



LINCOLN COUNTY PLANNING & INSPECTIONS DEPARTMENT
302 NORTH ACADEMY STREET, SUITE A, LINCOLNTON, NORTH CAROLINA 28092
704-736-8440 OFFICE 704-736-8434 INSPECTION REQUEST LINE 704-732-9010 FAX

To: Board of Commissioners
Planning Board

From: Randy Hawkins, Zoning Administrator

Date: November 17, 2017

Re: PD #2017-3
D.R. Horton, Inc., applicant
Parcel ID# 02378 and 33155

The following information is for use by the Lincoln County Board of Commissioners and Planning Board at their joint meeting/public hearing on December 4, 2017.

REQUEST

The applicant is requesting the rezoning of 208 acres from R-T (Transitional Residential) to PD-R (Planned Development-Residential) to permit a subdivision with up to 422 single-family detached houses, including 132 age-restricted (55+) homes. Under the Lincoln County Unified Development Ordinance, any proposed subdivision with 50 or more lots is subject to approval through the planned development process. The applicant is also proposing lots smaller in size than the minimum area permitted in the R-T district.

A concept plan and a PD-R report with terms and conditions for the proposed development, Ingleside Farm, have been submitted as part of the rezoning application and would serve as the master plan for the development if the rezoning request is approved. The PD-R report includes commitments by the applicant to provide certain traffic improvements and to provide a monetary contribution toward a proposed traffic improvement project. The improvements are based on a traffic impact analysis that is included with the application. The application also includes minutes from a community involvement meeting that was held on June 15. A follow-up meeting was held on Nov. 7.

SITE AREA AND DESCRIPTION

The property is located on the south side of N.C. 73 and the east and west sides of South Ingleside Farm Road. It is adjoined by property zoned R-T, PD-R and R-SF (Residential Single-Family). The Trilogy planned residential development borders this property to the east. Water and sewer mains are located in close proximity to this property. Land uses in the area are primarily residential and agricultural. This property

is not located in a water-supply watershed. A portion of this property along Killian Creek is located in a 100-year floodplain.

This property is the site of the historic Ingleside house, which was built in 1817 for Daniel Forney, a major in the War of 1812 and a state legislator. The Federal-style mansion is listed on the National Register of Historic Places. The PD-R report calls for the house and surrounding acreage to be transferred to an historic preservation organization, to Lincoln County or to another entity for use for public or private functions.

PLAN CONFORMANCE

This property is part of an area designated by the Lincoln County Land Use Plan as Rural Residential, suitable for low-density residential development (overall densities of not greater than one dwelling unit per acre). The proposed density for Ingleside Farm is 2.0 homes per acre.

UDO COMPLIANCE

The UDO requires that a planned development include a minimum of 12.5% recreation and open space. Approximately 55% of the acreage in Ingleside Farm would be reserved as recreation and open space.

The proposed plan also complies with the UDO's subdivision standards for external access and internal connectivity.

The applicant has applied for waivers from the subdivision standards regarding the maximum length of cul-de-sacs. The Planning Board will hear and decide that request following the rezoning hearing. (Section 5.4.11.B sets a maximum length for cul-de-sacs of ten times the minimum lot width or 1,000 feet, whichever is less. In this case, the proposed minimum lot width is 50 feet.)

STAFF'S RECOMMENDATION

Staff recommends approval of the rezoning request.

Under state law, prior to adopting or rejecting a zoning amendment, the Board of Commissioners must adopt one of the following statements:

(1) A statement approving the zoning amendment and describing its consistency with an adopted comprehensive plan and explaining why the action taken is reasonable and in the public interest.

(2) A statement rejecting the zoning amendment and describing its inconsistency with an adopted comprehensive plan and explaining why the action taken is reasonable and in the public interest.

(3) A statement approving the zoning amendment and containing at least all of the following:

a. A declaration that the approval is also deemed an amendment to the comprehensive plan.

b. An explanation of the change in conditions the governing board took into account in amending the plan to meet the development needs of the community.

c. Why the action taken is reasonable and in the public interest.

Staff recommends that the Board of Commissioners exercise Option 3. See proposed statement on following page.



LINCOLN COUNTY PLANNING & INSPECTIONS DEPARTMENT

302 NORTH ACADEMY STREET, SUITE A, LINCOLNTON, NORTH CAROLINA 28092
704-736-8440 OFFICE 704-736-8434 INSPECTION REQUEST LINE 704-732-9010 FAX

Proposed Statement Approving Zoning Amendment, Simultaneously Amending Land Use Plan

Case No. **PD #2017-3**

Applicant **D.R. Horton, Inc.**

Parcel ID# **02378 and 33155**

Location **south side of N.C. 73 and east and west sides of Ingleside Farm Road**

Proposed amendment **rezone from R-T to PD-R to permit a subdivision with 422 single-family detached homes, including 132 age- restricted (55+) homes**

The Board of Commissioners approves this zoning amendment and hereby declares that this approval is also deemed an amendment to the Lincoln County Land Use Plan to designate these parcels as Suburban Residential. In amending the Land Use Plan, the Board of Commissioners took into account the limited sewer line and pump station capacity in other areas of eastern Lincoln County and the demand for housing of the type planned for this development, evidenced in part by the adjoining Trilogy subdivision to the east.

This proposed amendment is reasonable and in the public interest in that:

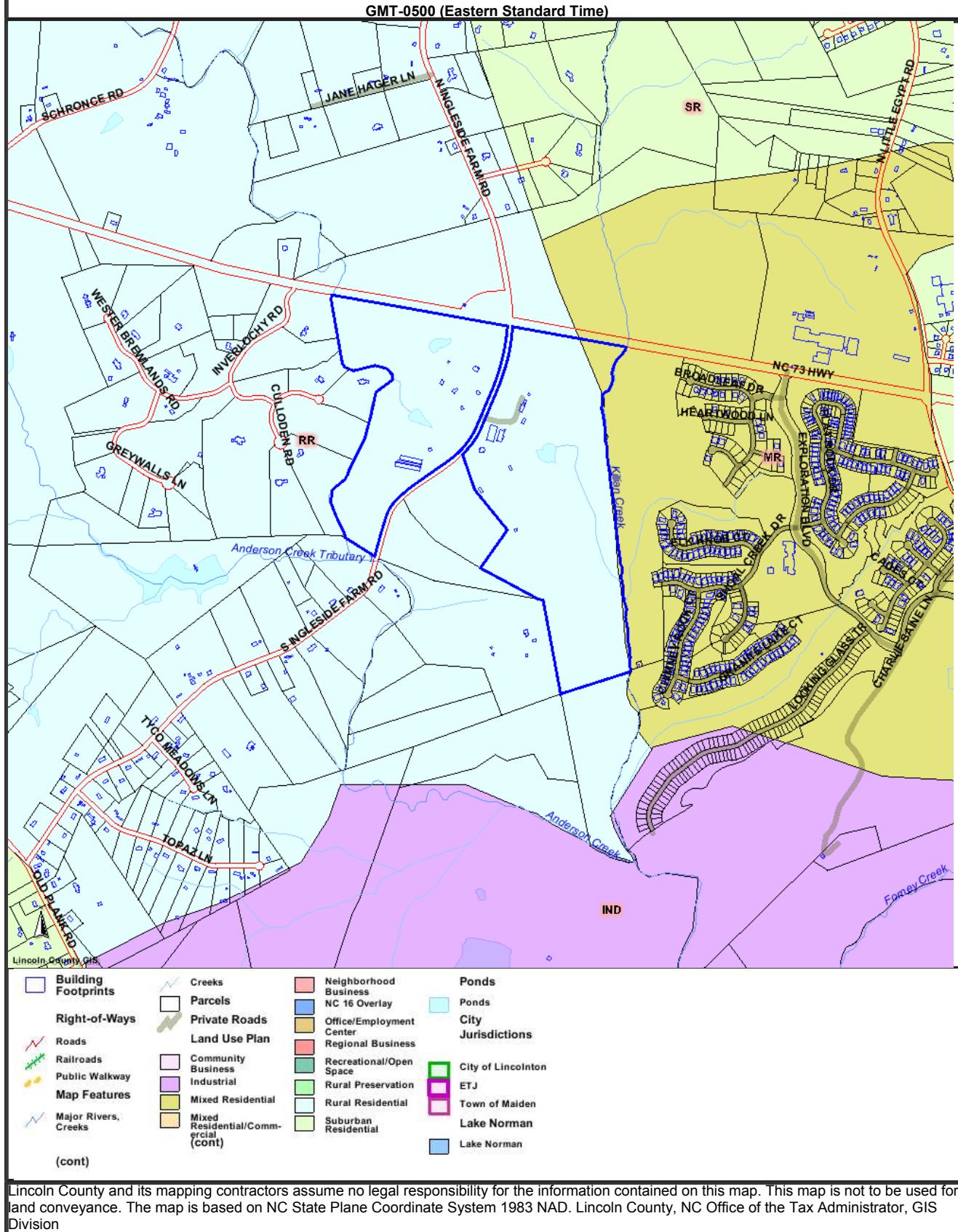
This property is adjoined by property zoned PD-R and which is approved for a higher density (2.75 homes per acre) than this planned development. This property borders on Killian Creek where a gravity sewer main is located. A water main extends along N.C. 73 to Killian Creek. This property is located on a main highway at an interchange, less than two miles from a four-lane, divided highway that serves the region. As part of the rezoning, road improvements and a monetary contribution toward road improvements will be provided to mitigate the impact of the development. Approximately 55% of the site will be reserved as recreation and open space. Under the rezoning plan, a historic house and surrounding land will be preserved.

