHMENTS:

Name:	Description:	Type:
Application.pdf	Application	Cover Memo
18830_W_Catawba_Ave_Zoning.pdf	Zoning Map	Cover Memo
18830_W_Catawba_Ave_LU.pdf	Future Land Use Map	Cover Memo
18830_W_Catawba_Ave_Vicinity.pdf	Aerial Vicinity Map	Cover Memo
18830_W_Catawba_Ave_Property.pdf	Aerial Property Map	Cover Memo
REZ_01-18(TB)_CD_Nantz_Staff_Report.pdf	Staff Report	Cover Memo
TIA_Reduced.pdf	TIA Report	Cover Memo
Rendering.pdf	Color Site Plan	Cover Memo
CD_Nantz_(Concept).pdf	Site Plan	Cover Memo
Combined_ElevationsR.pdf	Elevations	Cover Memo
Ordinance_on_Rezoning_Property_REZ_01-18_(CD_Nantz).pdf	Ordinance	Cover Memo
RESOLUTION_OF_THE_TOWN_OF_CORNELIUS_BOARD_REZ_01-18_(CD_Nantz)__Consistency_Statement.pdf	Resolution	Cover Memo

TOWN OF CORNELIUS
Planning Department
PO Box 399 | Cornelius, NC 28031 | Phone: 704-896-2461 | Fax: 704-896-2462

Staff Only:
Date Rec'd: ________
Rec'd by: ________
Case #: ________

LAND DEVELOPMENT APPLICATION FORM

1. Application Type

	✔	Fee		✔	Fee
• *Sketch Plan/Plat (Major Sub):*	☐		• *Conditional Zoning (CZ)*	☒	$1,250
• *Preliminary Plat (Major Sub):*	☐		• *Special Use Permit (SUP)*	☐	
• *Final Plat (Major Sub):*	☐		• *Major Architectural Variation*	☐	
• *Construction Documents:*	☐		• *Minor Architectural Variation*	☐	
• *General Rezoning*	☐		• *Other:* ________	☐	
			Fee Total:		$1,250

2. Project Information

Date of Application: 02/12/2018 Name of Project: CD Nantz

Location: 18808 & 18830 WEST CATAWBA AVE. Property Size (acres): 9.02 # of Units/Lots: ________

Current Zoning: NMX (NEIGHBORHOOD MIXED USE) Proposed Zoning: CZ

Current Land Use: BUSINESS/COMMERCIAL Proposed Land Use: COMMERCIAL/RETAIL

Tax Parcel Number(s): 00524319, 00524320

3. Contact Information

CONVIENIENCE DEVELOPMENT PARTNERS, LLC
Owner, Applicant, or Developer
15141 HUGH MCAULET RD.
Address
HUNTERSVILLE, NC 28078
City, State Zip
(262)-442-8702
Telephone Fax
EVAN WALTON 02/20/2018
Signature Print Name Date
Email - EWALTON@CDPARTNERS.NET

FREELAND & KAUFFMAN, INC.
Agent(s) (Engineer, Architect, Etc.)
209 WEST STONE AVE.
Address
GREENVILLE, SC 29609
City, State Zip
(864)-672-3421
Telephone Fax
CHARLES A. GARCIA 02/20/2018
Signature Print Name Date
Email - CGARCIA@FK-INC.COM

4. The following items may also be required to be considered part of a complete application, please check all that apply on this list:

☒ **Signed "Original" application**

☒ **Project Fee(s)** – See Fee Schedule

☐ **Written Summary/Description of Request** can be on company letterhead. Shall include requested use or uses, sq. feet of non-residential space, or density and number of units/lots for residential, or any other applicable information. For CZ's, must also describe any variations proposed from the Land Development Code

☐ **Property Survey** (at least one copy), including existing buildings, topography, wetlands, streams, vegetation (trees over 18" in diameter), and other natural features.

☐ **Site/sketch plan** (at least one copy), may contain multiple pages and must be drawn to scale by an engineer or landscape architect. Shall include locations of buildings and/or lots, streets, parking, proposed grading, landscaping/screening, open space, watershed/storm water information, associated storm water measures, and proposed utilities and lighting. Shall also include general information from adjoining lots

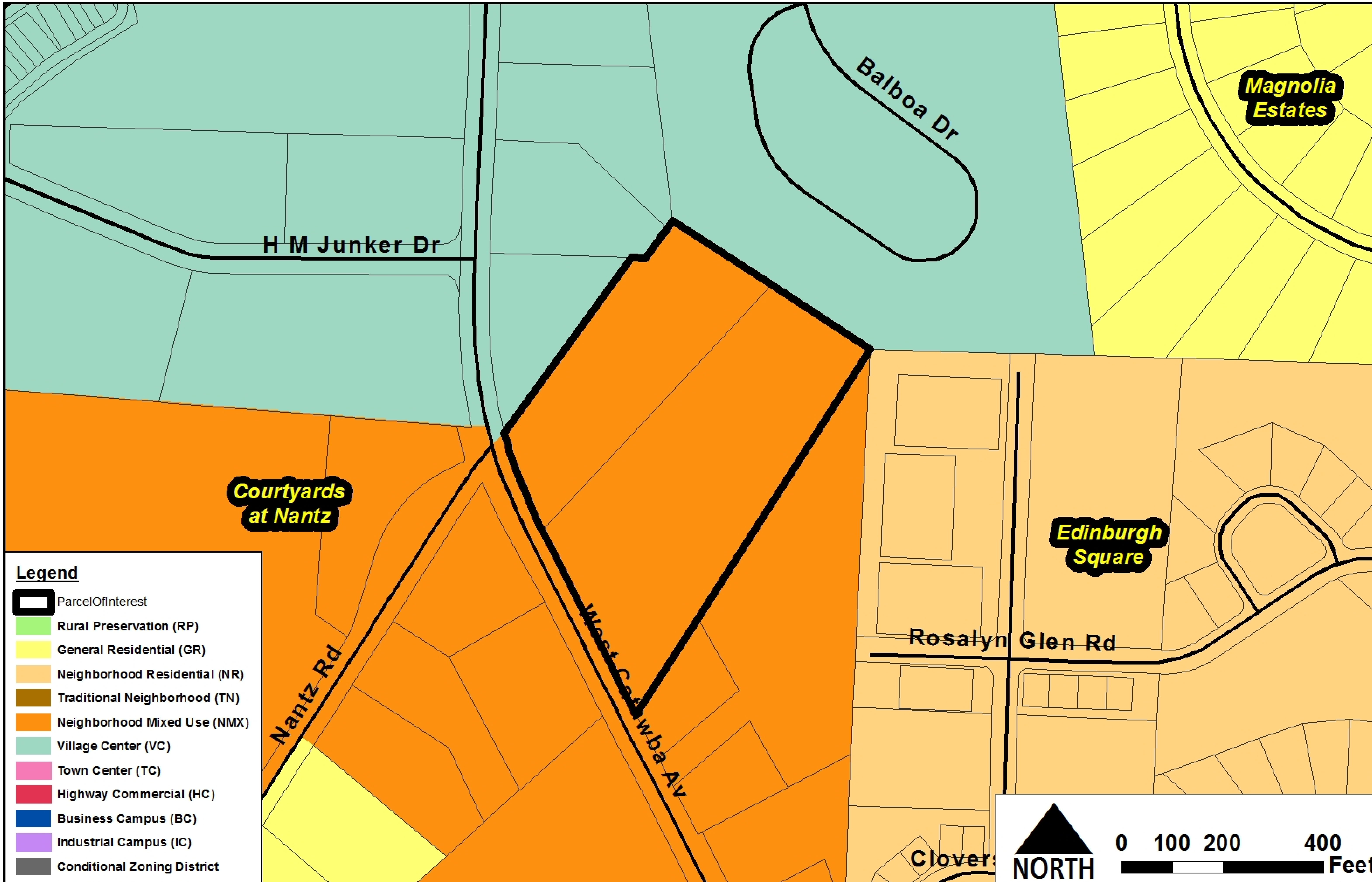
☐ **Illustrative (color) site/sketch plan** for presentation purposes with same layers as described above

☐ **Architectural elevations, Perspective Renderings, and Architectural Review Board Checklist** may include multiple pages and must be drawn to scale by an architect. Include all primary and accessory buildings (all building sides), an illustrative color package, and black and white w/dimensions. Other architectural elements/features of the site such as gazebos, trellis's, garden walls, retaining walls, or other items over 4-feet in height must also be included (NOT REQUIRED, BUT OPTIONAL FOR SINGLE-FAMILY RESIDENTIAL DEVELOPMENTS).

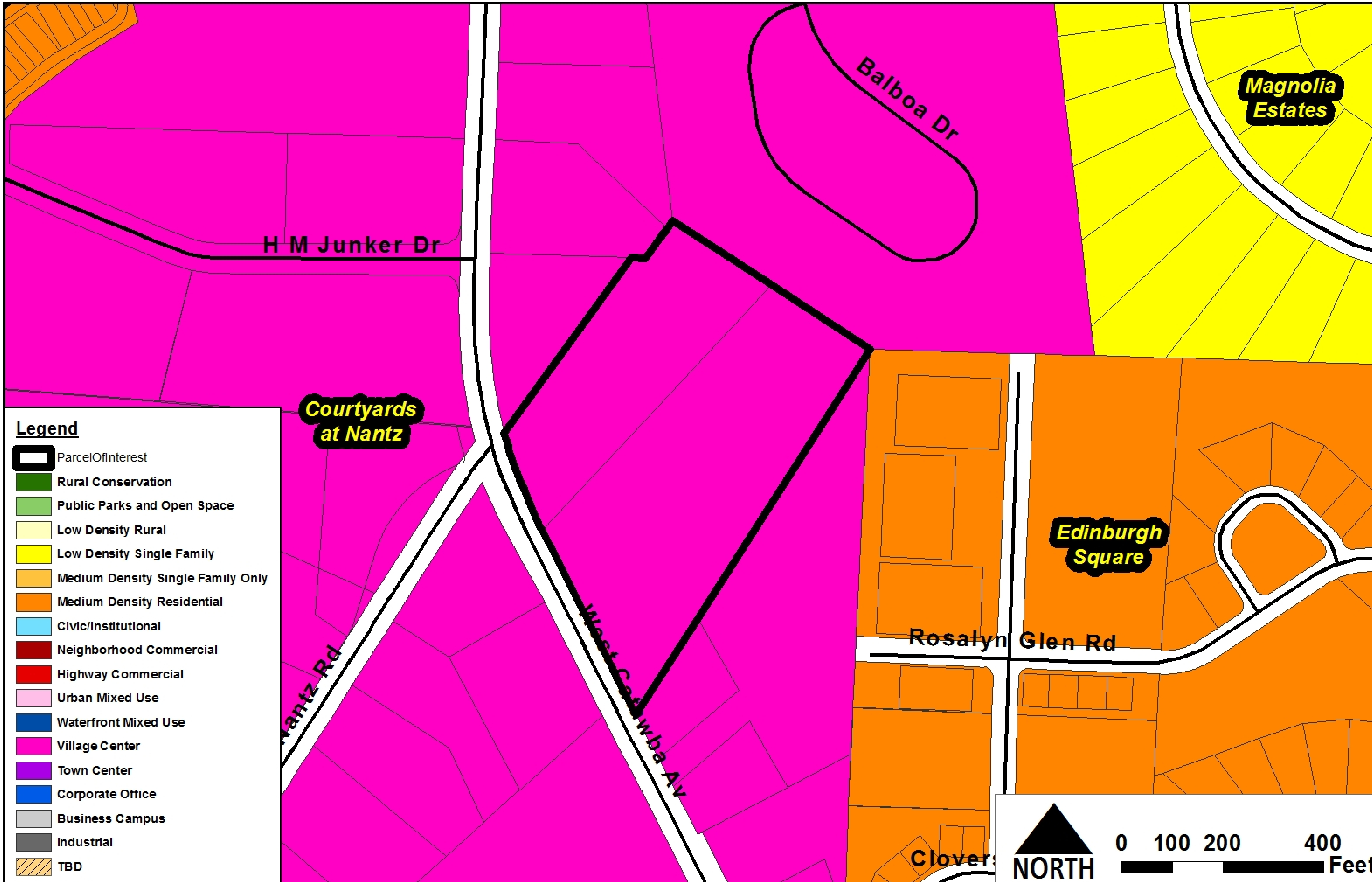
☐ **Charlotte Water Capacity Assurance Review Application** Provide copy with application, and send original to CW.

☐ **Illustrative (color) elevations** for presentation purposes for all items described above, as well as perspective (3D) renderings and photograph examples

☐ **Digital Files** of all items listed above



Balboa Dr
Magnolia Estates
H M Junker Dr
Courtyards at Nantz
Edinburgh Square
Nantz Rd
West Catawba Av
Rosalyn Glen Rd
Clovers
Legend
ParcelOfInterest
Rural Preservation (RP)
General Residential (GR)
Neighborhood Residential (NR)
Traditional Neighborhood (TN)
Neighborhood Mixed Use (NMX)
Village Center (VC)
Town Center (TC)
Highway Commercial (HC)
Business Campus (BC)
Industrial Campus (IC)
Conditional Zoning District
NORTH
0 100 200 400
Feet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Low Density Single Family
Medium Density Single Family Only
Medium Density Residential
Civic/Institutional
Neighborhood Commercial
Highway Commercial
Urban Mixed Use
Waterfront Mixed Use
Village Center
Town Center
Corporate Office
Business Campus
Industrial
TBD
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NORTH
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Feet

REZ 01-18
CD Nantz

Conditional Zoning Request

Town Board Meeting
November 19, 2018

OWNER/APPLICANT: Evan Walton
Convenience Development Partners
15141 Hugh McAulet Rd.
Huntersville, NC 28078

AGENT: Charles A Garcia
Freeland & Kauffman, Inc.
209 West Stone Ave.
Greenville, SC 29609

PROPERTY LOCATION: 18830 W. Catawba Ave. (PID#: 00524319 & 00524320)

PROPERTY SIZE: 9.02 acres total

CURRENT LAND USE: Two homes used as commercial

PROPOSED LAND USE: Convenience store, commercial retail, and office

EXISTING ZONING: NMX (Neighborhood Mixed Use)

PROPOSED ZONING: CZ (Conditional Zoning)

EXISTING CONDITIONS:

1. *Description of Adjoining Zoning and Land Uses* – This property has road frontage along West Catawba Avenue. To the north, this parcel directly touches existing businesses on West Catawba Avenue as well as other vacant properties all zoned VC (Village Center). To the south and west, properties are zoned and NMX (Neighborhood Mixed Use) and include existing office buildings and vacant properties. Directly east, this projects borders an NMX zoned vacant property. It also is within close proximity to NR zoned multi-family properties.

2. *Topography* – The property is mostly flat toward West Catawba Avenue but has a considerable slope towards the center of the property.

3. *Vegetation* – Of the 9.02 acres, about 1/3 of the property fronting West Catawba Avenue is covered with grass and the other 2/3 toward the rear is covered with trees.

4. *Infrastructure* – Currently, water and sewer access and capacity is available. This development includes the extension of Nantz Road east of West Catawba Avenue. The development will have two access drives off of Nantz Road Extension. One driveway will be constructed allowing traffic to enter and exit (right in, right out) the site directly off of West Catawba Avenue. Until the construction of R-2555B (Wet Catawba Phase II Widening), Nantz Road will remain a full access signal and will allow full movement in and out of the new Nantz Road Extension. After R-2555B is complete, the Nantz Road intersection will become a superstreet design.

STAFF COMMENTS:

1. *Project Overview* – Convenience Development Partners, LLC is requesting to rezone the property located at 18808 and 18830 West Catawba Avenue to develop a convenience store with gas pump and car wash, two commercial buildings totaling 9,400 square feet fronting West Catawba Avenue, and an office building housing 45,000 square feet of office space. Also included with this proposal is the extension of Nantz Road east of West Catawba Avenue.

2. *Land Use Plan Consistency* – The Land Use Plan adopted by the Town Board on January 6th, 2014 designates this property as "Village Center," which allows for a mix of community serving commercial uses and professional office developments. The proposed uses are consistent with the 2014 Land Use Plan.

3. *Pre-Development Review Committee* – The sketch plan was presented to the PDRC on February 2, 2018. The PDRC was supportive of the proposed development.

4. *Community Meeting* – The applicant held the required community meeting on Wednesday, May 9, 2018. The attendance was mainly by property owners nearby who were interested in the proposal. Concerns raised at the meeting were about traffic already on West Catawba Avenue and how this project would affect the proposed road design. There were also concerns about the existing vegetation between the site and the neighboring properties. The initial proposal included a Petsuites facility. This raised concerns from the neighbors regarding noise from animals. This has now been removed from the plan and replaced with an office building thus eliminating those concerns.

5. *Town Board Public Hearing #1* – The meeting was held on May 21, 2018. No significant issues were raised.

6. *Planning Board* – The Planning Board unanimously recommended approval on October 29th, 2018.

7. *Architectural Review* – The ARB approved the current architectural elevations at their October 29th meeting with conditions. Conditions include the parapets must wrap all the way around the tops of buildings and the rear office building must be constructed of a similar color as the front buildings.

8. *Project Phasing* – The developer has proposed to phase the project in conjunction with the R-2555B widening project. Phase I of the project will include the convenience store and two commercial buildings fronting West Catawba Avenue. Phase II of the project will include the office building in the rear of the site. A Certificate of Occupancy hold will be issued until commencement of R-2555B and will be included as a condition.

STAFF RECOMMENDATIONS:

Staff recommends approval with the following conditions:

1. Town approval is contingent on review and approval by other applicable local, state and federal agencies.

2. The development shall comply with all other applicable requirements of the Town of Cornelius Land Development Code.

3. Town approval incorporates and shall comply with any and all submittals in the case file and correspondence presented to the board in support of this application, including, but not limited to the following: The site/sketch plan, architectural elevations, and any other information related to this case or improvements recommended by the Town and/or other agencies.

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5. A convenience store with fuel station and car wash shall be allowed in the building at the corner of West Catawba Avenue and Nantz Road. Commercial, retail, service, office and restaurant uses shall be permitted within the two non-residential buildings fronting West Catawba Avenue. Professional office uses shall be permitted in the rear building.

6. Final CO will be held for the rear office building until 2020 in order to properly phase and coordinate with the West Catawba Avenue widening project.

7. Applicant shall coordinate with NCDOT on constructing the multi-purpose path, additional right-of-way and all other required improvements on West Catawba Avenue for widening project R-2555B.

8. TIA mitigation items:

<u>West Catawba Avenue and Nantz Road/Site Access A</u>

2019 Build Phase 1 Improvements:

- Restripe, and widen if necessary, the eastbound Nantz Road approach to provide a left turn lane with 125 feet storage and appropriate taper, and one shared through/right lane.
- Construct the westbound Site Access A approach with one left turn lane with 150 feet of storage and appropriate taper, and one shared through/right lane.
- Construct a southbound West Catawba Avenue left turn lane with 100 feet of storage and appropriate taper.
- Provide permissive left turn treatments on the side streets and permissive/protected left turn treatments on the West Catawba Avenue approaches.

2019 Full Build Improvements:

- No additional improvements are recommended.

<u>West Catawba Avenue and Site Access B</u>

2019 Build Phase 1 Improvements:

- Construct Site Access B with one ingress lane and one egress lane (right-in/right-out only).
- Install a quick curb median to prohibit left turns at the intersection.

2019 Full Build Improvements:

- No additional improvements are recommended.

<u>Site Access A and Site Access C</u>

2019 Build Phase 1 Improvements:

- Construct Site Access C with one ingress lane and one egress lane (shared left/right).

2019 Full Build Improvements:

- No additional improvements are recommended.

<u>Site Access A and Site Access D</u>

2019 Full Build Improvements:

- Construct Site Access D with one ingress lane and one egress lane (shared left/right).

9. Due to utility lines, low ornamental shade trees and shrub landscaping should be shown fronting West Catawba Avenue.

Traffic Impact Study
West Catawba
Cornelius, NC
October 2018

RAMEY KEMP & ASSOCIATES

TRAFFIC IMPACT STUDY

FOR THE

18830 West Catawba Development

LOCATED
IN
CORNELIUS, NORTH CAROLINA

Prepared For:
Win Development
400 West Main Street, Suite 211
Round Rock, TX 78644

Prepared By:
Ramey Kemp & Associates, Inc.
8307 University Executive Park Drive, Suite 260
Charlotte, NC 28262
License #C-0910

NORTH CAROLINA
PROFESSIONAL
SEAL
036792
ENGINEER
J. ANDREW EAGLE

J Andrew Eagle
10-23-2018

October 2018
RKA Project #18155

RAMEY KEMP & ASSOCIATES

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TRAFFIC IMPACT STUDY

18830 WEST CATAWBA
CORNELIUS, NORTH CAROLINA

1. EXECUTIVE SUMMARY

This report summarizes the findings of the Traffic Impact Study (TIS) that was performed for the proposed 18830 West Catawba development to be located along West Catawba Avenue, east of Nantz Road in Cornelius, North Carolina. The purpose of this study is to determine the potential impact to the surrounding transportation system caused by the development generated trips.

The site is proposed to consist of up to 4,000 square feet of medical/dental office space, 45,000 general office space, 5,400 square feet of shopping center, and a 16 fueling position gas station. Phase 1 includes 4,000 square feet of medical/dental office space, 5,400 square feet of shopping center, 16 fueling position gas station, and three driveways. One full access driveway (Access A) is proposed opposite Nantz Road and one right-in / right-out driveway (Access B) is proposed on West Catawba Avenue. Another driveway (Access C) would form a three leg intersection with Access A and is expected to be built out by the year 2019. The Full Buildout includes an additional 45,000 square feet of general office space and an additional driveway (Access D). This driveway would provide full access and form a three leg intersection with Access A. The site is expected to be fully built by the year 2019.

The study area for the TIS was determined through coordination with NCDOT and the Town of Cornelius and consists of the following intersections:

1. West Catawba Avenue and One Norman Boulevard
2. West Catawba Avenue and Bethel Church Road
3. West Catawba Avenue and Jetton Road
4. West Catawba Avenue and Magnolia Estates Drive
5. West Catawba Avenue and Harbor View Drive
6. West Catawba Avenue and HM Junker Drive
7. West Catawba Avenue and Nantz Road/Site Access A (Signalized)
8. West Catawba Avenue and Edinburgh Square Drive
9. West Catawba Avenue and Westmoreland Lake Drive

10. West Catawba Avenue and Silver Quay Drive
11. West Catawba Avenue and Harborside Drive
12. West Catawba Avenue and Westmoreland Road
13. West Catawba Avenue and Site Access B (Right-In / Right-Out)
14. Site Access A and Site Access C (Unsignalized–Full Access)
15. Site Access A and Site Access D (Unsignalized–Full Access)

Based on coordination with the NCDOT and the Town of Cornelius, no offsite developments were determined to have an impact on the project study area. NCDOT STIP R-2555B was identified as an approved roadway project that will have an impact on the project study area.

Several scenarios were analyzed using traffic analysis software. Traffic operations during the weekday AM and PM peak hours were modeled for each scenario. The results of each scenario were compared to determine impacts from background traffic growth and the proposed development. The following scenarios were modeled:

- 2018 Existing
- 2019 No-Build
- 2019 Build Phase 1
- 2019 Full Build
- 2024 Build w/STIP R-2555B

Based on the analysis results, some impacts are expected by the proposed development. No changes to NCDOT STIP R-2555B are recommended. The following improvements are recommended to be done by the developer:

<u>West Catawba Avenue and Nantz Road/Site Access A</u>

- 2019 Build Phase 1 Improvements:
    - Restripe, and widen if necessary, the eastbound Nantz Road approach to provide a left turn lane with 125 feet storage and appropriate taper, and one shared through/right lane.

  - Construct the westbound Site Access A approach with one left turn lane with 150 feet of storage and appropriate taper, and one shared through/right lane.
  - Construct a southbound West Catawba Avenue left turn lane with 100 feet of storage and appropriate taper.
  - Provide permissive left turn treatments on the side streets and permissive/protected left turn treatments on the West Catawba Avenue approaches.
- 2019 Full Build Improvements:
  - No additional improvements are recommended.

<u>West Catawba Avenue and Site Access B</u>

- 2019 Build Phase 1 Improvements:
  - Construct Site Access B with one ingress lane and one egress lane (right-in/right-out only).
  - Install a quick curb median to prohibit left turns at the intersection.
- 2019 Full Build Improvements:
  - No additional improvements are recommended.

<u>Site Access A and Site Access C</u>

- 2019 Build Phase 1 Improvements:
  - Construct Site Access C with one ingress lane and one egress lane (shared left/right).
- 2019 Full Build Improvements:
  - No additional improvements are recommended.

<u>Site Access A and Site Access D</u>

- 2019 Full Build Improvements:
  - Construct Site Access D with one ingress lane and one egress lane (shared left/right).

2. INTRODUCTION

2.1 Purpose of Report

This report summarizes the findings of the Traffic Impact Study (TIS) that was performed for the proposed 18830 West Catawba development to be located along West Catawba Avenue, east of Nantz Road in Cornelius, North Carolina. The purpose of this study is to determine the potential impact to the surrounding transportation system caused by the traffic generated by the development.

2.2 Study Objectives

The site is proposed to consist of up to 4,000 square feet of medical/dental office space, 45,000 general office space, 5,400 square feet of shopping center, and a 16 fueling position gas station. Phase 1 includes 4,000 square feet of medical/dental office space, 5,400 square feet of shopping center, 16 fueling position gas station, and three driveways. One full access driveway (Access A) is proposed opposite Nantz Road and one right-in / right-out driveway (Access B) is proposed on West Catawba Avenue. Another driveway (Access C) would form a three leg intersection with Access A and is expected to be built out by the year 2019. The Full Buildout includes an additional 45,000 square feet of general office space and an additional driveway (Access D). This driveway would provide full access and form a three leg intersection with Access A. The site is expected to be fully built by the year 2019.

Refer to Figure 1 in Appendix A for an illustration of the site location. Refer to Figure 2 for the preliminary site plan. The objective of this report is to determine what geometric improvements are necessary to mitigate traffic conditions on the transportation network surrounding the site with the proposed development fully built out.

3. AREA CONDITIONS

3.1 Transportation Network Study Area

3.1.1. Area Roadway System

The project study area for this TIS was determined through coordination with the North Carolina Department of Transportation (NCDOT) and the Town of Cornelius. Table 1 summarizes the characteristics of the roadways within the study area. The NCDOT Functional Class map was used to determine the classification of each road. Traffic Volume maps from NCDOT were used to find the average daily traffic (ADT) volumes in vehicles per day (vpd) for the roadways. A field visit was conducted to verify the existing cross-sections and speed limits in mph.

TABLE 1
STUDY AREA ROADS

ROADWAY	CLASSIFICATION	CROSS-SECTION	ADT (vpd)	SPEED LIMIT (mph)
West Catawba Avenue	Minor Arterial	Four-Lane N of Magnolia Estates Dr/Two-Lane S of Magnolia Estates Dr	25,000	35/45 South of Harborside Dr
One Norman Boulevard	Local	Three-Lane	N/A	35
Bethel Church Road	Local	Three-Lane	6,900	45
Jetton Road	Local	Four-Lane	12,000	35
Magnolia Estates Drive	Local	Three-Lane	N/A	25
Harbor View Drive	Local	Two-Lane	N/A	20
HM Junker Drive	Local	Two-Lane	N/A	N/A
Nantz Road	Local	Two-Lane	1,600	35
Site Drive B	Local	Two-Lane	N/A	N/A
Edinburgh Square Drive	Local	Two-Lane	N/A	N/A
Westmoreland Lake Dive	Local	Three-Lane	N/A	20
Silver Quay Drive	Local	Two-Lane	N/A	15
Harborside Drive	Local	Four-Lane	N/A	N/A
Westmoreland Road	Minor Collector	Three-Lane	12,000	45

3.1.1.1. Existing Roadway Conditions

Existing lane configurations (number of traffic lanes on the intersection approach), storage capacities, and other intersection and roadway information within the study area was collected by Ramey Kemp and Associates, Inc. (RKA). Refer to Figure 3 for the existing lane configurations and traffic control at study intersections.

3.1.1.2. Future Roadway Conditions

The NCDOT STIP R-2555B was identified as an approved roadway project that will have an impact on the project study area. This project is expected to start construction in winter 2020. The project is a continuation of improvements that were completed in 2009 between Jetton Road and I-77.

3.1.2. Study Area and Existing Traffic Volumes

The study area for the TIS was determined through coordination with NCDOT and the Town of Cornelius and consists of the following intersections:

1. West Catawba Avenue and One Norman Boulevard
2. West Catawba Avenue and Bethel Church Road
3. West Catawba Avenue and Jetton Road
4. West Catawba Avenue and Magnolia Estates Drive
5. West Catawba Avenue and Harbor View Drive
6. West Catawba Avenue and HM Junker Drive
7. West Catawba Avenue and Nantz Road/Site Access A (Signalized)
8. West Catawba Avenue and Edinburgh Square Drive
9. West Catawba Avenue and Westmoreland Lake Drive
10. West Catawba Avenue and Silver Quay Drive
11. West Catawba Avenue and Harborside Drive
12. West Catawba Avenue and Westmoreland Road
13. West Catawba Avenue and Site Access B (Right-In / Right-Out)
14. Site Access A and Site Access C (Unsignalized–Full Access)
15. Site Access A and Site Access D (Unsignalized–Full Access)

Existing traffic volumes were determined through traffic counts conducted during the AM peak period (7:00-9:00 AM) and the PM peak period (4:30-6:30 PM). These counts were performed in May 2018. All traffic counts were performed while schools were in session. The counts were balanced between intersections where appropriate by increasing through volumes. A copy of the traffic count data can be found in Appendix B of this report. Refer to Figure 4 for an illustration of the existing peak hour traffic volumes.

3.2. Study Area – Adjacent Land Use

3.2.1. Existing Land Uses

The existing site is undeveloped. The surrounding land is primarily commercial and residential.

3.2.2. Anticipated or Approved Future Development

Based on coordination with NCDOT and the Town of Cornelius, no offsite developments were determined to have an impact on the project study area.

4. PROJECTED TRAFFIC

4.1. Site Traffic

In order to determine the future traffic conditions after the proposed development is completed, an estimate of traffic projected to travel to / from the proposed development is required. The average weekday daily, AM peak hour, and PM peak hour site trips for this study were calculated based on the ITE *Trip Generation Manual, 10th Edition*.

4.1.1. Trip Generation

For the purposes of this study, two phases of construction were analyzed. Phase 1 was assumed to include the construction of 4,000 square feet of medical/dental office space, 5,400 square feet of shopping center, and a 16 fueling position gas station by 2019. Full Buildout was assumed to include the construction of an additional 45,000 square feet of general office space by 2019. Table 2 presents a summary of the trip generation calculations for the proposed development.

