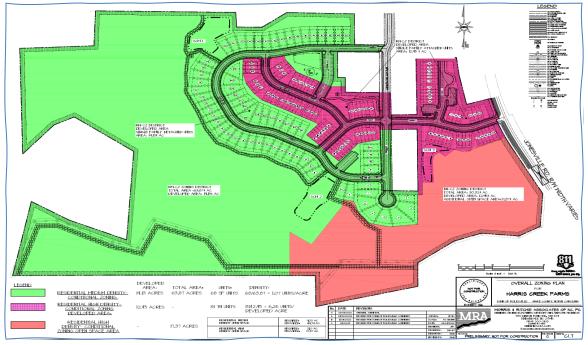


Memo

To:	Town of Rolesville Planning Board
From:	Michael Elabarger, Senior Planner and Michele Raby, Planner I
Date:	August 28, 2023
Re:	Harris Creek Farms
	Map Amendment Rezoning MA 22-08

Background

The Town of Rolesville Planning Department received a Map Amendment (Rezoning) application in August of 2022 [MA 22-08] for approximately 93 acres consisting of nineteen (19) tracts of land on the West side of Jonesville Road near Universal Drive. This application requests rezoning from Wake County's R-30 Zoning District to the Town's Land Development Ordinance (LDO), with a combination of two (2) Zoning Districts; Residential Medium as a Conditional Zoning District (RM-CZ) for an approximately 63 acre portion, and; Residential High as a Conditional Zoning (RH-CZ) District for approximately 32 acres. See Attachments 6 and 7 for Proposed District Boundary map and legal descriptions. The below exhibit excerpt details the RM-CZ in red, and the RH-CZ District in green. The specifics of the project include maximums of 149 total residential dwellings units (comprised of maximums of 68 single-family detached units and 81 single-family attached (Townhome) units, and a minimum of 40% gross acreage (~37 acres) preserved as undisturbed open space.



Harris Creek Farms Concept Site Plan – District Boundaries

A Voluntary Annexation Petition (ANX 22-05) has also been submitted and reviewed and processed simultaneously with this Rezoning application request. There will be a combined Legislative hearing at a future Town Board of Commissioners meeting.

The application includes a set of Conditions of Approval (see Attachment 8) and a Concept/Sketch Plan (see Attachment 5); see the analysis of these conditions further in this memo.

Applicant Justification

The applicant provided this brief statement regarding the submittal (see Attachment 4 also).

The development is proposing two zoning districts, RM-CZ and RH-CZ. The Cluster Development afforded in LDO Section 3.1.B will be utilized in the RM-CZ section of the project which will consist of single family residential uses. The RH-CZ section of the property will consist of single family attached uses in the form of townhomes. While the RH-CZ zoning allows 6-12 dwelling units per acre, the proposed density is 5.77 units/acre. A condition of a maximum allowable density of 6.0 units/acre within the RH-CZ district is proposed in order to ensure future conformance to the Site Plan proposed in this Map Amendment. The developed area within the RH-CZ portion of the site will be less than 15 acres. The RM-CZ section of the property will consist of single family detached units. the proposed density is 1.11 units/acre, under the maximum allowable density of 5.0 units/acre. The project as a whole will have a density of 1.60 units/total site area. The proposed uses are in accordance with 3.1.A.1-3-Residential Districts by providing a variety of residential housing choices with varied densities, types and designs; creating neighborhoods and preserving existing character while allowing for new, compatible development; and providing for safe, appropriately located lands for residential development consistent with the Rolesville Comprehensive Plan. The Future Land Use Map designates the subject property for residential use. The requested zoning is consistent and compatible with the Future Land Use Map and with the Rolesville 2017 Comprehensive Plan. We request your support for the proposed Zoning Map Amendment.

Neighborhood Meetings

Under the header of MA 22-08, the Applicant conducted a Neighborhood meeting on July 12, 2023; see Attachment 9. Per the applicant, there were 24 attendees in the meeting.

Comprehensive Plan

Land Use

The 2017 Comprehensive Plan's Future Land Use Map designates the subject property, and the entire area south of Harris Creek to Mitchell Mill Road, as appropriate for Medium Density Residential development. Per the Plan, this is defined as:

Predominantly single-family residential uses with portion of duplex, townhouse, or multifamily residential. These are lots or tracts at a density range of three to five (3-5) dwelling units per gross acre including preserved open space areas along with limited non-residential uses under planned unit development or form base code provisions.

Community Transportation Plan

The Town of Rolesville's Community Transportation Plan (CTP, adopted 2021) includes recommendations for Thoroughfares, Collectors, and intersections. There are no plans for new Collector roadways in the vicinity of the subject property, but there is this Thoroughfare Recommendation (page 79/131):

• Jonesville Road is planned to be a 2-lane (with Two Way Left Turn Lane), curb and gutter, bike lanes, and Sidewalks.

Per the Concept Site Plan, the project is proposing one new primary site access (Street A) to Jonesville Road, located south of where Universal Drive lies and the Harris Creek bridge crossing.

Intersection Recommendations

- There are no intersection recommendations associated with the subject property.
- The closest intersection recommendations are located at Mitchell Mill and Rolesville Roads, for an intersection realignment.

<u>Transportation Improvements:</u> To address transportation impacts reasonably expected to be generated by the development, the following road improvements shall be installed in accordance with plans approved by NCDOT and the Town of Rolesville:

- US 401 BYPASS AND JONESVILLE ROAD
 - 1. Conduct a full signal warrant analysis prior to full build-out of the proposed development and install a traffic signal if warranted and approved by the Town and NCDOT.
- US401 BYPASS AND EASTERN U-TURN LOCATION
 - 1. Conduct a full signal warrant analysis prior to full build-out of the proposed development and install a traffic signal if warranted and approved by the Town and NCDOT.
- <u>MITCHELL MILL ROAD AND JONESVILLE ROAD/PEEBLES ROAD</u>
 - 1. Construct a Southbound (Jonesville Road) left-turn lane with at least 10 feet of storage and appropriate deceleration and taper.
 - 2. Construct a Westbound (Mitchell Mill Road) right-turn lane with at least 100 feet of storage and appropriate deceleration and taper.
 - 3. Construct an Eastbound (Mitchell Mill Road) right-turn lane with at least 100 feet of storage and appropriate deceleration and taper.
 - 4. Conduct a full signal warrant analysis prior to full build-out of the proposed development and install a traffic signal if warranted and approved by the Town and NCDOT.
 - JONESVILLE ROAD AND SITE DRIVE
 - 1. Construct the Eastbound approach (site drive) with one ingress land and one egress lane.
 - 2. Provide stop-control for the Eastbound approach (site drive).

Greenway and Bike Plans

As per the 2022 Greenway and Bike Plans, proposed pedestrian routes are shown in the following locations:

• A ten-foot (10') private maintained greenway trail with public access easement, turns into a twenty-foot (20') trail easement before returning to a ten-foot (10') private maintained

greenway trail with public access easement is shown on the northwest side of the property, along Harris Creek.

Consistency

The applicant's rezoning request is consistent with the Town of Rolesville's Comprehensive Plan for the following reasons:

- The proposed mix of residential product types with a commercial element fits the Medium Density Residential land use description.
- The proposed vehicular circulation network is in harmony/no conflict with the Town's Community Transportation Plan.
- The proposed greenways will establish pedestrian connections as recommended by Rolesville's Greenway Plan.

Traffic

Traffic Impact Analysis

The consulting firm, Ramey Kemp Associates, performed the Traffic Impact Analysis (TIA) for this project on behalf of the Town; the study analyzed a development of 68 Single Family Detached and 81 Single family Attached (townhome) housing units. The Final Sealed Report dated May 08, 2023, is included as Attachment 10 to this memo. Traffic conditions during weekday AM and PM peak hours were looked at in four (4) scenarios: 2022 Existing Traffic Conditions, 2027 No-build Traffic Conditions, 2027 Build Traffic Conditions and 2027 Build-Improved Traffic Conditions. See excerpted Table E-1 from the TIA report:

Land Use (ITE Code)	Intensity	Daily Traffic (vpd)	Weekday <mark>AM Peak Hour Trips</mark> (vph)			Weekday PM Peak Hour Trips (vph)		
		(vpu)	Enter	Exit	Total	Enter	Exit	Total
Single-Family Home (210)	68 DU	708	13	39	52	44	25	69
Single Family Attached (215)	81 DU	568	9	27	36	26	19	45
Total Primary Trips		1,276	22	66	88	70	44	114

Table E-1: Site Trip Generation

Four intersections were studied for capacity analysis and Level of Service (LOS) impact of this development – US 401 Bypass and Jonesville Road; US 401 Bypass and Eastern U-turn location; Mitchell Mill Road and Jonesville Road / Peebles Road and Jonesville Road and Universal Drive.

TIA Summary – Intersection Improvements				
Recommendations				
Future Traffic	Cobblestone Crossing Mixed-Use (Cobblestone)			
Conditions	Young Street PUD (The Point)			
A growth rate of 0% was	Wheeler Tract (Rolesville Crossing)			
used due to the number of	Louisbury Road Assemblage			
developments included in	 Kalas / Watkins Family Property (Kalas Falls) 			
the background traffic and	• 5109 Mitchell Mill			
the proximity of some of	Hills at Harris Creek			
these developments to				

the proposed development. The following adjacent developments were identified to be considered under future conditions:	
US 401 Bypass and Jonesville Road	 Conduct a full signal warrant analysis prior to Full Build-out of the proposed development and install a traffic signal if warranted and approved by NCDOT and Town.
Mitchell Mill Road and Jonesville Road / Peebles Road	 Construct a south-bound (Jonesville Rd) left-turn lane with at least 100 feet of storage and appropriate deceleration and taper. It should be noted that this improvement was also identified by the 5109 Mitchell Mill Rd and Hills at Harris Creek TIA.
	 Construct an eastbound (Mitchell Mill Rd) left-turn lane with at least 100 feet of storage and appropriate deceleration and taper. It should be noted that this improvement was also identified by the 5109 Mitchell Mill Rd TIA.
	 Construct a westbound (Mitchell Mill Road) right-turn lane with at least 100 feet of storage and appropriate deceleration and taper. It should be noted that this improvement was also identified by the Hills at Harris Creek TIA.
	 Conduct a full signal warrant analysis prior to Full Build-out of the proposed development and install a traffic signal if warranted and approved by NCDOT and Town.
Jonesville Road and Site Drive	Construct the eastbound approach (Site Drive) with one ingress lane and one egress lane.
	• Provide stop control for the eastbound approach (Site Drive).

Development Review

The Technical Review Committee (TRC) reviewed three (4) versions of the Rezoning application, with all comments pertinent to the consideration of the proposed districts and the general development plan being resolved. Note that this does not mean that all LDO subdivision and/or site development regulations have been demonstrated, as Attachment 5 is only a conceptual plan, and not an engineered and dimensioned layout. Should the proposed Zoning Districts be approved, the project would next process an Administratively reviewed/approved Major Preliminary Subdivision Plat (PSP) application, followed by Construction Infrastructure Drawings (CID).

Staff Analysis – LDO Appendix A / 2.3.G. Review Standards

Below are Staff's response to the review standards based on the TRC review:

1. Is the application consistent with the Comprehensive Plan and other applicable adopted Town plans.

Staff finds that the general project intent to develop a mix of single-family detached and attached dwelling unit, is consistent with the Medium Density Residential land use, and the pedestrian and transportation improvements will fulfill the development of the Community Transportation Plan, and Greenway Plan.

2. Is the application in conflict with any provision of the LDO or the Town Code of Ordinances.

Based on the level of detail provided, the application materials appear consistent with the LDO; the project will demonstrate full compliance with subdivision/land development requirements at later stages of development.

3. Does the application correct any errors in the existing zoning present at the time it was adopted.

The subject property is currently under land use control of Wake County and therefore is not consistent with the Rolesville Comprehensive Plan, which pre-dates the Annexation Agreement with the City of Raleigh whereby this property, if sought to Voluntarily Annex, would annex into Rolesville.

4. Does the application allow uses that are compatible with existing and allowed uses on surrounding land.

Presently, the surrounding land uses are larger lot single family detached residential pursuant to Wake County's R-30 low density zoning. These existing land uses are inconsistent with the Rolesville Comprehensive Plan, which covers this region. The application therefore complies with the Rolesville Comprehensive Plan but is significantly different from the existing or currently allowed (under Wake County R-30 zoning) development pattern.

5. Would the application ensure efficient development within the Town, including the capacity and safety of the street network, public facilities, and other similar considerations.

The application, with an envisioned density in the range of 1.07 units for single family dwelling units per acre and 6.26 dwelling units per acre for attached single family dwelling units per acre (149 units/1.07-6.26 units per acres) is in line with the prescribed residential density range of 3 to 5 dwelling units per acre for the Residential Medium Zoning District (RM), and in line with the residential density range of 6-9 dwelling units per acre for the Residential High Zoning District. The application is demonstrating compliance with planned Community Transportation Plan roadways, as well as pedestrian features. The identified amenities are demonstrating general compliance with LDO amenity requirements.

- 6. Would the application result in a logical and orderly development pattern; and Based on the concept/sketch plan, the proposed development indicates intentions to meet or exceed all subdivision requirements, including roadway and pedestrian improvements.
- 7. Would the application result in adverse impacts on water, air, noise, storm water management, wildlife, vegetation, wetlands, and the natural functioning of the environment.

Based on the concept/sketch plan and the requirement to comply with all LDO minimum requirements to develop the project, no negative impacts as described should result.

8. If a conditional rezoning, the BOC may also consider if the conditional rezoning addresses the impacts reasonably expected to be generated by the development or use of the site, can reasonably be implemented and enforced for the subject property, and if it will mitigate specific issues that would likely result if the subject property were zoned to accommodate all the uses and the minimum standards of the corresponding general zoning district.

Both Zoning Districts (RM and RH) are being proposed as Conditional Zoning (CZ) District, and per Attachment 8, most of the listed Conditions detail or express commitments that otherwise would not be required by the LDO for base/general district subdivision and development.

Overall Analysis

The proposed Residential Medium (RM) district entails developing a maximum of 68 single family detached (SFD) dwelling units, exercising the LDO Section 3.1.B. option of Cluster Development at the time of Major Preliminary Subdivision Plat to achieve that lot count. The resultant density – 68 dwelling units over 63.87 acres – is 0.93 dwelling units per acre. The theoretical by-right maximum density – 63.87 acres (2,782,177 SF) / 15,000 SF minimum lot size = 185 dwelling units or a density of 185 units/63.87 acres = 2.89 d/u per acre. The proposed Density is approximately 1/3 the by-right density and will require a minimum of 40% preserved Open Space compared to the (LDO Section 6.2.1.D.1.) by-right minimum of 12%.

The proposed Residential High (RH) district entails developing a maximum of 81 single family attached (townhome) dwelling units; while the Zoning District is proposed as 30.32 acres, the Concept Site Plan is demonstrating that the project will comply with the LDO Section 3.1.3.B./Special Standard requirement that '*No more than 15 gross acres may be assigned to attached … uses.*' This requirement shall be accurately demonstrated at the time of Major Preliminary Subdivision Plat review. The resultant density – 81 dwelling units over 30.32 acres – is 2.67 dwelling Units per acre; when only contemplating the 81 units within the maximum of 15 acres, the density calculation is 5.4 dwelling units per acre. Calculating a theoretical by-right lot yield for Townhomes in the RH district is more difficult than (SFD in the RM District) but using the minimum 2,000 SF lot size across the maximum of 15 acres, that yield would be 326 dwelling units; that number would be impossible to achieve given unique aspects like the minimum 30' separation requirements be Townhome buildings.

Individually, the proposed RM and RH Districts are committing to far less than the LDO stated maximum densities and far less than the theoretical by-right subdivision yields. Collectively, the gross density of the proposed combined 149 dwelling units over 93 acres = 1.6 units per acre. In summary, the proposed housing types are consistent with the Comprehensive Plan Future Land Use designation of Medium Density Residential, and the density falls within the Low Density Future Land Use category.

Staff Recommendation

Staff finds the proposed Rezoning request MA 22-08 is consistent with the Comprehensive Plan and recommends Approval. Staff notes that further review of the proposed Conditions may occur prior to the Town Board of Commissioners review to improve their future implementation.

Proposed Motion

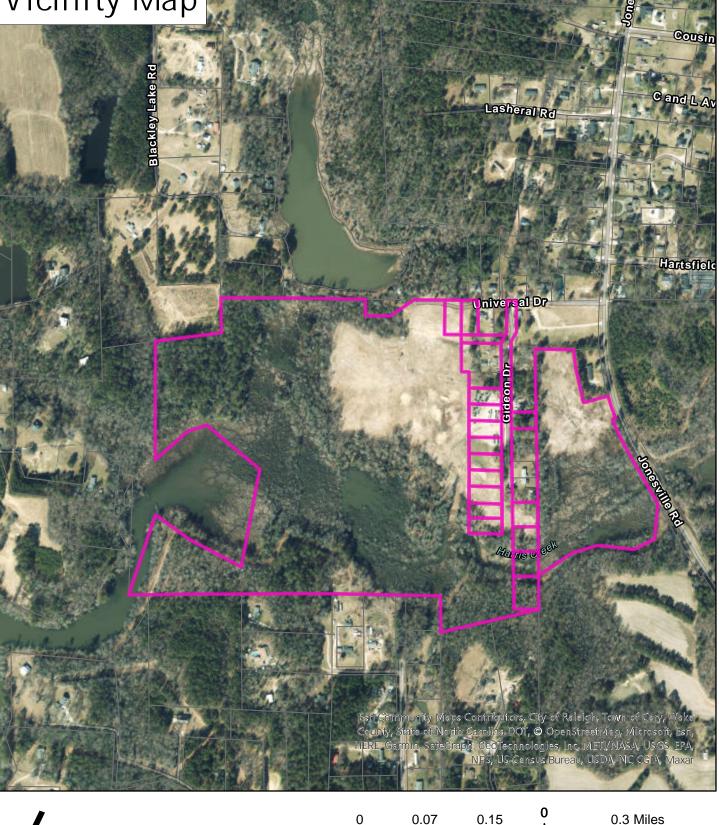
Motion to recommend to the Town Board of Commissioners (approval or denial) of Rezoning request MA 22-08 – Harris Creek Farms.

Attach	Attachments				
1	Vicinity Map				
2	Zoning Map				
3	Future Land Use Map				
4	Map Amendment Application				
5	Concept Site Plan, August 1, 2023				
6	Zoning District Boundaries				
7	Zoning District Legal Descriptions				
8	Proposed Conditions of Approval				
9	Neighborhood Meeting Package, July 12, 2022				
10	Traffic Impact Analysis (TIA), May 8, 2023				



Case: MA 22-08 ANX 22-05 Harris Creek Farms Address: 4928 Universal PIN: 1757277811, 1757375276, 1757375365, 1757375464, 1757375575, 1757375665, 1757375765, 1757375865, 1757375975, 1757385064, 1757384572, 1757383572, 1757368816, 1757378013, 1757378109, 1757378303, 1757377990, 1757471559, 1757385349 Date: 2022.09.12

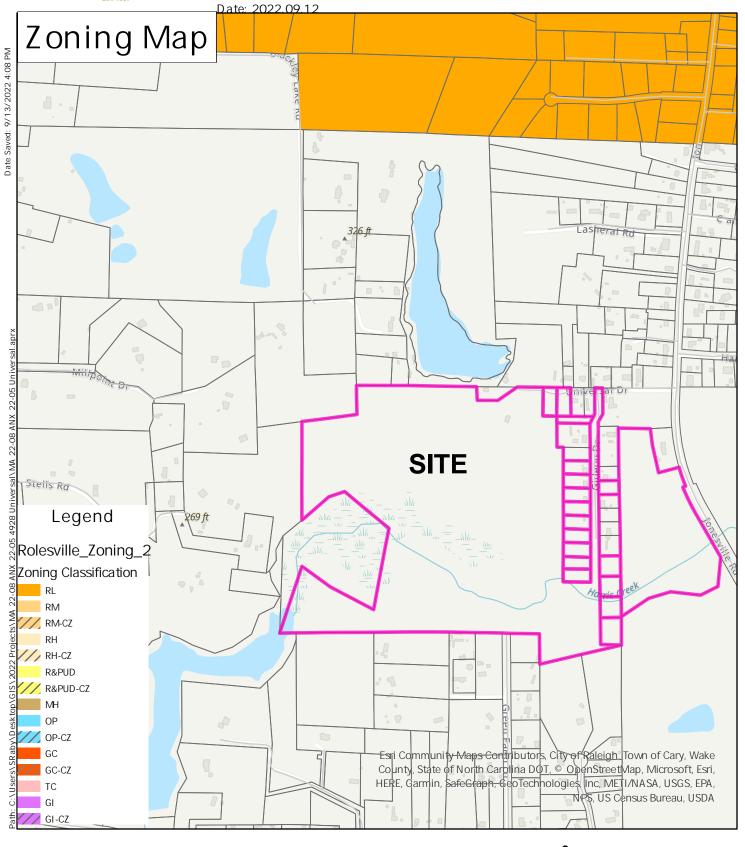
Vicinity Map



Miles



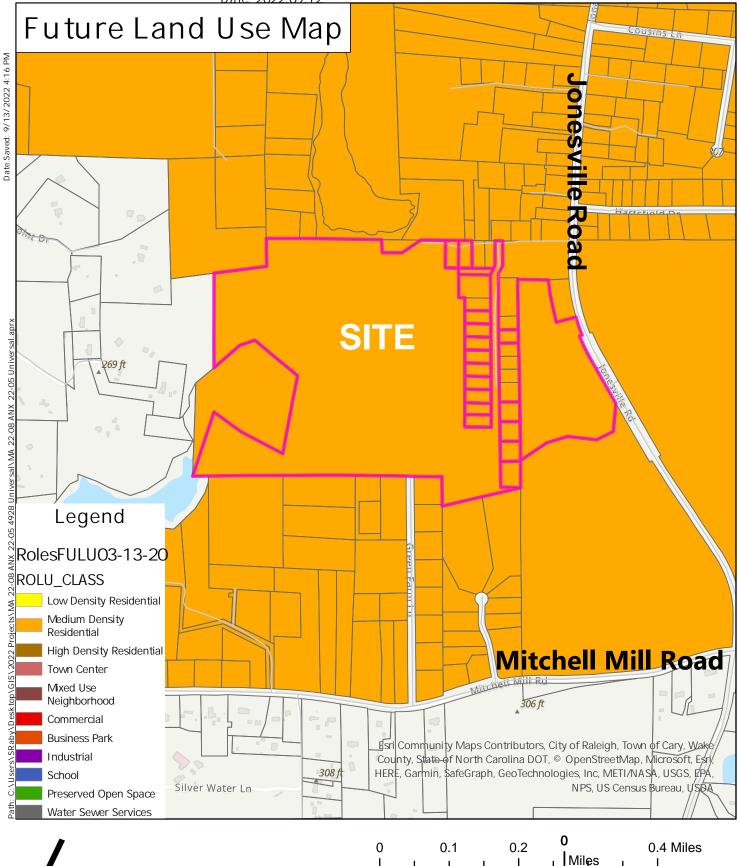
Case: MA 22-08 ANX 22-05 Harris Creek Farms Address: 4928 Universal PIN: 1757277811, 1757375276, 1757375365, 1757375464, 1757375575, 1757375665, 1757375765, 1757375865, 1757375975, 1757385064, 1757384572, 1757383572, 1757368816, 1757378013, 1757378109, 1757378303, 1757377990, 1757471559, 1757385349



*Site is approximately 1 mile from Carlton Pointe 00.04 0.08 0.16 Miles



Case: MA 22-08 ANX 22-05 Harris Creek Farms Address: 4928 Universal PIN: 1757277811, 1757375276, 1757375365, 1757375464, 1757375575, 1757375665, 1757375765, 1757375865, 1757375975, 1757385064, 1757384572, 1757383572, 1757368816, 1757378013, 1757378109, 1757378303, 1757377990, 1757471559, 1757385349 Date: 2022.09.12





Map Amendment Application

Contact Information

Property Owner CHE NP ING			
Address 10030 GREEN LEVEL CHUR CH RD STE 802 #149	City/State/Zip CARY NC 27519-8195		
Phone 919-798-0429	Email plng@thecscgrp.com		
Developer The CSC Group, LL C			
Contact Name Ping Chen			
Address GREEN LEVEL CHUR CH RD STE 802 #149	City/State/Zip CARY NC 27519-8195		
Phone 919-798-0429	Email ping@thecscgrp.com		

Property Information

Address 4928 UNIVERSAL D	R
Wake County PIN(s)	57277811, 1757355276, 1757375383, 1757375464, 1757375575, 1757375665, 1757375765, 1757375865, 1757376975, 1757376975, 1757386572, 1757386372, 1757366818, 1757378013, 1757378108, 1757378303, 1757377380, 1757377380, 1757377380, 1757377380, 1757377380, 1757377380, 1757377380, 1757377380, 1757377380, 1757377380, 1757377380, 1757377380, 1757378302, 175737
Current Zoning District	R-30 Requested Zoning District RM-C Z an RH C :Z
Total Acreage 93.22	

Owner Signature

I hereby certify that the information contained herein is true and completed. I understand that if any item is found to be otherwise after evidentiary hearing before the Town Board of Commissioners, that the action of the

Board may be invalidated		
Signature	~	Date <u>[2/01/202</u> 2
STATE OF NORTH CAROLINA		
COUNTY OF Matt		
I, a Notary Public, do hereby certify th	nat Ting Chen	
personally appeared before me this d	ay and acknowledged the due exect	ution of the foregoing instrument. This
the	willing of Vecent	<u>ep2022</u> .
My commission expires	202 THICK A BARS	
Signature		
	08-18-27	
0	Town of Roles wile Planning	
PO Box 250 / Rolesvill	e, North Carolilla 27571 / Rolesville	NC.gov / 919.554.6517



Map Amendment Application

Metes and Bounds Description of Property



Map Amendment Application

Rezoning Justification

The applicant is proposing a Conditional Rezoning Map Amendment Application to zone the subject property to Residential Medium Density Conditional Zoning (RM-CZ) and Residential High Density Conditional Zoning (RH-CZ) Zoning Districts. In support of this request the applicant offers the following information and conditions:

The subject property is approximately 93 +/- acres located west of Jonesville Road north of it's intersection of Mitchell Mill Road and bordered by Harris Creek. The property is currently zoned R-30 by Wake County, a rural holding district. The subject property is planned to come into the Town of Rolesville and to be developed as a part of the town. The subject property was included in the 2017 Rolesville Comprehensive Plan.

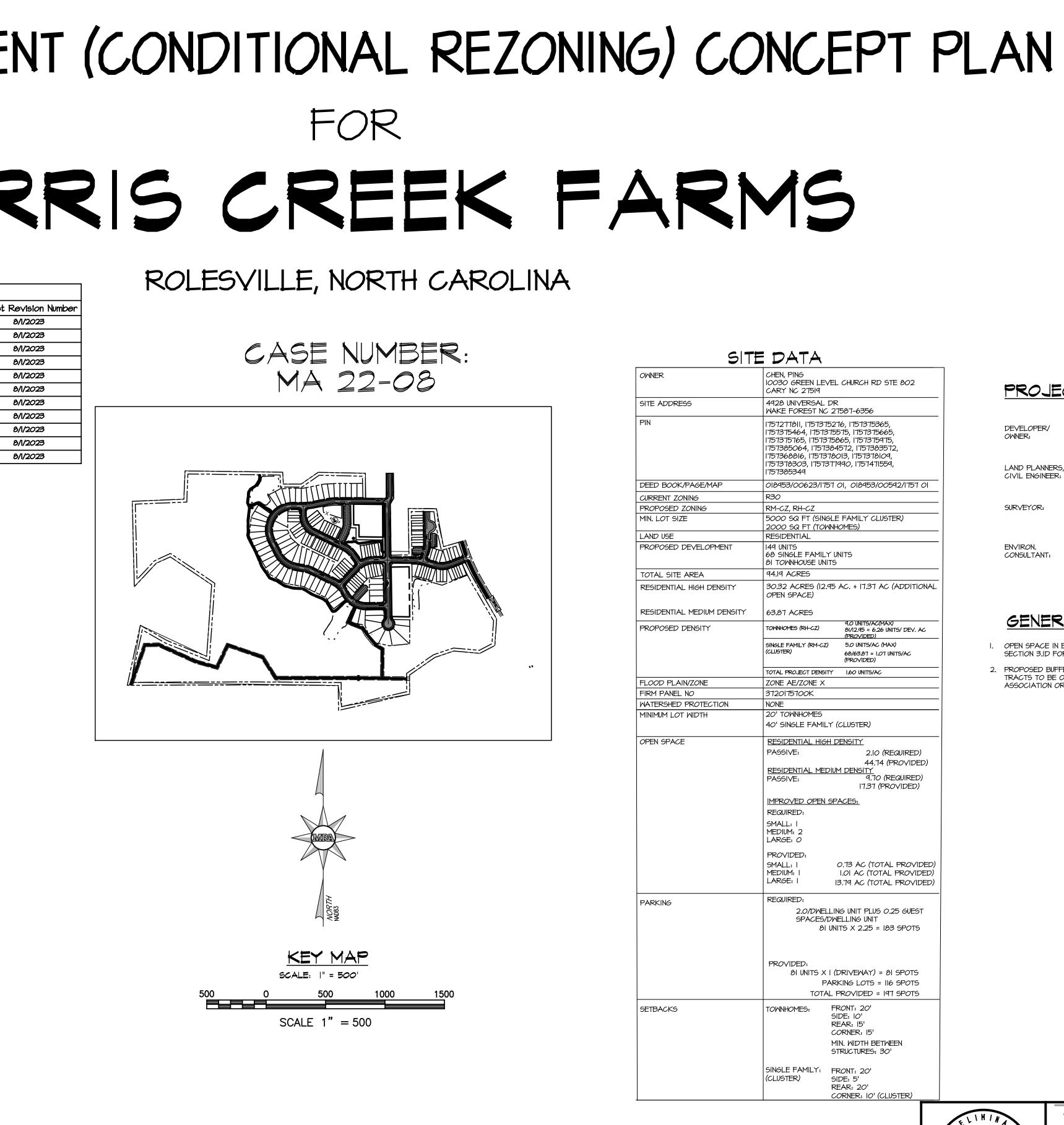


Map Amendment Application

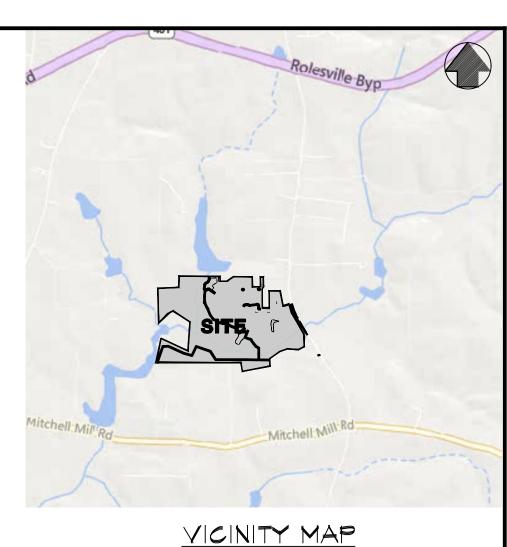
Property Owner Information

Wake County PIN	Property Owner	Mailing Address	Zip Code
	_		

. Town of Rolesville	Sheet List Table
Planning Department 502 Southtown Circle Rolesville, NC 27571 8. Wake County Watershed Management	Sheet NumberSheet TitleDateCO.0COVER - REZONING6/1/2022CO.0AVOLUNTARY REZONING CONDITIONS6/1/2022CO.1EXISTING CONDITIONS6/1/2022CI.0OVERALL SITE PLAN6/1/2022CI.1SITE PLAN - SHEET 1 OF 66/1/2022CI.2SITE PLAN - SHEET 1 OF 66/1/2022
Waverly F. Akins Building 337 S. Salisbury St Raleigh, NC 27601 Contact: Karyn Pageau Phone: (919)-796-8769 Email: karyn.pageau@wakegov.com	CI.3 SITE PLAN - SHEET 3 OF 6 6/1/2022 CI.4 SITE PLAN - SHEET 4 OF 6 6/1/2022 CI.5 SITE PLAN - SHEET 5 OF 6 6/1/2022 CI.6 SITE PLAN - SHEET 6 OF 6 6/1/2022 CI.6 SITE PLAN - SHEET 6 OF 6 6/1/2022 CI.7 OVERALL ZONING PLAN 6/1/2022
. City of Raleigh Public Utilities Department One Exchange Plaza Suite 620 Raleigh, NC 27601 P.O.Box 590 Raleigh, NC 27602 Phone: 919-996-3245	STREET DATASTREET A1,200 LFSTREET B2,368 LFSTREET C450 LFSTREET D743 LF
Email: publicutilityinfo@raleighnc.gov P. NCDOT Division 5, District Office 4009 District Drive Raleigh, NC 27607 Contact: Amy Neidringhaus, District Engine Phone: 919-733-3213 Email	er
Email: anneidringhaus@ncdot.gov	



			<u>VICINIIT MAP</u> scale: I"=2000'
	SITE	DATA	
0		HEN, PING 2030 GREEN LEVEL CHURCH RD STE 802	
	Ci	4RY NC 27519 928 UNIVERSAL DR	PROJECT TEAM
IC	W	AKE FOREST NC 27587-6356	THE CSC GROUP LLC
		57277811, 1757375276, 1757375365, 57375464, 1757375575, 1757375665, 57375765, 1757375865, 1757375975,	DEVELOPER/ 10030 GREEN LEVEL CHURCH RD STE 802 OWNER: CARY NC 27519
	17	57385064, 1757384572, 1757383572, 5738806, 1757378013, 1757378109,	ATTN: PING CHENG 919-798-0429
		57378303, 1757377990, 1757471559, 57385349	LAND PLANNERS, MORRIS & RITCHIE ASSOCIATES OF NC, PC CIVIL ENGINEER: 530 HINTON POND ROAD, SUITE 104
		18953/00623/1757 01, 018953/00592/1757 0 30	OI KNIGHTDALE, NC 27545 ATTN: MR. JEREMY M KEENY, PE, PLS
P	ROPOSED ZONING RI	M-CZ, RH-CZ 000 SQ FT (SINGLE FAMILY CLUSTER)	SURVEYOR: GIL CLARK SURVEYING. P.O. BOX 1243
	20	000 SQ FT (SINGLE FAMILT CLUSTER) 000 SQ FT (TOWNHOMES) ESIDENTIAL	ATTN: WALLACE G. CLARK, JR
	ROPOSED DEVELOPMENT 14	9 UNITS 8 SINGLE FAMILY UNITS	ENVIRON. MORRIS & RITCHIE ASSOCIATES OF NC, PC. CONSULTANT: 530 HINTON POND ROAD, SUITE 104
	81	I TOWNHOUSE UNITS 4.19 ACRES	KNIGHTDALE, NC 27545 ATTN: MR. JAMIE B. GUERRERO, PE, CPSWQ
	ESIDENTIAL HIGH DENSITY 30	0.32 ACRES (12.95 AC. + 17.37 AC (ADDITIO PEN SPACE)	ONAL
		3.87 ACRES	
	ROPOSED DENSITY TO	9,0 UNITS/AC(MAX) 81/12,45 = 6,26 UNITS/ DEV. AC	GENERAL NOTES
		(PROVIDED) NGLE FAMILY (RM-CZ) 5.0 UNITS/AC (MAX) LUSTER) 68/63.81 = 1.01 UNITS/AC	I. OPEN SPACE IN EXCESS OF 40% PROPOSED ON SITE PER LDO SECTION 3.ID FOR CLUSTER DEVELOPMENTS
· ·		(PROVIDED) TAL PROJECT DENSITY 1.60 UNITS/AC	2. PROPOSED BUFFERS SHALL BE PLATTED AS SEPARATE
	_OOD PLAIN/ZONE ZC	DNE AE/ZONE X 120175700K	TRACTS TO BE OWNED AND MAINTAINED BY THE HOMEOWNERS ASSOCIATION OR SIMILAR
I I I I I I I I I I I I I I I I I I I	ATERSHED PROTECTION NO	ONE	
M		O' TOWNHOMES O' SINGLE FAMILY (CLUSTER)	
o		RESIDENTIAL HIGH DENSITY ASSIVE: 210 (REQUIRED)	
		ASSIVE: 2.10 (REQUIRED) 44.74 (PROVIDED RESIDENTIAL MEDIUM DENSITY	
		ASSIVE: 9.70 (REQUIRED) 17.37 (PROVIDED)	
		MPROVED OPEN SPACES:	
	SI	EQUIRED: MALL: I	
		IEDIUM: 2 ARGE: 0	
		ROVIDED: MALL: I 0.73 AC (TOTAL PROVID	DED)
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P.	ARKING R	EQUIRED:	
		2.0/DWELLING UNIT PLUS 0.25 GUEST SPACES/DWELLING UNIT	
		81 UNITS X 2.25 = 183 SPOTS	
	F	PROVIDED:	
		81 UNITS X I (DRIVEWAY) = 81 SPOTS PARKING LOTS = 116 SPOTS	
_		TOTAL PROVIDED = 197 SPOTS	
SI	ETBACKS TC	OWNHOMES: FRONT: 20' SIDE: 10' REAR: 15'	
		CORNER: 15' MIN. WIDTH BETWEEN	FOR SITE PLAN REVIEW ONLY NOT FOR CONSTRUCTION
		STRUCTURES: 30'	PLAN IS SUBJECT TO REVISIONS
		INGLE FAMILY: FRONT: 20' CLUSTER) SIDE: 5'	DURING THE CONSTRUCTION APPROVAL PROCESS
		REAR: 20' CORNER: 10' (CLUSTER)	
			COVER - REZONING
			FOR CONSTRUCTION
			HARRIS CREEK FARMS
			TOWN OF ROLESVILLE WAKE COUNTY, NORTH CAROLINA
			ENGINEER'S SEAL
No. DATE REVISIONS 0 06/01/2022 ORIGINAL SUBMITT	AL		MORRIS & RITCHIE ASSOCIATES OF NC, PC ENGINEERS, ARCHITECTS, PLANNERS, SURVEYORS AND LANDSCAPE ARCHITECTS
	N OF ROLESVILLE COMMENTS	JOB NO.: 21790	530 HINTON POND RD., STE 104
	N OF ROLESVILLE COMMENTS	SCALE: AS SHOWN	KNIGHTDALE, NC 27545 (984) 200-2103
C 8/1/2023 REVISED PER TOW	N OF ROLESVILLE COMMENTS	DATE: 06/01/2022 ENGINEER: JMK	LICENSE # C-4182 WWW.MRAGTA.COM
		DRAWN BY: ER/JM	© 2023 MORRIS & RITCHIE ASSOCIATES, INC.
		REVIEW BY: PKN	PRELIMINARY NOT FOR CONSTRUCTION C CO.O



Ι.	THE SUBJECT PROP	PERTY SHALL B	E DEVELOPED	IN GENERAL	COMPLIANCE WITH	THE MAP AM

- 3. THE MAXIMUM ALLOWABLE DENSITY WITHIN THE RH-CZ ZONING SHALL BE 6.0 UNITS/ACRE.
- DIAGONALLY ACROSS THE INTERSECTION.
- 5. GARAGE DOOR SHALL EITHER CONTAIN WINDOWS OR CARRIAGE STYLE ADORNMENTS .
- 6. SINGLE-FAMILY ATTACHED (TOWNHOMES) SHALL HAVE:

a.SIDING BE A MINIMUM OF 0.45 GAUGE VINYL SIDING, OR, HAVE CEMENTITIOUS SIDING THAT SHALL VARY IN TYPE AND COLOR WITH BRICK, SHAKES, BOARD AND BATTEN, OR STONE ACCENTS PROVIDED AS DECORATIVE FEATURES. b. ARTICULATION IN THE END UNIT SIDE ELEVATIONS, WHICH INCLUDES TWO OF THE FOLLOWING: SIDE ENTRY, WINDOWS (TWO OR MORE), PARTIAL MASONRY, TWO TYPES OF FINISHES (I.E. HORIZONTAL SIDING WITH BOARD AND BATTEN OR SHAKES IN GABLES), AND ROOFLINE CHANGES. C. FIRST FLOOR GLAZING WHICH SHALL CONSIST OF ONE OR MORE OF THE FOLLOWING: GARAGE DOORS WITH GLASS WINDOWS, OR FRONT DOORS WITH WINDOWS OR SIDELIGHTS. d.8" MINIMUM EAVES AND RAKES ON FRONT, REAR, AND SIDES.

- 7. SINGLE-FAMILY DETACHED DWELLING UNITS SHALL: a.BE A MINIMUM OF 1,500 HEATED SQUARE FEET. C. HAVE AT LEAST TWO TYPES OF FINISHES ON THE FRONT: LAP SIDING, MASONRY, SHAKES, AND BOARD AND BATTEN.

- ROLESVILLE.
- US 401 BYPASS AND JONESVILLE ROAD
- CONDUCT A FULL SIGNAL WARRANT ANALYSIS PRIOR TO FULL BUILD-OUT OF THE PROPOSED DEVELOPMENT AND INSTALL A TRAFFIC SIGNAL IF WARRANTED AND APPROVED BY THE TOWN AND NCDOT.
- US 401 BYPASS AND EASTERN U-TURN LOCATION
- CONDUCT A FULL SIGNAL WARRANT ANALYSIS PRIOR TO FULL BUILD-OUT OF THE PROPOSED DEVELOPMENT AND INSTALL A TRAFFIC SIGNAL IF WARRANTED AND APPROVED BY THE TOWN AND NCDOT.

MITCHELL MILL ROAD AND JONESVILLE ROAD / PEEBLES ROAD

- CONSTRUCT A SOUTHBOUND (JONESVILLE ROAD) LEFT-TURN LANE WITH AT LEAST 100 FEET OF STORAGE AND APPROPRIATE DECEL AND TAPER.
- 2. CONSTRUCT A WESTBOUND (MITCHELL MILL ROAD) RIGHT-TURN LANE WITH AT LEAST 100 FEET OF STORAGE AND APPROPRIATE DECEL AND TAPER.
- 3. CONSTRUCT AN EASTBOUND (MITCHELL MILL ROAD) LEFT-TURN LANE WITH AT LEAST 100 FEET OF STORAGE AND APPROPRIATE DECEL AND TAPER.
- 4. CONDUCT A FULL SIGNAL WARRANT ANALYSIS PRIOR TO FULL BUILD-OUT OF THE PROPOSED DEVELOPMENT AND INSTALL A TRAFFIC SIGNAL IF WARRANTED AND APPROVED BY THE TOWN AND NCDOT.

JONESVILLE ROAD AND SITE DRIVE

- CONSTRUCT THE EASTBOUND APPROACH (SITE DRIVE) WITH ONE INGRESS LANE AND ONE EGRESS LANE.
- 2. PROVIDE STOP-CONTROL FOR THE EASTBOUND APPROACH (SITE DRIVE).

VOLUNTARY REZONING CONDITIONS

1ENDMENT (CONDITIONAL REZONING) CONCEPT PLAN, DATED 7/24/2023.

2. THE DEVELOPMENT SHALL CONSIST OF MAXIMUMS OF 68 SINGLE-FAMILY DETACHED DWELLING UNITS/LOTS AS DETAILED IN THE MAP AMENDMENT (CONDITIONAL REZONING) CONCEPT PLAN, DATED 7/24/2023.

4. DWELLING UNIT FACADE ANTI-MONOTONY: IN ORDER TO PROMOTE VARIATION IN HOME APPEARANCE, NO SINGLE-FAMILY FRONT FAÇADE SHALL BE DUPLICATED FOR THREE (3) LOTS IN A ROW, OR DIRECTLY ACROSS THE STREET. FOR CORNER LOTS, THIS SHALL APPLY TO THE LOTS

b. HAVE SIDING BE A MINIMUM OF 0.45 GAUGE VINYL SIDING, OR, HAVE CEMENTITIOUS SIDING THAT SHALL VARY IN TYPE AND COLOR WITH BRICK, SHAKES, BOARD AND BATTEN, OR STONE ACCENTS PROVIDED AS DECORATIVE FEATURES.

8. A HOMEOWNERS ASSOCIATION (HOA) SHALL BE CREATED, AND ALL OPEN SPACES OBSERVED IN MAP AMENDMENT (CONDITIONAL REZONING) CONCEPT PLAN, DATED 7/24/2023, SHALL BE OWNED AND MAINTAINED BY THE HOA.

9. FOUNDATIONS: TOP OF SLABS SHALL BE ELEVATED A MINIMUM OF 18 INCHES ABOVE FINISHED GRADE FOR ALL DWELLING UNITS. ALL FOUNDATIONS SHALL BE TREATED WITH MASONRY ON THE FRONT AND STREET-FACING SIDES FOR A MINIMUM OF 10".

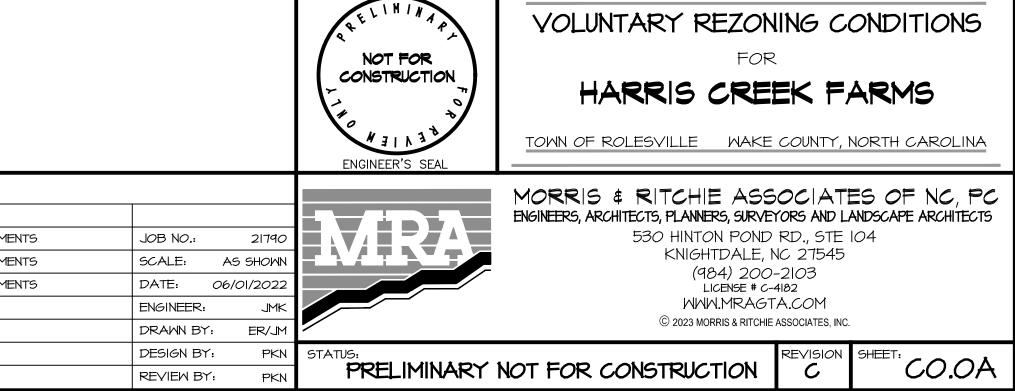
IO. RECREATIONAL AMENITIES: THE FOLLOWING RECREATIONAL AMENITIES SHALL BE CONSTRUCTED AS OBSERVED IN MAP AMENDMENT (CONDITIONAL REZONING) CONCEPT PLAN, DATED 7/24/2023. PUBLIC GREENWAY (APPROXIMATELY 5,600 LINEAR FEET), PRIVATE MULTI-USE PATHS (APPROXIMATELY 4IOLINEAR FEET), GAZEBOS, PLAYGROUNDS, AND A DOG PARK. AMENITIES SHALL BE BUILT AS PART OF THE SUBDIVISION INFRASTRUCTURE WITHIN THE PHASE IT IS LOCATED.

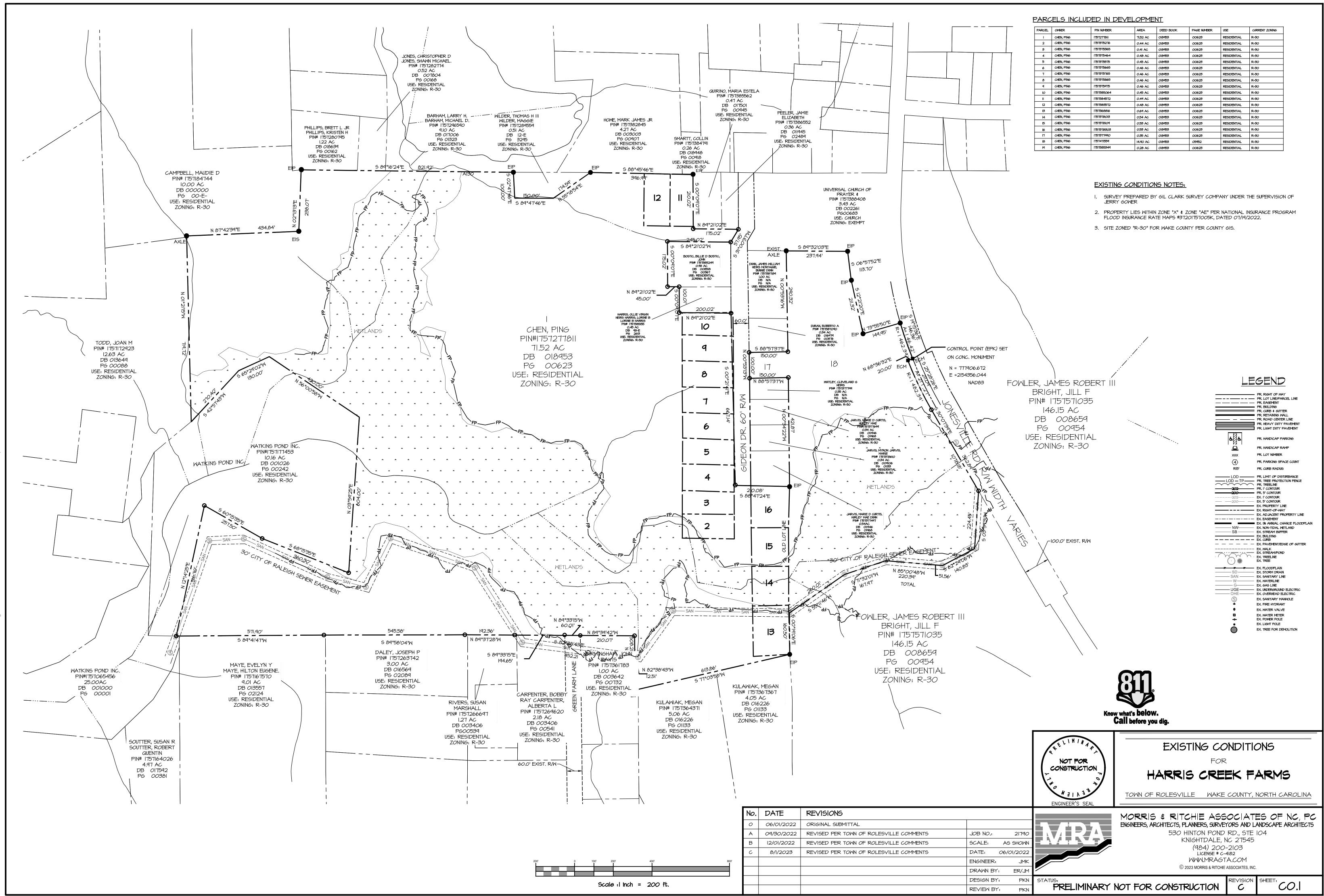
II. ATLEAST TWENTY PERCENT (20%) OF THE LANDSCAPING PLANTED IN COMMON AREAS ON THE SUBJECT PROPERTY SHALL UTILIZE PLANT MATERIALS THAT ARE LISTED AS NATIVE POLLINATOR PLANTS ON NORTH CAROLINA WILDLIFE FEDERATION ("NCWF") OR OTHER RESOURCES FOR NATIVE PLANTS RECOMMENDED BY THE NOWF ON THEIR WEBSITE, CURRENTLY FOUND AT HTP://NCWF.ORG/HABITAT/NATIVE-POLLINATOR-PLANTS/. WHERE EVERGREEN PLANTINGS OR STREET TREES ARE REQUIRED BY THE TOWN OF ROLESVILLE LDO, POLLINATOR PLANTINGS SHALL NOT BE REQUIRED. SUCH PLANTINGS SHALL CLEARLY BE SHOWN IN CONSTRUCTION DRAWINGS AND INSTALLED AS PART OF SUBDIVISION INFRASTRUCTURE. NOTHING HEREIN SHALL BE CONSTRUCTED TO LIMIT THE PLANTS MATERIALS PERMITTED ON INDIVIDUAL RESIDENTIAL LOTS.