PD #2017-3
Land Use Plan map of area

Scale: 1 Inch = 1600 Feet

LINCOLN COUNTY GIS

Wed Nov 15 2017 14:01:14



Lincoln County and its mapping contractors assume no legal responsibility for the information contained on this map. This map is not to be used for land conveyance. The map is based on NC State Plane Coordinate System 1983 NAD. Lincoln County, NC Office of the Tax Administrator, GIS Division



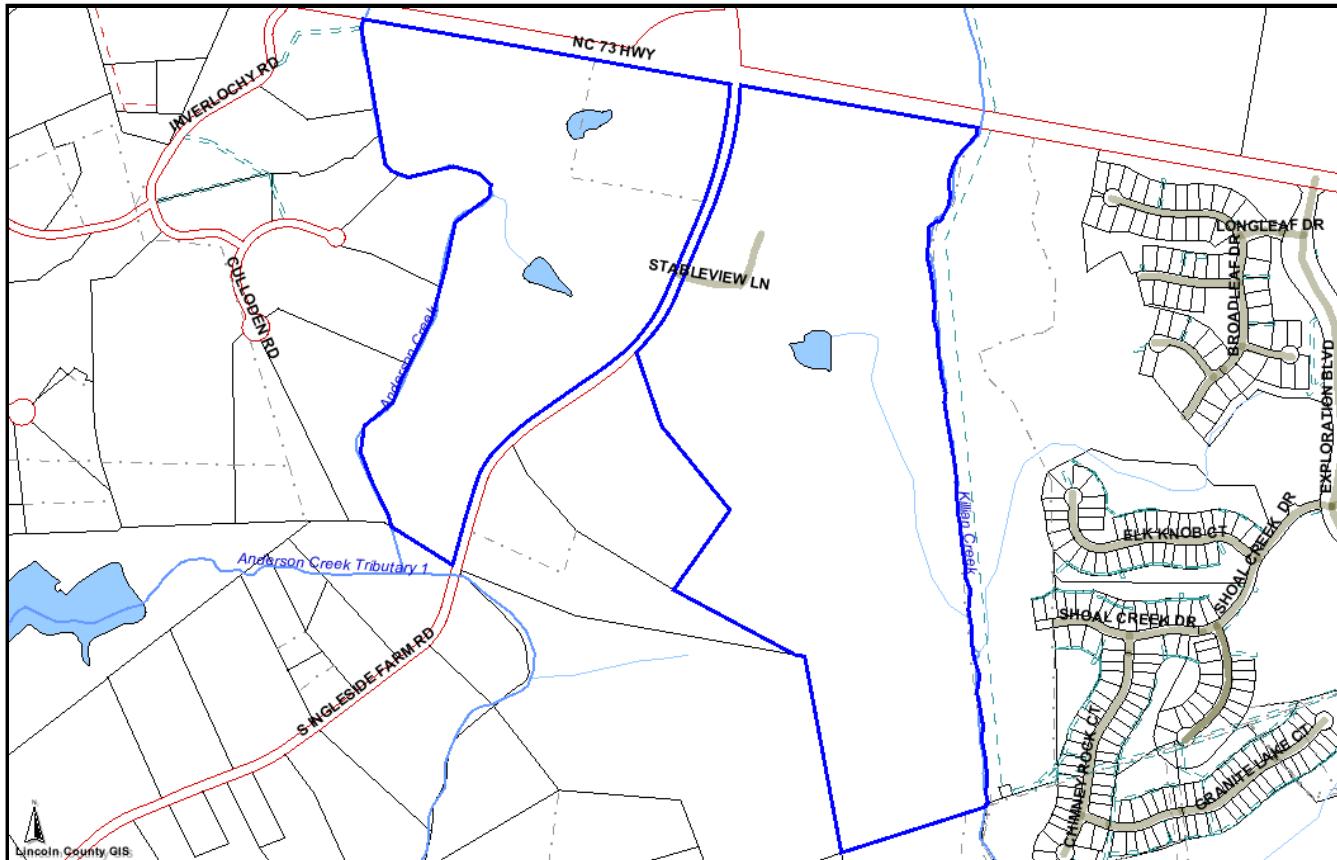
Lincoln County, NC

Office of the Tax Administrator, GIS Mapping Division

Lincoln County and its mapping contractors assume no legal responsibility for the information contained on this map. This map is not to be used for land conveyance. The map is based on NC State Plane Coordinate System 1983 NAD.



Date: 5/5/2017 Scale: 1 Inch = 1000 Feet



PHOTOS



PARCEL INFORMATION FOR 3692-25-9098

Parcel ID	02378	Owner	CLARK CAROLINE
Map	3692-00	Mailing Address	21 FORMOSA DR CHARLESTON SC 29407
Account	0113107	Recorded	1/15/1996
Deed	928-102	Total Value	\$1,982,374
Land Value	\$1,329,214	----- All values are for tax year 2017. -----	
Description	PT OF CAROLINE CLARK LAND	Deed Acres	0
Address	214 S INGLESIDE FARM RD	Tax Acres	190.66
Township	CATAWBA SPRINGS	Tax/Fire District	EAST LINCOLN
Main Improvement	COLONIAL	Value	\$319,116
Main Sq Feet	4256	Stories	2
Finished Basement	2128	Year Built	1860
Zoning District	Calculated Acres	Voting Precinct	Calculated Acres
R-T	190.67	LOWESVILLE (LW31)	0.1
Watershed Class		LOWESVILLE WEST (LW18)	190.57
Not in a watershed	190.67	Sewer District	
2000 Census County		Not in the sewer district	190.67
37109		Tract	Block
37109		071000	1000
37109		071000	1001
37109		071000	1002
		071100	3016
FloodZone Description	AE SPECIAL FLOOD HAZARD AREA BASE ELEVATION DETERMINED -		
AE	100 YEAR		111.33
X	NO FLOOD HAZARD		70.09
			4.96
			4.29
		Panel	
		3710369200	36.46
		3710369200154.21	