TABLE 2
PROPOSED SITE TRIP GENERATION

LAND USE	DENSITY	AVERAGE DAILY TRAFFIC (vpd)	AM PEAK HOUR (vph)		PM PEAK HOUR (vph)	
			Enter	Exit	Enter	Exit
2019 BUILD PHASE 1						
Medical-Dental Office Building (LUC 720)	4,000 SF	140	9	2	4	10
Shopping Center (LUC 820)	5,400 SF	828	95	59	30	33
Pass-By Trips			0	0	11	11
Total New External Trips			95	59	19	22
Gas Station with Convenience Market (LUC 945)	16 FP	3,286	102	98	114	110
Pass-By Trips			62	62	63	63
Total New External Trips			40	36	51	47
2019 FULL BUILD						
General Office Building (LUC 710)	45,000 SF	490	72	10	21	94
Total Trips		4,744	278	169	169	247
Pass-By Trips			62	62	74	74
Total New External Trips			216	107	95	173

4.1.2. Trip Distribution and Assignment

The trip distribution percentages were developed based on existing traffic patterns, location of employment centers, and engineering judgment. Figures 5 and 6 illustrate the Phase 1 and Full Build primary trip distribution percentages, respectively. Figure 7 illustrates the pass-by trip distribution percentages for Phase 1 while Figure 8 shows pass-by trip distribution percentages for the Full Build scenario. These trip distribution percentages were applied to the trip generation data to calculate the primary and pass-by site trip assignments shown in Figures 9-12. Figures 13 and 14 illustrate the total trip assignment for the site.

5. TRAFFIC ANALYSIS

5.1. Traffic Analysis Scenarios

Several scenarios were analyzed using traffic analysis software, Synchro 9.1. Traffic operations during the AM and PM peak hours were modeled for each scenario. The results of each scenario were compared in order to determine impacts from background traffic growth and the proposed development. The following scenarios were modeled:

- 2018 Existing
- 2019 No-Build
- 2019 Build Phase 1
- 2019 Full Build
- 2024 Build w/STIP R-2555B

The 2018 Existing scenario included the traffic characteristics that currently exist in the study area. Existing peak hour traffic volumes were used from the intersection counts (Figure 4). Existing signal timing data was obtained from NCDOT and referenced in all traffic models. Refer to Appendix C for the signal timing data. No changes to the existing lane configurations were made. Congestion Management guidelines recommend prohibiting right turns during a red traffic signal phase. For this analysis, right turns were permitted during red traffic signal phases to better correlate with the existing conditions.

The 2019 No-Build scenario was analyzed to determine the expected future traffic operations. Existing peak hour traffic volumes were projected to the year 2019 using a growth rate of 4% per year. Refer to Figure 15 for the 2019 projected peak hour traffic volumes. These volumes represent the 2019 No-Build peak hour traffic volumes. The existing signal timing data was used. The splits and offsets at the signalized intersections were optimized. There are no expected changes to the signalized intersections in the study area that would require prohibiting right turns on red, therefore right turns on red were allowed.

The 2019 Build Phase 1 scenario was compared to the 2019 No-Build scenario to determine expected impacts caused by the proposed site. This scenario included the same assumptions as the 2019 No-Build scenario. The trips expected to be generated by Phase 1 of the proposed development (Figure 13) were added to the 2019 No-Build peak hour volumes (Figure 15) to determine the 2019 Build Phase 1 peak hour traffic volumes. Refer to Figure 16 for the 2019 Build Phase 1 peak hour traffic volumes. The existing signal timing data was used. The splits and offsets at the signalized intersections were optimized. Site drives were added to the existing lane configurations. Right turns on red were prohibited at the intersection of Catawba Avenue and Nantz Road due to the addition of a fourth approach. There are no expected changes to the remaining signalized intersections in the study area that would require prohibiting right turns on red, therefore right turns on red were allowed.

The 2019 Full Build scenario was compared to the 2019 No-Build scenario to determine expected impacts caused by the proposed site. This scenario included the same assumptions as the 2019 No-Build scenario. The trips expected to be generated by full buildout of the proposed development (Figure 14) were added to the 2019 No-Build peak hour volumes (Figure 15) to determine the 2019 Full Build peak hour traffic volumes. Refer to Figure 17 for the 2019 Full Build peak hour traffic volumes. The existing signal timing data was used. The splits and offsets at the signalized intersections were optimized. Site drives were added to the existing lane configurations. Right turns on red were prohibited at the intersection of Catawba Avenue and Nantz Road due to the addition of a fourth approach. There are no expected changes to the remaining signalized intersections in the study area that would require prohibiting right turns on red, therefore right turns on red were allowed.

The 2024 Build scenario with STIP R-2555B was developed to determine if any changes to the roadway project would be needed. STIP R-2555B provides a four-lane divided road with a raised median. A superstreet design would be constructed at the intersection of Catawba Avenue and Nantz Road. Existing peak hour traffic volumes were projected to the year 2024 using a growth rate of 4% per year. Refer to Figure 18 for the 2024 projected peak hour traffic volumes. The trips expected to be generated by the proposed development (Figure 14) were added to the 2024 projected peak hour volumes (Figure 18) to determine the 2024 Build peak hour traffic volumes shown in Figure 19. STIP R-2555B would combine the two westbound approaches at Harbor View Drive and HM Junker Drive into one approach. Figure 20 illustrates the 2024 Build volumes at these intersections before and after the approaches are combined. The construction of a raised median as part of STIP R-2555B would prohibit some of the left turning traffic along the Catawba Avenue corridor. Therefore, some of the 2024 Build volumes had to be rerouted. Figure 21 illustrates how these volumes were rerouted. Applying these rerouted adjustments in Figure 21 to the 2024 Build volumes in Figures 19 and 20 results in the 2024 Build with TIP volumes shown in Figure 22.

5.2. Traffic Analysis Procedure

All study intersections (both unsignalized and signalized) were analyzed using the methodology outlined in the Highway Capacity Manual (HCM) published by the Transportation Research Board. A computer software package, Synchro and SimTraffic (Version 9.1), was used to complete the analyses for all of the study area intersections. Synchro was developed by Trafficware Corporation and allows the user to input data into the Synchro software and calculate the output based on methodologies in the HCM. SimTraffic creates a traffic simulation model from the Synchro inputs. SimTraffic was used in this study to determine expected queue lengths.

Analysis results for signalized intersections provide delay and level of service (LOS) for all movements and approaches. The overall intersection delay and LOS is also provided. The capacity analysis for an unsignalized intersection does not provide an overall LOS for the intersection, rather a LOS for movements and/or approaches that have a conflicting movement.

The HCM defines capacity as "the maximum hourly rate at which persons or vehicles can reasonably be expected to traverse a point or uniform section of a lane or roadway during a given time period under prevailing roadway, traffic, and control conditions". LOS is a term used to represent different driving conditions, and is defined as a "qualitative measure describing operational conditions within a traffic stream, and their perception by motorists and/or passengers". LOS varies from Level "A" representing free flow to Level "F" where greater vehicle delays are evident.

Refer to Table 3 for HCM levels of service and related average control delay per vehicle for both signalized and unsignalized intersections. Control delay as defined by the HCM includes "initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay". As shown in Table 3, an average control delay of 40 seconds at a signalized intersection results in a LOS D.

TABLE 3
HIGHWAY CAPACITY MANUAL - LEVELS OF SERVICE AND DELAY

UNSIGNALIZED INTERSECTION		SIGNALIZED INTERSECTION	
LEVEL OF SERVICE	AVERAGE CONTROL DELAY PER VEHICLE (SECONDS)	LEVEL OF SERVICE	AVERAGE CONTROL DELAY PER VEHICLE (SECONDS)
A	0-10	A	0-10
B	10-15	B	10-20
C	15-25	C	20-35
D	25-35	D	35-55
E	35-50	E	55-80
F	>50	F	>80

5.3. Mitigation Requirements

NCDOT has guidelines for determining when improvements are needed by the developer. The District Engineer is responsible for the final determination of the improvements. NCDOT typically requires mitigation to be identified when developments are expected to impact the traffic operations as described below:

- Overall intersection or intersection approach delay increases by 25% or more.
- LOS degrades by at least one level
- LOS is F
- Synchro 95th or SimTraffic maximum queue results are greater than the existing turn lane storage length

The Town of Cornelius has level of service thresholds that must be maintained at the study intersections based on the zoning. Additional information regarding the Town's mitigation requirements can be found in the Town of Cornelius Land Development Code.

5.4. Capacity and Level of Service at Study Intersections

5.4.1. West Catawba Avenue and One Norman Drive

The intersection of West Catawba Avenue and One Norman Drive was analyzed as a four-leg signalized intersection with existing lane configurations. It is located within the Village Center and Highway Commercial zoning areas; requiring LOS D to be maintained. Table 4 summarizes the capacity analysis results. Refer to Appendix D for the Synchro reports for this intersection. All SimTraffic reports can be found in Appendix S.

Phase 1 and the Full Build of the proposed development are not expected to cause any level of service or delay impacts based on NCDOT criteria. The southbound approach does not meet the Town's level of service criteria in the 2019 No-Build scenario. The proposed site is not expected to significantly affect this approach. Furthermore, no queue impacts were identified. No improvements by the developer are recommended.

TABLE 4
ANALYSIS SUMMARY OF
WEST CATAWBA AVENUE AND ONE NORMAN DRIVE

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	AM PEAK HOUR		PM PEAK HOUR	
			Approach LOS (Delay)	Overall LOS (Delay)	Approach LOS (Delay)	Overall LOS (Delay)
2018 Existing	EB WB NB SB	1 LT, 1 TH, 1 TH-RT 1 LT, 2 TH, 1 RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	A (5.9) A (6.9) D (37.5) E (61.3)	B (10.9)	A (4.2) A (7.3) D (40.3) E (71.3)	B (11.5)
2019 No-Build	EB WB NB SB	1 LT, 1 TH, 1 TH-RT 1 LT, 2 TH, 1 RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	A (5.9) A (7.6) D (37.4) E (62.2)	B (11.3)	A (4.9) A (7.7) D (41.8) E (75.4)	B (12.2)
2019 Build Phase 1	EB WB NB SB	1 LT, 1 TH, 1 TH-RT 1 LT, 2 TH, 1 RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	A (6.7) A (8.0) D (37.4) E (62.2)	B (11.6)	A (5.0) A (7.9) D (42.0) E (75.1)	B (12.2)
2019 Full Build	EB WB NB SB	1 LT, 1 TH, 1 TH-RT 1 LT, 2 TH, 1 RT 1 LT, 1 TH-RT 1 LT, 1 TH-RT	A (6.5) A (8.1) D (37.4) E (62.2)	B (11.5)	A (4.8) A (8.0) D (42.0) E (75.1)	B (12.0)

5.4.2. West Catawba Avenue and Bethel Church Road

The intersection of West Catawba Avenue and Bethel Church Road was analyzed as a four-leg signalized intersection with existing lane configurations. It is located within the Village Center zoning area; requiring LOS D to be maintained. Table 5 summarizes the capacity analysis results. Refer to Appendix E for the Synchro reports for this intersection. All SimTraffic reports can be found in Appendix S.

Phase 1 and the Full Build of the proposed development are not expected to cause any level of service impacts. The eastbound approach is expected to increase in delay more than 25%, but LOS B is expected to be maintained. All approaches meet the Town's level of service criteria in the 2019 Build scenario. Furthermore, no queue impacts were identified. No improvements by the developer are recommended.

TABLE 5
ANALYSIS SUMMARY OF
WEST CATAWBA AVENUE AND BETHEL CHURCH ROAD

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	AM PEAK HOUR Approach LOS (Delay)	AM PEAK HOUR Overall LOS (Delay)	PM PEAK HOUR Approach LOS (Delay)	PM PEAK HOUR Overall LOS (Delay)
2018 Existing	EB	1 LT, 1 TH, 1 TH-RT	A (4.3)	B (10.6)	A (9.8)	B (18.1)
	WB	1 LT, 2 TH, 1 RT	A (7.0)		B (13.0)	
	NB	1 LT-TH-RT	D (48.2)		D (42.9)	
	SB	1 LT, 1 LT-TH, 1 RT	D (41.4)		D (42.3)	
2019 No-Build	EB	1 LT, 1 TH, 1 TH-RT	A (5.2)	B (11.1)	B (10.5)	B (18.6)
	WB	1 LT, 2 TH, 1 RT	A (7.4)		B (13.6)	
	NB	1 LT-TH-RT	D (48.2)		D (42.7)	
	SB	1 LT, 1 LT-TH, 1 RT	D (41.6)		D (41.8)	
2019 Build Phase 1	EB	1 LT, 1 TH, 1 TH-RT	A (5.0)	B (10.8)	B (13.7)	B (19.8)
	WB	1 LT, 2 TH, 1 RT	A (7.2)		B (14.1)	
	NB	1 LT-TH-RT	D (48.2)		D (42.7)	
	SB	1 LT, 1 LT-TH, 1 RT	D (41.6)		D (41.8)	
2019 Full Build	EB	1 LT, 1 TH, 1 TH-RT	A (5.1)	B (10.8)	B (13.9)	B (19.8)
	WB	1 LT, 2 TH, 1 RT	A (7.3)		B (14.2)	
	NB	1 LT-TH-RT	D (48.2)		D (42.7)	
	SB	1 LT, 1 LT-TH, 1 RT	D (41.6)		D (41.8)	

5.4.3. West Catawba Avenue and Jetton Road

The intersection of West Catawba Avenue and Jetton Road was analyzed as a four-leg signalized intersection with existing lane configurations. It is located within the Village Center zoning area; requiring LOS D to be maintained. Table 6 summarizes the capacity analysis results. Refer to Appendix F for the Synchro reports for this intersection. All SimTraffic reports can be found in Appendix S.

Phase 1 and the Full Build of the proposed development are expected to degrade the intersection from LOS B to LOS C during the AM peak hour. The eastbound approach is expected to degrade from LOS D to LOS E during the PM peak hour of Build Phase 1. No delay impacts were identified. The degrading level of service at the intersection and on the approaches is more a result of the delay value being just under the thresholds between analysis scenarios. Upon review of SimTraffic, there was some spillback in the left turn lane on the eastbound approach. The spillback in the eastbound left turn lane occurred in all scenarios. Several mitigations were analyzed to resolve the queuing issue, but all resulted in longer queues on West Catawba Avenue; shifting the queue issue from the side street to the mainline. There are no recommended improvements since the queueing is not a direct result of the proposed development.

The intersection was analyzed with NCDOT STIP R-2555B, which is a four-lane divided road with a raised median. STIP R-2555B provides an additional left turn lane on the northbound approach. The eastbound left turn still experiences the same amount of queuing as other scenarios. The northbound left turn lanes also are expected to spillback into the through lane. Extending the lanes would locate the left turn lanes in front of Magnolia Estates Drive. Driveways are typically avoided within the functional area of intersection so extending the northbound left turn lanes may not be ideal. No improvements by the developer are recommended.

TABLE 6
ANALYSIS SUMMARY OF
WEST CATAWBA AVENUE AND JETTON ROAD

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	AM PEAK HOUR		PM PEAK HOUR	
			Approach LOS (Delay)	Overall LOS (Delay)	Approach LOS (Delay)	Overall LOS (Delay)
2018 Existing	EB WB NB SB	1 LT, 1 TH, 1 RT 1 LT, 1 TH-RT 1 LT, 1 TH, 1 TH-RT 1 LT, 2 TH, 1 RT	D (44.1) D (47.2) B (10.8) A (8.9)	B (19.1)	D (45.4) D (48.3) B (17.8) A (9.8)	C (25.9)
2019 No-Build	EB WB NB SB	1 LT, 1 TH, 1 RT 1 LT, 1 TH-RT 1 LT, 1 TH, 1 TH-RT 1 LT, 2 TH, 1 RT	D (46.9) D (47.6) B (10.2) A (8.8)	B (19.4)	D (53.1) D (52.0) B (18.6) B (10.4)	C (28.8)
2019 Build Phase 1	EB WB NB SB	1 LT, 1 TH, 1 RT 1 LT, 1 TH-RT 1 LT, 1 TH, 1 TH-RT 1 LT, 2 TH, 1 RT	D (53.5) D (48.3) B (11.0) A (9.8)	C (21.1)	E (55.5) D (53.2) B (13.1) B (10.7)	C (27.4)
2019 Full Build	EB WB NB SB	1 LT, 1 TH, 1 RT 1 LT, 1 TH-RT 1 LT, 1 TH, 1 TH-RT 1 LT, 2 TH, 1 RT	E (55.1) D (48.4) B (10.4) B (10.0)	C (21.2)	E (57.6) D (54.3) B (13.4) B (11.5)	C (28.2)
2024 Build With TIP	EB WB NB SB	1 LT, 1 TH, 1 RT 1 LT, 1 TH-RT **2 LT**, 1 TH, 1 TH-RT 1 LT, 2 TH, 1 RT	F (80.1) D (50.0) C (24.4) B (11.0)	C (31.7)	F (84.2) E (64.3) D (37.6) A (8.9)	D (43.3)

Bold denotes improvement on approach.

5.4.4. West Catawba Avenue and Magnolia Estates Drive

The intersection of West Catawba Avenue and Magnolia Estates Drive was analyzed as a four-leg unsignalized intersection with existing lane configurations. It is located within the Village Center zoning area; requiring LOS D to be maintained. Table 7 summarizes the capacity analysis results. Refer to Appendix G for the Synchro reports for this intersection. All SimTraffic reports can be found in Appendix S.

The side street approaches operate at LOS F during the 2018 Existing scenario. Increases in delay are expected due to the background traffic growth and the proposed development. SimTraffic indicates the eastbound approach is expected to queue a maximum of 266 feet while the westbound approach is expected to queue a maximum of 286 feet during the 2019 Full Build scenario. No improvements are recommended by the developer.

STIP R-2555B is expected to address the poor operation of this intersection with the construction of a median on West Catawba Avenue. The median installation along West Catawba Avenue will convert Magnolia Estates Drive from full access to right-in / right-out. Upon review of SimTraffic, the maximum queue is expected to be approximately 100 feet on the eastbound approach. The westbound approach is expected to queue less than 100 feet during the AM peak hour, but more than 600 feet during the PM. The long queue during the PM peak hour is due to spillback from the intersection of West Catawba Avenue and Jetton Road. This queue issue is not caused by the proposed development trips. No improvements are recommended by the developer.

TABLE 7
ANALYSIS SUMMARY OF
WEST CATAWBA AVENUE AND MAGNOLIA ESTATES DRIVE

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	AM PEAK HOUR		PM PEAK HOUR	
			Approach LOS (Delay)	Overall LOS (Delay)	Approach LOS (Delay)	Overall LOS (Delay)
2018 Existing	EB[2] WB[2] NB[1] SB[1]	1 LT-TH-RT 1 LT-TH, 1 RT 1 LT, 1 TH-RT 1 LT, 1 TH, 1 RT	F (53.9) F (426.4) B (12.7) B (11.1)	NA[3]	E (36.1) F (ERR) B (13.7) B (11.0)	NA[3]
2019 No-Build	EB[2] WB[2] NB[1] SB[1]	1 LT-TH-RT 1 LT-TH, 1 RT 1 LT, 1 TH-RT 1 LT, 1 TH, 1 RT	F (69.5) F (598.5) B (13.3) B (11.3)	NA[3]	E (42.2) F (ERR) B (14.4) B (11.3)	NA[3]
2019 Build Phase 1	EB[2] WB[2] NB[1] SB[1]	1 LT-TH-RT 1 LT-TH, 1 RT 1 LT, 1 TH-RT 1 LT, 1 TH, 1 RT	F (110.3) F (ERR) B (14.5) B (11.6)	NA[3]	E (48.7) F (ERR) C (15.1) B (11.6)	NA[3]
2019 Full Build	EB[2] WB[2] NB[1] SB[1]	1 LT-TH-RT 1 LT-TH, 1 RT 1 LT, 1 TH-RT 1 LT, 1 TH, 1 RT	F (138.8) F (ERR) C (15.3) B (11.7)	NA[3]	F (50.7) F (ERR) C (15.3) B (11.9)	NA[3]
2024 Build With TIP	EB[2] WB[2] NB SB	**1 RT** **1 RT** **2 TH, 1 RT** **1 TH, 1 TH-RT**	B (10.5) C (16.7) - -	NA[3]	B (13.1) C (18.4) - -	NA[3]

1. Major street left-turn movement for unsignalized intersection.
2. Stop controlled approach for unsignalized intersection.
3. Overall intersection LOS is not provided for unsignalized intersections
Bold denotes improvement on approach.

5.4.5. West Catawba Avenue and Harbor View Drive

The intersection of West Catawba Avenue and Harbor View Drive was analyzed as a four-leg unsignalized intersection with existing lane configurations. It is located within the Village Center zoning area; requiring LOS D to be maintained. Table 8 summarizes the capacity analysis results. Refer to Appendix H for the Synchro reports for this intersection. All SimTraffic reports can be found in Appendix S.

The side street approaches operate at LOS F during the 2018 Existing scenario. Increases in delay are expected due to the background traffic growth and the build out of the proposed development. SimTraffic indicates the eastbound approach is expected to queue a maximum of approximately 100 feet while the westbound approach is expected to queue approximately 50 feet during the 2019 Full Build scenario. No improvements are recommended by the developer.

The intersection was analyzed with NCDOT STIP R-2555B, which is a four-lane divided road with a raised median. STIP R-2555B would eliminate left turning traffic at the intersection and relocate the westbound approach, creating a separate intersection to the south. The westbound approaches of the Harbor View Drive and HM Junker Drive intersections would be combined in STIP R-2555B. The eastbound Harbor View Drive approach is expected to operate at LOS B during the 2024 Build with TIP scenario. The combined westbound approach of Harbor View Drive and HM Junker Drive is expected to operate at LOS A during the 2024 Build with TIP scenario. Table 8 includes the analysis results for the separate intersection that is the combination of the westbound approaches of Harbor View Drive and HM Junker Drive in STIP R-2555B.

TABLE 8
ANALYSIS SUMMARY OF
WEST CATAWBA AVENUE AND HARBOR VIEW DRIVE

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	AM PEAK HOUR		PM PEAK HOUR	
			Approach LOS (Delay)	Overall LOS (Delay)	Approach LOS (Delay)	Overall LOS (Delay)
2018 Existing	EB[2] WB[2] NB[1] SB[1]	1 LT-TH-RT 1 LT-TH-RT 1 LT-TH-RT 1 LT-TH-RT	F (84.1) F (1117.6) A (1.4) -	NA[3]	F (89.4) F (517.6) A (3.0) A (0.7)	NA[3]
2019 No-Build	EB[2] WB[2] NB[1] SB[1]	1 LT-TH-RT 1 LT-TH-RT 1 LT-TH-RT 1 LT-TH-RT	F (95.0) F (1298.6) A (1.8) -	NA[3]	F (121.3) F (787.1) A (3.9) A (0.9)	NA[3]
2019 Build Phase 1	EB[2] WB[2] NB[1] SB[1]	1 LT-TH-RT 1 LT-TH-RT 1 LT-TH-RT 1 LT-TH-RT	F (79.3) F (904.6) A (2.6) -	NA[3]	F (122.0) F (732.8) A (5.0) A (1.1)	NA[3]
2019 Full Build	EB[2] WB[2] NB[1] SB[1]	1 LT-TH-RT 1 LT-TH-RT 1 LT-TH-RT 1 LT-TH-RT	F (75.7) F (763.9) A (3.0) -	NA[3]	F (118.8) F (686.3) A (5.8) A (1.6)	NA[3]
2024 Build With TIP	EB[2] NB[1] SB[1]	**1 RT** **2 TH** **1TH, 1 TH-RT**	B (10.4) - -	NA[3]	B (13.0) - -	NA[3]
2024 Build With TIP[4]	WB[2] NB[1] SB[1]	**1 RT** **1 TH, 1 TH-RT** **2 TH**	A (8.9) - -	NA[3]	A (9.1) - -	NA[3]

1. Major street left-turn movement for unsignalized intersection.
2. Stop controlled approach for unsignalized intersection.
3. Overall intersection LOS is not provided for unsignalized intersections
4. Combined west legs of Harbor View Drive and HM Junker Drive intersections in the 2024 Build w/TIP Project R-2555B

Bold denotes improvement on approach.

5.4.6. West Catawba Avenue and HM Junker Drive

The intersection of West Catawba Avenue and HM Junker Drive was analyzed as a four-leg unsignalized intersection with existing lane configurations. It is located within the Village Center zoning area; requiring LOS D to be maintained. Table 9 summarizes the capacity analysis results. Refer to Appendix I for the Synchro reports for this intersection. Impacts requiring mitigation are highlighted in yellow. All SimTraffic reports can be found in Appendix S.

The side street approaches operate at LOS F during the 2018 Existing scenario. Increases in delay are expected due to the background traffic growth and the proposed development. SimTraffic indicates the eastbound approach is expected to queue a maximum of approximately 86 feet. The westbound approach is a very low volume driveway. No improvements are recommended by the developer.

The intersection was analyzed with NCDOT STIP R-2555B, which is a four-lane divided road with a raised median. STIP R-2555B would eliminate left turning traffic at the intersection and relocate the westbound approach, creating a separate intersection to the north. The westbound approaches of the Harbor View Drive and HM Junker Drive intersections would be combined in STIP R-2555B. The eastbound HM Junker Drive approach is expected to operate at LOS C during the 2024 Build with TIP scenario. The combined westbound approach of Harbor View Drive and HM Junker Drive is expected to operate at LOS A during the 2024 Build with TIP scenario. Table 8 includes the analysis results for the separate intersection that is the combination of the westbound approaches of Harbor View Drive and HM Junker Drive in STIP R-2555B.

TABLE 9
ANALYSIS SUMMARY OF
WEST CATAWBA AVENUE AND HM JUNKER DRIVE

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	AM PEAK HOUR Approach LOS (Delay)	AM PEAK HOUR Overall LOS (Delay)	PM PEAK HOUR Approach LOS (Delay)	PM PEAK HOUR Overall LOS (Delay)
2018 Existing	EB[2] WB[2] NB[1] SB[1]	1 LT-TH-RT 1 LT-TH-RT 1 LT-TH-RT 1 LT-TH-RT	F (ERR) - A (0.1) A (0.3)	NA[3]	F (ERR) - A (0.1) -	NA[3]
2019 No-Build	EB[2] WB[2] NB[1] SB[1]	1 LT-TH-RT 1 LT-TH-RT 1 LT-TH-RT 1 LT-TH-RT	F (ERR) - A (0.1) A (0.4)	NA[3]	F (ERR) - A (0.1) -	NA[3]
2019 Build Phase 1	EB[2] WB[2] NB[1] SB[1]	1 LT-TH-RT 1 LT-TH-RT 1 LT-TH-RT 1 LT-TH-RT	F (ERR) - A (0.1) A (0.8)	NA[3]	F (ERR) - A (0.1) -	NA[3]
2019 Full Build	EB[2] WB[2] NB[1] SB[1]	1 LT-TH-RT 1 LT-TH-RT 1 LT-TH-RT 1 LT-TH-RT	F (ERR) - A (0.1) A (0.9)	NA[3]	F (ERR) - A (0.1) -	NA[3]
2024 Build With TIP	EB[2] NB[1] SB[1]	**1 RT** **2 TH** **1 TH, 1 TH-RT**	C (17.4) - -	NA[3]	C (20.1) - -	NA[3]

1. Major street left-turn movement for unsignalized intersection.
2. Stop controlled approach for unsignalized intersection.
3. Overall intersection LOS is not provided for unsignalized intersections

Bold denotes improvement on approach.

5.4.7. West Catawba Avenue Nantz Road / Site Access A

The intersection of West Catawba Avenue and Nantz Road was analyzed as a three-leg signalized intersection with existing lane configurations. It is located within the Village Center and Neighborhood Mixed Use zoning areas; requiring LOS D to be maintained. Table 10 summarizes the capacity analysis results. Refer to Appendix J for the Synchro reports for this intersection. Impacts requiring mitigation are highlighted in yellow. All SimTraffic reports can be found in Appendix S.

The 2019 Build scenario was modeled with shared lanes and permitted phasing. Site Access A would add a fourth leg to the intersection. The intersection is expected to operate poorly under the above conditions. Level of service, delay, and queuing issues were addressed in the 2019 Build Phase 1 with improvements scenario. The following improvements are recommended to be done by the developer:

- Restripe, and widen if necessary, the eastbound Nantz Road approach to provide a left turn lane with 125 feet storage and appropriate taper, and one shared through/right lane.
- Construct the westbound Site Access A approach with one left turn lane with 150 feet of storage and appropriate taper, and one shared through/right lane.
- Construct a southbound West Catawba Avenue left turn lane with 100 feet of storage and appropriate taper.

A 2019 Build scenario with protected only phasing was also analyzed in order to determine the storage lengths needed under the worst case scenario. However, the preferred recommendation is the addition of dedicated left turns to the southbound, eastbound, and westbound approaches with permissive left turn treatments on the side streets and permissive/protected left turn treatments on the West Catawba Avenue approaches.

The intersection was analyzed with NCDOT STIP Project R-2555B, which is a four-lane divided road with a raised median. STIP R-2555B eliminates left and through movements from the eastbound and westbound approaches; creating a superstreet design. This is expected to reduce the overall intersection delay to LOS B or better. No queue issues were identified. No improvements by the developer are recommended.

TABLE 10
ANALYSIS SUMMARY OF
WEST CATAWBA AVENUE AND NANTZ ROAD / SITE ACCESS A

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	AM PEAK HOUR		PM PEAK HOUR	
			Approach LOS (Delay)	Overall LOS (Delay)	Approach LOS (Delay)	Overall LOS (Delay)
2018 Existing	EB NB SB	1 LT, 1 RT 1 LT, 1 TH 1 TH-RT	C (34.9) A (5.0) B (11.4)	A (8.9)	D (45.5) A (6.2) C (22.7)	B (16.2)
2019 No-Build	EB NB SB	1 LT, 1 RT 1 LT, 1 TH 1 TH-RT	C (34.5) A (6.0) B (14.1)	B (10.7)	D (46.8) A (7.6) C (28.3)	B (19.7)
2019 Build Phase 1	EB WB NB SB	1 LT-TH, 1 RT 1 LT-TH-RT 1 LT, 1 TH-RT 1 LT-TH-RT	E (63.5) F (222.9) A (8.7) F (344.1)	F (174.0)	E (70.7) F (196.2) A (3.9) F (180.0)	F (102.4)
2019 Build Phase 1 w/Improvement with Permissive LT Treatment	EB WB NB SB	**1 LT, 1 TH-RT** **1 LT, 1 TH-RT** 1 LT, 1 TH-RT **1 LT,** 1 TH-RT	E (62.7) F (89.6) C (25.9) C (23.7)	C (28.8)	E (61.8) E (73.9) B (13.3) D (45.0)	C (33.3)
2019 Build Phase 1 w/Improvement with Protected Only LT Treatment	EB WB NB SB	**1 LT, 1 TH-RT** **1 LT, 1 TH-RT** 1 LT, 1 TH-RT **1 LT,** 1 TH-RT	E (62.7) F (89.6) C (28.6) C (28.7)	C (32.4)	E (69.2) F (92.1) B (14.0) D (41.9)	C (33.0)
2019 Full Build	EB WB NB SB	1 LT-TH, 1 RT 1 LT-TH-RT 1 LT, 1 TH-RT 1 LT-TH-RT	E (63.7) F (257.4) A (8.8) F (521.4)	F (259.8)	E (59.5) F (275.5) A (5.3) F (349.9)	F (193.6)
2019 Full Build w/Improvement with Permissive LT Treatment	EB WB NB SB	**1 LT, 1 TH-RT** **1 LT, 1 TH-RT** 1 LT, 1 TH-RT **1 LT,** 1 TH-RT	E (63.1) F (108.9) C (24.2) C (27.8)	C (31.0)	E (62.3) F (126.6) B (17.9) D (53.9)	D (44.4)
2019 Full Build w/Improvement with Protected Only LT Treatment	EB WB NB SB	**1 LT, 1 TH-RT** **1 LT, 1 TH-RT** 1 LT, 1 TH-RT **1 LT,** 1 TH-RT	E (63.1) F (127.8) C (33.3) C (31.7)	D (37.9)	E (62.3) F (126.6) C (20.9) E (59.5)	D (48.4)
2024 Build With TIP	EB NB SB	**1 RT** **1 LT** **2 TH, 1 RT**	E (57.4) D (49.3) A (5.5)	A (9.9)	E (58.8) D (49.2) A (7.5)	B (12.0)
2024 Build With TIP	WB NB SB	**2 RT** **2 TH, 1 RT** **1 LT**	D (47.9) A (7.1) E (56.2)	B (14.0)	D (53.7) A (6.3) D (50.3)	B (14.0)

Bold denotes improvement on approach.