12. TRANSPORTATION IMPROVEMENTS: TO ADDRESS TRANSPORTATION IMPACTS REASONABLY EXPECTED TO BE GENERATED BY THE DEVELOPMENT, THE FOLLOWING ROAD IMPROVEMENTS SHALL BE INSTALLED IN ACCORDANCE WITH PLANS APPROVED BY NOT AND THE TOWN OF

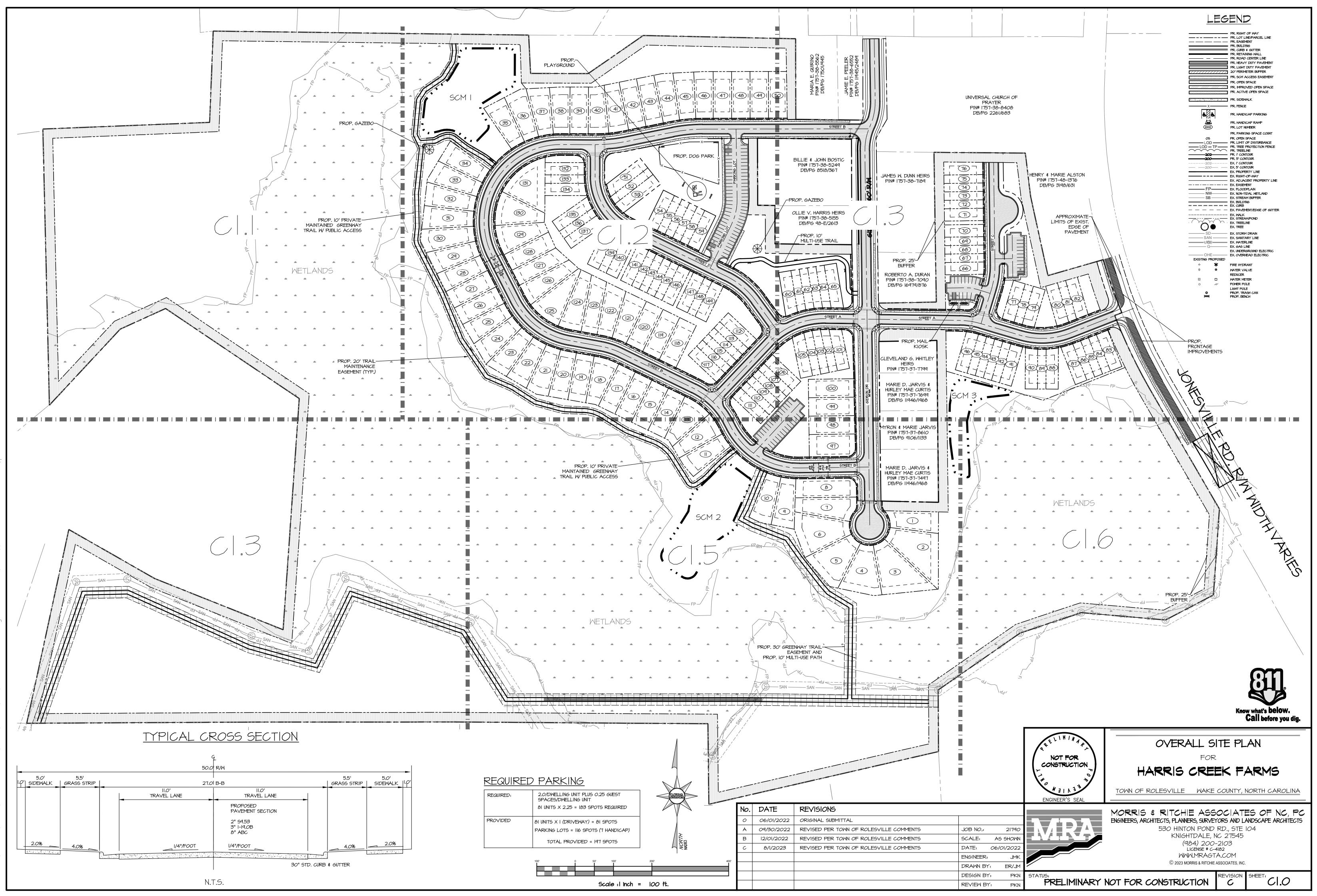
No.	DATE	REVISIONS
0	06/01/2022	ORIGINAL SUBMITTAL
A	09/30/2022	REVISED PER TOWN OF ROLESVILLE COMM
в	12/01/2022	REVISED PER TOWN OF ROLESVILLE COMM
C	8/1/2023	REVISED PER TOWN OF ROLESVILLE COMM



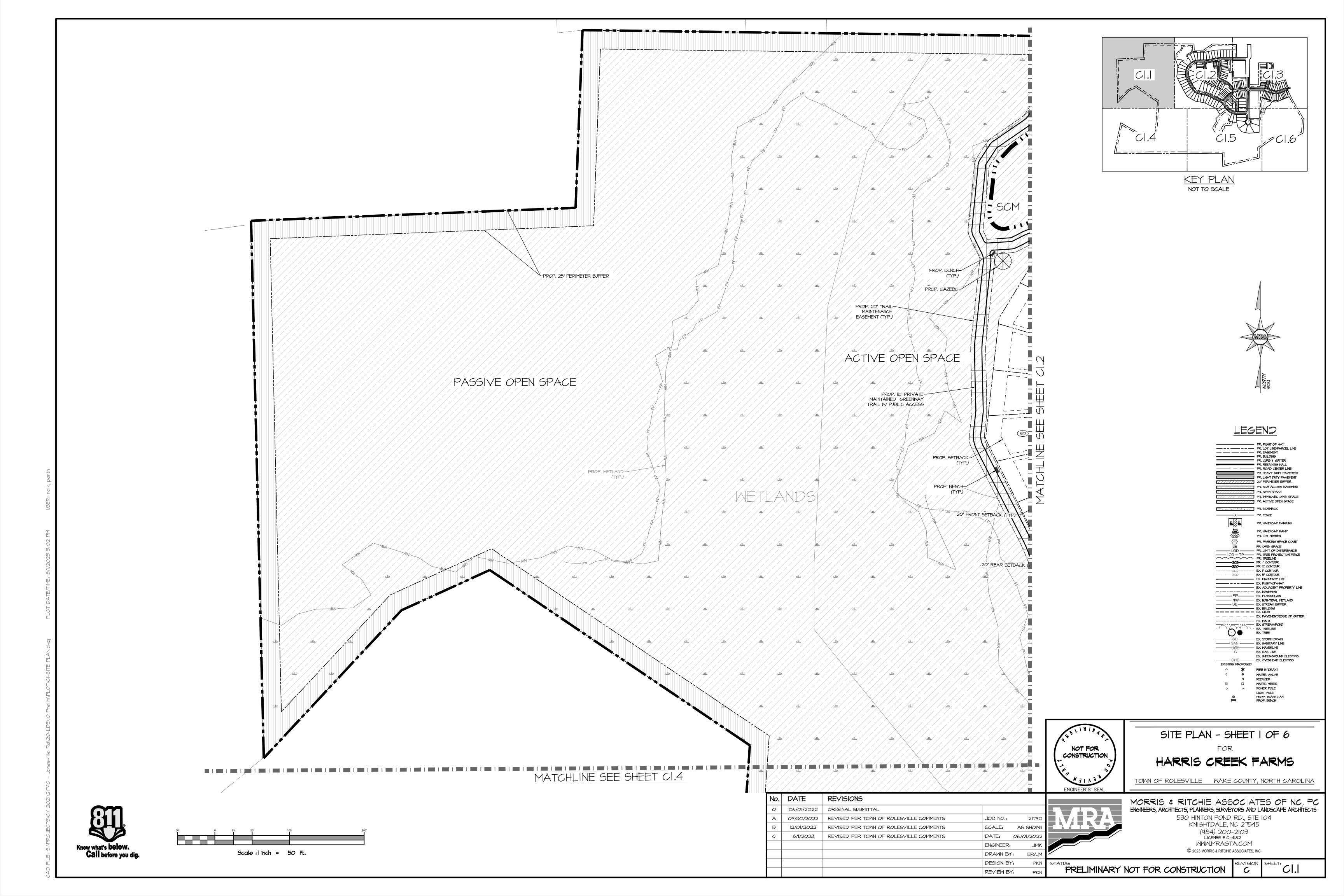


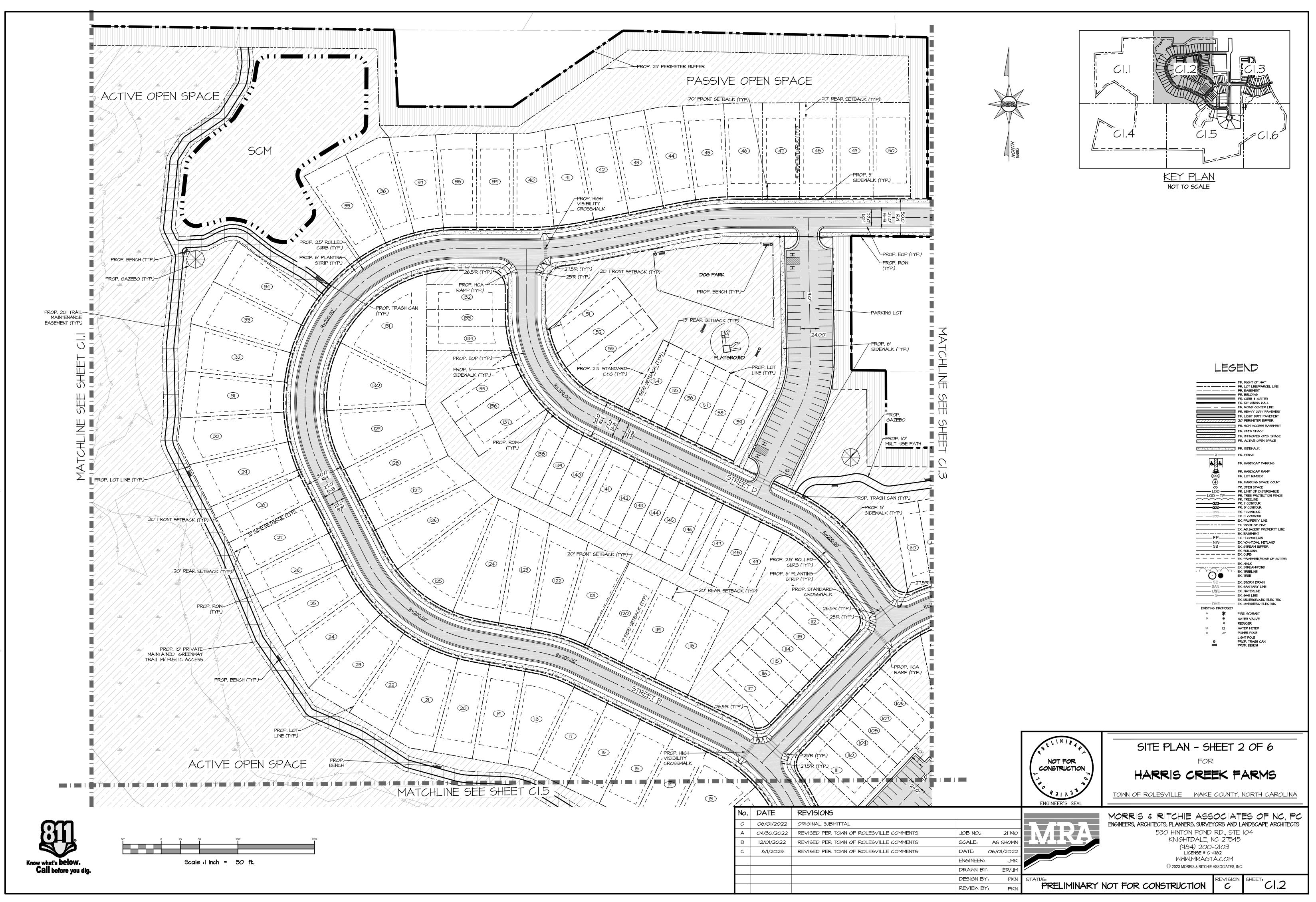


NIDITIONS.dwg PLOT DATE/TIME: 8/1/2023 3:01 PM USER: naik, p

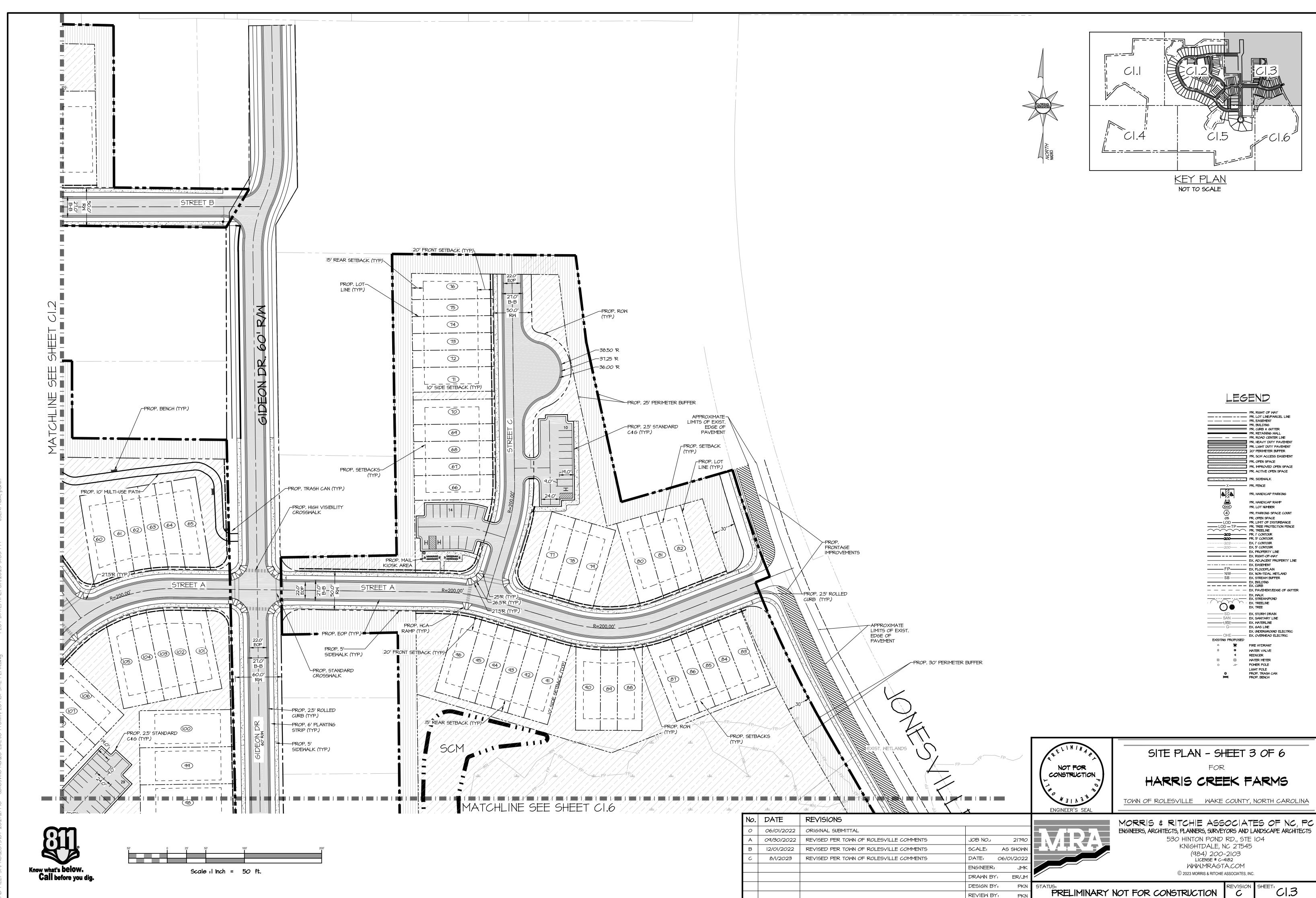


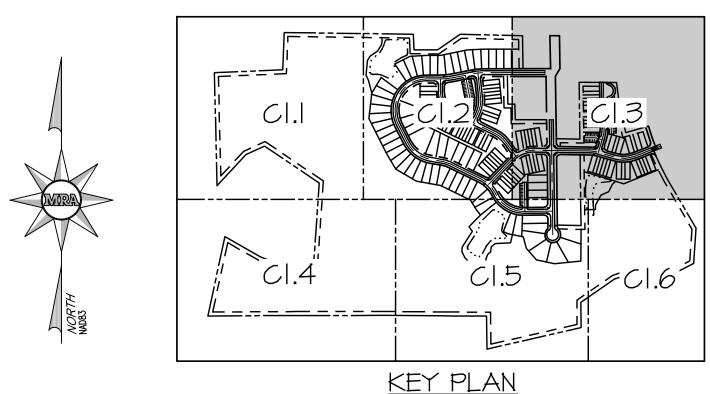
AD FILE: S:\PROJECTS\CY 2021\21790 - Jonesville Rd\20-LDE\10 Prelim\PL0T\CI-0VERALL SITE PLAN.dwg PL0T DATE/TIME: 8/1/2023 3:10 PM USER: naik, pant

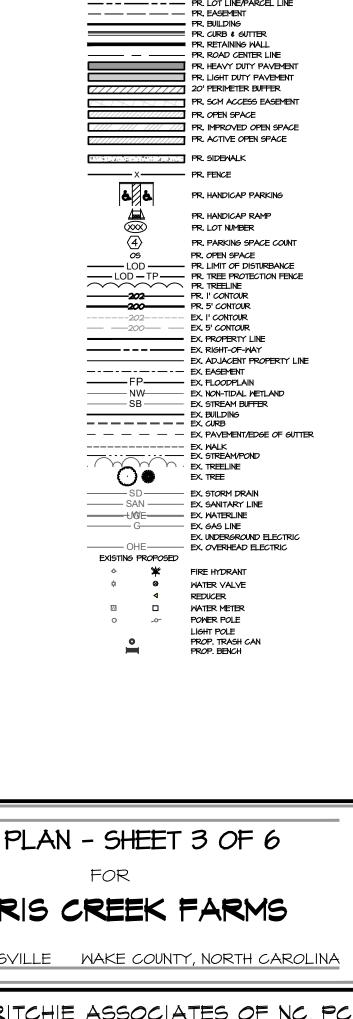


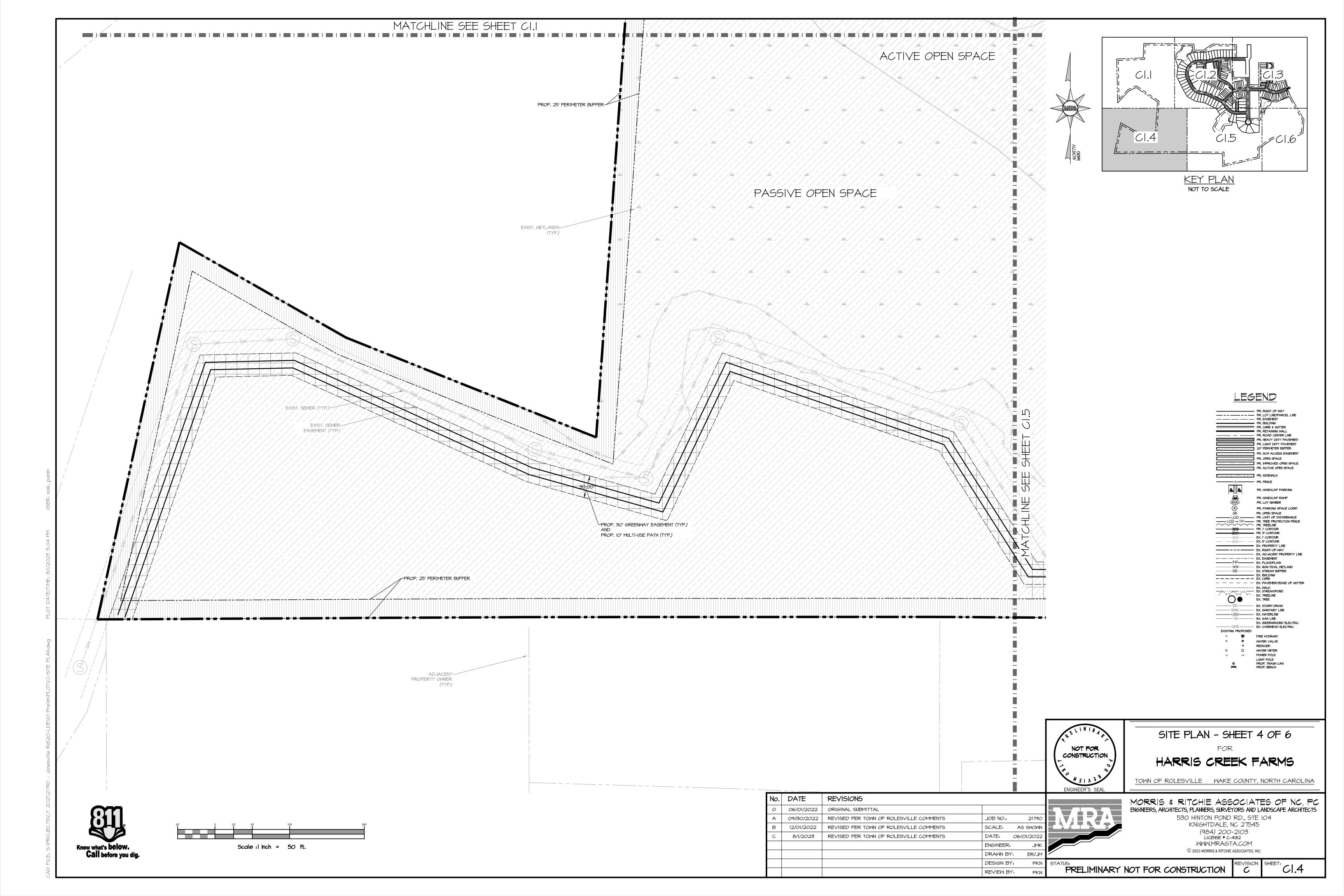


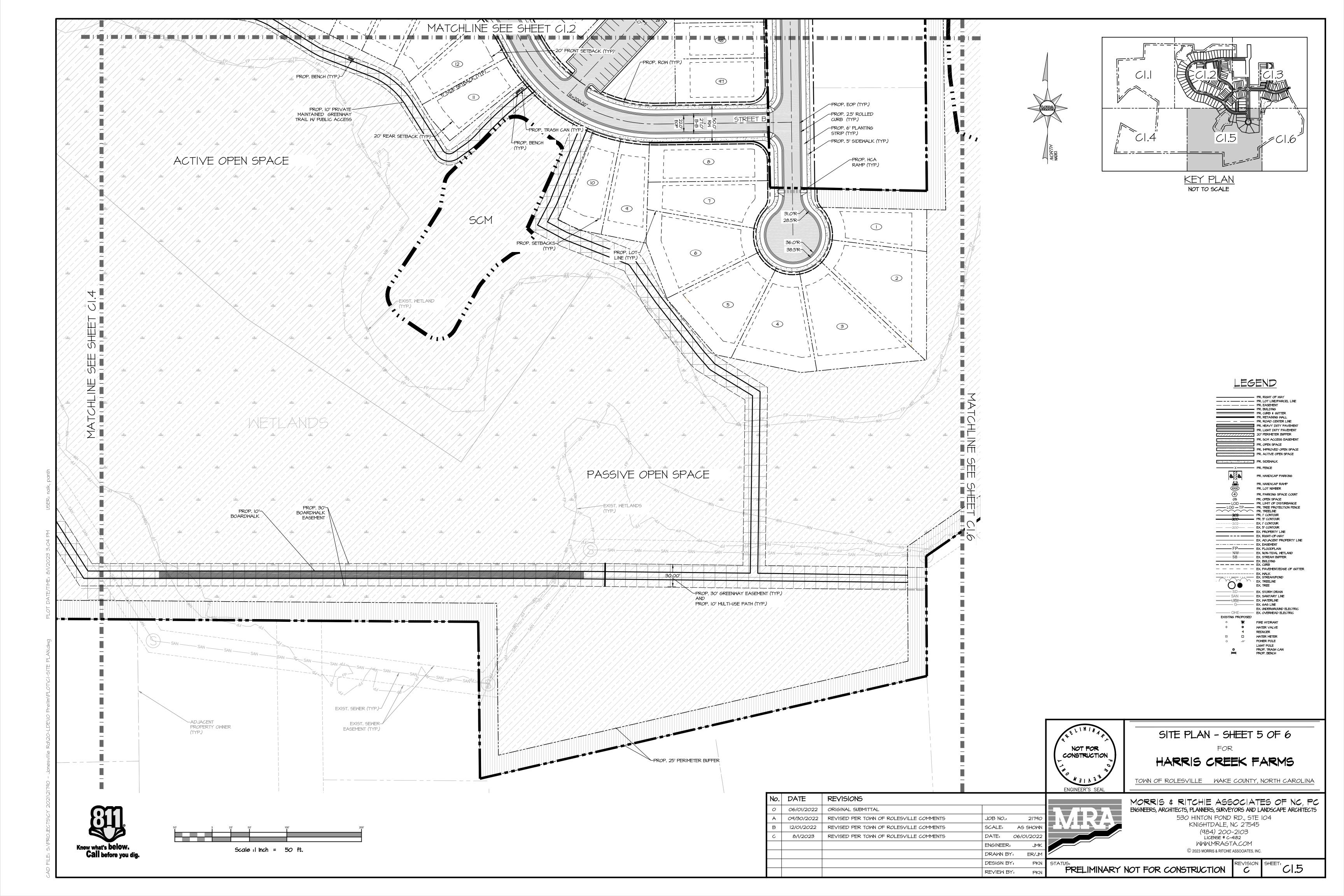
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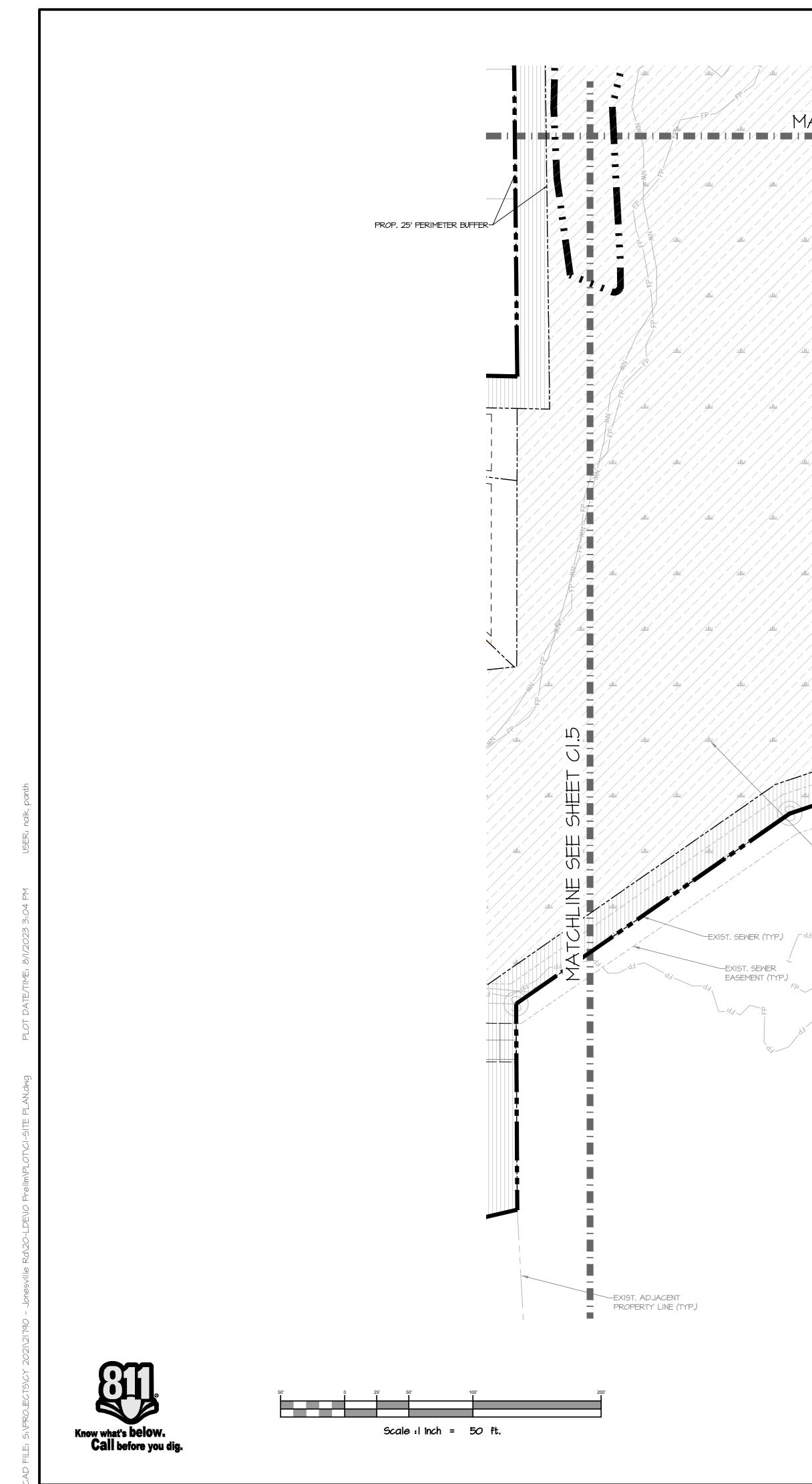












MATCHLINE SEE SHEET CI.3

XNL FP /

PASSIVE OPEN SPACE

/ عالد / /بالد/

-EXIST. WETLANDS

(TYP.)

Fp D

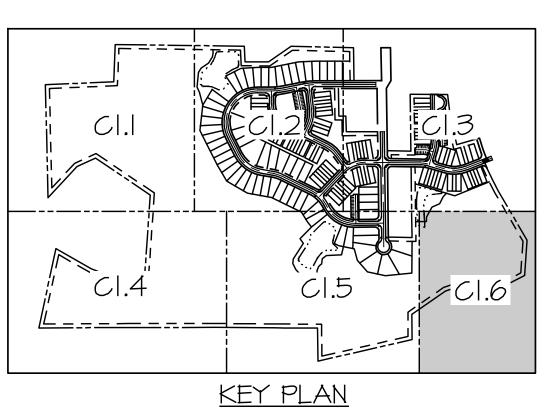
PROP. 25' PERIMETER BUFFER

_ كالح

PROP. 30' PERIMETER BUFFER

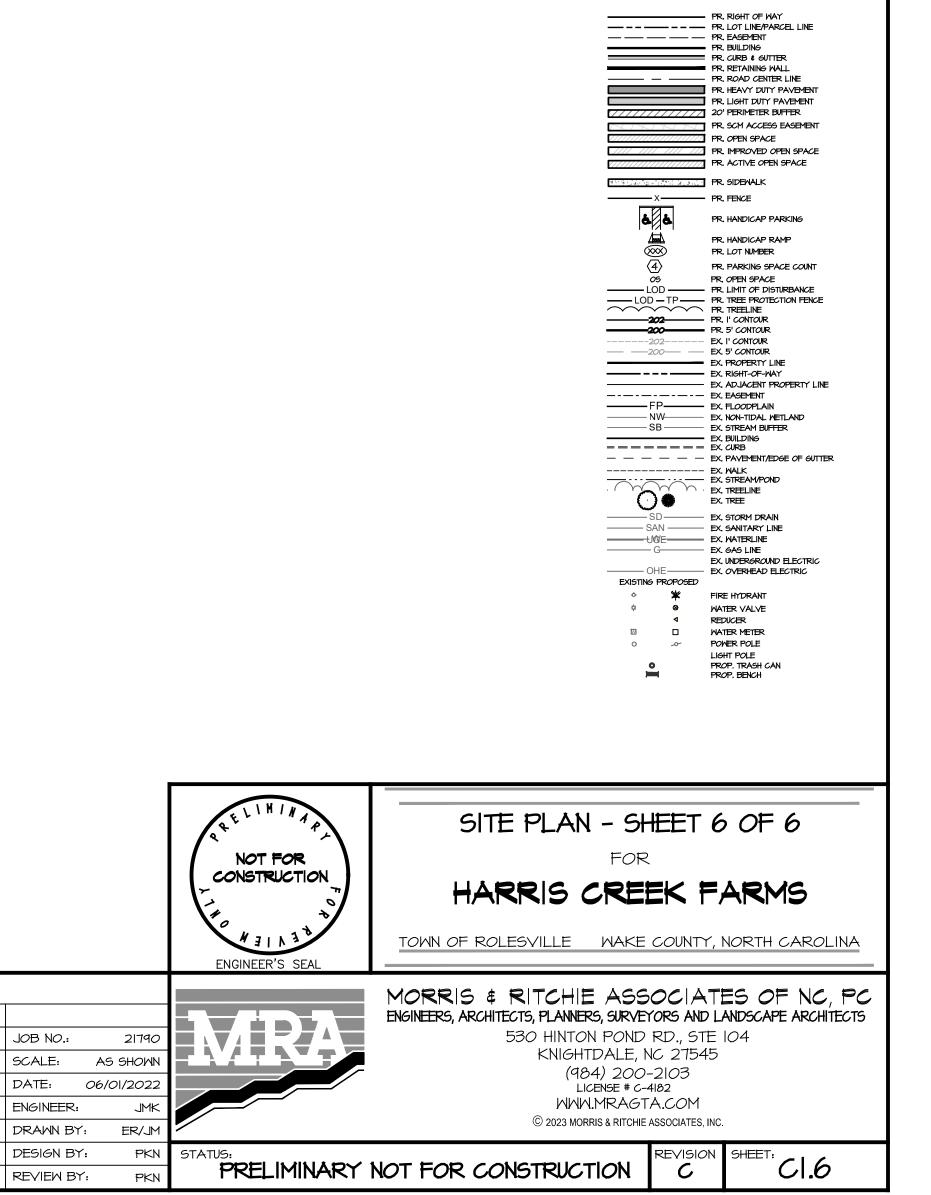
No. DATE REVISIONS 06/01/2022 ORIGINAL SUBMITTAL 0 A 09/30/2022 REVISED PER TOWN OF ROLESVILLE COMMENTS 12/01/2022 REVISED PER TOWN OF ROLESVILLE COMMENTS 8/1/2023 REVISED PER TOWN OF ROLESVILLE COMMENTS

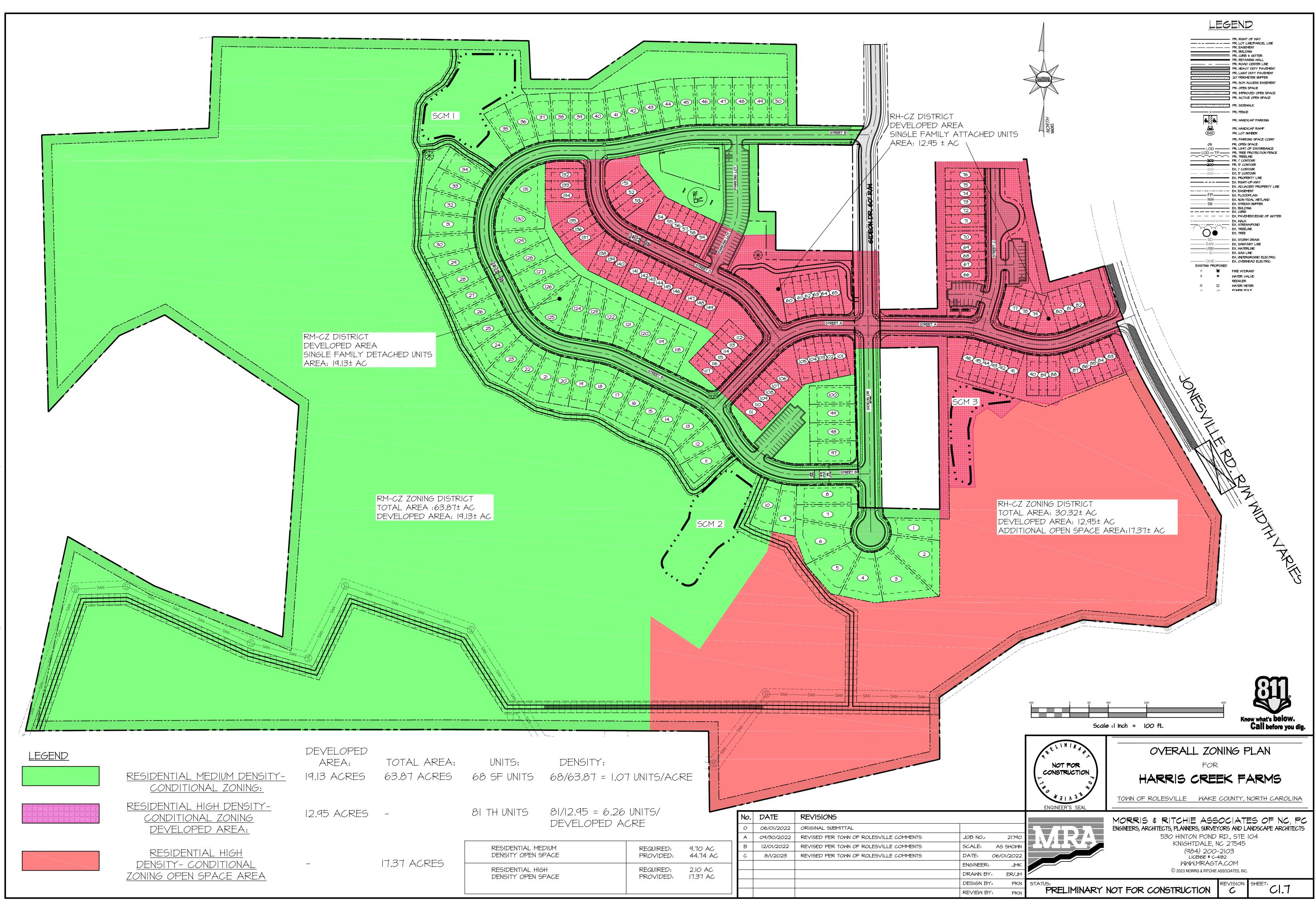




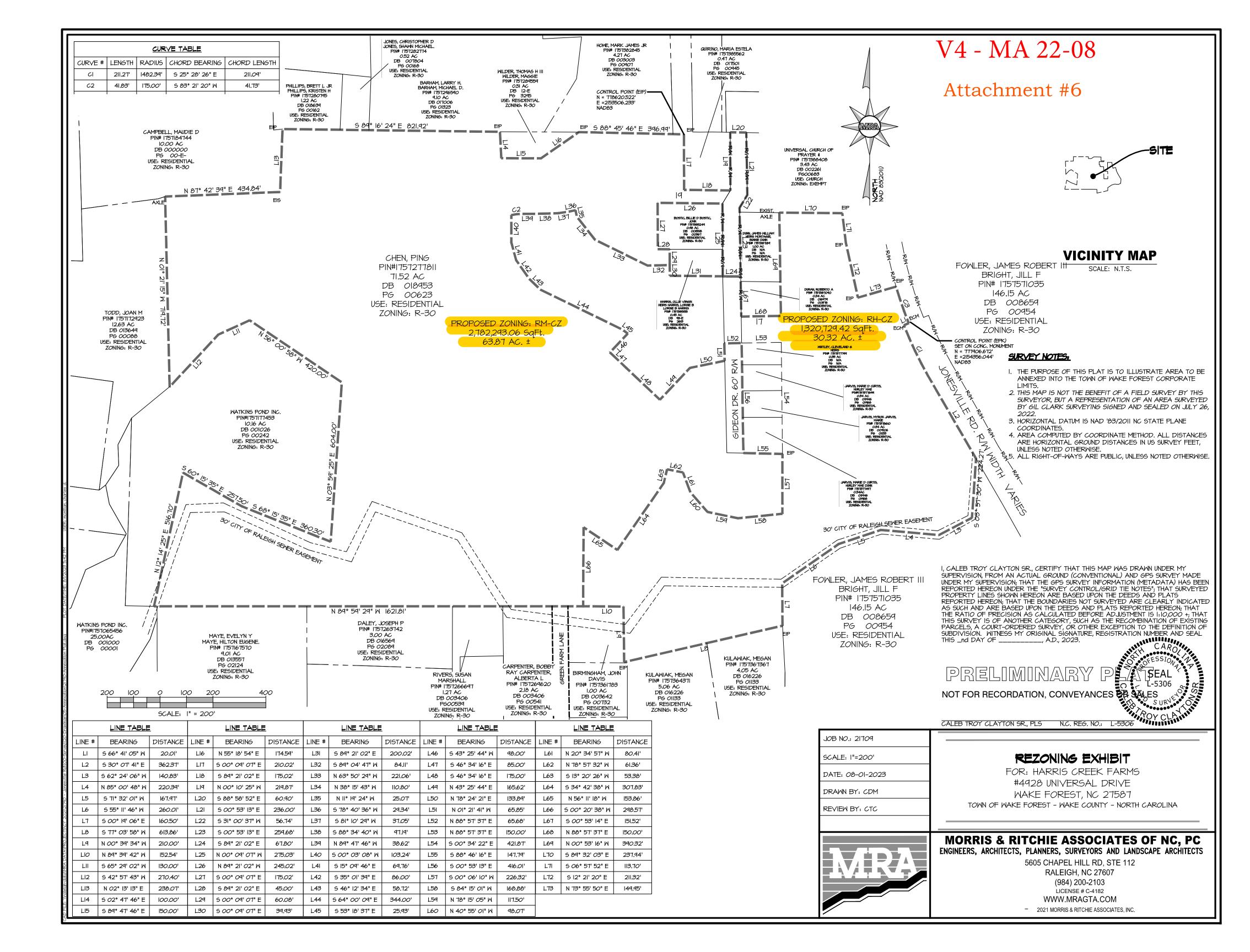
NOT TO SCALE

LEGEND





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V4 - MA 22-08/Harris Creek Farms

MORRIS & RITCHIE ASSOCIATES OF NC, PC

AN AFFILIATE OF MORRIS & RITCHIE ASSOCIATES, INC. WHICH PROVIDES ENGINEERING, ARCHITECTURE, PLANNING, SURVEYING & LANDSCAPE ARCHITECTURE THROUGHOUT THE MID-ATLANTIC REGION AND LANDSCAPE ARCHITECTS



RH-CZ Zoning District

<u>Legal Description – Exhibit "A"</u> 30.32 Acres ± Portion of Lands of Ping Chen Wake Forest Township – Wake County, North Carolina

All that certain parcel of land lying generally easterly of Jonesville Road, being located in Wake Forest Township, Wake County, North Carolina and being a portion of those lands described in deed dated March 11, 2022 from Jerri Jo Miller, Tammy Gower Batts, Clifton Edward Blackley and spouse Joetta May Blackley, Grantor to Ping Chen and recorded in the Land Records of Wake County, North Carolina in Deed Book 18953, page 592 and page 623, being more particularly described as follows, to wit:

Beginning at a PK nail set in an existing concrete monument on the Southwestern right-of-way of Jonesville Road, having North Carolina state plane coordinates N: 777,906.672 E: 2,154,356.044. Thence, with said right-of way, South 66°41'05" West 20.01 feet to a concrete monument on the Southwestern right-of-way line of Jonesville Road; thence, with said right-ofway and along a curve with a cord bearing distance South 25°28'26" East 211.09 feet and a radius of 1,482.39 feet to an iron pipe; thence along said right-of-way, South 30°07'41" East 362.37 feet to an iron pipe; thence leaving said right-of-way, South 03°57'30" West 224.27 feet to a point; thence, South 62°24'06" West 140.83 feet to a point; thence, North 85°00'48" West 220.39 feet to a point; thence, South 71°32'01" West 167.97 feet to a point; thence, South 55°11'46" West 260.01 feet to a point; thence South 00°19'06" East 160.50 feet to an iron pipe; thence, South 77°03'58" West 613.86 feet to an iron pipe; thence, North 00°39'34" West 210.00 feet to an iron pipe; thence, North 89°39'42" West 152.54 feet to a point; thence, North $00^{\circ}20'38"$ East 298.57 feet to a point; thence, South 56°11'18" East 153.86 feet to a point; thence, North 34°42'38" East 298.57 feet to a point; thence, North 13°20'26" East 53.38 feet to a point; thence, South 78°57'32" East 61.36 feet to a point; thence, South 20°34'57" East 80.41 feet to a point; thence, South 40°55'01" East 98.07 feet to a point; thence, South 78°15'05" East 117.50 feet to a point; thence, North 84°15'01" East 168.88 feet to a point; thence, North 00°06'10" East 226.32 feet to an iron pipe; thence, North 00°34'22" West 421.87 feet to a point; thence, South 88°57'37" West 150.00 feet to a point; thence, South 88°57'37" West 65.68 feet to a point; thence, South 01°21'41" East 65.85 feet to a point; thence, South 78°24'21" West 133.89 feet to a point; thence, South 43°25'44" East 165.62 feet to a point; thence, North 46°34'16" West 175.00 feet to a point; thence, North 46°34'16" West 85.00 feet to a point; thence, North 43°25'44" East 98.00 feet to a point; thence, North 53°18'37" West 25.93 feet to a point; thence, North 64°00'09" West 344.00 feet to a point; thence, North 46°12'34" West 58.72 feet to a point; thence, North 35°01'39" West 86.00 feet to a point; thence, North 15°09'46" West 69.76 feet to a point; thence, North 00°03'08" East 103.24 feet to a point; thence, along a curve with a cord bearing distance North 83°21'20" East 41.73 feet and a radius of 175.00 feet to a point; thence, South 89°47'46" East 38.62 feet to a point; thence, North 88°34'40" East 97.19 feet to a point; thence, North 81°10'29" East 37.05 feet to a point; thence, North 78°40'36" East 29.34 feet to a point; thence, South 11°19'24" East 25.07 feet to a point; thence, South 38°15'43" East 110.80 feet to an iron pipe; thence, South 63°50'29" East 221.06 feet to a point;

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thence, North $89^{\circ}04'47"$ East 84.11feet to a point; thence, South $00^{\circ}09'07"$ East 39.93 feet to an iron pipe; thence, South $89^{\circ}21'02"$ East 200.02 feet to an iron pipe on the Western right-of-way of Gideon Drive; thence, leaving said right-of-way, South $89^{\circ}21'02"$ East 67.80 feet to a point on the Eastern right-of-way of Gideon Drive; thence, with said right-of-way, South $00^{\circ}53'14"$ East 151.52 feet to a point; thence leaving said right of way, North $88^{\circ}57'37"$ East 150.00 feet to a point; thence, North $00^{\circ}53'16"$ West 390.32 feet to an axle; thence, South $89^{\circ}32'03"$ East 237.94 feet to an iron pipe; thence, South $06^{\circ}57'52"$ East 113.70 feet to a point; thence, South $12^{\circ}21'20"$ East 211.32 feet to an iron pipe; thence, North $73^{\circ}55'50"$ East 149.95 feet to an iron pipe on the Southwestern right-of-way of Jonesville Road; thence, with said right-of-way and along a curve with a bearing and distance of South $19^{\circ}15'36"$ East 146.36 feet and a radius of 1,462.39 feet to the point of beginning. Containing **30.32** AC.±.

The total area of the **Exhibit "A"** herein described being a portion of Tract 1 as described in deed dated March 11, 2022 from Jerri Jo Miller, Tammy Gower Batts, Clifton Edward Blackley and spouse Joetta May Blackley, Grantor to Ping Chen and recorded in the Land Records of Wake County, North Carolina in Deed Book 18953, page 592 and page 623, and containing a total area of **30.32** AC.± and being subject to any and all matters of which a current title package would disclose.



Abingdon, MD 🔶	Baltimore, MD	♦ Laurel, MD	Towson, MD 🔶	Georgetown, DE 🔶	New Castle, DE 🔶	Leesburg, VA	✦ Raleigh, NC
(410) 515-9000	(443) 490-7201	(410) 792-9792	(410) 821-1690	(302) 855-5734	(302) 326-2200	(703) 994-4047	(984) 200-2103

V4 - MA 22-08 / Harris Creek Farms

MORRIS & RITCHIE ASSOCIATES OF NC, PC

AN AFFILIATE OF MORRIS & RITCHIE ASSOCIATES, INC. WHICH PROVIDES ENGINEERING, ARCHITECTURE, PLANNING, SURVEYING & LANDSCAPE ARCHITECTURE THROUGHOUT THE MID-ATLANTIC REGION AND LANDSCAPE ARCHITECTS



RM-CZ Zoning District

Legal Description – Exhibit "B"

63.87 Acres Portion of Lands of Ping Chen Wake Forest Township – Wake County, North Carolina

All that certain parcel of land lying generally easterly of Jonesville Road, being located in Wake Forest Township, Wake County, North Carolina and being a portion of those lands described in deed dated March 11, 2022 from Jerri Jo Miller, Tammy Gower Batts, Clifton Edward Blackley and spouse Joetta May Blackley, Grantor to Ping Chen and recorded in the Land Records of Wake County, North Carolina in Deed Book 18953, page 592 and page 623, being more particularly described as follows, to wit:

Beginning at an existing iron pipe in the center of Universal Drive, having North Carolina state plane coordinates N: 778,620.5224 E: 2,153,506.2328. Thence, South 00°09'07" East 210.02 feet to an iron pipe; thence, South 89°21'02" East 175.02 feet to an iron pipe on the Western right-of-way of Gideon Drive; thence with said right-of-way, North 00°10'25" West 219.87 feet to a point; thence leaving said right of way, South 88°58'52" East 60.90 feet to a point on the Eastern right-of-way of Gideon Drive; thence, with said right-of-way South 00°53'13" East 236.00 feet to a point; thence, South 31°00'37" West 56.74 feet to a point; thence, South 00°53'13" East 259.68 feet to a point; thence, crossing said right-of-way, South 89°21'02" East 67.80 feet to an iron pipe; thence, with said right-of-way North 00°09'07" West 275.03 feet to an iron pipe on the Western right-of-way of Gideon Drive; thence, leaving said right-of-way, North 89°21'02" West 245.02 feet to an iron pipe; thence, South 00°09'07 East 175.02 feet to an iron pipe; thence, South 89°21'02" East 45.00 feet to an iron pipe; South 89°04'47" West 84.11 feet to a point; thence, North 63°50'29" West 221.06 feet to a point; thence, North 38°15'43" West 110.80 feet to a point; thence, North 11°19'24" West 25.07 feet to a point; thence, South 78°40'36" West 29.34 feet to a point; thence, South 81°10'29" West 37.05 feet to a point; thence, South 88°34'40" West 97.19 feet to a point; thence, North 89°47'46" West 38.62 feet to a point; thence along a curve with a cord bearing and distance, South 83°21'20" West 41.73 feet and a radius of 175.00 feet to a point; thence, South 00°03'08" West 103.24 feet to a point; thence, South 15°09'46" East 69.76 feet to a point; thence, South 35°01'39" East 86.00 feet to a point; thence, South 46°12'34" East 58.72 feet to a point; thence, South 64°00'09" East 344.00 feet to a point; thence, South 53°18'37" East 25.93 feet to a point; thence, South 43°25'44" West 98.00 feet to a point; thence, South 46°34'16" East 85.00 feet to a point; thence, South 46°34'16" East 175.00 feet to a point; thence, North 43°25'44" West 165.62 feet to a point; thence, North 78°24'21" East 133.89 feet to a point on the Western right-of-way of Gideon Drive; thence, North 01°21'41" West 65.85 feet to a point; thence, leaving said right-of-way North 88°57'37" East 65.68 feet to a point on the Eastern right-of-way of Gideon Drive; thence, with said right-of-way South 00°53'13" East 416.01 feet to a point; thence, leaving said right-ofway, South 88°46'16" East 147.79 feet to an iron pipe; thence, South 00°06'10" West 226.32 feet to a point; thence, South 84°15'01" West 168.88 feet to a point; thence, North 78°15'05" West 117.50 feet to a point; thence, North 40°55'01" West 98.07 feet to a point; thence, North 20°34'57" West 80.41 feet to a point; thence, North 78°57'32" West 61.36 feet to a point;

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thence, South 13°20'26" West 53.38 feet to a point; thence, South 34°42'38" West 307.83 feet to a point; thence, North 56°11'18" West 153.86 feet to a point; thence, South 00°18'21" West 298.57 feet to a point; thence, North 89°59'29" West 1,621.81 feet to an iron pipe; thence, North 12°14'25" East 516.70 feet to an iron pipe; thence, South 60°15'35" East 257.50 feet to an iron pipe; thence, South 68°15'35" East 360.30 feet to an iron pipe; thence, North 03°59'25" East 604.00 feet to an iron pipe; thence, North 56°00'58" West 420.00 feet to an iron pipe; thence, South 65°29'02" West 130.00 feet to an iron pipe; thence, South 42°57'43" West 270.40 feet to an iron pipe; thence, North 01°21'15" West 719.72 feet to an axle; thence, North 87°42'39" East 434.84 feet to an iron pipe; thence, North 02°13'13" East 238.07 feet to an iron pipe; thence, South 89°16'24" East 821.92 feet to an iron pipe; thence, South 02°47'46" East 100.00 feet to an iron pipe; thence, North 55°18'54" East 174.59 feet to an iron pipe; thence, South 88°45'46" East 396.99 feet to the point of beginning. Containing **63.87 AC.±**.

The total area of the **Exhibit "B"** herein described being a portion of Tract 1 as described in deed dated March 11, 2022 from Jerri Jo Miller, Tammy Gower Batts, Clifton Edward Blackley and spouse Joetta May Blackley, Grantor to Ping Chen and recorded in the Land Records of Wake County, North Carolina in Deed Book 18953, page 592 and page 623, and containing a total area of **63.87** AC.± and being subject to any and all matters of which a current title package would disclose.



HARRIS CREEK FARMS

VOLUNTARY REZONING CONDITIONS

1.THE SUBJECT PROPERTY SHALL BE DEVELOPED IN GENERAL COMPLIANCE WITH THE MAP AMENDMENT (CONDITIONAL REZONING) CONCEPT PLAN, DATED 7/24/2023.

2.THE DEVELOPMENT SHALL CONSIST OF MAXIMUMS OF 68 SINGLE-FAMILY DETACHED DWELLING UNITS/LOTS AND 81 SINGLE-FAMILY ATTACHED (TOWNHOME) DWELLING UNITS/LOTS AS DETAILED IN THE MAP AMENDMENT (CONDITIONAL REZONING) CONCEPT PLAN, DATED 7/24/2023.

3. THE MAXIMUM ALLOWABLE DENSITY WITHIN THE RH-CZ ZONING SHALL BE 6.0 UNITS/ACRE.

4.DWELLING UNIT FACADE ANTI-MONOTONY: IN ORDER TO PROMOTE VARIATION IN HOME APPEARANCE, NO SINGLE-FAMILY FRONT FAÇADE SHALL BE DUPLICATED FOR THREE (3) LOTS IN A ROW, OR DIRECTLY ACROSS THE STREET. FOR CORNER LOTS, THIS SHALL APPLY TO THE LOTS DIAGONALLY ACROSS THE INTERSECTION.

5.GARAGE DOOR SHALL EITHER CONTAIN WINDOWS OR CARRIAGE STYLE ADORNMENTS .

6. SINGLE-FAMILY ATTACHED (TOWNHOMES) SHALL HAVE:

a. SIDING BE A MINIMUM OF 0.45 GAUGE VINYL SIDING, OR, HAVE CEMENTITIOUS SIDING THAT SHALL VARY IN TYPE AND COLOR WITH BRICK, SHAKES, BOARD AND BATTEN, OR STONE ACCENTS PROVIDED AS DECORATIVE FEATURES.

b. ARTICULATION IN THE END UNIT SIDE ELEVATIONS, WHICH INCLUDES TWO OF THE FOLLOWING: SIDE ENTRY, WINDOWS (TWO OR MORE), PARTIAL MASONRY, TWO TYPES OF FINISHES (I.E. HORIZONTAL SIDING WITH BOARD AND BATTEN OR SHAKES IN GABLES), AND ROOFLINE CHANGES.

c. FIRST FLOOR GLAZING WHICH SHALL CONSIST OF ONE OR MORE OF THE FOLLOWING: GARAGE DOORS WITH GLASS WINDOWS, OR FRONT DOORS WITH WINDOWS OR SIDELIGHTS.

d.8" MINIMUM EAVES AND RAKES ON FRONT, REAR, AND SIDES.

7. SINGLE-FAMILY DETACHED DWELLING UNITS SHALL:

a.BE A MINIMUM OF 1,500 HEATED SQUARE FEET.

b. HAVE SIDING BE A MINIMUM OF 0.45 GAUGE VINYL SIDING, OR, HAVE CEMENTITIOUS SIDING THAT SHALL VARY IN TYPE AND COLOR WITH BRICK, SHAKES, BOARD AND BATTEN, OR STONE ACCENTS PROVIDED AS DECORATIVE FEATURES

c. HAVE AT LEAST TWO TYPES OF FINISHES ON THE FRONT: LAP SIDING, MASONRY, SHAKES, AND BOARD AND BATTEN.

8.A HOMEOWNERS ASSOCIATION (HOA) SHALL BE CREATED, AND ALL OPEN SPACES OBSERVED IN MAP AMENDMENT (CONDITIONAL REZONING) CONCEPT PLAN, DATED 7/24/2023, SHALL BE OWNED AND MAINTAINED BY THE HOA.

9. FOUNDATIONS: TOP OF SLABS SHALL BE ELEVATED A MINIMUM OF 18 INCHES ABOVE FINISHED GRADE FOR ALL DWELLING UNITS. ALL FOUNDATIONS SHALL BE TREATED WITH MASONRY ON THE FRONT AND STREET-FACING SIDES FOR A MINIMUM OF 10".