02378



02378



02378



02378



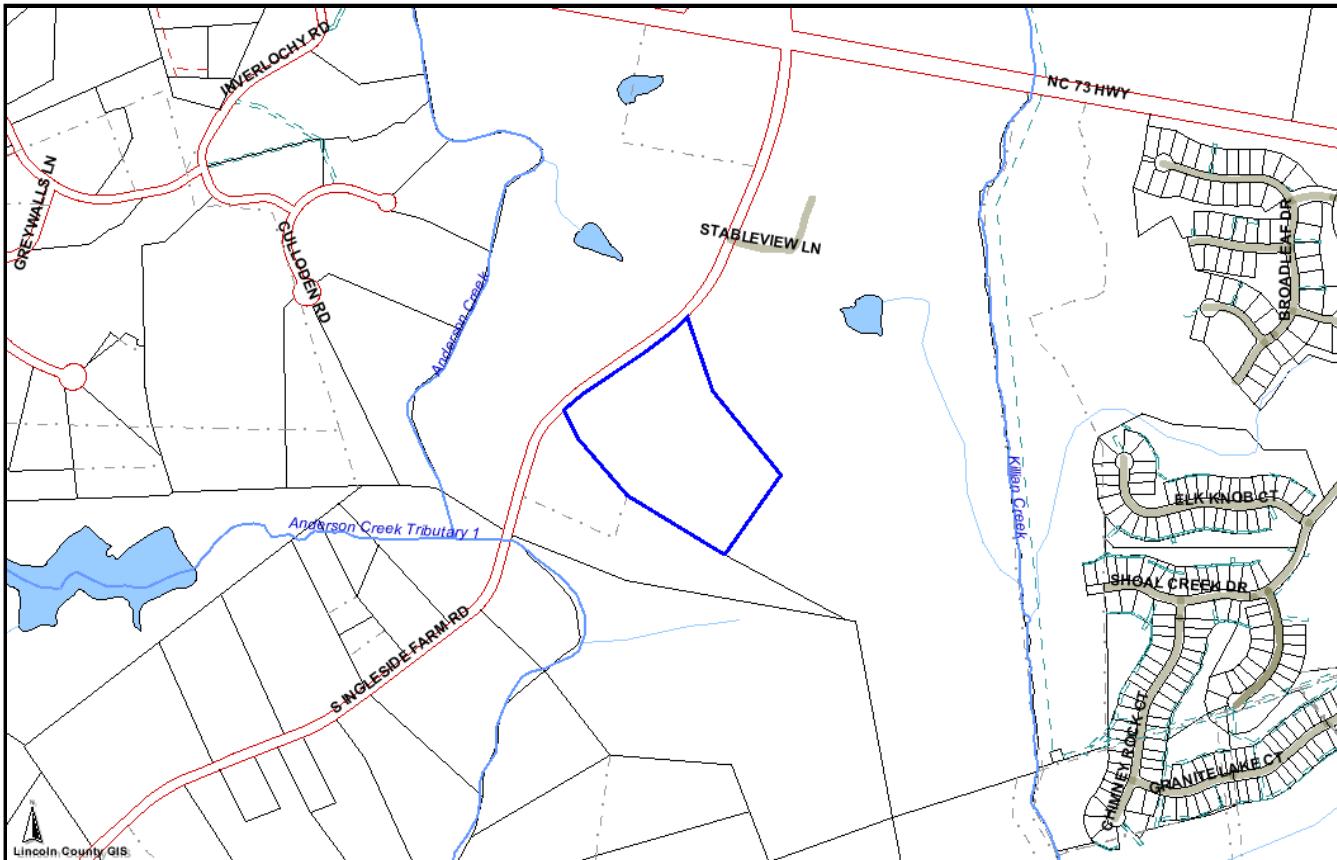
Lincoln County, NC

Office of the Tax Administrator, GIS Mapping Division

Lincoln County and its mapping contractors assume no legal responsibility for the information contained on this map. This map is not to be used for land conveyance. The map is based on NC State Plane Coordinate System 1983 NAD.



Date: 5/5/2017 Scale: 1 Inch = 1000 Feet



PHOTOS

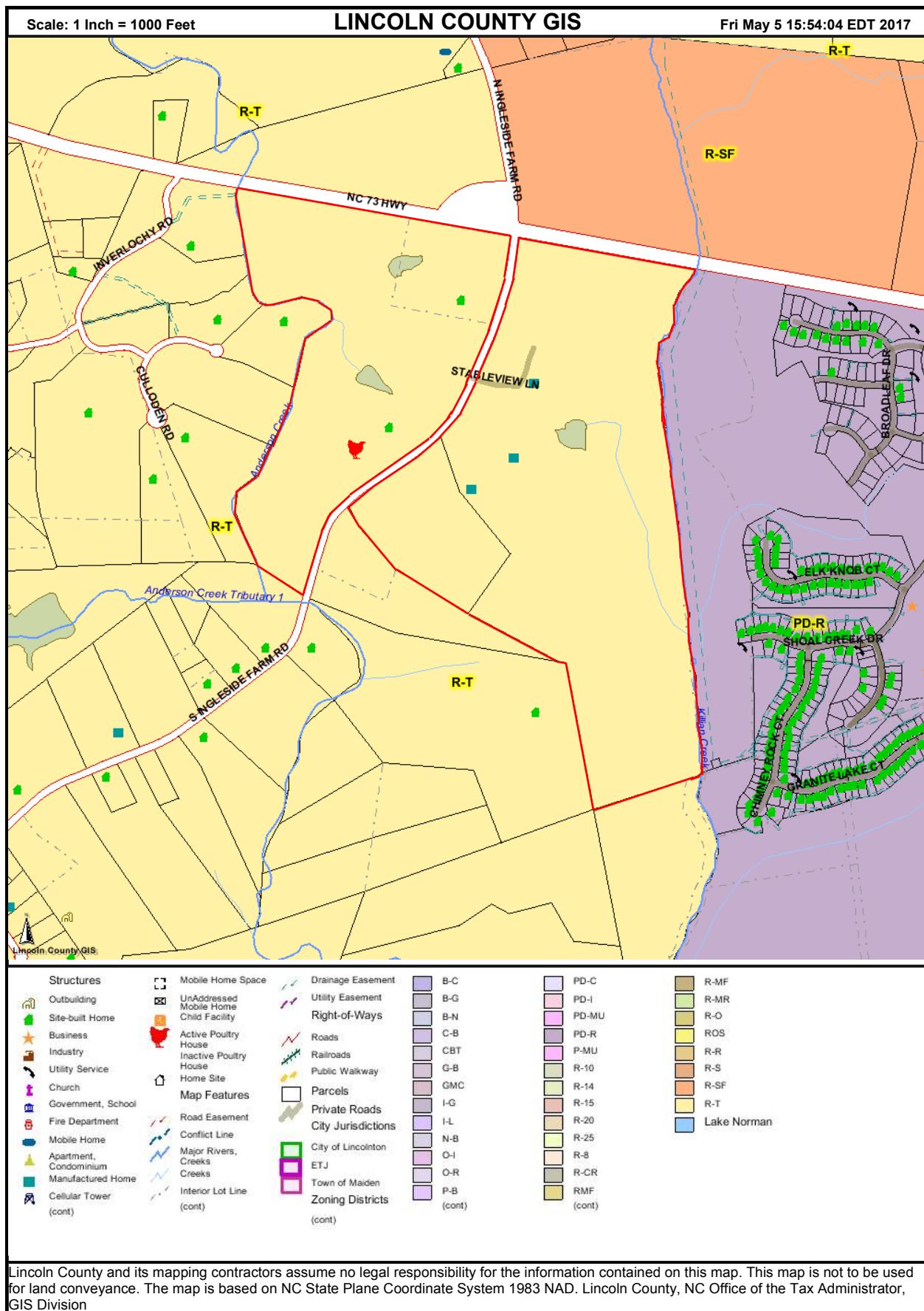


Photo Not Available

PARCEL INFORMATION FOR 3692-24-5405

Parcel ID	33155	Owner	CLARK ALLISON THORNE ***
Map	3692-00	Mailing Address	PO BOX 9
Account	30670	Recorded	LINCOLNTON NC 28093-0009
Deed	673-447	Total Value	\$193,787
Land Value	\$193,787	Sale Price	0
----- All values are for tax year 2017. -----			
Description	CLARK LD RD 1383	Deed Acres	17.74
Address	S. INGLESIDE FARM RD	Tax Acres	17.61
Township	CATAWBA SPRINGS	Tax/Fire District	EAST LINCOLN
Improvement		No Improvements	
Zoning District	Calculated Acres	Voting Precinct	Calculated Acres
R-T	17.62	LOWESVILLE WEST (LW18)	17.62
Watershed Class		Sewer District	
Not in a watershed	17.62	Not in the sewer district	17.62
2000 Census County		Tract	Block
37109		071000	1000
37109		071000	1001
Flood	Zone Description	Panel	
X	NO FLOOD HAZARD	3710369200	17.62

PD #2017-3
Subject property is outlined in red





Planned Development Rezoning Application

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

PART I

Applicant Name D. R. Horton

Applicant Address 8001 Arrowridge Blvd., Charlotte, NC 28273

Applicant Phone Number 704-787-5622

Property Owner Name Caroline Clark

Property Owner Address 21 Formosa Dr., Charleston, SC 29407

Property Owner Phone Number _____

PART II

Property Location Incleside Farm Rd at NC 73

Property ID (10 digits) 3692-24-5045 Property size Appox. 208.2 ac. ft.

Parcel # (5 digits) 02378 Deed Book(s) 928 Page(s) 102

PART III

Existing Zoning District R-T Proposed Zoning District PD-R

Briefly describe how the property is being used and any existing structures.

Property is former family farm that includes an historic structure

Briefly described the proposed planned development.

Proposed development is for 422 single family homes

***SEE PLANNING DEPT. FOR PLANNED DEVELOPMENT FEES.**

I hereby certify that all knowledge of the information provided for this application and attachments is true and correct to the best of my knowledge.

D. R. Horton
Applicant's Signature

4-27-17
Date

PD-R TERMS & CONDITIONS
INGLESIDE COMMUNITY DEVELOPMENT STANDARDS
LINCOLN COUNTY, NC

The purpose of this report is to establish the Terms and Conditions for the Ingleside community in Lincoln County for the single family development and the preservation of the historic Ingleside Home.

1. PROJECT INFORMATION

Ingleside is proposed to be a Single Family community located generally south of NC Hwy 73 generally at Ingleside Farm Road. The total site area is approximately 208.2 acres and lies on both sides of Ingleside Farm Road. This new Planned Development Plan includes 422 single family detached homes for an overall density of approximately 2.0 dwellings per acre.

2. GENERAL PROVISIONS

The Planned District Plan is intended to reflect a generalized arrangement of the site in terms of lot layout, building layout, street network, and open space areas. Final configuration, placement and size of individual site elements, streets alignments, etc. may be altered or modified within the limits of the Ordinance as described in Section 9.5.13, and the standards established within these conditional notes during the design development (platting) and construction phases. The Petitioner reserves the right to make minor modifications and adjustments to the approved Planned District Plan, subject to staff approval, provided that the total number of residential units does not exceed the maximum permitted. Any major modifications will require resubmittal to the Board of Commissioners.