5.4.8. West Catawba Avenue and Edinburgh Square Drive

The intersection of West Catawba Avenue and Edinburgh Square Drive was analyzed as a three-leg unsignalized intersection with existing lane configurations. It is located within the Village Center zoning area; requiring LOS D to be maintained. Table 11 summarizes the capacity analysis results. Refer to Appendix K for the Synchro reports for this intersection. All SimTraffic reports can be found in Appendix S.

The westbound approach operates at LOS E during the 2018 Existing scenario. Increases in delay are expected due to the background traffic growth, and the proposed development is expected to degrade the westbound approach to LOS F during the 2019 Build Phase 1 and Full Build scenarios. SimTraffic indicates the westbound approach is expected to queue a maximum of 100 feet during the 2019 Full Build scenario. No improvements are recommended by the developer.

STIP R-2555B is expected to address the poor operation of this intersection with the construction of a median on West Catawba Avenue. The median installation along West Catawba Avenue will convert Edinburgh Square Drive from full access to right-in / right-out. Upon review of SimTraffic, the maximum westbound queue is expected to be approximately 74 feet. No improvements are recommended by the developer.

TABLE 11
ANALYSIS SUMMARY OF
WEST CATAWBA AVENUE AND EDINBURGH SQUARE DRIVE

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	AM PEAK HOUR Approach LOS (Delay)	AM PEAK HOUR Overall LOS (Delay)	PM PEAK HOUR Approach LOS (Delay)	PM PEAK HOUR Overall LOS (Delay)
2018 Existing	WB2 NB SB1	1 LT-RT 1 TH-RT 1 LT, 1 TH	E (49.6) - B (11.8)	NA3	E (42.0) - B (11.0)	NA3
2019 No-Build	WB2 NB SB1	1 LT-RT 1 TH-RT 1 LT, 1 TH	E (55.9) - B (12.1)	NA3	E (47.4) - B (11.2)	NA3
2019 Build Phase 1	WB2 NB SB1	1 LT-RT 1 TH-RT 1 LT, 1 TH	F (68.1) - B (12.6)	NA3	F (52.6) - B (11.5)	NA3
2019 Full Build	WB2 NB SB1	1 LT-RT 1 TH-RT 1 LT, 1 TH	F (74.0) - B (12.9)	NA3	F (56.7) - B (11.5)	NA3
2024 Build With TIP	WB2 NB SB	**1 RT** **1 TH, 1 TH-RT** **2 TH**	C (19.4) - -	NA3	C (16.4) - -	NA3

1. Major street left-turn movement for unsignalized intersection.
2. Stop controlled approach for unsignalized intersection.
3. Overall intersection LOS is not provided for unsignalized intersections

5.4.9. West Catawba Avenue and Westmoreland Lake Drive

The intersection of West Catawba Avenue and Westmoreland Lake Drive was analyzed as a three-leg unsignalized intersection with existing lane configurations. It is located within the Neighborhood Mixed Use and Neighborhood Residential zoning areas; requiring LOS D to be maintained. Table 12 summarizes the capacity analysis results. Refer to Appendix L for the Synchro reports for this intersection. All SimTraffic reports can be found in Appendix S.

The westbound approach operates at LOS F during the AM peak hour and LOS E during the PM peak hour of the 2018 Existing scenario. Increases in delay are expected due to the background traffic growth, and the background growth is expected to degrade the westbound approach to LOS F during the PM peak hour. SimTraffic indicates the westbound left turn lane is expected to queue a maximum of 150 feet and the westbound right turn lane a maximum of 278 feet during the 2019 Build scenario. No improvements are recommended by the developer.

STIP R-2555B is expected to address the poor operation of this intersection with the construction of a median on West Catawba Avenue. The median installation along West Catawba Avenue will convert Westmoreland Lake Drive from full access to right-in / right-out. Upon review of SimTraffic, the maximum westbound queue is expected to be approximately 108 feet. No improvements are recommended by the developer.

TABLE 12
ANALYSIS SUMMARY OF
WEST CATAWBA AVENUE AND WESTMORELAND LAKE DRIVE AND

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	AM PEAK HOUR		PM PEAK HOUR	
			Approach LOS (Delay)	Overall LOS (Delay)	Approach LOS (Delay)	Overall LOS (Delay)
2018 Existing	WB[2] NB SB[1]	1 LT, 1 RT 1 TH-RT 1 LT, 1 TH	F (56.8) - B (11.6)	NA[3]	E (46.4) - B (11.3)	NA[3]
2019 No-Build	WB[2] NB SB[1]	1 LT-RT 1 TH-RT 1 LT, 1 TH	F (65.6) - B (11.9)	NA[3]	F (53.1) - B (11.6)	NA[3]
2019 Build Phase 1	WB[2] NB SB[1]	1 LT-RT 1 TH-RT 1 LT, 1 TH	F (82.5) - B (12.5)	NA[3]	F (60.3) - B (11.9)	NA[3]
2019 Full Build	WB[2] NB SB[1]	1 LT-RT 1 TH-RT 1 LT, 1 TH	F (90.2) - B (12.7)	NA[3]	F (66.2) - B (11.9)	NA[3]
2024 Build With TIP	WB[2] NB SB[1]	**1 RT** **2 TH, 1 RT** **1 UT/LT, 2 TH**	C (21.5) - C (15.7)	NA[3]	C (18.1) - C (15.1)	NA[3]

1. Major street left-turn movement for unsignalized intersection.
2. Stop controlled approach for unsignalized intersection.
3. Overall intersection LOS is not provided for unsignalized intersections
Bold denotes improvement on approach.

5.4.10. West Catawba Avenue and Silver Quay Drive

The intersection of West Catawba Avenue and Silver Quay Drive was analyzed as a three-leg unsignalized intersection with existing lane configurations. It is located within the Neighborhood Mixed Use zoning area; requiring LOS D to be maintained. Table 13 summarizes the capacity analysis results. Refer to Appendix M for the Synchro reports for this intersection. All SimTraffic reports can be found in Appendix S.

The eastbound approach is expected to operate at LOS F during the AM peak hour and LOS E during the PM peak hour of the 2019 No-Build scenario. Increases in delay are expected due to the proposed development without affecting the level of service grade. SimTraffic indicates the eastbound left turn lane is expected to queue a maximum of 32 feet and the eastbound right turn lane a maximum of 48 feet during the 2019 Build scenario. No improvements are recommended by the developer.

STIP R-2555B is expected to address the poor operation of this intersection with the construction of a median on West Catawba Avenue. The median installation along West Catawba Avenue will convert Silver Quay Drive from full access to right-in / right-out. Upon review of SimTraffic, the maximum eastbound queue is expected to be approximately 41 feet. No improvements are recommended by the developer.

TABLE 13
ANALYSIS SUMMARY OF
WEST CATAWBA AVENUE AND SILVER QUAY DRIVE

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	AM PEAK HOUR		PM PEAK HOUR	
			Approach LOS (Delay)	Overall LOS (Delay)	Approach LOS (Delay)	Overall LOS (Delay)
2018 Existing	EB[2] NB[1] SB	1 LT, 1 RT 1 LT, 1 TH 1 TH-RT	E (50.0) - -	NA[3]	D (33.0) B (12.1) -	NA[3]
2019 No-Build	EB[2] NB[1] SB	1 LT, 1 RT 1 LT, 1 TH 1 TH-RT	F (56.5) - -	NA[3]	E (36.0) B (12.4) -	NA[3]
2019 Build Phase 1	EB[2] NB[1] SB	1 LT, 1 RT 1 LT, 1 TH 1 TH-RT	F (67.1) - -	NA[3]	E (38.8) B (12.7) -	NA[3]
2019 Full Build	EB[2] NB[1] SB	1 LT, 1 RT 1 LT, 1 TH 1 TH-RT	F (71.2) - -	NA[3]	E (41.9) B (13.1) -	NA[3]
2024 Build With TIP	EB[2] NB SB	**1 RT** **2 TH** **1 TH, 1 TH-RT**	C (16.6) - -	NA[3]	C (19.3) - -	NA[3]

1. Major street left-turn movement for unsignalized intersection.
2. Stop controlled approach for unsignalized intersection.
3. Overall intersection LOS is not provided for unsignalized intersections
Bold denotes improvement on approach.

5.4.11. West Catawba Avenue and Harborside Drive

The intersection of West Catawba Avenue and Harborside Drive was analyzed as a four-leg unsignalized intersection with existing lane configurations. It is located within the Neighborhood Mixed Use zoning area; requiring LOS D to be maintained. Table 14 summarizes the capacity analysis results. Refer to Appendix N for the Synchro reports for this intersection. All SimTraffic reports can be found in Appendix S.

The side street approaches operate at LOS F during the 2018 Existing scenario. Increases in delay are expected due to the background traffic growth, and the proposed development. SimTraffic indicates the eastbound approach is expected to queue a maximum of 76 feet during the 2019 Build scenario. The westbound shared left/through lane is expected to queue a maximum of 480 feet while the right turn lane is expected to queue 367 feet. No improvements are recommended by the developer.

STIP R-2555B is expected to address the poor operation of this intersection with the construction of a median on West Catawba Avenue. The median installation along West Catawba Avenue will convert Harborside Drive from full access to right-in / right-out. Upon review of SimTraffic, the maximum eastbound queue is expected to be approximately 35 feet while the westbound queue is expected to be approximately 93 feet. No improvements are recommended by the developer.

TABLE 14
ANALYSIS SUMMARY OF
WEST CATAWBA AVENUE AND HARBORSIDE DRIVE

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	AM PEAK HOUR Approach LOS (Delay)	AM PEAK HOUR Overall LOS (Delay)	PM PEAK HOUR Approach LOS (Delay)	PM PEAK HOUR Overall LOS (Delay)
2018 Existing	EB[2] WB[2] NB[1] SB[1]	1 LT-TH-RT 1 LT-TH, 1 RT 1 LT, 1 TH, 1 RT 1 LT, 1 TH-RT	F (965.4) F (5683.5) - B (13.6)	NA[3]	F 877.1) F (4013.1) B (12.4) B (13.4)	NA[3]
2019 No-Build	EB[2] WB[2] NB[1] SB[1]	1 LT-TH-RT 1 LT-TH, 1 RT 1 LT, 1 TH, 1 RT 1 LT, 1 TH-RT	F (1888.8) F (5665.9) - B (14.6)	NA[3]	F (1364.0) F (4056.8) B (12.8) B (14.0)	NA[3]
2019 Build Phase 1	EB[2] WB[2] NB[1] SB[1]	1 LT-TH-RT 1 LT-TH, 1 RT 1 LT, 1 TH, 1 RT 1 LT, 1 TH-RT	F (ERR) F (5670.4) - C (16.9)	NA[3]	F (2019.4) F (4058.2) B (13.1) B (14.8)	NA[3]
2019 Full Build	EB[2] WB[2] NB[1] SB[1]	1 LT-TH-RT 1 LT-TH, 1 RT 1 LT, 1 TH, 1 RT 1 LT, 1 TH-RT	F (ERR) F (5673.6) - C (18.2)	NA[3]	F (2314.4) F (4058.6) B (13.5) B (14.8)	NA[3]
2024 Build With TIP	EB[2] WB[2] NB[1] SB[1]	**1 RT** **1 RT** **2 TH, 1 RT** **2 TH, 1 RT**	C (16.6) B (11.9) - -	NA[3]	C (18.3) B (10.9) - -	NA[3]

1. Major street left-turn movement for unsignalized intersection.
2. Stop controlled approach for unsignalized intersection.
3. Overall intersection LOS is not provided for unsignalized intersections

Bold denotes improvement on approach.

5.4.12. West Catawba Avenue and Westmoreland Road

The intersection of West Catawba Avenue and Westmoreland Road was analyzed as a four-leg signalized intersection with existing lane configurations. It is located within the Neighborhood Mixed Use and Neighborhood Residential zoning areas; requiring LOS D to be maintained. Table 15 summarizes the capacity analysis results. Refer to Appendix O for the Synchro reports for this intersection. Impacts requiring mitigation are highlighted in yellow. All SimTraffic reports can be found in Appendix S.

The proposed development is expected to increase delay on the northbound approach more than 25% during the AM peak hour. The proposed development is also expected to degrade the southbound approach and increase its delay more than 25% during the PM peak hour. SimTraffic indicated the westbound right turn lane and the southbound left turn lane are both expected to spillback during the 2019 No-Build scenario. The proposed development is expected to increase this spillback. The southbound left turn lane cannot be extended without shortening the existing northbound left turn lane at Village Harbor Drive or significantly widening Catawba Avenue.

The intersection was analyzed with NCDOT STIP R-2555B, which is a four-lane divided road with a raised median. STIP R-2555B provides westbound dual left and right turn lanes, northbound dual right turn lanes, and southbound dual left turn lanes. The intersection is expected to operate at an acceptable level of service. SimTraffic indicates no queue issues are expected. No improvements are recommended by the developer.

TABLE 15
ANALYSIS SUMMARY OF
WEST CATAWBA AVENUE AND WESTMORELAND ROAD

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	AM PEAK HOUR Approach LOS (Delay)	AM PEAK HOUR Overall LOS (Delay)	PM PEAK HOUR Approach LOS (Delay)	PM PEAK HOUR Overall LOS (Delay)
2018 Existing	EB	1 LT-TH-RT	C (28.0)	B (19.4)	C (29.3)	D (35.1)
	WB	1 LT-TH, 1 RT	D (42.0)		D (48.0)	
	NB	1 LT, 1 TH, 1 RT	B (18.8)		D (37.8)	
	SB	1 LT, 1 TH-RT	A (9.3)		C (26.7)	
2019 No-Build	EB	1 LT-TH-RT	C (27.9)	C (21.6)	C (29.8)	D (39.0)
	WB	1 LT-TH, 1 RT	D (42.9)		D (52.8)	
	NB	1 LT, 1 TH, 1 RT	C (21.9)		D (46.9)	
	SB	1 LT, 1 TH-RT	B (11.6)		C (26.1)	
2019 Build Phase 1	EB	1 LT-TH-RT	C (27.9)	C (24.1)	C (29.8)	D (43.7)
	WB	1 LT-TH, 1 RT	D (43.3)		D (52.7)	
	NB	1 LT, 1 TH, 1 RT	C (27.5)		D (47.7)	
	SB	1 LT, 1 TH-RT	B (12.3)		D (36.4)	
2019 Full Build	EB	1 LT-TH-RT	C (27.9)	C (25.4)	C (29.8)	D (46.7)
	WB	1 LT-TH, 1 RT	D (44.2)		D (52.2)	
	NB	1 LT, 1 TH, 1 RT	C (29.2)		E (57.9)	
	SB	1 LT, 1 TH-RT	B (13.4)		D (36.2)	
2024 Build With TIP	EB	1 LT-TH-RT	D (48.7)	C (23.7)	D (48.5)	C (28.0)
	WB	**2 LT, 1 TH, 2 RT**	D (38.0)		D (44.3)	
	NB	**1 LT, 2 TH, 2 RT**	B (18.3)		C (22.4)	
	SB	**2 LT, 1 TH, 1 TH-RT**	C (20.2)		C (23.7)	

Bold denotes improvement on approach.

5.4.13. West Catawba Avenue and Site Access B

The intersection of West Catawba Avenue and Site Access B was analyzed as a proposed three-leg unsignalized right-in right-out intersection. It is located within the Neighborhood Mixed Use zoning area; requiring LOS D to be maintained. Table 16 summarizes the capacity analysis results. Refer to Appendix P for the Synchro reports for this intersection. All SimTraffic reports can be found in Appendix S.

The unsignalized right-in right-out intersection is expected to operate at LOS D in the AM and PM Peak hours of the 2019 Full Build scenario. SimTraffic indicates a maximum queue of 203 feet is expected on the westbound approach. The northbound approach is expected to spillback from the signal at Nantz Road, past Site Access B. It is recommended the developer construct Site Access B with one ingress lane and one egress lane (right-out only). It is also recommended the developer install a quick curb median on West Catawba Avenue to prohibit left turns at the intersection.

The intersection was analyzed with NCDOT STIP R-2555B, which is a four-lane divided road with a raised median. The intersection is expected to operate with less delay and queueing due to the additional through lanes on West Catawba Avenue. No improvements are recommended.

After reviewing NCDOT warrants for right turn lanes, it was determined a northbound right turn lane would be warranted on West Catawba Avenue during the 2019 Build Phase 1 scenario. This turn lane was left out of the analysis shown in Table 16 in order to show the worst case scenario. This right turn lane may also be warranted during the 2024 Build with TIP scenario, but it should be noted this turn lane warrant is intended for application on high speed highways. Synchro and SimTraffic results indicate the intersection is expected to function acceptably without a right turn lane. No turn lane is recommended. See Appendix P for the turn lane warrant analysis.

TABLE 16
ANALYSIS SUMMARY OF
WEST CATAWBA AVENUE AND SITE ACCESS B

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	AM PEAK HOUR Approach LOS (Delay)	AM PEAK HOUR Overall LOS (Delay)	PM PEAK HOUR Approach LOS (Delay)	PM PEAK HOUR Overall LOS (Delay)
2019 Build Phase 1	WB[2] NB SB	1 RT 1 TH-RT 1 TH	D (30.9) - -	NA[3]	D (26.8) - -	NA[3]
2019 Full Build	WB[2] NB SB	1 RT 1 TH-RT 1 TH	D (32.2) - -	NA[3]	D (28.5) - -	NA[3]
2024 Build With TIP	WB[2] NB SB	1 RT **1 TH, 1 TH-RT** **2 TH**	C (19.1) - -	NA[3]	C (17.9) - -	NA[3]

1. Major street left-turn movement for unsignalized intersection.
2. Stop controlled approach for unsignalized intersection.
3. Overall intersection LOS is not provided for unsignalized intersections

Bold denotes improvement on approach.

5.4.14. Site Access A and Site Access C

The intersection of Site Access A and Site Access C was analyzed as a proposed three-leg unsignalized intersection. It is located within the Neighborhood Mixed Use zoning area; requiring LOS D to be maintained. Table 17 summarizes the capacity analysis results. Refer to Appendix Q for the Synchro reports for this intersection. All SimTraffic reports can be found in Appendix S.

The unsignalized intersection is expected to operate at LOS B or better. SimTraffic indicates a maximum queue of more than 200 feet is expected on the northbound approach. If this becomes an issue, vehicles could instead exit via Access D which is expected to have a queue of less than 75 feet. The westbound approach is expected to spillback from the signal at West Catawba Avenue, past Site Access C. The spillback is relatively short and shouldn’t cause major issues. However, this spillback could be expected to increase as development occurs along Access A. Access C could be moved farther away from Catawba Avenue or changed to a right-in/right-out in order to avoid any future queue issues. The queue is expected to be shortened once NCDOT STIP R-2555B is constructed; resulting in a queue of approximately 125 feet from the signal. It is recommended the developer construct Site Access C with one ingress lane and one egress lane (shared left/right).

After reviewing NCDOT warrants for right turn lanes, it was determined an eastbound right turn lane would not be warranted on Access A.

TABLE 17
ANALYSIS SUMMARY OF
SITE ACCESS A AND SITE ACCESS C

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	AM PEAK HOUR		PM PEAK HOUR	
			Approach LOS (Delay)	Overall LOS (Delay)	Approach LOS (Delay)	Overall LOS (Delay)
2019 Build Phase 1	EB WB[1] NB[2]	1 TH-RT 1 LT-TH 1 LT-RT	- - A (9.4)	NA[3]	- - A (9.3)	NA[3]
2019 Full Build	EB WB[1] NB[2]	1 TH-RT 1 LT-TH 1 LT-RT	- - A (10.0)	NA[3]	- - B (10.1)	NA[3]

1. Major street left-turn movement for unsignalized intersection.
2. Stop controlled approach for unsignalized intersection.
3. Overall intersection LOS is not provided for unsignalized intersections

5.4.15. Site Access A and Site Access D

The intersection of Site Access A and Site Access D was analyzed as a proposed three-leg unsignalized intersection. It is located within the Neighborhood Mixed Use zoning area; requiring LOS D to be maintained. Table 18 summarizes the capacity analysis results. Refer to Appendix R for the Synchro reports for this intersection. All SimTraffic reports can be found in Appendix S.

The unsignalized intersection is expected to operate at LOS A. SimTraffic indicates a maximum queue of 63 feet is expected on the northbound approach. It is recommended the developer construct Site Access D with one ingress lane and one egress lane (shared left/right).

TABLE 18
ANALYSIS SUMMARY OF
SITE ACCESS A AND SITE ACCESS D

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	AM PEAK HOUR		PM PEAK HOUR	
			Approach LOS (Delay)	Overall LOS (Delay)	Approach LOS (Delay)	Overall LOS (Delay)
2019 Full Build	EB WB[1] NB[2]	1 TH-RT 1 LT-TH 1 LT-RT	- - A (8.9)	NA[3]	- - A (9.0)	NA[3]

1. Major street left-turn movement for unsignalized intersection.
2. Stop controlled approach for unsignalized intersection.
3. Overall intersection LOS is not provided for unsignalized intersections

6. CRASH ANALYSIS

Crash data was obtained from the NCDOT. Crashes in this report are located on West Catawba Avenue from One Norman Boulevard to Westmoreland Road starting June 1, 2013 to May 31, 2018. These crashes were divided into categories. Based on the crash data report, it was determined that rear end crashes accumulated 119 of the 224 crashes that occurred in the study area. There were 34 angle crashes, 16 left-turn crashes on the same roadway, and 15 sideswipe crashes in the same direction. Other crash types were recorded, but occurred less frequently. Appendix T includes the crash data obtained from NCDOT.

Out of the 119 rear end crashes, 50 were reported to occur with no traffic control device present, 40 did not list a type of traffic control, 16 occurred in stop and go traffic at a signal. The remaining crashes occurred at a stop sign, yield sign, or along a double yellow no-passing zone. Based on this data, it appears most rear end crashes occurred away from signalized intersections. Causes of this type of crash could be high turn volumes, excessive speed, or driver being unaware of an intersection. It was reported that 26 out of the 119 rear end crashes resulted in an injury; with most of them being Class C injuries.

Angle crashes accounted for 34 out of the 224 total crashes. The majority of these occurred at signalized intersections. No recurring crash pattern was identified at individual intersections. Left turning vehicles were involved in most of the crashes. Causes of this type of crash could be large turn volumes, restricted sight distance, short yellow phases, no protected left turn phase, or excessive speed. Signal adjustments, or prohibiting left turns could mitigate these types of crashes. It was reported that 11 of the 34 angle crashes resulted in an injury.

The majority of left-turn crashes on the same roadway occurred at One Norman Boulevard or Jetton Road. No recurring crash pattern was identified at individual intersections. Causes of this type of crash could be large turn volumes, restricted sight distance, short yellow phases, no protected left turn phase, or excessive speed. Signal adjustments, or prohibiting left turns could mitigate these types of crashes. It was reported that 4 of the 16 left-turn crashes resulted in an injury.

There were 15 sideswipe crashes in the same direction. Out of the 15 crashes, 6 occurred in the southbound direction, just south of Jetton Road. There are two southbound through lanes on Catawba Avenue at Jetton Road. The outer through lanes drops as a right turn lane approximately 400 feet south of Jetton Road at Magnolia Estates Drive. This drop lane could be attributing to the number of sideswipes, as 3 of the crashes involved a vehicle changing lanes or merging. Lengthening the lane could mitigate this type of crash. No injuries were reported as a result of sideswipe crashes.

7. COMPLIANCE WITH LOCAL IMPROVEMENT PLANS

The project area is impacted by three (3) local transportation improvement plans. The following sections cover the improvements by the Cornelius Pedestrian Plan, the Cornelius Bike Plan, the 2014 Land Use Plan, The Cornelius Centennial Transportation Plan, and the Charlotte Department of Transportation Comprehensive Transportation Improvement Plan. The recommended improvements in the sections above comply with the following plans.

- Cornelius Bike Plan
    - The addition of dedicated bike facilities on West Catawba from Torrence Chapel Road to Jetton Road
    - The addition of dedicated bike facilities on West Catawba from Magnolia Estates Drive to Sam Furr Road
    - The addition of sidepaths on West Catawba from Jetton Road to Westmoreland Road
- 2014 Land Use Plan
    - Combine turning movements on side streets along West Catawba
    - Only allow site driveways to operate as a right-in/ right-out
    - Install sidewalks on both sides of West Catawba corridor
    - The addition of right and left turn lanes at major intersections along West Catawba
    - Allows multiuse land developments along West Catawba

- Cornelius Centennial Transportation Plan
    - Combine turning movements on side streets along West Catawba
    - Only allow site driveways to operate as a right-in/ right-out

8. CONCLUSIONS

This report summarizes the findings of the Traffic Impact Study (TIS) that was performed for the proposed 18830 West Catawba development to be located along West Catawba Avenue, east of Nantz Road in Cornelius, North Carolina. The purpose of this study is to determine the potential impact to the surrounding transportation system caused by the traffic generated by the development.

The site is proposed to consist of up to 4,000 square feet of medical/dental office space, 45,000 general office space, 5,400 square feet of shopping center, and a 16 fueling position gas station. Phase 1 includes 4,000 square feet of medical/dental office space, 5,400 square feet of shopping center, 16 fueling position gas station, and three driveways. One full access driveway (Access A) is proposed opposite Nantz Road and one right-in / right-out driveway (Access B) is proposed on West Catawba Avenue. Another driveway (Access C) would form a three leg intersection with Access A and is expected to be built out by the year 2019. The Full Buildout includes an additional 45,000 square feet of general office space and an additional driveway (Access D). This driveway would provide full access and form a three leg intersection with Access A. The site is expected to be fully built by the year 2019.

8.1 Summary of Recommended Improvements

Based on the analysis results, some impacts are expected by the proposed development. Figures 23 and 24 illustrate the improvements recommended to be completed by the developer. No changes to NCDOT STIP R-2555B are recommended. The following improvements are recommended to be done by the developer:

<u>West Catawba Avenue and Nantz Road/Site Access A</u>

- 2019 Build Phase 1 Improvements:
    - Restripe, and widen if necessary, the eastbound Nantz Road approach to provide a left turn lane with 125 feet storage and appropriate taper, and one shared through/right lane.
    - Construct the westbound Site Access A approach with one left turn lane with 150 feet of storage and appropriate taper, and one shared through/right lane.

  - Construct a southbound West Catawba Avenue left turn lane with 100 feet of storage and appropriate taper.
  - Provide permissive left turn treatments on the side streets and permissive/protected left turn treatments on the West Catawba Avenue approaches.
- 2019 Full Build Improvements:
  - No additional improvements are recommended.

<u>West Catawba Avenue and Site Access B</u>

- 2019 Build Phase 1 Improvements:
  - Construct Site Access B with one ingress lane and one egress lane (right-in/right-out only).
  - Install a quick curb median to prohibit left turns at the intersection.
- 2019 Full Build Improvements:
  - No additional improvements are recommended.

<u>Site Access A and Site Access C</u>

- 2019 Build Phase 1 Improvements:
  - Construct Site Access C with one ingress lane and one egress lane (shared left/right).
- 2019 Full Build Improvements:
  - No additional improvements are recommended.

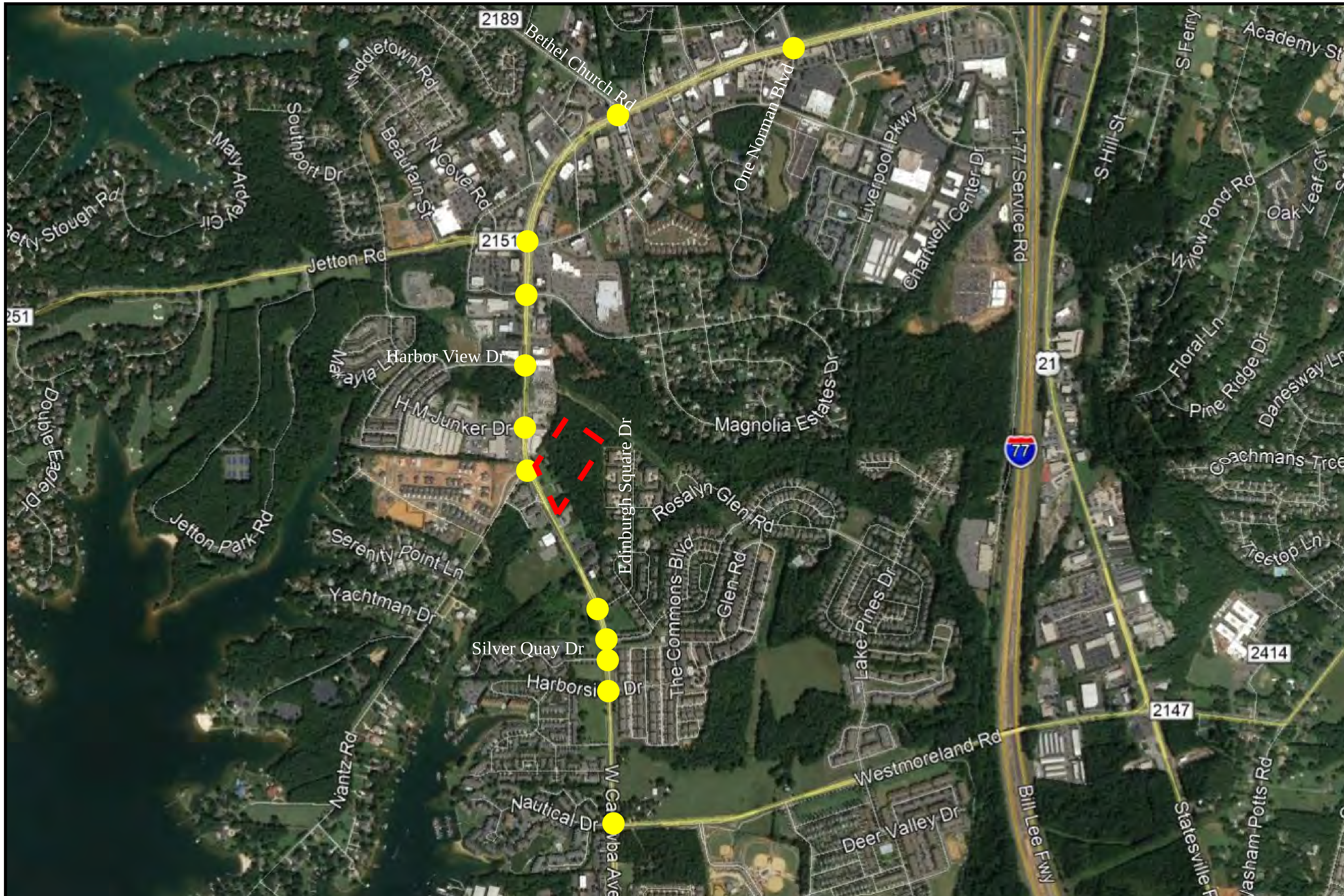
<u>Site Access A and Site Access D</u>

- 2019 Full Build Improvements:
  - Construct Site Access D with one ingress lane and one egress lane (shared left/right).