10. **RECREATIONAL AMENITIES:** THE FOLLOWING RECREATIONAL AMENITIES SHALL BE CONSTRUCTED AS OBSERVED IN MAP AMENDMENT (CONDITIONAL REZONING) CONCEPT PLAN, DATED 7/24/2023. PUBLIC GREENWAY (APPROXIMATELY 5,600 LINEAR FEET), PRIVATE MULTI-USE PATHS (APPROXIMATELY 410LINEAR FEET), GAZEBOS, PLAYGROUNDS, AND A DOG PARK. AMENITIES SHALL BE BUILT AS PART OF THE SUBDIVISION INFRASTRUCTURE WITHIN THE PHASE IT IS LOCATED. 11.ATLEAST TWENTY PERCENT (20%) OF THE LANDSCAPING PLANTED IN COMMON AREAS ON THE SUBJECT PROPERTY SHALL UTILIZE PLANT MATERIALS THAT ARE LISTED AS NATIVE POLLINATOR PLANTS ON NORTH CAROLINA WILDLIFE FEDERATION ("NCWF") OR OTHER RESOURCES FOR NATIVE PLANTS RECOMMENDED BY THE NCWF ON THEIR WEBSITE, CURRENTLY FOUND AT HTP://NCWF.ORG/HABITAT/NATIVE-POLLINATOR-PLANTS/. WHERE EVERGREEN PLANTINGS OR STREET TREES ARE REQUIRED BY THE TOWN OF ROLESVILLE LDO, POLLINATOR PLANTINGS SHALL NOT BE REQUIRED. SUCH PLANTINGS SHALL CLEARLY BE SHOWN IN CONSTRUCTION DRAWINGS AND INSTALLED AS PART OF SUBDIVISION INFRASTRUCTURE. NOTHING HEREIN SHALL BE CONSTRUCTED TO LIMIT THE PLANTS MATERIALS PERMITTED ON INDIVIDUAL RESIDENTIAL LOTS.

12. TRANSPORTATION IMPROVEMENTS: TO ADDRESS TRANSPORTATION IMPACTS REASONABLY EXPECTED TO BE GENERATED BY THE DEVELOPMENT, THE FOLLOWING ROAD IMPROVEMENTS SHALL BE INSTALLED IN ACCORDANCE WITH PLANS APPROVED BY NCDOT AND THE TOWN OF ROLESVILLE.

US 401 BYPASS AND JONESVILLE ROAD

1.CONDUCT A FULL SIGNAL WARRANT ANALYSIS PRIOR TO FULL BUILD-OUT OF THE PROPOSED DEVELOPMENT AND INSTALL A TRAFFIC SIGNAL IF WARRANTED AND APPROVED BY THE TOWN AND NCDOT.

US 401 BYPASS AND EASTERN U-TURN LOCATION

1.CONDUCT A FULL SIGNAL WARRANT ANALYSIS PRIOR TO FULL BUILD-OUT OF THE PROPOSED DEVELOPMENT AND INSTALL A TRAFFIC SIGNAL IF WARRANTED AND APPROVED BY THE TOWN AND NCDOT.

MITCHELL MILL ROAD AND JONESVILLE ROAD / PEEBLES ROAD

1.CONSTRUCT A SOUTHBOUND (JONESVILLE ROAD) LEFT-TURN LANE WITH AT LEAST 100 FEET OF STORAGE AND APPROPRIATE DECEL AND TAPER.

2.CONSTRUCT A WESTBOUND (MITCHELL MILL ROAD) RIGHT-TURN LANE WITH AT LEAST 100 FEET OF STORAGE AND APPROPRIATE DECEL AND TAPER.

3.CONSTRUCT AN EASTBOUND (MITCHELL MILL ROAD) LEFT-TURN LANE WITH AT LEAST 100 FEET OF STORAGE AND APPROPRIATE DECEL AND TAPER.

4.CONDUCT A FULL SIGNAL WARRANT ANALYSIS PRIOR TO FULL BUILD-OUT OF THE PROPOSED DEVELOPMENT AND INSTALL A TRAFFIC SIGNAL IF WARRANTED AND APPROVED BY THE TOWN AND NCDOT.

JONESVILLE ROAD AND SITE DRIVE

1.CONSTRUCT THE EASTBOUND APPROACH (SITE DRIVE) WITH ONE INGRESS LANE AND ONE EGRESS LANE.

2.PROVIDE STOP-CONTROL FOR THE EASTBOUND APPROACH (SITE DRIVE).

REZONING AND ANNEXATION OF PROPERTY CONSISTING OF +/- 93.609 ACRES, LOCATED SOUTHWEST OF THE JONESVILLE ROAD AND UNIVERSAL DRIVE INTERSECTION, IN THE TOWN OF ROLESVILLE

REPORT OF MEETING WITH ADJACENT PROPERTY OWNERS AND TENANTS ON JULY 12, 2022

Pursuant to applicable provisions of the Unified Development Ordinance, a meeting was held with respect to a potential rezoning and annexation with adjacent neighbors on Wednesday, July 12, 2023, at 6:00 p.m. The property considered for this potential rezoning totals approximately 93.609 acres, and is located along southwest of the Jonesville Road and Universal Drive intersection, in the Town of Rolesville. This meeting was held at virtually via a Zoom Meeting. All owners and tenants of property within 500 feet of the subject property were invited to attend the meeting. Attached hereto as **Exhibit A** is a copy of the neighborhood meeting notice. A copy of the required mailing list for the meeting invitations is attached hereto as **Exhibit B**. A summary of the items discussed at the meeting is attached hereto as **Exhibit C**. Attached hereto as **Exhibit D** is a list of individuals who attended the meeting.

EXHIBIT A – NEIGHBORHOOD MEETING NOTICE



To: Neighboring Property Owners and Tenants
 From: Samuel Morris
 Date: June 23, 2023
 Re: Virtual Neighborhood Meeting for Annexation and Rezoning of Harris Creek Farm (f.k.a. 4928 Universal) (ANX 22-05 & MA 22-08)

You are invited to attend a virtual meeting to discuss the proposed annexation and rezoning of Harris Creek Farm (f.k.a. 4928 Universal) (ANX 22-05 & MA 22-08). We have scheduled an informational meeting with surrounding neighbors on <u>Wednesday</u>, July 12, 2023 from 6:00 PM until <u>7:00 PM</u>. This meeting will be held virtually. You can participate online or by telephone.

To join with video:

https://zoom.us/ Meeting ID: 871 7347 4235 Password: 922539

To join by telephone:

+1 646 558 8656 Meeting ID: 871 7347 4235 Password: 922539

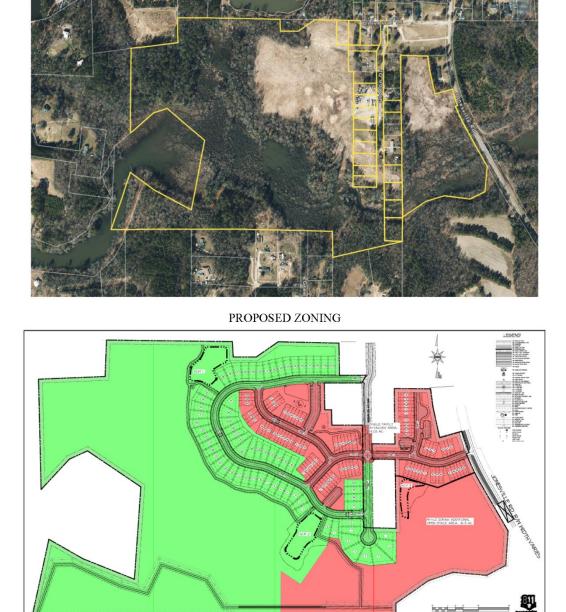
The purpose of this meeting is to discuss the proposed annexation and rezoning of Harris Creek Farm (f.k.a. 4928 Universal) (ANX 22-05 & MA 22-08). The property assemblage totals approximately 93.609 acres in size and is located southwest of the Jonesville Road and Universal Drive intersection.

The property is currently zoned Residential-30 (R-30) under Wake County zoning. The proposed rezoning would change the zoning to Residential Medium Density Conditional Zoning and Residential High Density Conditional Zoning (RM-CZ & RH-CZ) under the Town of Rolesville zoning. The purpose of the rezoning is to allow for the development of single family homes and townhomes.

The Town of Rolesville requires a neighborhood meeting involving the owners and tenants of property within 500 feet of the properties during the rezoning process. After the meeting, we will prepare a report for the Planning Department regarding the items discussed at the meeting.

Please do not hesitate to contact me directly if you have any questions or wish to discuss any issues. I can be reached at 919.780.5438 and <u>smorris@longleaflp.com</u>. Also, for more information about the rezoning, you may visit <u>https://www.rolesvillenc.gov/projects/harris-creek-farm-fka-4928-universal</u> or contact the Town of Rolesville Planning Department at 919.554.6517.

> Attached to this invitation are the following materials: 1.Subject Property Current Aerial 2.Proposed Zoning Map



OVERALL ZONING PLAN

MRA

30 10 - 2/140 16A.5 46 546 OCIATES OF NC. PC

IN B C1.7

 DEVELOPED
 AREA:
 UNITS:
 DENSITY:

 19.3 ACRES
 61.06 ACRES
 60 SF UNITS
 64/61.08 * ULUNITS

61 TH UNITS

DATE REVERCE 495/2022 REVERDIER TOHI OF ROLESVILE COMMITS 220/2022 REVERDIER TOHI OF ROLESVILE COMMITS

14.02ACRE5 32.5 ACRE5

RESIDENTIAL MEDIUM DENSIT CONDITIONAL ZONINS: RESIDENTIAL HIGH DENSITY-CONDITIONAL ZONING:

RESCENTIAL MEDIAN DEBILITY OPEN RPACE RESCENTIAL HIGH DEBILITY OPEN RPACE REGISED, 110 AC REVIDED, 4404 AC REVIDED, 4404 AC REGISED, 313 AC (46.3 ADDITONS, ACRE)

CURRENT PROPERTY MAP

EXHIBIT B – NOTICE LIST

HUNT, FERDINAND V HUNT, LYDIA L 1000 SIMPSON ST APT 6B BRONX NY 10459-3348

JARVIS, MARIE D CURTIS, HURLEY MAE 3704 GIDEON DR WAKE FOREST NC 27587-6360

> WATKINS POND INC ANTHONY BRIDGES 98 BERKSHIRE LN HAMPSTEAD NC 28443-0480

WILDER, THOMAS H III WILDER, MAGGIE 104 DARTMOUTH RD APT 326 RALEIGH NC 27609-8409

> FERRELL, BRIAN L 3807 JONESVILLE RD WAKE FOREST NC 27587-8181

> BIRMINGHAM, JOHN D 3636 GREEN FARM LN WAKE FOREST NC 27587-6827

RIVERS, SUSAN MARSHALL 3627 GREEN FARM LN WAKE FOREST NC 27587-6828

MCGEE, LORIE ANN MCGEE, BILLY RAY 3621 GREEN FARM LN WAKE FOREST NC 27587-6828

FOWLER, JAMES ROBERT III BRIGHT, JILL F 7400 FOWLER RD ZEBULON NC 27597-8318

> CARTER, LISA CAROL 3604 GREEN FARM LN WAKE FOREST NC 27587-6827

FERRELL, CHARLES E FERRELL, GRETTA L 3805 JONESVILLE RD WAKE FOREST NC 27587-8181

JARVIS, MARIE D CURTIS, HURLEY MAE 3704 GIDEON DR WAKE FOREST NC 27587-6360

> TODD, JOAN M 4180 STELLS RD WAKE FOREST NC 27587-6306

> HARTSFIELD, ROZELIA J HEIRS HATTIE SMITH 2450 MINERAL SPRINGS RD BOYDTON VA 23917-4404

> BIRMINGHAM, JOHN DAVIS 3636 GREEN FARM LN WAKE FOREST NC 27587-6827

WW OVERTIME LLC 3728 GIDEON DR WAKE FOREST NC 27587-6360

LEE, BRENDA HEIRS BRENDEX MEEKS 3861 JONESVILLE RD WAKE FOREST NC 27587-8181

ALSTON, HENRY ALSTON, MARIE F 3741 JONESVILLE RD WAKE FOREST NC 27587-8179

BOSTIC, BILLIE D BOSTIC, JOHN J 9413 WHITE CARRIAGE DR WAKE FOREST NC 27587-7046

BIRMINGHAM, JOHN D 3636 GREEN FARM LN WAKE FOREST NC 27587-6827 HOWE, MARK JAMES JR PO BOX 61122 RALEIGH NC 27661-1122

DONAN, JESUS CORDON, LUCY DONAN 3617 GREEN FARM LN WAKE FOREST NC 27587-6828

POWER ELEVEN CONSTRUCTION LLC 4125 DURHAM CHAPEL HILL BLVD STE 8A DURHAM NC 27707-2666

> BOUTAVONG, KIT 3521 WOOD DUCK LN WAKE FOREST NC 27587-6874

PEELER, JAMIE ELIZABETH 313 SHERWEE DR RALEIGH NC 27603-3521

BOYD, KATHERINE B PAYNE, M TRAVIS 4220 MILLPOINT DR WAKE FOREST NC 27587-6377

PHILLIPS, BRETT L JR PHILLIPS, KRISTEN HOPE 9237 BLACKLEY LAKE RD WAKE FOREST NC 27587-8196

> PULLEN, MAGGIE H C/O SAREN GILMORE 3833 JONESVILLE RD WAKE FOREST NC 27587-8181

WATKINS POND INC ANTHONY BRIDGES 98 BERKSHIRE LN HAMPSTEAD NC 28443-0480

JARVIS, MYRON JARVIS, MARIE 3704 GIDEON DR WAKE FOREST NC 27587-6360 BURNHAM, ABRAHAM T BURNHAM, KYLA L 3803 JONESVILLE RD WAKE FOREST NC 27587-8181

HARRIS, OLLIE VIRGIN HEIRS HARRIS, LORINE B LORINE B HARRIS PO BOX 225 FRANKLINTON NC 27525-0225

> DALEY, JOSEPH P 3619 GREEN FARM LN WAKE FOREST NC 27587-6828

PHILLIPS, BRETT LEE JR PHILLIPS, KRISTEN HOPE 9237 BLACKLEY LAKE RD WAKE FOREST NC 27587-8196

> QUIRINO, MARIA ESTELA 4916 UNIVERSAL DR WAKE FOREST NC 27587-6356

KENNETH INVESTMENT LLC 10030 GREEN LEVEL CHURCH RD STE 802 CARY NC 27519-8195

KENNETH INVESTMENT LLC 10030 GREEN LEVEL CHURCH RD STE 802 CARY NC 27519-8195

KENNETH INVESTMENT LLC 10030 GREEN LEVEL CHURCH RD STE 802 CARY NC 27519-8195

KENNETH INVESTMENT LLC 10030 GREEN LEVEL CHURCH RD STE 802 CARY NC 27519-8195

KENNETH INVESTMENT LLC 10030 GREEN LEVEL CHURCH RD STE 802 CARY NC 27519-8195 DUNN, JAMES WILLIAM HEIRS MONTAGUE, BUNNIE DUNN 2390 W RIVER RD FRANKLINTON NC 27525-7217

KENNETH INVESTMENT LLC 10030 GREEN LEVEL CHURCH RD STE 802 CARY NC 27519-8195

KENNETH INVESTMENT LLC 10030 GREEN LEVEL CHURCH RD STE 802 CARY NC 27519-8195

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KENNETH INVESTMENT LLC 10030 GREEN LEVEL CHURCH RD STE 802 CARY NC 27519-8195

SOUTTER, SUSAN R SOUTTER, ROBERT QUENTIN 3636 BRIDGES POND WAY WAKE FOREST NC 27587-5611 WHITLEY, CLEVELAND G HEIRS DEBRA WHITLEY 3720 GIDEON DR WAKE FOREST NC 27587-6360

KULAWIAK, MEGAN 3533 WOOD DUCK LN WAKE FOREST NC 27587-6874

BARHAM, LARRY H. BARHAM, MICHAEL D. 5821 WILD ORCHID TRL RALEIGH NC 27613-8549

> SMARTT, COLLIN 147 ROLLING CREEK CIR CLAYTON NC 27520-5132

KENNETH INVESTMENT LLC 10030 GREEN LEVEL CHURCH RD STE 802 CARY NC 27519-8195

KENNETH INVESTMENT LLC 10030 GREEN LEVEL CHURCH RD STE 802 CARY NC 27519-8195

KENNETH INVESTMENT LLC 10030 GREEN LEVEL CHURCH RD STE 802 CARY NC 27519-8195

KENNETH INVESTMENT LLC 10030 GREEN LEVEL CHURCH RD STE 802 CARY NC 27519-8195

KENNETH INVESTMENT LLC 10030 GREEN LEVEL CHURCH RD STE 802 CARY NC 27519-8195

> WILSON, TIMOTHY LEE 5409 KNOLLWOOD RD RALEIGH NC 27609-4552

BLACKLEY LAKE FISHING CLUB C/O GLENN BARHAM 9001 BLACKLEY LAKE RD WAKE FOREST NC 27587-8110

CURTIS, HENDELL HEIRS 4917 UNIVERSAL DR WAKE FOREST NC 27587-6357

KULAWIAK, MEGAN 3533 WOOD DUCK LN WAKE FOREST NC 27587-6874 JP MORGAN MORTGAGE ACQUISITION CORP 4817 LONG GREEN DR WAKE FOREST NC 27587-5244

PHILLIPS, BRETT L JR PHILLIPS, KRISTEN H 9237 BLACKLEY LAKE RD WAKE FOREST NC 27587-8196

> HARTSFIELD, ROZELIA J HEIRS HATTIE SMITH 2450 MINERAL SPRINGS RD BOYDTON VA 23917-4404

FERRELL, BRIAN L 3807 JONESVILLE RD WAKE FOREST NC 27587-8181

CARPENTER, BOBBY RAY CARPENTER, ALBERTA L 3629 GREEN FARM LN WAKE FOREST NC 27587-6828

> HARTSFIELD, ROZELIA J HEIRS HATTIE SMITH 2450 MINERAL SPRINGS RD BOYDTON VA 23917-4404

KENNETH INVESTMENT LLC 10030 GREEN LEVEL CHURCH RD STE 802 CARY NC 27519-8195

UNIVERSAL CHURCH OF PRAYER & 4912 UNIVERSAL DR WAKE FOREST NC 27587-6356

GHOLSON, RYAN PATRICK 7924 MANDREL WAY RALEIGH NC 27616-9503

PHILLIPS, BRETT L JR PHILLIPS, KRISTEN H 9237 BLACKLEY LAKE RD WAKE FOREST NC 27587-8196

JONES, CHRISTOPHER D JONES, SHAWN MICHAEL 5108 CHRISTIAN SCHOOL RD PANTEGO NC 27860-9255

FERRELL, CHARLES E FERRELL, SHARON R 3805 JONESVILLE RD WAKE FOREST NC 27587-8181

> RIVERS, SUSAN M 3627 GREEN FARM LN WAKE FOREST NC 27587-6828

SOUTTER, SUSAN R SOUTTER, ROBERT QUENTIN 3636 BRIDGES POND WAY WAKE FOREST NC 27587-5611

MAYE, EVELYN Y MAYE, HILTON EUGENE 4725 MITCHELL MILL RD WAKE FOREST NC 27587-7240

SUAREZ, HELENA TRUSTEE THE HELENA SUAREZ FAMILY TRUST 9660 FALLS OF NEUSE RD # 138-286 RALEIGH NC 27615-2473

> GARCIA, SALVADOR 4901 OLD POOLE RD RALEIGH NC 27610

KENNETH INVESTMENT LLC 10030 GREEN LEVEL CHURCH RD STE 802 CARY NC 27519-8195

KENNETH INVESTMENT LLC 10030 GREEN LEVEL CHURCH RD STE 802 CARY NC 27519-8195

HOLLOWAY, ROY D HOLLOWAY, MARTHA L 3613 GREEN FARM LN WAKE FOREST NC 27587-6828

KENNETH INVESTMENT LLC 10030 GREEN LEVEL CHURCH RD STE 802 CARY NC 27519-8195

> NC FARM AND FORAGE LLC 9261 BLACKLEY LAKE RD WAKE FOREST NC 27587-8196

EXHIBIT C – MEETING MINUTES

- What is proposed timing for construction to start on the development
 - Developer and attorney explained proposed timeline with development plan and permits
- Would you have plans to do with the area that isn't a part of development?
 - Developer explained that wetland and southern land will remain the way it is (no development)
- How do we plan to avoid pollution from construction to the wells.
 - Developer and engineer explained their precautions in the construction process and state level regulations
- What about the blacktop water runoff and drying wells
 - Engineer explains storm drainage system and pond that will be on site state mandated process that requires permit from town to avoid flooding downstream properties.
- Worried about runoff into Watkins Pond What guarantee that it won't "get dirtied up".
 - Engineer explains codes and state mandated permits required to help control effects to the pond. Municipality will also come out to inspect site and silt fence.
- Who is the Developer on this project
 - Attorney explained who the client is and their members
- What is the price point of the townhomes and single-family homes
 - Developer explained projections on cost per unit. Do not have final pricing due to market changes and upgrades
- Will there be any fencing on the wooded areas into the private properties to separate the areas. Worried about people passing through to private property with greenways. Worried about "higher quality resident"
 - Developer and attorney explained Not projecting fencing due to where the wetlands are. Town of Rolesville will have public easement regarding the greenway it is up to the Town of Rolesville regarding fencing. Unlikely due to natural features.
- What is going to happen to the property that is not accessible from the road and is not in the wetlands? Will this ever be developed?
 - Developer explains it will not be developed and remained untouched. Units will not be added later to the plan.
- Will the land owner that is located along road next to development be able to access the road?
 - Attorney and developer explained that they will have access in and out as it is today. It is a public road
- The buffer at the NE corner of the development, where the words Universal Dr are on the map, appears to back up to the front yard at 4921 (the last home on the right). Will access to that end of Universal Dr beyond Gideon be cut off?
 - Attorney explained that the owners will still have access to their property. We are not allowed to cut off access. The scope of the rezoning should not effect that.

- Does this project have anything to do with the greenway plan?
 - Attorney explained that we do not have control of greenway development we give easement to the Town of Rolesville.
- Concerted that diesel fuel will get into the Watkins Pond
 - Engineer explained that the control of the fuel tank will be mandated at a state level by the contractor this is handled at the construction phase.
- Is the town mandating the developer to address the traffic concerns?
 - Attorney and Developer explained that an Impact analysis was done by Ramey Kemp. The NCDOT signed off on this. Based on increased trips and conditions on site they make recommendations on monitoring and approved intersections. The results will be included in the request. The Town of Rolesville contracts that traffic engineer and the developer and are not associated with the developer
- Are there plans to pave Universal Dr as well as Gideon?
- The town is requiring developer to pave all of Gideon Drive, not Universal
- Concerned about increased traffic load on Universal Drive
 - Developer explained access points to the development and town requirements
- Will Universal not be eligible for paving?
 - Engineer explained it has not been required by the town to be paved for this development. Not anticipate increased traffic to Universal due to it being unpaved. It is not a public road.
- Who sends out the meeting notifications for the City of Rolesville public hearings?
 - Attorney explained the notices will be coming from the Town of Rolesville. Mailed and signs are typical notification types as well as posted on their website.
- Will there be an HOA with this development?
 - Developer explained there will be an HOA that will maintain open areas as well as amenities.
- Where will the amenities be located within the development?
 - Engineer explained what amenities they are expecting to create and location of same.
- What type of barriers do you see with the proposal plan?
 - Developer and attorney explained that they have met with staff and made modification to address any of these concerns. Also explained there is a good path forward considering policies and overall plan for the Town of Rolesville
- If the church gave permission to be paved on Universal, could it be paved? Do we need to request it be paved with the Town of Rolesville?
 - Attorney explained that yes you can pave it if is your private road
- Residents on Jonesville Road Concerned about safety on this road for children there are no sidewalks. How do we get sidewalks put in on that road
 - Attorney and engineer explained improvements can only be made on our property. We can not take other people's property to create sidewalks. We are only required to improve along out frontage. We are building roadway and sidewalk on the property.
- Will school busses be stopping on Jonesville Road or will it go into the development? Will the roads be able to accommodate this?

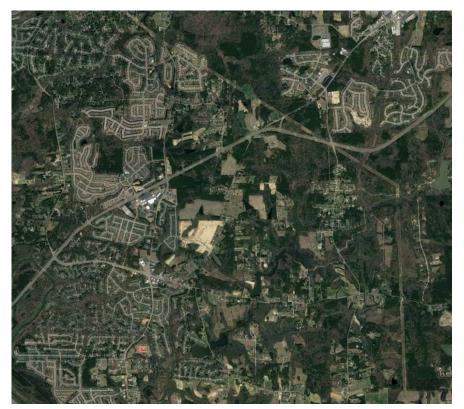
- Engineer and developer explained the education department will be making that decision later on in the process. We have not control/make on that decision.
- Has any analysis been done regarding any wildlife in the wetlands on the property?
 - Attorney and engineer explained the open space requirements as well as the other preliminary environmental analysis that are required. The development will be predominantly be taking place in the already cleared areas.
- What measure will be taking place for privacy to neighboring properties? Will there be n natural buffers?
 - Attorney, developer and engineer explained the tree preservation areas and that they will keep trees where they can. There will be vegetative buffers and open space around property line.
- Is there a sidewalk plan along the eastern portion of Gideon Drive?
 - The engineer explained the town street requirements will require sidewalk improvements.
- What is the architectural design for the homes in the development?
 - Developer explained that they will be colonial type design that generally matches other developments in the area. This will not be mandated affordable housing but will be market rate but not luxury
- Neighbors are worried that the prices of the homes are not in line with others in the area they are too inexpensive compared to the "nice homes" in the area. We are worried about property value decreasing based on this development.
 - Developer and attorney explained that the prices will change in the future based on market rate. It depends on what the market will be like in the next 3-5 years. There will be a range depending on the home type (townhomes and single family).
- Is there a date on the next meeting?
 - Attorney and developer explained that there has not been a meeting set yet. More documentation must be submitted. A link for the Town's portal was shared in the Zoom chat

EXHIBIT D – MEETING ATTENDEES

- 1. Sam Morris (Attorney with Longleaf Law Partners)
- 2. Kaline Shelton (Assistant at Longleaf Law Partners)
- 3. Steven George (Development Team)
- 4. Jeremy Keeny (Engineer)
- 5. Joan Todd
- 6. Natasha Hayes Smart
- 7. Marie Jarvis
- 8. Helena Suarez
- 9. Collin Smartt
- 10. Bill Harrell
- 11. Bryan Yaborough
- 12. Jackie
- 13. Lorine Harris
- 14. Steve
- 15. Brett
- 16. 919-453-4522
- 17.919-602-5532
- 18.919-621-1068
- 19. 984-204-0897
- 20. 434-265-0618
- 21. 919-272-1335
- 22. 919-438-9979
- 23. 919-491-6535
- 24. 919-827-5639

RAMEY KEMP ASSOCIATES

TOGETHER WE ARE LIMITLESS







Harris Creek Farm **Traffic Impact Analysis Rolesville, North Carolina**



rameykemp.com

TRAFFIC IMPACT ANALYSIS

FOR

HARRIS CREEK FARM

LOCATED

IN

ROLESVILLE, NORTH CAROLINA

Prepared For: Town of Rolesville 502 Southtown Circle Rolesville, NC 27571

Prepared By: Infrastructure Consulting Services, Inc. *dba* **Ramey Kemp Associates** 5808 Faringdon Place Raleigh, NC 27609 License #F-1489



MAY 2023

Prepared By: DAR

Reviewed By: <u>JAE</u>

RKA Project No. 20498 - 009

TRAFFIC IMPACT ANALYSIS HARRIS CREEK FARM ROLESVILLE, NORTH CAROLINA

EXECUTIVE SUMMARY

1. Development Overview

A Traffic Impact Analysis (TIA) was conducted for the proposed Harris Creek Farm development in accordance with the Town of Rolesville (Town) Land Development Ordinance (LDO) and North Carolina Department of Transportation (NCDOT) capacity analysis guidelines. The proposed development, anticipated to be completed in 2027, is to be located on the west side of Jonesville Road near Universal Drive in Rolesville, NC. The proposed development is expected to consist of 68 single-family homes and 81 townhomes. Site access is proposed via two (2) fullmovement driveway connections: one on Universal Drive and one on Jonesville Road approximately 700 feet south of Universal Drive.

The study analyzes traffic conditions during the weekday AM and PM peak hours for the following scenarios:

- 2022 Existing Traffic Conditions
- 2027 No-Build Traffic Conditions
- 2027 Build Traffic Conditions
- 2027 Build-Improved Traffic Conditions

2. Existing Traffic Conditions

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

- US 401 Bypass and Jonesville Road
- US 401 Bypass and Eastern U-Turn Location
- Mitchell Mill Road and Jonesville Road / Peebles Road
- Jonesville Road and Universal Drive



Existing peak hour traffic volumes were determined based on traffic counts conducted at the study intersections listed above except for Jonesville Road and Universal Drive, in November of 2021 during typical weekday AM (7:00 AM – 9:00 AM) and PM (4:00 PM – 6:00 PM) peak periods, while schools were in session for in-person learning.

Existing peak hour turning movement volumes at the intersection of Jonesville Road and Universal Drive were estimated by generating and assigning trips for the nine (9) homes that are accessed via Universal Drive. It was estimated that there will be 8 AM trips: 2 enter 6 exit and 10 PM trips: 7 enter 3 exit. The trips were distributed to the north and south along Jonesville Road the same as site trips. Through traffic volumes were balanced from the Mitchell Mill Road/Jonesville Road intersection.

Previously collected counts from the year 2021 were projected to the 2022 existing analysis year using a compounded annual growth rate of 2%. Weekday AM and PM traffic volumes were balanced between study intersections, where appropriate.

3. Site Trip Generation

The proposed development is assumed to consist of 68 single-family homes and 81 townhomes,. Average weekday daily, AM peak hour, and PM peak hour trips for the proposed development were estimated using methodology contained within the ITE *Trip Generation Manual*, 11th Edition. Table E-1 provides a summary of the trip generation potential for the site.

Land Use (ITE Code)	Intensity		Weekday AM Peak Hour Trips (vph)			Weekday PM Peak Hour Trips (vph)		
		(vpd)	Enter	Exit	Total	Enter	Exit	Total
Single-Family Home (210)	68 DU	708	13	39	52	44	25	69
Single Family Attached (215)	81 DU	568	9	27	36	26	19	45
Total Primary Trips		1,276	22	66	88	70	44	114

Table E-1: Site Trip Generation



4. Future Traffic Conditions

Through coordination with the Town and NCDOT, it was determined that an annual growth rate of 0% would be used to generate 2027 projected weekday AM and PM peak hour traffic volumes. A growth rate of 0% was used due to the number of developments included in the background traffic and the proximity of some of these developments to the proposed development. The following adjacent developments were identified to be considered under future conditions:

- Cobblestone Crossing Mixed-Use (Cobblestone)
- Young Street PUD (The Point)
- Wheeler Tract (Rolesville Crossing)
- Louisbury Road Assemblage
- Kalas / Watkins Family Property (Kalas Falls)
- 5109 Mitchell Mill
- Hills at Harris Creek

5. Capacity Analysis Summary

The analysis considered weekday AM and PM peak hour traffic for 2022 existing, 2027 no-build, 2027 build, and 2027 build-improved conditions. Refer to Section 7 of the TIA for the capacity analysis summary performed at each study intersection.

6. Recommendations

Based on the findings of this study, specific geometric and traffic control improvements have been identified at study intersections. The improvements are summarized below and are illustrated in Figure E-1.

Recommended Improvements by Developer

US 401 Bypass and Jonesville Road

• Conduct a full signal warrant analysis prior to full build-out of the proposed development and install a traffic signal if warranted and approved by the Town and NCDOT.



US 401 Bypass and Eastern U-Turn Location

• Conduct a full signal warrant analysis prior to full build-out of the proposed development and install a traffic signal if warranted and approved by the Town and NCDOT.

Mitchell Mill Road and Jonesville Road / Peebles Road

- Construct a southbound (Jonesville Road) left-turn lane with at least 100 feet of storage and appropriate decel and taper.
 - It should be noted that this improvement was also identified by the 5109
 Mitchell Mill Road TIA and Hills at Harris Creek TIA
- Construct a westbound (Mitchell Mill Road) right-turn lane with at least 100 feet of storage and appropriate decel and taper.
 - It should be noted that this improvement was also identified by the Hills at Harris Creek TIA
- Construct an eastbound (Mitchell Mill Road) left-turn lane with at least 100 feet of storage and appropriate decel and taper.
 - It should be noted that this improvement was also identified by the 5109
 Mitchell Mill Road TIA
- Conduct a full signal warrant analysis prior to full build-out of the proposed development and install a traffic signal if warranted and approved by the Town and NCDOT.

Jonesville Road and Site Drive

- Construct the eastbound approach (Site Drive) with one ingress lane and one egress lane.
- Provide stop-control for the eastbound approach (Site Drive).



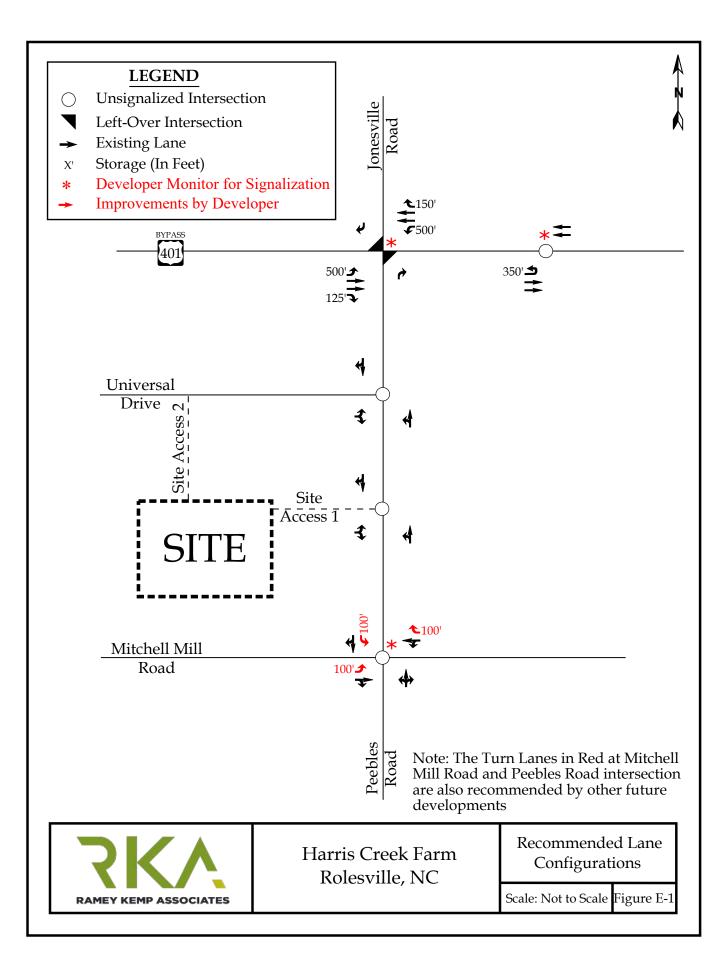


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- Appendix A: Scoping Documentation
- Appendix B: Traffic Counts
- Appendix C: Adjacent Development Information
- Appendix D: Capacity Calculations US 401 Bypass & Jonesville Road
- Appendix E: Capacity Calculations US 401 Bypass & Eastern U-Turn Location
- Appendix F: Capacity Calculations Mitchell Mill Road & Jonesville Road / Peebles Road
- Appendix G: Capacity Calculations Jonesville Road & Universal Drive
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- Appendix J: MUTCD / ITRE Signal Warrant Analysis



TRAFFIC IMPACT ANALYSIS HARRIS CREEK FARM ROLESVILLE, NORTH CAROLINA

1. INTRODUCTION

The contents of this report present the findings of the Traffic Impact Analysis (TIA) conducted for the proposed Harris Creek Farm development in Rolesville, North Carolina. The proposed development, anticipated to be completed in 2027, is to be located on the west side of Jonesville Road near Universal Drive in Rolesville, NC. The proposed development is expected to consist of 68 single-family homes and 81 townhomes. The purpose of this study is to determine the potential impacts to the surrounding transportation system created by traffic generated by the proposed development, as well as recommend improvements to mitigate the impacts.

The study analyzes traffic conditions during the weekday AM and PM peak hours for the following scenarios:

- 2022 Existing Traffic Conditions
- 2027 No-Build Traffic Conditions
- 2027 Build Traffic Conditions

1.1. Site Location and Study Area

The proposed development is to be located on the west side of Jonesville Road near Universal Drive in Rolesville, NC. Refer to Figure 1 for the site location map. The study area for the TIA was determined through coordination with the North Carolina Department of Transportation (NCDOT) and the Town of Rolesville (Town) and consists of the following existing intersections:

- US 401 Bypass and Jonesville Road
- US 401 Bypass and Eastern U-Turn Location
- Jonesville Road and Universal Drive
- Mitchell Mill Road and Jonesville Road / Peebles Road

Refer to Appendix A for the approved scoping documentation.



1.2. Proposed Land Use and Site Access

The site is to be located on the west side of Jonesville Road near Universal Drive. The proposed development is anticipated to be completed in 2027, and is assumed to consist of the following uses:

- 68 single-family homes
- 81 townhomes

Site access to the proposed development is expected to be provided via two (2) full-movement driveway connections: one on Universal Drive and one on Jonesville Road approximately 700 feet south of Universal Drive. Refer to Figure 2 for a copy of the preliminary site plan.

1.3. Adjacent Land Uses

The proposed development is located in an area consisting primarily of undeveloped land and residential development.

1.4. Existing Roadways

Existing lane configurations (number of traffic lanes on each intersection approach), storage capacities, and other intersection and roadway information within the study area are shown in Figure 3. Table 1 provides a summary of this information, as well.

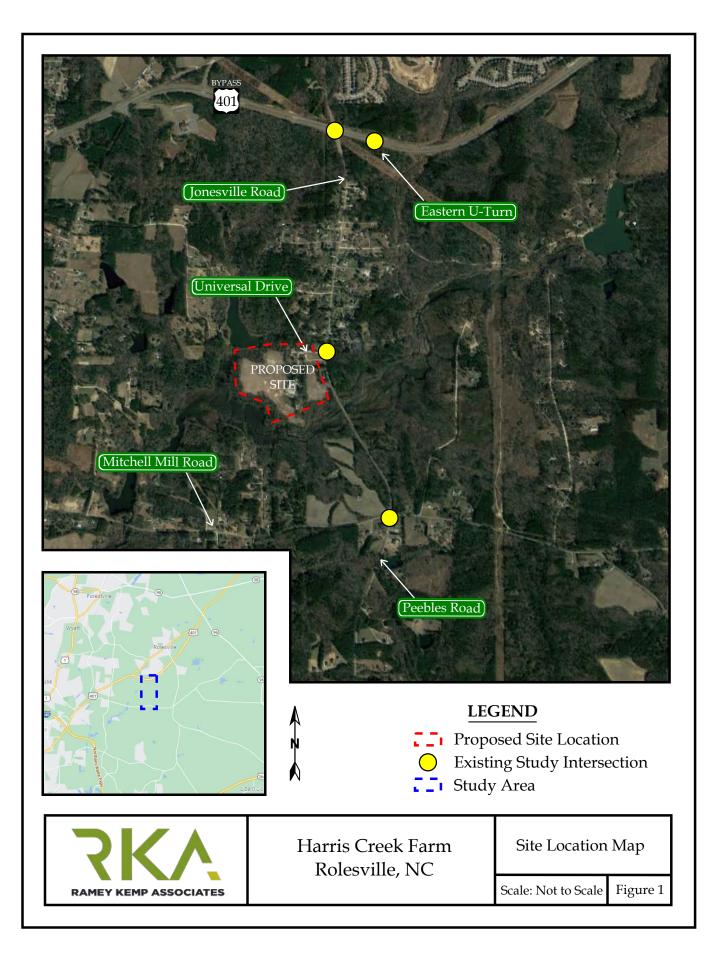


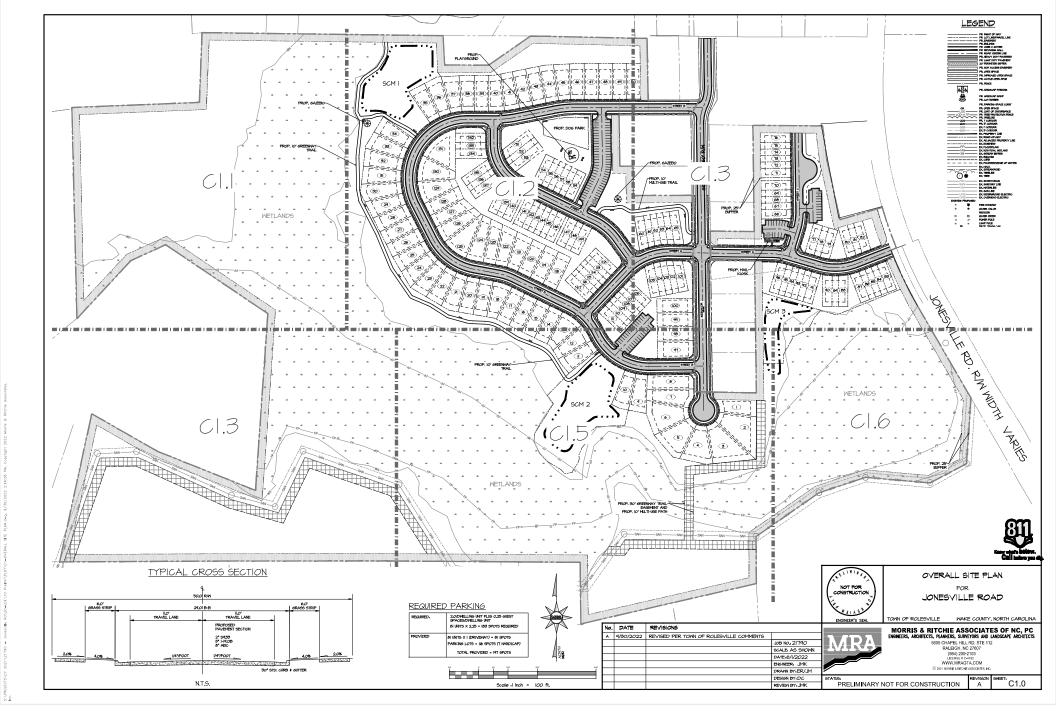
Road Name	Route Number	Typical Cross- Section	Speed Limit	Maintained By	2019 AADT (vpd)	
US 401 Byp	Dass	4-lane divided	55 mph	NCDOT	17,500	
Jonesville Road	SR 2226	2-lane undivided	35 mph / 45 mph	NCDOT	2,210*	
Mitchell Mill Road	SR 2224	2-lane undivided	45 mph	NCDOT	4,000	
Peebles Road	SR 2929	2-lane undivided	45 mph	NCDOT	1,700*	

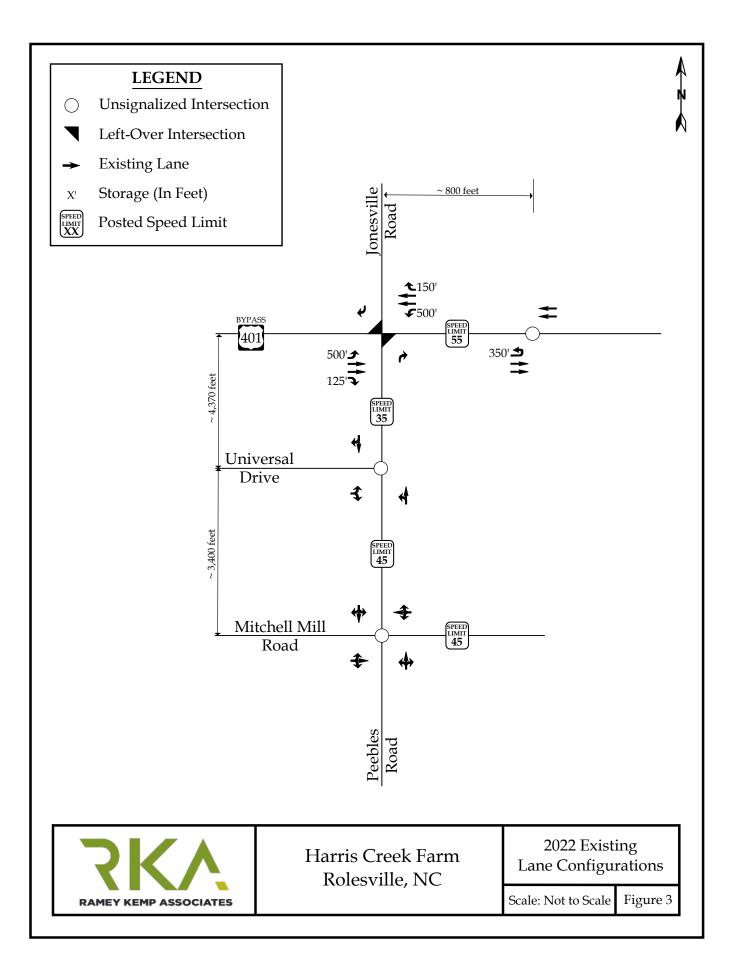
Table 1: Existing Roadway Inventory

*ADT based on 2022 existing traffic volumes and assuming the weekday PM peak hour volume is 10% of the average daily traffic.









2. 2022 EXISTING PEAK HOUR CONDITIONS

2.1. 2022 Existing Peak Hour Traffic Volumes

Existing peak hour traffic volumes were determined based on previously collected traffic counts conducted at the study intersections listed below, in November of 2021 during typical weekday AM (7:00 AM – 9:00 AM) and PM (4:00 PM – 6:00 PM) peak periods, while schools were in session for in-person learning:

- US 401 Bypass and Jonesville Road
- US 401 Bypass and Eastern U-Turn Location
- Mitchell Mill Road and Jonesville Road / Peebles Road

Previously collected counts from the year 2021 were projected to the 2022 existing analysis year using a compounded annual growth rate of 2%.

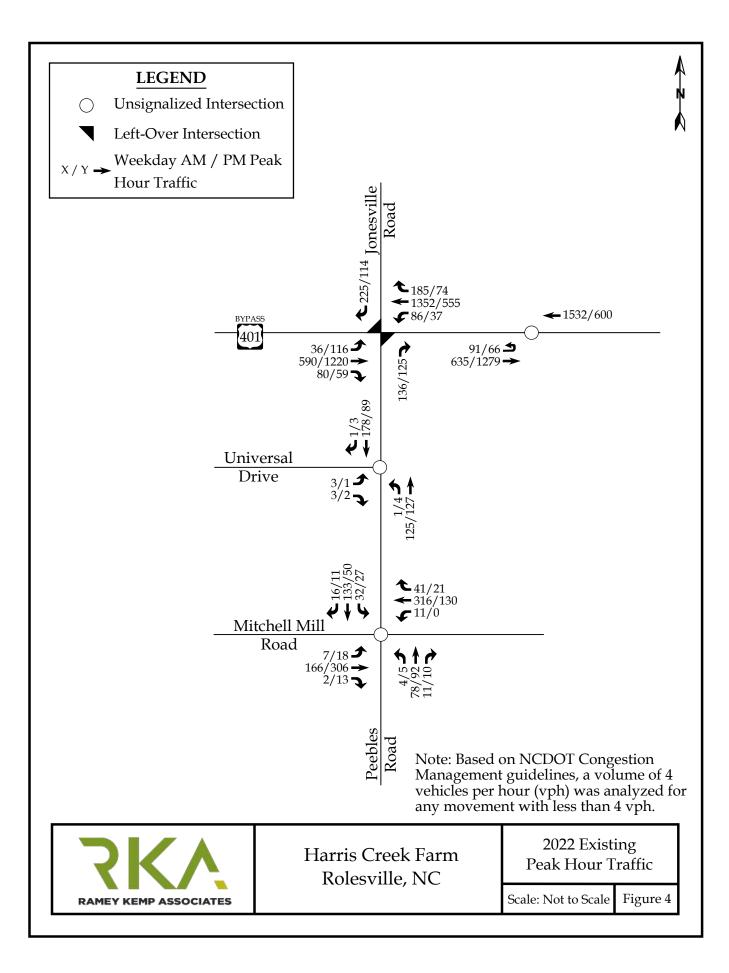
Existing peak hour turning movement volumes at the intersection of Jonesville Road and Universal Drive were estimated by generating and assigning trips for the nine (9) homes that are accessed via Universal Drive. It was estimated that there will be 8 AM trips: 2 enter 6 exit and 10 PM trips: 7 enter 3 exit. The trips were distributed to the north and south along Jonesville Road the same as site trips. Through traffic volumes were balanced from the Mitchell Mill Road/Jonesville Road intersection.

Weekday AM and PM traffic volumes were balanced between study intersections, where appropriate. Refer to Figure 4 for 2022 existing weekday AM and PM peak hour traffic volumes. A copy of the count data is located in Appendix B of this report.

2.2. Analysis of 2022 Existing Peak Hour Traffic Conditions

The 2022 existing weekday AM and PM peak hour traffic volumes were analyzed to determine the current levels of service at the study intersections under existing roadway conditions. The results of the analysis are presented in Section 7 of this report.





3. 2027 NO-BUILD PEAK HOUR CONDITIONS

In order to account for growth of traffic and subsequent traffic conditions at a future year, nobuild traffic projections are needed. No-build traffic is the component of traffic due to the growth of the community and surrounding area that is anticipated to occur regardless of whether or not the proposed development is constructed. No-build traffic is comprised of existing traffic growth within the study area and additional traffic created as a result of adjacent approved developments.

3.1. Ambient Traffic Growth

Through coordination with NCDOT and the Town, it was determined that an annual growth rate of 0% would be used to generate 2027 projected weekday AM and PM peak hour traffic volumes. A growth rate of 0% was used due to the number of developments included in the background traffic and the proximity of some of these developments to the proposed development. Refer to Figure 5 for 2027 projected peak hour traffic.

3.2. Adjacent Development Traffic

Through coordination with NCDOT and the Town, the following adjacent developments were identified to be included in this study:

- Cobblestone Crossing Mixed-Use (Cobblestone)
- Young Street PUD (The Point)
- Wheeler Tract (Rolesville Crossing)
- Louisbury Road Assemblage
- Kalas / Watkins Family Property (Kalas Falls)
- 5109 Mitchell Mill
- Hills at Harris Creek

Table 2, on the following page, provides a summary of the adjacent developments. Adjacent development trips are shown in Figure 6. Adjacent development information can be found in Appendix C.



Development Name	Location	Build- Out Year	Land Use / Intensity	TIA Performed	
Cobblestone Crossing Mixed- Use	Crossing Mixed- Main Street and 2023		180 multi-family homes 18,200 sq. ft. municipal flex space 50,000 sq. ft. general retail	March 2021 by RKA	
Young Street PUD	Along both sides of US 401 Bypass west of Young Street	2025	96 single-family homes 525 single-family homes 320 multi-family homes 122,800 sq. ft. general retail	June 2019 by Kimley Horn	
Wheeler Tract	Northeast quadrant of the intersection of Rolesville Road and Mitchell Mill Road2026233 single-family homes 125 multi-family homes		June 2019 by RKA		
Louisbury Road Assemblage	West of Louisbury Road and south of Stells Road	2025	152 single-family homes	May 2020 by RKA	
Kalas / Watkins Family Property	Along the west side of Rolesville Road, north of Mitchell Mill Road	2025	439 single-family homes 96 multi-family homes	August 2019 by Stantec	
5109 Mitchell Mill	Along both sides of Jonesville Road north of Mitchell Mill Road	2028	69 single-family homes 195 single-family homes 129 multi-family homes 50,000 sq. ft. shopping center	August 2022 by RKA	
Hills at Harris Creek		2027	211 single-family homes 109 multi-family homes 25,400 sq. ft. general retail	May 2022 by RKA	

Table 2: Adjacent Development Information



3.3. Future Roadway Improvements

Based on coordination with NCDOT and the Town, it was determined there were two previously approved TIA's that recommended roadway improvements that were considered under future conditions with this study. Both developments are to construct improvements at the intersection of Jonesville Road and Mitchell Mill Road. An exclusive eastbound left-turn lane was identified in the 5109 Mitchell Mill Road TIA. An exclusive westbound right-turn lane was identified in the Hills at Harris Creek TIA. In both the 5109 Mitchell Mill Road TIA and the Hills at Harris Creek TIA an exclusive southbound left-turn lane improvement was identified. It should be noted that per the Rolesville Community Transportation Plan (dated May 2022), the ultimate cross-section of Jonesville Road is identified as a 2-lane roadway with a center two-way-left-turn-lane (TWLTL) and Mitchell Mill Road is identified as a 4-lane median-divided roadway.

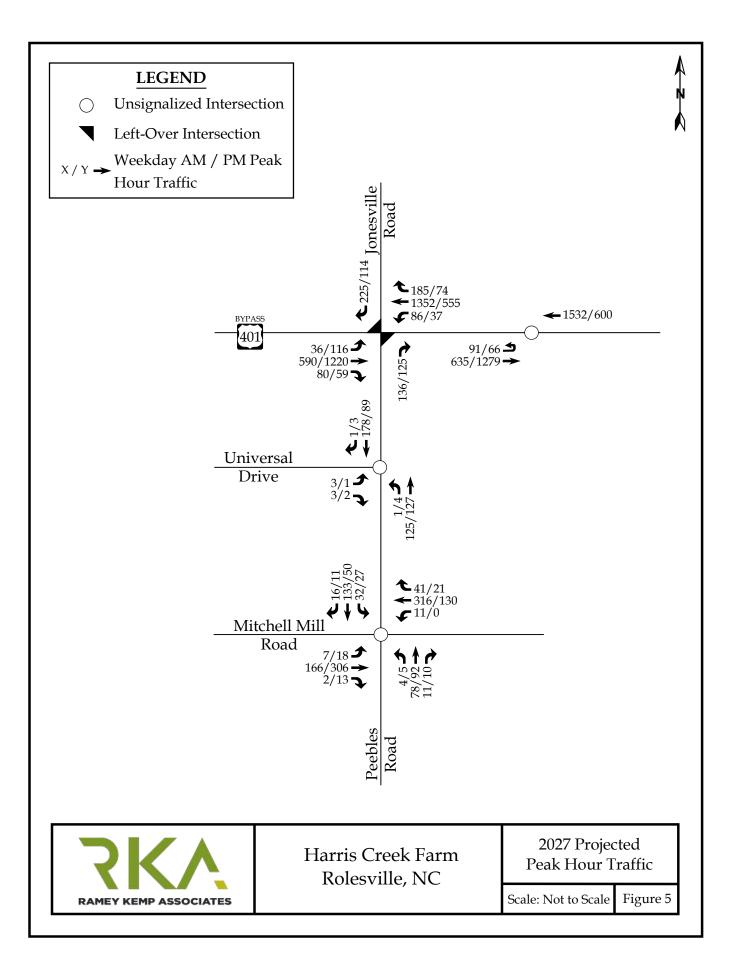
3.4. 2027 No-Build Peak Hour Traffic Volumes

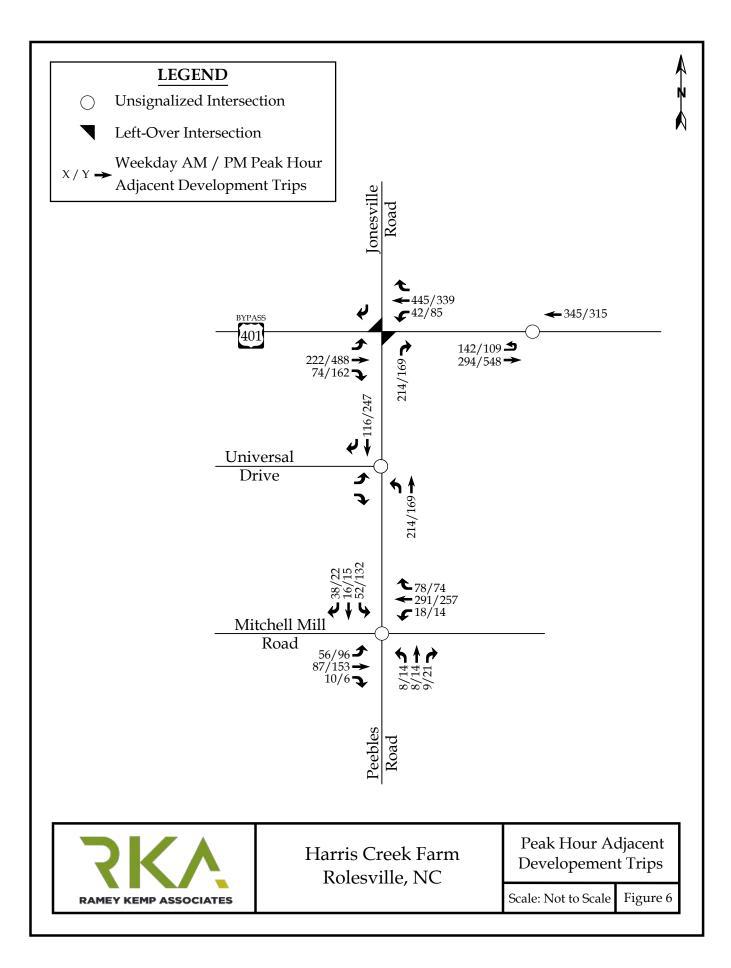
The 2027 no-build traffic volumes were determined by projecting the 2022 existing peak hour traffic to the year 2027 and adding the adjacent development trips. Refer to Figure 7 for an illustration of the 2027 no-build peak hour traffic volumes at the study intersections.