Throughout these Conditions, the terms “Owner”, “Owners”, “Petitioner” or “Petitioners,” , “Applicant” or “Applicants” shall, with respect to the Site, be deemed to include the heirs, devisees, personal representatives, successors in interest and assignees of the owner or owners of the Site who may be involved in its development from time to time.

3. DEVELOPMENT STANDARDS

Pursuant to Sections 2.4.9 and 9.5 of the Lincoln County Unified Development Ordinance (UDO) entitled Planned Development Districts and Planned Development Review respectively; the Petitioner seeks to obtain approval of the use of the following Development Standards concurrently with the approval of the Rezoning Petition. These standards, as established both by the conditional notes as set out below and as depicted on the Preliminary Concept Plan shall be followed for development of the property. Unless otherwise approved as part of these conditional notes, the Lincoln County Unified Development Ordinance shall prevail when developing the site.

4. PURPOSE OF DEVELOPMENT REQUEST.

The Ingleside site is part of what had been a large family farm. The historic home is still standing on the property and it is the intention of the developer to re-purpose this home for public or private purposes. The site is divided by Ingleside Farm Road and is bound by streams on the east and west. The Applicant proposes to develop a single family community with choices of lot sizes and home sizes along with active and passive amenities to serve the residents.

5. PERMITTED USES/DENSITIES

The project shall be limited to 422 single family residential units and any incidental or accessory uses. A total of 132 of the single family homes will be restricted to residents age 55 years and older. In accordance with the Fair Housing Act at least 80% of the units so designated must be occupied by at least one person who is 55 years of age or older.

Uses on the Common Open Space (COS) may include landscaping, fences, walls, berms, pedestrian trails, passive and active recreational uses, natural areas, entry signage, monuments, and storm water BMPs (if required). The use of the Historic Ingleside Home may include private residential use, public uses, private uses such as events, meetings, weddings, fund raising, and other similar gatherings. It may also be used for overnight accommodations as a bed and breakfast or in conjunction with events on the property.

6. AMENITIES

The community will include an amenity area for the use of the residents that may include but not be limited to a pool and cabana (or clubhouse), recreation courts, open space recreation spaces that will be constructed with the first 200 dwelling units.

7. OPEN SPACE, BUFFER YARDS, AND LANDSCAPING

The community will meet or exceed the requirements for open space. Landscaping for the development shall meet or exceed all requirements of the UDO.

8. PROPERTY OWNER'S ASSOCIATION

Property Owners Association shall be established and will be responsible for maintaining all private roadways/right-of-way landscaping, signs, amenities; storm water features, parking areas, and common open space.

9. PARKING, LIGHTING, AND SIGNAGE

Parking, lighting, and signage shall comply with all requirements in the UDO.

10. STORM WATER COMPLIANCE

The development of the community shall comply with all required storm water management regulations.

11. PERMITTING

The Petitioner understands that all permits from the appropriate agencies must be obtained prior to construction activities.

12. WATER AND SEWER AVAILABILITY

This property is located in the East Lincoln Water and Sewer District and the Petitioner understands that water and sewer availability must be approved by Lincoln County prior to development. It is the Petitioner's responsibility to incur all fees and infrastructure costs for providing water and sewer throughout the development. The Petitioner will comply with all district water and sewer standards.

13. DEVELOPMENT PHASING

The Single Family section will be developed in multiple phases as shown on the Concept Plan. The pool and clubhouse will be constructed with the first 200 units.

14. VEHICULAR ACCESS AND ROAD IMPROVEMENTS

Access to the community will be primarily from Ingleside Farm Road. The transportation improvements that will be constructed as part of the development are based on the traffic impact of the development, as included in the approved Traffic Impact Analysis conducted for the proposed development. As the TIA does not call for any specific improvements, the Applicant, in consultation with NCDOT and Lincoln County, will make the following improvements in connection with the development of the site.

- A. The Applicant will construct a westbound right turn lane with 100' of storage on NC 73 at the intersection of NC 73 and Ingleside Farm Road. The improvements at this location will include the reconfiguration of the existing intersection and median and the installation of a 4' median in NC 73 to convert the connection from NC 73 to Ingleside Farm Road to right in and right out movements only. This improvement will be constructed as part of the 1st phase of the development.
- B. The Applicant will construct a new "loop" street segment that will connect Ingleside Farm Road to NC 73. The intersection of this street segment with NC 73 will include the construction of a 4' raised median in NC 73 so that access will be limited to right in and right out movements only and necessary widening for turn lanes if required on Ingleside Farm Road. This improvement will be constructed as part of the 1st phase of the development.

C. The Applicant will contribute \$100,000.00 to NCDOT as part of the funding of improvements at the intersection of NC 73 and Little Egypt Road to the east of the site. This contribution will be made at the time that NCDOT executes a contract for the intersection improvements.

15. DIMENSIONAL STANDARDS FOR LOTS

Lot width: 61' and 50'

Lot depth: 125' and 130'.

These dimensions are subject to modification for lots along curved streets or cul-de-sacs and the lot widths will be determined in accordance with the standards of the UDO.

Building setbacks shall be:

Front: 20'

Side: 5', 10' on corner lots

Rear: 10'

Building height shall be limited to 40'

16. MODEL HOMES/SALES OFFICES

Model homes may be constructed within residential areas at the developer's discretion. Mobile temporary sales offices shall be allowed at the developer's discretion and shall be subject to any special permits required by Lincoln County. All models shall have an approved all weather surface (stone, asphalt, etc.) prior to the issuance of a Certificate of Occupancy.

17. Historic Home.

The historic home is still standing on the property and it is the intention of the developer to re-purpose this home for public or private purposes. This will include the transfer of the historic home and several acres of land as generally depicted on the site plan, to an historic preservation organization, to Lincoln County for public use, or to some other entity. Those use may include public or private functions, educational purposes, preservation or the housing of various historic collections, and may include the residence for a caretaker or manager of the facility. The historic home and associated land will be transferred to the receiving grantee no later than the commencement of the 4th phase of development but may be transferred at an earlier time upon agreement between the parties.

Initial Submission: April 28, 2017 .1.1

Revised for resubmission November 15, 2017, 1.2c

Synopsis of Community Meeting of July 15th for Ingleside

Walter Fields made introduction of himself and the project. Also at the table were: Kristin Bickman, City Manager with DR Horton; Dan Brewer, Engineer with ESP; and Brian Ethridge, Division President with DR Horton.

Walter then described the project and the process: 208 Ac with 422 Units, a portion of which is age restricted (132+-), giving an overall density of 2 DU/Ac, which is a lower density than Trilogy.

Most questions/heartburn that people have are 3 items and discussed them.

- 1) Traffic concerns. He discussed the TIA and the fact that NCDOT has just signed off on the Traffic Study. We are offering to provide (not required in the TIA) a right lane from Ingleside Farm onto NC 73, right turn only heading east. Our comments from NCDOT is to provide a little more information and tweaking on the plan, which we are currently working on. We have not been requested to make any improvements on NC 73. He discussed details of the TIA.
- 2) School concerns – We are currently working with county staff on the school impact. Interestingly enough, the student population has dropped each year for the past few years (predominately due to the opening of New Charter schools in Lincoln County.) School assessment is in the process.
- 3) What is happening with Killians Creek in terms of establishing a trail system or future trail system – like the Carolina Thread Trail. We are planning trails within the neighborhood, but had not considered including this in the Carolina Thread Trail. We will continue these discussions.

Kristin then spoke and explained the product planned for Ingleside is similar to their product at Covington and offered all in attendance to come visit and look at the product.

Walter then discussed the Clarke Home place – Mansion and that we were in talks with the Historical Society to dedicate the Mansion and that conversations still continue and will be a part of this final plan.

Commissioner Martin Oates then wanted to speak about the “Process”: There are 5 County Commissioners, 2 of which live in East Lincoln (Myself and Mr. Permenter., Sail view). We cannot stop development by law which is why there are rules in place which are to be followed. 2 DU/Ac, access points are rules to follow. Lincoln County does not build, improve nor rule on roads within LC; this is only done by NCDOT and any Traffic Study can only be done by NCDOT approved Traffic Engineering Firms. Every project that has been previously approved (whether it is built or not) must be included in this study. Level of service cannot be changed to the negative. If you have complaints about growth, then it is your responsibility to vote. One way to stop development in its tracks “Do not build another sewer treatment plant.” We may run out of capacity mid next year. We do not know if there is enough capacity for all of this project. It takes about 2-3 years to build a plant and if we make decision not to expand a plant then there will be no more development. Does everyone understand that? It comes on a first come first serve basis. The current capacity of the plant being used is at 51%. Permits that have been issued is 59%; DENR allows capacity to reach 80% and then that triggers and expansion. We are using 51%, have plans approved to bring it up to 58%; have approved projects without approved plans that would bring it up to 86%.

One of the things that are positive about growth are: Movie theaters, Stores, retail stores; it will help from everyone driving to Huntersville. Growth comes where there is sewer. Mentioned that Andrew is working on a new land use plan, so look out for meetings posted on website and be a part of these meetings. Our land use plan is old and there will be a new strategic plan. Water is no issue, we are drowning in water. If you are done with me I will sit down.