TECHNICAL APPENDIX

APPENDIX A

FIGURES



LEGEND

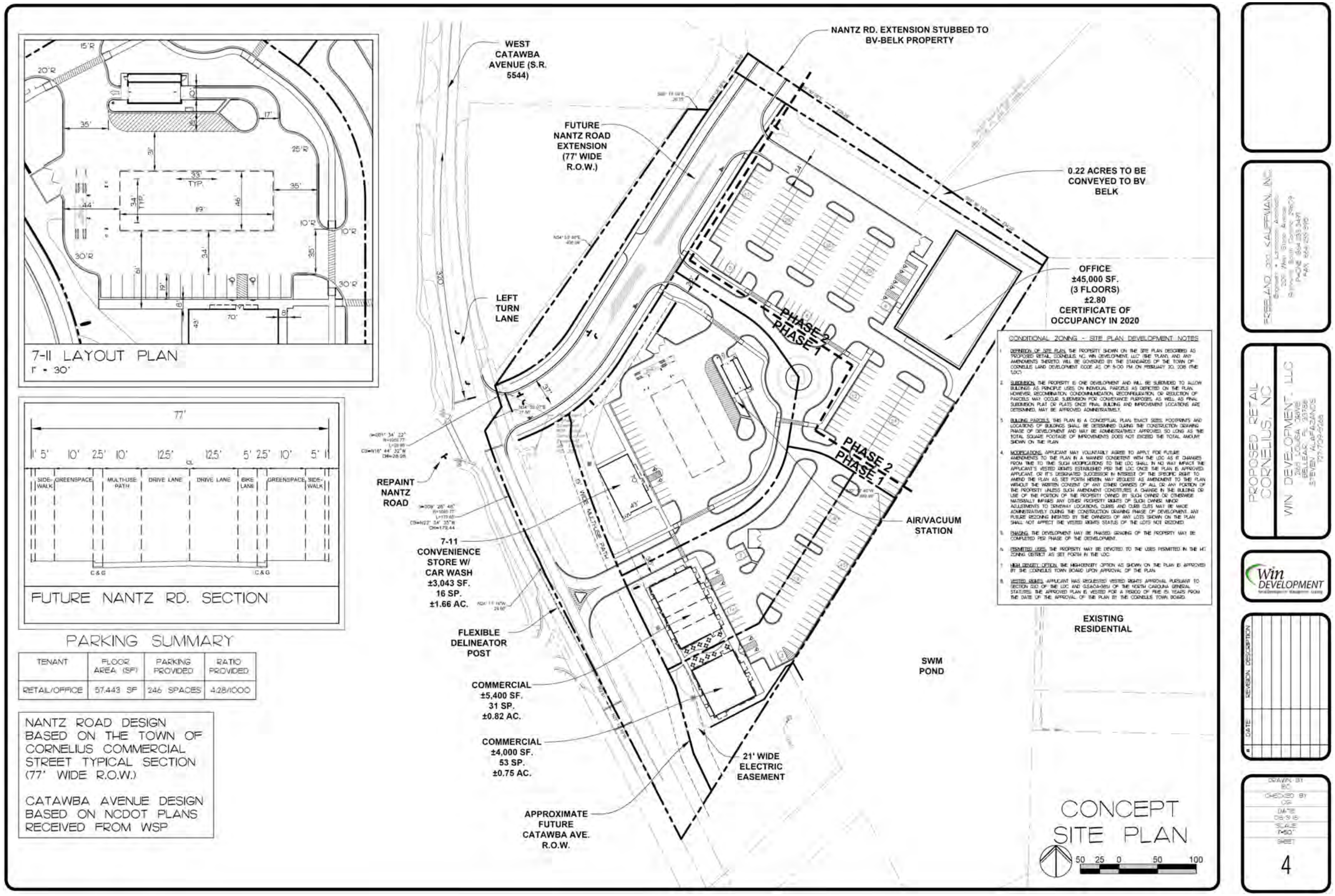
Proposed Site Location

Study Intersection

N

RAMEY KEMP & ASSOCIATES
TRANSPORTATION ENGINEERS

18830 West Catawba Development Cornelius, NC	Site Location Map	
	Scale: Not to Scale	Figure 1



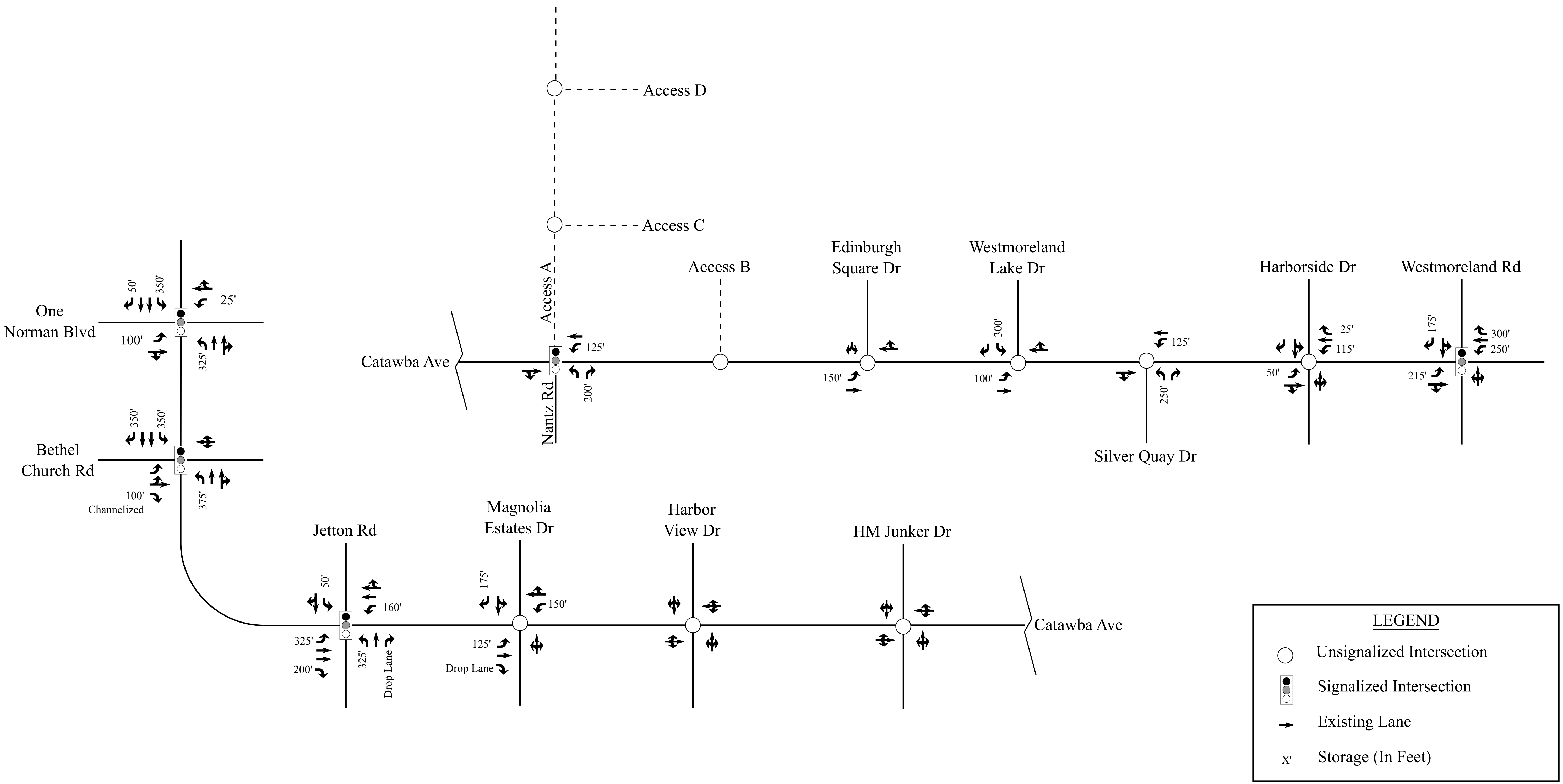
RAMEY KEMP & ASSOCIATES
TRANSPORTATION ENGINEERS

18830 West Catawba Development
Cornelius, NC

Preliminary Site Plan

Scale: Not to Scale

Figure 2



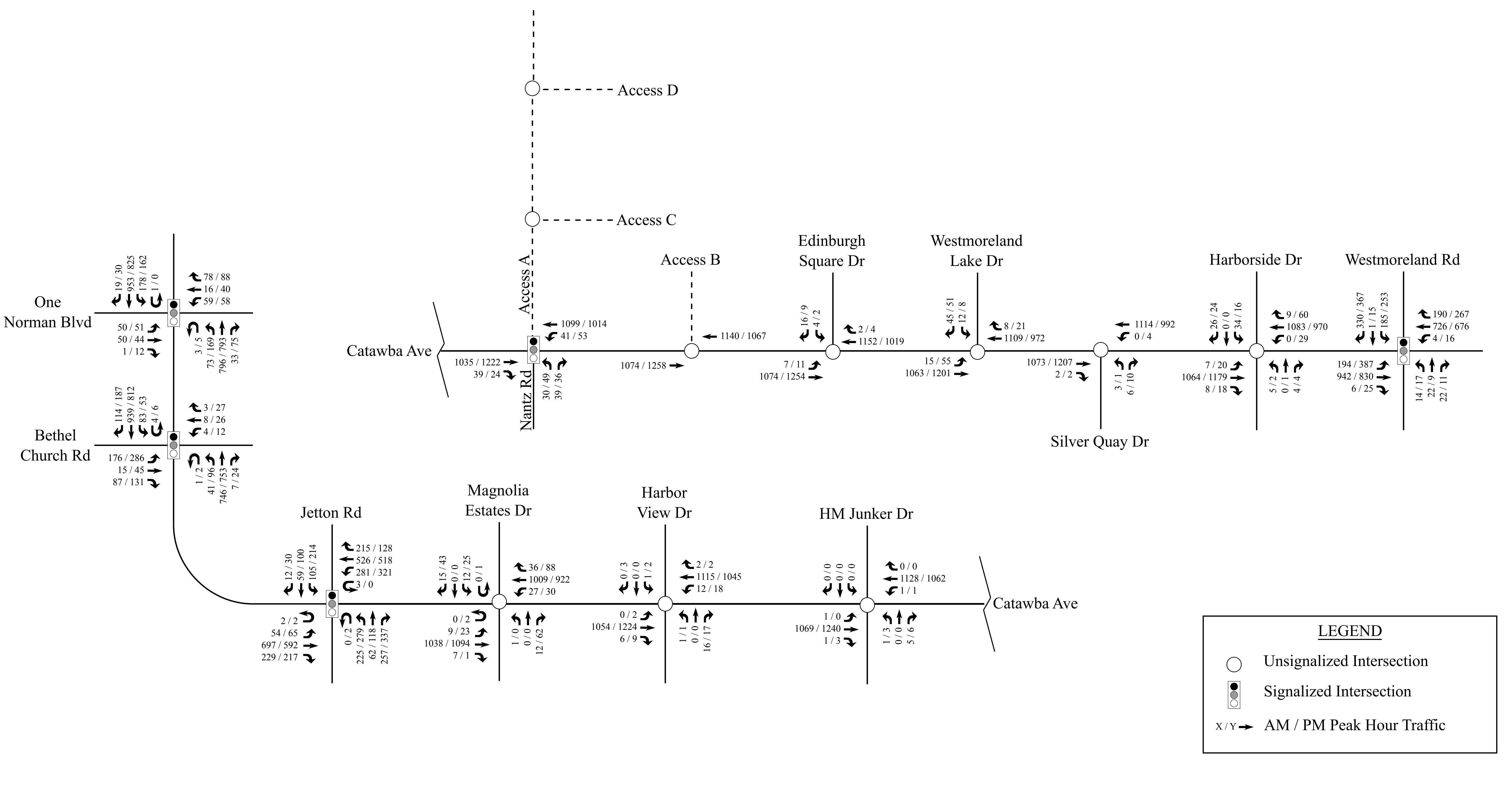
RAMEY KEMP & ASSOCIATES
TRANSPORTATION ENGINEERS

18830 West Catawba Development
Cornelius, NC

2018 Existing Lane Configurations

Scale: Not to Scale

Figure 3



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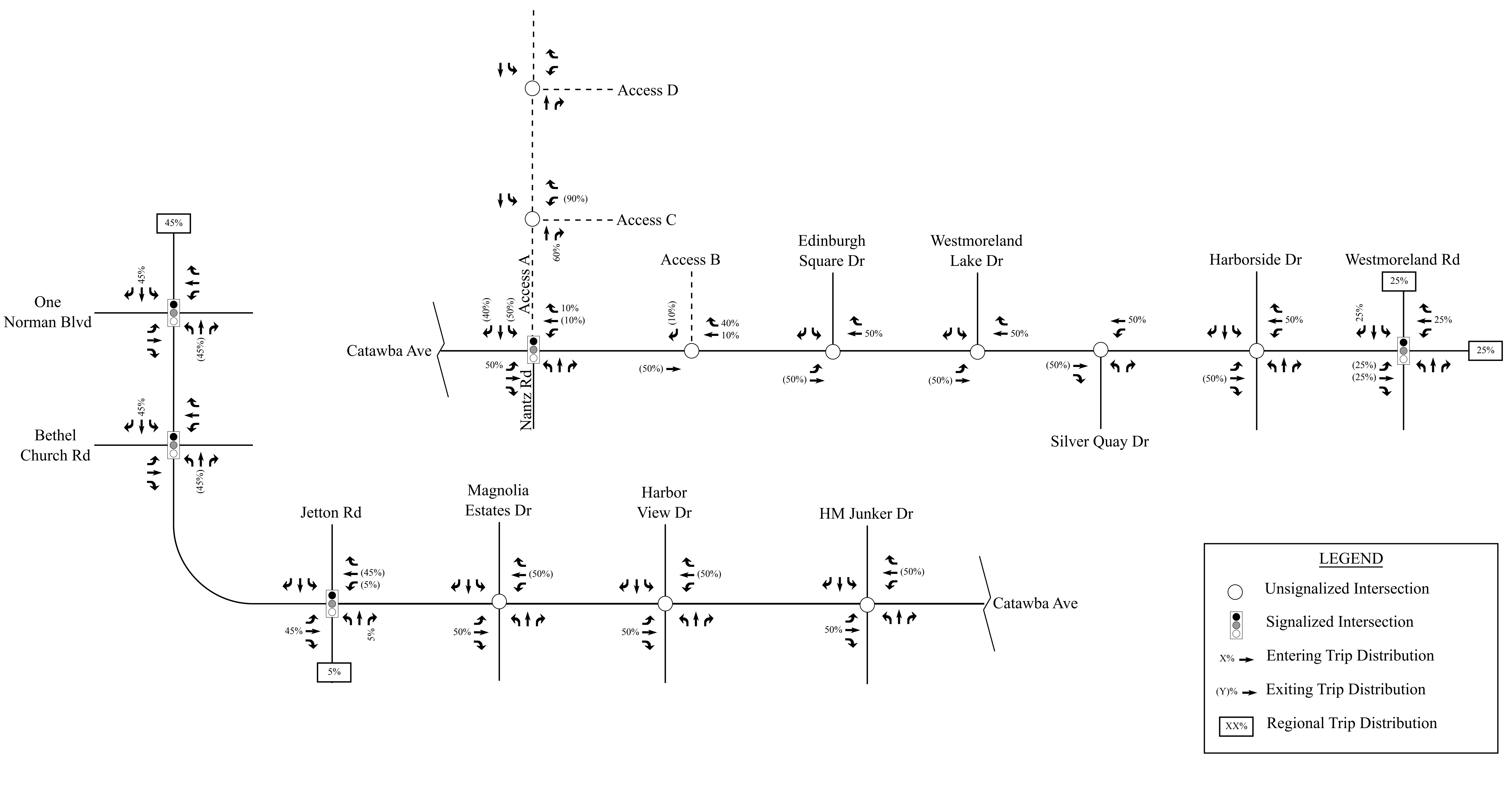
TRANSPORTATION ENGINEERS

18830 West Catawba Development
Cornelius, NC

2018 Existing Peak Hour Traffic Volumes

Scale: Not to Scale

Figure 4



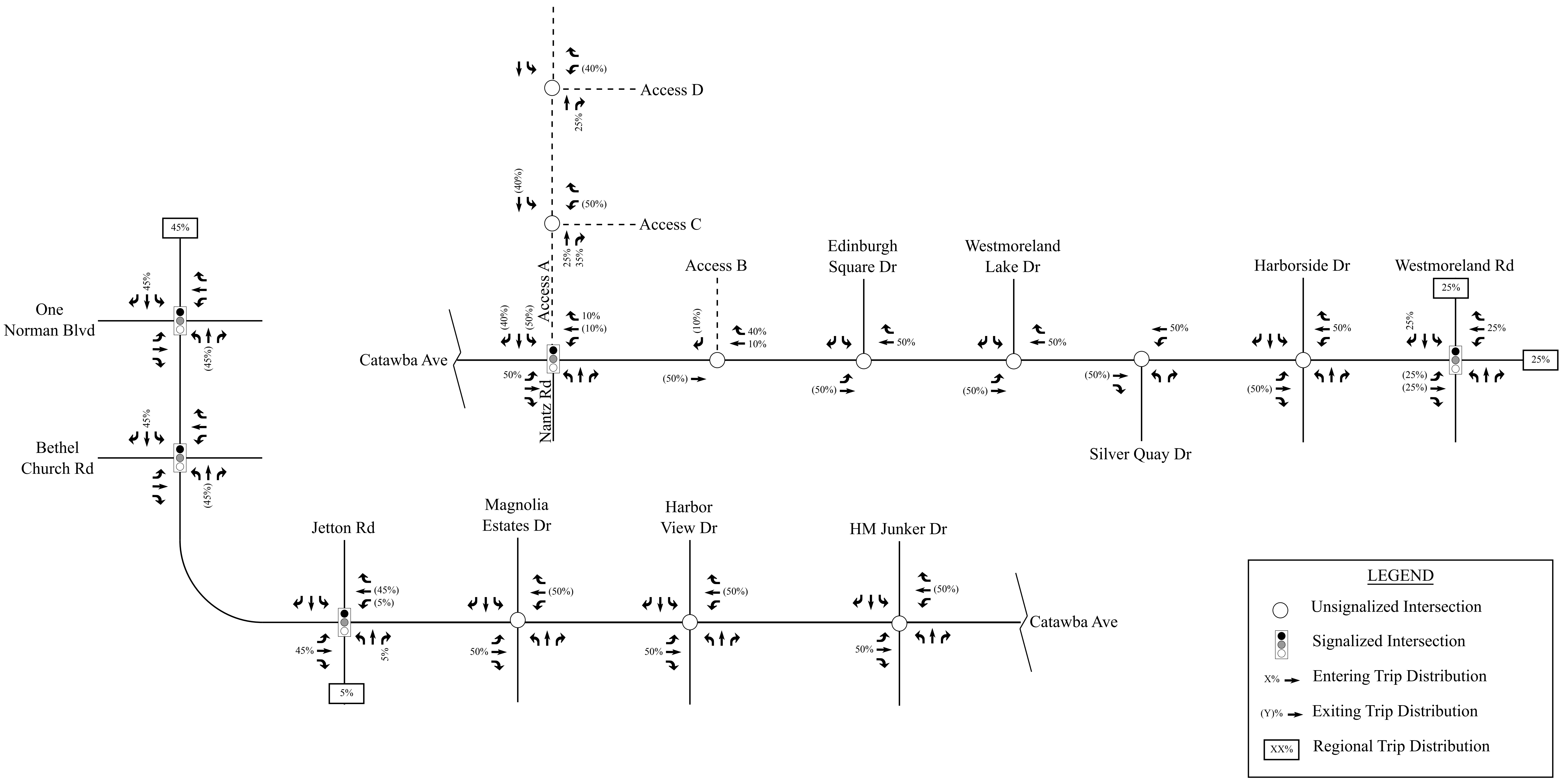
RAMEY KEMP & ASSOCIATES
TRANSPORTATION ENGINEERS

18830 West Catawba Development
Cornelius, NC

Proposed Site
Phase 1
Trip Distribution Percentages

Scale: Not to Scale

Figure 5



N

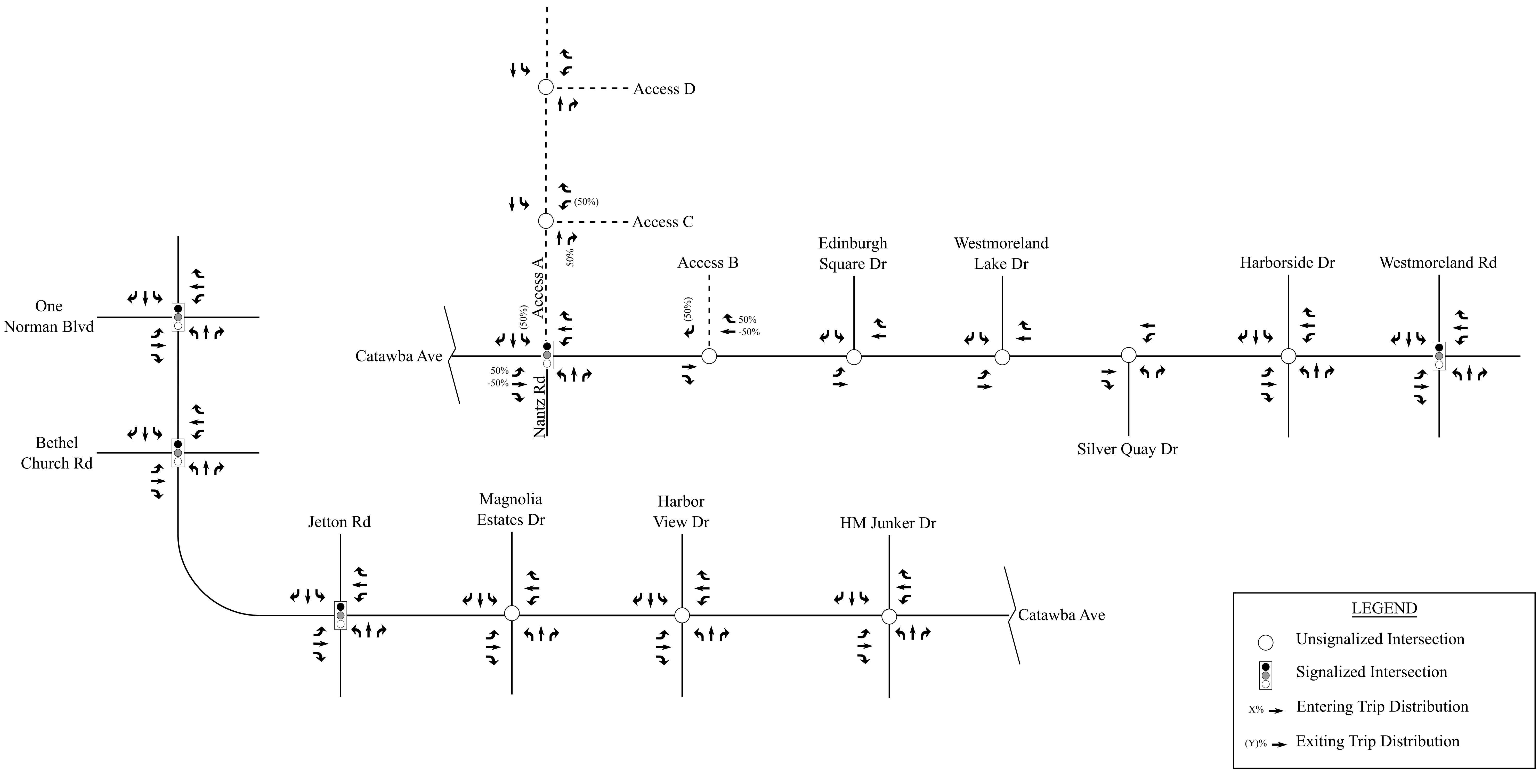
RAMEY KEMP & ASSOCIATES
TRANSPORTATION ENGINEERS

18830 West Catawba Development
Cornelius, NC

Proposed Site
Full Build
Trip Distribution Percentages

Scale: Not to Scale

Figure 6



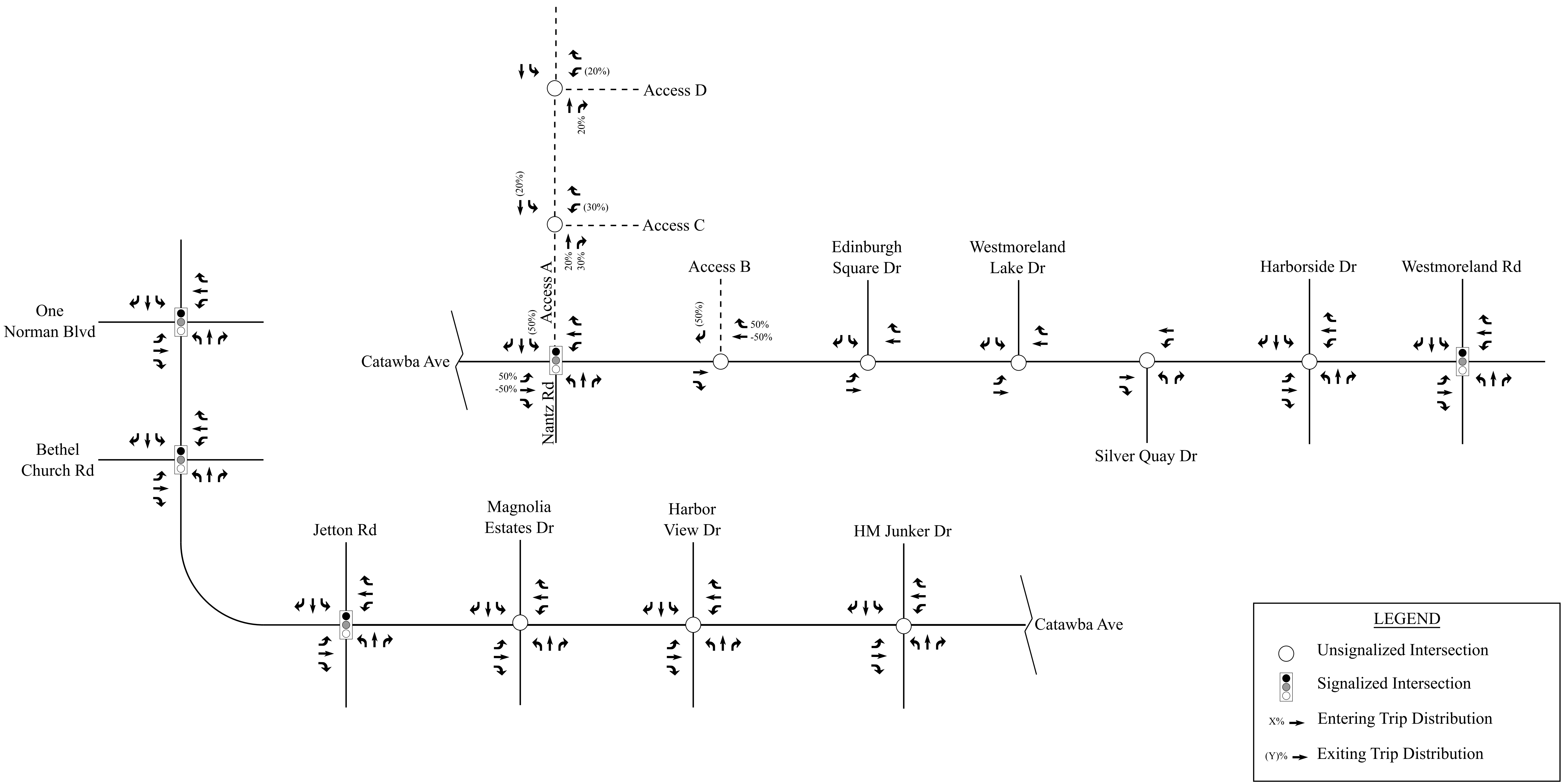
RAMEY KEMP & ASSOCIATES
TRANSPORTATION ENGINEERS

18830 West Catawba Development
Cornelius, NC

Proposed Site Phase 1
Pass-By
Trip Distribution Percentages

Scale: Not to Scale

Figure 7



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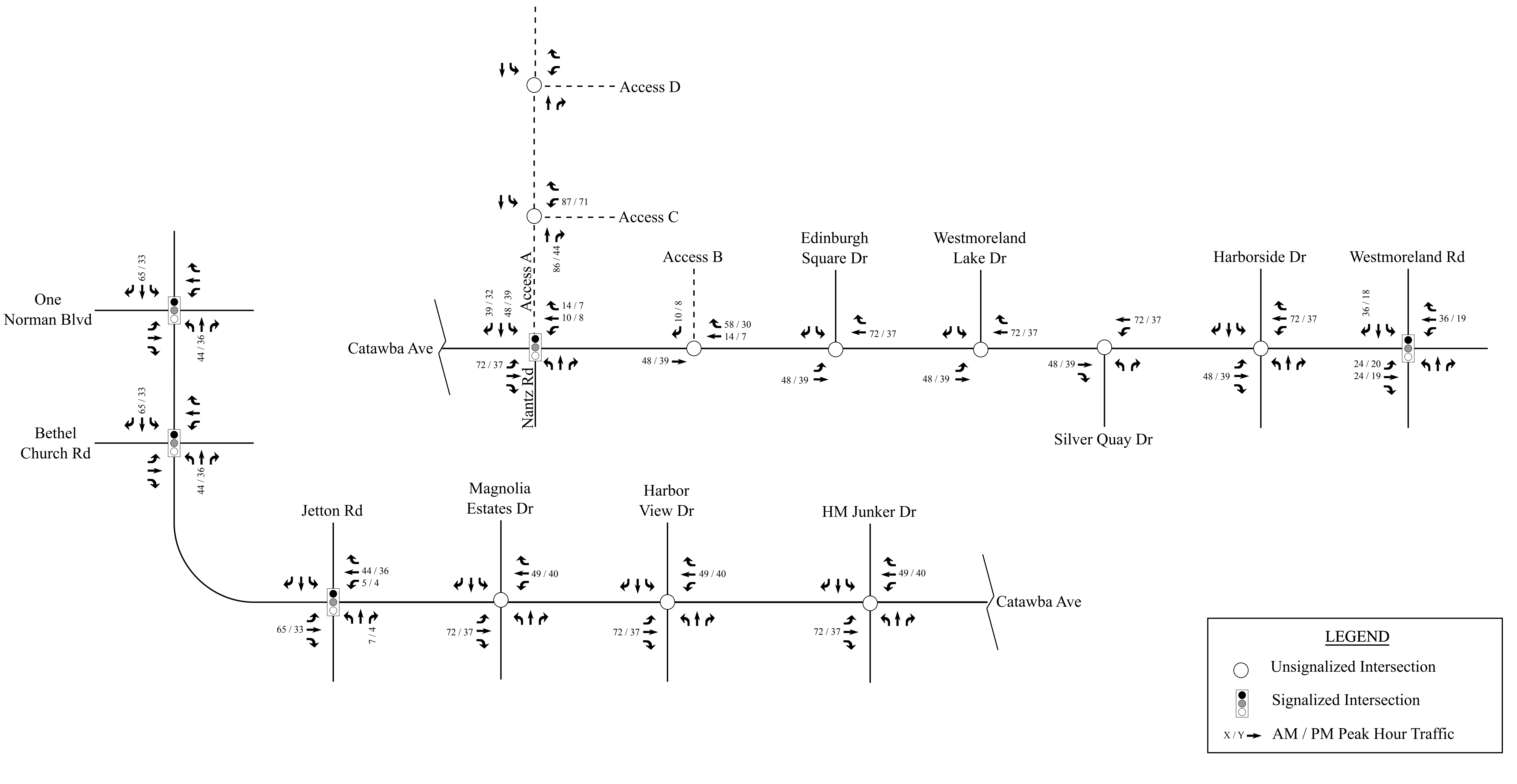
18830 West Catawba Development
Cornelius, NC