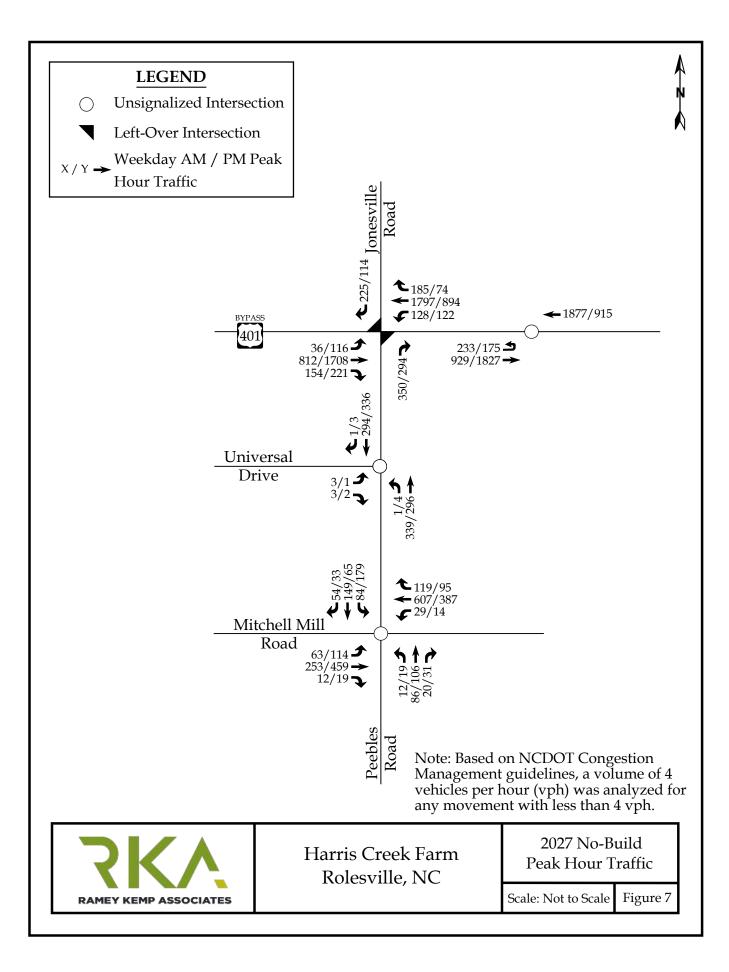
3.5. Analysis of 2027 No-Build Peak Hour Traffic Conditions

The 2027 no-build AM and PM peak hour traffic volumes at the study intersections were analyzed with existing geometric roadway conditions and traffic control. The analysis results are presented in Section 7 of this report.









4. SITE TRIP GENERATION AND DISTRIBUTION

4.1. Trip Generation

The proposed development is assumed to consist of 68 single-family homes and 81 townhomes. Average weekday daily, AM peak hour, and PM peak hour trips for the proposed development were estimated using methodology contained within the ITE *Trip Generation Manual*, 11th Edition. Table 3 provides a summary of the trip generation potential for the site.

Land Use (ITE Code)	Intensity Curd		Weekday AM Peak Hour Trips (vph)			Weekday PM Peak Hour Trips (vph)		
		(vpd)	Enter	Exit	Total	Enter	Exit	Total
Single-Family Home (210)	68 DU	708	13	39	52	44	25	69
Single Family Attached (215)	81 DU	568	9	27	36	26	19	45
Total Primary Trips		1,276	22	66	88	70	44	114

Table 3: Trip Generation Summary

It is estimated that the proposed development will generate approximately 1,276 total site trips on the roadway network during a typical 24-hour weekday period. Of the daily traffic volume, it is anticipated that 88 trips (22 entering and 66 exiting) will occur during the weekday AM peak hour and 114 trips (70 entering and 44 exiting) will occur during the weekday PM peak hour.



4.2. Site Trip Distribution and Assignment

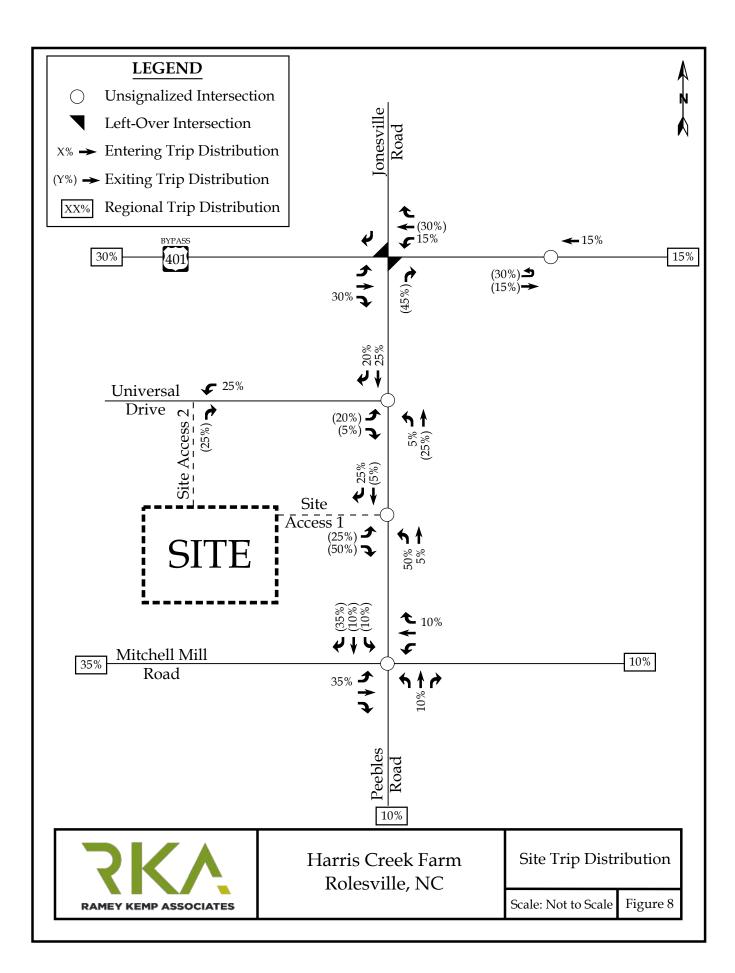
Trip distribution percentages used in assigning site trips for this development were approved during the scoping process and were estimated based on a combination of existing traffic patterns, population centers adjacent to the study area, and engineering judgment.

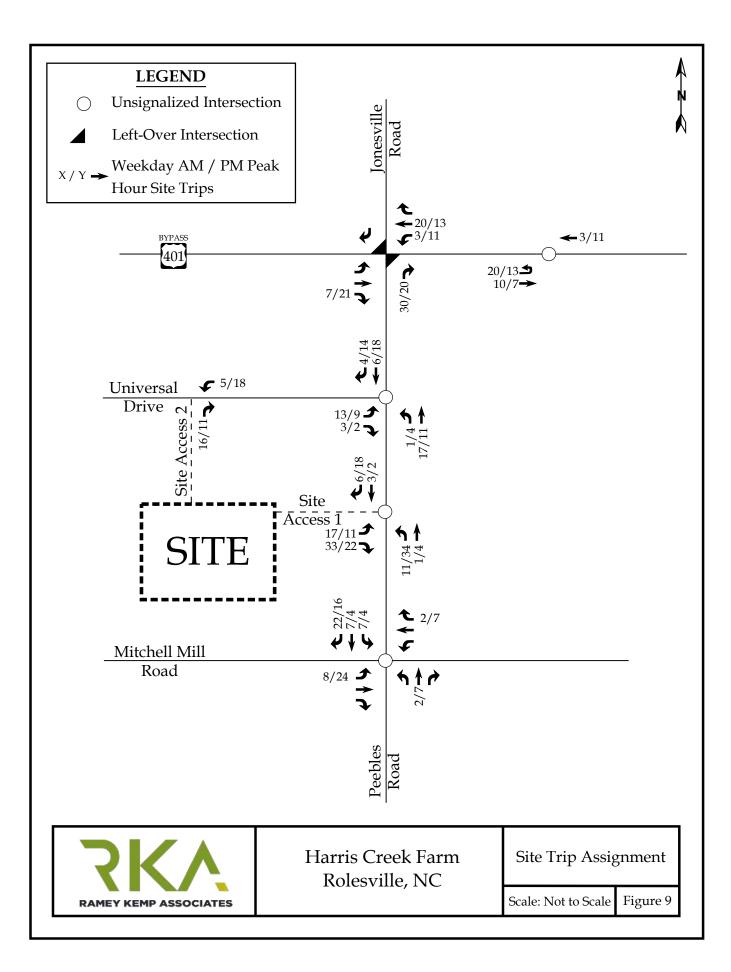
It is estimated that the residential site trips will be regionally distributed as follows:

- 35% to/from the west via Mitchell Mill Road
- 30% to/from the west via US 401 Bypass
- 15% to/from the east via US 401 Bypass
- 10% to/from the south via Peebles Road
- 10% to/from the east via Mitchell Mill Road

The site trip distribution is shown in Figure 8 and the peak hour site trip assignment is shown in Figure 9.







5. 2027 BUILD TRAFFIC CONDITIONS

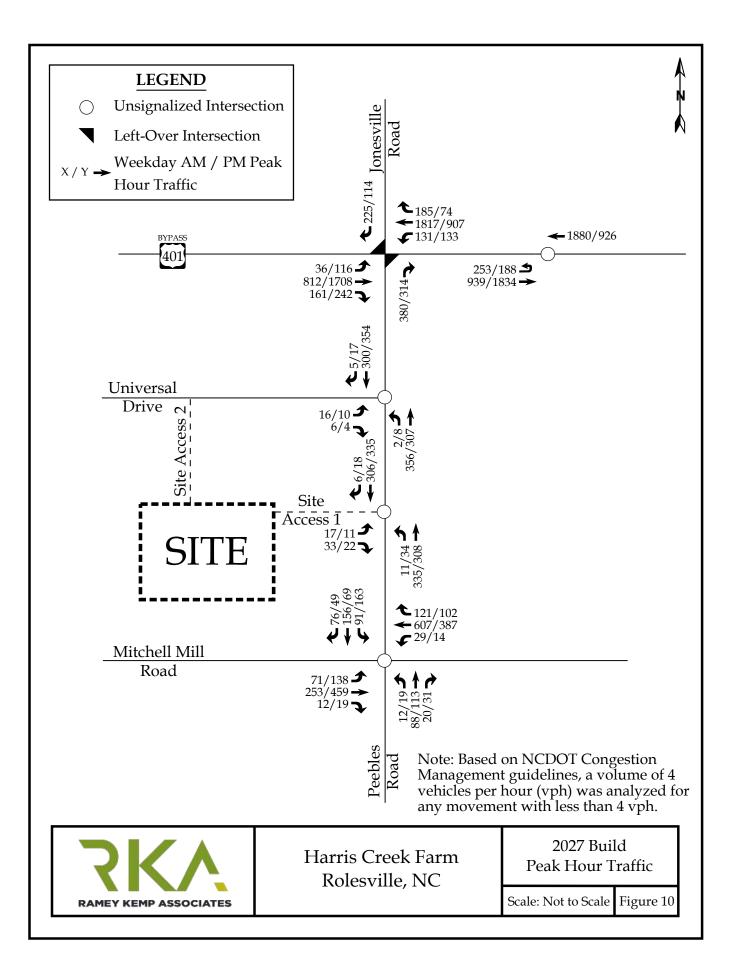
5.1. 2027 Build Peak Hour Traffic Volumes

To estimate traffic conditions with the site fully built-out, the total site trips were added to the 2027 no-build traffic volumes to determine the 2027 build traffic volumes. Refer to Figure 10 for an illustration of the 2027 build peak hour traffic volumes with the proposed site fully developed.

5.2. Analysis of 2027 Build Peak Hour Traffic Conditions

Study intersections were analyzed with the 2027 build traffic volumes using the same methodology previously discussed for existing and no-build traffic conditions. Intersections were analyzed with improvements necessary to accommodate future traffic volumes. The results of the capacity analysis for each intersection are presented in Section 7 of this report.





6. TRAFFIC ANALYSIS PROCEDURE

Study intersections were analyzed using the methodology outlined in the *Highway Capacity Manual* (HCM), 6th Edition published by the Transportation Research Board. Capacity and level of service are the design criteria for this traffic study. A computer software package, Synchro (Version 11), was used to complete the analyses for most of the study area intersections. Please note that the unsignalized capacity analysis does not provide an overall level of service for an intersection; only delay for an approach with 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." Level of service (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." Level of service varies from Level "A" representing free flow, to Level "F" where breakdown conditions are evident. Refer to Table 4 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." An average control delay of 50 seconds at a signalized intersection results in LOS "D" operation at the intersection.

UNSIGN	ALIZED INTERSECTION	SIGNALIZED INTERSECTION		
LEVEL OF SERVICE	AVERAGE CONTROL DELAY PER VEHICLE (SECONDS)	LEVEL OF SERVICE	AVERAGE CONTROL DELAY PER VEHICLE (SECONDS)	
А	0-10	А	0-10	
В	10-15	В	10-20	
С	15-25	С	20-35	
D	25-35	D	35-55	
Е	35-50	Е	55-80	
F	>50	F	>80	

Table 4: Highway Capacity Manual – Levels-of-Service and Delay

6.1. Adjustments to Analysis Guidelines

Capacity analysis at all study intersections was completed according to Town LDO and NCDOT Congestions Management Guidelines.



7. CAPACITY ANALYSIS

7.1. US 401 Bypass and Jonesville Road

The existing unsignalized intersection of US 401 Bypass Road and Jonesville Road was analyzed under 2022 existing, 2027 no-build, and 2027 build traffic conditions with the lane configurations and traffic control shown in Table 5. Refer to Table 5 for a summary of the analysis results. Refer to Appendix D for the Synchro capacity analysis reports.

ANALYSIS	A P P R	LANE	PEAK	DAY AM HOUR F SERVICE	WEEKDAY PM PEAK HOUR LEVEL OF SERVICE		
SCENARIO	O A C H	CONFIGURATIONS	Approach	Overall (seconds)	Approach	Overall (seconds)	
	EB WB* NB	2 TH, 1 RT 1 LT 1 RT	 C ¹ B ²	N/A	 E ¹ C ²	N/A	
2022 Existing	EB** WB SB	1 LT 2 TH, 1 RT 1 RT	F ¹ E ²	N/A	C ¹ B ²	N/A	
	EB WB* NB	2 TH, 1 RT 1 LT 1 RT	 D ¹ D ²	N/A	 F ¹ F ²	N/A	
2027 No-Build	EB** WB SB	1 LT 2 TH, 1 RT 1 RT	F ¹ F ²	N/A	E ¹ B ²	N/A	
2027 B. 11	EB WB* NB	2 TH, 1 RT 1 LT 1 RT	 D ¹ D ²	N/A	 F ¹ F ²	N/A	
2027 Build	EB** WB SB	1 LT 2 TH, 1 RT 1 RT	F ¹ F ²	N/A	E ¹ B ²	N/A	
2027 Build-	EB WB* NB	2 TH, 1 RT 1 LT 1 RT	B B B	B (16)	B D C	C (23)	
Improved	EB** WB SB	1 LT 2 TH, 1 RT 1 RT	F ¹ F ²	N/A	E ¹ B ²	N/A	

Table 5: Analysis Summary of US 401 Bypass and Jonesville Road

*Synchro analyzed the WB left-turns as SB through movements due to the nature of the superstreet and synchro limitations.

**Synchro analyzed the EB left-turns as NB through movements due to the nature of the superstreet and synchro limitations.

1. Level of service for major-street left-turn movement.

2. Level of service for minor-street approach.



Capacity analysis of 2022 existing traffic conditions indicates that the major-street left-turn movements and minor-street approaches are expected to operate at LOS D or better with the exception of the eastbound left-turn movement during the weekday AM peak hour (LOS F), the westbound left-turn movement during the weekday PM peak hour (LOS E), and the southbound minor-street approach during the weekday AM peak hour (LOS E).

Under 2027 no-build and 2027 build traffic conditions, the major-street left-turn movements are expected to operate at LOS E/F during the weekday AM and PM peak hours with the exception of the westbound left-turn movement during the weekday AM peak hour (LOS D) under 2027 no-build and 2027 build traffic conditions. The minor-street approaches are expected to operate at LOS E/F during the weekday AM and PM peak hours with the exception of the northbound approach during the weekday AM peak hour (LOS D) and the southbound approach during the weekday PM peak hour (LOS B) under 2027 no-build and 2027 build traffic conditions. It should be noted that the proposed development is expected to account for approximately 2% of the overall traffic at this intersection during the weekday AM and PM peak hours. The proposed development is expected to account for 8% and 6% of the northbound right movements during the AM and PM peak hours, respectively.

Due to the poor levels-of-service expected at this intersection, a traffic signal was considered under 2027 build traffic conditions to achieve acceptable levels of service. Weekday AM and PM peak hour traffic volumes were utilized in evaluating the potential need for signalization based on the guidelines contained within the *Manual on Uniform Traffic Control Devices* (MUTCD) and within the *Guidelines for Signalization of Intersections with Two or Three Approaches Final Report*, published by ITRE. Based on a review of the peak hour signal warrant at this intersection, the intersection is expected to meet the peak hour warrant for both the weekday AM and PM peak hours under 2027 no-build and 2027 build traffic conditions. It is not expected that this intersection would satisfy the MUTCD 8-hour (warrant 1) or 4-hour (warrant 2) warrants, which NCDOT favors for installation of a traffic signal. These longer period warrants are not typically met for residential areas due to the distinct peak traffic periods for these types of development. Based on a review of ITRE 95th percentile queue length calculations, the northbound right-turn movement demand is expected to be over 85%



capacity during the weekday AM peak hour and exceed capacity during the weekday PM peak hour under 2027 no-build and 2027 build traffic conditions. Refer to Appendix J for a copy of the MUTCD warrants and the ITRE 95th percentile queue length calculations.

Based on the Town's LDO, improvements must be identified to maintain no-build levels-ofservice under build traffic conditions or to limit the degradation to less than a five percent increase in total delay on any approach for those operating at failing levels-of-service under no-build traffic conditions. Therefore, additional turn-lanes were considered for the northbound right-turn and westbound left-turn movements at this intersection to achieve acceptable operation per the Town's LDO. However, additional turn-lanes are not a realistic or practical improvement at an unsignalized intersection operating with superstreet configurations.

Based on the Town's LDO, it is recommended that this intersection be monitored for signalization and a full signal warrant analysis be conducted prior to the full build-out of the proposed development and install a traffic signal if warranted and approved by the Town and NCDOT. With signalization, it is expected that this intersection will operate at acceptable levels-of-service during the weekday AM and PM peak hours.



7.2. US 401 Bypass and Eastern U-Turn Location

The existing unsignalized intersection of US 401 Bypass and Eastern U-Turn Location was analyzed under 2022 existing, 2027 no-build, and 2027 build traffic conditions with the lane configurations and traffic control shown in Table 6. Refer to Table 6 for a summary of the analysis results. Refer to Appendix E for the Synchro capacity analysis reports.

ANALYSIS	A P P R	LANE	PEAK	DAY AM HOUR SERVICE	WEEKDAY PM PEAK HOUR LEVEL OF SERVICE		
SCENARIO	O A C H	CONFIGURATIONS	Approach	Overall (seconds)	Approach	Overall (seconds)	
2022 Existing	EB* WB	1 UT 2 TH	C1	N/A	B1 	N/A	
2027 No-Build	EB* WB	1 UT 2 TH	F ¹	N/A	C1	N/A	
2027 Build	EB* WB	1 UT 2 TH	F ¹	N/A	C1	N/A	
2027 Build – Improved	EB* WB	1 UT 2 TH	D B	C (21)	B A	B (11)	

 Table 6: Analysis Summary of US 401 Bypass and Eastern U-Turn

 Location

*Synchro analyzed the EB u-turn as a NB left-turn movement due to the nature of the superstreet and synchro limitations.

1. Level of service for major-street u-turn movement.

Capacity analysis of 2022 existing and 2027 no-build traffic conditions indicates that the major-street u-turn movement is expected to operate at LOS C or better during the weekday AM and PM peak hours, with the exception of the weekday AM peak hour under 2027 no-build conditions (LOS F).

Under 2027 build traffic conditions, the major-street u-turn movement is expected to operate at LOS F during the weekday AM peak hour and at LOS C during the weekday PM peak hour. It should be noted that the proposed development is expected to account for approximately 1% of the overall traffic at this intersection during the weekday AM and PM peak hours. The proposed development is expected to account for approximately 8% and 7%



of the overall eastbound u-turn movements at this intersection during the weekday AM and PM peak hours, respectively.

Due to the poor levels-of-service expected at this intersection, a traffic signal was considered under 2027 build traffic conditions to achieve acceptable levels of service. Weekday AM and PM peak hour traffic volumes were utilized in evaluating the potential need for signalization based on the guidelines contained within the Manual on Uniform Traffic Control Devices (MUTCD) and within the Guidelines for Signalization of Intersections with Two or Three Approaches Final Report, published by ITRE. Based on a review of signal warrants at this intersection, the peak hour warrant (warrant 3) from the MUTCD is expected to be met for the weekday AM peak hour under 2027 no-build and build traffic conditions. It is not expected that this intersection would satisfy the MUTCD 8-hour (warrant 1) or 4-hour (warrant 2) warrants, which NCDOT favors for installation of a traffic signal. These longer period warrants are not typically met for residential areas due to the distinct peak traffic periods for these types of development. Based on a review of ITRE 95th percentile queue length calculations, the eastbound u-turn movement demand is expected to exceed capacity during the weekday AM peak hour under 2027 no-build and 2027 build traffic conditions. Refer to Appendix J for a copy of the MUTCD warrants and the ITRE 95th percentile queue length calculations.

Based on the Town's LDO, improvements must be identified to maintain no-build levels-ofservice under build traffic conditions or to limit the degradation to less than a five percent increase in total delay on any approach for those operating at failing levels-of-service under no-build traffic conditions. Therefore, additional turn-lanes were considered for the eastbound u-turn movement at this intersection to achieve acceptable operation per the Town's LDO. However, additional turn-lanes are not a realistic or practical improvement at an unsignalized intersection operating with superstreet configurations.

Based on the Town's LDO, it is recommended that this intersection be monitored for signalization and a full signal warrant analysis be conducted prior to the full build-out of the proposed development and install a traffic signal if warranted and approved by the Town



and NCDOT. With signalization, it is expected that this intersection will operate at acceptable levels-of-service during the weekday AM and PM peak hours.



7.3. Mitchell Mill Road and Jonesville Road / Peebles Road

The existing unsignalized four-way stop intersection of Mitchell Mill Road and Jonesville Road / Peebles Road was analyzed under 2022 existing, 2027 no-build, and 2027 build traffic conditions with the lane configurations and traffic control shown in Table 7. Refer to Table 7 for a summary of the analysis results. Refer to Appendix F for the Synchro capacity analysis reports.

ANALYSIS	A P P R	LANE	PEAK	DAY AM HOUR SERVICE	WEEKDAY PM PEAK HOUR LEVEL OF SERVICE		
SCENARIO	O A C H	CONFIGURATIONS	Approach	Overall (seconds)	Approach	Overall (seconds)	
2022 Existing	EB WB NB SB	1 LT-TH-RT 1 LT-TH-RT 1 LT-TH-RT 1 LT-TH-RT	$egin{array}{c} B^1 \ B^1 \ B^1 \ B^1 \ B^1 \end{array}$	B (13)	$\begin{array}{c} B^1\\ A^1\\ A^1\\ A^1\end{array}$	B (11)	
2027 No-Build	EB WB NB SB	1 LT, 1 TH-RT 1 LT-TH, 1 RT 1 LT-TH-RT 1 LT, 1 TH-RT	$\begin{array}{c} C^1 \\ F^1 \\ C^1 \\ C^1 \end{array}$	F (95)	$F^1 \\ E^1 \\ C^1 \\ C^1$	F (57)	
2027 Build	EB WB NB SB	1 LT, 1 TH-RT 1 LT-TH, 1 RT 1 LT-TH-RT 1 LT, 1 TH-RT	$\begin{array}{c} C^1 \\ F^1 \\ C^1 \\ C^1 \end{array}$	F (104)	$F^1 \\ F^1 \\ C^1 \\ C^1$	F (61)	
2027 Build - Improved	EB WB NB SB	1 LT, 1 TH-RT 1 LT-TH, 1 RT 1 LT-TH-RT 1 LT, 1 TH-RT	A B B C	B (14)	B B B B	B (13)	

Table 7: Analysis Summary of Mitchell Mill Road and Jonesville Road / Peebles Road

1. Level of service for all-way stop controlled approach.

Capacity analysis of 2022 existing indicates that the intersection is expected to operate at an overall LOS B or better during the weekday AM and PM peak hours. Under 2027 no-build and 2027 build traffic conditions, this intersection is expected to operate at an overall LOS F during the weekday AM and PM peak hours. It should be noted that the proposed development is expected to account for approximately 3% and 4% of the overall traffic at this



intersection during the weekday AM and PM peak hours, respectively. The proposed development is expected to account for approximately 11% and 17% of the eastbound left movement and 17% and 7% of the westbound right movements during the weekday AM and PM peak hours, respectively.

Several turn lanes expected to be constructed by adjacent developments were included in the 2027 no-build and 2027 build scenarios. An exclusive eastbound left-turn lane was identified in the 5109 Mitchell Mill Road TIA. An exclusive westbound right-turn lane was identified in the Hills at Harris Creek TIA. In both the 5109 Mitchell Mill Road TIA and the Hills at Harris Creek TIA an exclusive southbound left-turn lane improvement was identified.

Due to the poor levels-of-service expected at this intersection, a traffic signal was considered under 2027 build traffic conditions to achieve acceptable levels-of-service. The peak hour warrant (warrant 3) from the *Manual on Uniform Traffic Control Devices* (MUTCD) was considered. Based on a review of the peak hour signal warrant at this intersection, the intersection is expected to meet the peak hour warrant for both the weekday AM and PM peak hours under 2027 no-build and 2027 build traffic conditions. It is not expected that this intersection would satisfy the MUTCD 8-hour (warrant 1) or 4-hour (warrant 2) warrants, which NCDOT favors for installation of a traffic signal. These longer period warrants are not typically met for residential areas due to the distinct peak traffic periods for these types of development. Refer to Appendix J for a copy of the MUTCD warrants.

Based on the Town's LDO, it is recommended that this intersection be monitored for signalization and a full signal warrant analysis be conducted prior to the full build-out of the proposed development and install a traffic signal if warranted and approved by the Town and NCDOT. With signalization, it is expected that this intersection will operate at acceptable levels-of-service during the weekday AM and PM peak hours.



7.4. Jonesville Road and Universal Drive

The existing unsignalized intersection of Jonesville Road and Universal Drive was analyzed under 2027 build traffic conditions with the lane configurations and traffic control shown in Table 8. Refer to Table 8 for a summary of the analysis results. Refer to Appendix G for the synchro capacity analysis reports.

ANALYSIS	A P P R	LANE	PEAK	DAY AM HOUR SERVICE	WEEKDAY PM PEAK HOUR LEVEL OF SERVICE		
SCENARIO	O A C H	CONFIGURATIONS Approac		Overall (seconds)	Approach	Overall (seconds)	
2022 Existing	EB NB SB	1 LT-RT 1 LT-TH 1 TH-RT	A ² A ¹	N/A	A ² A ¹	N/A	
2027 No-Build	EB NB SB	1 LT-RT 1 LT-TH 1 TH-RT	B ² A ¹	N/A	B ² A ¹	N/A	
2027 Build	EB NB SB	1 LT-RT 1 LT-TH 1 TH-RT	B ² A ¹	N/A	B ² A ¹	N/A	

Table 8: Analysis Summary of Jonesville Road and Universal Drive

1. Level of service for major-street left-turn movement.

2. Level of service for minor-street approach.

Capacity analysis of 2027 build traffic conditions indicates that the major-street left-turn movement is expected to operate at LOS A during the weekday AM and PM peak hours. The minor-street approach is expected to operate at LOS B or better during the weekday AM and PM peak hours.

Right and left-turn lanes were considered based on the NCDOT *Policy on Street and Driveway Access to North Carolina Highways*. Based on the estimated low volume of right-turn and leftturn movements into the proposed development at this intersection, exclusive right-turn and left-turn lanes are not recommended. Refer to Appendix I for a copy of the turn lane warrants. No improvements are recommended by the developer.



7.5. Jonesville Road and Site Drive

The proposed intersection of Jonesville Road and Site Drive was analyzed under 2027 build traffic conditions with the lane configurations and traffic control shown in Table 9. Refer to Table 9 for a summary of the analysis results. Refer to Appendix H for the synchro capacity analysis reports.

A P P ANALYSIS R		LANE	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
SCENARIO	O A C H	CONFIGURATIONS	Approach	Overall (seconds)	Approach	Overall (seconds)
	EB	1 LT-RT	B ²		B ²	
2027 Build	NB	1 LT-TH	A^1	N/A	A^1	N/A
	SB	1 TH-RT				

Table 9: Analysis Summary of Jonesville Road and Site Drive

1. Level of service for major-street left-turn movement.

2. Level of service for minor-street approach.

Capacity analysis of 2027 build traffic conditions indicates that the major-street left-turn movement is expected to operate at LOS A during the weekday AM and PM peak hours. The minor-street approach is expected to operate at LOS B or better during the weekday AM and PM peak hours.

Right and left-turn lanes were considered based on the NCDOT *Policy on Street and Driveway Access to North Carolina Highways*. Based on the estimated low volume of right-turn and leftturn movements into the proposed development at this intersection, exclusive right-turn and left-turn lanes are not recommended. Refer to Appendix I for a copy of the turn lane warrants. No improvements are recommended by the developer.



8. CONCLUSIONS

This Traffic Impact Analysis was conducted to determine the potential traffic impacts of the proposed Harris Creek Farm development to be located on the west side of Jonesville Road near Universal Drive in Rolesville, North Carolina. The development is expected to consist of 68 single-family homes and 81 townhomes and to be built-out in 2027. Site access is proposed via two (2) full-movement driveway connections: one on Universal Drive and one on Jonesville Road approximately 700 feet south of Universal Drive.

The study analyzes traffic conditions during the weekday AM and PM peak hours for the following scenarios:

- 2022 Existing Traffic Conditions
- 2027 No-Build Traffic Conditions
- 2027 Build Traffic Conditions

Trip Generation

It is estimated that the proposed development will generate approximately 1,276 site trips on the roadway network during a typical 24-hour weekday period. Of the daily traffic volume, it is anticipated that 88 trips (22 entering and 66 exiting) will occur during the weekday AM peak hour and 114 trips (70 entering and 44 exiting) will occur during the weekday PM peak hour.

Adjustments to Analysis Guidelines

Capacity analysis at all study intersections was completed according to NCDOT Congestion Management Guidelines. Refer to section 6.1 of this report for a detailed description of any adjustments to these guidelines made throughout the analysis.

Intersection Capacity Analysis Summary

All the study area intersections (including the proposed site driveways) are expected to operate at acceptable levels-of-service under existing and future year conditions with the exception of those identified in Section 7 of this report.



9. **RECOMMENDATIONS**

Based on the findings of this study, specific geometric improvements have been identified and are recommended to accommodate future traffic conditions. See a more detailed description of the recommended improvements below. Refer to Figure 11 for an illustration of the recommended lane configurations for the proposed development.

Recommended Improvements by Developer

US 401 Bypass and Jonesville Road

• Conduct a full signal warrant analysis prior to full build-out of the proposed development and install a traffic signal if warranted and approved by the Town and NCDOT.

US 401 Bypass and Eastern U-Turn Location

• Conduct a full signal warrant analysis prior to full build-out of the proposed development and install a traffic signal if warranted and approved by the Town and NCDOT.

Mitchell Mill Road and Jonesville Road / Peebles Road

- Construct a southbound (Jonesville Road) left-turn lane with at least 100 feet of storage and appropriate decel and taper.
 - It should be noted that this improvement was also identified by the 5109
 Mitchell Mill Road TIA and Hills at Harris Creek TIA
- Construct a westbound (Mitchell Mill Road) right-turn lane with at least 100 feet of storage and appropriate decel and taper.
 - It should be noted that this improvement was also identified by the Hills at Harris Creek TIA
- Construct an eastbound (Mitchell Mill Road) left-turn lane with at least 100 feet of storage and appropriate decel and taper.
 - It should be noted that this improvement was also identified by the 5109
 Mitchell Mill Road TIA

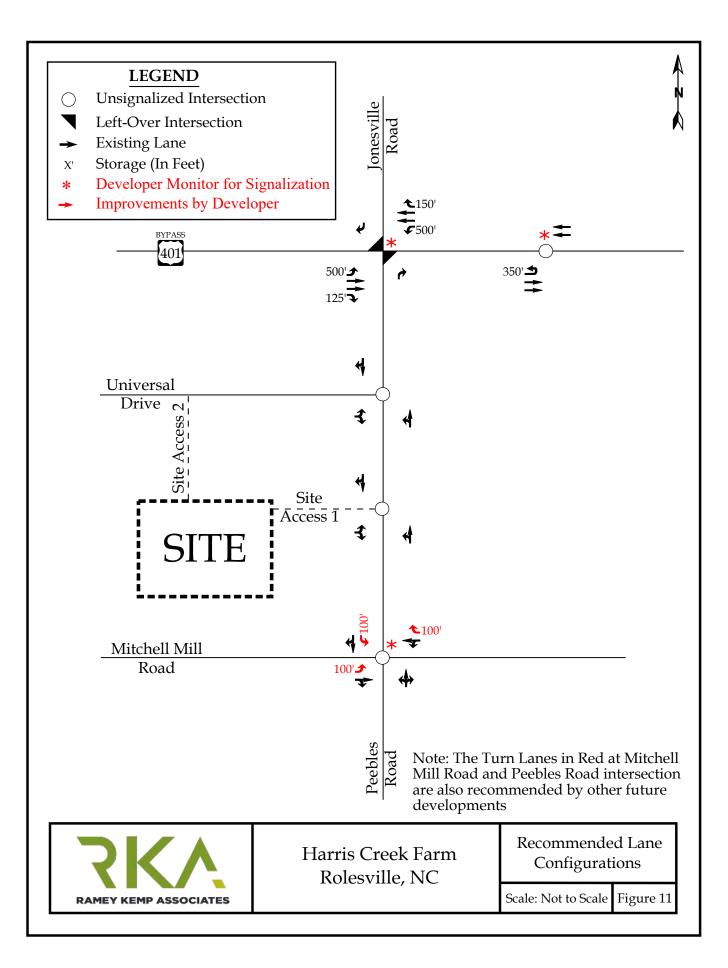


• Conduct a full signal warrant analysis prior to full build-out of the proposed development and install a traffic signal if warranted and approved by the Town and NCDOT.

Jonesville Road and Site Drive

- Construct the eastbound approach (Site Drive) with one ingress lane and one egress lane.
- Provide stop-control for the eastbound approach (Site Drive).





TECHNICAL APPENDIX

APPENDIX A

SCOPING DOCUMENTATION

RAMEY KEMP ASSOCIATES

TOGETHER WE ARE LIMITLESS

T 919 872 5115 5808 Faringdon Pl, Raleigh, NC 27609

JKV

March 17, 2023

Jeremy L. Warren, PE NCDOT District 1 Engineer 4009 District Drive Raleigh, NC 27507 <u>jlwarren@ncdot.gov</u> [Sent via Email]

Reference:	Harris Creek Farm
	Rolesville, North Carolina

Subject: Memorandum of Understanding for TIA Report

Dear Mr. Warren:

The following is a Memorandum of Understanding (MOU) outlining the proposed scope of work and assumptions related to the Traffic Impact Analysis (TIA) for the proposed Harris Creek Farm development in Rolesville, North Carolina. The proposed development is to be located on the west side of Jonesville Road near Universal Drive in Rolesville, NC. The development is expected to consist of 68 single-family homes and 81 townhomes and is anticipated to be built out by 2027. Refer to the attached site location map. Site access to the proposed development is expected to be provided via two (2) full-movement driveway connections: one on Jonesville Road and one on Universal Drive. Refer to the attachments for a copy of the preliminary site plan.

Study Area

The study area is proposed to consist of the following intersections:

- Mitchell Mill Road & Jonesville Road / Peebles Road (unsignalized)
- US 401 Bypass and Jonesville Road (unsignalized)
- US 401 Bypass and Eastern U-Turn Location (unsignalized)
- Jonesville Road and Universal Drive (unsignalized)
- Jonesville Road and Site Driveway (unsignalized)

Existing Traffic Volumes

Existing peak hour traffic volumes will be determined based on previously collected traffic counts at the study intersections below, in November 2021 during typical weekday AM (7:00 AM – 9:00 AM) and PM (4:00 PM – 6:00 PM) peak periods, while schools were in session for in-person learning:

- Mitchell Mill Road & Jonesville Road / Peebles Road
- US 401 Bypass and Jonesville Road
- US 401 Bypass and Eastern U-Turn Location

These previously collected counts will be projected to the year 2022 using a compounded annual growth rate of 2%.

Existing peak hour turning movement volumes at the intersection of Jonesville Road and Universal Drive will be estimated by generating and assigning trips for the nine (9) homes that are accessed via Universal Drive (AM trips: 2 enter 6 exit and PM trips: 7 enter 3 exit, distributed to the north and south along Jonesville Road the same as site trips). Through traffic volumes will be balanced from the Mitchell Mill Road/Jonesville Road intersection.

Refer to the attachments for an illustration of 2022 existing peak hour traffic volumes.

Background Traffic Volumes

Background traffic volumes will be determined by projecting 2022 existing traffic volumes to the year 2027 using a 0% annual growth rate. A growth rate of 0% will be used due to the number of developments included in the background traffic and the proximity of some of these developments to the proposed development. It is assumed that the following adjacent developments are to be included in this study:

- Cobblestone Crossing Mixed-Use (Cobblestone)
- Young Street PUD (The Point)
- Wheeler Tract (Rolesville Crossing)
- Louisbury Road Assemblage
- Kalas / Watkins Family Property (Kalas Falls)
- 5109 Mitchell Mill
- Hills at Harris Creek

Future Roadway Improvements

There are no future roadway improvements within the study area to consider under future traffic conditions.



Trip Generation

Average weekday daily, AM peak hour, and PM peak hour trips for the proposed development were estimated using methodology contained within the ITE *Trip Generation Manual*, 11th Edition. Refer to Table 1, on the following page, for a summary of the proposed site trip generation for full buildout of the proposed development.

Land Use (ITE Code)	Intensity	Daily Traffic (vpd)	Weekday AM Peak Hour Trips (vph)			Weekday PM Peak Hour Trips (vph)		
			Enter	Exit	Total	Enter	Exit	Total
Single-Family Home (210)	68 DU	710	13	39	52	44	25	69
Multi-Family Home (Low-Rise) (220)	81 DU	568	9	27	36	26	19	45
Total Trips	1,268	22	66	88	70	44	114	

Table 1: Trip Generation Summary

It is estimated that the proposed development will generate approximately 1,268 site trips on the roadway network during a typical 24-hour weekday period. Of the daily traffic volume, it is anticipated that 88 trips (22 entering and 66 exiting) will occur during the weekday AM peak hour and 114 trips (70 entering and 44 exiting) will occur during the weekday PM peak hour.

Trip Distribution and Assignment

Site trips are distributed based on the locations of existing traffic patterns, population centers adjacent to the study area, and engineering judgment. A summary of the overall distributions is below.

Residential

- 30% to/from the west via US 401 Bypass
- 15% to/from the east via US 401 Bypass
- 10% to/from the south via Peebles Road
- 35% to/from the west via Mitchell Mill Road
- 10% to/from the east via Mitchell Mill Road

Refer to the attached site trip distribution figure.



Analysis Scenarios

All capacity analyses will be performed utilizing Synchro (Version 11). All study intersections will be analyzed during the weekday AM and PM peak hours under the following proposed traffic scenarios:

- 2022 Existing Traffic Conditions
- 2027 No-Build Traffic Conditions
- 2027 Build Traffic Conditions

<u>Report</u>

The TIA report will be prepared based on the Town and NCDOT requirements.

If you find this memorandum of understanding acceptable, please let me know so that we may include it in the TIA report. If you have any questions or concerns, please do not hesitate to contact me.

Sincerely, Ramey Kemp Associates,

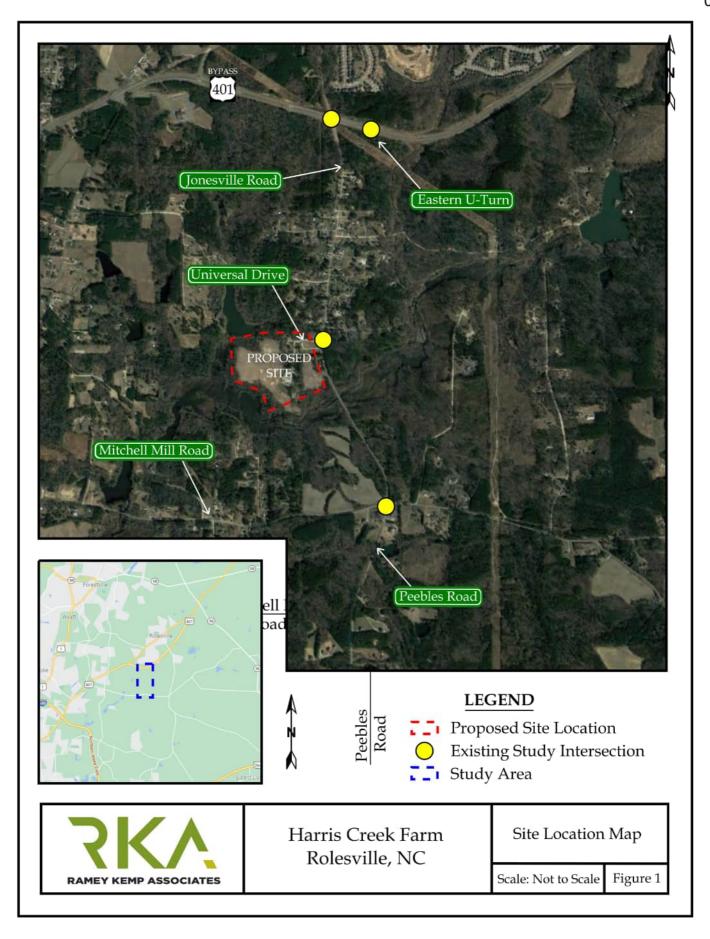
Andraw Eagle

J. Andrew Eagle, PE, PTOE Senior Traffic Engineering Project Manager

Attachments: Site Location Map Site Plan 2022 Existing Traffic Volumes Figure Proposed Site Trip Distribution Figure

cc: Matthew J. Nolfo, NCDOT Holt Willis, NCDOT Clarence Bunting, NCDOT Nicholas Lineberger, NCDOT Daniel Collins, NCDOT Meredith Gruber, Town of Rolesville Michael Elabarger, Town of Rolesville





AGENCY CONTACTS

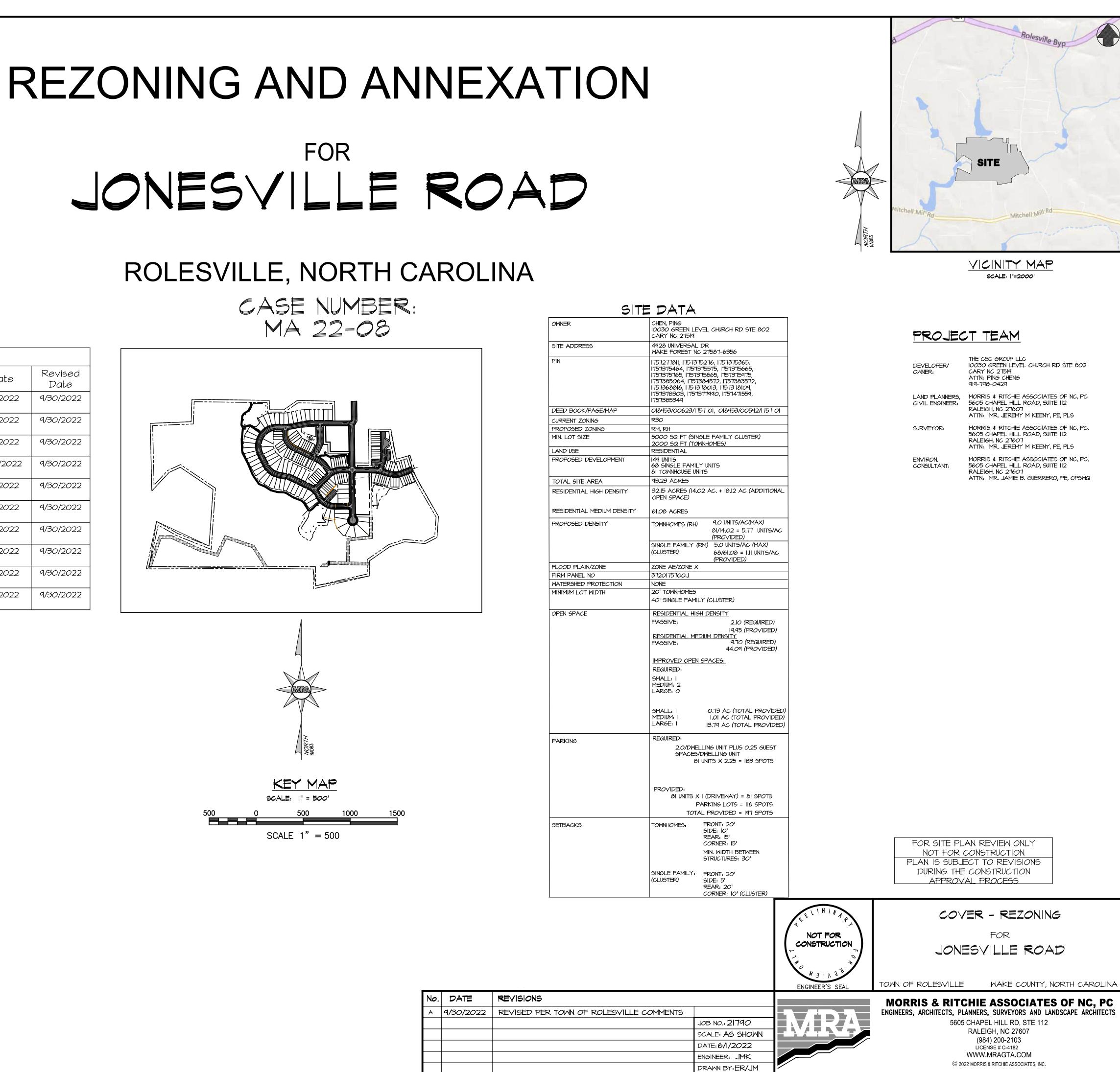
- A. Town of Rolesville Planning Department 502 Southtown Circle Rolesville, NC 27571
- B. Wake County Watershed Management Waverly F. Akins Building 337 S. Salisbury St Raleigh, NC 27601 Contact: Karyn Pageau Phone: (919)-796-8769 Email: karyn.pageau@wakegov.com

C. City of Raleigh Public Utilities Department Oné Exchangé Plaza Suite 620 Raleigh, NC 27601 P.O.Box 590 Raleigh, NC 27602 Phone: 919-996-3245 Email: publicutilityinfo@raleighnc.gov

D. NCDOT Division 5, District | Office 4009 District Drive Raleigh, NC 27607 Contact: Amy Neidringhaus, District Engineer Phone: 919-733-3213 Email: anneidringhaus@ncdot.gov

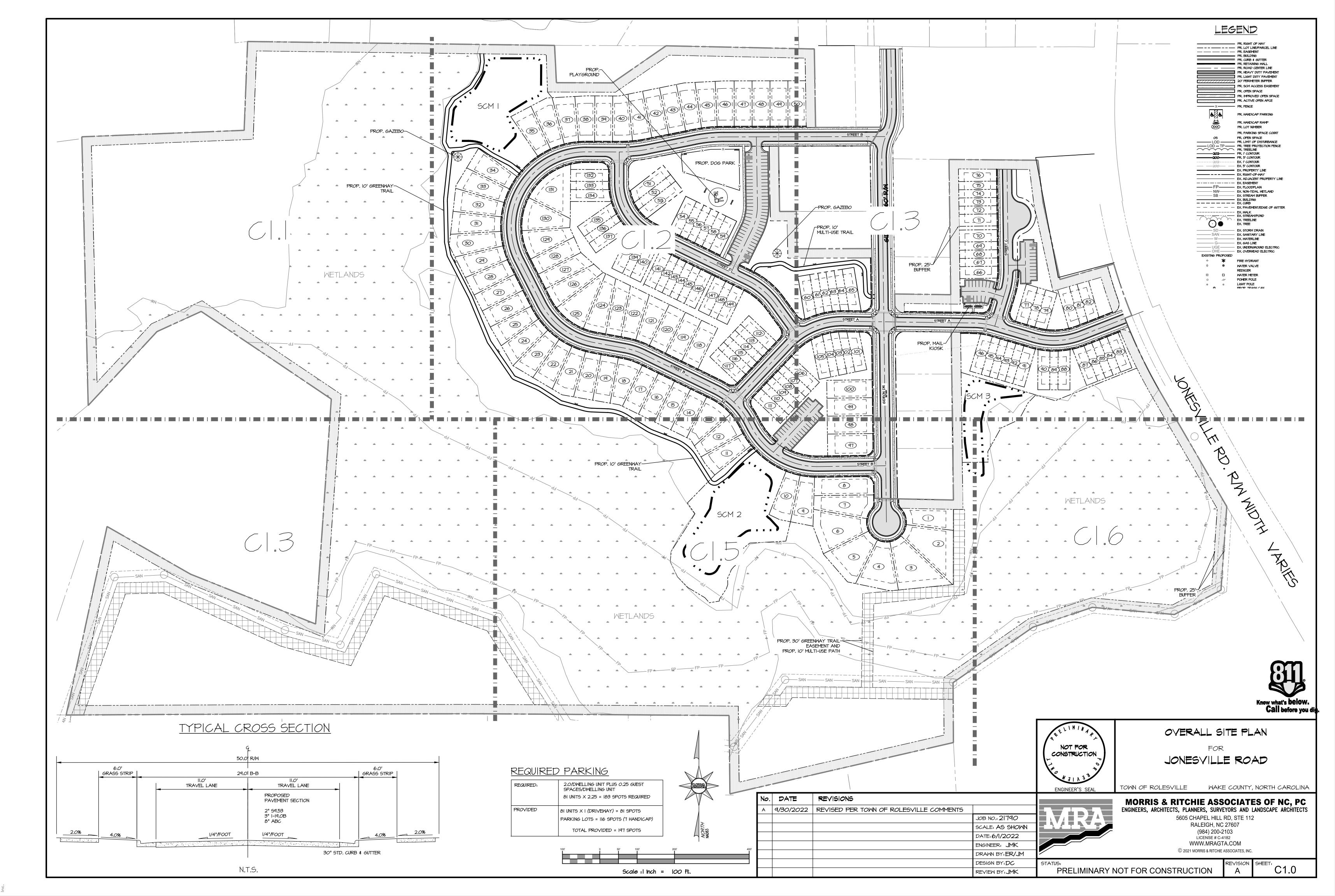
STREET DATA			
STREET A	1,200 LF		
STREET B	2,368 LF		
STREET C	450 LF		
STREET D	743 LF		