Walter: started discussing water capacity and sewer capacity. In 2005 LC ran out of sewer capacity. Once the new plant was built, development returned. This is a great place to retire and people want to come here and live.

Walter then opened it up to Questions:

- 1) What is net increase in tax revenue? Pricing is in mid-250 – 300's and pricing is increasing and will be increasing when we go to sale. Tax rate is \$0.61, so this will bring about \$2 M/year in revenue.
- 2) Density question if 2 DU/Ac what is lot size? Gross land/total number of units. Avg. lot size is 0.15 – 0.20 Ac. Cannot look into lot size – it is gross numbers. (This question came up several times and no one could understand this)
- 3) Discuss ramp again – Walter did.
- 4) Is there plans to buy more land; I see 2 future connections? WF- There are no plans to expand this project. Those connection points are required by the county and we must provide this as a part of our development. This is for connectivity and a requirement of the county.

Matt Covington came the front with Walter. He is with the Catawba Land Conservancy. Management and is working with the adjoining property owner (George Clark) on putting his 142 Ac tract into a Conservancy. This means that it can never be developed. Once we put the easement on these 142 acres there can be no development. We would like not to have these connections. This property goes to the Duke CT Plant. I have more comments but I will get with you individually.

- 5) The concrete bridge that goes over Killian Creek (corrected Anderson Creek) is it staying or will it be removed? BE- we have no plans for that and we are not even sure if it is ours or on the Trilogy Project. "Well that bridge really impacts Trilogy – we don't want kids or other people to come across the creek and use our amenities".

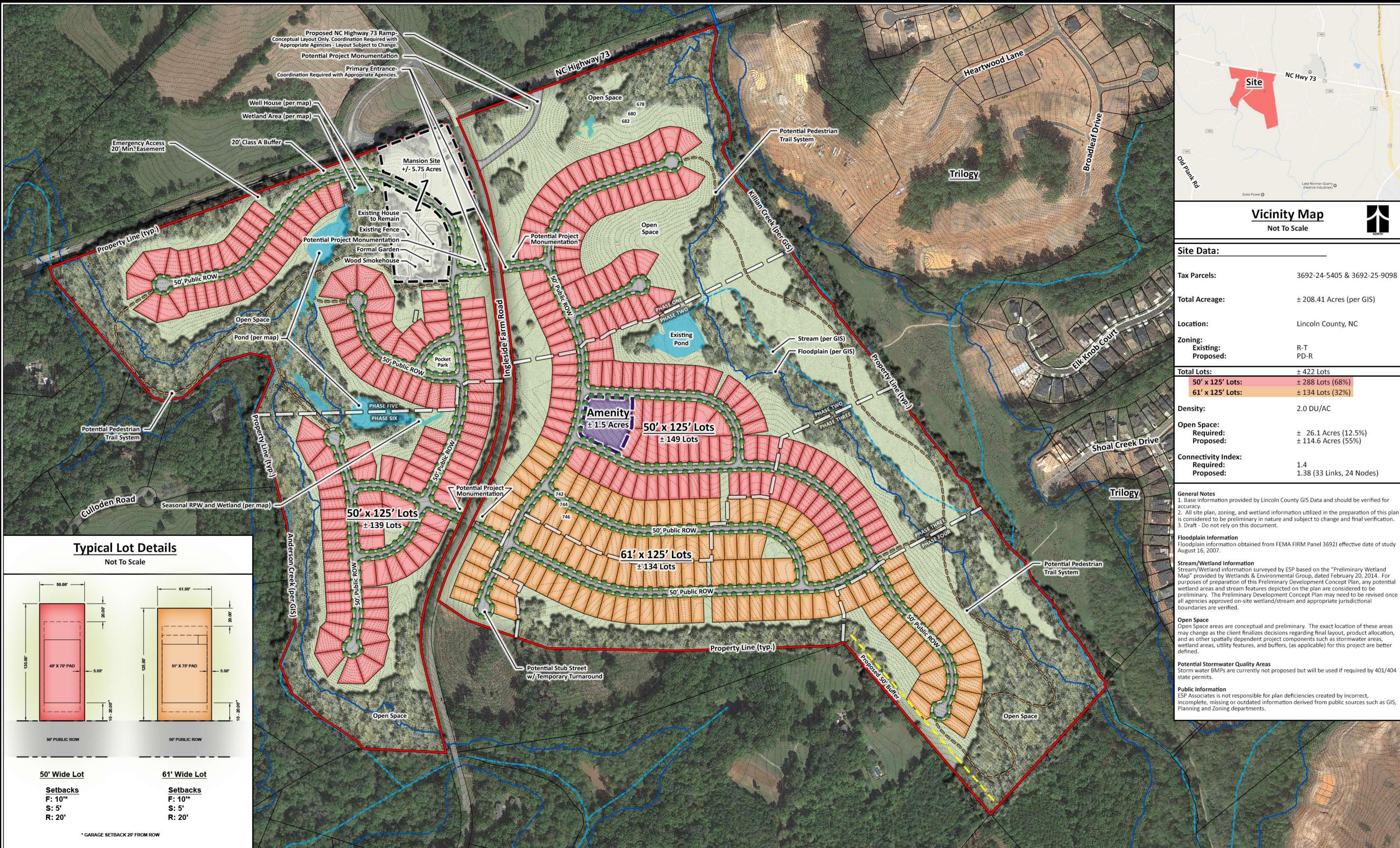
Walter said we have questions that we may not have answers to so I expect that we will want to have a follow up meeting; sometime in July so discuss items that we have no answers to. So you will be able to get answers to tonight's questions. This is not the end of the conversation.

- 6) Is the Traffic Study, wastewater and School Study complete? TS is complete and is in hands of LC and is available to anyone to view. The School and wastewater studies; there is an analysis that the county staff does and they are working on. Utilities – we have sewer capacity and it is a first come first serve process.
- 7) Several questions came up about the TIA- some requested the County to hire their own traffic study as no one could believe that we were not being required to widen 73 and questioned the legitimacy of the study and possibility of disputing the study. This discussion lasted quite a while. We would like to aggregate improvements into one improvement that is useful to

everyone. Anyone can call NCDOT to discuss parameters, the study, etc. Their office is in Lincolnton and the Division engineer is Tim Anderson.

- 8) If property was not rezoned, what is current zoning? RT - which is $\frac{3}{4}$ Acre lots. As long as we follow guidelines and rules, it can be rezoned. It is a technical and political process.
- 9) What is the process on the rezoning? Starts with us filing an application with the county (TIA, school assessment, etc.); County makes comments; we have community meeting like here tonight; we make it as good as we can make it; then it goes to public hearing with CC and Planning Board. Public Hearing and planning board meet on same night; then recommendations are made to CC and CC makes decision.
- 10) Traffic Study and roads came up again. Apparently is this the main issue with this project. They want an "Unbiased report" CC Oates – this is an exception to the plan, so we can deny an exception.
- 11) There are mobile classrooms at the elementary school and I don't think children should be taught in trailers. Commissioner Oates replied that the mobile classrooms are not being used for class they were left over and the school did not spend the money to remove.
- 12) What is the school impact with this development? C Oates responded- the school system loses 800 student per year for the last 8 years and there is a new charter school that will take another 500 students from our system. This is currently unexplained. Our school system growth is flat or reducing. This project will generate about 90 kids.
- 13) Have you looked into internet providers, etc. Will they bring broad band, etc. with this development? We have not control, it is a market driven by those utilities.
- 14) To C Oates- PB and CC either approve or do not approve rezoning, Correct? Oates explained the process. 5 person board and 1 vacancy.
- 15) What happens to DR Horton if this is not approved? BE- we would probably move on. We will not build on $\frac{3}{4}$ Ac. CM- people now want small lots and COS with walking trails, clubhouse, etc. They want a quality of living that allows for the space without having to maintain it.

Walter offered another meeting in July.



ESP Associates, P.A.
P.O. Box 7030 3475 Lakemont Blvd.
Charlotte, NC 28241 Fort Mill, SC 29708
NC - 704.583.4949 SC - 803.802.2440
www.espassociates.com



Ingleside Farm Site

Preliminary Development Concept Plan

SP Job # FM53.100

ember 2, 2017

GRAPHIC SCALE

200 0 100 200 400

1 INCH = 200 FT.

D·R·HORTON®
America's Builder

TRAFFIC IMPACT ANALYSIS

INGLESIDE FARM

Ingleside Farm Road (SR 1383), south of NC Hwy. 73
Lincoln County, North Carolina



for

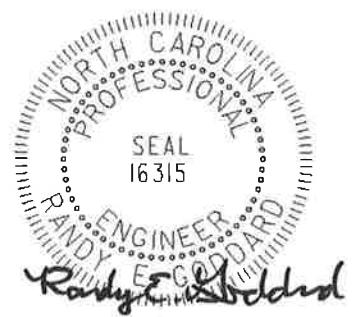
DR Horton

November 2017

681-001 (C-2165)



2459 Wilkinson Boulevard, Suite 200
Charlotte, NC 28208



REVISED TRANSPORTATION TECHNICAL MEMORANDUM

Date: November 1, 2017

To: Timothy W. Anderson, P.E.
District Engineer
NCDOT Division 12, District 3

From: Randy E. Goddard, P.E.
Managing Principal
Design Resource Group, PA (C-2165)

Subject: **Ingleside Farm Age Restricted Development Plan – NC 73 & Little Egypt Road (681-001)**

DISCUSSION

Background/Location:

DR Horton previously proposed a development plan for 422 single family homes with a portion considered "age-targeted" units in Lincoln County, NC. The site is located on the east and west sides of Ingleside Farm Road (SR 1383) (south of NC Hwy. 73) in Lincoln County, NC - with two accesses on each side of Ingleside Farm Road. The developer is now proposing an updated development plan, of which the buildout consists of 290 single family homes and 132 "age-restricted" detached homes. The purpose of this TTM is to evaluate the mitigation required at the intersection of NC 73 & Little Egypt Road from the "age-targeted" development studied in the Traffic Impact Analysis (TIA) in comparison to the proposed partially "age-restricted" development.