Proposed Site Full Build Pass-By Trip Distribution Percentages

Scale: Not to Scale

Figure 8



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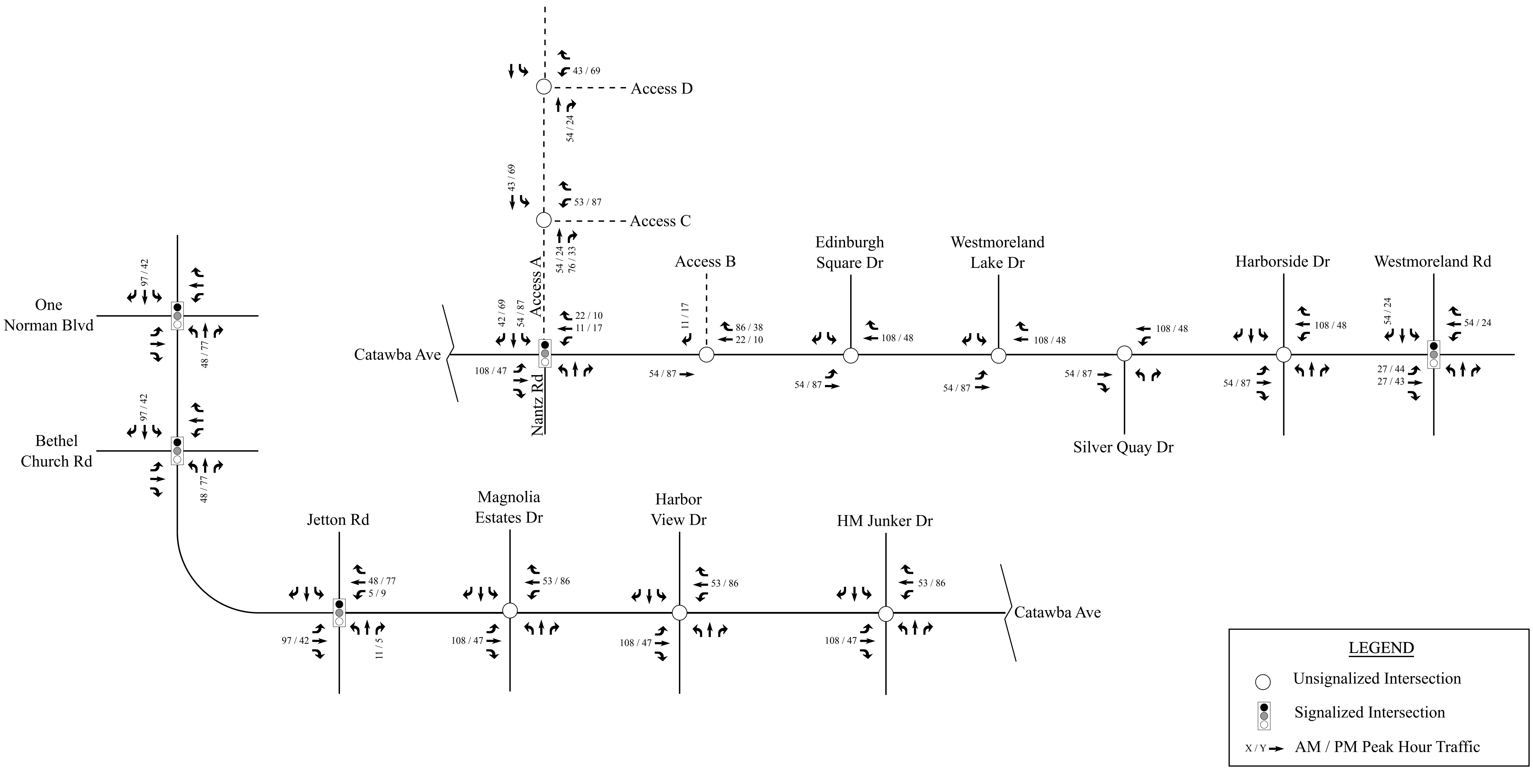
18830 West Catawba Development
Cornelius, NC

Proposed Site
Phase 1
Primary Trip Assignment

Scale: Not to Scale

Figure 9



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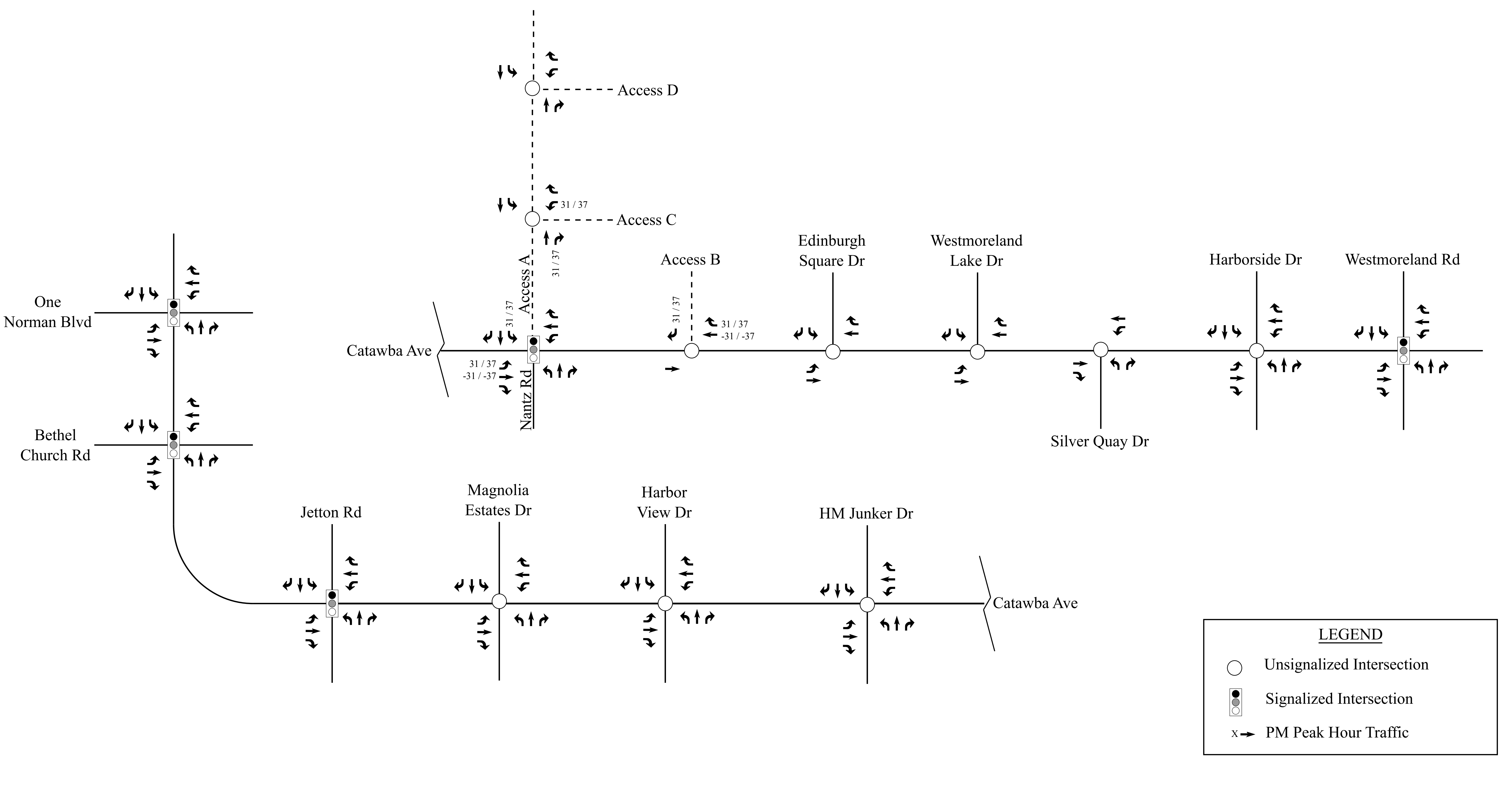
TRANSPORTATION ENGINEERS

18830 West Catawba Development
Cornelius, NC

Proposed Site
Full Build
Primary Trip Assignment

Scale: Not to Scale

Figure 10



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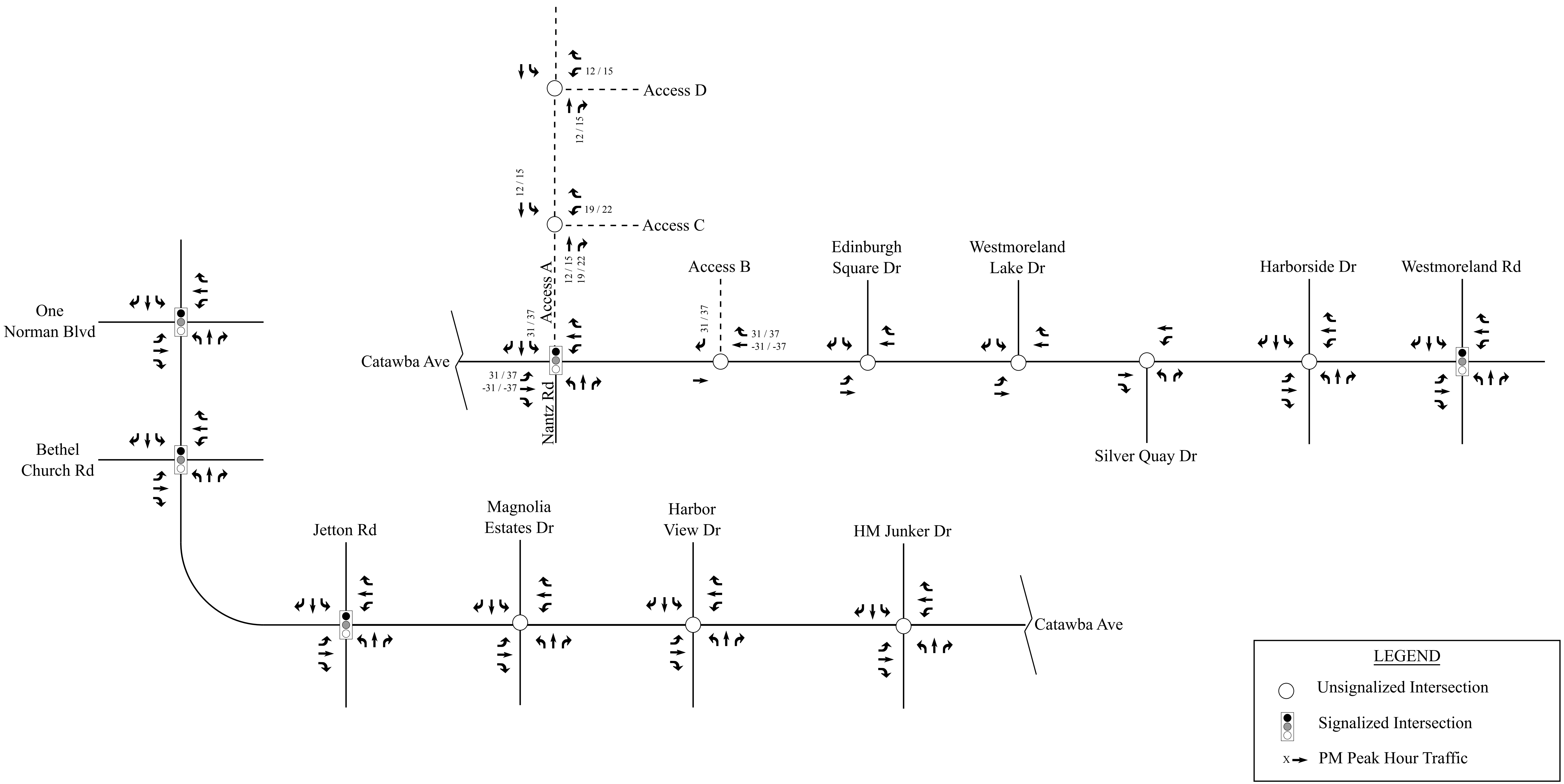
18830 West Catawba Development
Cornelius, NC

Proposed Site
Phase 1
Pass-By Trip Assignment

Scale: Not to Scale	Figure 11

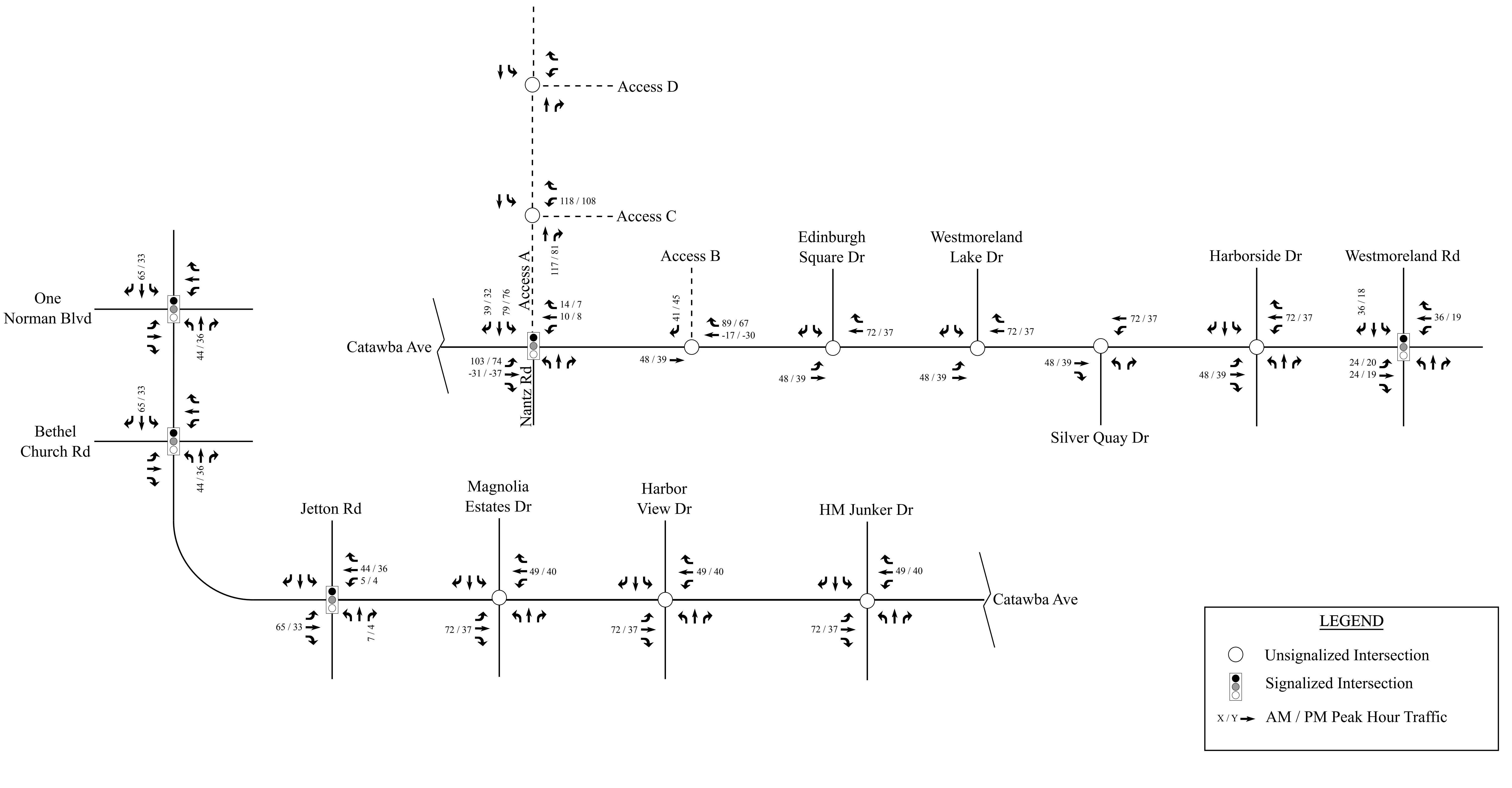


18830 West Catawba Development
Cornelius, NC

Proposed Site
Full Build
Pass-By Trip Assignment

Scale: Not to Scale

Figure 12



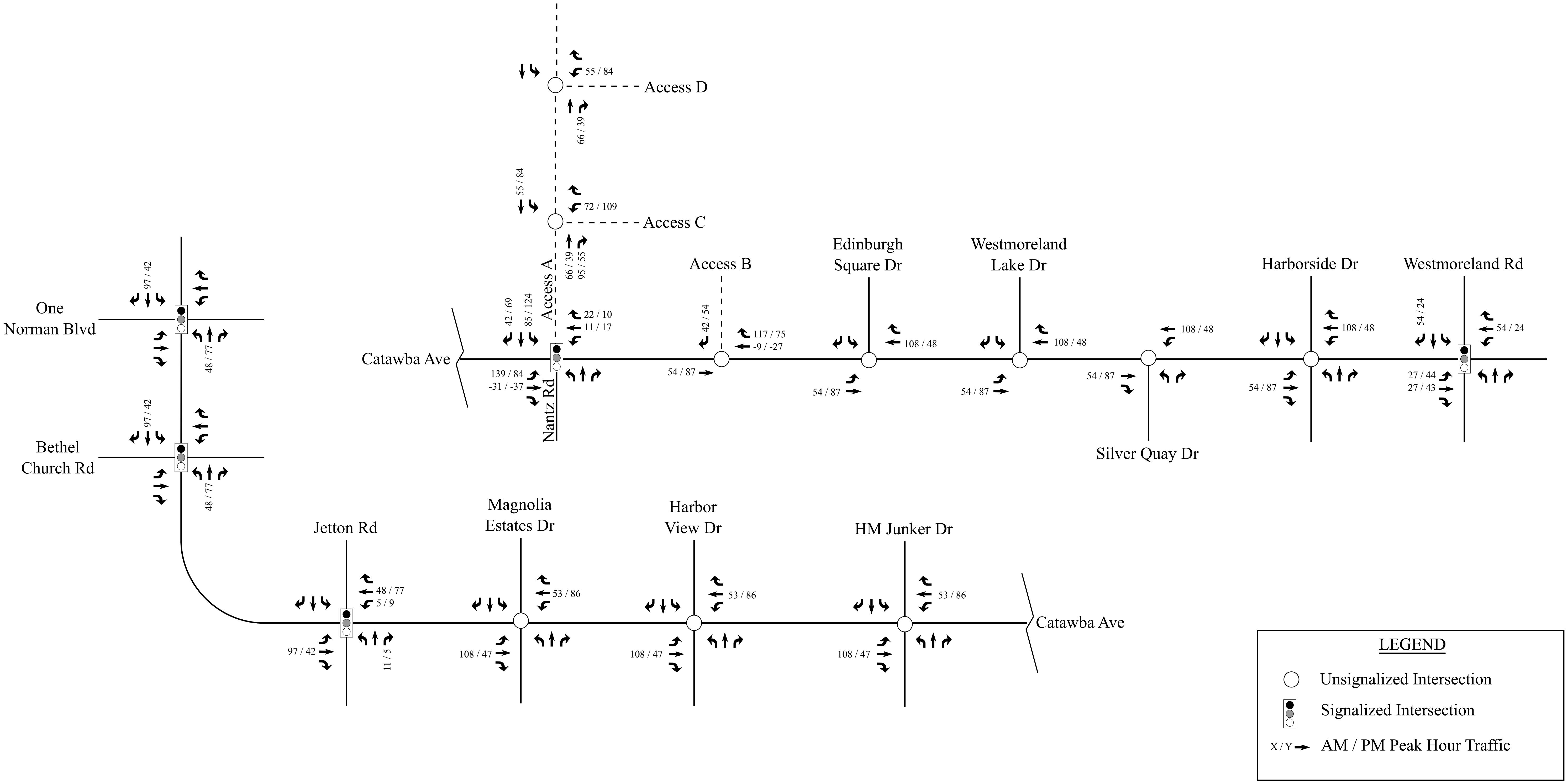
RAMEY KEMP & ASSOCIATES
TRANSPORTATION ENGINEERS