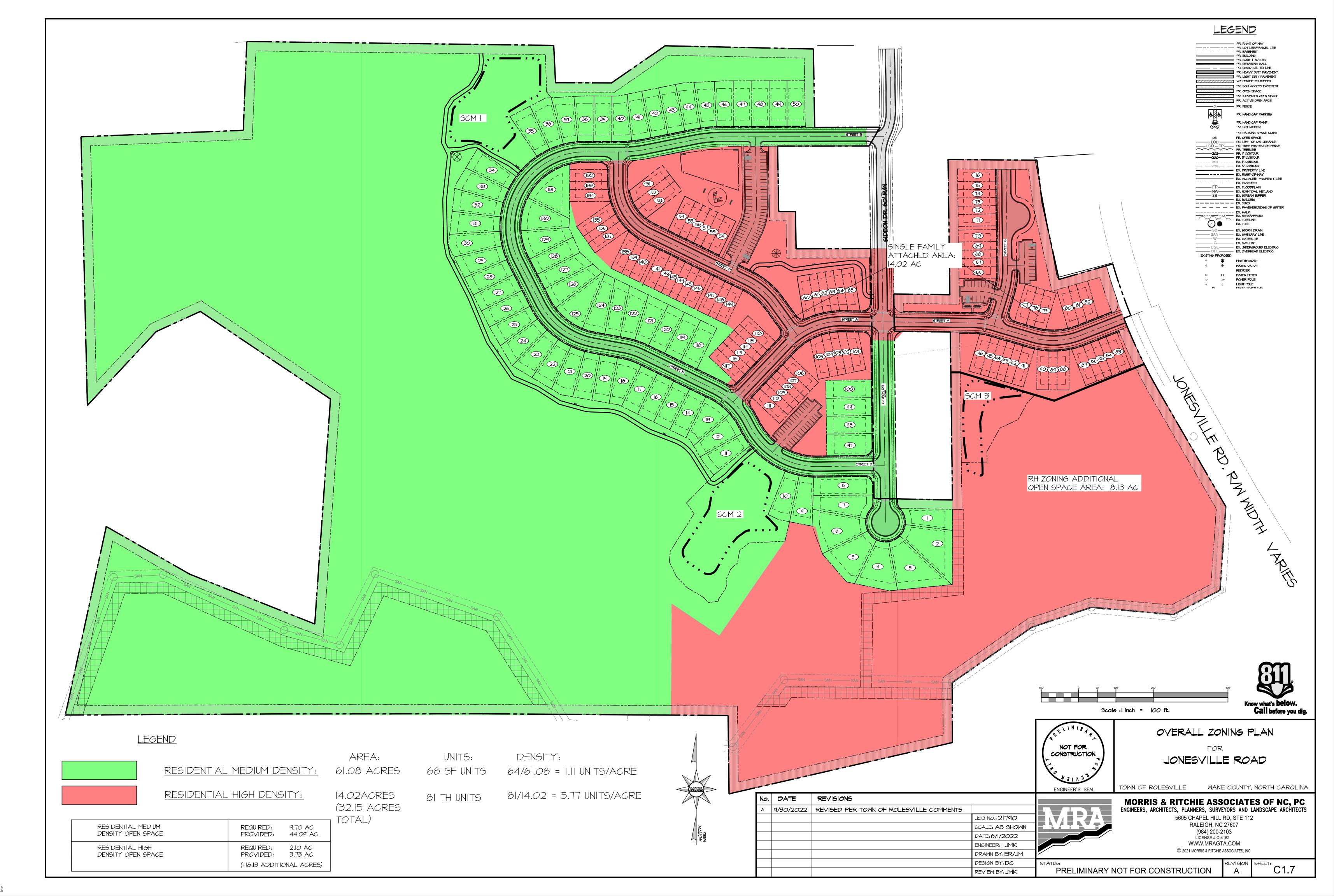
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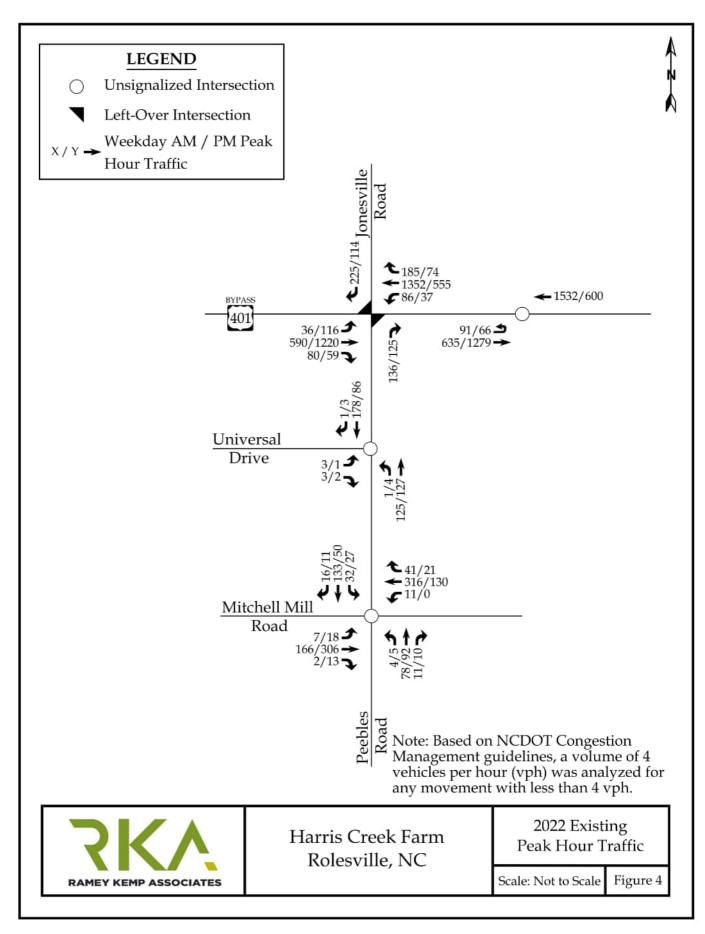


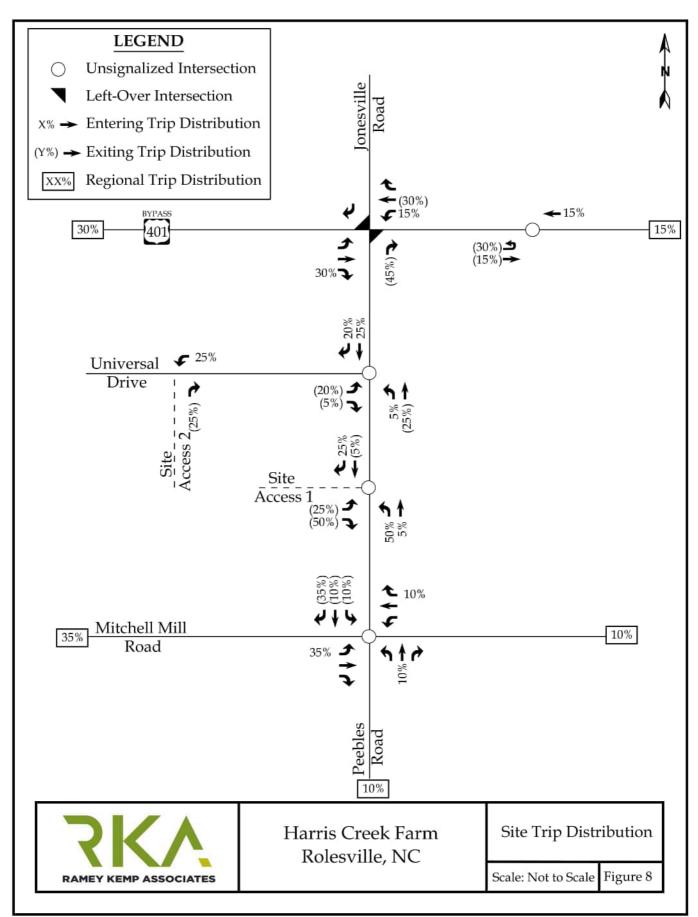
_		
No.	DATE	REVISIONS
А	9/30/2022	REVISED PER TOWN OF ROLESVILLE

DESIGN BY: DC		REVISION	SHEET:
REVIEW BY: JMK	PRELIMINARY NOT FOR CONSTRUCTION	A	C0.0









APPENDIX B

TRAFFIC COUNTS



File Name : Rolesville(US 401 and Jonesville)AM Peak Site Code : Start Date : 11/9/2021 Page No : 1

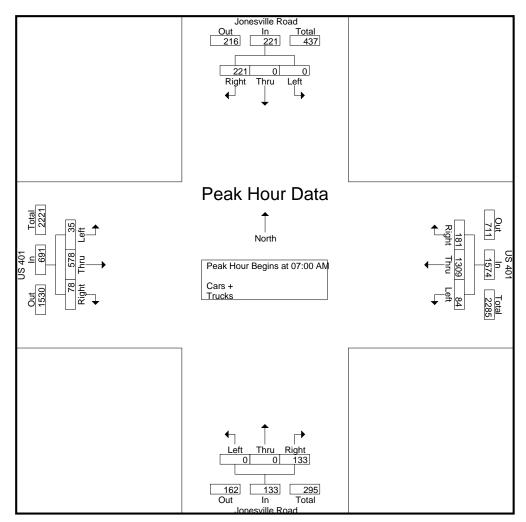
Group	s Printed-	Cars + -	Trucks

		Jonesvil	lle Roa	d			401			Jonesvil	le Roa	d		US	401		
		South	bound			West	bound			North	bound						
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
07:00 AM	63	0	0	63	24	380	21	425	23	0	0	23	18	182	3	203	714
07:15 AM	42	0	0	42	39	362	24	425	37	0	0	37	11	125	7	143	647
07:30 AM	51	0	0	51	80	318	23	421	48	0	0	48	24	136	15	175	695
07:45 AM	65	0	0	65	38	249	16	303	25	0	0	25	25	135	10	170	563
Total	221	0	0	221	181	1309	84	1574	133	0	0	133	78	578	35	691	2619
									1								I
08:00 AM	61	0	0	61	26	236	13	275	23	0	0	23	30	120	10	160	519
08:15 AM	36	0	0	36	12	233	9	254	16	0	0	16	13	94	9	116	422
08:30 AM	24	0	0	24	10	213	5	228	9	0	0	9	6	91	3	100	361
08:45 AM	28	0	0	28	9	145	5	159	10	0	0	10	11	85	2	98	295
Total	149	0	0	149	57	827	32	916	58	0	0	58	60	390	24	474	1597
																	i.
Grand Total	370	0	0	370	238	2136	116	2490	191	0	0	191	138	968	59	1165	4216
Apprch %	100	0	0		9.6	85.8	4.7		100	0	0		11.8	83.1	5.1		
Total %	8.8	0	0	8.8	5.6	50.7	2.8	59.1	4.5	0	0	4.5	3.3	23	1.4	27.6	
Cars +	366	0	0	366	233	2094	114	2441	188	0	0	188	135	916	57	1108	4103
% Cars +	98.9	0	0	98.9	97.9	98	98.3	98	98.4	0	0	98.4	97.8	94.6	96.6	95.1	97.3
Trucks	4	0	0	4	5	42	2	49	3	0	0	3	3	52	2	57	113
% Trucks	1.1	0	0	1.1	2.1	2	1.7	2	1.6	0	0	1.6	2.2	5.4	3.4	4.9	2.7



File Name : Rolesville(US 401 and Jonesville)AM Peak Site Code : Start Date : 11/9/2021 Page No : 2

		Jonesvi	lle Roa	d		US	401			Jonesvi	lle Roa	d]			
		South	bound			West	bound			North	bound						
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Ana	Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																
Peak Hour for	Entire In	tersection	on Beg	ins at 07:	00 AM												
07:00 AM	63	0	0	63	24	380	21	425	23	0	0	23	18	182	3	203	714
07:15 AM	42	0	0	42	39	362	24	425	37	0	0	37	11	125	7	143	647
07:30 AM	51	0	0	51	80	318	23	421	48	0	0	48	24	136	15	175	695
07:45 AM	65	0	0	65	38	249	16	303	25	0	0	25	25	135	10	170	563
Total Volume	221	0	0	221	181	1309	84	1574	133	0	0	133	78	578	35	691	2619
% App. Total	100	0	0		11.5	83.2	5.3		100	0	0		11.3	83.6	5.1		
PHF	.850	.000	.000	.850	.566	.861	.875	.926	.693	.000	.000	.693	.780	.794	.583	.851	.917





File Name : Rolesville(US 401 and Jonesville)PM Peak Site Code : Start Date : 11/9/2021 Page No : 1

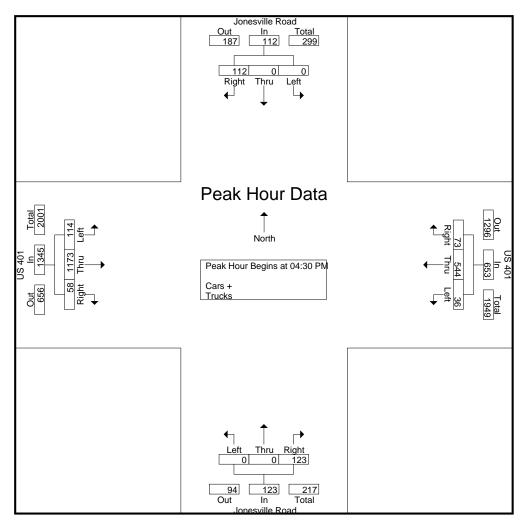
Groups Printed- Cars + - Trucks

		Jonesvil	lle Roa	d			401	inited 0	Jonesville Road US 401									
		South	bound			West	bound			North	bound							
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total	
04:00 PM	47	0	0	47	13	124	6	143	21	0	0	21	37	217	22	276	487	
04:15 PM	34	0	0	34	13	119	6	138	26	0	0	26	15	231	20	266	464	
04:30 PM	30	0	0	30	19	118	12	149	32	0	0	32	12	291	28	331	542	
04:45 PM	15	0	0	15	22	137	6	165	32	0	0	32	8	303	30	341	553	
Total	126	0	0	126	67	498	30	595	111	0	0	111	72	1042	100	1214	2046	
				1														
05:00 PM	37	0	0	37	10	143	7	160	23	0	0	23	23	322	30	375	595	
05:15 PM	30	0	0	30	22	146	11	179	36	0	0	36	15	257	26	298	543	
05:30 PM	39	0	0	39	20	145	3	168	34	0	0	34	23	262	14	299	540	
05:45 PM	24	0	0	24	10	112	9	131	22	0	0	22	11	227	21	259	436	
Total	130	0	0	130	62	546	30	638	115	0	0	115	72	1068	91	1231	2114	
Grand Total	256	0	0	256	129	1044	60	1233	226	0	0	226	144	2110	191	2445	4160	
Apprch %	100	Õ	õ	200	10.5	84.7	4.9	1200	100	õ	Ő	220	5.9	86.3	7.8	2110	1100	
Total %	6.2	Õ	0	6.2	3.1	25.1	1.0	29.6	5.4	Õ	0	5.4	3.5	50.7	4.6	58.8		
Cars +	252	0	0	252	127	1020	60	1207	223	0	0	223	142	2051	191	2384	4066	
% Cars +	98.4	Õ	Õ	98.4	98.4	97.7	100	97.9	98.7	õ	Õ	98.7	98.6	97.2	100	97.5	97.7	
Trucks	4	0	0	4	2	24	0	26	3	0	0	3	2	59	0	61	94	
% Trucks	1.6	0	0	1.6	1.6	2.3	0	2.1	1.3	0	0	1.3	1.4	2.8	0	2.5	2.3	



File Name : Rolesville(US 401 and Jonesville)PM Peak Site Code : Start Date : 11/9/2021 Page No : 2

		Jonesvi	lle Roa	d		US	401			Jonesvi	ille Roa	d]			
		South	bound			Westbound					bound						
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for	Entire In	tersection	on Beg	ins at 04:	30 PM												
04:30 PM	30	0	0	30	19	118	12	149	32	0	0	32	12	291	28	331	542
04:45 PM	15	0	0	15	22	137	6	165	32	0	0	32	8	303	30	341	553
05:00 PM	37	0	0	37	10	143	7	160	23	0	0	23	23	322	30	375	595
05:15 PM	30	0	0	30	22	146	11	179	36	0	0	36	15	257	26	298	543
Total Volume	112	0	0	112	73	544	36	653	123	0	0	123	58	1173	114	1345	2233
% App. Total	100	0	0		11.2	83.3	5.5		100	0	0		4.3	87.2	8.5		
PHF	.757	.000	.000	.757	.830	.932	.750	.912	.854	.000	.000	.854	.630	.911	.950	.897	.938





File Name : Rolesville(US 401 and Eastern U Turn)AM Peak Site Code : Start Date : 11/9/2021 Page No : 1

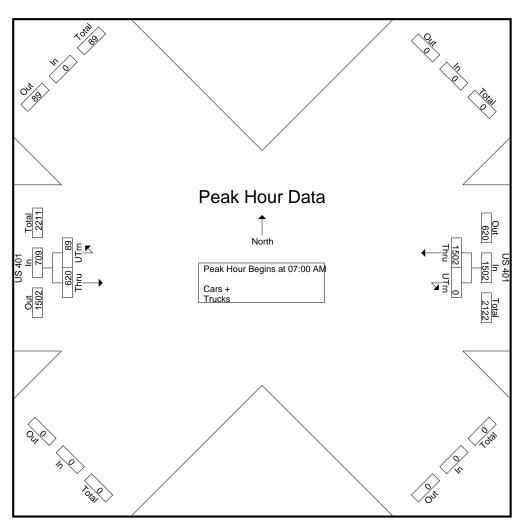
Groups Printed- Cars + - Trucks

		US 401			US 401		
		Westbound			Eastbound		
Start Time	Thru	UTrn	App. Total	Thru	UTrn	App. Total	Int. Total
07:00 AM	421	0	421	198	12	210	631
07:15 AM	410	0	410	136	24	160	570
07:30 AM	392	0	392	149	36	185	577
07:45 AM	279	0	279	137	17	154	433
Total	1502	0	1502	620	89	709	2211
08:00 AM	253	0	253	130	20	150	403
08:15 AM	243	0	243	98	13	111	354
08:30 AM	223	0	223	94	7	101	324
08:45 AM	147	0	147	85	9	94	241
Total	866	0	866	407	49	456	1322
Grand Total	2368	0	2368	1027	138	1165	3533
Apprch %	100	0		88.2	11.8		
Total %	67	0	67	29.1	3.9	33	
Cars +	2318	0	2318	973	136	1109	3427
% Cars +	97.9	0	97.9	94.7	98.6	95.2	97
Trucks	50	0	50	54	2	56	106
% Trucks	2.1	0	2.1	5.3	1.4	4.8	3



File Name : Rolesville(US 401 and Eastern U Turn)AM Peak Site Code : Start Date : 11/9/2021 Page No : 2

		US 401					
		Westbound			Eastbound		
Start Time	Thru	UTrn	App. Total	Thru	UTrn	App. Total	Int. Total
Peak Hour Analysis From 07:00) AM to 08:45 AM	- Peak 1 of 1					
Peak Hour for Entire Intersection	on Begins at 07:00	AM					
07:00 AM	421	0	421	198	12	210	631
07:15 AM	410	0	410	136	24	160	570
07:30 AM	392	0	392	149	36	185	577
07:45 AM	279	0	279	137	17	154	433
Total Volume	1502	0	1502	620	89	709	2211
% App. Total	100	0		87.4	12.6		
PHF	.892	.000	.892	.783	.618	.844	.876





File Name : Rolesville(US 401 and Eastern U Turn)PM Peak Site Code : Start Date : 11/9/2021 Page No : 1

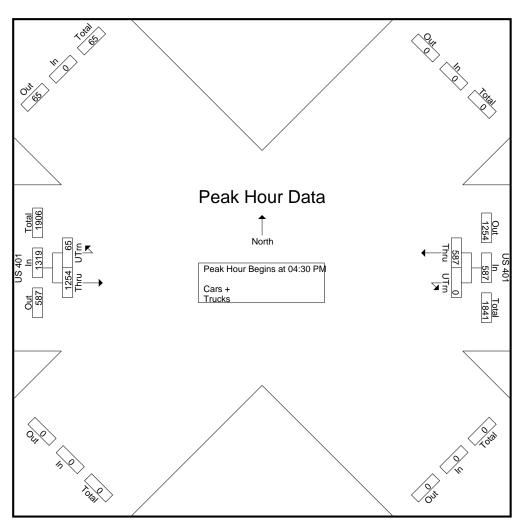
Groups Printed- Cars + - Trucks

		US 401		114616	US 401		
		Westbound			Eastbound		
Start Time	Thru	UTrn	App. Total	Thru	UTrn	App. Total	Int. Total
04:00 PM	130	0	130	240	12	252	382
04:15 PM	128	0	128	237	15	252	380
04:30 PM	129	0	129	311	19	330	459
04:45 PM	149	0	149	317	19	336	485
Total	536	0	536	1105	65	1170	1706
05:00 PM	149	0	149	342	8	350	499
05:15 PM	160	Õ	160	284	19	303	463
05:30 PM	161	Ő	161	273	22	295	456
05:45 PM	120	0	120	235	12	247	367
Total	590	0	590	1134	61	1195	1785
Grand Total	1126	0	1126	2239	126	2365	3491
Apprch %	100	0		94.7	5.3		
Total %	32.3	0	32.3	64.1	3.6	67.7	
Cars +	1101	0	1101	2175	125	2300	3401
% Cars +	97.8	0	97.8	97.1	99.2	97.3	97.4
Trucks	25	0	25	64	1	65	90
% Trucks	2.2	0	2.2	2.9	0.8	2.7	2.6



File Name : Rolesville(US 401 and Eastern U Turn)PM Peak Site Code : Start Date : 11/9/2021 Page No : 2

		US 401					
		Westbound			Eastbound		
Start Time	Thru	UTrn	App. Total	Thru	UTrn	App. Total	Int. Total
Peak Hour Analysis From 04:00	OPM to 05:45 PM	Peak 1 of 1					
Peak Hour for Entire Intersection	on Begins at 04:30	PM					
04:30 PM	129	0	129	311	19	330	459
04:45 PM	149	0	149	317	19	336	485
05:00 PM	149	0	149	342	8	350	499
05:15 PM	160	0	160	284	19	303	463
Total Volume	587	0	587	1254	65	1319	1906
% App. Total	100	0		95.1	4.9		
PHF	.917	.000	.917	.917	.855	.942	.955





File Name : Rolesville(Jonesville and Mitchell Mill)AM Peak Site Code : Start Date : 11/30/2021 Page No : 1

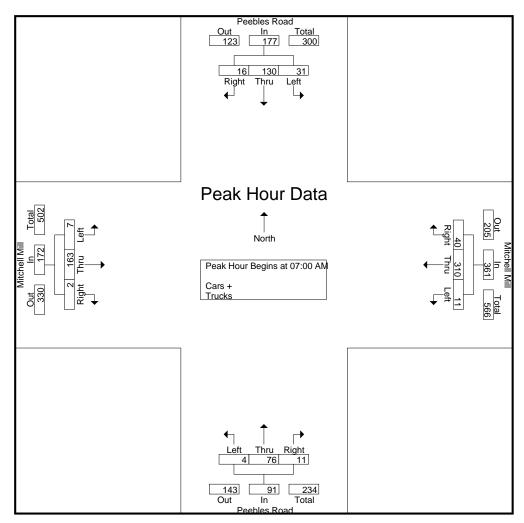
Groups Printed- Cars + - Trucks

		Peeble	s Road	ł			ell Mill	milea O		Peeble	s Road	1		Mitch	ell Mill		
		South	bound			West	bound			North	bound						
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
07:00 AM	4	17	13	34	8	73	5	86	6	11	3	20	0	74	1	75	215
07:15 AM	4	36	7	47	8	101	2	111	3	26	1	30	0	32	1	33	221
07:30 AM	6	34	5	45	16	87	3	106	0	24	0	24	1	33	1	35	210
07:45 AM	2	43	6	51	8	49	1	58	2	15	0	17	1	24	4	29	155
Total	16	130	31	177	40	310	11	361	11	76	4	91	2	163	7	172	801
08:00 AM	7	31	12	50	4	53	1	58	1	8	2	11	0	28	3	31	150
08:15 AM	12	17	3	32	1	37	1	39	1	7	0	8	1	24	1	26	105
08:30 AM	6	4	2	12	3	49	2	54	1	4	2	7	0	19	0	19	92
08:45 AM	1	13	3	17	4	32	1	37	1	3	1	5	1	18	2	21	80
Total	26	65	20	111	12	171	5	188	4	22	5	31	2	89	6	97	427
			- 4					- 10				100					1000
Grand Total	42	195	51	288	52	481	16	549	15	98	_ 9	122	4	252	13	269	1228
Apprch %	14.6	67.7	17.7		9.5	87.6	2.9		12.3	80.3	7.4		1.5	93.7	4.8		
Total %	3.4	15.9	4.2	23.5	4.2	39.2	1.3	44.7	1.2	8	0.7	9.9	0.3	20.5	1.1	21.9	
Cars +	42	195	50	287	52	479	16	547	15	98	9	122	4	249	13	266	1222
% Cars +	100	100	98	99.7	100	99.6	100	99.6	100	100	100	100	100	98.8	100	98.9	99.5
Trucks	0	0	1	1	0	2	0	2	0	0	0	0	0	3	0	3	6
% Trucks	0	0	2	0.3	0	0.4	0	0.4	0	0	0	0	0	1.2	0	1.1	0.5



File Name : Rolesville(Jonesville and Mitchell Mill)AM Peak Site Code : Start Date : 11/30/2021 Page No : 2

		Peeble		ł		Mitch				s Road]				
		South	bound			West	bound			North	bound			East	bound		
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Ana	ilysis Fro	om 07:0	0 AM t	o 08:45 A	M - Pea	ak 1 of 1											
Peak Hour for	Entire In	tersecti	on Beg	ins at 07:	00 AM												
07:00 AM	4	17	13	34	8	73	5	86	6	11	3	20	0	74	1	75	215
07:15 AM	4	36	7	47	8	101	2	111	3	26	1	30	0	32	1	33	221
07:30 AM	6	34	5	45	16	87	3	106	0	24	0	24	1	33	1	35	210
07:45 AM	2	43	6	51	8	49	1	58	2	15	0	17	1	24	4	29	155
Total Volume	16	130	31	177	40	310	11	361	11	76	4	91	2	163	7	172	801
% App. Total	9	73.4	17.5		11.1	85.9	3		12.1	83.5	4.4		1.2	94.8	4.1		
PHF	.667	.756	.596	.868	.625	.767	.550	.813	.458	.731	.333	.758	.500	.551	.438	.573	.906





File Name : Rolesville(Jonesville and Mitchell Mill)PM Peak Site Code : Start Date : 11/30/2021 Page No : 1

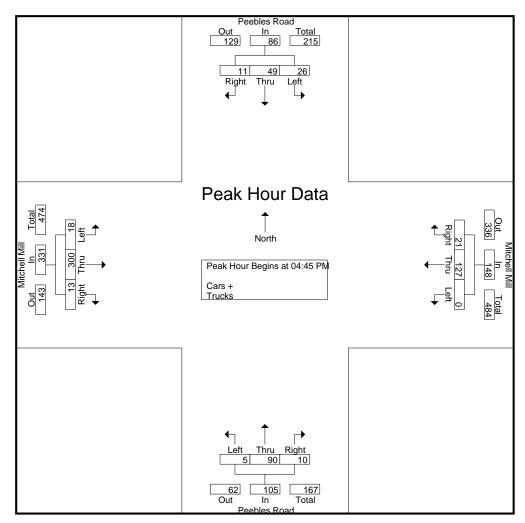
Groups Printed- Cars + - Trucks

		Peeble	s Road bound	ł		Mitch	ell Mill bound	ninea o		Peeble	s Roac bound	I			ell Mill bound		
Stort Time	Dialat			• -	Diaht			·	Dialat			A	Dialat			• T · · ·	Int. Total
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	
04:00 PM	7	11	13	31	6	25	1	32	1	14	1	16	2	44	6	52	131
04:15 PM	6	11	4	21	2	27	2	31	1	17	3	21	1	62	4	67	140
04:30 PM	3	13	3	19	4	30	2	36	0	27	1	28	3	64	3	70	153
04:45 PM	2	8	5	15	4	37	0	41	3	18	0	21	3	71	3	77	154
Total	18	43	25	86	16	119	5	140	5	76	5	86	9	241	16	266	578
05:00 PM	1	15	6	22	5	31	0	36	3	19	2	24	1	78	5	84	166
05:15 PM	3	15	6	24	4	23	õ	27	3	26	1	30	4	89	7	100	181
05:30 PM	5	11	9	25	8	36	0	44	1	27	2	30	5	62	3	70	169
05:45 PM	1	7	4	12	2	21	1	24	2	13	2	17		55	6	65	118
	10	48	25	83	19	111	1	131	9	85	7		14	284	21		634
Total	10	40	25	03	19		I	131	9	60	1	101	14	204	21	319	034
Grand Total	28	91	50	169	35	230	6	271	14	161	12	187	23	525	37	585	1212
Apprch %	16.6	53.8	29.6		12.9	84.9	2.2		7.5	86.1	6.4		3.9	89.7	6.3		
Total %	2.3	7.5	4.1	13.9	2.9	19	0.5	22.4	1.2	13.3	1	15.4	1.9	43.3	3.1	48.3	
Cars +	28	91	50	169	35	229	6	270	14	161	12	187	23	524	37	584	1210
% Cars +	100	100	100	100	100	99.6	100	99.6	100	100	100	100	100	99.8	100	99.8	99.8
Trucks	0	0	0	0	0	1	0	1	0	0	0	0	0	1	0	1	2
% Trucks	0	0	0	0	0	0.4	0	0.4	0	0	0	0	0	0.2	0	0.2	0.2



File Name : Rolesville(Jonesville and Mitchell Mill)PM Peak Site Code : Start Date : 11/30/2021 Page No : 2

		Peeble	s Road	ł		Mitchell Mill				Peeble	s Road]			
		South	bound			West	bound			North	bound						
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Ana	alysis Fro	om 04:0	0 PM t	o 05:45 P	M - Pea	ak 1 of 1											
Peak Hour for	Entire In	tersecti	on Beg	ins at 04:	45 PM												
04:45 PM	2	8	5	15	4	37	0	41	3	18	0	21	3	71	3	77	154
05:00 PM	1	15	6	22	5	31	0	36	3	19	2	24	1	78	5	84	166
05:15 PM	3	15	6	24	4	23	0	27	3	26	1	30	4	89	7	100	181
05:30 PM	5	11	9	25	8	36	0	44	1	27	2	30	5	62	3	70	169
Total Volume	11	49	26	86	21	127	0	148	10	90	5	105	13	300	18	331	670
% App. Total	12.8	57	30.2		14.2	85.8	0		9.5	85.7	4.8		3.9	90.6	5.4		
PHF	.550	.817	.722	.860	.656	.858	.000	.841	.833	.833	.625	.875	.650	.843	.643	.828	.925



APPENDIX C

ADJACENT DEVELOPMENT INFORMATION

TRAFFIC IMPACT ANALYSIS

FOR

COBBLESTONE CROSSING MIXED-USE

LOCATED

IN

ROLESVILLE, NORTH CAROLINA

Prepared For: Town of Rolesville 502 Southtown Circle Rolesville, NC 27571

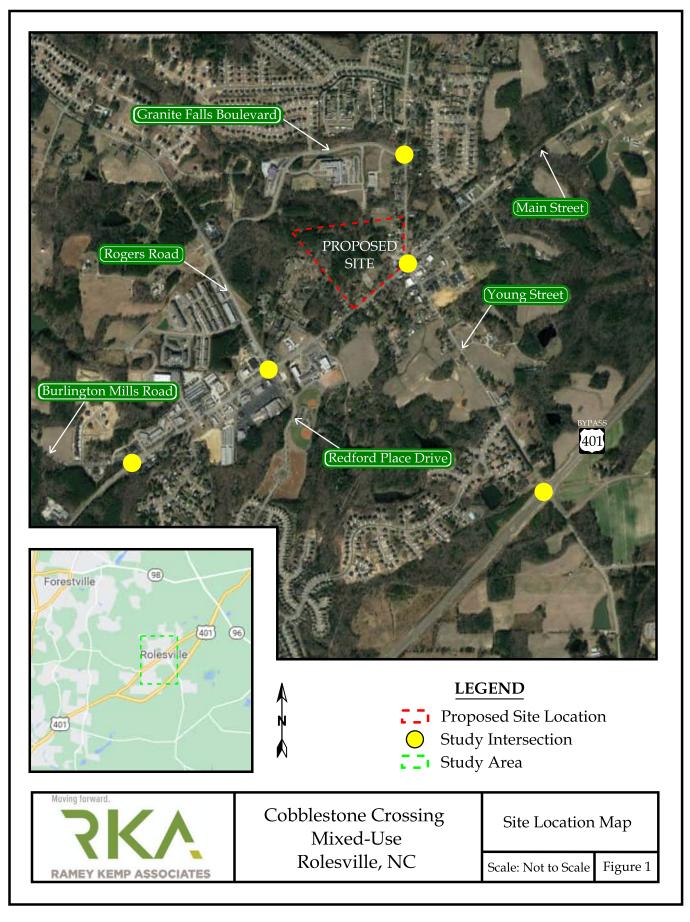
Prepared By: Ramey Kemp & Associates, Inc. 5808 Faringdon Place, Suite 100 Raleigh, NC 27609 License #C-0910

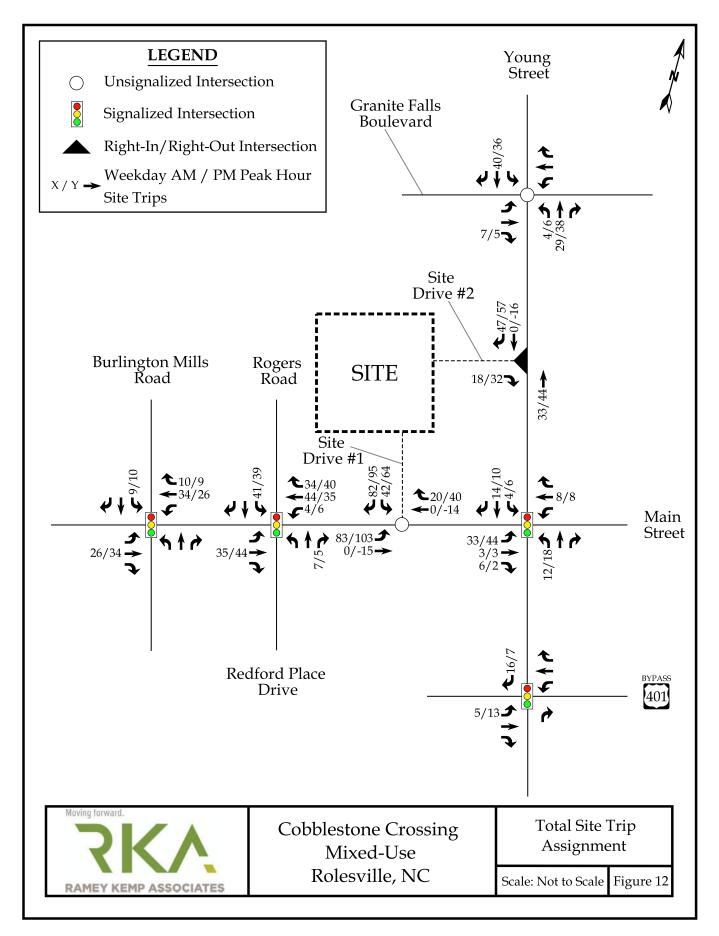
MARCH 2021



Prepared By: TF Reviewed By: MK

RKA Project No. 20498





9. RECOMMENDATIONS

Based on the findings of this study, specific geometric improvements have been identified and are recommended to accommodate future traffic conditions. See a more detailed description of the recommended improvements below. Refer to Figure 14 for an illustration of the recommended lane configuration for the proposed development.

Improvements by STIP U-6241

STIP U-6241 is expected to realign Burlington Mills Road and install a traffic signal at the relocated intersection on Main Street. STIP U-6241 is also expected to provide improvements to the pedestrian and bike facilities along Main Street and add a concrete median island along Main Street west of Rogers Road. These improvements associated with STIP U-6241 will alter the existing lane configurations at the study intersections along Main Street.

Recommended Improvements by Developer

Main Street and Site Drive 1

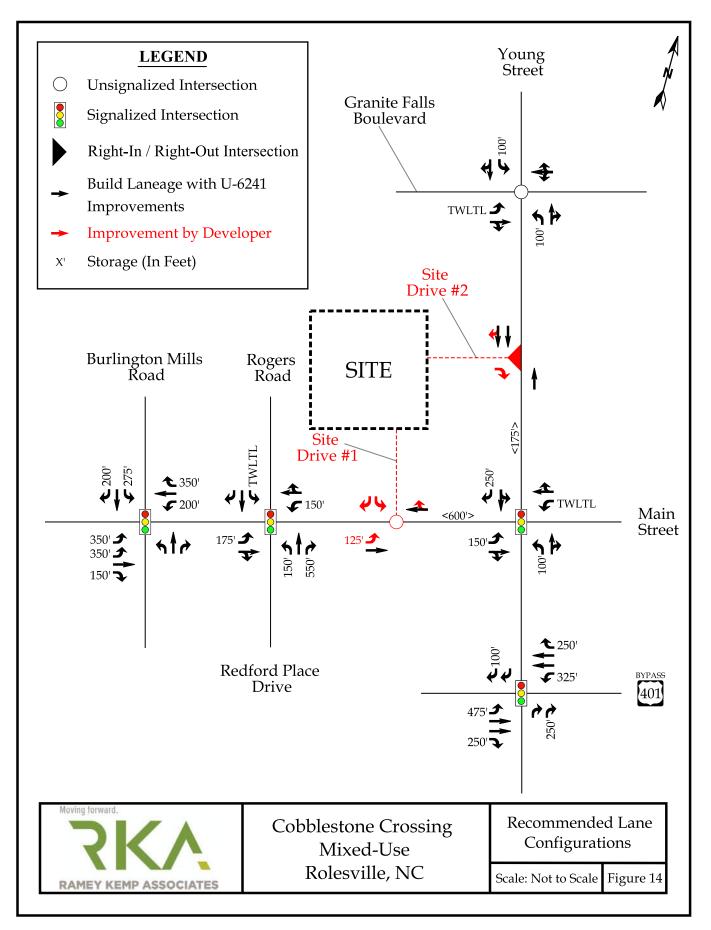
- Construct the southbound approach with one ingress and two egress lanes.
- Provide stop control for the southbound approach. ٠
- Install an eastbound left-turn lane with at least 125 feet of storage and appropriate decel ٠ and taper.

Young Street and Site Drive 2

- Construct the eastbound approach with one ingress and egress lane. •
- Provide stop control for the eastbound approach.



Transportation. Consulting that moves us forward.



Revised Traffic Impact Analysis for

Young Street PUD

Rolesville, North Carolina

Prepared for: Ashton Woods Raleigh, North Carolina

Prepared by:

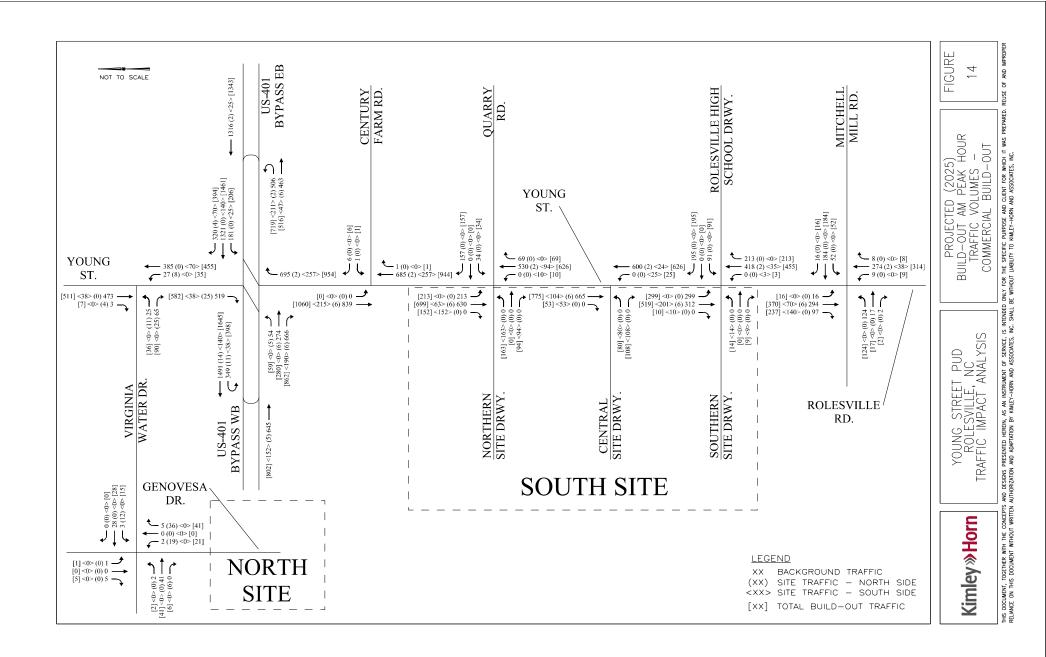
Kimley-Horn and Associates, Inc. NC License #F-0102 421 Fayetteville Street, Suite 600 Raleigh, NC 27601 (919) 677-2000

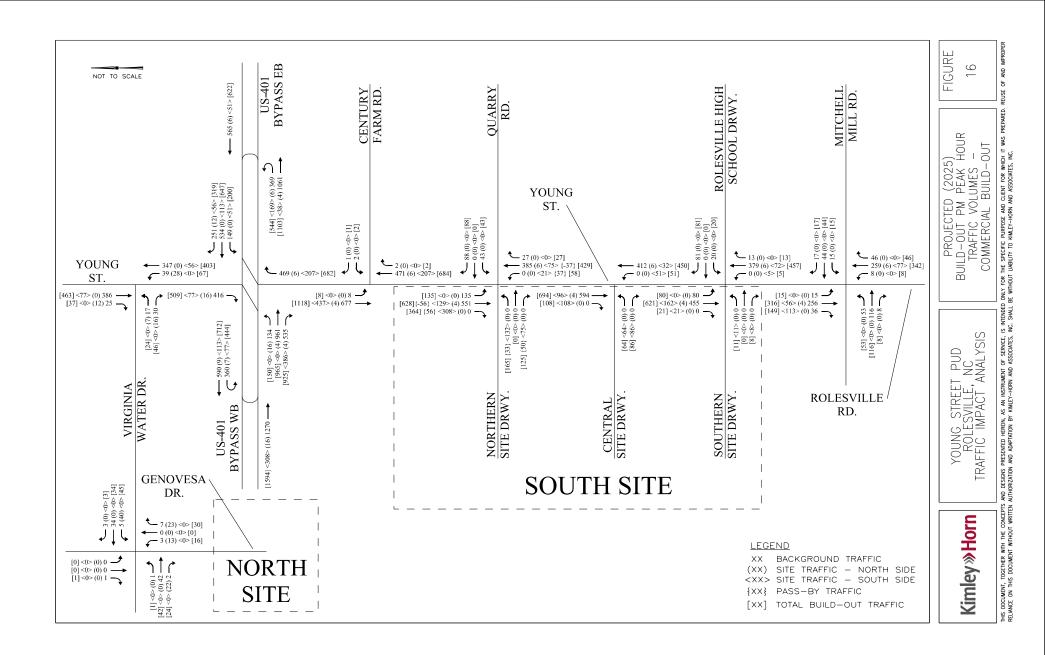
> June 2019 015956012





THIS DOCUMENT, TOGETHER WITH THE CONCEPTS AND DESIGNS PRESENTED HEREIN, AS AN INSTRUMENT OF SERVICE, IS INTENDED ONLY FOR THE SPECIFIC PURPOSE AND CLIENT FOR WHICH IT WAS PREPARED. REUSE OF AND IMPROPER RELIANCE ON THIS DOCUMENT WITHOUT WRITTEN AUTHORIZATION AND ADAPTATION BY KIMLEY-HORN AND ASSOCIATES, INC. SHALL BE WITHOUT LIABILITY TO KIMLEY-HORN AND ASSOCIATES, INC.





7.0 Recommendations

Residential Build-out

The following improvements are recommended to be performed to accommodate projected site traffic volumes at build-out of the residential portion of the development:

US 401 Bypass:

• Coordinate the traffic signals at the intersections of US 401 at Young Street and the Superstreet U-turns

Young Street at Quarry Road/North Site Driveway:

- Construct a northbound left-turn lane on Young Street with 100 feet of storage and appropriate tapers
- Construct a southbound right-turn lane on Young Street with 100 feet of storage and appropriate tapers
- Restripe the existing westbound left-turn lane on Quarry Road to a shared left/through lane
- Provide an exclusive left-turn lane with 275 feet of storage and appropriate tapers and a shared through/right lane on the North Site Driveway
- Install a traffic signal when warranted

Young Street at Central Site Driveway:

- Construct a northbound left-turn lane on Young Street with 100 feet of storage and appropriate tapers
- Construct a southbound right-turn lane on Young Street with 100 feet of storage and appropriate tapers
- Provide exclusive left and right-turn lanes on the Central Site Driveway with 125 feet of storage and appropriate tapers for the left-turn lane

Young Street at Rolesville High School Driveway/South Site Driveway:

- Construct a northbound left-turn lane on Young Street with 50 feet of storage and appropriate tapers
- Provide one egress lane on the South Site Driveway

Rolesville Road at Mitchell Mill Road:

• Install a traffic signal when warranted

Analyses indicate that with the recommended improvements in place, all of the study intersections except for Young Street at Century Farm Road and Young Street at Rolesville High School Driveway/South Site Driveway are expected to operate at an acceptable LOS at build-out of the residential-only phase of the development.

Kimley »Horn

Analyses indicate that the intersection of Young Street at Century Farm Road is expected to operate with long delays on the minor street approach (Century Farm Road) in the AM peak hour at project build-out. However, it is typical for stop sign controlled side streets and driveways intersecting major streets to experience long delays during peak hours while the majority of the traffic moving through the intersection on the major street experiences little or no delay. SimTraffic traffic simulations indicate that no queuing issues are expected at this intersection.

Analyses indicate that the intersection of Young Street at the Rolesville High School Driveway/South Site Driveway is expected to operate with long delays on the minor street approach (Rolesville High School Driveway) in the AM peak hour and school PM peak hour with or without the proposed project in place in the study year 2025. SimTraffic traffic simulations also indicate the possibility of long queues on the westbound left-turn movement at this intersection in the AM peak hour and school PM peak hour. However, it is typical for stop sign controlled side streets and driveways intersecting major streets to experience long delays during peak hours, while the majority of the traffic moving through the intersection on the major street experiences little or no delay. This intersection is not expected to meet 4-hour or 8-hour MUTCD traffic signal warrants.

Commercial Build-out

The following additional improvements are recommended to be performed in addition to those recommended above for the residential phase to accommodate projected site traffic volumes when the retail portion of the site is developed:

US 401 Bypass Eastbound at Young Street:

• Extend the storage of the existing eastbound right-turn lane on US 401 Bypass by approximately 175 feet to provide 400 feet of storage and appropriate tapers

Young Street at Quarry Road/North Site Driveway:

- Construct a northbound right-turn lane on Young Street with 100 feet of storage and appropriate tapers
- Modify the traffic signal to accommodate the additional laneage

Analyses indicate that with the recommended improvements in place, all of the study intersections except for Young Street at Century Farm Road, Young Street at the Central Site Driveway, and Young Street at Rolesville High School Driveway/South Site Driveway are expected to operate at acceptable LOS at commercial build-out of the development.

Analyses indicate that the intersection of Young Street at Century Farm Road is expected to operate with long delays on the minor street approach (Century Farm Road) in the AM peak hour at project build-out. It is typical for stop sign controlled side streets and driveways intersecting major streets to experience long delays during peak hours, while the majority of the traffic moving through the intersection on the major street experiences little or no delay. SimTraffic

Kimley »Horn

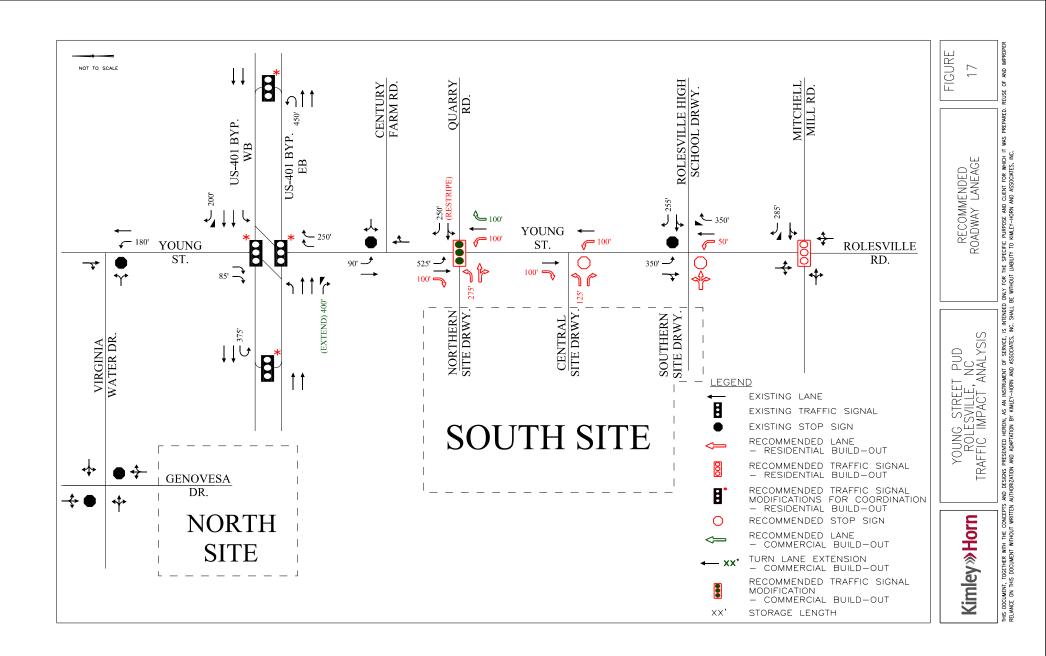
traffic simulations indicate that short queues are likely on the minor street approach in the AM peak hour at commercial build-out.

Analyses indicate that the intersection of Young Street at the Central Site Driveway is expected to operate with long delays on the minor street approach (Central Site Driveway) in the AM peak hour in the commercial build-out traffic condition. It is typical for stop sign controlled side streets and driveways intersecting major streets to experience long delays during peak hours, while the majority of the traffic moving through the intersection on the major street experiences little or no delay. SimTraffic traffic simulations indicate the possibility of long queues on the eastbound left-turn movement at this intersection in the AM peak hour in the commercial build-out condition.

Analyses indicate that the intersection of Young Street at the Rolesville High School Driveway/South Site Driveway is expected to operate with long delays on the minor street approach (Rolesville High School Driveway) in the AM peak hour and school PM peak hour with or without the proposed project in place in the study year 2025. SimTraffic traffic simulations also indicate the possibility of long queues on the westbound left-turn movement at this intersection in the AM peak hour and school PM peak hour. However, it is typical for stop sign controlled side streets and driveways intersecting major streets to experience long delays during peak hours, while the majority of the traffic moving through the intersection on the major street experiences little or no delay. This intersection is not expected to meet 4-hour or 8-hour MUTCD traffic signal warrants.

As shown in the analysis, the impact of site traffic associated with the commercial build-out of this proposed PUD is generally consistent with the currently-approved PUD for the site. The proposed PUD is expected to generate no more than 50 additional peak hour trips in each of the studied peak hours compared to the approved PUD, and delays at commercial build-out of both plans are generally consistent at each of the study intersections.

The recommended laneage for the development is shown on Figure 17.



TRAFFIC IMPACT ANALYSIS

FOR

WHEELER TRACT

LOCATED

IN

ROLESVILLE, NC

Prepared For: Hopper Communities 173 Paraggi Court Clayton, NC 27527

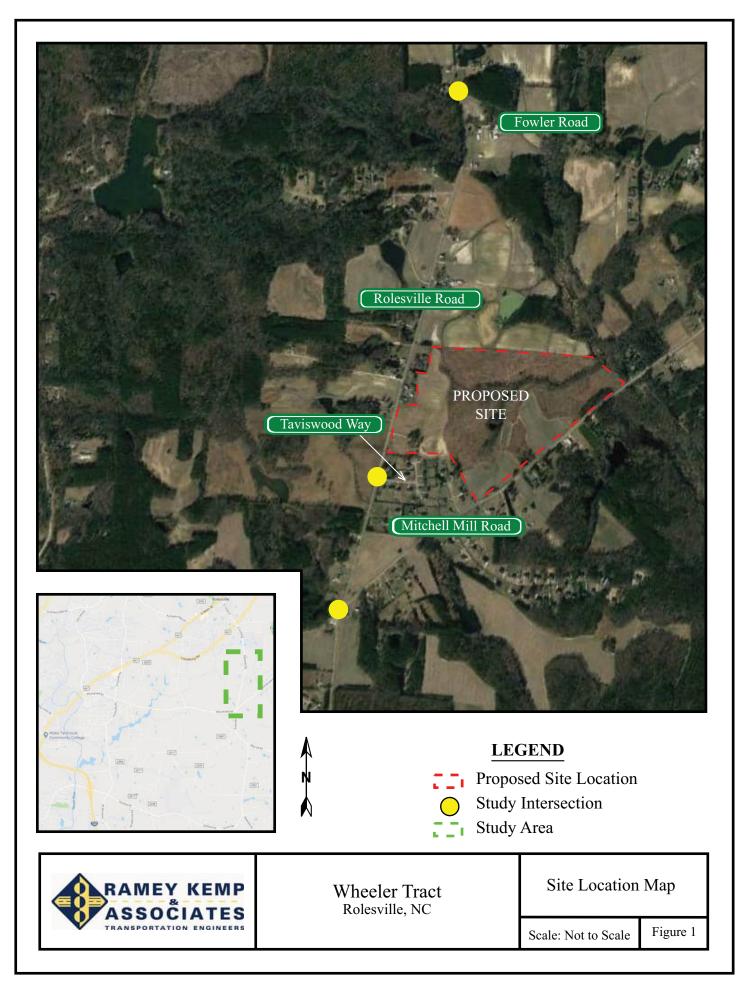
Prepared By: Ramey Kemp & Associates, Inc. 5808 Faringdon Place, Suite 100 Raleigh, NC 27609 License #C-0910

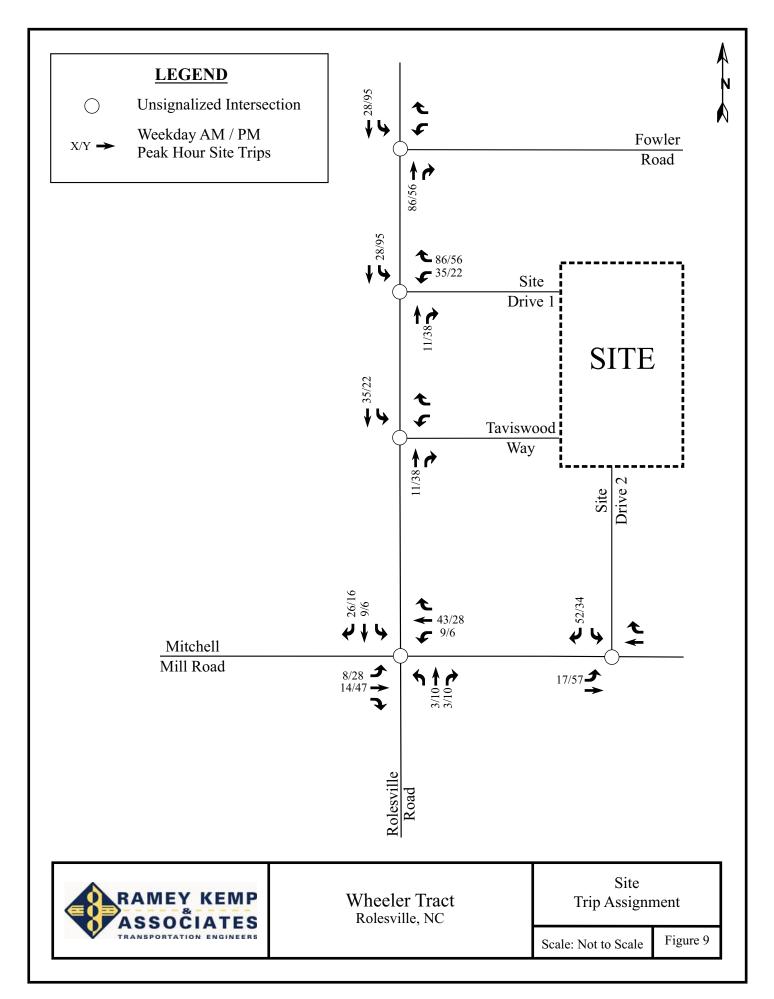
June 2019



Prepared By: <u>CAB</u> Reviewed By: JTR

RKA Project No. 19045





9. **RECOMMENDATIONS**

Based on the findings of this study, specific geometric improvements have been identified and are recommended to accommodate future traffic conditions. See a more detailed description of the recommended improvements below. Refer to Figure 11 for an illustration of the recommended lane configuration for the proposed development.