Per the North Carolina Department of Transportation's (NCDOT) request, Design Resource Group, PA (DRG) provides the following information pertaining to the location of the development, proposed site trip generation, and our mitigation recommendations for the critical intersection of NC 73 & Little Egypt Road with the proposed age-restricted residential component:

Trip Generation:

The AM and PM peak-hour-trip-generation data for the residential developments are presented in Table 1. The values for the trips generated by the residential land uses are obtained from the Institute of Transportation Engineers, Trip Generation Manual, 9th Edition, 2012.

Table 1: Trip Generation Comparison

Land Use [ITE Code]	Weekday Daily	AM Peak Hour			PM Peak Hour				
		Enter	Exit	Total	Enter	Exit	Total		
Age Targeted Development (April 2017 – DRAFT TIA)									
Single Family Homes [210]	422	DUs	3,950	76	229	305	242	142	384
Proposed Development with Age Restricted Units									
Single Family Homes [210]	290	DUs	2,797	53	160	213	173	101	274
Senior Detached Homes [251]	132	DUs	605	18	34	52	34	21	55
Total Trips		3,402		71		194		265	
Difference Between Age Targeted Development (TIA) & Proposed Development		-548		-5		-35		-40	
(TIA) & Proposed Development		-35		-20		-55			

References:

Trip Generation, 9th Edition, Institute of Transportation Engineers, Washington, DC. 2012.

The Age Targeted Development (April 2017- Draft TIA) is expected to generate 3,950 new two-way daily trips, 305 new trips in the AM peak hour and 384 new trips in the PM peak hour. The Proposed Development with the Age Restricted residential component is expected to generate 2,797 two-way daily trips, 265 trips in the AM peak hour and 329 trips in the PM peak hour. Therefore, when comparing the Age Targeted Development & the Proposed Development with Age Restricted homes, the Proposed Development generates 548 fewer daily trips, 40 fewer AM peak trips, and 55 fewer PM peak trips.

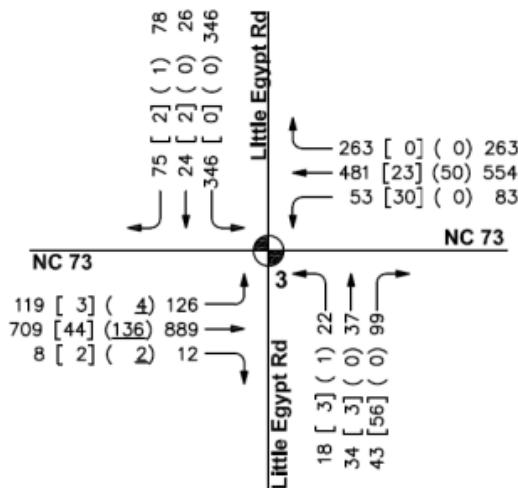
Traffic Analysis:

The directional distribution used for the site traffic trip assignment matches the previously approved Ingleside Farm TIA and is expected to be as follows for use in the revised analysis for the intersection of NC 73 & Little Egypt Road:

- Approximately 70% of the site traffic is expected to arrive/depart from the east via NC 73
- Approximately 2% of the site traffic is expected to arrive/depart from the north via Little Egypt Road
- Approximately 1% of the site traffic is expected to arrive/depart from the south via Little Egypt Road
- The remaining 27% of the site traffic does not traverse through the study intersection

The traffic volumes for both peak hours for the revised development are shown in the following figure and the results of the revised analyses with the age restricted units are presented in Table 2.

2022 REVISED BUILD AM PEAK
HOUR TRAFFIC VOLUMES



2022 REVISED BUILD PM PEAK
HOUR TRAFFIC VOLUMES

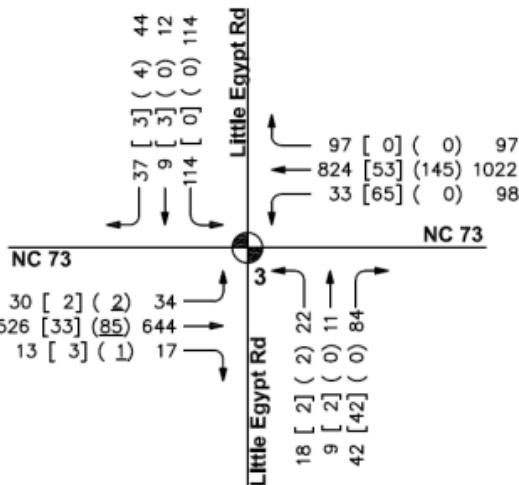


Table 2: NC 73 & Little Egypt Road Levels of Service

Intersection	Intersection/ Approach	AM Peak			PM Peak		
		Delay (sec/veh)	Capacity (v/c)	LOS	Delay (sec/veh)	Capacity (v/c)	LOS
2017 Existing Conditions (TIA)							
3. NC 73 & Little Egypt Rd.		50.7	1.11	D	19.1	0.83	B
2022 No Build w/Offsite (TIA)							
3. NC 73 & Little Egypt Rd.	<i>Intersection</i>	87.4	1.26	F	35.9	0.93	D
	Northbound	116.9	-	F	24.9	-	C
	Southbound	145.9	-	F	81.7	-	F
	Eastbound	75.4	-	E	27.2	-	C
	Westbound	48.7	-	D	30.0	-	C
2022 Build w/Offsite (TIA – Single Family & Age Targeted)							
3. NC 73 & Little Egypt Rd.	<i>Intersection</i>	109.6	1.29	F	48.0	1.06	D
	Northbound	122.3	-	F	26.3	-	C
	Southbound	145.7	-	F	104.8	-	F
	Eastbound	135.0	-	F	27.8	-	C
	Westbound	54.8	-	D	48.2	-	D
2022 Build w/Offsite (Revised - Single Family & Age Restricted)							
3. NC 73 & Little Egypt Rd.	<i>Intersection</i>	105.5	1.29	F	43.8	1.06	D
	Northbound	122.3	-	F	26.3	-	C
	Southbound	145.7	-	F	105.1	-	F
	Eastbound	124.3	-	F	27.3	-	C
	Westbound	54.4	-	D	40.2	-	D
2022 Build w/Offsite with Improvements (Revised - Single Family & Age Restricted)							
3. NC 73 & Little Egypt Rd. ¹	<i>Intersection</i>	63.7	1.05	E	33.7	0.93	C
	Northbound	86.7	-	F	26.3	-	C
	Southbound	89.9	-	F	78.0	-	E
	Eastbound	64.2	-	E	24.9	-	C
	Westbound	40.2	-	D	28.7	-	C

¹ Test imps. to calc. a LOS "E" or better for approaches (**NOT RECOMMENDED – FOR INFO. PURPOSES ONLY**) include a 2nd SB left turn lane on Little Egypt Rd. and a 2nd EB thru lane on NC 73 (with a 2nd EB receiving lane on NC 73)



As provided in Table 2 above, the minor reduction of trips caused by the trip generation reduction (single family to age restricted units) does not significantly affect the results of the analysis when compared to the original Ingleside Farm TIA.

The results indicate the impact of the “age-restricted” plan are the same with respect to the Level-of-Service (LOS) for the intersection and all approaches at NC 73 & Little Egypt Road. Only one approach per peak hour drops in LOS, which is the same as per the results of the original TIA.

CONCLUSION

As discussed previously, the reduced site traffic expected to be generated by the new single family with the age-restricted component is not significantly different than the results of the previous Ingleside Farm TIA (Draft – April 2017) at the NC 73 & Little Egypt Road Intersection; only one approach per peak hour exceeds the Lincoln County threshold for mitigation.

Please contact us should you need any additional information.