18830 West Catawba Development
Cornelius, NC

Proposed Site
Phase 1
Total Trip Assignment

Scale: Not to Scale

Figure 13



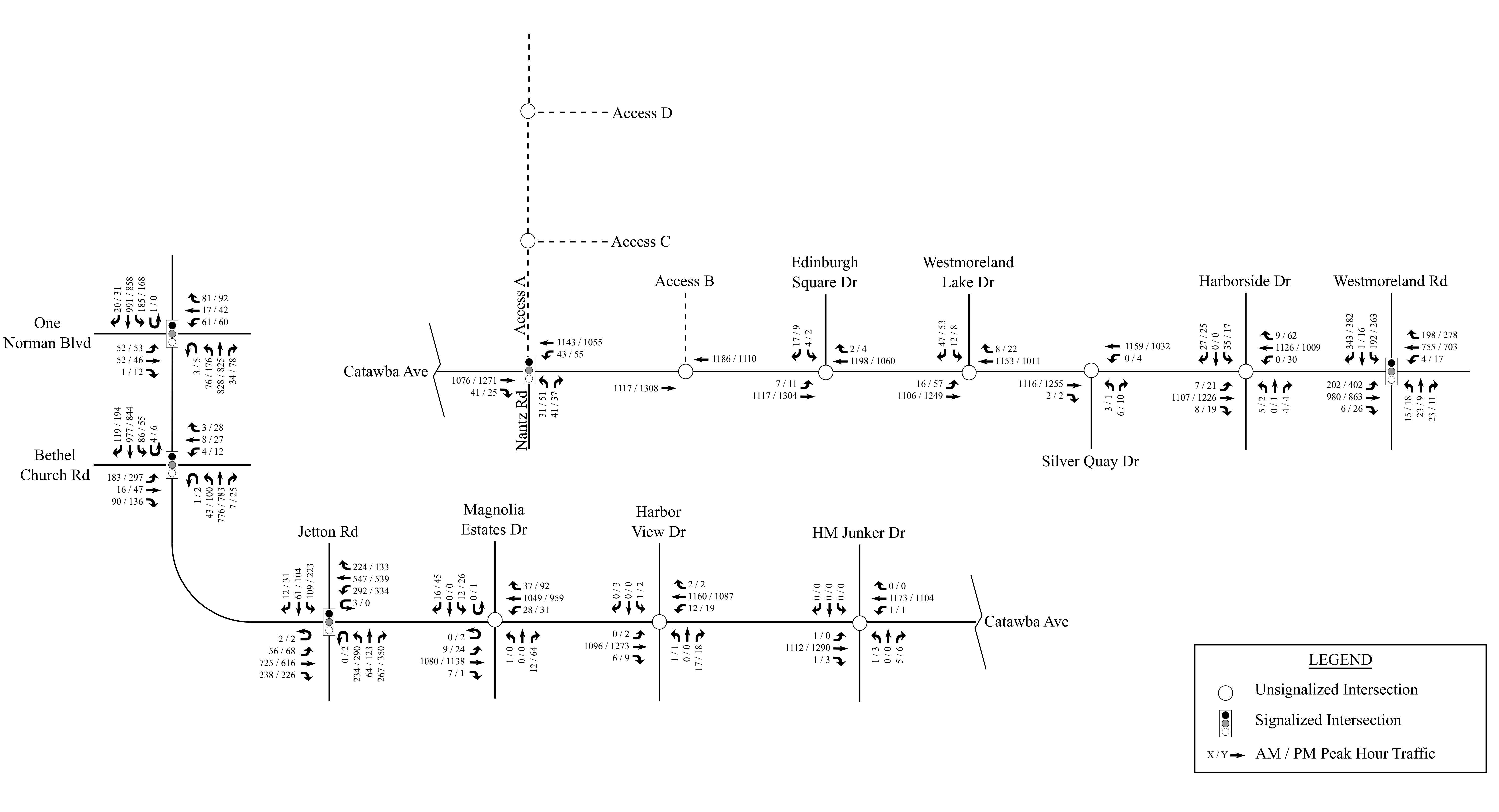
RAMEY KEMP & ASSOCIATES
TRANSPORTATION ENGINEERS

18830 West Catawba Development
Cornelius, NC

Proposed Site
Full Build
Total Trip Assignment

Scale: Not to Scale

Figure 14



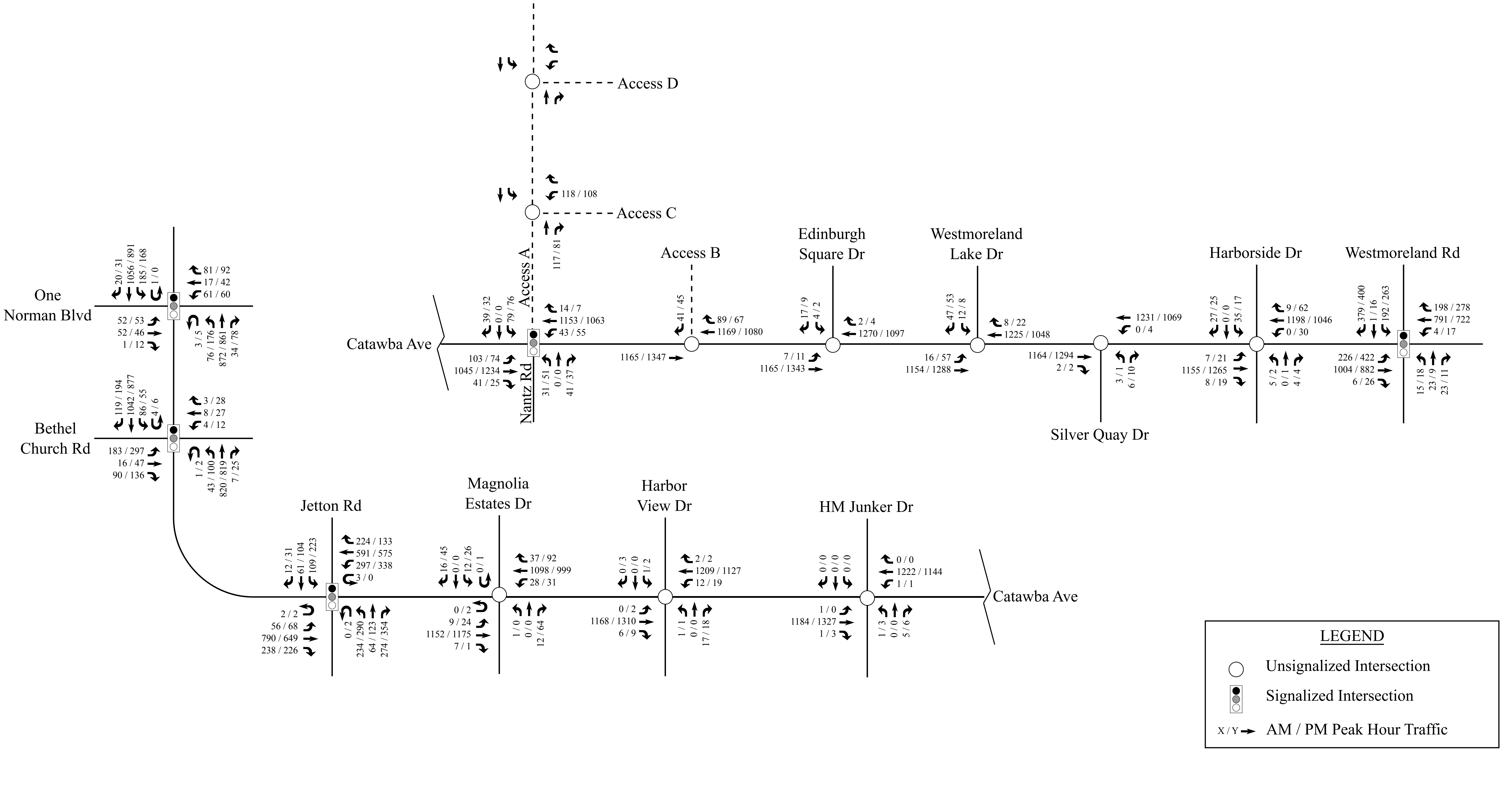
RAMEY KEMP & ASSOCIATES
TRANSPORTATION ENGINEERS

18830 West Catawba Development
Cornelius, NC

2019 No-Build
Peak Hour Traffic Volumes

Scale: Not to Scale

Figure 15



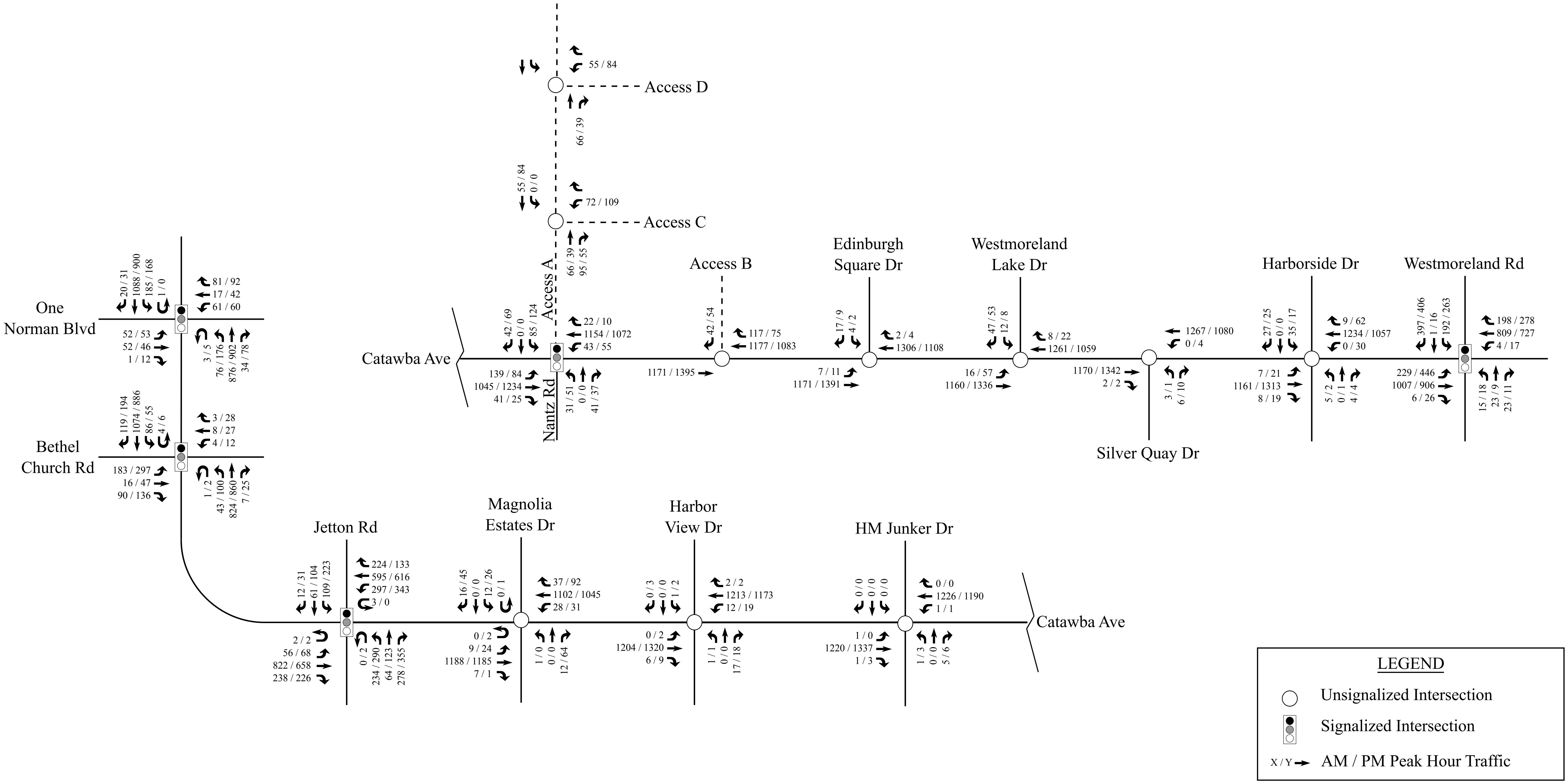
RAMEY KEMP & ASSOCIATES
TRANSPORTATION ENGINEERS

18830 West Catawba Development
Cornelius, NC

2019 Build Phase 1 Peak Hour Traffic Volumes

Scale: Not to Scale

Figure 16



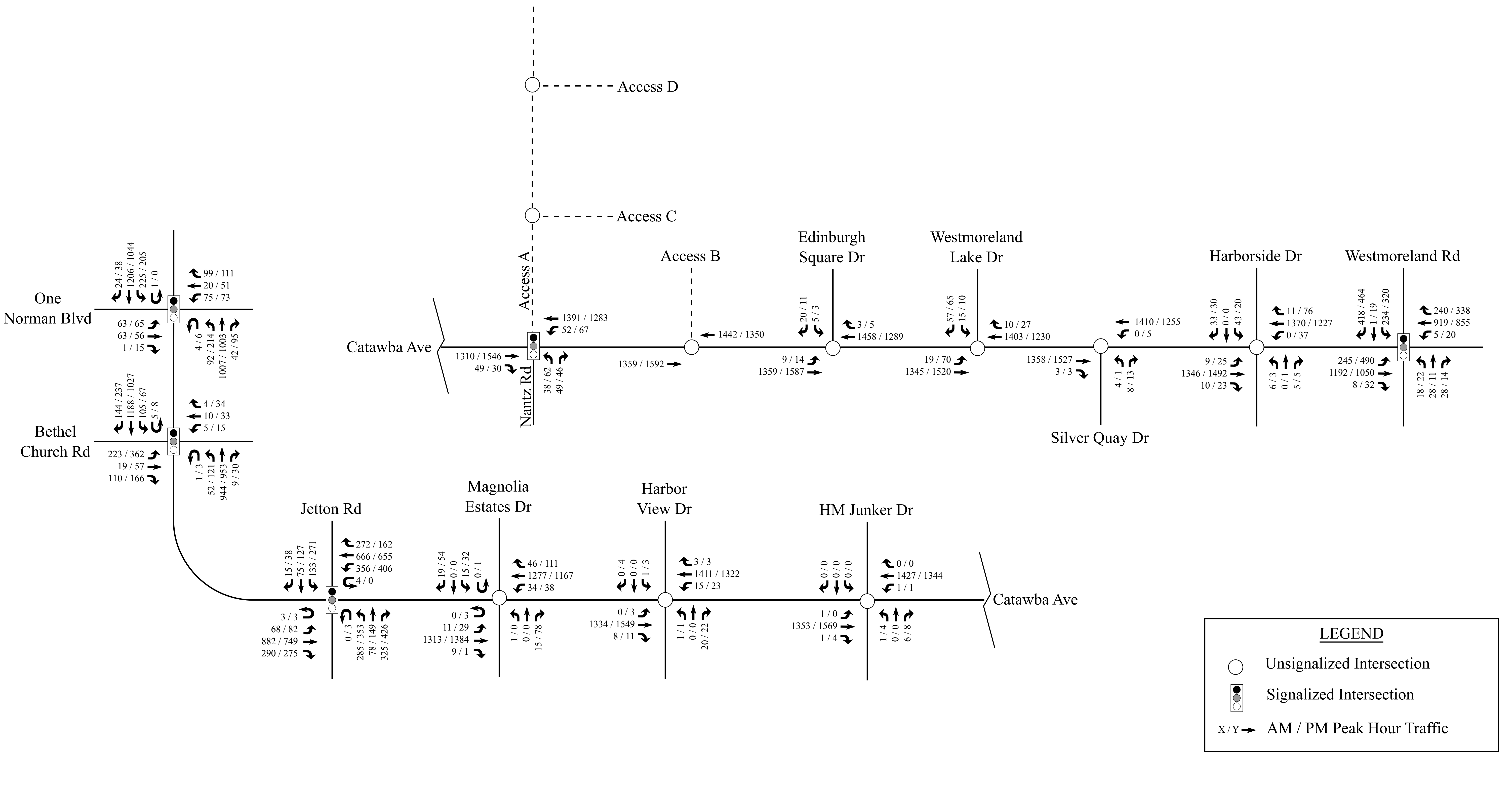
RAMEY KEMP & ASSOCIATES
TRANSPORTATION ENGINEERS

18830 West Catawba Development
Cornelius, NC

2019 Full Build
Peak Hour Traffic Volumes

Scale: Not to Scale

Figure 17



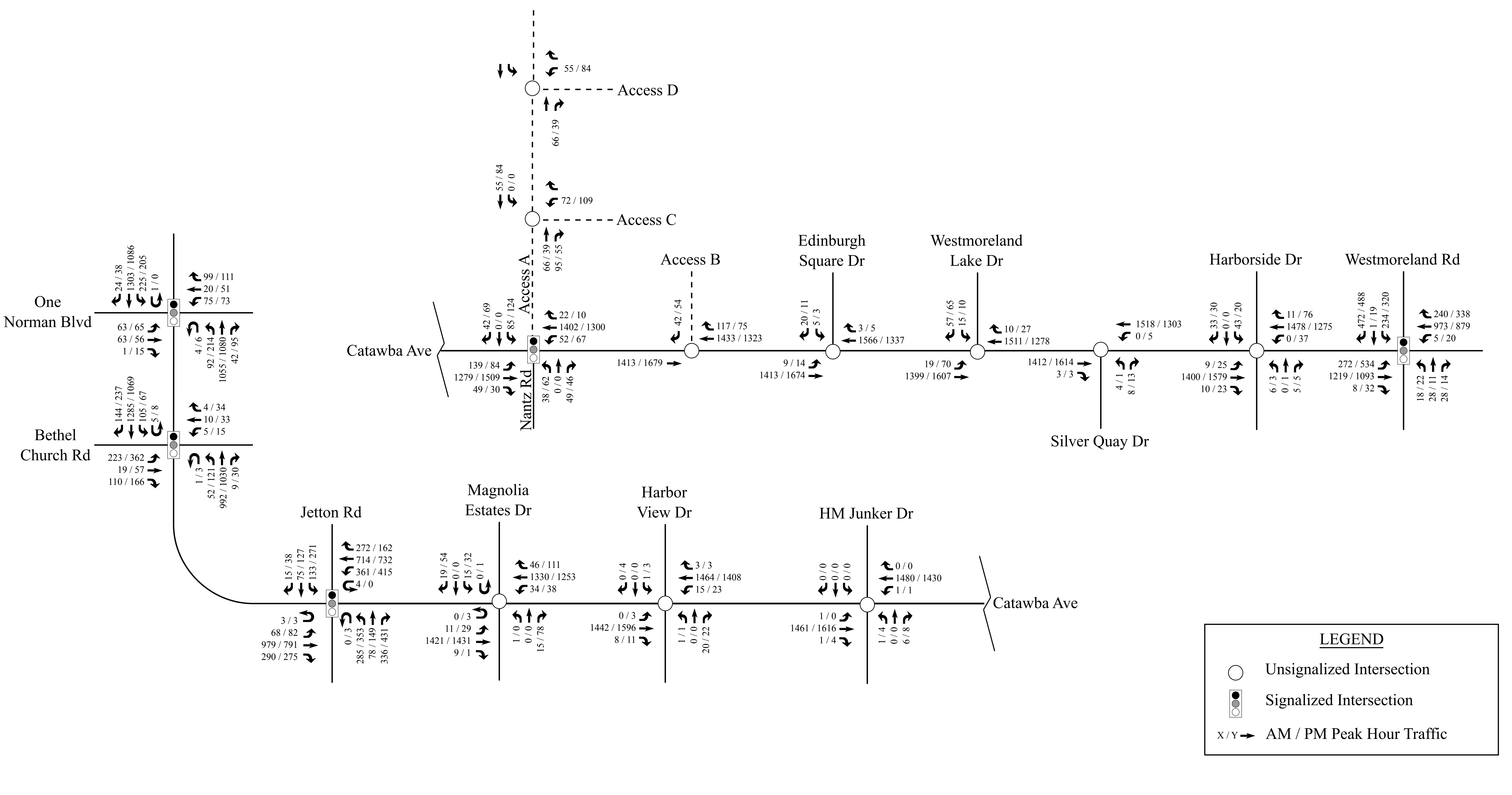
RAMEY KEMP & ASSOCIATES
TRANSPORTATION ENGINEERS

18830 West Catawba Development
Cornelius, NC

2024 Projected Peak Hour Traffic Volumes

Scale: Not to Scale

Figure 18



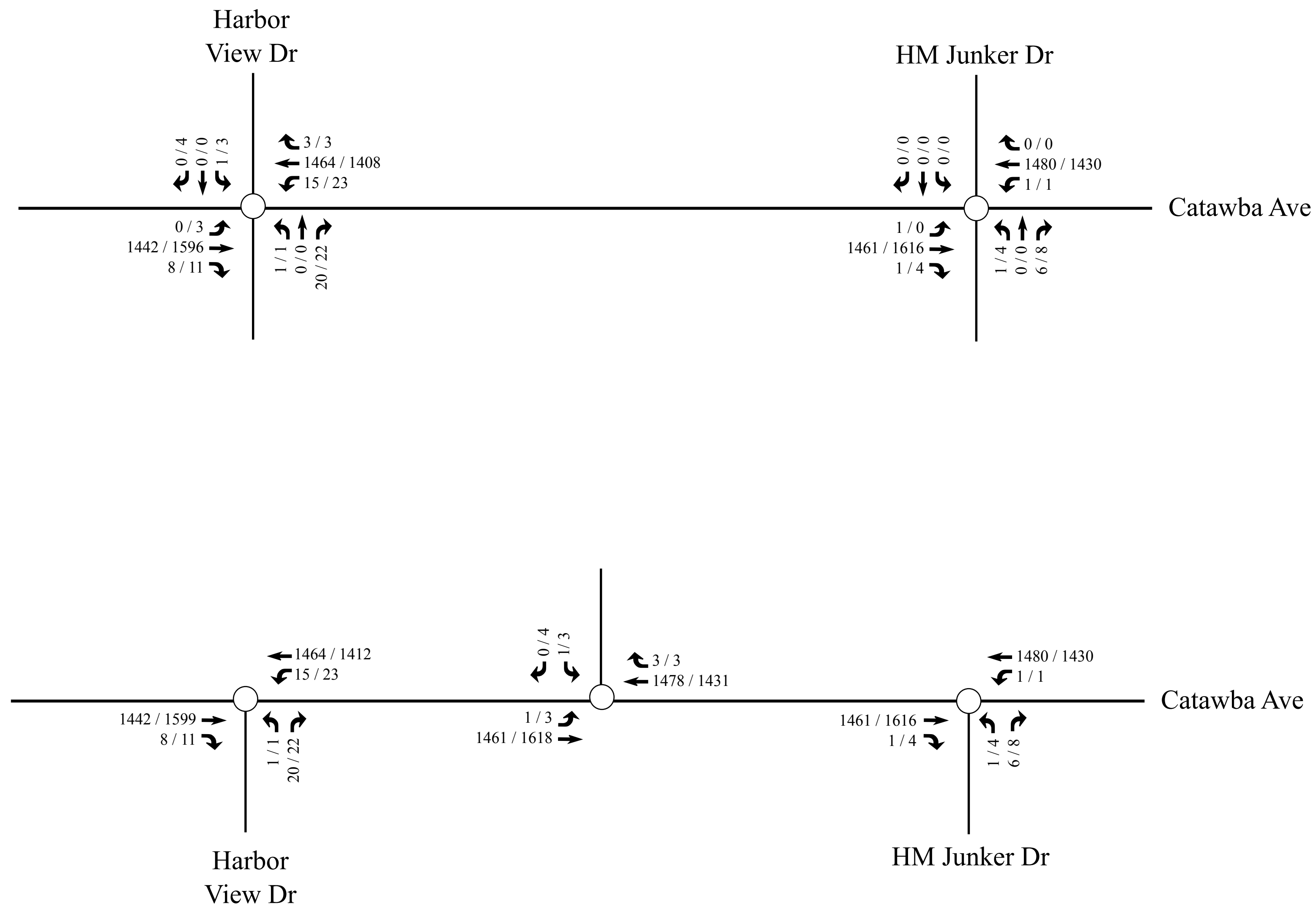
RAMEY KEMP & ASSOCIATES
TRANSPORTATION ENGINEERS

18830 West Catawba Development
Cornelius, NC

2024 Build
Peak Hour Traffic Volumes

Scale: Not to Scale

Figure 19



LEGEND

- Unsignalized Intersection
- Signalized Intersection
- X / Y → AM / PM Peak Hour Traffic

N

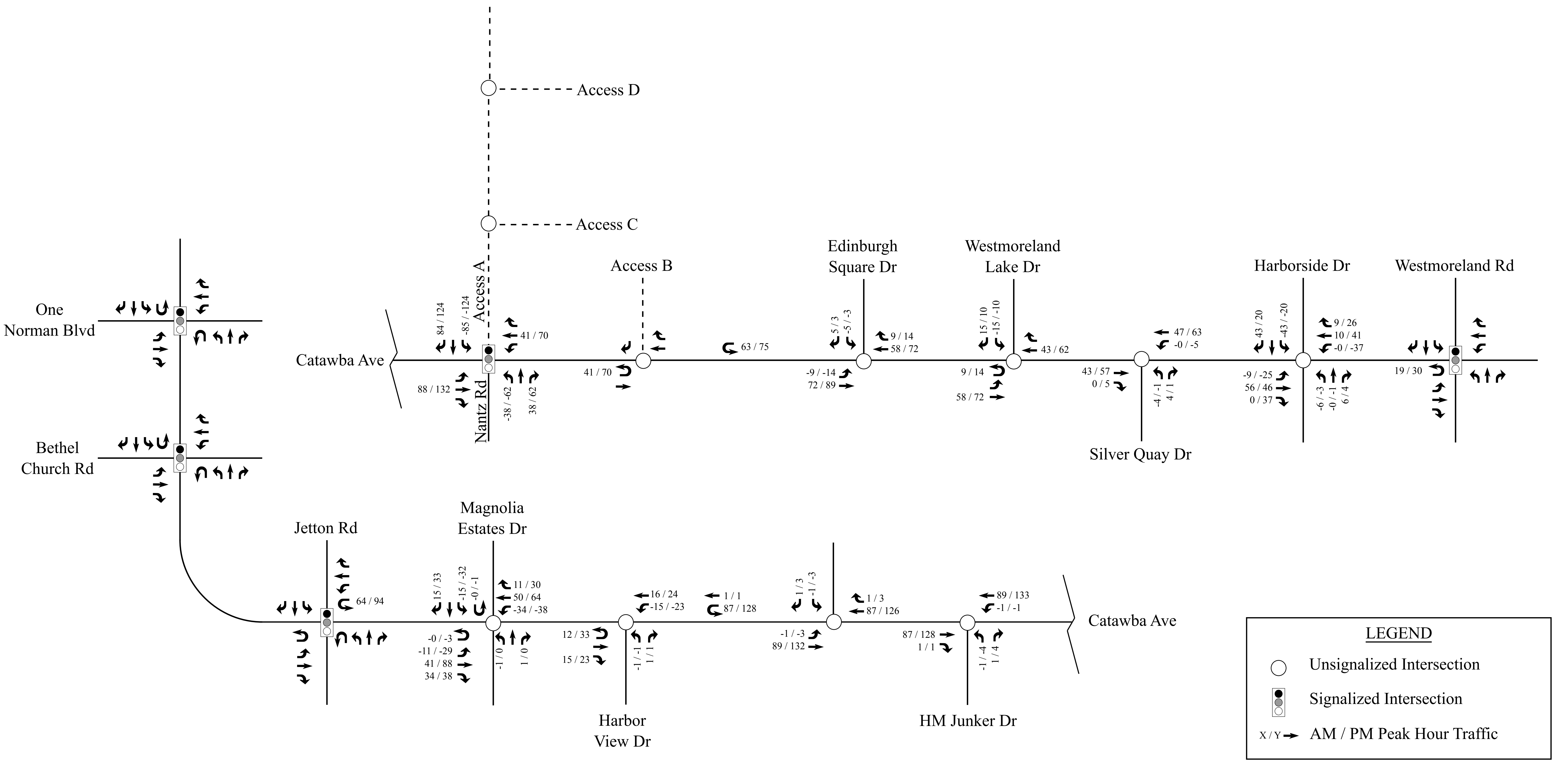
RAMEY KEMP & ASSOCIATES
TRANSPORTATION ENGINEERS

18830 West Catawba Development
Cornelius, NC

2024 Build
Combined Approaches
Peak Hour Traffic Volumes

Scale: Not to Scale

Figure 20



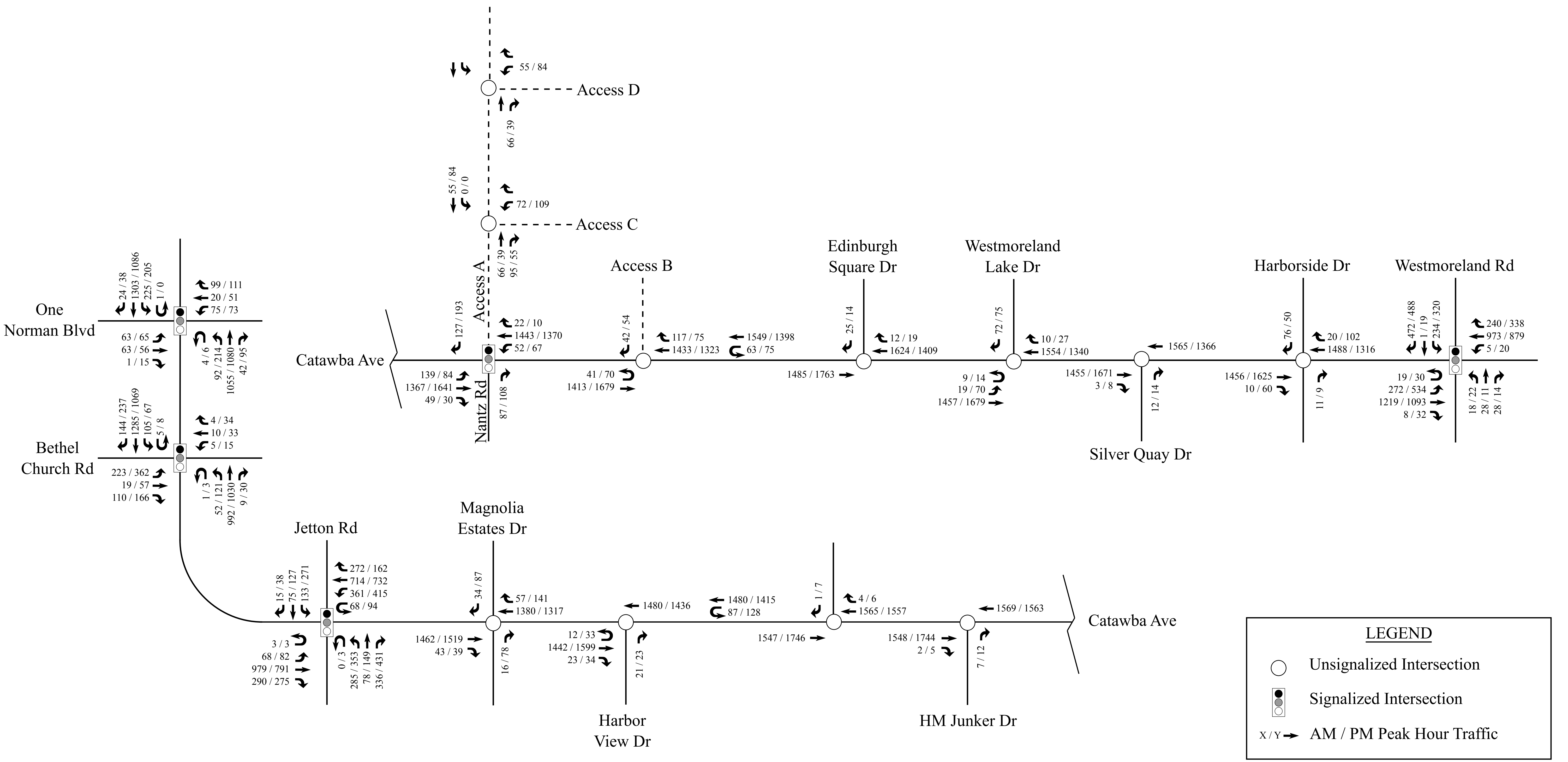
RAMEY KEMP & ASSOCIATES
TRANSPORTATION ENGINEERS

18830 West Catawba Development
Cornelius, NC

2024 Build with TIP Rerouted
Peak Hour Traffic Volumes

Scale: Not to Scale

Figure 21



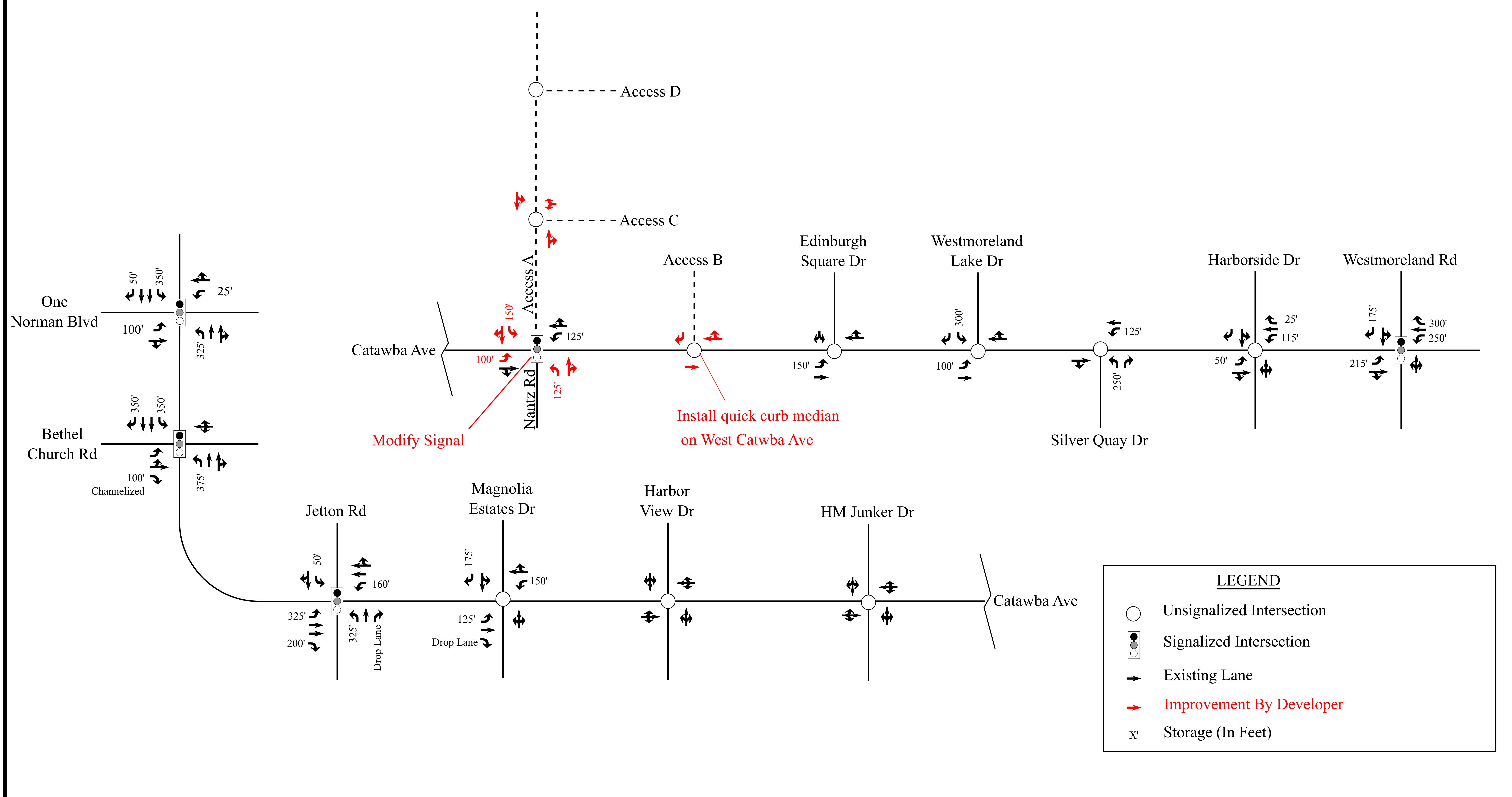
RAMEY KEMP & ASSOCIATES
TRANSPORTATION ENGINEERS

18830 West Catawba Development
Cornelius, NC

2024 Build with TIP
Peak Hour Traffic Volumes

Scale: Not to Scale

Figure 22



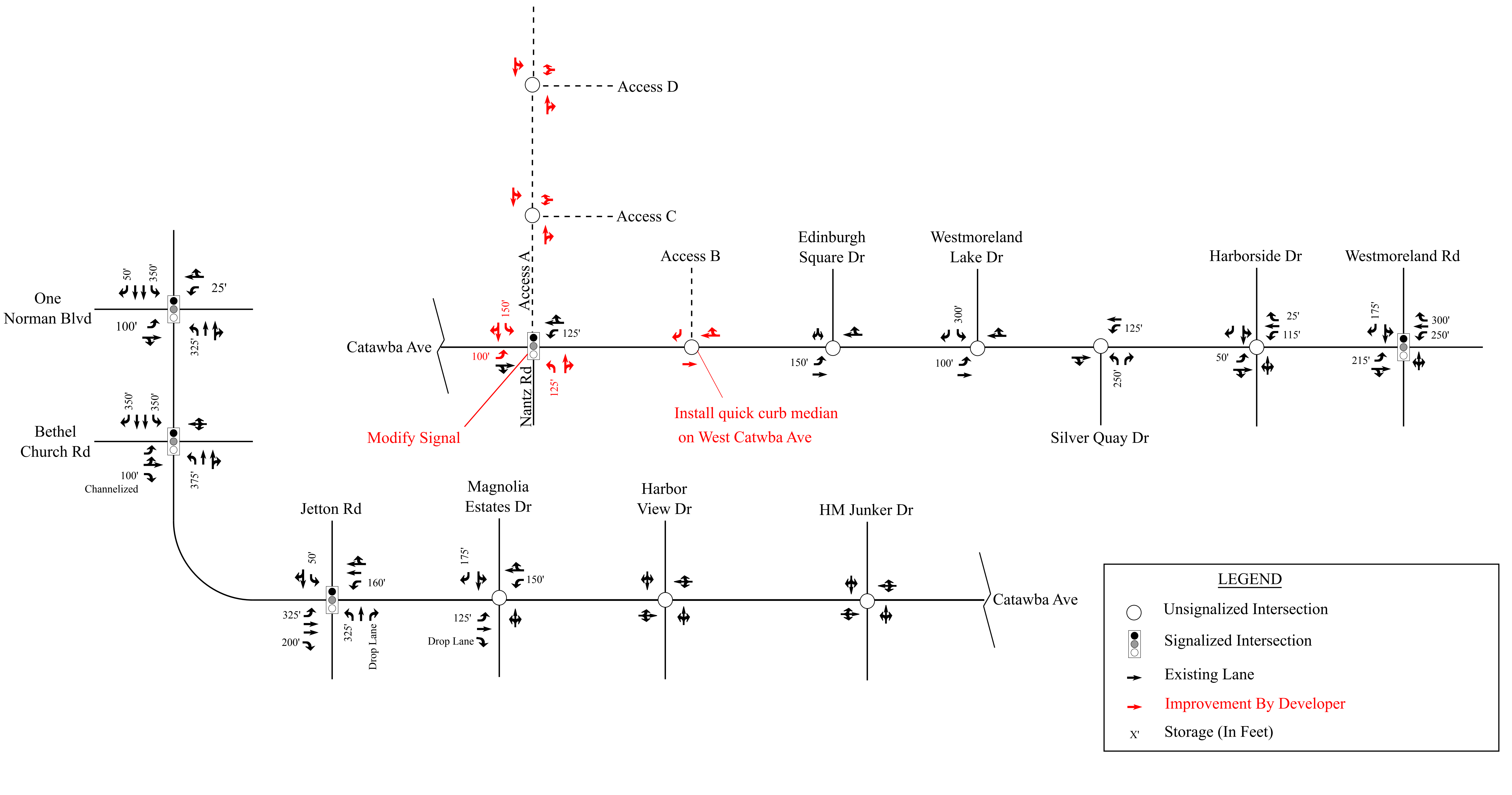
RAMEY KEMP & ASSOCIATES
TRANSPORTATION ENGINEERS

18830 West Catawba Development
Cornelius, NC

Phase 1 Recommended Lane Configurations

Scale: Not to Scale

Figure 23



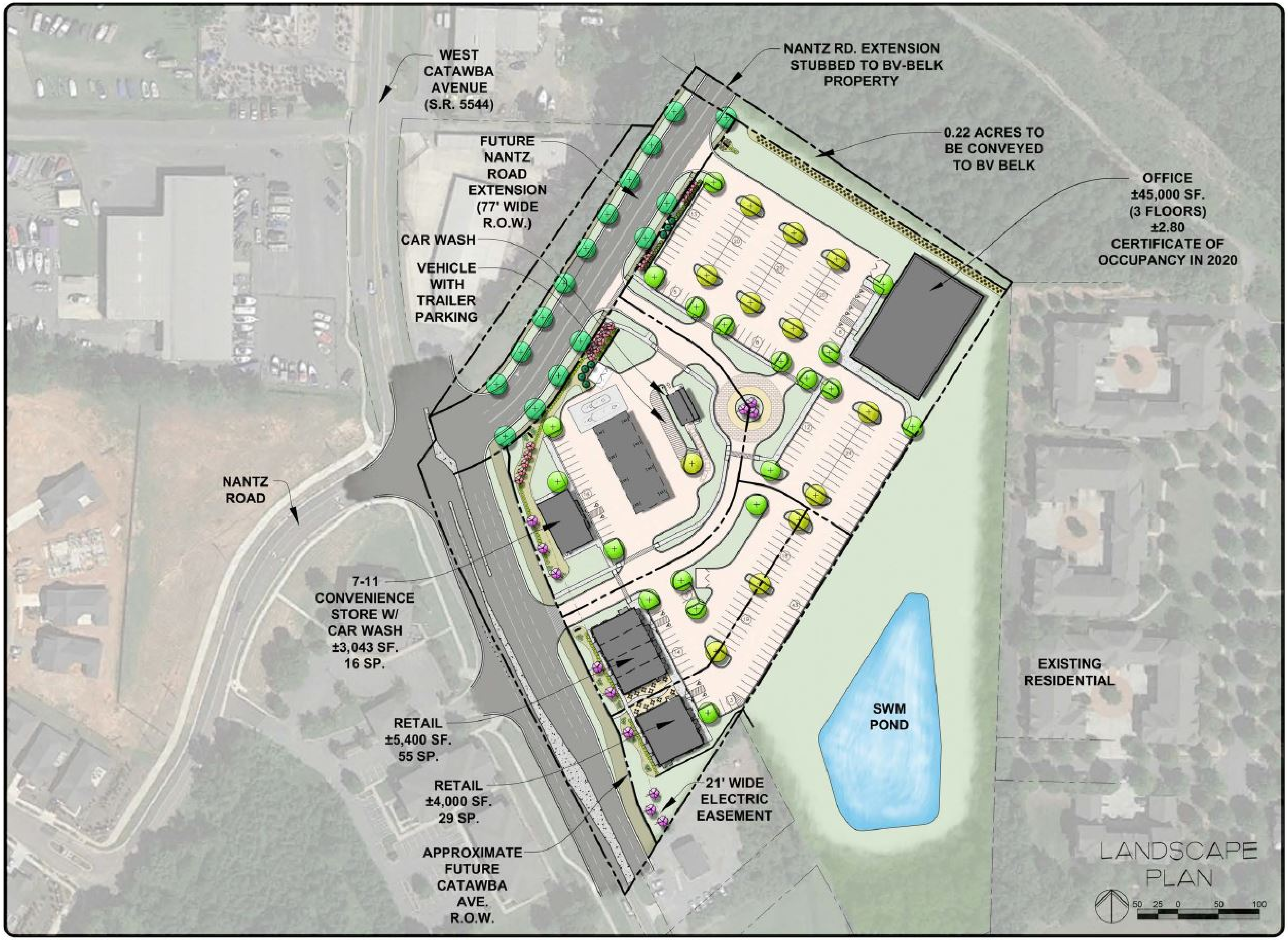
RAMEY KEMP & ASSOCIATES
TRANSPORTATION ENGINEERS