Recommended Improvements by Developer

Rolesville Road and Mitchell Mill Road

• Monitor intersection for signalization.

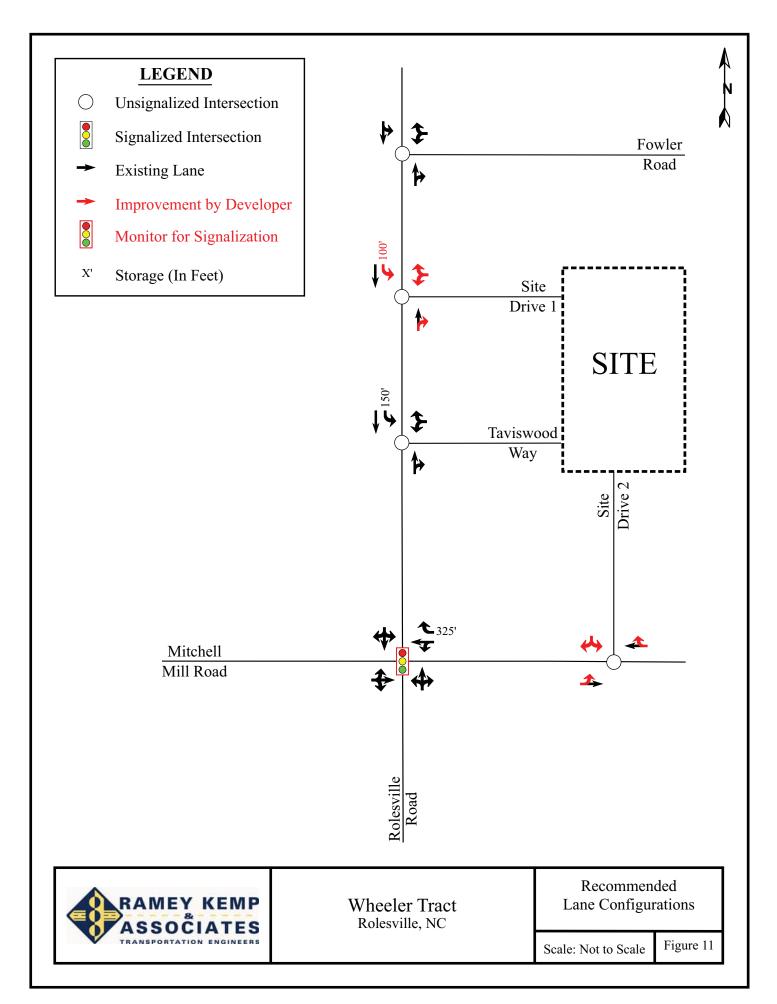
Rolesville Road and Site Drive 1

- Provide site access via a full movement intersection with one ingress lane and one egress lane.
- Provide stop control for westbound Site Drive 1 approach.
- Provide a designated southbound left-turn lane with at least 100 feet of storage and appropriate deceleration and taper.

Mitchell Mill Road and Site Drive 2

- Provide site access via a full movement intersection with one ingress lane and one egress lane.
- Provide stop control for southbound Site Drive 2 approach.





TRAFFIC IMPACT ANALYSIS

FOR

LOUISBURY ROAD ASSEMBLAGE

LOCATED

IN

RALEIGH, NC

Prepared For: McAdams Company 2905 Meridian Parkway Durham, NC 27713

Prepared By: Ramey Kemp & Associates, Inc. 5808 Faringdon Place, Suite 100 Raleigh, NC 27609 License #C-0910

andrew Ryle Rithe

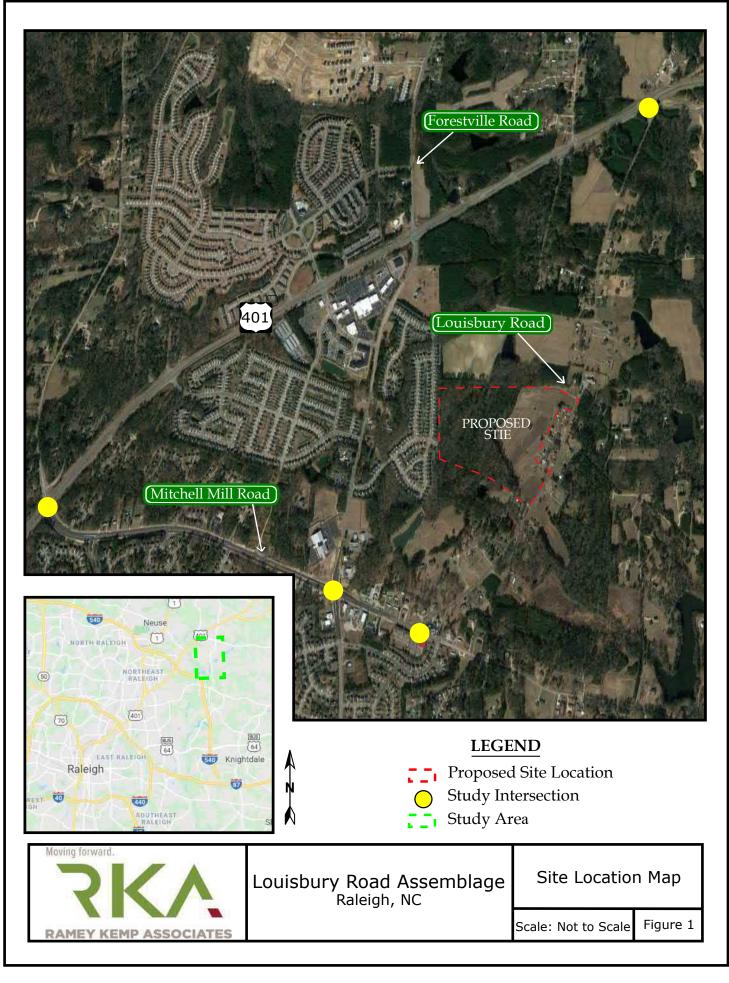
SEAL 047058 5/8/2020

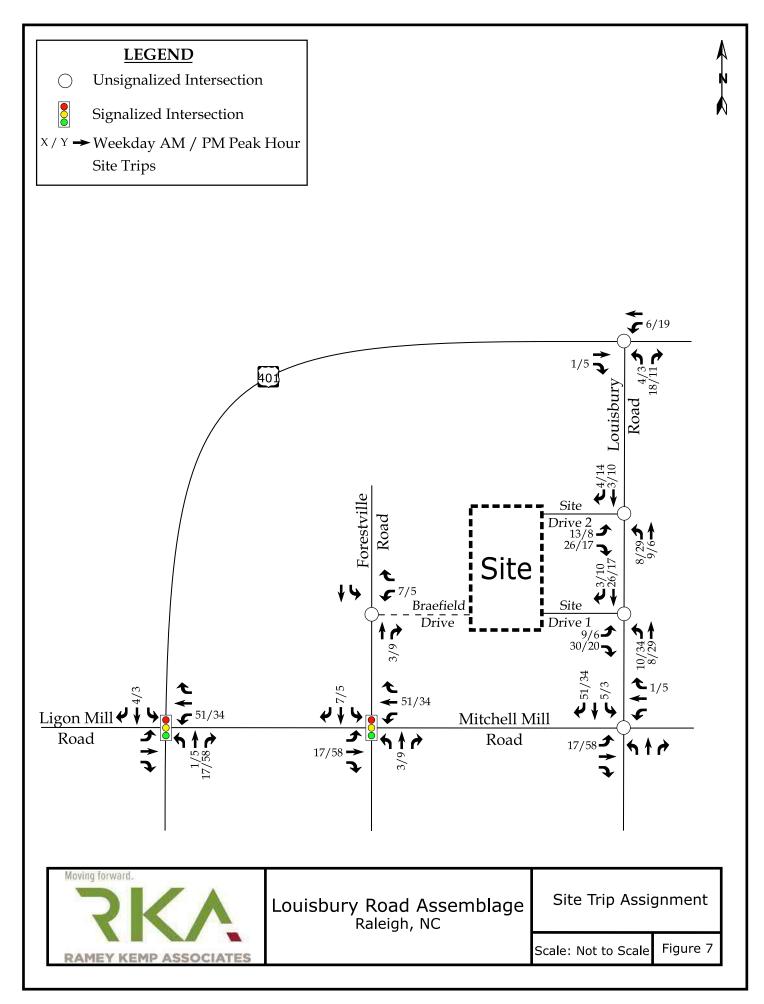
May 2020

Prepared By: <u>DT</u>

Reviewed By: DR

RKA Project No. 19418





12. RECOMMENDATIONS

Based on the findings of this study, specific geometric improvements have been identified and are recommended to accommodate future traffic conditions. See a more detailed description of the recommended improvements below. Refer to Figure 9 for an illustration of the recommended lane configuration for the proposed development.

Recommended Improvements by Developer

Mitchell Mill Road and Louisbury Road

• Monitor for signalization after site is constructed.

US 401 and Louisbury Road

- Per NCDOT, extend northbound left turn lane to 175' of storage.
- Monitor for signalization after site is constructed.

Louisbury Road and Site Drive 1

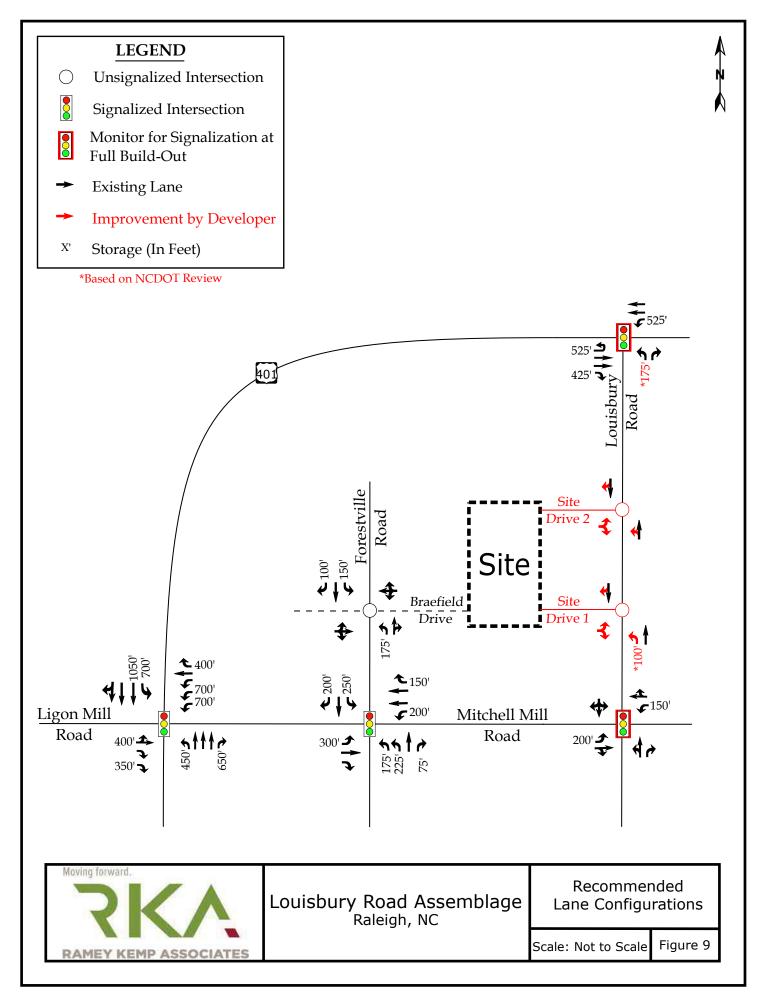
- Provide site access via full movement intersection with one (1) ingress lane and one (1) egress lane.
- Per NCDOT, provide northbound left turn lane with 100' of storage.
- Provide stop control for eastbound approach.

Louisbury Road and Site Drive 2

- Provide site access via full movement intersection with one (1) ingress lane and one (1) egress lane.
- Provide stop control for eastbound approach.



Transportation Consulting that moves us forward.





Kalas / Watkins Family Property Traffic Impact Analysis

Rolesville Road, Rolesville, North Carolina

August 24, 2019

Prepared for:

Mitchell Mill Road Investors LLC PO Box 3557 Cary, NC 27519

Prepared by:

Stantec Consulting Services Inc.

801 Jones Franklin Road Suite 300 Raleigh, NC 27606

Sign-off Sheet

This document entitled Kalas / Watkins Family Property Traffic Impact Analysis was prepared by Stantec Consulting Services Inc. ("Stantec") for the account of Mitchell Mill Road Investors LLC (the "Client"). Any reliance on this document by any third party is strictly prohibited. The material in it reflects Stantec's professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Stantec and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Stantec did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Stantec shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

Prepared by

(signature)

Maggie Rogers

Reviewed by __

2

(signature)

Matt Peach, PE, PTOE une Approved by

(signature)

Christa Greene, PE



Introduction August 24, 2019

1.0 INTRODUCTION

The purpose of this report is to evaluate the transportation impacts of the proposed Kalas / Watkins Family Property development located on the west side of Rolesville Road just north of Mitchell Mill Road in Rolesville, NC. The project location is shown below in Figure 1.

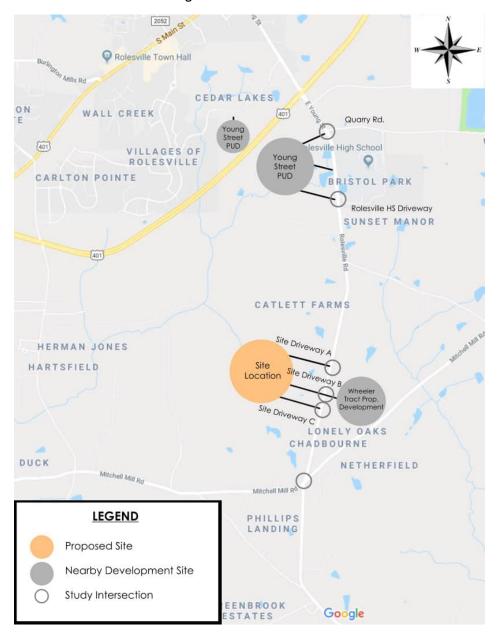


Figure 1: Site Location

KALAS / WATKINS FAMILY PROPERTY TRAFFIC IMPACT ANALYSIS

Trip Generation and Distribution August 24, 2019

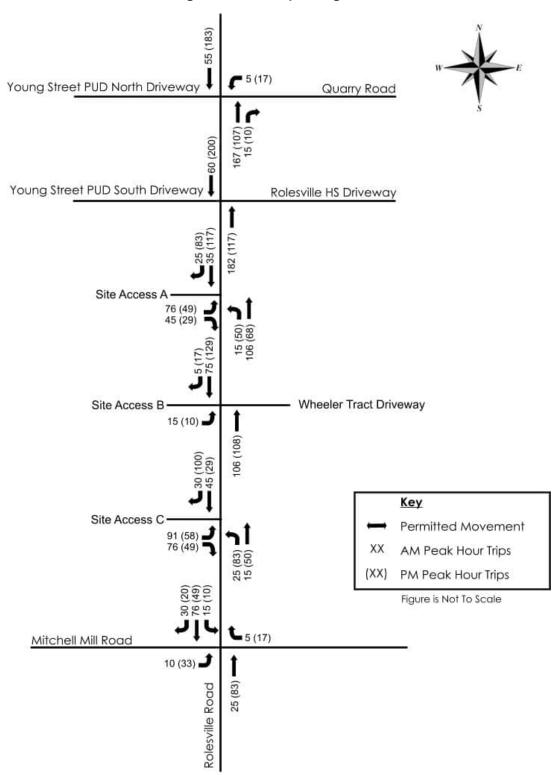


Figure 6: Site Trip Assignment

Traffic Analysis August 24, 2019

5.4 2025 BUILD WITH IMPROVEMENTS

Geometric improvements such as the installation of turn-lanes are recommended and therefore analyzed in this scenario. These items are listed below as well as in the recommendations section.

Rolesville Road at Site Driveway A

- Construct Driveway A as a full-movement access point onto Rolesville Road with one ingress lane and one egress lane.
- Construct an exclusive eastbound right-turn lane with 100 feet of full-width storage and appropriate taper on Driveway A.
- Construct an exclusive northbound left-turn lane with 100 feet of full-width storage and appropriate taper on Rolesville Road.
- Construct an exclusive southbound right-turn lane with 100 feet of full-width storage and appropriate taper on Rolesville Road.

Rolesville Road at Site Driveway B / Wheeler Tract Driveway

- Construct Driveway B as a full-movement access point onto Rolesville Road with one ingress lane and one egress lane.
- Construct an exclusive northbound left-turn lane with 100 feet of full-width storage and appropriate taper on Rolesville Road.
- Construct an exclusive southbound right-turn lane with 50 feet of full-width storage and appropriate taper on Rolesville Road.

Rolesville Road at Site Driveway C

- Construct Driveway C as a full-movement access point onto Rolesville Road with one ingress lane and one egress lane.
- Construct an exclusive eastbound right-turn lane with 100 feet of full-width storage and appropriate taper on Driveway C.
- Construct an exclusive northbound left-turn lane with 100 feet of full-width storage and appropriate taper on Rolesville Road.
- Construct an exclusive southbound right-turn lane with 100 feet of full-width storage and appropriate taper on Rolesville Road.

Accordingly, all study area intersections and approaches operate at acceptable levels of service with the following exceptions:

- The east and westbound approaches to the intersection of Rolesville Road at Rolesville High School Driveway / Young Street PUD Southern Driveway operates at LOS F in the AM peak hour. This causes high overall delays at the intersection. Furthermore, the eastbound approach operates at LOS F and westbound approach operates at LOS E in the PM peak hour.
- The east and westbound approaches at the intersection of Rolesville Road at Site Driveway B / Wheeler Tract Driveway operate at LOS E in the AM peak hour.

The east and westbound approaches to the intersection of Rolesville Road at Rolesville High School Driveway / Young Street PUD Southern Driveway performs unacceptably across analysis scenarios. These delays can be



KALAS / WATKINS FAMILY PROPERTY TRAFFIC IMPACT ANALYSIS

Traffic Analysis August 24, 2019

attributed to both the Young Street PUD and High School traffic on the side street approaches. The Kalas / Watkins development is projected to only add through volumes to the intersection and are anticipated to have a minimal impact on overall delays at this intersection.

Delays on the eastbound approach of Site Driveway B at Rolesville Road can be attributed to high thru volumes on Rolesville Road during the AM peak hour. Traffic volumes using this approach are anticipated to be minor (i.e. 15 vehicles in the AM peak hour and 10 vehicles in the PM peak hour) and side street delays should dissipate after High School Traffic passes through the network. Table 8 lists the results of the capacity analysis under the 2025 build-improved traffic conditions. The recommended improvements are illustrated in figure 14.

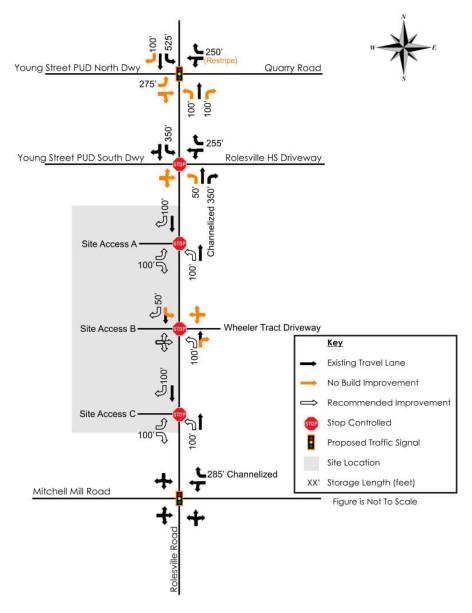


Figure 14: Recommended Improvements



TRAFFIC IMPACT ANALYSIS

FOR

5109 MITCHELL MILL ROAD

LOCATED

IN

ROLESVILLE, NORTH CAROLINA

Prepared For: Town of Rolesville 502 Southtown Circle Rolesville, NC 27571



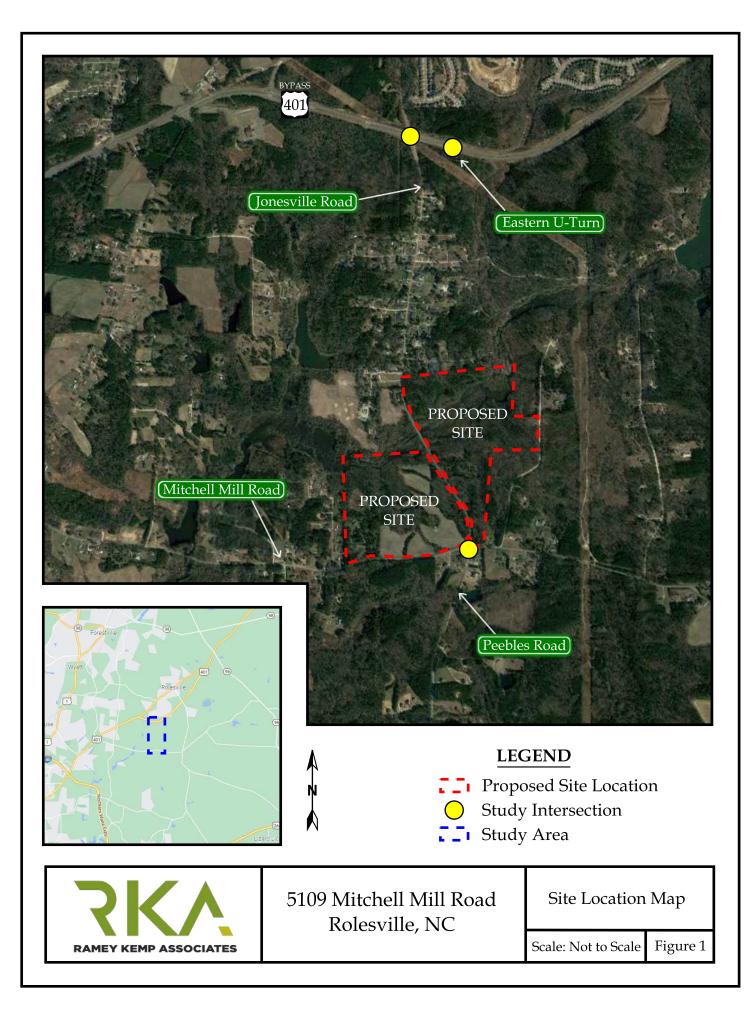
Prepared By: Infrastructure Consulting Services, Inc. *dba* **Ramey Kemp Associates** 5808 Faringdon Place Raleigh, NC 27609 License #F-1489

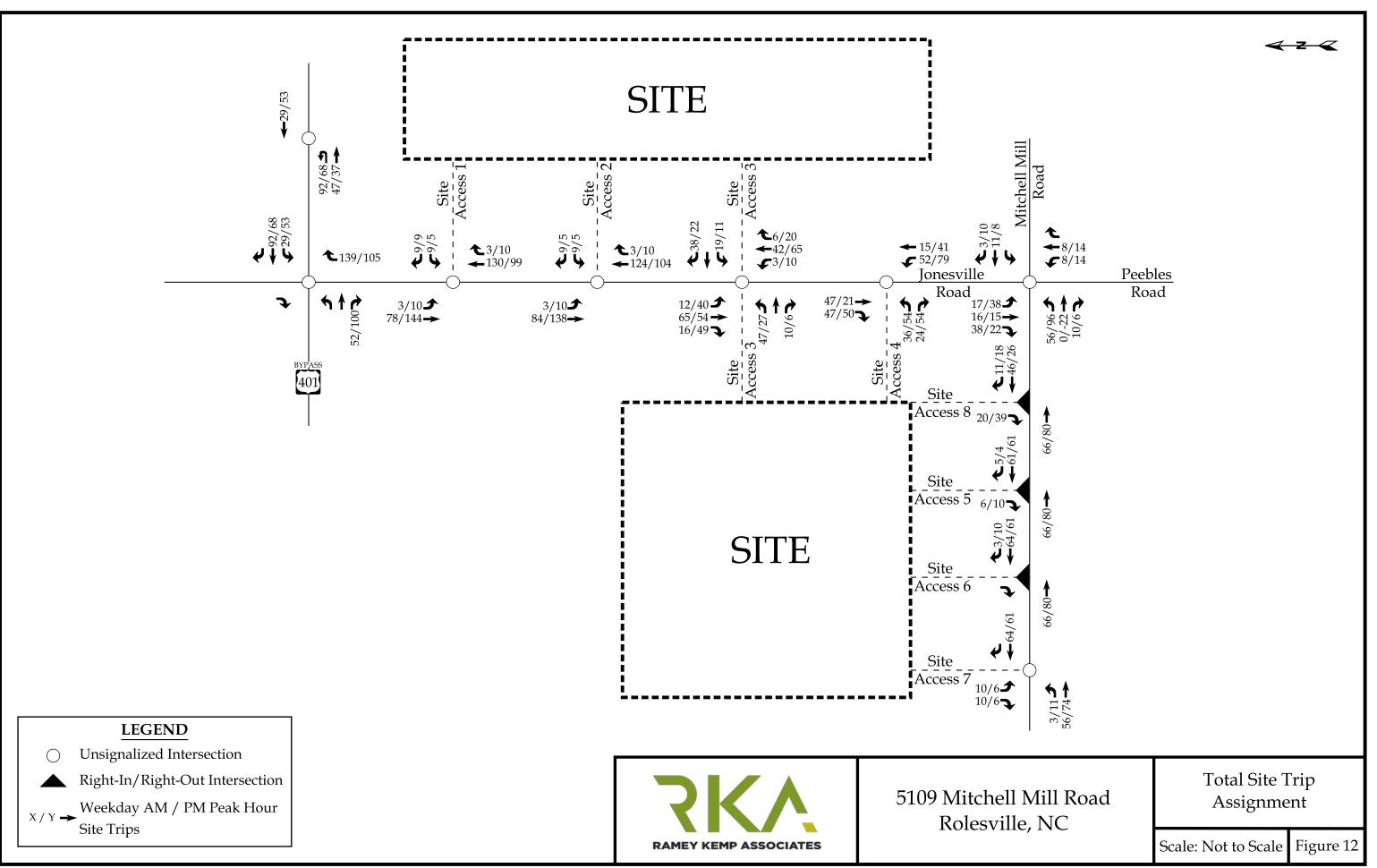
AUGUST 2022

RKA Project No. 20498 - 004

Prepared By: TF

Reviewed By: CH





9. **RECOMMENDATIONS**

Based on the findings of this study, specific geometric improvements have been identified and are recommended to accommodate future traffic conditions. See a more detailed description of the recommended improvements below. Refer to Figure 14 for an illustration of the recommended lane configurations for the proposed development.

Recommended Improvements by Developer

Required Frontage Improvements per Rolesville Community Transportation Plan

- Widen Jonesville Road along the site frontage between Site Access 1 and Mitchell Mill Road to this roadway's ultimate section (2-lane w/ TWLTL).
- Widen one-half section of Mitchell Mill Road along the site frontage to this roadway's ultimate section (4-lane median divided).

US 401 Bypass and Jonesville Road

• Conduct a full signal warrant analysis prior to full build-out of the proposed development and install a traffic signal if warranted and approved by the Town and NCDOT.

US 401 Bypass and Eastern U-Turn Location

• Conduct a full signal warrant analysis prior to full build-out of the proposed development and install a traffic signal if warranted and approved by the Town and NCDOT.

Mitchell Mill Road and Jonesville Road / Peebles Road

- Construct a southbound (Jonesville Road) left-turn lane with at least 100 feet of storage and appropriate decel and taper.
- Construct an eastbound (Mitchell Mill Road) left-turn lane with at least 100 feet of storage and appropriate decel and taper.
- Conduct a full signal warrant analysis prior to full build-out of the proposed development and install a traffic signal if warranted and approved by the Town and NCDOT.



Jonesville Road and Site Access 1

- Construct the westbound approach (Site Access 1) with one ingress lane and one egress lane.
- Provide stop-control for the westbound approach (Site Access 1).
- Construct a southbound (Jonesville Road) left-turn lane with at least 100 feet of storage and appropriate decel and taper.

Jonesville Road and Site Access 2

- Construct the westbound approach (Site Access 2) with one ingress lane and one egress lane.
- Provide stop-control for the westbound approach (Site Access 2).
- Construct a northbound (Jonesville Road) right-turn lane with at least 100 feet of storage and appropriate decel and taper.
- Construct a southbound (Jonesville Road) left-turn lane with at least 100 feet of storage and appropriate decel and taper.

Jonesville Road and Site Access 3

- Construct the eastbound and westbound approaches (Site Access 3) with one ingress lane and one egress lane.
- Provide stop-control for the eastbound and westbound approaches (Site Access 3).
- Construct a northbound (Jonesville Road) left-turn lane with at least 100 feet of storage and appropriate decel and taper.
- Construct a northbound (Jonesville Road) right-turn lane with at least 100 feet of storage and appropriate decel and taper.
- Construct a southbound (Jonesville Road) left-turn lane with at least 100 feet of storage and appropriate decel and taper.
- Construct a southbound (Jonesville Road) right-turn lane with at least 100 feet of storage and appropriate decel and taper.



Jonesville Road and Site Access 4

- Construct the eastbound approach (Site Access 4) with one ingress lane and one egress lane.
- Provide stop-control for the eastbound approach (Site Access 4).
- Construct a northbound (Jonesville Road) left-turn lane with at least 100 feet of storage and appropriate decel and taper.
- Construct a southbound (Jonesville Road) right-turn lane with at least 100 feet of storage and appropriate decel and taper.

Mitchell Mill Road and Site Access 5

- Construct the southbound approach (Site Access 5) with one ingress lane and one egress lane striped as an exclusive right-turn lane.
- Provide stop-control for the southbound approach (Site Access 5). This proposed intersection will be restricted to right-in/right-out operations.
- Construct an exclusive westbound (Mitchell Mill Road) right-turn lane with at least 100 feet of storage and appropriate decel and taper.

Mitchell Mill Road and Site Access 6

- Construct the southbound approach (Site Access 6) with one ingress lane and one egress lane striped as an exclusive right-turn lane.
- Provide stop-control for the southbound approach (Site Access 6). This proposed intersection will be restricted to right-in/right-out operations.
- Construct an exclusive westbound (Mitchell Mill Road) right-turn lane with at least 100 feet of storage and appropriate decel and taper.

Mitchell Mill Road and Site Access 7

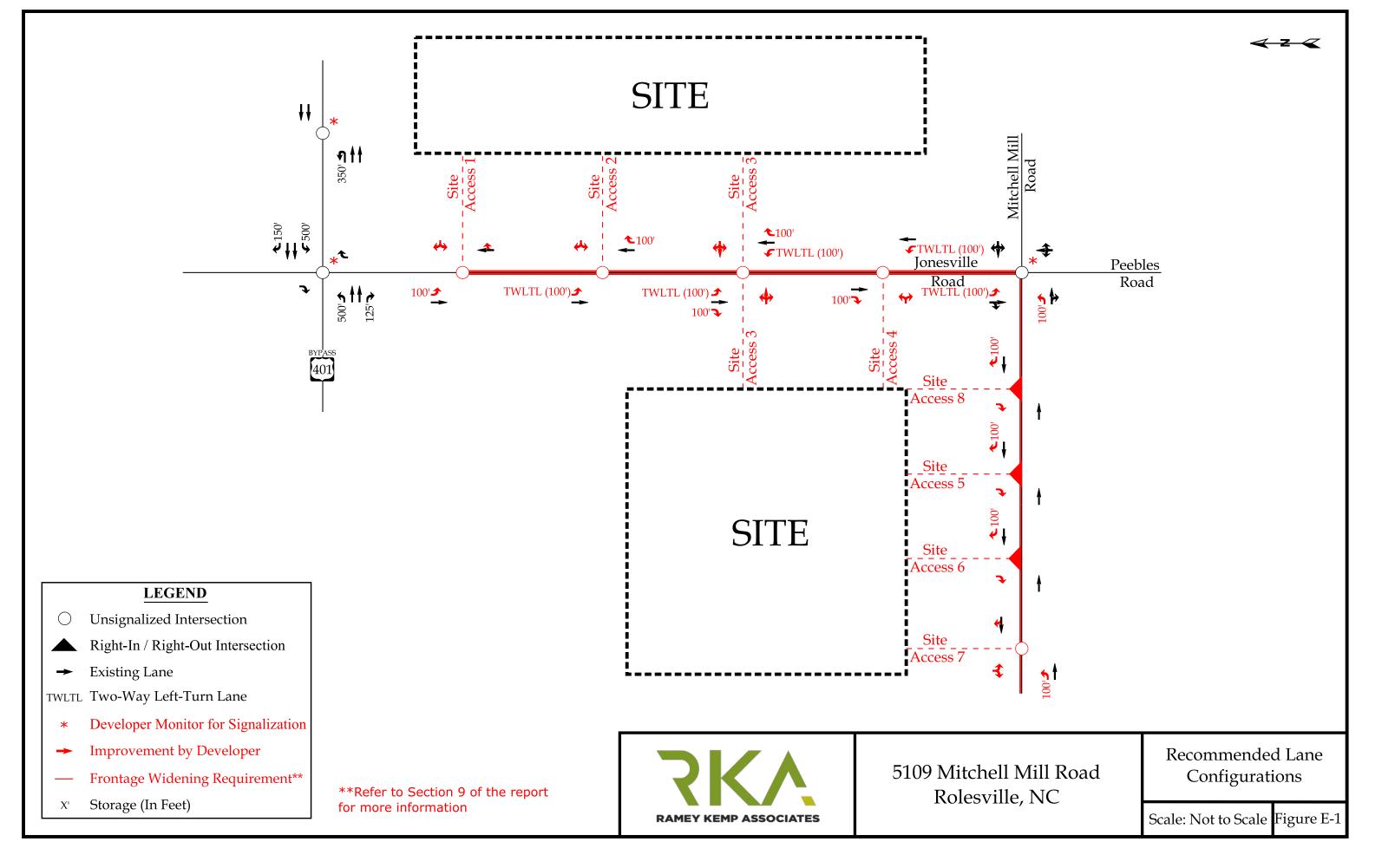
- Construct the southbound approach (Site Access 7) with one ingress lane and one egress lane.
- Provide stop-control for the southbound approach (Site Access 7)
- Construct an exclusive eastbound (Mitchell Mill Road) left-turn lane with at least 100 feet of storage and appropriate decel and taper.



Mitchell Mill Road and Site Access 8

- Construct the southbound approach (Site Access 8) with one ingress lane and one egress lane striped as an exclusive right-turn lane.
- Provide stop-control for the southbound approach (Site Access 8). This proposed intersection will be restricted to right-in/right-out operations.
- Construct an exclusive westbound (Mitchell Mill Road) right-turn lane with at least 100 feet of storage and appropriate decel and taper.





TRAFFIC IMPACT ANALYSIS

FOR

HILLS AT HARIS CREEK

LOCATED

IN

ROLESVILLE, NORTH CAROLINA

Prepared For: Town of Rolesville 502 Southtown Circle Rolesville, NC 27571

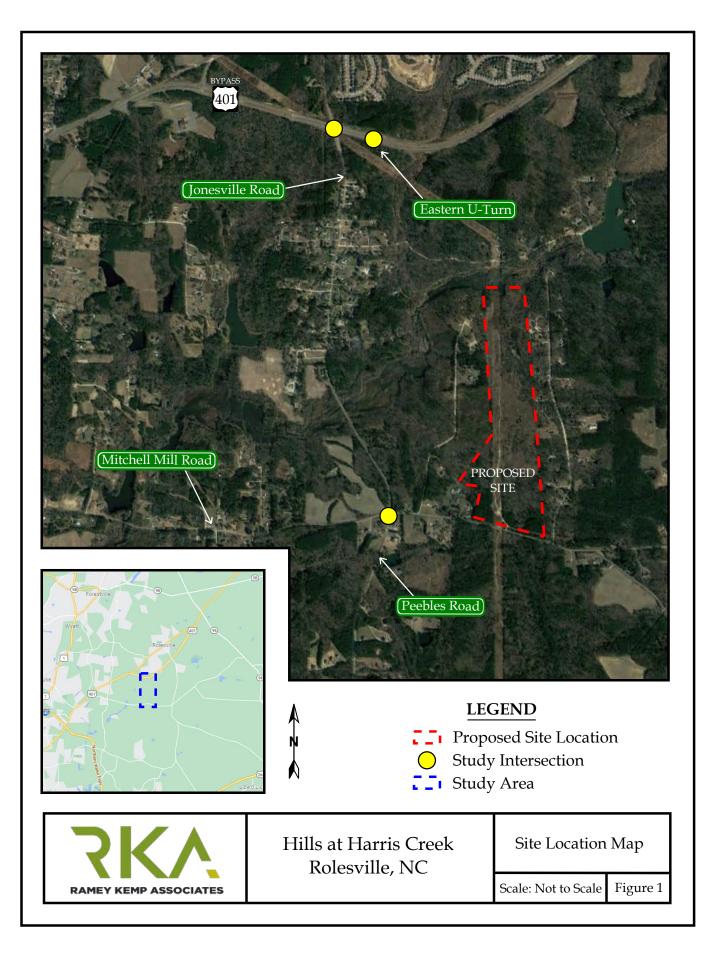
Prepared By: Ramey Kemp & Associates, Inc. 5808 Faringdon Place, Suite 100 Raleigh, NC 27609 License #C-0910

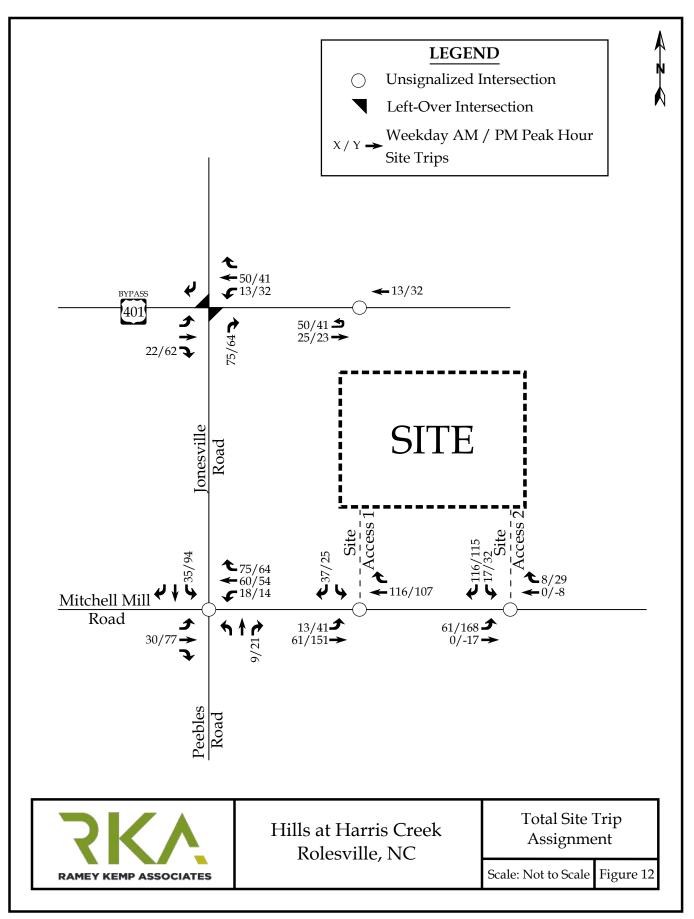


MAY 2022

Prepared By: <u>TF</u> Reviewed By: <u>JMC</u>

RKA Project No. 20498 - 005





9. **RECOMMENDATIONS**

Based on the findings of this study, specific geometric improvements have been identified and are recommended to accommodate future traffic conditions. See a more detailed description of the recommended improvements below. Refer to Figure 14 for an illustration of the recommended lane configurations for the proposed development.

Recommended Improvements by Developer

Required Frontage Improvements per Rolesville Community Transportation Plan

• Widen one-half section of Mitchell Mill Road along the site frontage to this roadway's ultimate section (4-lane median divided).

US 401 Bypass and Jonesville Road

• Conduct a full signal warrant analysis prior to full build-out of the proposed development and install a traffic signal if warranted and approved by the Town and NCDOT.

US 401 Bypass and Eastern U-Turn Location

• Conduct a full signal warrant analysis prior to full build-out of the proposed development and install a traffic signal if warranted and approved by the Town and NCDOT.

Mitchell Mill Road and Jonesville Road / Peebles Road

- Construct a southbound (Jonesville Road) left-turn lane with at least 100 feet of storage and appropriate decel and taper.
 - It should be noted that this improvement was also identified by the 5109
 Mitchell Mill Road TIA.
- Construct a westbound (Mitchell Mill Road) right-turn lane with at least 100 feet of storage and appropriate decel and taper.
- Conduct a full signal warrant analysis prior to full build-out of the proposed development and install a traffic signal if warranted and approved by the Town and NCDOT.



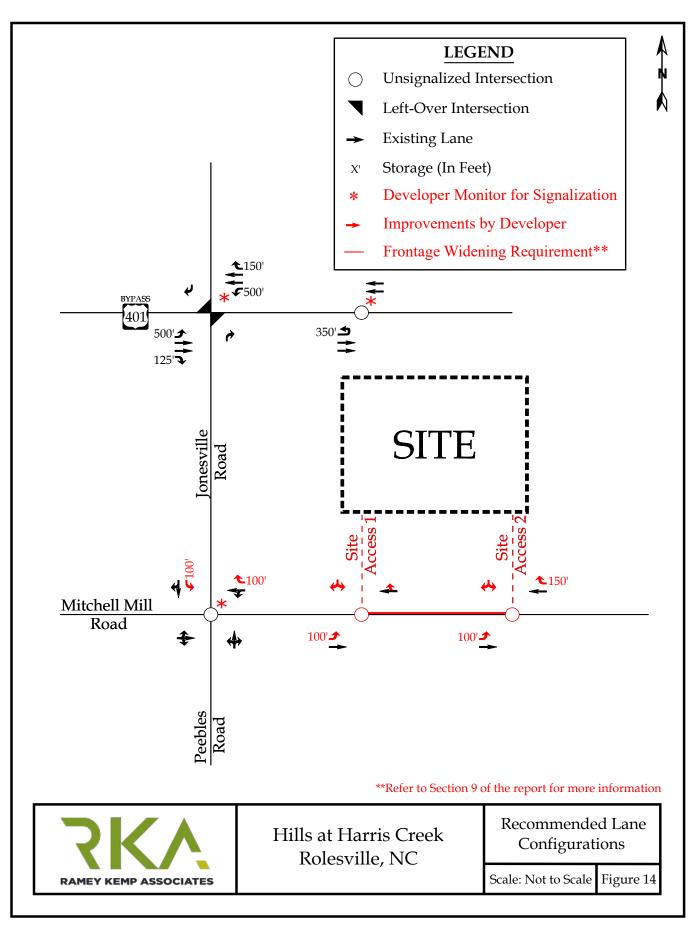
Mitchell Mill Road and Site Access 1

- Construct the southbound approach (Site Access 1) with one ingress lane and one egress lane.
- Provide stop-control for the southbound approach (Site Access 1).
- Construct an eastbound (Mitchell Mill Road) left-turn lane with at least 100 feet of storage and appropriate decel and taper.

Mitchell Mill Road and Site Access 2

- Construct the southbound approach (Site Access 2) with one ingress lane and one egress lane.
- Provide stop-control for the southbound approach (Site Access 2).
- Construct an eastbound (Mitchell Mill Road) left-turn lane with at least 150 feet of storage and appropriate decel and taper.
- Construct a westbound (Mitchell Mill Road) right-turn lane with at least 100 feet of storage and appropriate decel and taper.





APPENDIX D

CAPACITY ANALYSIS CALCULATIONS US 401 BYPASS & JONESVILLE ROAD

Intersection

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations				WDL		WDIX	NDL			ODL			
•	•	TT	00	0	0	0	•	•	400	•	T	0	
Traffic Vol, veh/h	0	590	80	0	0	0	0	0	136	0	86	0	
Future Vol, veh/h	0	590	80	0	0	0	0	0	136	0	86	0	
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	
Sign Control	Free	Free	Free	Stop									
RT Channelized	-	-	Yield	-	-	None	-	-	None	-	-	None	
Storage Length	-	-	125	-	-	-	-	-	0	-	-	-	
Veh in Median Storage,	# -	0	-	-	0	-	-	0	-	-	0	-	
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-	
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90	
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	
Mvmt Flow	0	656	89	0	0	0	0	0	151	0	96	0	

Major/Minor	Major1					Minor	1		Ν	/linor2				
Conflicting Flow All	-	0	0				-	-	328	-	656	-		
Stage 1	-	-	-				-	-	-	-	0	-		
Stage 2	-	-	-				-	-	-	-	656	-		
Critical Hdwy	-	-	-				-	-	6.94	-	6.54	-		
Critical Hdwy Stg 1	-	-	-				-	-	-	-	-	-		
Critical Hdwy Stg 2	-	-	-				-	-	-	-	5.54	-		
Follow-up Hdwy	-	-	-				-	-	3.32	-	4.02	-		
Pot Cap-1 Maneuver	0	-	-				0	0	668	0	384	0		
Stage 1	0	-	-				0	0	-	0	-	0		
Stage 2	0	-	-				0	0	-	0	460	0		
Platoon blocked, %		-	-											
Mov Cap-1 Maneuver	-	-	-				-	-	668	-	384	-		
Mov Cap-2 Maneuver	-	-	-				-	-	-	-	384	-		
Stage 1	-	-	-				-	-	-	-	-	-		
Stage 2	-	-	-				-	-	-	-	460	-		
Approach	EB					Ν	3			SB				
HCM Control Delay, s	0					1	2			17.5				
HCM LOS							3			С				
Minor Lane/Major Mvn	nt N	BLn1	EBT	EBR	SBLn1		_							
Capacity (veh/h)		668	-	-	384									
HCM Lane V/C Ratio	(0.226	-	-	0.249									
HCM Control Delay (s))	12	-	-	17.5									
HCM Lane LOS		В	-	-	С									
HCM 95th %tile Q(veh)	0.9	_	-	1									

Intersection

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		††	1						1	-	Ť	-
Traffic Vol, veh/h	0	1220	59	0	0	0	0	0	125	0	37	0
Future Vol, veh/h	0	1220	59	0	0	0	0	0	125	0	37	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Stop								
RT Channelized	-	-	Yield	-	-	None	-	-	None	-	-	None
Storage Length	-	-	125	-	-	-	-	-	0	-	-	-
Veh in Median Storage,	,# -	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	1356	66	0	0	0	0	0	139	0	41	0

Major/Minor	Major1					Mino	r1		Ν	/linor2				
Conflicting Flow All	-	0	0				-	-	678	-	1356	-		
Stage 1	-	-	-				-	-	-	-	0	-		
Stage 2	-	-	-				-	-	-	-	1356	-		
Critical Hdwy	-	-	-				-	-	6.94	-	6.54	-		
Critical Hdwy Stg 1	-	-	-				-	-	-	-	-	-		
Critical Hdwy Stg 2	-	-	-				-	-	-	-	5.54	-		
Follow-up Hdwy	-	-	-				-	-	3.32	-	4.02	-		
Pot Cap-1 Maneuver	0	-	-				0	0	395	0	148	0		
Stage 1	0	-	-				0	0	-	0	-	0		
Stage 2	0	-	-				0	0	-	0	216	0		
Platoon blocked, %		-	-											
Mov Cap-1 Maneuver	-	-	-				-	-	395	-	148	-		
Mov Cap-2 Maneuver	-	-	-				-	-	-	-	148	-		
Stage 1	-	-	-				-	-	-	-	-	-		
Stage 2	-	-	-				-	-	-	-	216	-		
Approach	EB					Ν	١B			SB				
HCM Control Delay, s	0						19			38.4				
HCM LOS							С			Е				
Minor Lane/Major Mvm	nt N	BLn1	EBT	EBR	SBLn1									
Capacity (veh/h)	-	395	-	-	148								 	
HCM Lane V/C Ratio	(0.352	-	-	0.278									
HCM Control Delay (s)		19	-	-	38.4									
HCM Lane LOS		C	-	-	E									
HCM 95th %tile Q(veh))	1.6	-	-	1.1									

Intersection

Int Delay, s/veh

Lane Configurations Image: configuration in the image: configuration	Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Traffic Vol, veh/h 0 812 154 0 0 0 0 350 0 128 0 Future Vol, veh/h 0 812 154 0 0 0 0 350 0 128 0 Conflicting Peds, #/hr 0 </td <td></td> <td>EDL</td> <td></td> <td>EDK</td> <td>VVDL</td> <td>VVDI</td> <td>VVDR</td> <td>INDL</td> <td>INDI</td> <td>NDR</td> <td>SDL</td> <td>SDI</td> <td>SDK</td> <td></td>		EDL		EDK	VVDL	VVDI	VVDR	INDL	INDI	NDR	SDL	SDI	SDK	
Future Vol, veh/h 0 812 154 0 0 0 0 350 0 128 0 Conflicting Peds, #/hr 0	Lane Configurations		11	r						r		1		
Conflicting Peds, #/hr 0 <td>Traffic Vol, veh/h</td> <td>0</td> <td>812</td> <td>154</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>350</td> <td>0</td> <td>128</td> <td>0</td> <td></td>	Traffic Vol, veh/h	0	812	154	0	0	0	0	0	350	0	128	0	
Sign ControlFreeFreeFreeStopStopStopStopStopStopStopStopStopRT ChannelizedYieldNoneNoneNoneStorage Length1250Veh in Median Storage, #0000-Grade, %-000-0-Peak Hour Factor9090909090909090909090	Future Vol, veh/h	0	812	154	0	0	0	0	0	350	0	128	0	
RT Channelized - - Yield - - None - - None Storage Length - - 125 - - - 0 - - 0 Veh in Median Storage, # 0 - - 0	Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	
Storage Length - - 125 - - - 0 -	Sign Control	Free	Free	Free	Stop									
Veh in Median Storage, # 0 - - 0 - - 0 - 0 - Grade, % - 0 - - 0 - - 0 - - 0 - Peak Hour Factor 90	RT Channelized	-	-	Yield	-	-	None	-	-	None	-	-	None	
Grade, % - 0 0 0 0 - Peak Hour Factor 90 90 90 90 90 90 90 90 90 90 90 90	Storage Length	-	-	125	-	-	-	-	-	0	-	-	-	
Peak Hour Factor 90 90 90 90 90 90 90 90 90 90 90 90 90	Veh in Median Storage.	,# -	0	-	-	0	-	-	0	-	-	0	-	
	Grade, %	-	0	-	-	0	-	-	0	-	-	0	-	
Hence V (objection V) 2 2 2 2 2 2 2 2 2 2	Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90	
	Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	
Mvmt Flow 0 902 171 0 0 0 0 389 0 142 0	Mvmt Flow	0	902	171	0	0	0	0	0	389	0	142	0	

Major/Minor	Major1				Minor1		Ν	/linor2			
Conflicting Flow All	-	0	0		-	-	451	-	902	-	
Stage 1	-	-	-		-	-	-	-	0	-	
Stage 2	-	-	-		-	-	-	-	902	-	
Critical Hdwy	-	-	-		-	-	6.94	-	6.54	-	
Critical Hdwy Stg 1	-	-	-		-	-	-	-	-	-	
Critical Hdwy Stg 2	-	-	-		-	-	-	-	5.54	-	
Follow-up Hdwy	-	-	-		-	-	3.32	-	4.02	-	
Pot Cap-1 Maneuver	0	-	-		0	0	556	0	276	0	
Stage 1	0	-	-		0	0	-	0	-	0	
Stage 2	0	-	-		0	0	-	0	355	0	
Platoon blocked, %		-	-								
Mov Cap-1 Maneuver	-	-	-		-	-	556	-	276	-	
Mov Cap-2 Maneuver	-	-	-		-	-	-	-	276	-	
Stage 1	-	-	-		-	-	-	-	-	-	
Stage 2	-	-	-		-	-	-	-	355	-	
Approach	EB				NB			SB			
HCM Control Delay, s	0				25.2			31.1			
HCM LOS	v				D			D			
					5			5			
Minor Long/Maigr Mur	at N		ГРТ	EBR SBLn1							
Minor Lane/Major Mvn	nt N	IBLn1	EBT								
Capacity (veh/h)		556	-	- 276							
HCM Lane V/C Ratio		0.699	-	- 0.515							
HCM Control Delay (s))	25.2	-	- 31.1							
HCM Lane LOS		D	-	- D							

2.7

_

5.5

HCM 95th %tile Q(veh)

Intersection

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
	EDL	EDI	EDR	VVDL	VVDI	VVDN	INDL	INDI	NDR	SDL	SDI	JDR	
Lane Configurations		TT.	r						r		Ť		
Traffic Vol, veh/h	0	1708	221	0	0	0	0	0	294	0	122	0	
Future Vol, veh/h	0	1708	221	0	0	0	0	0	294	0	122	0	
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	
Sign Control	Free	Free	Free	Stop									
RT Channelized	-	-	Yield	-	-	None	-	-	None	-	-	None	
Storage Length	-	-	125	-	-	-	-	-	0	-	-	-	
Veh in Median Storage,	# -	0	-	-	0	-	-	0	-	-	0	-	
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-	
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90	
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	
Mvmt Flow	0	1898	246	0	0	0	0	0	327	0	136	0	

Major1			Minor1	ľ	Minor2		
-	0	0	-	- 949	- 1898	-	
-	-	-	-		- 0	-	
-	-	-	-		- 1898	-	
-	-	-	-	- 6.94	- 6.54	-	
-	-	-	-			-	
-	-	-	-		- 5.54	-	
-	-	-	-	- 3.32	- 4.02	-	
0	-	-	0	0 ~261	0 ~ 69	0	
0	-	-	0	0 -	0 -	0	
0	-	-	0	0 -	0 ~116	0	
	-	-					
	-	-	-	- ~261	- ~69	-	
· -	-	-	-		- ~69	-	
-	-	-	-			-	
-	-	-	-		- ~116	-	
EB			NB		SB		
0			180.2	\$	579.5		
			F		F		
	- - - - - - - 0 0 0 0 0 0 0 0	- 0 0 - 0 - 0 -	- 0 0 0 0 0 0 	- 0 0 - - - - - - - - - - - - - - - - - - - - - 0 - - 0 0 - - 0 0 - - 0 0 - - 0 - - 0 - - - - 0 - - - 0 - - - 0 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - <	- 0 0 - - 949 - - - - - - - - - - - - - - - -	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$