Attachments: Analysis Reports

cc:	Randy Hawkins	Lincoln County
	Stephen Pace	Pace Development Group
	David J. Hughes	DR Horton
	Walter Fields	Walter Fields Group, Inc.
	File	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑	↑		↑	↑	↑		↑	↑	↑	↑	
Traffic Volume (vph)	126	889	12	83	554	263	22	37	99	346	26	78
Future Volume (vph)	126	889	12	83	554	263	22	37	99	346	26	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	700		0	150		200	0		225	0		175
Storage Lanes	1		0	1		1	0		1	1		1
Taper Length (ft)	0			130			25			145		
Satd. Flow (prot)	1711	1797	0	1711	1801	1531	0	1779	1531	1711	1597	0
Flt Permitted	0.950			0.950				0.851		0.950		
Satd. Flow (perm)	1711	1797	0	1711	1801	1531	0	1532	1531	1711	1597	0
Right Turn on Red			No			No			No		No	
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		1647			3028			1008			1017	
Travel Time (s)		25.0			45.9			15.3			15.4	
Peak Hour Factor	0.50	0.90	0.90	0.90	0.90	0.50	0.90	0.50	0.90	0.50	0.50	0.50
Shared Lane Traffic (%)												
Lane Group Flow (vph)	252	1001	0	92	616	526	0	98	110	692	208	0
Turn Type	Prot	NA		Prot	NA	pm+ov	Perm	NA	Free	Prot	NA	
Protected Phases	5	2		1	6	7		8		7	4	
Permitted Phases					6	8			Free			
Detector Phase	5	2		1	6	7	8	8		7	4	
Switch Phase												
Minimum Initial (s)	7.0	12.0		7.0	12.0	7.0	7.0	7.0		7.0	7.0	
Minimum Split (s)	14.0	19.0		14.0	19.0	14.0	14.0	14.0		14.0	14.0	
Total Split (s)	32.0	89.0		14.0	71.0	63.0	14.0	14.0		63.0	77.0	
Total Split (%)	17.8%	49.4%		7.8%	39.4%	35.0%	7.8%	7.8%		35.0%	42.8%	
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	-2.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0		5.0	5.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lag	Lag		Lead		
Lead-Lag Optimize?												
Recall Mode	None	C-Min		None	C-Min	None	None	None	None	None	None	
Act Effct Green (s)	27.0	84.0		9.0	66.0	129.0		9.0	180.0	58.0	72.0	
Actuated g/C Ratio	0.15	0.47		0.05	0.37	0.72		0.05	1.00	0.32	0.40	
v/c Ratio	0.98	1.19		1.08	0.93	0.48		1.29	0.07	1.26	0.33	
Control Delay	94.8	131.8		187.7	67.6	15.5		259.5	0.1	177.7	39.1	
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay	94.8	131.8		187.7	67.6	15.5		259.5	0.1	177.7	39.1	
LOS	F	F		F	E	B		F	A	F	D	
Approach Delay		124.3			54.4			122.3			145.7	
Approach LOS		F			D			F			F	
Queue Length 50th (ft)	294	~1416		~119	586	258		~146	0	~1018	169	
Queue Length 95th (ft)	201	m#1494		#255	#942	150		#117	0	482	123	
Internal Link Dist (ft)		1567			2948			928			937	
Turn Bay Length (ft)	700			150		200			225			
Base Capacity (vph)	256	838		85	660	1097		76	1531	551	638	
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	
Reduced v/c Ratio	0.98	1.19		1.08	0.93	0.48		1.29	0.07	1.26	0.33	

Intersection Summary

Area Type: Other

Cycle Length: 180

Actuated Cycle Length: 180

Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green, Master Intersection

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.29

Intersection Signal Delay: 105.5

Intersection LOS: F

Intersection Capacity Utilization 91.7%

ICU Level of Service F

Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.

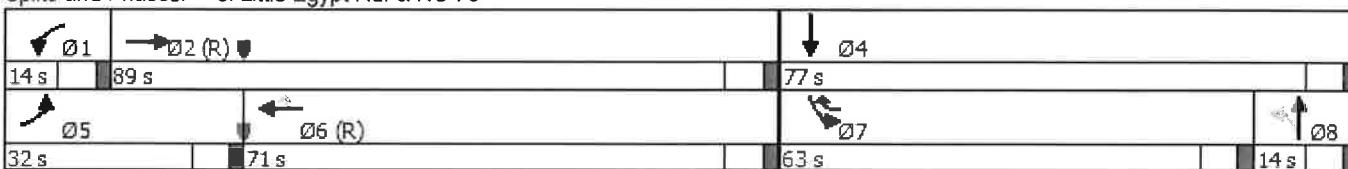
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: Little Egypt Rd. & NC 73



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Traffic Volume (vph)	34	644	17	98	1022	97	22	11	84	114	12	44
Future Volume (vph)	34	644	17	98	1022	97	22	11	84	114	12	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	700		0	150		200	0		225	0		175
Storage Lanes	1		0	1		1	0		1	1		1
Taper Length (ft)	0			130			25			145		
Satd. Flow (prot)	1711	1793	0	1711	1801	1531	0	1756	1531	1711	1588	0
Flt Permitted	0.950			0.950				0.777		0.950		
Satd. Flow (perm)	1711	1793	0	1711	1801	1531	0	1399	1531	1711	1588	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		1647			3028			1008			1017	
Travel Time (s)		25.0			45.9			15.3			15.4	
Peak Hour Factor	0.50	0.90	0.90	0.90	0.90	0.50	0.90	0.50	0.90	0.50	0.50	0.50
Shared Lane Traffic (%)												
Lane Group Flow (vph)	68	735	0	109	1136	194	0	46	93	228	112	0
Turn Type	Prot	NA		Prot	NA	pm+ov	Perm	NA	Free	Prot	NA	
Protected Phases	5	2		1	6	7		8		7	4	
Permitted Phases					6	8		Free				
Detector Phase	5	2		1	6	7	8	8		7	4	
Switch Phase												
Minimum Initial (s)	7.0	12.0		7.0	12.0	7.0	7.0	7.0		7.0	7.0	
Minimum Split (s)	14.0	19.0		14.0	19.0	14.0	14.0	14.0		14.0	14.0	
Total Split (s)	14.0	79.0		20.0	85.0	22.0	14.0	14.0		22.0	36.0	
Total Split (%)	10.4%	58.5%		14.8%	63.0%	16.3%	10.4%	10.4%		16.3%	26.7%	
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	-2.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0		5.0		5.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lag	Lag		Lead		
Lead-Lag Optimize?												
Recall Mode	None	C-Min		None	C-Min	None	None	None	None	None	None	
Act Effct Green (s)	9.0	78.0		13.8	85.6	108.6		9.0	135.0	17.0	28.2	
Actuated g/C Ratio	0.07	0.58		0.10	0.63	0.80		0.07	1.00	0.13	0.21	
v/c Ratio	0.60	0.71		0.62	0.99	0.16		0.49	0.06	1.06	0.34	
Control Delay	82.0	22.3		80.9	42.7	2.8		79.3	0.1	133.5	47.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay	82.0	22.3		80.9	42.7	2.8		79.3	0.1	133.5	47.4	
LOS	F	C		F	D	A		E	A	F	D	
Approach Delay		27.3			40.2			26.3			105.1	
Approach LOS		C			D			C			F	
Queue Length 50th (ft)	59	338		93	~1092	37		40	0	~219	82	
Queue Length 95th (ft)	60	403		160	#1357	8		45	0	155	73	
Internal Link Dist (ft)		1567			2948			928			937	
Turn Bay Length (ft)	700			150		200			225			
Base Capacity (vph)	114	1035		190	1142	1231		93	1531	215	364	
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	
Reduced v/c Ratio	0.60	0.71		0.57	0.99	0.16		0.49	0.06	1.06	0.31	

Intersection Summary

Area Type: Other

Cycle Length: 135

Actuated Cycle Length: 135

Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green, Master Intersection

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.06

Intersection Signal Delay: 43.8

Intersection LOS: D

Intersection Capacity Utilization 85.1%

ICU Level of Service E

Analysis Period (min) 15

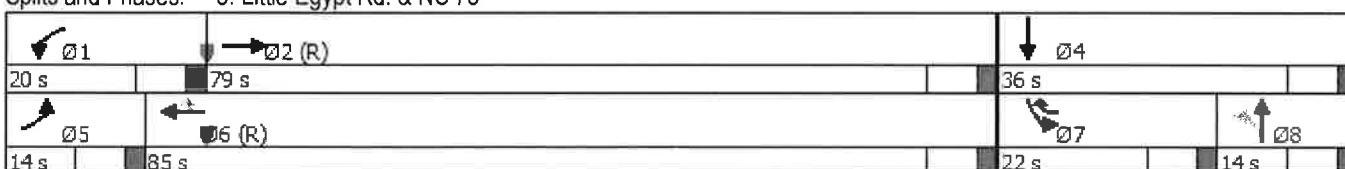
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3: Little Egypt Rd. & NC 73