18830 West Catawba Development
Cornelius, NC

Full Build Recommended Lane Configurations

Scale: Not to Scale

Figure 24



FREELAND and KAUFFMAN, INC.
Engineers • Landscape Architects
209 West Stone Avenue
Greenville, South Carolina 29609
PHONE 864-233-5497
FAX 864-233-8915

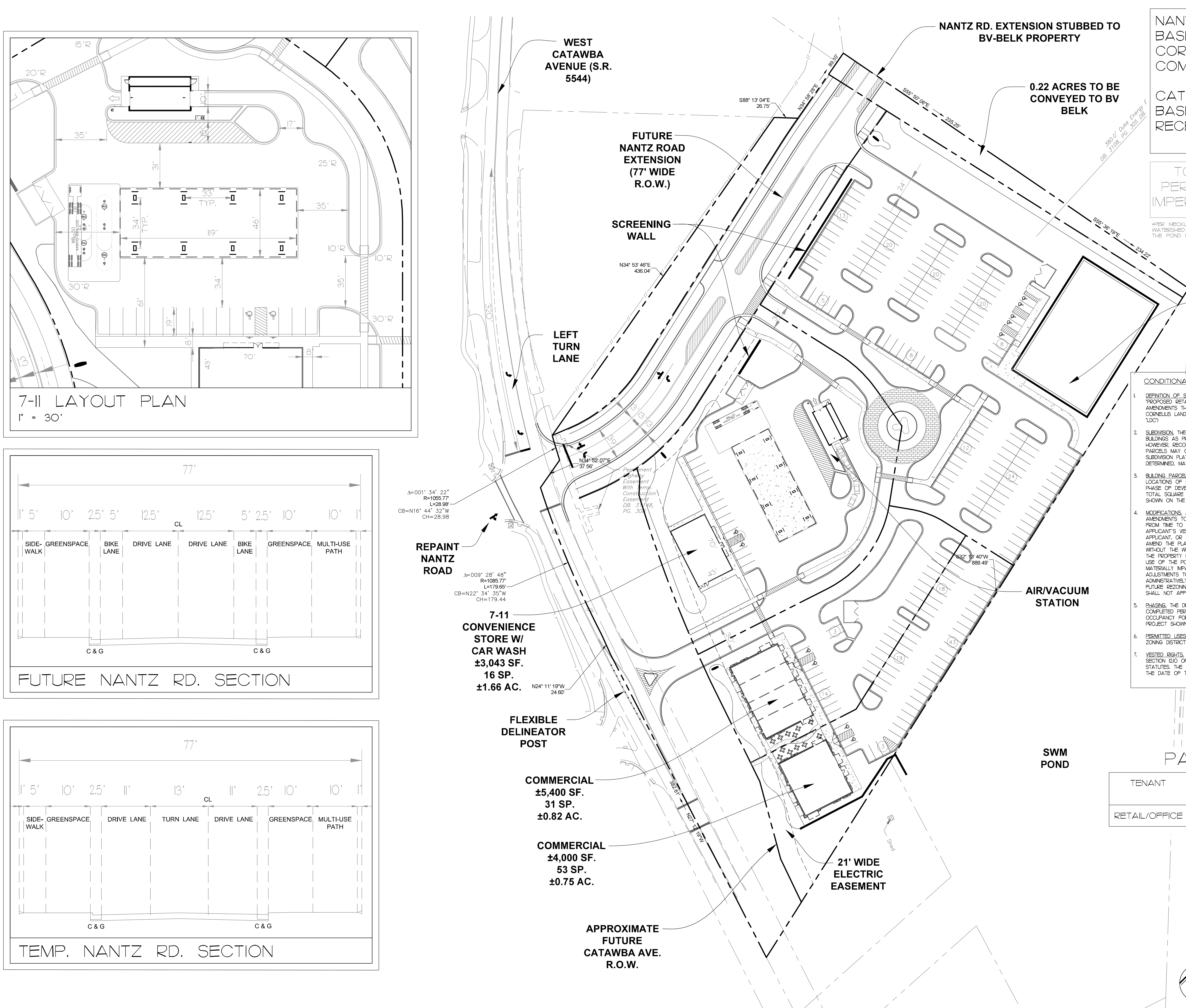
PROPOSED RETAIL
CORNELIUS, NC

WIN DEVELOPMENT, LLC
265 LOUISA DRIVE
BELLEAIR, FL 33756
STEVEN ALAFAZANOS
727-709-5265

Win DEVELOPMENT
Retail Development • Management • Leasing

#	DATE	REVISION DESCRIPTION

DRAWN BY
WP
CHECKED BY
CG
DATE
10-01-18
SCALE
1"=50'
SHEET
15



NANTZ ROAD DESIGN BASED ON THE TOWN OF CORNELIUS STAFF COMMENT (77' WIDE R.O.W.)

CATAWBA AVENUE DESIGN BASED ON NCDOT PLANS RECEIVED FROM WSP

TOTAL AREA= 9.88 AC.
PERVIOUS- 5.48 AC. (55.5%)
IMPERVIOUS- 4.40 AC. (44.5%)

*PER MECKLENBURG COUNTY THE AREA COUNTED TOWARDS THE WATERSHED WILL INLCUDE THE LOT THAT CONTAINS THE POND BECAUSE THE POND PROPERTY WILL NO LONGER BE DEVELOPABLE.

CONDITIONAL ZONING - SITE PLAN DEVELOPMENT NOTES

1. DEFINITION OF SITE PLAN. THE PROPERTY SHOWN ON THE SITE PLAN DESCRIBED AS "PROPOSED RETAIL, CORNELIUS, NC, WIN DEVELOPMENT, LLC" (THE "PLAN"), AND ANY AMENDMENTS THERETO, WILL BE GOVERNED BY THE STANDARDS OF THE TOWN OF CORNELIUS LAND DEVELOPMENT CODE AS OF 5:00 PM ON FEBRUARY 20, 2018 (THE "LDC")
2. SUBDIVISION. THE PROPERTY IS ONE DEVELOPMENT AND WILL BE SUBDIVIDED TO ALLOW BUILDINGS AS PRINCIPLE USES ON INDIVIDUAL PARCELS AS DEPICTED ON THE PLAN. HOWEVER, RECOMBINATION, CONDOMINIUMIZATION, RECONFIGURATION, OR REDUCTION OF PARCELS MAY OCCUR. SUBDIVISION FOR CONVEYANCE PURPOSES, AS WELL AS FINAL SUBDIVISION PLAT OR PLATS ONCE FINAL BUILDING AND IMPROVEMENT LOCATIONS ARE DETERMINED, MAY BE APPROVED ADMINISTRATIVELY.
3. BUILDING PARCELS. THIS PLAN IS A CONCEPTUAL PLAN. EXACT SIZES, FOOTPRINTS AND LOCATIONS OF BUILDINGS SHALL BE DETERMINED DURING THE CONSTRUCTION DRAWING PHASE OF DEVELOPMENT AND MAY BE ADMINISTRATIVELY APPROVED, SO LONG AS THE TOTAL SQUARE FOOTAGE OF IMPROVEMENTS DOES NOT EXCEED THE TOTAL AMOUNT SHOWN ON THE PLAN.
4. MODIFICATIONS. APPLICANT MAY VOLUNTARILY AGREE TO APPLY FOR FUTURE AMENDMENTS TO THE PLAN IN A MANNER CONSISTENT WITH THE LDC AS IT CHANGES FROM TIME TO TIME. SUCH MODIFICATIONS TO THE LDC SHALL IN NO WAY IMPACT THE APPLICANT'S VESTED RIGHTS ESTABLISHED PER THE LDC ONCE THE PLAN IS APPROVED. APPLICANT, OR IT'S DESIGNATED SUCCESSOR IN INTEREST OF THE SPECIFIC RIGHT TO AMEND THE PLAN AS SET FORTH HEREIN, MAY REQUEST AS AMENDMENT TO THIS PLAN WITHOUT THE WRITTEN CONSENT OF ANY OTHER OWNERS OF ALL OR ANY PORTION OF THE PROPERTY UNLESS SUCH AMENDMENT CONSTITUTES A CHANGE IN THE BUILDING OR USE OF THE PORTION OF THE PROPERTY OWNED BY SUCH OWNER OR OTHERWISE MATERIALLY IMPAIRS ANY OTHER PROPERTY RIGHTS OF SUCH OWNER. MINOR ADJUSTMENTS TO DRIVEWAY LOCATIONS, CURBS AND CURB CUTS MAY BE MADE ADMINISTRATIVELY DURING THE CONSTRUCTION DRAWING PHASE OF DEVELOPMENT. ANY FUTURE REZONING INITIATED BY THE OWNER(S) OF ANY LOTS SHOWN ON THE PLAN SHALL NOT AFFECT THE VESTED RIGHTS STATUS OF THE LOTS NOT REZONED.
5. PHASING. THE DEVELOPMENT MAY BE PHASED. GRADING OF THE PROPERTY MAY BE COMPLETED PER PHASE OF THE DEVELOPMENT. AN APPLICATION FOR A CERTIFICATE OF OCCUPANCY FOR THE LAST BUILDING TO BE SUBSTANTIALLY COMPLETED WITHIN THE PROJECT SHOWN ON THE PLAN SHALL NOT BE SUBMITTED PRIOR TO JANUARY 1, 2020.
6. PERMITTED USES. THE PROPERTY MAY BE DEVOTED TO THE USES PERMITTED IN THE HC ZONING DISTRICT AS SET FORTH IN THE LDC.
7. VESTED RIGHTS. APPLICANT HAS REQUESTED VESTED RIGHTS APPROVAL PURSUANT TO SECTION 12.10 OF THE LDC AND G.S.160A-385.1 OF THE NORTH CAROLINA GENERAL STATUTES. THE APPROVED PLAN IS VESTED FOR A PERIOD OF FIVE (5) YEARS FROM THE DATE OF THE APPROVAL OF THE PLAN BY THE CORNELIUS TOWN BOARD.

PARKING SUMMARY

TENANT	FLOOR AREA (SF)	PARKING PROVIDED	RATIO PROVIDED
RETAIL/OFFICE	57,443 SF	246 SPACES	4.28/1000

CONCEPT SITE PLAN

50 25 0 50 100

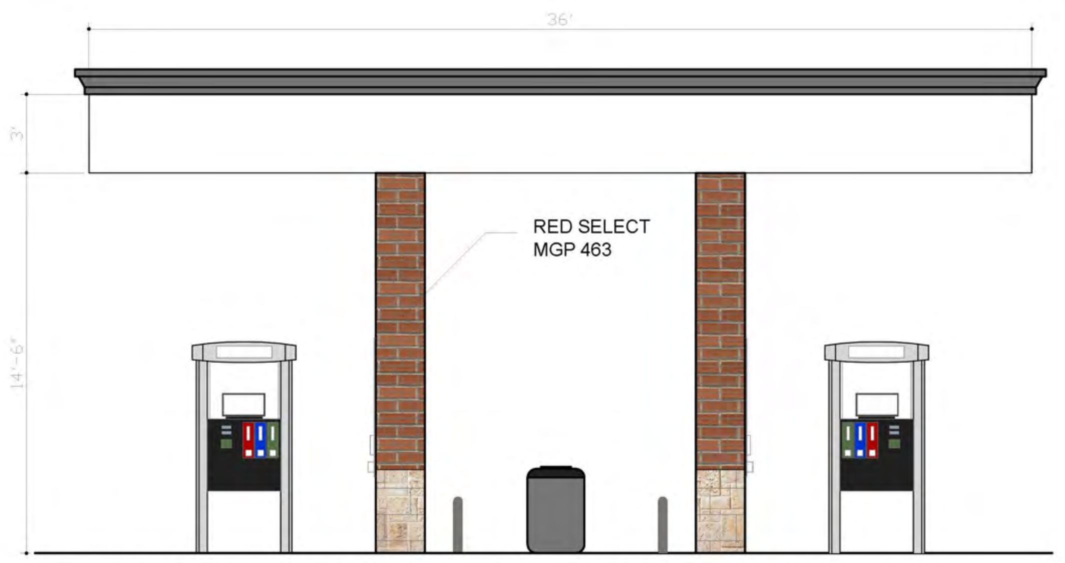
FREELAND and KAUFFMAN, INC.
Engineers * Landscape Architects
209 West Stone Avenue
Greenville, South Carolina 29609
PHONE 864-233-5497
FAX 864-233-8915

PROPOSED RETAIL
CORNELIUS, NC

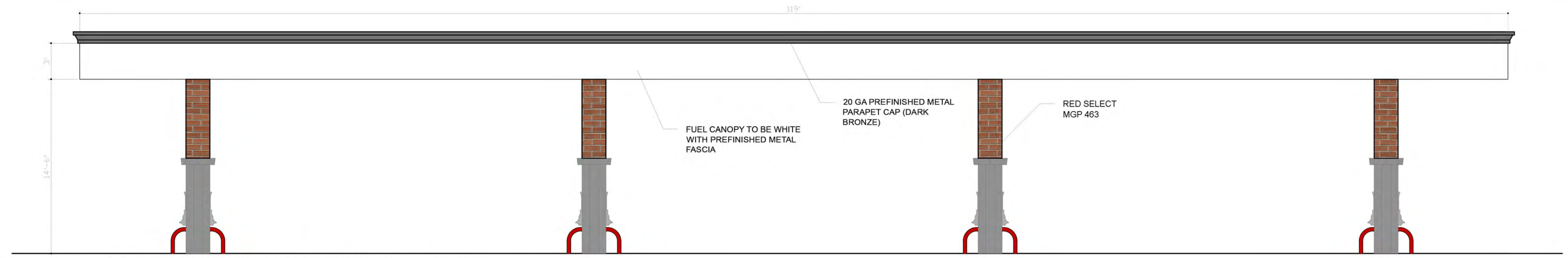
WIN DEVELOPMENT, LLC
2165 LOUISA DRIVE
BELLEAIR, FL 33786
STEVEN ALAFAZANOS
727-709-5266

#	DATE	REVISION DESCRIPTION

DRAWN BY
EO
CHECKED BY
CG
DATE
10-22-18
SCALE
1"=50'
SHEET
4



6 CANOPY ELEVATION SHORT
CUSTOM = 1'- 0"



5 CANOPY ELEVATION LONG
CUSTOM" = 1'- 0"

4 LEFT ELEVATION
3/16" = 1'- 0"

3 RIGHT ELEVATION
3/16" = 1'- 0"

2 FRONT ELEVATION
3/16" = 1'- 0"

1 REAR ELEVATION
3/16" = 1'- 0"

PAINT
SW 7069 IRON ORE

CANOPY
SUNBRELLA BEAUFORT
GREEN PANTONE 349C

COMPOSIT CMU VENEER
ANGELUS SPLIT FACE
BLOCK - CHAMPAGNE

BRICK VENEER
ACME- DRIFTWOOD
VELOUR

RED SELECT
MGP 463

Intrépide design
4101 HUNTINGTON DRIVE #6305
ROGERS, AR 72758 PHONE: 479.721.4814

Seal:

THIS DRAWING IS FOR REVIEW AND REFERENCE ONLY - NOT FOR CONSTRUCTION

Consultants:

Submissions:
DATE: PHASE

7-ELEVEN STORE #38494
18830 CATAWBA AVENUE
CORNELIUS, NORTH CAROLINA

WIN DEVELOPMENT, LLC
2165 LOUISA DRIVE
BELLEAIRE, FL 33786

Job Number:
Drawn By:
Checked By:
Proto Date:
Document Date:
Sheet Name:
REVIEW BOARD ELEVATIONS

Sheet Number:
RB-1

4 REAR ELEVATION
1/4" = 1'- 0"

3 LEFT ELEVATION
1/4" = 1'- 0"

2 RIGHT ELEVATION
1/4" = 1'- 0"

1 FRONT ELEVATION
1/4" = 1'- 0"

5 ELEVATION - DUMPSTER ENCLOSURE
3/8" = 1'- 0"

PAINT
SW 7069 IRON ORE

COMPOSIT CMU VENEER
ANGELUS SPLIT FACE
BLOCK - CHAMPAGNE

RED SELECT
MGP 463

Intrépide design
4101 HUNTINGTON DRIVE #6305
ROGERS, AR 72758 PHONE: 479.721.4814

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7-ELEVEN STORE #38494
18830 CATAWBA AVENUE
CORNELIUS, NORTH CAROLINA

WIN DEVELOPMENT, LLC
2165 LOUISA DRIVE
BELLEAIRE, FL 33786

Job Number:

Drawn By:

Checked By:

Proto Date:

Document Date:

Sheet Name:

REVIEW BOARD ELEVATIONS

Sheet Number:

RB-2

FRONT ELEVATION GLAZING = 70.44%

RIGHT ELEVATION GLAZING = 73.77%

REAR ELEVATION GLAZING = 73.79%

LEFT ELEVATION GLAZING = 70.97%

CANOPY
SUNBRELLA BEAUFORT ALPINE/BEIGE

AWNINGS
PAINTED ALUMINUM

PAINT
SW 7069 IRON ORE

COMPOSITE CMU VENEER
ANGELUS SPLIT FACE BLOCK -CHAMPAGNE

BRICK VENEER
DRIFTWOOD VELOUR-DVP207

BRICK VENEER
RED SELECT-MGP463

CORNELIUS COMMERCIAL

BUILDING A ELEVATIONS

CORNELIUS, NC

06.25.18

FISHER ARCHITECTS

AA26001738

FRONT ELEVATION GLAZING = 70.33%

RIGHT ELEVATION GLAZING = 73.77%

REAR ELEVATION GLAZING = 71.43%

LEFT ELEVATION GLAZING = 73.23%

CANOPY	SUNBRELLA BEAUFORT WHITE/BEIGE
AWNINGS	PAINTED ALUMINUM
PAINT	SW 7069 IRON ORE
COMPOSITE CMU VENEER	ANGELUS SPLIT FACE BLOCK -CHAMPAGNE
BRICK VENEER	DRIFTWOOD VELOUR-DVP207
BRICK VENEER	RED SELECT-MGP463

CORNELIUS COMMERCIAL

BUILDING B ELEVATIONS

CORNELIUS, NC

06.25.18

FISHER ARCHITECTS

AA26001738

WHITE (OR VERY LIGHT COLORED)BRICK (SMOOTH) FOR THE PRIMARY BRICK

WHITE (OR VERY LIGHT COLORED) BRICK (TYEXTURED) FOR THE ACCENT BRICK

BLACK (OR CHARCOAL COLORED) BRICK (TYEXTURED) FOR THE ACCENT BRICK AROUND ENTRY

CERAMIC TILE-WOOD PLANK STYLE

CERAMIC TILE-WOOD PLANK
STYLE

WHITE (OR VERY LIGHT
COLORED)BRICK (SMOOTH)
FOR THE PRIMARY BRICK

WHITE (OR VERY LIGHT COLORED)
BRICK (TYEXTURED) FOR THE ACCENT
BRICK

CERAMIC TILE-WOOD PLANK
STYLE

BLACK (OR CHARCOAL COLORED)
BRICK (TYEXTURED) FOR THE ACCENT
BRICK AROUND ENTRY


605
TENANT LOGO
TENANT LOGO
TENANT LOGO
TENANT LOGO

Ordinance No. 2018- _____

AN ORDINANCE TO AMEND THE TOWN OF CORNELIUS ZONING MAP

REZ 01-18 CD Nantz

WHEREAS, the Town of Cornelius has received an application requesting that the zoning classification of parcels of land subject to the zoning regulations of the Town be reclassified; and

WHEREAS, notice of public hearing on the question of the reclassification of the subject parcels has been provided through posting of the property; and

WHEREAS, notice of public hearing on the question of the reclassification of the subject parcels has been provided through advertisement in a newspaper of general circulation in the Town; and

WHEREAS, property owners contiguous to the subject parcels have been notified by first class mail of the public hearing on the question of the reclassification; and

WHEREAS, a public hearing on the question of the reclassification of the subject parcel has been held by the Board of Commissioners of the Town of Cornelius; and

NOW, THEREFORE, BE IT ORDAINED BY THE BOARD OF COMMISSIONERS OF THE TOWN OF CORNELIUS THAT:

Tax Parcel Number 00524319 and 00524320 consisting of approximately 8.61 acres located at 18830 West Catawba Avenue, be reclassified as *Conditional Zoning (CZ) District* as shown on *Exhibit A* and as further subject to the conditions shown on *Exhibit B* attached hereto and incorporated herein by reference.

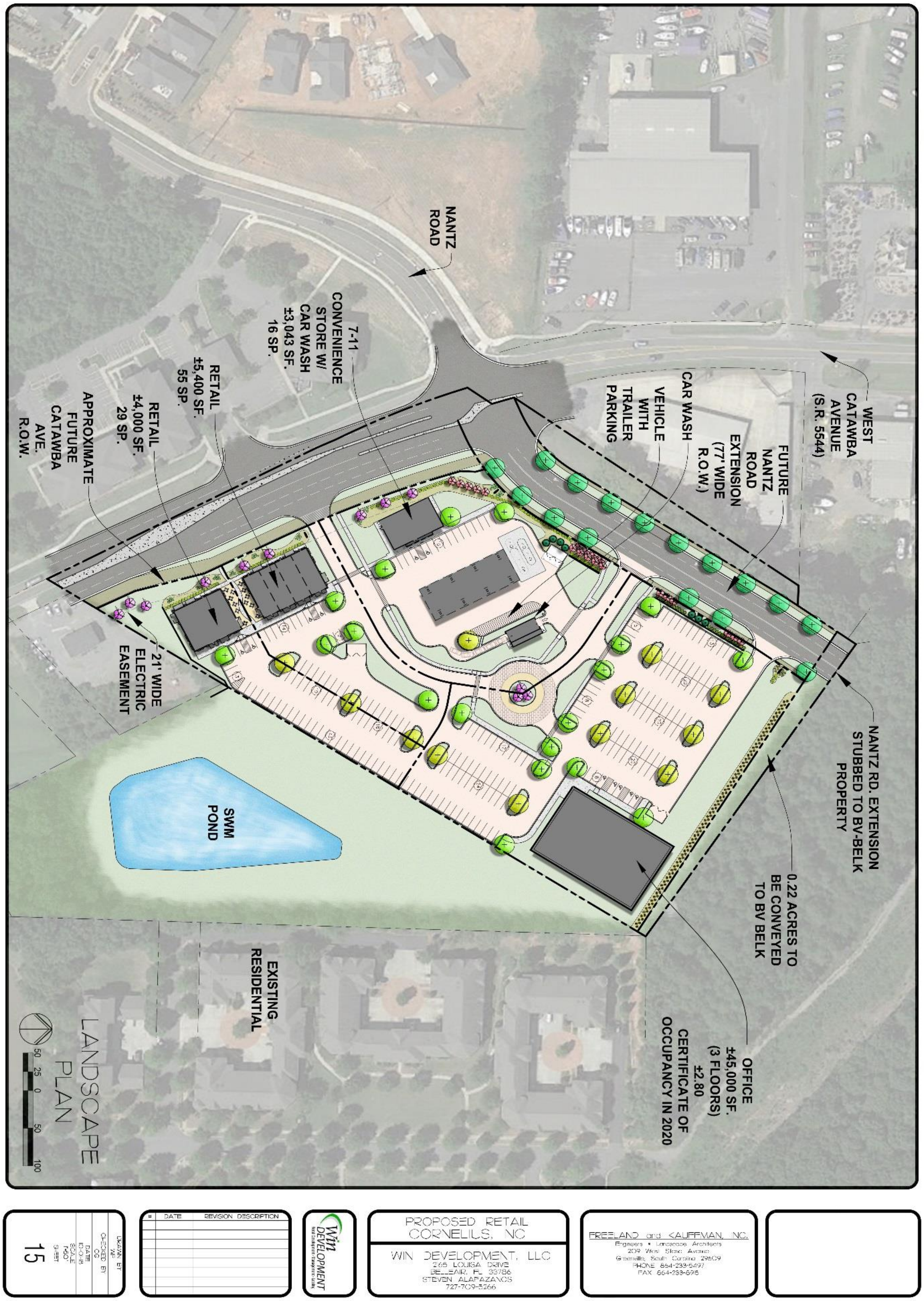
Adopted this the 19th day of November, 2018.

____
Woody T. Washam, Jr., Mayor

ATTEST: APPROVED AS TO FORM:

_______________________________ _______________________________
Lori A. Harrell, Town Clerk Town Attorney

Exhibit A



NANTZ ROAD
WEST CATAWBA AVENUE (S.R. 5544)
FUTURE NANTZ ROAD EXTENSION (77' WIDE R.O.W.)
CAR WASH
VEHICLE WITH TRAILER PARKING
7-11 CONVENIENCE STORE W/ CAR WASH ±3,043 SF. 16 SP.
RETAIL ±5,400 SF. 55 SP.
RETAIL ±4,000 SF. 29 SP.
APPROXIMATE FUTURE CATAWBA AVE. R.O.W.
21' WIDE ELECTRIC EASEMENT
SWM POND
NANTZ RD. EXTENSION STUBBED TO BV-BELK PROPERTY
0.22 ACRES TO BE CONVEYED TO BV BELK
OFFICE ±45,000 SF. (3 FLOORS) ±2.80 CERTIFICATE OF OCCUPANCY IN 2020
EXISTING RESIDENTIAL
LANDSCAPE PLAN
50 25 0 50 100
15
PROPOSED RETAIL
CORNELIUS, NC
WIN DEVELOPMENT, LLC
FREELAND and KAUFFMAN, INC.

Exhibit B

Conditions of REZ 01-18

1. Town approval is contingent on review and approval by other applicable local, state and federal agencies.

2. The development shall comply with all other applicable requirements of the Town of Cornelius Land Development Code.

3. Town approval incorporates and shall comply with any and all submittals in the case file and correspondence presented to the board in support of this application, including, but not limited to the following: The site/sketch plan, architectural elevations, and any other information related to this case or improvements recommended by the Town and/or other agencies.

4. The US Postal Service has notified the Town that all future subdivision approvals must utilize a community mail delivery system. Locations and details of the proposed community mailboxes must be included in the Construction Documents, and must be reviewed and approved by the Post Master for this area. The applicant(s) must provide the Town with written confirmation that the local Post Master is in agreement with the proposed box locations.

5. A convenience store with fuel station and car wash shall be allowed in the building at the corner of West Catawba Avenue and Nantz Road. Commercial, retail, service, office and restaurant uses shall be permitted within the two non-residential buildings fronting West Catawba Avenue. Professional office uses shall be permitted in the rear building.

6. Final CO will be held for the rear office building until 2020 in order to properly phase and coordinate with the West Catawba Avenue widening project.

7. Applicant shall coordinate with NCDOT on constructing the multi-purpose path, additional right-of-way and all other required improvements on West Catawba Avenue for widening project R-2555B.

8. TIA mitigation items:

West Catawba Avenue and Nantz Road/Site Access A

2019 Build Phase 1 Improvements:

- Restripe, and widen if necessary, the eastbound Nantz Road approach to provide a left turn lane with 125 feet storage and appropriate taper, and one shared through/right lane.
- Construct the westbound Site Access A approach with one left turn lane with 150 feet of storage and appropriate taper, and one shared through/right lane.
- Construct a southbound West Catawba Avenue left turn lane with 100 feet of storage and appropriate taper.
- Provide permissive left turn treatments on the side streets and permissive/protected left turn treatments on the West Catawba Avenue approaches.

2019 Full Build Improvements:

- No additional improvements are recommended.

West Catawba Avenue and Site Access B

2019 Build Phase 1 Improvements:

- Construct Site Access B with one ingress lane and one egress lane (right-in/right-out only).
- Install a quick curb median to prohibit left turns at the intersection.

2019 Full Build Improvements:

- No additional improvements are recommended.

Site Access A and Site Access C

2019 Build Phase 1 Improvements:

- Construct Site Access C with one ingress lane and one egress lane (shared left/right).

2019 Full Build Improvements:

- No additional improvements are recommended.

Site Access A and Site Access D

2019 Full Build Improvements:

- Construct Site Access D with one ingress lane and one egress lane (shared left/right).

9. Due to utility lines, low ornamental shade trees and shrub landscaping should be shown fronting West Catawba Avenue.

Resolution No. 2018-______

RESOLUTION OF THE TOWN OF CORNELIUS BOARD OF COMMISSIONERS PERTAINING TO THE REASONABLENESS AND CONSISTENCY OF PROPOSED ZONING MAP AMENDMENTS

REZ 01-18 CD Nantz

WHEREAS, David Smith, applicant, initiated the process to rezone the property located at 18830 West Catawba Avenue (PID #: 00524319 & 00524320), which consists of 8.61 acres, to *Conditional Zoning District* as shown in *Exhibit A*, and to use the property in accordance with the conditions set forth in *Exhibit B*; and

WHEREAS, in accordance with the provisions of North Carolina General Statutes 160A-382 and 383, the Town Board has considered the reasonableness and consistency of rezoning the above described property and adopts the following statement.

NOW, THEREFORE, BE IT RESOLVED, by the Town of Cornelius Board of Commissioners that the rezoning _____ IS _____ IS NOT consistent with the Town's adopted comprehensive land use plan as proposed and _____ IS ____ IS NOT reasonable and in the public interest.

Adopted this 19th day of November, 2018.