Minor Lane/Major Mvmt	NBLn1	EBT	EBR SBLn1		
Capacity (veh/h)	261	-	- 69	1	
HCM Lane V/C Ratio	1.252	-	- 1.965		
HCM Control Delay (s)	180.2	-	-\$ 579.5		
HCM Lane LOS	F	-	- F		
HCM 95th %tile Q(veh)	15.9	-	- 12.4		
Notes					
-: Volume exceeds capacity	/ \$: De	lav exc	eeds 300s	+: Computation Not Defined	*: All major volume in platoon

Intersection

Int Delay, s/veh

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		11	1						1		Ť		
Traffic Vol, veh/h	0	812	161	0	0	0	0	0	380	0	131	0	
Future Vol, veh/h	0	812	161	0	0	0	0	0	380	0	131	0	
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	
Sign Control	Free	Free	Free	Stop									
RT Channelized	-	-	Yield	-	-	None	-	-	None	-	-	None	
Storage Length	-	-	125	-	-	-	-	-	0	-	-	-	
Veh in Median Storage,	# -	0	-	-	-	-	-	0	-	-	0	-	
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-	
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90	
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	
Mvmt Flow	0	902	179	0	0	0	0	0	422	0	146	0	

Major/Minor I	Major1				Minor1		Ν	/linor2			
Conflicting Flow All	-	0	0		-	-	451	-	902	-	
Stage 1	-	-	-		-	-	-	-	0	-	
Stage 2	-	-	-		-	-	-	-	902	-	
Critical Hdwy	-	-	-		-	-	6.94	-	6.54	-	
Critical Hdwy Stg 1	-	-	-		-	-	-	-	-	-	
Critical Hdwy Stg 2	-	-	-		-	-	-	-	5.54	-	
Follow-up Hdwy	-	-	-		-	-	3.32	-	4.02	-	
Pot Cap-1 Maneuver	0	-	-		0	0	556	0	276	0	
Stage 1	0	-	-		0	0	-	0	-	0	
Stage 2	0	-	-		0	0	-	0	355	0	
Platoon blocked, %		-	-								
Mov Cap-1 Maneuver	-	-	-		-	-	556	-	276	-	
Mov Cap-2 Maneuver	-	-	-		-	-	-	-	276	-	
Stage 1	-	-	-		-	-	-	-	-	-	
Stage 2	-	-	-		-	-	-	-	355	-	
Approach	EB				NB			SB			
HCM Control Delay, s	0				29.1			31.7			
HCM LOS	0				23.1 D			D			
					U			U			
Minor Lane/Major Mvm	nt NB	BLn1	EBT	EBR SBLn1							
Capacity (veh/h)		556	-	- 276							
HCM Lane V/C Ratio		759	-	- 0.527							
HCM Control Delay (s)		29.1	-	- 31.7							
HCM Lane LOS		D	-	- D							

6.7

HCM 95th %tile Q(veh)

2.9

Intersection

Int Delay, s/veh

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		11	٢						٢		Ť		
Traffic Vol, veh/h	0	1708	242	0	0	0	0	0	314	0	133	0	
Future Vol, veh/h	0	1708	242	0	0	0	0	0	314	0	133	0	
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	
Sign Control	Free	Free	Free	Stop									
RT Channelized	-	-	Yield	-	-	None	-	-	None	-	-	None	
Storage Length	-	-	125	-	-	-	-	-	0	-	-	-	
Veh in Median Storage,	# -	0	-	-	-	-	-	0	-	-	0	-	
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-	
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90	
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	
Mvmt Flow	0	1898	269	0	0	0	0	0	349	0	148	0	

/lajor1				Minor1		Ν	linor2				
-	0	0		-	-	949	-	1898	-		
-	-	-		-	-	-	-	0	-		
-	-	-		-	-	-	-	1898	-		
-	-	-		-	-	6.94	-	6.54	-		
-	-	-		-	-	-	-	-	-		
-	-	-		-	-	-	-		-		
-	-	-		-	-		-		-		
0	-	-		0	0	~ 261	0	~ 69	0		
0	-	-		0	0	-	0	-			
0	-	-		0	0	-	0	~ 116	0		
	-	-									
-	-	-		-	-	~ 261	-		-		
-	-	-		-	-	-	-	~ 69	-		
-	-	-		-	-	-	-	-	-		
-	-	-		-	-	-		~ 116	-		
EB				NB			SB				
0				213			\$ 655				
				F			F				
t NBL	n1 EE	BT _	EBR SBLn1								
		-	- 69								
		-	- 2.142								
		-									
	F	-	- F								
18	3.2	-	- 13.8								
	- - - - - - - 0 0 0 0 0 0 0 0 0 0 0 0 0	- 0 0 0 - 0	- 0 0 0 0 0 0 0 	- 0 0 0 0 0 0 0 	- 0 0 - - - - - - - - - - - - - - - - - - - - 0 0 - - 0 0 - - 0 0 - - 0 - - 0 - - - - 0 0 - - - EB NB 0 213 F - 69 - 1.337 - 2.142 213 - \$ 655 F - F	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$

Notes ~: Volume exceeds capacity

+: Computation Not Defined \$: Delay exceeds 300s

*: All major volume in platoon

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		11	1						1		Ť	
Traffic Volume (vph)	0	812	161	0	0	0	0	0	380	0	131	0
Future Volume (vph)	0	812	161	0	0	0	0	0	380	0	131	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		125	0		0	0		0	0		0
Storage Lanes	0		1	0		0	0		1	0		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850						0.865			
Flt Protected												
Satd. Flow (prot)	0	3539	1583	0	0	0	0	0	1611	0	1863	0
Flt Permitted												
Satd. Flow (perm)	0	3539	1583	0	0	0	0	0	1611	0	1863	0
Right Turn on Red			No			No			No	No		No
Satd. Flow (RTOR)												
Link Speed (mph)		55			55			35			45	
Link Distance (ft)		278			727			1295			275	
Travel Time (s)		3.4			9.0			25.2			4.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	902	179	0	0	0	0	0	422	0	146	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	902	179	0	0	0	0	0	422	0	146	0
Turn Type		NA	Perm						Prot		NA	
Protected Phases		2							4		4	
Permitted Phases			2									
Detector Phase		2	2						4		4	
Switch Phase												
Minimum Initial (s)		14.0	14.0						7.0		7.0	
Minimum Split (s)		21.0	21.0						14.0		14.0	
Total Split (s)		28.0	28.0						32.0		32.0	
Total Split (%)		46.7%	46.7%						53.3%		53.3%	
Maximum Green (s)		21.0	21.0						25.0		25.0	
Yellow Time (s)		5.0	5.0						5.0		5.0	
All-Red Time (s)		2.0	2.0						2.0		2.0	
Lost Time Adjust (s)		-2.0	-2.0						-2.0		-2.0	
Total Lost Time (s)		5.0	5.0						5.0		5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0	3.0						3.0		3.0	
Recall Mode		None	None						Min		Min	
Act Effct Green (s)		20.8	20.8						20.4		20.4	
Actuated g/C Ratio		0.40	0.40						0.40		0.40	
v/c Ratio		0.63	0.28						0.66		0.20	
Control Delay		15.5	13.2						18.6		11.0	
Queue Delay		0.0	0.0						0.0		0.0	
Total Delay		15.5	13.2						18.6		11.0	
LOS		В	В						В		В	
Approach Delay		15.1						18.6			11.0	
Approach LOS		В						В			В	

2027 Build AM Harris Creek Farm - Rolesville, NC 11:36 am 01/05/2023 2027 Build - Improved RKA

Synchro 11 Report Page 1

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Lane Group	EBL EB	T EE	BR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBF
Queue Length 50th (ft)	11	4	36						107		30	
Queue Length 95th (ft)	19	4	84						187		59	
Internal Link Dist (ft)	19	8			647			1215			195	
Turn Bay Length (ft)		1	25									
Base Capacity (vph)	162	.9 7.	28						870		1006	
Starvation Cap Reductn		0	0						0		0	
Spillback Cap Reductn		0	0						0		0	
Storage Cap Reductn		0	0						0		0	
Reduced v/c Ratio	0.5	5 0.	25						0.49		0.15	
Intersection Summary												
Area Type: C	Other											
Cycle Length: 60												
Actuated Cycle Length: 51.4												
Natural Cycle: 40												
Control Type: Actuated-Unco	ordinated											
Maximum v/c Ratio: 0.66												
Intersection Signal Delay: 15					tersectior							
Intersection Capacity Utilizati	on 58.7%			IC	U Level o	of Service	В					
Analysis Period (min) 15												
Splits and Phases: 1: Jone	esville Road/WB	Left-Ove	er&l	JS 401 B	ypass EB	}						

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		11	r						r.		Ť	
Traffic Volume (vph)	0	1708	242	0	0	0	0	0	314	0	133	0
Future Volume (vph)	0	1708	242	0	0	0	0	0	314	0	133	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		125	0		0	0		0	0		0
Storage Lanes	0		1	0		0	0		1	0		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850						0.865			
Flt Protected												
Satd. Flow (prot)	0	3539	1583	0	0	0	0	0	1611	0	1863	0
Flt Permitted												
Satd. Flow (perm)	0	3539	1583	0	0	0	0	0	1611	0	1863	0
Right Turn on Red			No			No			No	No		No
Satd. Flow (RTOR)												
Link Speed (mph)		55			55			35			45	
Link Distance (ft)		278			727			1295			275	
Travel Time (s)		3.4			9.0			25.2			4.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	1898	269	0	0	0	0	0	349	0	148	0
Shared Lane Traffic (%)	-			-	-	-	-	-		-		-
Lane Group Flow (vph)	0	1898	269	0	0	0	0	0	349	0	148	0
Turn Type	-	NA	Perm	-	-	-	-	-	Prot	-	NA	-
Protected Phases		2							4		4	
Permitted Phases			2									
Detector Phase		2	2						4		4	
Switch Phase												
Minimum Initial (s)		14.0	14.0						7.0		7.0	
Minimum Split (s)		21.0	21.0						14.0		14.0	
Total Split (s)		40.0	40.0						20.0		20.0	
Total Split (%)		66.7%	66.7%						33.3%		33.3%	
Maximum Green (s)		33.0	33.0						13.0		13.0	
Yellow Time (s)		5.0	5.0						5.0		5.0	
All-Red Time (s)		2.0	2.0						2.0		2.0	
Lost Time Adjust (s)		-2.0	-2.0						-2.0		-2.0	
Total Lost Time (s)		5.0	5.0						5.0		5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)		3.0	3.0						3.0		3.0	
Recall Mode		None	None						Min		Min	
Act Effct Green (s)		35.0	35.0						15.0		15.0	
Actuated g/C Ratio		0.58	0.58						0.25		0.25	
v/c Ratio		0.92	0.29						0.87		0.32	
Control Delay		20.8	7.3						46.6		20.6	
Queue Delay		0.0	0.0						0.0		0.0	
Total Delay		20.8	7.3						46.6		20.6	
LOS		20.0 C	7.0 A						D		20.0 C	
Approach Delay		19.1						46.6	U		20.6	
Approach LOS		B						40.0 D			20.0 C	
		U						U			U	

2027 Build PM Harris Creek Farm - Rolesville, NC 11:14 am 04/14/2023 2027 Build - Improved RKA

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		285	43						121		44	
Queue Length 95th (ft)		#481	78						#254		87	
Internal Link Dist (ft)		198			647			1215			195	
Turn Bay Length (ft)			125									
Base Capacity (vph)		2064	923						402		465	
Starvation Cap Reductn		0	0						0		0	
Spillback Cap Reductn		0	0						0		0	
Storage Cap Reductn		0	0						0		0	
Reduced v/c Ratio		0.92	0.29						0.87		0.32	
Intersection Summary												
Area Type:	Other											
Cycle Length: 60												
Actuated Cycle Length: 60												
Natural Cycle: 60												
Control Type: Actuated-Un	coordinated											
Maximum v/c Ratio: 0.92												
Intersection Signal Delay: 2	22.8			In	Itersectior	LOS: C						
Intersection Capacity Utilization	ation 75.0%			IC	CU Level o	of Service	D					
Analysis Period (min) 15												
# 95th percentile volume	exceeds cap	bacity, qu	eue may	be longer	r.							
Queue shown is maxim	um after two	cycles.										
Splits and Phases: 1: Jo	nesville Roa	d/WB Lef	t-Over &	US 401 B	Sypass EE	}						17

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Intersection

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations					11	1		†		-	-	1	
Traffic Vol, veh/h	0	0	0	0	1352	185	0	36	0	0	0	225	
Future Vol, veh/h	0	0	0	0	1352	185	0	36	0	0	0	225	
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	
Sign Control	Stop	Stop	Stop	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop	
RT Channelized	-	-	None										
Storage Length	-	-	-	-	-	150	-	-	-	-	-	0	
Veh in Median Storage,	# -	1	-	-	0	-	-	0	-	-	0	-	
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-	
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90	
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	
Mvmt Flow	0	0	0	0	1502	206	0	40	0	0	0	250	

Major/Minor		Ν	/lajor2		Mi	inor1			Mi	Minor2	Minor2
Conflicting Flow All			-	-	0	-	1708	-		-	
Stage 1			-	-	-	-	0	-		-	
Stage 2			-	-	-	-	1708	-		-	
Critical Hdwy			-	-	-	-	6.54	-		-	
Critical Hdwy Stg 1			-	-	-	-	-	-	-		-
Critical Hdwy Stg 2			-	-	-	-	5.54	-	-		-
Follow-up Hdwy			-	-	-	-	4.02	-	-		-
Pot Cap-1 Maneuver			0	-	-	0	90	0	0		0
Stage 1			0	-	-	0	-	0	0		0
Stage 2			0	-	-	0	145	0	0		0
Platoon blocked, %				-	-						
Mov Cap-1 Maneuver			-	-	-	-	90	-	-		-
Mov Cap-2 Maneuver			-	-	-	-	90	-	-		-
Stage 1			-	-	-	-	-	-	-		-
Stage 2			-	-	-	-	145	-	-	-	
Approach			WB			NB			SB		
HCM Control Delay, s			0			73.7			36.5		
HCM LOS						F			Е		
Minor Lane/Major Mvmt	NBLn1	WBT	WBR \$	SBLn1							
Capacity (veh/h)	90	-	-	353							
HCM Lane V/C Ratio	0.444	-	-	0.708							
HCM Control Delay (s)	73.7	-	-	36.5							
HCM Lane LOS	F	-	-	Е							
HCM 95th %tile Q(veh)	1.9	-	-	5.2							

Intersection

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations					11	1		Ť				1	
Traffic Vol, veh/h	0	0	0	0	555	74	0	116	0	0	0	114	
Future Vol, veh/h	0	0	0	0	555	74	0	116	0	0	0	114	
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	
Sign Control	Stop	Stop	Stop	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop	
RT Channelized	-	-	None										
Storage Length	-	-	-	-	-	150	-	-	-	-	-	0	
Veh in Median Storage,	# -	1	-	-	0	-	-	0	-	-	0	-	
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-	
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90	
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	
Mvmt Flow	0	0	0	0	617	82	0	129	0	0	0	127	

Major/Minor		N	Major2		Mi	inor1		Mi	nor2			
Conflicting Flow All			-	-	0	-	699	-	-	-	309	
Stage 1			-	-	-	-	0	-	-	-	-	
Stage 2			-	-	-	-	699	-	-	-	-	
Critical Hdwy			-	-	-	-	6.54	-	-	-	6.94	
Critical Hdwy Stg 1			-	-	-	-	-	-	-	-	-	
Critical Hdwy Stg 2			-	-	-	-	5.54	-	-	-	-	
Follow-up Hdwy			-	-	-	-	4.02	-	-	-	3.32	
Pot Cap-1 Maneuver			0	-	-	0	362	0	0	0	687	
Stage 1			0	-	-	0	-	0	0	0	-	
Stage 2			0	-	-	0	440	0	0	0	-	
Platoon blocked, %				-	-							
Mov Cap-1 Maneuver			-	-	-	-	362	-	-	-	687	
Mov Cap-2 Maneuver			-	-	-	-	362	-	-	-	-	
Stage 1			-	-	-	-	-	-	-	-	-	
Stage 2			-	-	-	-	440	-	-	-	-	
Approach			WB			NB			SB			
HCM Control Delay, s			0			20.3			11.4			
HCM LOS						С			В			
Minor Lane/Major Mvmt	NBLn1	WBT	WBR	SBLn1								
Capacity (veh/h)	362	-	-	687								
HCM Lane V/C Ratio	0.356	-	-	0.184								
HCM Control Delay (s)	20.3	-	-	11.4								
HCM Lane LOS	С	-	-	В								
HCM 95th %tile Q(veh)	1.6		_	0.7								

Intersection

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	202	201			11	1	TIDE .	•		000		1	
Traffic Vol, veh/h	0	0	0	0	1797	185	0	36	0	0	0	225	
Future Vol, veh/h	0	0	0	0	1797	185	0	36	0	0	0	225	
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	
Sign Control	Stop	Stop	Stop	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop	
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None	
Storage Length	-	-	-	-	-	150	-	-	-	-	-	0	
Veh in Median Storage,	# -	1	-	-	0	-	-	0	-	-	0	-	
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-	
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90	
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	
Mvmt Flow	0	0	0	0	1997	206	0	40	0	0	0	250	

Major/Minor		I	Major2		М	inor1		Mi	inor2				
Conflicting Flow All			-	-	0	-	2203	-	-	-	999		
Stage 1			-	-	-	-	0	-	-	-	-		
Stage 2			-	-	-	-	2203	-	-	-	-		
Critical Hdwy			-	-	-	-	6.54	-	-	-	6.94		
Critical Hdwy Stg 1			-	-	-	-	-	-	-	-	-		
Critical Hdwy Stg 2			-	-	-	-	5.54	-	-	-	-		
Follow-up Hdwy			-	-	-	-	4.02	-	-	-	3.32		
Pot Cap-1 Maneuver			0	-	-	0	44	0	0		~ 242		
Stage 1			0	-	-	0	-	0	0	0	-		
Stage 2			0	-	-	0	81	0	0	0	-		
Platoon blocked, %				-	-								
Mov Cap-1 Maneuver			-	-	-	-	44	-	-	-	~ 242		
Mov Cap-2 Maneuver			-	-	-	-	44	-	-	-	-		
Stage 1			-	-	-	-	-	-	-	-	-		
Stage 2			-	-	-	-	81	-	-	-	-		
Approach			WB			NB			SB				
HCM Control Delay, s			0		4	250.5		1	10.8				
HCM LOS						F			F				
Minor Lane/Major Mvmt	NBLn1	WBT	WBR S	BLn1									
Capacity (veh/h)	44	-	-	242									
HCM Lane V/C Ratio	0.909	-	-	1.033									
HCM Control Delay (s)	250.5	-	-	110.8									
HCM Lane LOS	F	-	-	F									
HCM 95th %tile Q(veh)	3.6	-	-	10.2									
Notes													
~: Volume exceeds capacity	\$: De	lay exc	eeds 30	0s	+: Comp	utation	Not De	fined	*: All m	ajor v	olume in	platoon	

Intersection

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations					††	1		↑				1	
Traffic Vol, veh/h	0	0	0	0	894	74	0	116	0	0	0	114	
Future Vol, veh/h	0	0	0	0	894	74	0	116	0	0	0	114	
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	
Sign Control	Stop	Stop	Stop	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop	
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None	
Storage Length	-	-	-	-	-	150	-	-	-	-	-	0	
Veh in Median Storage,	# -	1	-	-	0	-	-	0	-	-	0	-	
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-	
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90	
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	
Mvmt Flow	0	0	0	0	993	82	0	129	0	0	0	127	

Major/Minor		Ν	/lajor2		М	inor1		М	inor2			
Conflicting Flow All				-	0	-	1075	-	-	-	497	
Stage 1			-	-	-	-	0	-	-	-	-	
Stage 2			-	-	-	-	1075	-	-	-	-	
Critical Hdwy			-	-	-	-	6.54	-	-	-	6.94	
Critical Hdwy Stg 1			-	-	-	-	-	-	-	-	-	
Critical Hdwy Stg 2			-	-	-	-	5.54	-	-	-	-	
Follow-up Hdwy			-	-	-	-	4.02	-	-	-	3.32	
Pot Cap-1 Maneuver			0	-	-	0	218	0	0	0	519	
Stage 1			0	-	-	0	-	0	0	0	-	
Stage 2			0	-	-	0	294	0	0	0	-	
Platoon blocked, %				-	-							
Mov Cap-1 Maneuver			-	-	-	-	218	-	-	-	519	
Mov Cap-2 Maneuver			-	-	-	-	218	-	-	-	-	
Stage 1			-	-	-	-	-	-	-	-	-	
Stage 2			-	-	-	-	294	-	-	-	-	
Approach			WB			NB			SB			
HCM Control Delay, s			0			42.9			14.2			
HCM LOS						Е			В			
Minor Lane/Major Mvmt	NBLn1	WBT	WBR	SBLn1								
Capacity (veh/h)	218	-	-	519								
HCM Lane V/C Ratio	0.591	-	-	0.244								
HCM Control Delay (s)	42.9	-	-	14.2								
HCM Lane LOS	E	-	-	В								
HCM 95th %tile Q(veh)	3.3	-	-	0.9								

Intersection

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations					††	1		Ť				1	
Traffic Vol, veh/h	0	0	0	0	1817	185	0	36	0	0	0	225	
Future Vol, veh/h	0	0	0	0	1817	185	0	36	0	0	0	225	
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	
Sign Control	Stop	Stop	Stop	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop	
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None	
Storage Length	-	-	-	-	-	150	-	-	-	-	-	0	
Veh in Median Storage,	# 147	45600	-	-	0	-	-	0	-	-	0	-	
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-	
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90	
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	
Mvmt Flow	0	0	0	0	2019	206	0	40	0	0	0	250	

Major/Minor		1	Major2		Ν	linor1		М	inor2				
Conflicting Flow All			-	-	0	-	2225	-	-	-	1010		
Stage 1			-	-	-	-	0	-	-	-	-		
Stage 2			-	-	-	-	2225	-	-	-	-		
Critical Hdwy			-	-	-	-	6.54	-	-	-	6.94		
Critical Hdwy Stg 1			-	-	-	-	-	-	-	-	-		
Critical Hdwy Stg 2			-	-	-	-	5.54	-	-	-	-		
Follow-up Hdwy			-	-	-	-	4.02	-	-	-	3.32		
Pot Cap-1 Maneuver			0	-	-	0	43	0	0		~ 238		
Stage 1			0	-	-	0	-	0	0	0	-		
Stage 2			0	-	-	0	79	0	0	0	-		
Platoon blocked, %				-	-								
Mov Cap-1 Maneuver			-	-	-	-	43	-	-	-	~ 238		
Mov Cap-2 Maneuver			-	-	-	-	43	-	-	-	-		
Stage 1			-	-	-	-	-	-	-	-	-		
Stage 2			-	-	-	-	79	-	-	-	-		
Approach			WB			NB			SB				
HCM Control Delay, s			0			260.9			116.8				
HCM LOS						F			F				
Minor Lane/Major Mvmt	NBLn1	WBT	WBR S	SBLn1									
Capacity (veh/h)	43	-	-	238									
HCM Lane V/C Ratio	0.93	-	-	1.05									
HCM Control Delay (s)	260.9	-	-	116.8									
HCM Lane LOS	F	-	-	F									
HCM 95th %tile Q(veh)	3.7	-	-	10.5									
Notes													
~: Volume exceeds capacity	\$: De	lay exc	eeds 30)0s	+: Comp	utation	Not De	fined	*: All m	ajor v	olume in	platoon	

Intersection

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations					11	1		^			•= ·	1	
Traffic Vol, veh/h	0	0	0	0	907	74	0	116	0	0	0	114	
Future Vol, veh/h	0	0	0	0	907	74	0	116	0	0	0	114	
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0	
Sign Control	Stop	Stop	Stop	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop	
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None	
Storage Length	-	-	-	-	-	150	-	-	-	-	-	0	
Veh in Median Storage,	# 747	71104	-	-	0	-	-	0	-	-	0	-	
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-	
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90	
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2	
Mvmt Flow	0	0	0	0	1008	82	0	129	0	0	0	127	

Major/Minor		1	Major2		Mi	inor1		Mi	I	nor2	nor2
Conflicting Flow All			-	-	0	-	1090	-		-	
Stage 1			-	-	-	-	0	-		-	
Stage 2			-	-	-	-	1090	-		-	
Critical Hdwy			-	-	-	-	6.54	-	-		-
Critical Hdwy Stg 1			-	-	-	-	-	-	-		-
Critical Hdwy Stg 2			-	-	-	-	5.54	-	-		-
Follow-up Hdwy			-	-	-	-	4.02	-	-		-
Pot Cap-1 Maneuver			0	-	-	0	214	0	0		0
Stage 1			0	-	-	0	-	0	0		0
Stage 2			0	-	-	0	289	0	0		0
Platoon blocked, %				-	-						
Mov Cap-1 Maneuver			-	-	-	-	214	-	-		-
Mov Cap-2 Maneuver			-	-	-	-	214	-	-		-
Stage 1			-	-	-	-	-	-	-	-	
Stage 2			-	-	-	-	289	-	-	-	
Approach			WB			NB			SB		
HCM Control Delay, s			0			44.4			14.3		
HCM LOS						Е			В		
Minor Lane/Major Mvmt	NBLn1	WBT	WBR S	SBLn1							
Capacity (veh/h)	214	-	-	513							
HCM Lane V/C Ratio	0.602	-	-	0.247							
HCM Control Delay (s)	44.4	-	-	14.3							
HCM Lane LOS	E	-	-	В							
HCM 95th %tile Q(veh)	3.4	-	-	1							

APPENDIX E

CAPACITY ANALYSIS CALCULATIONS US 401 BYPASS & EASTERN U-TURN LOCATION

Intersection

Int Delay, s/veh	1.3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations				11	1	
Traffic Vol, veh/h	0	0	0	1532	91	0
Future Vol, veh/h	0	0	0	1532	91	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage,	# 2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	0	1702	101	0

Major/Minor	Ν	Major2	1	Minor1	
Conflicting Flow All		-	-	851	-
Stage 1		-	-	0	-
Stage 2		-	-	851	-
Critical Hdwy		-	-	6.84	-
Critical Hdwy Stg 1		-	-	-	-
Critical Hdwy Stg 2		-	-	5.84	-
Follow-up Hdwy		-	-	3.52	-
Pot Cap-1 Maneuver		0	-	299	0
Stage 1		0	-	-	0
Stage 2		0	-	379	0
Platoon blocked, %			-		
Mov Cap-1 Maneuver		-	-	299	-
Mov Cap-2 Maneuver		-	-	299	-
Stage 1		-	-	-	-
Stage 2		-	-	379	-
Approach		WB		NB	
HCM Control Delay, s		0		23.1	
HCM LOS		Ū		20.1 C	
				U	
Minor Lane/Major Mvmt	NBLn1	WBT			
Capacity (veh/h)	299	-			
HCM Lane V/C Ratio	0.338	-			
HCM Control Delay (s)	23.1	-			
HCM Lane LOS	С	-			
HCM 95th %tile Q(veh)	1.4	-			

Intersection

Int Delay, s/veh	1.1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations				11	1	
Traffic Vol, veh/h	0	0	0	600	66	0
Future Vol, veh/h	0	0	0	600	66	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage,	# 2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	0	667	73	0

Major/Minor	Ν	/lajor2	N	Minor1	
Conflicting Flow All		-	-	334	-
Stage 1		-	-	0	-
Stage 2		-	-	334	-
Critical Hdwy		-	-	6.84	-
Critical Hdwy Stg 1		-	-	-	-
Critical Hdwy Stg 2		-	-	5.84	-
Follow-up Hdwy		-	-	3.52	-
Pot Cap-1 Maneuver		0	-	636	0
Stage 1		0	-	-	0
Stage 2		0	-	697	0
Platoon blocked, %			-		
Mov Cap-1 Maneuver		-	-	636	-
Mov Cap-2 Maneuver		-	-	636	-
Stage 1		-	-	-	-
Stage 2		-	-	697	-
Approach		WB		NB	
HCM Control Delay, s		0		11.4	
HCM LOS		Ū		В	
				_	
NA'		WDT			
Minor Lane/Major Mvmt	NBLn1	WBT			
Capacity (veh/h)	636	-			
HCM Lane V/C Ratio	0.115	-			
HCM Control Delay (s)	11.4	-			
HCM Lane LOS	B	-			
HCM 95th %tile Q(veh)	0.4	-			

Int Delay, s/veh 16.8 EBT EBR WBL WBT NBL NBR Movement **††** 1877 Lane Configurations ካ 233 Traffic Vol, veh/h 0 0 0 0 Future Vol, veh/h 0 0 0 1877 233 0 0 Conflicting Peds, #/hr 0 0 0 0 0 Sign Control Stop Stop Free Free Stop Stop RT Channelized None -None None --Storage Length 0 -----Veh in Median Storage, # 2 --0 0 -Grade, % 0 0 0 ---Peak Hour Factor 90 90 90 90 90 90 Heavy Vehicles, % 2 2 2 2 2 2 Mvmt Flow 0 0 0 2086 259 0

Major/Minor	Ν	/lajor2	Minor	1		
Conflicting Flow All		-	- 1043	3 -		
Stage 1		-	- () -		
Stage 2		-	- 1043	3 -		
Critical Hdwy		-	- 6.84	1 -		
Critical Hdwy Stg 1		-	-			
Critical Hdwy Stg 2		-	- 5.84			
Follow-up Hdwy		-	- 3.52			
Pot Cap-1 Maneuver		0	- ~ 22	5 0		
Stage 1		0		- 0		
Stage 2		0	- 30) 0		
Platoon blocked, %			-			
Mov Cap-1 Maneuver		-	- ~ 22			
Mov Cap-2 Maneuver		-	- ~ 22	5 -		
Stage 1		-	-			
Stage 2		-	- 30) -		
Approach		WB	N	3		
HCM Control Delay, s		0	15	2		
HCM LOS				-		
Minor Lane/Major Mvmt	NBLn1	WBT				
Capacity (veh/h)	225	-				
HCM Lane V/C Ratio	1.151	-				
HCM Control Delay (s)	152	-				
HCM Lane LOS	F	-				
HCM 95th %tile Q(veh)	12.2	-				
Notes						
~: Volume exceeds capacity	\$: De	lay exce	eds 300s	+: Comp	outation Not Defined	*: All major volume in platoon

Int Delay, s/veh	2.7					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations				† †	7	
Traffic Vol, veh/h	0	0	0	915	175	0
Future Vol, veh/h	0	0	0	915	175	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage,	# 2	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	0	1017	194	0

Major/Minor	Ν	Major2	I	Minor1				
Conflicting Flow All			-		-			
Stage 1		-	-	0	-			
Stage 2		-	-	509	-			
Critical Hdwy		-	-	6.84	-			
Critical Hdwy Stg 1		-	-	-	-			
Critical Hdwy Stg 2		-	-	5.84	-			
Follow-up Hdwy		-	-	3.52	-			
Pot Cap-1 Maneuver		0	-	494	0			
Stage 1		0	-	-	0			
Stage 2		0	-	569	0			
Platoon blocked, %			-					
Mov Cap-1 Maneuver		-	-	494	-			
Mov Cap-2 Maneuver		-	-	494	-			
Stage 1		-	-	-	-			
Stage 2		-	-	569	-			
Approach		WB		NB				
HCM Control Delay, s		0		16.9				
HCM LOS				С				
Minor Lane/Major Mvmt	NBLn1	WBT						
Capacity (veh/h)	494	-						
HCM Lane V/C Ratio	0.394	-						
HCM Control Delay (s)	16.9	-						
HCM Lane LOS	10.3 C	-						
HCM 95th %tile Q(veh)	1.9	_						
	1.5							

Int Delay, s/veh	22.5					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations				††	1	
Traffic Vol, veh/h	0	0	0	1880	253	0
Future Vol, veh/h	0	0	0	1880	253	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage,	# -	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	0	2089	281	0

Major/Minor	N	Major2	Minor1			
Conflicting Flow All		-	- 1045	-		
Stage 1		-	- 0	-		
Stage 2		-	- 1045	-		
Critical Hdwy		-	- 6.84	-		
Critical Hdwy Stg 1		-		-		
Critical Hdwy Stg 2		-	- 5.84			
Follow-up Hdwy		-	- 3.52			
Pot Cap-1 Maneuver		0	- ~224	0		
Stage 1		0		•		
Stage 2		0	- 300	0		
Platoon blocked, %			-			
Mov Cap-1 Maneuver		-	- ~ 224			
Mov Cap-2 Maneuver		-	- ~224	-		
Stage 1		-		-		
Stage 2		-	- 300	-		
Approach		WB	NB			
HCM Control Delay, s		0	189.6			
HCM LOS			F			
Minor Lane/Major Mvmt	NBLn1	WBT				
Capacity (veh/h)	224	-				
HCM Lane V/C Ratio	1.255	-				
HCM Control Delay (s)	189.6	-				
HCM Lane LOS	F	-				
HCM 95th %tile Q(veh)	14.4	-				
Notes						
~: Volume exceeds capacity	\$: De	lay exce	eds 300s	+: Comp	utation Not Defined	*: All major volume in platoon

Int Delay, s/veh	3					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations				11	1	
Traffic Vol, veh/h	0	0	0	926	188	0
Future Vol, veh/h	0	0	0	926	188	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage	, # -	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	0	0	0	1029	209	0

Major/Minor	Ν	/lajor2	Ν	1inor1	
Conflicting Flow All		-	-	515	-
Stage 1		-	-	0	-
Stage 2		-	-	515	-
Critical Hdwy		-	-	6.84	-
Critical Hdwy Stg 1		-	-	-	-
Critical Hdwy Stg 2		-	-	5.84	-
Follow-up Hdwy		-	-	3.52	-
Pot Cap-1 Maneuver		0	-	489	0
Stage 1		0	-	-	0
Stage 2		0	-	565	0
Platoon blocked, %			-		
Mov Cap-1 Maneuver		-	-	489	-
Mov Cap-2 Maneuver		-	-	489	-
Stage 1		-	-	-	-
Stage 2		-	-	565	-
Approach		WB		NB	
HCM Control Delay, s		0		17.7	
HCM LOS				С	
Minor Lane/Major Mvmt	NBLn1	WBT			
Capacity (veh/h)	489	-			
HCM Lane V/C Ratio	0.427	-			
HCM Control Delay (s)	17.7	-			
HCM Lane LOS	С	-			
HCM 95th %tile Q(veh)	2.1	-			

		7	1	←	1	1
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations				11	1	
Traffic Volume (vph)	0	0	0	1880	253	0
Future Volume (vph)	0	0	0	1880	253	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00
Frt	1.00	1.00	1.00	0.00	1.00	1.00
Flt Protected					0.950	
Satd. Flow (prot)	0	0	0	3539	1770	0
Flt Permitted	0	0	0	0000	0.950	0
Satd. Flow (perm)	0	0	0	3539	1770	0
Right Turn on Red	0	No	U	0000	No	No
Satd. Flow (RTOR)		INU			NU	NU
Link Speed (mph)	55			55	45	
Link Distance (ft)	55 520			55 1076	45 100	
()						
Travel Time (s)	6.4	0.00	0.00	13.3	1.5	0.00
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	2089	281	0
Shared Lane Traffic (%)	^	^	^	0000	004	^
Lane Group Flow (vph)	0	0	0	2089	281	0
Turn Type				NA	Prot	
Protected Phases				6	8	
Permitted Phases				-	_	
Detector Phase				6	8	
Switch Phase						
Minimum Initial (s)				14.0	7.0	
Minimum Split (s)				21.0	14.0	
Total Split (s)				44.0	16.0	
Total Split (%)				73.3%	26.7%	
Maximum Green (s)				37.0	9.0	
Yellow Time (s)				5.0	5.0	
All-Red Time (s)				2.0	2.0	
Lost Time Adjust (s)				-2.0	-2.0	
Total Lost Time (s)				5.0	5.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)				3.0	3.0	
Recall Mode				None	Min	
Act Effct Green (s)				39.0	11.0	
Actuated g/C Ratio				0.65	0.18	
v/c Ratio				0.91	0.87	
Control Delay				16.9	53.0	
Queue Delay				0.0	0.0	
Total Delay				16.9	53.0	
LOS				B	D	
Approach Delay				16.9	53.0	
Approach LOS				10.9 B	55.0 D	
Queue Length 50th (ft)				280	100	
				#513	#221	
Queue Length 95th (ft)	110					
Internal Link Dist (ft)	440			996	20	

2027 Build AM Harris Creek Farm - Rolesville, NC 11:36 am 01/05/2023 2027 Build - Improved RKA

		7	•	←	1	1
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Turn Bay Length (ft)						
Base Capacity (vph)				2300	324	
Starvation Cap Reductn				0	0	
Spillback Cap Reductn				0	0	
Storage Cap Reductn				0	0	
Reduced v/c Ratio				0.91	0.87	
Intersection Summary						
Area Type:	Other					
Cycle Length: 60						
Actuated Cycle Length: 60						
Natural Cycle: 60						
Control Type: Actuated-Un	coordinated					
Maximum v/c Ratio: 0.91						
Intersection Signal Delay:	21.2			Int	tersection	LOS: C
Intersection Capacity Utiliz	ation 74.3%			IC	U Level o	f Service D
Analysis Period (min) 15						
# 95th percentile volume	exceeds cap	acity, qu	eue may	be longer		
Queue shown is maxim	um after two	cycles.				
Splits and Phases: 2: Ea	astern U-Turr	& US 4	01 Rynas	s WB		

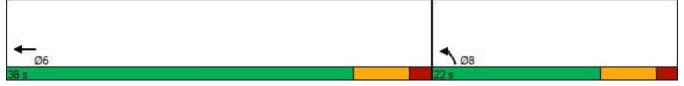
< Ø6	↑ Ø8
44 s	16.5

		7	•	<	1	1
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations			TTDL		ň	NDR
Traffic Volume (vph)	0	0	0	926	188	0
Future Volume (vph)	0	0	0	920	188	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	1.00
Frt	1.00	1.00	1.00	0.95	1.00	1.00
Fit Protected					0.950	
	0	0	0	2520		0
Satd. Flow (prot)	0	0	0	3539	1770	0
Flt Permitted	•	•	•	0.500	0.950	•
Satd. Flow (perm)	0	0	0	3539	1770	0
Right Turn on Red		No			No	No
Satd. Flow (RTOR)						
Link Speed (mph)	55			55	45	
Link Distance (ft)	520			1076	100	
Travel Time (s)	6.4			13.3	1.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	1029	209	0
Shared Lane Traffic (%)	-					-
Lane Group Flow (vph)	0	0	0	1029	209	0
Turn Type	v	v	U	NA	Prot	U
Protected Phases				6	8	
Permitted Phases				0	0	
				6	8	
Detector Phase				6	ð	
Switch Phase				44.0	7.0	
Minimum Initial (s)				14.0	7.0	
Minimum Split (s)				21.0	14.0	
Total Split (s)				38.0	22.0	
Total Split (%)				63.3%	36.7%	
Maximum Green (s)				31.0	15.0	
Yellow Time (s)				5.0	5.0	
All-Red Time (s)				2.0	2.0	
Lost Time Adjust (s)				-2.0	-2.0	
Total Lost Time (s)				5.0	5.0	
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)				3.0	3.0	
Recall Mode				None	Min	
Act Effct Green (s)				22.7	12.7	
Actuated g/C Ratio				0.50	0.28	
v/c Ratio				0.59	0.42	
Control Delay				9.9	17.9	
Queue Delay				0.0	0.0	
Total Delay				9.9	17.9	
LOS				А	В	
Approach Delay				9.9	17.9	
Approach LOS				А	В	
Queue Length 50th (ft)				87	43	
Queue Length 95th (ft)				157	111	
Internal Link Dist (ft)	440			996	20	

2027 Build PM Harris Creek Farm - Rolesville, NC 11:14 am 04/14/2023 2027 Build - Improved RKA

		7	•	←	1	1
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Turn Bay Length (ft)						
Base Capacity (vph)				2642	680	
Starvation Cap Reductn				0	0	
Spillback Cap Reductn				0	0	
Storage Cap Reductn				0	0	
Reduced v/c Ratio				0.39	0.31	
Intersection Summary						
Area Type:	Other					
Cycle Length: 60						
Actuated Cycle Length: 45	5.7					
Natural Cycle: 40						
Control Type: Actuated-Ur	ncoordinated					
Maximum v/c Ratio: 0.59						
Intersection Signal Delay:					tersection	
Intersection Capacity Utiliz	zation 44.3%			IC	U Level o	f Service A
Analysis Period (min) 15						

Splits and Phases: 2: Eastern U-Turn & US 401 Bypass WB



APPENDIX F

CAPACITY ANALYSIS CALCULATIONS MITCHELL MILL ROAD & JONESVILLE ROAD / PEEBLES ROAD

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eh 12.7
B
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			4			4			4	
Traffic Vol, veh/h	7	166	2	11	316	41	4	78	11	32	133	16
Future Vol, veh/h	7	166	2	11	316	41	4	78	11	32	133	16
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	184	2	12	351	46	4	87	12	36	148	18
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Approach	EB			WB			NB			SB		
Opposing Approach	WB			EB			SB			NB		
Opposing Lanes	1			1			1			1		
Conflicting Approach Left	SB			NB			EB			WB		
Conflicting Lanes Left	1			1			1			1		
Conflicting Approach Right	NB			SB			WB			EB		
Conflicting Lanes Right	1			1			1			1		
HCM Control Delay	10.8			14.8			10.1			11.4		
HCM LOS	В			В			В			В		

1	NDL 4	EDL -4		0014
Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	4%	4%	3%	18%
Vol Thru, %	84%	95%	86%	73%
Vol Right, %	12%	1%	11%	9%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	93	175	368	181
LT Vol	4	7	11	32
Through Vol	78	166	316	133
RT Vol	11	2	41	16
Lane Flow Rate	103	194	409	201
Geometry Grp	1	1	1	1
Degree of Util (X)	0.168	0.294	0.576	0.318
Departure Headway (Hd)	5.843	5.438	5.074	5.691
Convergence, Y/N	Yes	Yes	Yes	Yes
Сар	612	659	711	631
Service Time	3.897	3.483	3.111	3.736
HCM Lane V/C Ratio	0.168	0.294	0.575	0.319
HCM Control Delay	10.1	10.8	14.8	11.4
HCM Lane LOS	В	В	В	В
HCM 95th-tile Q	0.6	1.2	3.7	1.4

В

Intersection

Intersection Delay, s/veh Intersection LOS

10.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			4			4			4	
Traffic Vol, veh/h	18	306	13	0	130	21	5	92	10	27	50	11
Future Vol, veh/h	18	306	13	0	130	21	5	92	10	27	50	11
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	20	340	14	0	144	23	6	102	11	30	56	12
Number of Lanes	0	1	0	0	1	0	0	1	0	0	1	0
Approach	EB				WB		NB			SB		
Opposing Approach	WB				EB		SB			NB		
Opposing Lanes	1				1		1			1		
Conflicting Approach Left	SB				NB		EB			WB		
Conflicting Lanes Left	1				1		1			1		
Conflicting Approach Right	NB				SB		WB			EB		
Conflicting Lanes Right	1				1		1			1		
HCM Control Delay	12.2				9.4		9.5			9.4		
HCM LOS	В				А		А			А		

Lane	NBLn1	EBLn1	WBLn1	SBLn1	
Vol Left, %	5%	5%	0%	31%	
Vol Thru, %	86%	91%	86%	57%	
Vol Right, %	9%	4%	14%	12%	
Sign Control	Stop	Stop	Stop	Stop	
Traffic Vol by Lane	107	337	151	88	
LT Vol	5	18	0	27	
Through Vol	92	306	130	50	
RT Vol	10	13	21	11	
Lane Flow Rate	119	374	168	98	
Geometry Grp	1	1	1	1	
Degree of Util (X)	0.175	0.488	0.227	0.146	
Departure Headway (Hd)	5.3	4.694	4.868	5.368	
Convergence, Y/N	Yes	Yes	Yes	Yes	
Сар	669	760	730	660	
Service Time	3.395	2.76	2.948	3.464	
HCM Lane V/C Ratio	0.178	0.492	0.23	0.148	
HCM Control Delay	9.5	12.2	9.4	9.4	
HCM Lane LOS	А	В	А	А	
HCM 95th-tile Q	0.6	2.7	0.9	0.5	

Intersection

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95.4
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	2	T			4	1		4		2	T	
Traffic Vol, veh/h	63	253	12	29	607	119	12	86	20	84	149	54
Future Vol, veh/h	63	253	12	29	607	119	12	86	20	84	149	54
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	70	281	13	32	674	132	13	96	22	93	166	60
Number of Lanes	1	1	0	0	1	1	0	1	0	1	1	0
Approach	EB			WB			NB			SB		
Opposing Approach	WB			EB			SB			NB		
Opposing Lanes	2			2			2			1		
Conflicting Approach Left	SB			NB			EB			WB		
Conflicting Lanes Left	2			1			2			2		
Conflicting Approach Right	NB			SB			WB			EB		
Conflicting Lanes Right	1			2			2			2		
HCM Control Delay	19.9			170.3			16.1			17.2		
HCM LOS	С			F			С			С		

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	10%	100%	0%	5%	0%	100%	0%
Vol Thru, %	73%	0%	95%	95%	0%	0%	73%
Vol Right, %	17%	0%	5%	0%	100%	0%	27%
Sign Control	Stop						
Traffic Vol by Lane	118	63	265	636	119	84	203
LT Vol	12	63	0	29	0	84	0
Through Vol	86	0	253	607	0	0	149
RT Vol	20	0	12	0	119	0	54
Lane Flow Rate	131	70	294	707	132	93	226
Geometry Grp	6	7	7	7	7	7	7
Degree of Util (X)	0.302	0.152	0.597	1.372	0.229	0.215	0.476
Departure Headway (Hd)	9.162	8.438	7.887	6.988	6.248	9.036	8.326
Convergence, Y/N	Yes						
Сар	395	428	462	516	570	399	435
Service Time	7.162	6.138	5.587	4.777	4.036	6.736	6.026
HCM Lane V/C Ratio	0.332	0.164	0.636	1.37	0.232	0.233	0.52
HCM Control Delay	16.1	12.6	21.6	200.1	10.9	14.2	18.4
HCM Lane LOS	С	В	С	F	В	В	С
HCM 95th-tile Q	1.3	0.5	3.8	31.9	0.9	0.8	2.5

Intersection

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57.2
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	r.	T			4	1		4		2	T	
Traffic Vol, veh/h	114	459	19	14	387	95	19	106	31	159	65	33
Future Vol, veh/h	114	459	19	14	387	95	19	106	31	159	65	33
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	127	510	21	16	430	106	21	118	34	177	72	37
Number of Lanes	1	1	0	0	1	1	0	1	0	1	1	0
Approach	EB			WB			NB			SB		
Opposing Approach	WB			EB			SB			NB		
Opposing Lanes	2			2			2			1		
Conflicting Approach Left	SB			NB			EB			WB		
Conflicting Lanes Left	2			1			2			2		
Conflicting Approach Right	NB			SB			WB			EB		
Conflicting Lanes Right	1			2			2			2		
HCM Control Delay	90.6			50			19.2			17.4		
HCM LOS	F			E			С			С		

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	12%	100%	0%	3%	0%	100%	0%
Vol Thru, %	68%	0%	96%	97%	0%	0%	66%
Vol Right, %	20%	0%	4%	0%	100%	0%	34%
Sign Control	Stop						
Traffic Vol by Lane	156	114	478	401	95	159	98
LT Vol	19	114	0	14	0	159	0
Through Vol	106	0	459	387	0	0	65
RT Vol	31	0	19	0	95	0	33
Lane Flow Rate	173	127	531	446	106	177	109
Geometry Grp	6	7	7	7	7	7	7
Degree of Util (X)	0.429	0.289	1.13	0.95	0.204	0.443	0.251
Departure Headway (Hd)	9.353	8.206	7.661	7.994	7.251	9.428	8.662
Convergence, Y/N	Yes						
Сар	388	438	473	459	498	385	417
Service Time	7.353	5.959	5.414	5.694	4.951	7.128	6.362
HCM Lane V/C Ratio	0.446	0.29	1.123	0.972	0.213	0.46	0.261
HCM Control Delay	19.2	14.3	108.8	59	11.8	19.4	14.2
HCM Lane LOS	С	В	F	F	В	С	В
HCM 95th-tile Q	2.1	1.2	18.4	11.3	0.8	2.2	1

Intersection

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	T			4	1		4		2	ħ	
Traffic Vol, veh/h	71	253	12	29	607	121	12	88	20	91	156	76
Future Vol, veh/h	71	253	12	29	607	121	12	88	20	91	156	76
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	79	281	13	32	674	134	13	98	22	101	173	84
Number of Lanes	1	1	0	0	1	1	0	1	0	1	1	0
Approach	EB			WB			NB			SB		
Opposing Approach	WB			EB			SB			NB		
Opposing Lanes	2			2			2			1		
Conflicting Approach Left	SB			NB			EB			WB		
Conflicting Lanes Left	2			1			2			2		
Conflicting Approach Right	NB			SB			WB			EB		
Conflicting Lanes Right	1			2			2			2		
HCM Control Delay	20.8			191.1			16.7			19		
HCM LOS	С			F			С			С		

Lane	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Vol Left, %	10%	100%	0%	5%	0%	100%	0%
Vol Thru, %	73%	0%	95%	95%	0%	0%	67%
Vol Right, %	17%	0%	5%	0%	100%	0%	33%
Sign Control	Stop						
Traffic Vol by Lane	120	71	265	636	121	91	232
LT Vol	12	71	0	29	0	91	0
Through Vol	88	0	253	607	0	0	156
RT Vol	20	0	12	0	121	0	76
Lane Flow Rate	133	79	294	707	134	101	258
Geometry Grp	6	7	7	7	7	7	7
Degree of Util (X)	0.313	0.176	0.611	1.43	0.244	0.234	0.545
Departure Headway (Hd)	9.455	8.699	8.147	7.283	6.541	9.17	8.414
Convergence, Y/N	Yes						
Сар	383	415	448	502	553	394	430
Service Time	7.455	6.399	5.847	4.983	4.241	6.87	6.114
HCM Lane V/C Ratio	0.347	0.19	0.656	1.408	0.242	0.256	0.6
HCM Control Delay	16.7	13.2	22.8	225.3	11.3	14.6	20.7
HCM Lane LOS	С	В	С	F	В	В	С
HCM 95th-tile Q	1.3	0.6	4	34.3	1	0.9	3.2

Intersection

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60.9
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	T			4	1		4		2	T+	
Traffic Vol, veh/h	138	459	19	14	387	102	19	113	31	163	69	49
Future Vol, veh/h	138	459	19	14	387	102	19	113	31	163	69	49
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	153	510	21	16	430	113	21	126	34	181	77	54
Number of Lanes	1	1	0	0	1	1	0	1	0	1	1	0
Approach	EB			WB			NB			SB		
Opposing Approach	WB			EB			SB			NB		
Opposing Lanes	2			2			2			1		
Conflicting Approach Left	SB			NB			EB			WB		
Conflicting Lanes Left	2			1			2			2		
Conflicting Approach Right	NB			SB			WB			EB		
Conflicting Lanes Right	1			2			2			2		
HCM Control Delay	96.6			54.4			20.2			18		
HCM LOS	F			F			С			С		

Lana	NBLn1	EBLn1	EBLn2	WBLn1	WBLn2	SBLn1	SBLn2
Lane							
Vol Left, %	12%	100%	0%	3%	0%	100%	0%
Vol Thru, %	69%	0%	96%	97%	0%	0%	58%
Vol Right, %	19%	0%	4%	0%	100%	0%	42%
Sign Control	Stop						
Traffic Vol by Lane	163	138	478	401	102	163	118
LT Vol	19	138	0	14	0	163	0
Through Vol	113	0	459	387	0	0	69
RT Vol	31	0	19	0	102	0	49
Lane Flow Rate	181	153	531	446	113	181	131
Geometry Grp	6	7	7	7	7	7	7
Degree of Util (X)	0.455	0.358	1.159	0.973	0.225	0.459	0.304
Departure Headway (Hd)	9.533	8.403	7.857	8.211	7.466	9.559	8.735
Convergence, Y/N	Yes						
Сар	380	428	462	446	484	379	414
Service Time	7.533	6.158	5.612	5.911	5.166	7.259	6.435
HCM Lane V/C Ratio	0.476	0.357	1.149	1	0.233	0.478	0.316
HCM Control Delay	20.2	15.8	119.9	65.1	12.3	20.1	15.2
HCM Lane LOS	С	С	F	F	В	С	С
HCM 95th-tile Q	2.3	1.6	19.3	11.9	0.9	2.3	1.3

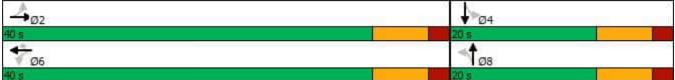
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	To			4	1		4		7	T	
Traffic Volume (vph)	71	253	12	29	607	121	12	88	20	91	156	76
Future Volume (vph)	71	253	12	29	607	121	12	88	20	91	156	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	0		100	0		0	100		0
Storage Lanes	1		0	0		1	0		0	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.993				0.850		0.978			0.951	
Flt Protected	0.950				0.998			0.995		0.950		
Satd. Flow (prot)	1770	1850	0	0	1859	1583	0	1813	0	1770	1771	0
Flt Permitted	0.247				0.976			0.946		0.785		
Satd. Flow (perm)	460	1850	0	0	1818	1583	0	1723	0	1462	1771	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		1536			1126			1017			1092	
Travel Time (s)		23.3			17.1			15.4			16.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	79	281	13	32	674	134	13	98	22	101	173	84
Shared Lane Traffic (%)												
Lane Group Flow (vph)	79	294	0	0	706	134	0	133	0	101	257	0
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8			4		
Detector Phase	2	2		6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	12.0	12.0		12.0	12.0	12.0	7.0	7.0		7.0	7.0	
Minimum Split (s)	19.0	19.0		19.0	19.0	19.0	14.0	14.0		14.0	14.0	
Total Split (s)	40.0	40.0		40.0	40.0	40.0	20.0	20.0		20.0	20.0	
Total Split (%)	66.7%	66.7%		66.7%	66.7%	66.7%	33.3%	33.3%		33.3%	33.3%	
Maximum Green (s)	33.0	33.0		33.0	33.0	33.0	13.0	13.0		13.0	13.0	
Yellow Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0			-2.0	-2.0		-2.0		-2.0	-2.0	
Total Lost Time (s)	5.0	5.0			5.0	5.0		5.0		5.0	5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	Min	Min		Min	Min	
Act Effct Green (s)	26.5	26.5			26.5	26.5		13.3		13.3	13.3	
Actuated g/C Ratio	0.53	0.53			0.53	0.53		0.26		0.26	0.26	
v/c Ratio	0.33	0.30			0.74	0.16		0.29		0.26	0.55	
Control Delay	10.9	7.4			14.4	6.5		19.1		19.1	23.0	
Queue Delay	0.0	0.0			0.0	0.0		0.0		0.0	0.0	
Total Delay	10.9	7.4			14.4	6.5		19.1		19.1	23.0	
LOS	В	A			В	А		В		В	С	
Approach Delay		8.2			13.2			19.1			21.9	
Approach LOS		A			В			В			С	

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	12	45			150	19		32		24	67	
Queue Length 95th (ft)	37	81			258	40		80		65	147	
Internal Link Dist (ft)		1456			1046			937			1012	
Turn Bay Length (ft)	100					100				100		
Base Capacity (vph)	333	1342			1319	1148		536		455	552	
Starvation Cap Reductn	0	0			0	0		0		0	0	
Spillback Cap Reductn	0	0			0	0		0		0	0	
Storage Cap Reductn	0	0			0	0		0		0	0	
Reduced v/c Ratio	0.24	0.22			0.54	0.12		0.25		0.22	0.47	
Intersection Summary												
Area Type:	Other											
Cycle Length: 60												
Actuated Cycle Length: 50.	2											
Natural Cycle: 50												
Control Type: Actuated-Un	coordinated											
Maximum v/c Ratio: 0.74												
Intersection Signal Delay: 1	4.4			In	tersectior	LOS: B						
Intersection Capacity Utilization	ation 76.2%			IC	U Level o	of Service	D					
Analysis Period (min) 15												

Splits and Phases: 3: Peebles Road/Jonesville Road & Mitchell Mill Road



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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	N.	ħ			ŧ	ř		4		N.	ef.	
Traffic Volume (vph)	138	459	19	14	387	102	19	113	31	163	69	49
Future Volume (vph)	138	459	19	14	387	102	19	113	31	163	69	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	0		100	0		0	100		0
Storage Lanes	1		0	0		1	0		0	1		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.994				0.850		0.975			0.938	
Flt Protected	0.950				0.998			0.994		0.950		
Satd. Flow (prot)	1770	1852	0	0	1859	1583	0	1805	0	1770	1747	0
Flt Permitted	0.436				0.973			0.951		0.728		
Satd. Flow (perm)	812	1852	0	0	1812	1583	0	1727	0	1356	1747	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)						-			-			
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		1536			1126			1017			1092	
Travel Time (s)		23.3			17.1			15.4			16.5	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	153	510	21	16	430	113	21	126	34	181	77	54
Shared Lane Traffic (%)				-		-				-		
Lane Group Flow (vph)	153	531	0	0	446	113	0	181	0	181	131	0
Turn Type	Perm	NA	-	Perm	NA	Perm	Perm	NA	-	Perm	NA	-
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8			4		
Detector Phase	2	2		6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	12.0	12.0		12.0	12.0	12.0	7.0	7.0		7.0	7.0	
Minimum Split (s)	19.0	19.0		19.0	19.0	19.0	14.0	14.0		14.0	14.0	
Total Split (s)	36.0	36.0		36.0	36.0	36.0	24.0	24.0		24.0	24.0	
Total Split (%)	60.0%	60.0%		60.0%	60.0%	60.0%	40.0%	40.0%		40.0%	40.0%	
Maximum Green (s)	29.0	29.0		29.0	29.0	29.0	17.0	17.0		17.0	17.0	
Yellow Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0			-2.0	-2.0		-2.0		-2.0	-2.0	
Total Lost Time (s)	5.0	5.0			5.0	5.0		5.0		5.0	5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	None	None		None	None	None	Min	Min		Min	Min	
Act Effct Green (s)	21.1	21.1			21.1	21.1		13.9		13.9	13.9	
Actuated g/C Ratio	0.46	0.46			0.46	0.46		0.31		0.31	0.31	
v/c Ratio	0.41	0.62			0.53	0.15		0.34		0.44	0.25	
Control Delay	12.4	13.1			11.6	8.0		15.8		18.1	14.8	
Queue Delay	0.0	0.0			0.0	0.0		0.0		0.0	0.0	
Total Delay	12.4	13.1			11.6	8.0		15.8		18.1	14.8	
LOS	В	В			В	A		В		В	В	
Approach Delay		12.9			10.9			15.8		_	16.7	
Approach LOS		B			В			В			В	
		-						-			-	

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	23	92			73	15		34		35	24	
Queue Length 95th (ft)	68	198			160	41		95		101	71	
Internal Link Dist (ft)		1456			1046			937			1012	
Turn Bay Length (ft)	100					100				100		
Base Capacity (vph)	581	1326			1297	1133		758		595	766	
Starvation Cap Reductn	0	0			0	0		0		0	0	
Spillback Cap Reductn	0	0			0	0		0		0	0	
Storage Cap Reductn	0	0			0	0		0		0	0	
Reduced v/c Ratio	0.26	0.40			0.34	0.10		0.24		0.30	0.17	
Intersection Summary												
Area Type:	Other											
Cycle Length: 60												
Actuated Cycle Length: 45.	5											
Natural Cycle: 40												
Control Type: Actuated-Unc	coordinated											
Maximum v/c Ratio: 0.62												
Intersection Signal Delay: 1	3.2			In	tersectior	LOS: B						
Intersection Capacity Utiliza	ation 81.0%			IC	CU Level o	of Service	D					
Analysis Period (min) 15												
Splits and Dhasas: 2: Day	oblas Bood/	1		N 411 - 11 - 11 - 11 - 11 - 11 - 11 - 11								

Splits and Phases: 3: Peebles Road/Jonesville Road & Mitchell Mill Road

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APPENDIX G

CAPACITY ANALYSIS CALCULATIONS Jonesville Road & Universal Drive

Int Delay, s/veh	0.2						
Movement	EBL	EBR	NBL	NBT	SBT	SBR	ł
Lane Configurations	Y			4	ħ		
Traffic Vol, veh/h	3	3	1	125	178	1	
Future Vol, veh/h	3	3	1	125	178	1	
Conflicting Peds, #/hr	0	0	0	0	0	0	1
Sign Control	Stop	Stop	Free	Free	Free	Free	;
RT Channelized	-	None	-	None	-	None	ļ
Storage Length	0	-	-	-	-	-	-
Veh in Median Storage,	# 0	-	-	0	0	-	-
Grade, %	0	-	-	0	0	-	
Peak Hour Factor	90	90	90	90	90	90	1
Heavy Vehicles, %	2	2	2	2	2	2	2
Mvmt Flow	3	3	1	139	198	1	

Major/Minor	Minor2	ļ	Major1	Ν	1ajor2	
Conflicting Flow All	340	199	199	0	-	0
Stage 1	199	-	-	-	-	-
Stage 2	141	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy		3.318		-	-	-
Pot Cap-1 Maneuver	656	842	1373	-	-	-
Stage 1	835	-	-	-	-	-
Stage 2	886	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	655	842	1373	-	-	-
Mov Cap-2 Maneuver	655	-	-	-	-	-
Stage 1	834	-	-	-	-	-
Stage 2	886	-	-	-	-	-
Approach	EB		NB		SB	
HCM Control Delay, s	9.9		0.1		0	
HCM LOS	А					
Minor Lane/Major Myr	nt	NRI		EBI n1	CBT	SBD

Minor Lane/Major Mvmt	NBL	NBT E	EBLn1	SBT	SBR	
Capacity (veh/h)	1373	-	737	-	-	
HCM Lane V/C Ratio	0.001	-	0.009	-	-	
HCM Control Delay (s)	7.6	0	9.9	-	-	
HCM Lane LOS	A	А	А	-	-	
HCM 95th %tile Q(veh)	0	-	0	-	-	

Int Delay, s/veh	0.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			4	ħ	
Traffic Vol, veh/h	1	2	4	127	89	3
Future Vol, veh/h	1	2	4	127	89	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage,	# 0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	2	4	141	99	3

Major/Minor	Minor2		Major1	Ν	/lajor2	
Conflicting Flow All	250	101	102	0	-	0
Stage 1	101	-	-	-	-	-
Stage 2	149	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	739	954	1490	-	-	-
Stage 1	923	-	-	-	-	-
Stage 2	879	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver		954	1490	-	-	-
Mov Cap-2 Maneuver	737	-	-	-	-	-
Stage 1	920	-	-	-	-	-
Stage 2	879	-	-	-	-	-
Approach	EB		NB		SB	
HCM Control Delay, s			0.2		0	
HCM LOS	A 5.2		0.2		U	
	~ ~					
Minor Lane/Major Mvi	mt	NBL	NBTI	EBLn1	SBT	SBR
Capacity (veh/h)		1490	-	869	-	-
HCM Lane V/C Ratio		0.003	-	0.004	-	-

	1100	v				
HCM Lane V/C Ratio	0.003	- 0.0)04	-	-	
HCM Control Delay (s)	7.4	0 9	9.2	-	-	
HCM Lane LOS	А	А	А	-	-	
HCM 95th %tile Q(veh)	0	-	0	-	-	

Int Delay, s/veh	0.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			4	ħ	
Traffic Vol, veh/h	3	3	1	339	294	1
Future Vol, veh/h	3	3	1	339	294	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage,	# 0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	3	1	377	327	1

Major/Minor	Minor2	I	Major1	Ν	lajor2	
Conflicting Flow All	707	328	328	0	-	0
Stage 1	328	-	-	-	-	-
Stage 2	379	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy		3.318	2.218	-	-	-
Pot Cap-1 Maneuver	402	713	1232	-	-	-
Stage 1	730	-	-	-	-	-
Stage 2	692	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver		713	1232	-	-	-
Mov Cap-2 Maneuver		-	-	-	-	-
Stage 1	729	-	-	-	-	-
Stage 2	692	-	-	-	-	-
Approach	EB		NB		SB	
HCM Control Delay, s			0		0	
HCM LOS	B		0		0	
	D					
Minor Lane/Major Mvi	mt	NBL	NBT E	EBLn1	SBT	SBR

Minor Lane/Major Wivmt	INBL	INB LEBEU L	SBI	SBR	
Capacity (veh/h)	1232	- 514	-	-	
HCM Lane V/C Ratio	0.001	- 0.013	-	-	
HCM Control Delay (s)	7.9	0 12.1	-	-	
HCM Lane LOS	Α	A B	-	-	
HCM 95th %tile Q(veh)	0	- 0	-	-	

Int Delay, s/veh	0.1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			4	ħ	
Traffic Vol, veh/h	1	2	4	296	336	3
Future Vol, veh/h	1	2	4	296	336	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage	, # 0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1	2	4	329	373	3

Major/Minor	Minor2		Major1	Majo	or2	
Conflicting Flow All	712	375	376	0	-	0
Stage 1	375	-	-	-	-	-
Stage 2	337	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	399	671	1182	-	-	-
Stage 1	695	-	-	-	-	-
Stage 2	723	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	397	671	1182	-	-	-
Mov Cap-2 Maneuver	397	-	-	-	-	-
Stage 1	692	-	-	-	-	-
Stage 2	723	-	-	-	-	-
Approach	EB		NB		SB	
HCM Control Delay, s	11.6		0.1		0	
HCM LOS	В					

Minor Lane/Major Mvmt	NBL	NBT I	EBLn1	SBT	SBR
Capacity (veh/h)	1182	-	546	-	-
HCM Lane V/C Ratio	0.004	-	0.006	-	-
HCM Control Delay (s)	8.1	0	11.6	-	-
HCM Lane LOS	А	А	В	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Int Delay, s/veh	0.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			4	ħ	
Traffic Vol, veh/h	16	6	2	356	300	5
Future Vol, veh/h	16	6	2	356	300	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage,	# 0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	18	7	2	396	333	6

Major/Minor	Minor2		Major1	Majo	or2	
Conflicting Flow All	736	336	339	0	-	0
Stage 1	336	-	-	-	-	-
Stage 2	400	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy		3.318		-	-	-
Pot Cap-1 Maneuver	386	706	1220	-	-	-
Stage 1	724	-	-	-	-	-
Stage 2	677	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver		706	1220	-	-	-
Mov Cap-2 Maneuver		-	-	-	-	-
Stage 1	723	-	-	-	-	-
Stage 2	677	-	-	-	-	-
Approach	EB		NB	:	SB	
HCM Control Delay, s	13.7		0		0	
HCM LOS	В					

Minor Lane/Major Mvmt	NBL	NBT I	EBLn1	SBT	SBR
Capacity (veh/h)	1220	-	439	-	-
HCM Lane V/C Ratio	0.002	-	0.056	-	-
HCM Control Delay (s)	8	0	13.7	-	-
HCM Lane LOS	А	А	В	-	-
HCM 95th %tile Q(veh)	0	-	0.2	-	-

Int Delay, s/veh	0.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			4	ħ	
Traffic Vol, veh/h	10	4	8	307	354	17
Future Vol, veh/h	10	4	8	307	354	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage,	# 0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	4	9	341	393	19

Major/Minor	Minor2	ļ	Major1	Ν	/lajor2	
Conflicting Flow All	762	403	412	0	-	0
Stage 1	403	-	-	-	-	-
Stage 2	359	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	373	647	1147	-	-	-
Stage 1	675	-	-	-	-	-
Stage 2	707	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	369	647	1147	-	-	-
Mov Cap-2 Maneuver	369	-	-	-	-	-
Stage 1	668	-	-	-	-	-
Stage 2	707	-	-	-	-	-
Approach	EB		NB		SB	
HCM Control Delay, s			0.2		0	
HCM LOS	13.9 B		0.2		U	
	D					
Minor Lane/Major Mvr	nt	NBL	NBT E	BLn1	SBT	SBR
Connectity (yeh/h)		11/7		101		

Capacity (veh/h)	1147	- 421	-	-	
HCM Lane V/C Ratio	0.008	- 0.037	-	-	
HCM Control Delay (s)	8.2	0 13.9	-	-	
HCM Lane LOS	А	A B	-	-	
HCM 95th %tile Q(veh)	0	- 0.1	-	-	

APPENDIX H

CAPACITY ANALYSIS CALCULATIONS Jonesville Road &

Site Drive

Int Delay, s/veh	1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		1	†	ħ	
Traffic Vol, veh/h	17	33	11	335	306	6
Future Vol, veh/h	17	33	11	335	306	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	50	-	-	-
Veh in Median Storage,	# 0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	19	37	12	372	340	7

Major/Minor	Minor2		Major1	Ν	/lajor2	
Conflicting Flow All	740	344	347	0	-	0
Stage 1	344	-	-	-	-	-
Stage 2	396	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy				-	-	-
Pot Cap-1 Maneuver	384	699	1212	-	-	-
Stage 1	718	-	-	-	-	-
Stage 2	680	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver		699	1212	-	-	-
Mov Cap-2 Maneuver		-	-	-	-	-
Stage 1	711	-	-	-	-	-
Stage 2	680	-	-	-	-	-
Approach	EB		NB		SB	
HCM Control Delay, s			0.3		0	
HCM LOS	B		0.0		Ū	
	2					
	. 1				ODT	000
Minor Lane/Major Mvr	mt	NBL	NBL	EBLn1	SBT	SBR
Capacity (veh/h)		1212	-	544	-	-

Capacity (ven/n)	1212	- 544	-	-	
HCM Lane V/C Ratio	0.01	- 0.102	-	-	
HCM Control Delay (s)	8	- 12.4	-	-	
HCM Lane LOS	А	- B	-	-	
HCM 95th %tile Q(veh)	0	- 0.3	-	-	

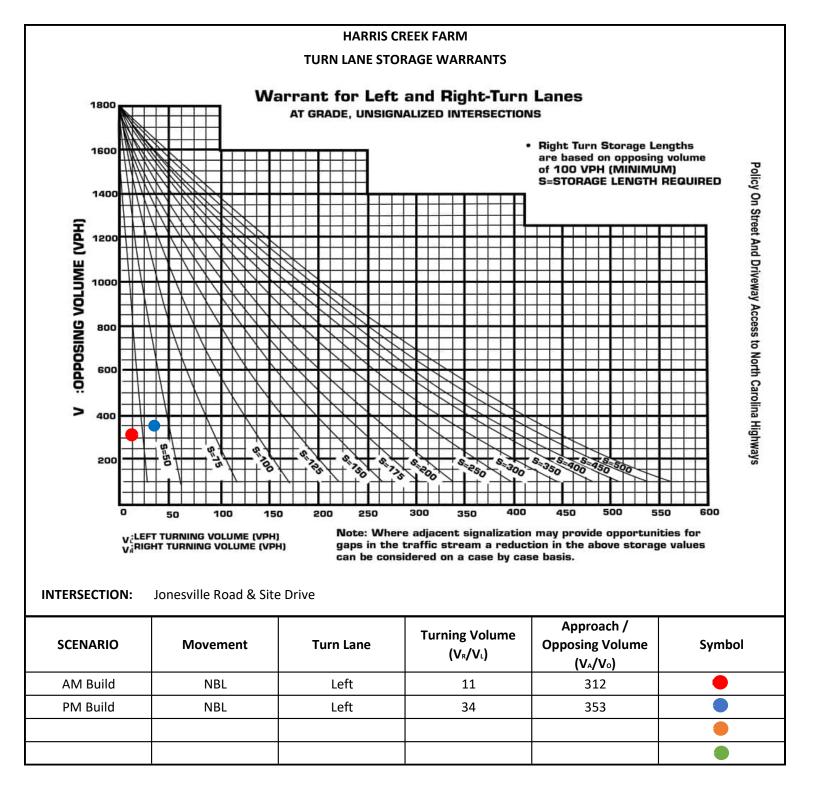
Int Delay, s/veh	1					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		3	Ť	ħ	
Traffic Vol, veh/h	11	22	34	308	335	18
Future Vol, veh/h	11	22	34	308	335	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	50	-	-	-
Veh in Median Storage,	# 0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	12	24	38	342	372	20

Major/Minor	Minor2	1	Major1	Ν	/lajor2	
Conflicting Flow All	800	382	392	0	, <u>-</u>	0
Stage 1	382	-	-	-	-	-
Stage 2	418	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	354	665	1167	-	-	-
Stage 1	690	-	-	-	-	-
Stage 2	664	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver		665	1167	-	-	-
Mov Cap-2 Maneuver	342	-	-	-	-	-
Stage 1	667	-	-	-	-	-
Stage 2	664	-	-	-	-	-
Approach	EB		NB		SB	
HCM Control Delay, s			0.8		0	
HCM LOS	12.7 B		0.0		U	
	D					
Minor Lane/Major Mvr	nt	NBL	NBT E	EBLn1	SBT	SBR
Capacity (veh/h)		1167	-	506	-	-
		0.000		0.070		

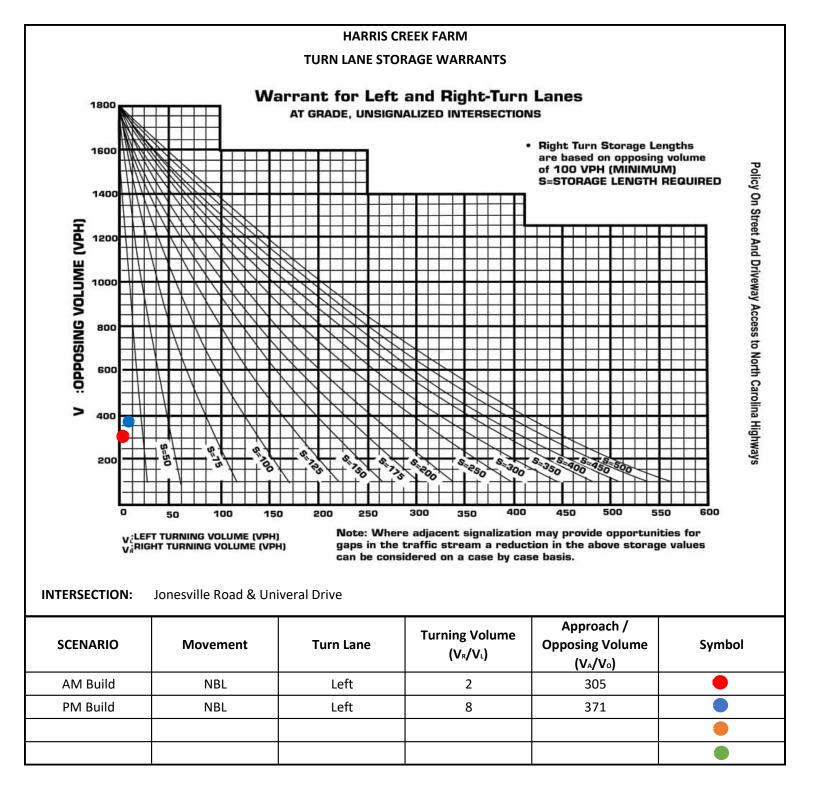
HCM Lane V/C Ratio	0.032	- 0.072	-	-
HCM Control Delay (s)	8.2	- 12.7	-	-
HCM Lane LOS	А	- B	-	-
HCM 95th %tile Q(veh)	0.1	- 0.2	-	-

APPENDIX I

TURN LANE WARRANTS



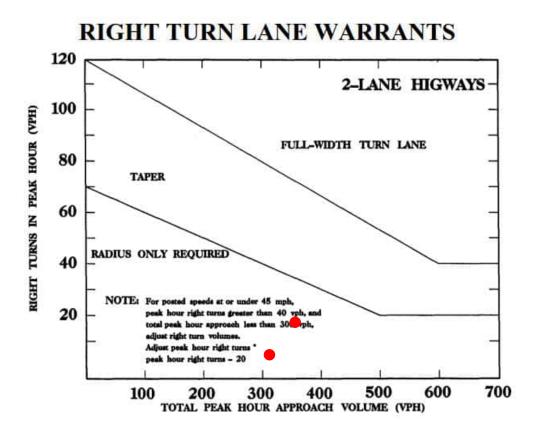






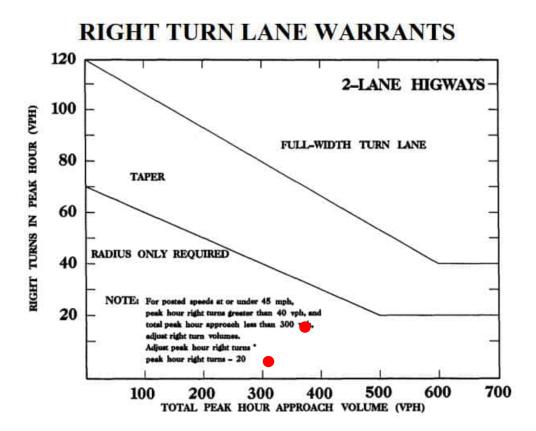
Jonesville Road and Site Drive

2027 Build						
Peak Hour	Approach	Right Turn Volume	Approach Volume	Warranted?		
AM	Southbound	6	312	No		
PM	Southbound	18	353	No		



Jonesville Road and Universal Drive

2027 Build						
Peak HourApproachRight TurnApproachWarranted?VolumeVolumeVolumeVolume						
AM	Southbound	5	305	No		
PM	Southbound	17	371	No		



APPENDIX J

MUTCD / ITRE SIGNAL WARRANT ANALYSIS

Traffic Signal Warrant Analysis

Warrants 1 - 3 (Volume Warrants)

Project Name	Harris C	Harris Creek Farm					
Project/File #	204	98 - 09	7				
Scenario	2027	2027 No-Build					
Intersection Information							
Major Street (E/W Road)	US 401 Bypass	Minor Street (N/S Road)	Jonesville Road / WB Left-Over				
Analyzed with	2 or more approach lanes	Analyzed with	1 Approach Lane				
Total Approach Volume	2895 vehicles	Total Approach Volume	894 vehicles				
Total Ped/Bike Volume	0 crossings	Total Ped/Bike Volume	0 crossings				
Right turn reduction of	0 percent applied	Right turn reduction of	100 percent applied				

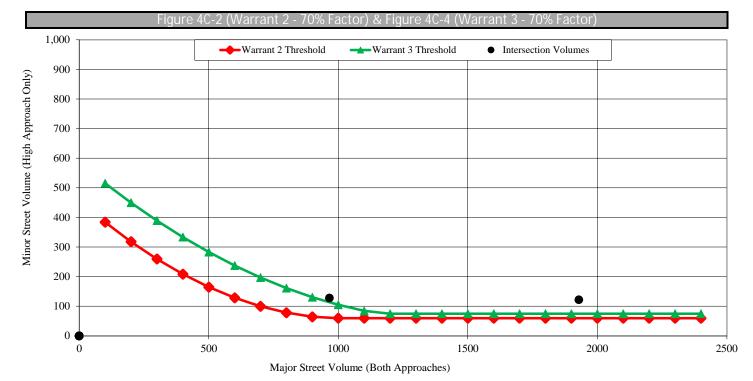
No high speed or isolated community reduction applied to the Volume Warrant thresholds.

Warrant 1, Eight Hour Vehicular Volume						
	Condition A	Condition B	Condition A+B*			
Condition Satisfied?	Not Satisfied	Not Satisfied	Not Satisfied			
Required values reached for	2 hours	2 hours	2 (Cond. A) & 2 (Cond. B)			
Criteria - Major Street (veh/hr)	420	630	336 (Cond. A) & 504 (Cond. B)			
Criteria - Minor Street (veh/hr)	105	53	84 (Cond. A) & 42 (Cond. B)			

* Should be applied only after an adequate trial of other alternatives that could cause less delay and inconvenience to traffic has failed to solve the traffic problems.

Warrant 2, Four Hour Vehicular Volume						
Condition Satisfied?	Not Satisfied					
Required values reached for	2 hours					
Criteria	See Figure Below					

Warrant 3, Peak Hour Vehicular Volume							
	Condition A	Condition B					
Condition Satisfied?	Not Satisfied	Satisfied					
Required values reached for	2051 total, 122 minor, 0 delay	2 hours					
Criteria - Total Approach Volume (veh in one hour)	800						
Criteria - Minor Street High Side Volume (veh in one hour)	100	See Figure Below					
Criteria - Minor Street High Side Delay (veh-hrs)	4						



Warrants 1 - 3 (Volume Warrants)

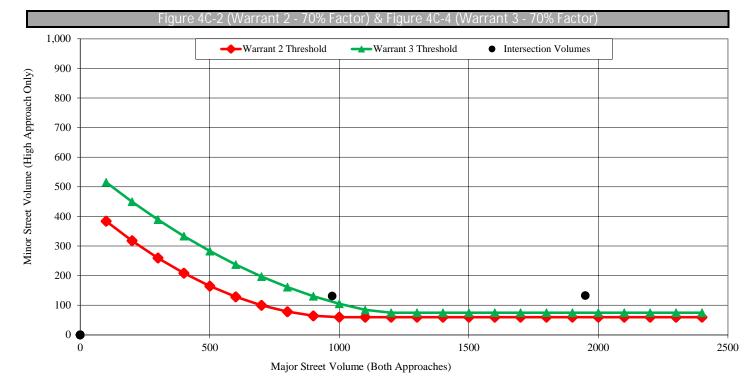
Project Name	Harris Creek Farm		7	
Project/File #	204	20498 - 09		
Scenario	2027 Build]	
Intersection Information				
Major Street (E/W Road)	US 401 Bypass	Minor Street (N/S Road)	Jonesville Road / WB Left-Over	
Analyzed with	2 or more approach lanes	Analyzed with	1 Approach Lane	
Total Approach Volume	2923 vehicles	Total Approach Volume	958 vehicles	
Total Ped/Bike Volume	0 crossings	Total Ped/Bike Volume	0 crossings	
Right turn reduction of	0 percent applied	0 percent applied Right turn reduction of		

No high speed or isolated community reduction applied to the Volume Warrant thresholds.

Warrant 1, Eight Hour Vehicular Volume				
Condition A Condition B Condition A+B*				
Condition Satisfied?	Not Satisfied	Not Satisfied	Not Satisfied	
Required values reached for	2 hours	2 hours	2 (Cond. A) & 2 (Cond. B)	
Criteria - Major Street (veh/hr)	420	630	336 (Cond. A) & 504 (Cond. B)	
Criteria - Minor Street (veh/hr)	105	53	84 (Cond. A) & 42 (Cond. B)	

Warrant 2, Four Hour Vehicular Volume			
Condition Satisfied?	Not Satisfied		
Required values reached for	2 hours		
Criteria	See Figure Below		

Warrant 3, Peak Hour Vehicular Volume			
	Condition A	Condition B	
Condition Satisfied?	Not Satisfied	Satisfied	
Required values reached for	2083 total, 133 minor, 0 delay	2 hours	
Criteria - Total Approach Volume (veh in one hour)	800		
Criteria - Minor Street High Side Volume (veh in one hour)	100	See Figure Below	
Criteria - Minor Street High Side Delay (veh-hrs)	4		



Warrants 1 - 3 (Volume Warrants)

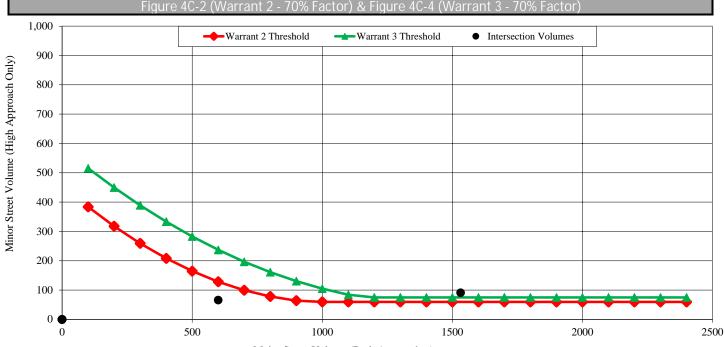
Project Name Project/File # Scenario	Harris Creek Farm 20498 - 09 2022 Existing		
Intersection Information			- Fostern II Turn Location
Major Street (E/W Road) Analyzed with	US 401 Bypass 2 or more approach lanes	Minor Street (N/S Road) Analyzed with	Eastern U-Turn Location 1 Approach Lane
Total Approach Volume	2132 vehicles Total Approach Volume		157 vehicles
Total Ped/Bike Volume	0 crossings	Total Ped/Bike Volume	0 crossings
Right turn reduction of	0 percent applied	0 percent applied Right turn reduction of	

No high speed or isolated community reduction applied to the Volume Warrant thresholds.

Warrant T, Eight Hour Vehicular Volume				
	Condition A	Condition B	Condition A+B*	
Condition Satisfied?	Not Satisfied	Not Satisfied	Not Satisfied	
Required values reached for	0 hours	1 hour	1 (Cond. A) & 2 (Cond. B)	
Criteria - Major Street (veh/hr)	420	630	336 (Cond. A) & 504 (Cond. B)	
Criteria - Minor Street (veh/hr)	105	53	84 (Cond. A) & 42 (Cond. B)	

Warrant 2, Four Hour Venicular Volume			
Condition Satisfied?	Not Satisfied		
Required values reached for	1 hour		
Criteria	See Figure Below		

vvarrant 3, Peak Hour venicular volume			
Condition A Condition B			
Condition Satisfied?	Not Satisfied	Satisfied	
Required values reached for	1623 total, 91 minor, 0 delay	1 hour	
Criteria - Total Approach Volume (veh in one hour)	650		
Criteria - Minor Street High Side Volume (veh in one hour)	100	See Figure Below	
Criteria - Minor Street High Side Delay (veh-hrs)	4		



Major Street Volume (Both Approaches)

Warrants 1 - 3 (Volume Warrants)

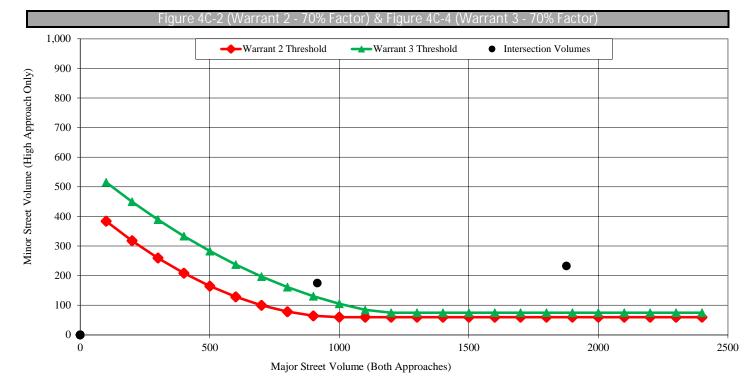
Project Name	Harris Creek Farm		
Project/File #	204	20498 - 09	
Scenario	2027 No-Build		
	Intersectio	on Information	
Major Street (E/W Road)	US 401 Bypass	Minor Street (N/S Road)	Eastern U-Turn Location
Analyzed with	2 or more approach lanes	Analyzed with	1 Approach Lane
Total Approach Volume	2792 vehicles	Total Approach Volume	408 vehicles
Total Ped/Bike Volume	0 crossings	Total Ped/Bike Volume	0 crossings
Right turn reduction of	0 percent applied	Right turn reduction of	0 percent applied

No high speed or isolated community reduction applied to the Volume Warrant thresholds.

Warrant 1, Eight Hour Vehicular Volume				
Condition A Condition B Condition A+B*				
Condition Satisfied?	Not Satisfied	Not Satisfied	Not Satisfied	
Required values reached for	2 hours	2 hours	2 (Cond. A) & 2 (Cond. B)	
Criteria - Major Street (veh/hr)	420	630	336 (Cond. A) & 504 (Cond. B)	
Criteria - Minor Street (veh/hr)	105	53	84 (Cond. A) & 42 (Cond. B)	

Warrant 2, Four Hour Vehicular Volume			
Condition Satisfied?	Not Satisfied		
Required values reached for	2 hours		
Criteria	See Figure Below		

Warrant 3, Peak Hour Vehicular Volume			
	Condition A	Condition B	
Condition Satisfied?	Not Satisfied	Satisfied	
Required values reached for	2110 total, 233 minor, 0 delay	2 hours	
Criteria - Total Approach Volume (veh in one hour)	650		
Criteria - Minor Street High Side Volume (veh in one hour)	100	See Figure Below	
Criteria - Minor Street High Side Delay (veh-hrs)	4		



Warrants 1 - 3 (Volume Warrants)

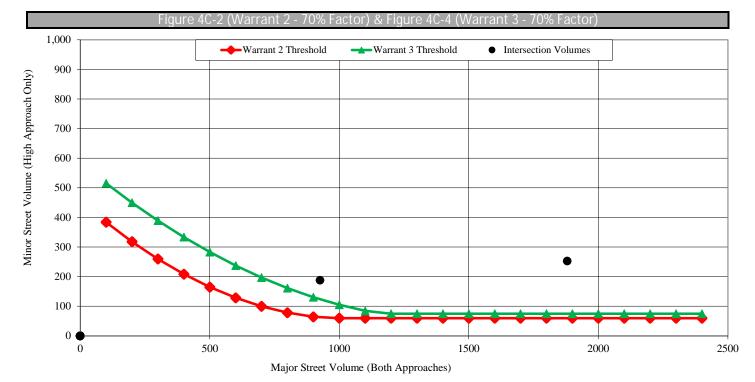
Project Name	Harris Creek Farm		7
Project/File #	2049	20498 - 09	
Scenario	2027 Build]
	Intersectio	on Information	
Major Street (E/W Road)	US 401 Bypass	Minor Street (N/S Road)	Eastern U-Turn Location
Analyzed with	2 or more approach lanes	Analyzed with	1 Approach Lane
Total Approach Volume	2806 vehicles	Total Approach Volume	441 vehicles
Total Ped/Bike Volume	0 crossings	Total Ped/Bike Volume	0 crossings
Right turn reduction of	0 percent applied	Right turn reduction of	0 percent applied

No high speed or isolated community reduction applied to the Volume Warrant thresholds.

Warrant 1, Eight Hour Vehicular Volume				
Condition A Condition B Condition A+B*				
Condition Satisfied?	Not Satisfied	Not Satisfied	Not Satisfied	
Required values reached for	2 hours	2 hours	2 (Cond. A) & 2 (Cond. B)	
Criteria - Major Street (veh/hr)	420	630	336 (Cond. A) & 504 (Cond. B)	
Criteria - Minor Street (veh/hr)	105	53	84 (Cond. A) & 42 (Cond. B)	

Warrant 2, Four Hour Vehicular Volume			
Condition Satisfied?	Not Satisfied		
Required values reached for	2 hours		
Criteria	See Figure Below		

Warrant 3, Peak Hour Vehicular Volume			
Condition A Condition			
Condition Satisfied?	Not Satisfied	Satisfied	
Required values reached for	2133 total, 253 minor, 0 delay	2 hours	
Criteria - Total Approach Volume (veh in one hour)	650		
Criteria - Minor Street High Side Volume (veh in one hour)	100	See Figure Below	
Criteria - Minor Street High Side Delay (veh-hrs)	4		



Warrants 1 - 3 (Volume Warrants)

Project Name Project/File #	Harris Creek Farm 20498 - 09 2022 Existing		
Scenario			
	Intersec	tion Information	
Major Street (E/W Road)	Mitchell Mill Road	Minor Street (N/S Road)	Jonesville Road
Analyzed with	1 approach lane	Analyzed with	1 Approach Lane
Total Approach Volume	1031 vehicles	Total Approach Volume	469 vehicles
Total Ped/Bike Volume	0 crossings	Total Ped/Bike Volume	0 crossings
Right turn reduction of	0 percent applied Right turn reduction of		0 percent applied

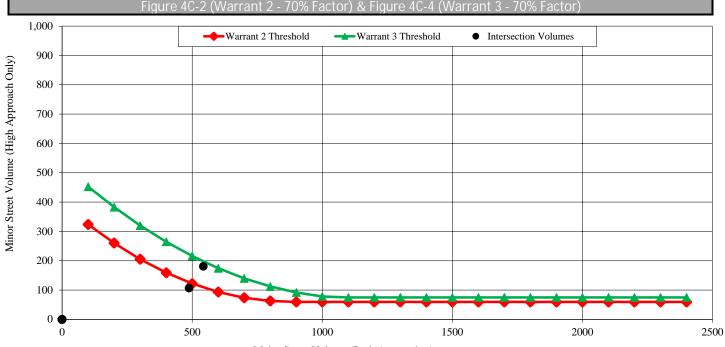
No high speed or isolated community reduction applied to the Volume Warrant thresholds.

Warrant T, Eight Hour Vehicular Volume				
	Condition A	Condition B	Condition A+B*	
Condition Satisfied?	Not Satisfied	Not Satisfied	Not Satisfied	
Required values reached for	2 hours	1 hour	2 (Cond. A) & 2 (Cond. B)	
Criteria - Major Street (veh/hr)	350	525	280 (Cond. A) & 420 (Cond. B)	
Criteria - Minor Street (veh/hr)	105	53	84 (Cond. A) & 42 (Cond. B)	

* Should be applied only after an adequate trial of other alternatives that could cause less delay and inconvenience to traffic has failed to solve the traffic problems.

Warrant 2, Four Hour Vehicular Volume				
Condition Satisfied?	Not Satisfied			
Required values reached for	1 hour			
Criteria	See Figure Below			

warrant 3, Peak Hour venicular volume			
Condition A Condition B			
Condition Satisfied?	Not Satisfied	Not Satisfied	
Required values reached for	817 total, 181 minor, 0 delay	0 hours	
Criteria - Total Approach Volume (veh in one hour)	800		
Criteria - Minor Street High Side Volume (veh in one hour)	100	See Figure Below	
Criteria - Minor Street High Side Delay (veh-hrs)	4		



Major Street Volume (Both Approaches)

Warrants 1 - 3 (Volume Warrants)

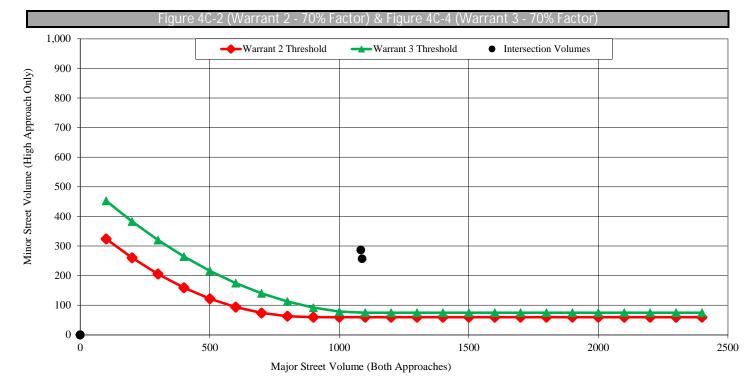
Project Name	Harris Creek Farm		
Project/File #	20498 - 09		
Scenario	2027 No-Build		
	Intersect	tion Information	
Major Street (E/W Road)	Mitchell Mill Road	Minor Street (N/S Road)	Jonesville Road
Analyzed with	1 approach lane	Analyzed with	1 Approach Lane
Total Approach Volume	2171 vehicles	Total Approach Volume	818 vehicles
Total Ped/Bike Volume	0 crossings	Total Ped/Bike Volume	0 crossings
Right turn reduction of	0 percent applied Right turn reduction of		0 percent applied

No high speed or isolated community reduction applied to the Volume Warrant thresholds.

Warrant 1, Eight Hour Vehicular Volume				
Condition A Condition B Condition A+B*				
Condition Satisfied?	Not Satisfied	Not Satisfied	Not Satisfied	
Required values reached for	2 hours	2 hours	2 (Cond. A) & 2 (Cond. B)	
Criteria - Major Street (veh/hr)	350	525	280 (Cond. A) & 420 (Cond. B)	
Criteria - Minor Street (veh/hr)	105	53	84 (Cond. A) & 42 (Cond. B)	

Warrant 2, Four Hour Vehicular Volume			
Condition Satisfied?	Not Satisfied		
Required values reached for	2 hours		
Criteria	See Figure Below		

Warrant 3, Peak Hour Vehicular Volume			
	Condition B		
Condition Satisfied?	Not Satisfied	Satisfied	
Required values reached for	1488 total, 287 minor, 0 delay	2 hours	
Criteria - Total Approach Volume (veh in one hour)	800		
Criteria - Minor Street High Side Volume (veh in one hour)	100	See Figure Below	
Criteria - Minor Street High Side Delay (veh-hrs)	4		



Warrants 1 - 3 (Volume Warrants)

Project Name	Harris		
Project/File #	20	9498 - 09	
Scenario	2027 Build		
	Intersec	tion Information	
Major Street (E/W Road)	Mitchell Mill Road	Minor Street (N/S Road)	Jonesville Road
Analyzed with	1 approach lane	Analyzed with	1 Approach Lane
Total Approach Volume	2212 vehicles	Total Approach Volume	887 vehicles
Total Ped/Bike Volume	0 crossings	Total Ped/Bike Volume	0 crossings
Right turn reduction of	0 percent applied	Right turn reduction of	0 percent applied

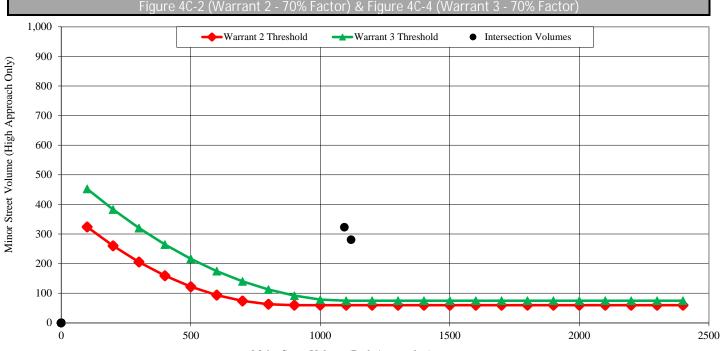
No high speed or isolated community reduction applied to the Volume Warrant thresholds.

Warrant 1, Eight Hour Vehicular Volume					
Condition A Condition B Condition A+B*					
Condition Satisfied?	Not Satisfied	Not Satisfied	Not Satisfied		
Required values reached for	2 hours	2 hours	2 (Cond. A) & 2 (Cond. B)		
Criteria - Major Street (veh/hr)	350	525	280 (Cond. A) & 420 (Cond. B)		
Criteria - Minor Street (veh/hr)	105	53	84 (Cond. A) & 42 (Cond. B)		

* Should be applied only after an adequate trial of other alternatives that could cause less delay and inconvenience to traffic has failed to solve the traffic problems.

Warrant 2, Four Hour Vehicular Volume		
Condition Satisfied?	Not Satisfied	
Required values reached for	2 hours	
Criteria	See Figure Below	

Warrant 3, Peak Hour Vehicular Volume				
	Condition A	Condition B		
Condition Satisfied?	Not Satisfied	Satisfied		
Required values reached for	1536 total, 323 minor, 0 delay	2 hours		
Criteria - Total Approach Volume (veh in one hour)	800			
Criteria - Minor Street High Side Volume (veh in one hour)	100	See Figure Below		
Criteria - Minor Street High Side Delay (veh-hrs)	4			



Major Street Volume (Both Approaches)

US 401 Bypass & Jonesville Road [Minor-Street Right-Turn] [No-Build]

AM Peak Hour

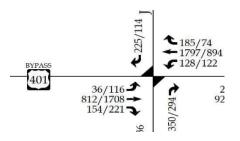
vph	g/c	а	b	С
720	0.7	0.00004	0.0108	0.2587
812	0.7	3.5E-05	0.010033	0.310936
900	0.7	0.00003	0.0093	0.3609

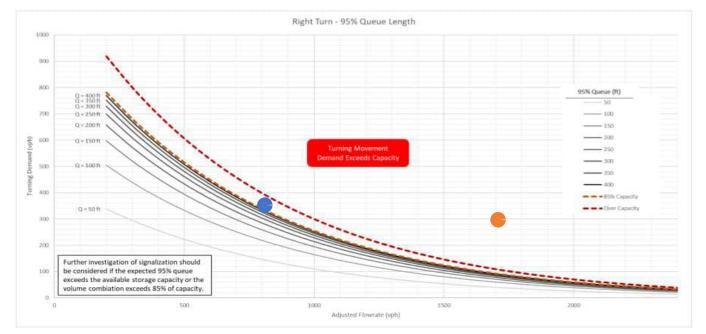
PM Pea	ak Hour			
vph	g/c	а	b	С
1620	0.7	0.00004	0.0108	0.2587
1708	0.7	3.5E-05	0.010067	0.308664
1800	0.7	0.00003	0.0093	0.3609

Distance to Upstream Signal	8800	ft
Posted Speed Limit	55	mph
Travel Time	109.09	S

CVAF	1
Conflicting Volume (vph)	812
Adjusted Conflicting (vph)	812
Turning Volume (vph)	350

CVAF		1	
Cor	flicting Volume (vph)		1708
Adju	usted Conflicting (vph)		1708
Τι	Irning Volume (vph)		294





US 401 Bypass & Jonesville Road [Minor-Street Right-Turn] [Build]

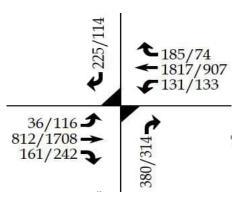
AM Pea	ak Hour			
vph	g/c	а	b	С
720	0.7	0.00004	0.0108	0.2587
812	0.7	3.5E-05	0.010033	0.310936
900	0.7	0.00003	0.0093	0.3609

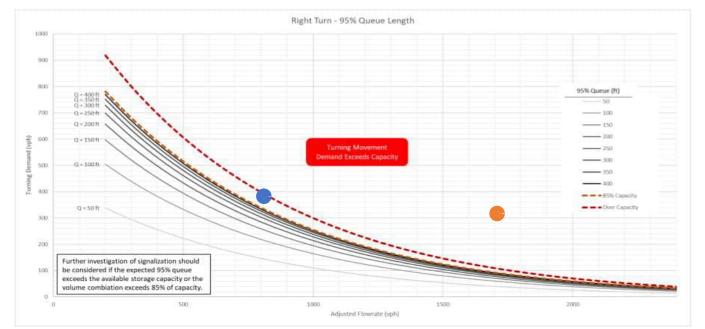
PM Pea	ak Hour			
vph	g/c	а	b	С
1620	0.7	0.00004	0.0108	0.2587
1708	0.7	3.5E-05	0.010067	0.308664
1800	0.7	0.00003	0.0093	0.3609

Distance to Upstream Signal	8800	ft
Posted Speed Limit	55	mph
Travel Time	109.09	S

CVAF	1
Conflicting Volume (vph)	812
Adjusted Conflicting (vph)	812
Turning Volume (vph)	380

CVAF	1
Conflicting Volume (vph)	1708
Adjusted Conflicting (vph)	1708
Turning Volume (vph)	314





US 401 Bypass & Jonesville Road [Major-Street Left-Turn] [No-Build]

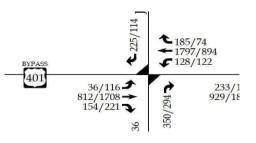
AM Pea	ak Hour			
vph	g/c	а	b	С
900	0.7	0.00004	0.0097	0.4284
966	0.7	4.0E-05	0.00915	0.46261
1080	0.7	0.00004	0.0082	0.5217

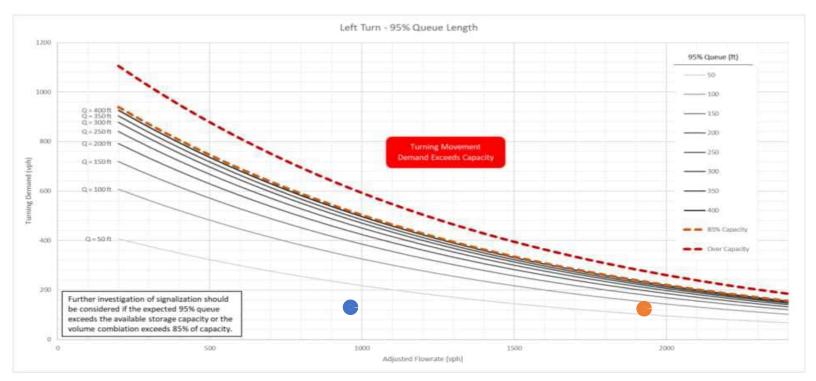
PM Pea	ak Hour			
vph	g/c	а	b	С
1800	0.7	0.00004	0.0097	0.4284
1929	0.7	4.0E-05	0.008625	0.495265
1980	0.7	0.00004	0.0082	0.5217

Distance to Upstream Signal	8800	ft
Posted Speed Limit	55	mph
Travel Time	109.09	S

CVAF	1
Conflicting Volume (vph)	966
Adjusted Conflicting (vph)	966
Turning Volume (vph)	128

CVAF	1
Conflicting Volume (vph)	1929
Adjusted Conflicting (vph)	1929
Turning Volume (vph)	122





US 401 Bypass & Jonesville Road [Major-Street Left-Turn] [Build]

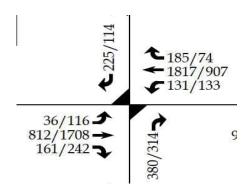
AM Pea	ak Hour			
vph	g/c	а	b	С
900	0.7	0.00004	0.0097	0.4284
973	0.7	4.0E-05	0.009092	0.466238
1080	0.7	0.00004	0.0082	0.5217

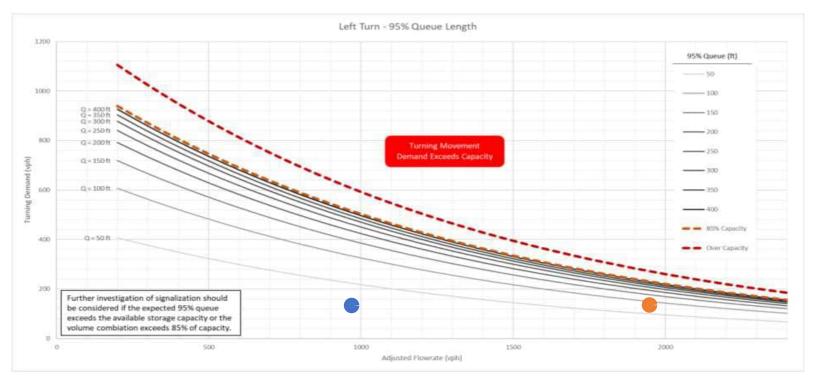
PM Pea	ak Hour			
vph	g/c	а	b	С
1800	0.7	0.00004	0.0097	0.4284
1950	0.7	4.0E-05	0.00845	0.50615
1980	0.7	0.00004	0.0082	0.5217

Distance to Upstream Signal	8800	ft
Posted Speed Limit	55	mph
Travel Time	109.09	S

CVAF	1
Conflicting Volume (vph)	973
Adjusted Conflicting (vph)	973
Turning Volume (vph)	131

CVAF	1
Conflicting Volume (vph)	1950
Adjusted Conflicting (vph)	1950
Turning Volume (vph)	133





US 401 Bypass & Eastern U-Turn Location [Major-Street U-Turn] [No-Build]

AM Peak Hour

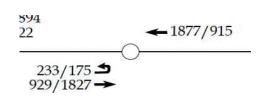
vph	g/c	а	b	С
1800	0.7	0.00003	0.0072	0.5106
1877	0.7	3.0E-05	0.007114	0.522064
1980	0.7	0.00003	0.007	0.5374

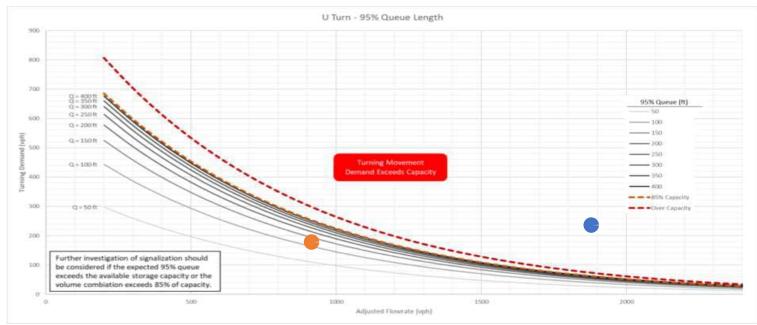
PM Pea	ak Hour			
vph	g/c	а	b	С
900	0.7	0.00003	0.0072	0.5106
915	0.7	3.0E-05	0.007183	0.512833
1080	0.7	0.00003	0.007	0.5374

Distance to Upstream Signal	10000	ft
Posted Speed Limit	55	mph
Travel Time	123.97	S

CVAF	1
Conflicting Volume (vph)	1877
Adjusted Conflicting (vph)	1877
Turning Volume (vph)	233

CVAF	1
Conflicting Volume (vph)	915
Adjusted Conflicting (vph)	915
Turning Volume (vph)	175





US 401 Bypass & Eastern U-Turn Location [Major-Street U-Turn] [Build]

AM Peak Hour

vph	g/c	а	b	С
1800	0.7	0.00003	0.0072	0.5106
1880	0.7	3.0E-05	0.007111	0.522511
1980	0.7	0.00003	0.007	0.5374

PM Peak Hour vph g/c b а с 900 0.7 0.00003 0.0072 0.5106 0.514471 0.7 3.0E-05 0.007171 926 0.007 0.5374 1080 0.7 0.00003

Distance to Upstream Signal	10000	ft
Posted Speed Limit	55	mph
Travel Time	123.97	S

CVAF	1
Conflicting Volume (vph)	1880
Adjusted Conflicting (vph)	1880
Turning Volume (vph)	253

CVAF	1
Conflicting Volume (vph)	926
Adjusted Conflicting (vph)	926
Turning Volume (vph)	188