____
Woody T. Washam, Jr., Mayor

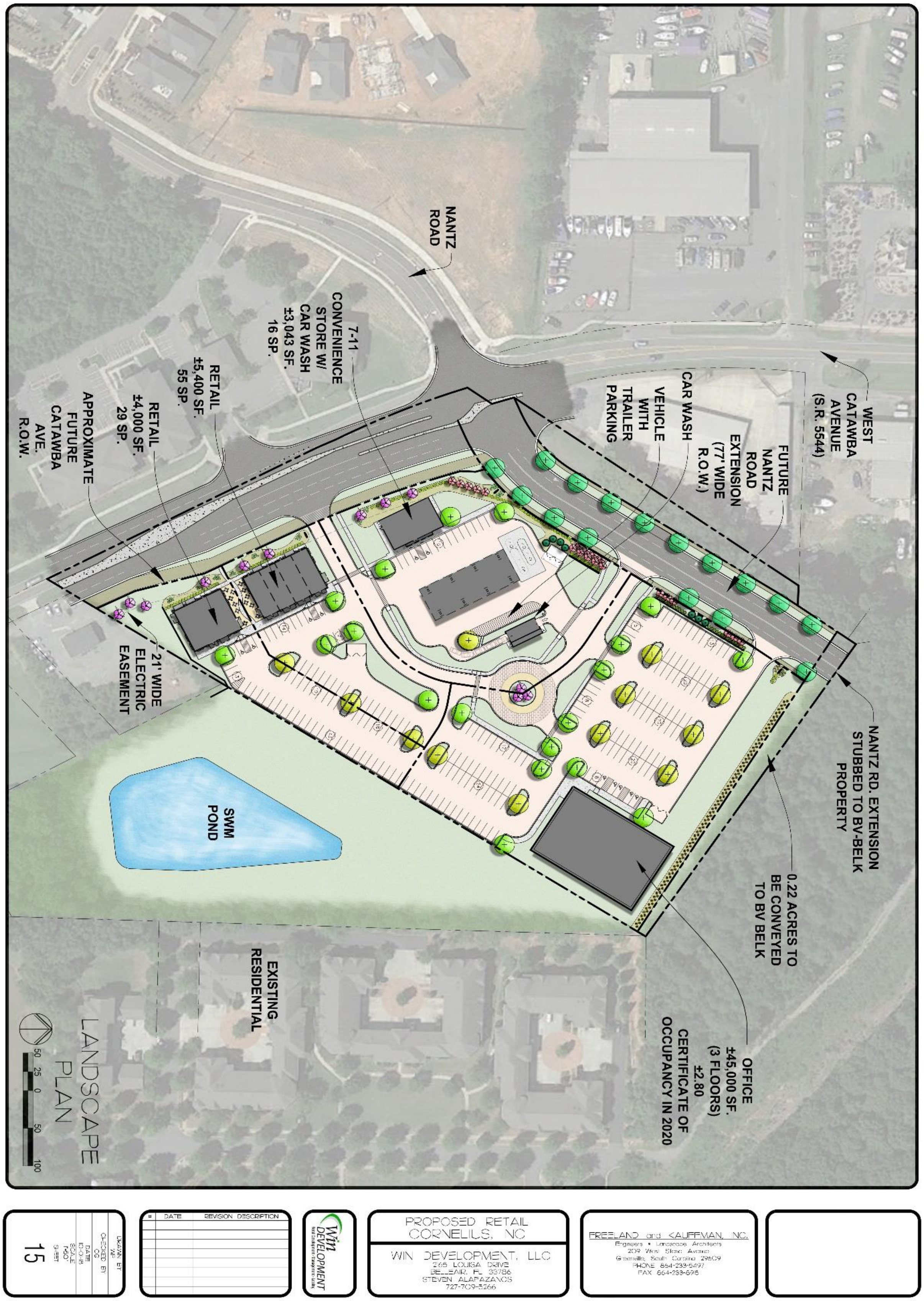
ATTEST:

____
Lori A. Harrell, Town Clerk

APPROVED AS TO FORM:

____
Town Attorney

Exhibit A



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VEHICLE WITH TRAILER PARKING
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21' WIDE ELECTRIC EASEMENT
SWM POND
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0.22 ACRES TO BE CONVEYED TO BV BELK
OFFICE ±45,000 SF. (3 FLOORS) ±2.80 CERTIFICATE OF OCCUPANCY IN 2020
EXISTING RESIDENTIAL
LANDSCAPE PLAN
50 25 0 50 100
15
PROPOSED RETAIL
CORNELIUS, NC
WIN DEVELOPMENT, LLC
FREELAND and KAUFFMAN, INC.

Exhibit B

Conditions of REZ 01-18

1. Town approval is contingent on review and approval by other applicable local, state and federal agencies.

2. The development shall comply with all other applicable requirements of the Town of Cornelius Land Development Code.

3. Town approval incorporates and shall comply with any and all submittals in the case file and correspondence presented to the board in support of this application, including, but not limited to the following: The site/sketch plan, architectural elevations, and any other information related to this case or improvements recommended by the Town and/or other agencies.

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5. A convenience store with fuel station and car wash shall be allowed in the building at the corner of West Catawba Avenue and Nantz Road. Commercial, retail, service, office and restaurant uses shall be permitted within the two non-residential buildings fronting West Catawba Avenue. Professional office uses shall be permitted in the rear building.

6. Final CO will be held for the rear office building until 2020 in order to properly phase and coordinate with the West Catawba Avenue widening project.

7. Applicant shall coordinate with NCDOT on constructing the multi-purpose path, additional right-of-way and all other required improvements on West Catawba Avenue for widening project R-2555B.

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West Catawba Avenue and Nantz Road/Site Access A

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- Restripe, and widen if necessary, the eastbound Nantz Road approach to provide a left turn lane with 125 feet storage and appropriate taper, and one shared through/right lane.

- Construct the westbound Site Access A approach with one left turn lane with 150 feet of storage and appropriate taper, and one shared through/right lane.
- Construct a southbound West Catawba Avenue left turn lane with 100 feet of storage and appropriate taper.
- Provide permissive left turn treatments on the side streets and permissive/protected left turn treatments on the West Catawba Avenue approaches.

2019 Full Build Improvements:

- No additional improvements are recommended.

<u>West Catawba Avenue and Site Access B</u>

2019 Build Phase 1 Improvements:

- Construct Site Access B with one ingress lane and one egress lane (right-in/right-out only).
- Install a quick curb median to prohibit left turns at the intersection.

2019 Full Build Improvements:

- No additional improvements are recommended.

<u>Site Access A and Site Access C</u>

2019 Build Phase 1 Improvements:

- Construct Site Access C with one ingress lane and one egress lane (shared left/right).

2019 Full Build Improvements:

- No additional improvements are recommended.

<u>Site Access A and Site Access D</u>

2019 Full Build Improvements:

- Construct Site Access D with one ingress lane and one egress lane (shared left/right).

9. Due to utility lines, low ornamental shade trees and shrub landscaping should be shown fronting West Catawba Avenue.

REQUEST FOR BOARD ACTION

Print

Date of Meeting: November 19, 2018

To: Mayor and Board of Commissioners

From: Becky Partin, Senior Planner

Action Requested:

Consider a modification to Chapter 4, Building Design, to clarify where the 70% window and door requirement for commercial buildings applies.

On July 23rd, the Land Development Code Advisory Board unanimously supported a text amendment specifying the 70% window and door requirement would only apply to first floor street fronting wall areas.

On August 24th, the Architectural Review Board had further discussion and recommended applying the minimum window and doorway requirement to the entire street fronting wall area, as well as reducing the requirement to 60%.

At its September 10th meeting, the Planning Board agreed with the Architectural Review Board and unanimously recommended approval of the text amendment as proposed.

Conduct a public hearing and consider modifying street frontage wall areas (including parapets) to be a minimum of 60% in windows or doorways.

Manager's Recommendation:

Conduct a public hearing and approve an Ordinance to amend Chapter 4 of the Land Development Code.

ATTACHMENTS:		
Name:	Description:	Type:
ORD_TA_05-18_70%_Glass.docx	ORD TA 05-18 Ch 4 70% Glass	Ordinance
CH_04_Building_Design_Specifications_-_Novus.pdf	TA 05-18 Chapter 4, 70% Glass	Backup Material

Ordinance No. 2018 - _________

AN ORDINANCE TO AMEND THE TOWN OF CORNELIUS LAND DEVELOPMENT CODE

WHEREAS, the Town Board of Commissioners on March 19, 2018 adopted an ordinance which regulates the classification and use of property within its zoning jurisdiction, including its extra-territorial jurisdiction; and,

WHEREAS, proper statutory notice of public hearing on the issue of amending the Cornelius Land Development Code has been provided through advertisement in a newspaper of general circulation in the Town; and,

WHEREAS, the Planning Board of the Town of Cornelius has recommended that the Town Board of Commissioners amend the Cornelius Land Development Code; and

WHEREAS, a public hearing on the amendment has been held by the Town Board of Commissioners on November 19, 2018.

NOW, THEREFORE, BE IT ORDAINED by the Board of Commissioners of the Town of Cornelius, North Carolina that the following chapters of the Land Development Code be amended: AMEND Chapter 4: Building Design Specifications (See Exhibit A).

Adopted this 19th day of November, 2018.

____
Woody T. Washam, Jr., Mayor

ATTEST:

____
Lori A. Harrell, Town Clerk

APPROVED AS TO FORM:

____
Town Attorney

EXHIBIT A

4.2.2: NON RESIDENTIAL, MIXED USE, AND MULTI-FAMILY BUILDINGS

B. Configurations

3. All Districts Except IC:

a. For commercial buildings, at least sixty percent (60%) of street frontage wall areas (including parapets) shall be in windows or doorways. Street level windows shall be visually permeable. Mirrorized glass is not permitted in any location. Faux or display casements are not permitted in lieu of exterior window treatments for the frontage elevation.

E. Ground mounted mechanical equipment shall be located to the rear or side yard and screened from off-site view. Roof-mounted mechanical equipment shall be screened from off-site view by a parapet wall.

F. Loading and service delivery areas shall be located to the rear or side yard away from the primary street frontage.

G. Canopies and awnings shall be canvas or similar material and shall be permitted to encroach over a sidewalk to within two feet of a public street curb and may be illuminated by external lighting only.

H. The front façade of all buildings shall extend parallel to the frontage line of the lot.

4.2.2: NON RESIDENTIAL, MIXED USE, AND MULTI-FAMILY BUILDINGS

A. Materials

1. Building walls:
   a. All districts except IC: Building walls shall be brick, cast concrete, stucco, stone, marble, or other materials similar in appearance and durability. Regular or decorative concrete block, and siding (non-vinyl) materials may be used on building walls not visible from a public street or as an accent material only. All accessory buildings shall be clad in materials similar in appearance to the principal structure.
   b. IC District: All building walls visible from a public street shall be brick, cast concrete, stucco, stone, marble, decorative concrete, masonry, or other materials similar in appearance and durability. All accessory buildings shall be clad in materials similar in appearance to the principal structure.
2. Pitched roofs shall be clad in wood shingles, standing seam metal, corrugated metal, slate, diamond tab asphalt shingles, or similar material.
3. Flat roofs shall incorporate parapet walls to conceal the flat portions of the roof that are visible on the front and side elevations from any public street.

B. Configurations

1. Two wall materials may be combined horizontally on one facade. The heavier material should be below.
2. Sky- lights shall be flat (non-bubble).
3. All Districts Except IC:
   a. For commercial buildings, at least sixty ~~seventy~~ percent (~~70~~ 60%) of ~~the~~ street ~~level~~ frontage~~s~~ wall areas (including parapets) shall be in windows or doorways. Street level windows shall be visually permeable. Mirrorized glass is not permitted in any location. Faux or display casements are not permitted in lieu of exterior window treatments for the frontage elevation.
   b. No frontage wall shall remain unpierced by a window or functional general access doorway for more than sixteen feet (16').
   c. Each exterior door that provides access to an individual unit or any shared door shall contain a porch, stoop, or awning that forms as the predominant aspect of the building design. Porches shall constitute at least fifteen percent (15%) of the front facade of apartment units.
   d. For buildings greater than one-hundred feet (100') in width, there shall be no uninterrupted wall length exceeding seventy-five feet (75'). An interruption may consist of a change in place or a change in texture/masonry patterns.

REQUEST FOR BOARD ACTION

Print

Date of Meeting: November 19, 2018

To: Mayor and Board of Commissioners

From: Becky Partin, Senior Planner

Action Requested:

Consider a modification to Chapter 10, Signs, to allow murals on street fronting walls, pending review and recommendation from the PARC Board and approval by the Zoning Administrator. Currently, murals are only allowed on side or rear walls. With the future arts district and the promotion of art on a town wide basis, the reviewing Boards felt it appropriate to allow murals on street fronting walls as long as the PARC Board reviews the proposal for appropriate application and content of the mural.

The Land Development Code Advisory Board unanimously supports this text amendment.

At its September 10, 2018 meeting the Planning Board unanimously recommended approval of this text amendment.

Conduct a public hearing and consider an amendment to allow murals on street fronting walls pending review and recommendation from the PARC Board and approval by the Zoning Administrator.

Manager's Recommendation:

Conduct a public hearing and approve an Ordinance to amend Chapter 10 of the Land Development Code.

ATTACHMENTS:

Name:	Description:	Type:
ORD_TA_06-18_Murals.pdf	ORD TA 06-18 Murals	Ordinance
Chapter_10_-_Murals_-_Novus.pdf	TA 06-18 Chapter 10, Signs	Backup Material

Ordinance No. 2018 - _________

AN ORDINANCE TO AMEND THE TOWN OF CORNELIUS LAND DEVELOPMENT CODE

WHEREAS, the Town Board of Commissioners on March 19, 2018 adopted an ordinance which regulates the classification and use of property within its zoning jurisdiction, including its extra-territorial jurisdiction; and,

WHEREAS, proper statutory notice of public hearing on the issue of amending the Cornelius Land Development Code has been provided through advertisement in a newspaper of general circulation in the Town; and,

WHEREAS, the Planning Board of the Town of Cornelius has recommended that the Town Board of Commissioners amend the Cornelius Land Development Code; and

WHEREAS, a public hearing on the amendment has been held by the Town Board of Commissioners on November 19, 2018.

NOW, THEREFORE, BE IT ORDAINED by the Board of Commissioners of the Town of Cornelius, North Carolina that the following chapters of the Land Development Code be amended: AMEND Chapter 10: Signs (See Exhibit A).

Adopted this 19th day of November, 2018.

____
Woody T. Washam, Jr., Mayor

ATTEST:

____
Lori A. Harrell, Town Clerk

APPROVED AS TO FORM:

____
Town Attorney

EXHIBIT A

Chapter 10: Signs

SECTION 10.5: BUILDING MOUNTED SIGN DESCRIPTIONS

P **MURALS**

Permissible Districts: HC, IC, NMX, VC, TC, TN, WMX, CO, BC

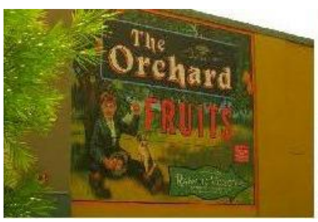
CRITERIA

Painted mural display applications may be allowed along an exterior wall, pending approval by the Zoning Administrator after review and recommendation by the Parks, Arts, Recreation and Culture (PARC) Board.

Murals must be painted to suitable portions of wall surfaces and may not be painted around or over any windows, awnings or glass doors.

Murals may be externally lighted with building proportionate spotlighting, gooseneck or similar. Fixtures should be adequately spaced, four (4) to six (6) feet apart. No ground mounted uplighting is allowed.

Examples of allowed mural signs:



SECTION 10.5: BUILDING MOUNTED SIGN DESCRIPTIONS

P

MURALS

Permissible Districts: HC, IC, NMX, VC, TC, TN, WMX, CO, BC

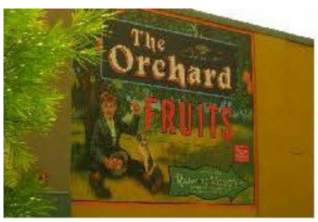
CRITERIA

Painted mural display applications may be allowed along an ~~available~~ exterior ~~non street-fronting~~ wall ~~spaces only~~, pending approval by the Zoning Administrator after review and recommendation by the ~~Architectural Review~~Parks, Arts, Recreation and Culture (PARC) Board.

Murals must be painted to suitable portions of ~~non streetfronting~~ wall surfaces~~. Murals~~ and may not be painted around or over any windows, awnings or glass doors.

Murals may be externally lighted with building proportionate spotlighting, gooseneck or similar. Fixtures should be adequately spaced, four (4) to six (6) feet apart. No ground mounted uplighting is allowed.

Examples of allowed mural signs:



REQUEST FOR BOARD ACTION

Print

Date of Meeting: November 19, 2018

To: Mayor and Board of Commissioners

From: Lori Harrell, Town Clerk

Action Requested:

Review the minutes from the Nov. 5th Closed Session meeting.

Manager's Recommendation:

Approve minutes

ATTACHMENTS:		
Name:	Description:	Type:
11-05-18_Closed_Session_draft.pdf	Closed Session	Backup Material

REQUEST FOR BOARD ACTION

Print

Date of Meeting: November 19, 2018

To: Mayor and Board of Commissioners

From: Lori Harrell, Town Clerk

Action Requested:

Review the minutes from the Nov. 5th Regular Meeting.

Manager's Recommendation:

Approve minutes

ATTACHMENTS:		
Name:	Description:	Type:
11-05-18_Regular_Meeting_draft.pdf	Regular Meeting	Backup Material

BOARD OF COMMISSIONERS

November 5, 2018
MINUTES

PRE-MEETING – 5:45PM

- Closed Session – Real Estate Acquisition Matters
  Mayor Washam called for a motion to go into Closed Session to discuss potential real estate acquisition matters.

  Commissioner Miltich made a motion to go into Closed Session at 5:53PM. Commissioner Gilroy seconded the motion and it passed unanimously, 5-0.

- Agenda Overview
  Upon return from Closed Session at 6:23PM, Deputy Town Manager Wayne Herron gave an overview of the Planning agenda items to be discussed at 7:00PM.

REGULAR MEETING – 7:00PM

1. CALL TO ORDER
   Mayor Washam called the meeting to order at 7:03PM.

2. DETERMINATION OF QUORUM
   All commissioners were present for the meeting.

3. APPROVAL OF AGENDA
   Commissioner Miltich made a motion to approve the agenda as presented. Commissioner Ross seconded the motion and it passed unanimously, 5-0.

4. MOMENT OF SILENCE AND PLEDGE OF ALLEGIANCE
   Devin Gilroy led the pledge after a moment of silence was observed.

5. PRESENTATIONS
   A. Devin Gilroy's Achievement Recognition
      Mayor Washam recognized Devin's #1 ranking USTA (U-10 girls) tennis accomplishment.

6. MAYOR/COMMISSIONERS/MANAGER REPORTS
   Commissioner Bilodeau reported on the following:
   - Attended the ASC Joint Board of Directors and Advisory retreat in Charlotte on Oct. 24th
   - Attended the Smithville Community Coalition meeting on Oct. 29th
   - Attended the PARC Commission meeting on Nov. 1st
   - Attended the Connecting Cornelius morning event this morning

- PARC events – Veterans Day celebration will be held on Nov. 10th; Santa Paws in the Park will be held on Nov. 17th at Robbins Park (12PM-2PM); and Light Up Cornelius will be held on Nov. 24th
- VLN – Visit Lake Norman was honored with 4 awards for exceptional achievement in destination marketing at the North Carolina Tourism Leadership Conference. They have won 10 destination marketing awards in the past 4 years. The Lake Norman Fall Classic will be held at Bailey Road Park within the next two weekends with 200+ soccer teams participating

Commissioner Ross reported on the following:

- Attended the Smithville Community Coalition meeting on Oct. 29th
- Chamber events – the Quarterly Non-Profit Meeting will be held on Nov. 7th at Angels and Sparrow in Huntersville; the Champions Diversity Luncheon will be held on Nov. 15th at River Run Country Club; and Focus Friday will be held on Nov. 16th to discuss the need for a magistrate in North Mecklenburg

Commissioner Miltich reported on the following:

- Attended the NCDOT local officials meeting on the Hwy. 73 widening project on Oct. 16th
- Attended the CRTPO Project Oversight Committee Policy Development Focus Group meeting on Oct. 17th
- Attended the Public Safety luncheon on Oct. 18th
- Attended the Chamber's Business Afterhours on Oct. 18th at Artisan Graphics
- Attended the Connecting Cornelius event held at D9 on Oct. 18th
- Attended the Chamber Focus Friday on Oct. 19th
- Attended Octoberfest at Bailey Road Park on Oct. 20th
- Attended the grand opening of Carolina Weight Loss on Oct. 29th
- Attended the Smithville Community Coalition meeting on Oct. 29th
- Attended the Connecting Cornelius morning event at Harvey's this morning
- Promoting the Cornelius Bond Referendum during early voting
- Will attend the CMS meeting to hear Superintendent Wilcox's report on the Municipal Concerns Act on Nov. 6th

Commissioner Naas reported on the following:

- Meetings for the Cornelius Educational Options Study Commission were held on Oct. 18th and Nov. 2nd
- The adaptive signal control system has been installed along the West Catawba corridor to integrate the signals between the I-77 and Jetton Road. It is the first pilot program in North Carolina

Town Manager Andrew Grant reported on the following:

- No Shave November donations are going to the Children National Hospital to support DIPG research in memory of Jace Thompson. More information can be found on the Cornelius PD webpage
- The Cornelius Citizens Academy graduation will take place on Nov. 13th
- Leaf vacuuming services will run now until the end of January

Mayor Washam reported on the following:

- Participated in "Lunch with the Mayor" at Cornelius Elementary School
- Attended Laketoberfest
- Attended the Chamber 2018 Public Safety luncheon
- Held the Connecting Cornelius evening event at D9 on Oct. 18th
- Attended the Business Today Top Women of 2018 awards
- Attended the Sherrill-Robbins House historic landmark designation celebration
- Attended the Cornelius-Lemley Fire and Rescue BBQ chicken fundraiser event
- Acknowledged the VLN achievement awards
- Held the Connecting Cornelius morning event at Harvey's this morning

7. CITIZEN CONCERNS/COMMENTS

Helen Holliday – 19510 Tryon Street, expressed her concerns with potential health risks related to the proposed small cell wireless text amendment to the Land Development Code and asked the Board to delay their consideration of approval.

Yancey Fouche´ – 21265 Summerbrook Drive, expressed her concerns with the Town's decision to study municipal charter schools as she supports CMS public schools.

8. PUBLIC HEARING AND CONSIDERATION OF APPROVAL

A. <u>REZ 03-18 Cambridge Square</u>

Mayor Washam called for a motion to open the public hearing on rezoning case REZ 03-18 Cambridge Square. *<u>The public notice is attached hereto</u>*.

Commissioner Gilroy made a motion to open the public hearing. Commissioner Miltich seconded the motion and it passed unanimously, 5-0.

Senior Planner Aaron Tucker gave the staff presentation *(Exhibit Book 31)* highlighting the rezoning request of 7.63 acres located at 18731 West Catawba from Neighborhood Mixed Use (NMX) to Commercial/Residential. The use proposed will include two 9,900sqft. commercial buildings fronting West Catawba and 20 single family homes in the rear. He explained that the applicant is proposing to upfit the existing commercial building and renovate the exterior so the elevations will have similar features as the new building adjacent to it.

Deputy Town Manager Wayne Herron gave an overview of the recommended staff conditions with the addition of **Condition #11** - *The approval of this project is contingent upon the Town of Cornelius Transportation Bond Package to be approved on November 6th 2018*. He stated that the applicant has agreed with all recommended conditions.

Commissioner Gilroy questioned if the elevations of the church site were part of the approval process and how confident staff was that building two would be built. Mr. Herron explained that the elevations for the commercial components have been approved by the ARB. He stated that the market will drive the construction of building two; however, it will not be required to be built prior to plat approval.

Commissioner Bilodeau expressed his concerns with building two's area becoming a parking lot. Mr. Herron stated that if that was the case a rezoning amendment would be required for approval. Staff will not approve parking for building 2 until the building is constructed.

Mayor Washam invited the applicant to speak.

Attorney Susan Irvin, representing the applicant, stated that staff did a great job presenting and the project really speaks for itself. She explained that the applicant would like to amend Condition #6 by adding "Civic" to the allowed uses in order to keep the development opportunities open. Commissioner Gilroy stated that he was not crazy about having a church as a use with residential behind it and expressed his concerns with parking. Attorney Irvin stated that building one will have 20-25 spaces and that parking would not impact the residential component. Commissioner Gilroy asked if there were any elevations for the residential homes. Attorney Irvin stated there were no residential elevations; however, the applicant is communicating with Simonini Builders and Saussy Burbank Homes. Mr. Herron added that state law protects developers from submitting residential elevations.

Mayor Washam invited the public to speak.

Chris Williams – 18530 Green Knoll Trace, Davidson and Kyle Wallace – 20505 Church Street, Cornelius, explained that they speaking on behalf of the Church of the Good Shepherd regarding the omission of "Civic" use by right; however, in light of the amendment to Condition #6 they would forego their comments. Pastor Wallace stated that they just wanted to make sure their church would have the option to purchase the commercial component if given the opportunity and thanked the Town for adding "Civic" as a permitted use. Commissioner Gilroy again expressed his concerns with inadequate parking for civic use. Mr. Herron explained the options available with administrative approval and the buffers and screening required. Commissioner Bilodeau questioned if there was anything that would prevent another investor from constructing building two. Mr. Herron stated that is always an option and could provide the additional church parking with a cross-parking easement between the two parties.

There being no further public comments, Mayor Washam called for a motion to close the public hearing.

Commissioner Miltich made a motion to close the public hearing. Commissioner Ross seconded the motion and it passed unanimously, 5-0.

Commissioner Miltich made a motion to approve Ordinance #2018-00691 to amend the Zoning Map with 11 conditions and the word "Civic" added to Condition #6. Commissioner Naas seconded the motion and it passed unanimously, 5-0.

Ordinance #2018-00691 is hereby made part of the minutes by reference.

Commissioner Miltich made a motion to approve Resolution #2018-00908 declaring that REZ 03-18 is consistent with the Town's Land Use Plan and reasonable in the public's interest. Commissioner Ross seconded the motion and it passed unanimously, 5-0.

Resolution #2018-00908 is hereby made part of the minutes by reference.

B. TA 09-17 Small Cell Wireless

Mayor Washam called for a motion to reconvene the public hearing opened on Oct. 15th for text amendment TA 09-17 Small Cell Wireless.

Commissioner Ross made a motion to reconvene the public hearing on TA 09-17. Commissioner Gilroy seconded the motion and it passed unanimously, 5-0.

Senior Planner Becky Partin explained that the proposed text amendment to Chapters 2, 4, 5 and 6 of the Land Development Code is due to the NC General Assembly adoption of HB310 in June, 2017 to reform small wireless communications infrastructure. Deputy Town Manager Wayne Herron stated that a lot of the proposed language came directly from the state statute. Commissioner Naas asked if staff had any insight with regards to Ms. Holliday's concerns. Deputy Town Manager Herron asked Ann Brooks from Crown Castle if she would comment. Ms. Brooks stated that FCC guidelines are followed for wireless safety operation and she believes that most wireless operations operate well within the standards of the FCC.

Mayor Washam invited the public to speak. There being no public comments made, he called for a motion to close the public hearing.

Commissioner Miltich made a motion to close the public hearing. Commissioner Bilodeau seconded the motion and it passed unanimously, 5-0.

Commissioner Miltich made a motion to approve Ordinance #2018-00692 to amend Chapters 2, 4, 5 and 6 of the Land Development Code as presented. Commissioner Gilroy seconded the motion and it passed unanimously, 5-0.

Ordinance #2018-00692 is hereby made part of the minutes by reference.

C. TA 02-18 Watershed Built Upon Area Averaging

Mayor Washam called for a motion to open the public hearing on text amendment TA 02-18 Watershed Built Upon Area Averaging. *The public notice is attached hereto.*

Commissioner Ross made a motion to open the public hearing on TA 02-18. Commissioner Miltich seconded the motion and it passed unanimously, 5-0.

Senior Planner Becky Partin explained that the proposed text amendment to Chapters 11 and 13 of the Land Development Code are due to receiving notification from the State that the Town was not in compliance with State statute. She explained the new process of review to be done by the Watershed Review Board as approved by the State on September 20, 2018.

Mayor Washam invited the public to speak. There being no public comments made, he called for a motion to close the public hearing.

Commissioner Miltich made a motion to close the public hearing. Commissioner Bilodeau seconded the motion and it passed unanimously, 5-0.

Commissioner Miltich made a motion to approve Ordinance #2018-00693 to amend Chapters 11 and 13 of the Land Development Code as presented. Commissioner Ross seconded the motion and it passed unanimously, 5-0.

Ordinance #2018-00693 is hereby made part of the minutes by reference.

9. CONSIDERATION OF APPROVAL

A. Code of Ordinances – Title 9, Chapter 94 Utility Right-of-Way Use Amendment
Senior Planner Becky Partin explained that the amendment to Chapter 94 adds regulations of small wireless facilities within Town maintained public rights-of-way in accordance with State legislation HB310 which was ratified on June 29, 2017.

Commissioner Miltich made a motion to approve Ordinance #2018-00694 to amend the Code of Ordinances – Title 9, Chapter 94 as presented. Commissioner Bilodeau seconded the motion and it passed unanimously, 5-0.

Ordinance #2018-00694 is hereby made part of the minutes by reference.

B. Code of Ordinances – Title 15, Chapter 154 Floodplain Amendment
Senior Planner Aaron Tucker explained that when FEMA maps are updated it necessitates amending the Town's Floodplain Ordinance. He stated that the new maps become effective on November 16th, therefore, the Town must adopt an Ordinance amending Chapter 154 of the Code of Ordinances.

Commissioner Miltich made a motion to approve Ordinance #2018-00695 to amend the Code of Ordinances – Title 15, Chapter 154 as presented. Commissioner Bilodeau seconded the motion and it passed unanimously, 5-0.

Ordinance #2018-00695 is hereby made part of the minutes by reference.

C. Electric Fund Write-offs
Finance Director Julie Niswonger stated that annually the Board is asked to approve the write-off of uncollectible ElectriCities bills from the Electric Fund. She explained that the Town makes every effort to collect on unpaid bills and also uses the Debt Setoff program offered by the State. She asked the Board to consider writing off the FY15 uncollectible debt of $25,116.98.

Commissioner Miltich made a motion to approve the Electric Fund write-offs for the FY15 uncollectible accounts. Commissioner Ross seconded the motion and it passed unanimously, 5-0.

D. FY19 Resurfacing Projects and Contract
Asst. Town Manager Tyler Beardsley outlined the projects scheduled to be completed with Powell Bill funds and the addendum that was added to the proposed contract. He stated that Red Clay Industries was the lowest responsive bidder.

Commissioner Miltich made a motion to approve a contract including the addendum with Red Clay Industries and authorize the Town Manager and Town Attorney to finalize and execute it. Commissioner Ross seconded the motion and it passed unanimously, 5-0.

10. CONSENT AGENDA
A. Approve Closed Session Minutes (Oct. 1st) *(Approved 5-0)*
B. Approve Regular Meeting Minutes (Oct. 1st & 15th) *(Approved 5-0)*

Commissioner Miltich made a motion to approve the Consent Agenda as presented. Commissioner Ross seconded the motion and it passed unanimously, 5-0.

11. COMMISSIONER CONCERNS
A. Lake Norman Hydrilla Issues
Commissioner Miltich reported that the Lake Norman Marine Commission is conducting a survey to determine how extensive the problem is as they consider resolutions.

B. Catawba Ave./Hwy. 21 Intersection Improvements
Commissioner Bilodeau stated that with the conclusion of the NCDOT public feedback session he remains concerned with getting the best scenario for the corridor and how traffic flows through the downtown area.

Commissioner Naas expressed his concerns with the proposed dual roundabouts and the impact it could have on the area businesses. He stated that if QT backs out and the property remains vacant for years and Cashion closes it would be a disastrous entrance into town.

12. ADJOURNMENT
There being no further business to discuss, Commissioner Miltich made a motion to adjourn at 8:40PM. Commissioner Ross seconded the motion and it passed unanimously, 5-0.

Approved this 19th day of November, 2018.

ATTEST: Woody Washam, Jr., Mayor

Lori A. Harrell, Town Clerk