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	126	889	12	83	554	263	22	37	99	346	26	78
Future Volume (vph)	126	889	12	83	554	263	22	37	99	346	26	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	700		0	150		200	0		225	500		175
Storage Lanes	1		0	1		1	0		1	1		1
Taper Length (ft)	0			130			25			145		
Satd. Flow (prot)	1711	1797	0	1711	1801	1531	0	1779	1531	3319	1597	0
Flt Permitted	0.950			0.950				0.851		0.950		
Satd. Flow (perm)	1711	1797	0	1711	1801	1531	0	1532	1531	3319	1597	0
Right Turn on Red			No			No		No			No	
Satd. Flow (RTOR)												
Link Speed (mph)		45				45			45		45	
Link Distance (ft)		1647				3028			1008		1017	
Travel Time (s)		25.0				45.9			15.3		15.4	
Peak Hour Factor	0.50	0.90	0.90	0.90	0.90	0.50	0.90	0.50	0.90	0.50	0.50	0.50
Shared Lane Traffic (%)												
Lane Group Flow (vph)	252	1001	0	92	616	526	0	98	110	692	208	0
Turn Type	Prot	NA		Prot	NA	pm+ov	Perm	NA	Free	Prot	NA	
Protected Phases	5	2		1	6	7		8		7	4	
Permitted Phases						6	8		Free			
Detector Phase	5	2		1	6	7	8	8		7	4	
Switch Phase												
Minimum Initial (s)	7.0	12.0		7.0	12.0	7.0	7.0	7.0		7.0	7.0	
Minimum Split (s)	14.0	19.0		14.0	19.0	14.0	14.0	14.0		14.0	14.0	
Total Split (s)	37.0	106.0		15.0	84.0	43.0	16.0	16.0		43.0	59.0	
Total Split (%)	20.6%	58.9%		8.3%	46.7%	23.9%	8.9%	8.9%		23.9%	32.8%	
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		-2.0	-2.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lag	Lag		Lead		
Lead-Lag Optimize?												
Recall Mode	None	C-Min		None	C-Min	None	None	None		None	None	
Act Effct Green (s)	30.4	101.0		10.0	80.6	123.6		11.0	180.0	38.0	54.0	
Actuated g/C Ratio	0.17	0.56		0.06	0.45	0.69		0.06	1.00	0.21	0.30	
v/c Ratio	0.87	0.99		0.97	0.76	0.50		1.05	0.07	0.99	0.43	
Control Delay	92.5	57.1		163.1	40.6	18.3		183.9	0.1	100.7	54.2	
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay	92.5	57.1		163.1	40.6	18.3		183.9	0.1	100.7	54.2	
LOS	F	E		F	D	B		F	A	F	D	
Approach Delay		64.2			40.2			86.7			89.9	
Approach LOS		E			D			F			F	
Queue Length 50th (ft)	302	1186		105	488	320		~125	0	425	199	
Queue Length 95th (ft)	195	#1491		#242	668	158		103	0	248	145	
Internal Link Dist (ft)		1567			2948			928			937	
Turn Bay Length (ft)	700			150		200			225		500	
Base Capacity (vph)	304	1008		95	806	1051		93	1531	700	479	
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	
Reduced v/c Ratio	0.83	0.99		0.97	0.76	0.50		1.05	0.07	0.99	0.43	

Intersection Summary

Area Type: Other

Cycle Length: 180

Actuated Cycle Length: 180

Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green, Master Intersection

Natural Cycle: 150

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.05

Intersection Signal Delay: 63.7

Intersection LOS: E

Intersection Capacity Utilization 82.4%

ICU Level of Service E

Analysis Period (min) 15

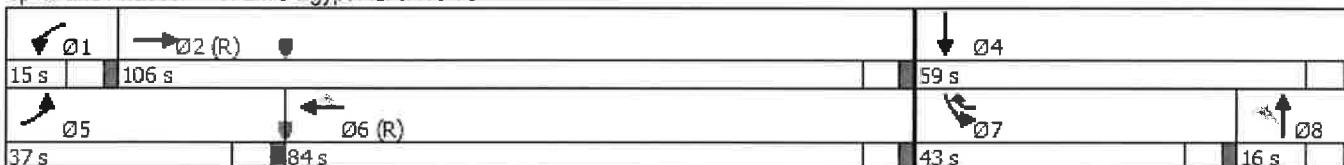
~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3: Little Egypt Rd. & NC 73



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	644	17	98	1022	97	22	11	84	114	12	44
Future Volume (vph)	34	644	17	98	1022	97	22	11	84	114	12	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	700		0	150		200	0		225	500		175
Storage Lanes	1		0	1		1	0		1	1		1
Taper Length (ft)	0			130			25			145		
Satd. Flow (prot)	1711	1793	0	1711	1801	1531	0	1756	1531	3319	1588	0
Flt Permitted	0.950			0.950				0.777		0.950		
Satd. Flow (perm)	1711	1793	0	1711	1801	1531	0	1399	1531	3319	1588	0
Right Turn on Red			No			No			No		No	
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			45			45	
Link Distance (ft)		1647			3028			1008			1017	
Travel Time (s)		25.0			45.9			15.3			15.4	
Peak Hour Factor	0.50	0.90	0.90	0.90	0.90	0.50	0.90	0.50	0.90	0.50	0.50	0.50
Shared Lane Traffic (%)												
Lane Group Flow (vph)	68	735	0	109	1136	194	0	46	93	228	112	0
Turn Type	Prot	NA		Prot	NA	pm+ov	Perm	NA	Free	Prot	NA	
Protected Phases	5	2		1	6	7		8		7	4	
Permitted Phases					6	8		Free				
Detector Phase	5	2		1	6	7	8	8		7	4	
Switch Phase												
Minimum Initial (s)	7.0	12.0		7.0	12.0	7.0	7.0	7.0		7.0	7.0	
Minimum Split (s)	14.0	19.0		14.0	19.0	14.0	14.0	14.0		14.0	14.0	
Total Split (s)	14.0	85.0		21.0	92.0	15.0	14.0	14.0		15.0	29.0	
Total Split (%)	10.4%	63.0%		15.6%	68.1%	11.1%	10.4%	10.4%		11.1%	21.5%	
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	-2.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0		5.0		5.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag	Lead	Lag	Lag		Lead		
Lead-Lag Optimize?												
Recall Mode	None	C-Min		None	C-Min	None	None	None	None	None	None	
Act Effct Green (s)	9.0	83.5		14.4	91.7	108.6		9.0	135.0	10.9	22.1	
Actuated g/C Ratio	0.07	0.62		0.11	0.68	0.80		0.07	1.00	0.08	0.16	
v/c Ratio	0.60	0.66		0.60	0.93	0.16		0.49	0.06	0.85	0.43	
Control Delay	84.4	19.4		76.1	28.6	3.1		79.3	0.1	89.1	55.6	
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay	84.4	19.4		76.1	28.6	3.1		79.3	0.1	89.1	55.6	
LOS	F	B		E	C	A		E	A	F	E	
Approach Delay		24.9			28.7			26.3			78.0	
Approach LOS		C			C			C			E	
Queue Length 50th (ft)	60	310		88	1009	48		40	0	104	88	
Queue Length 95th (ft)	60	370		160	#1289	8		45	0	79	79	
Internal Link Dist (ft)		1567			2948			928			937	
Turn Bay Length (ft)	700			150		200			225	500		
Base Capacity (vph)	114	1109		202	1223	1231		93	1531	267	282	
Starvation Cap Reductn	0	0		0	0	0		0	0	0	0	



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn	0	0		0	0	0		0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0		0	0	0	0	0
Reduced v/c Ratio	0.60	0.66		0.54	0.93	0.16		0.49	0.06	0.85	0.40	

Intersection Summary

Area Type: Other

Cycle Length: 135

Actuated Cycle Length: 135

Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBT, Start of Green, Master Intersection

Natural Cycle: 120

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.93

Intersection Signal Delay: 33.7

Intersection LOS: C

Intersection Capacity Utilization 82.0%

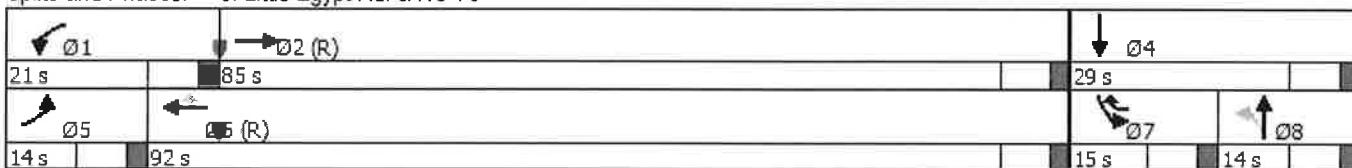
ICU Level of Service E

Analysis Period (min) 15

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Splits and Phases: 3: Little Egypt Rd. & NC 73





ESP Associates, P.A.
P.O. Box 7030 3475 Lakemont Blvd.
Charlotte, NC 28241 Fort Mill, SC 29708
NC - 704-583-4949 SC - 803-802-2440
www.espassociates.com

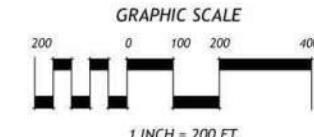


Ingleside Farm Site

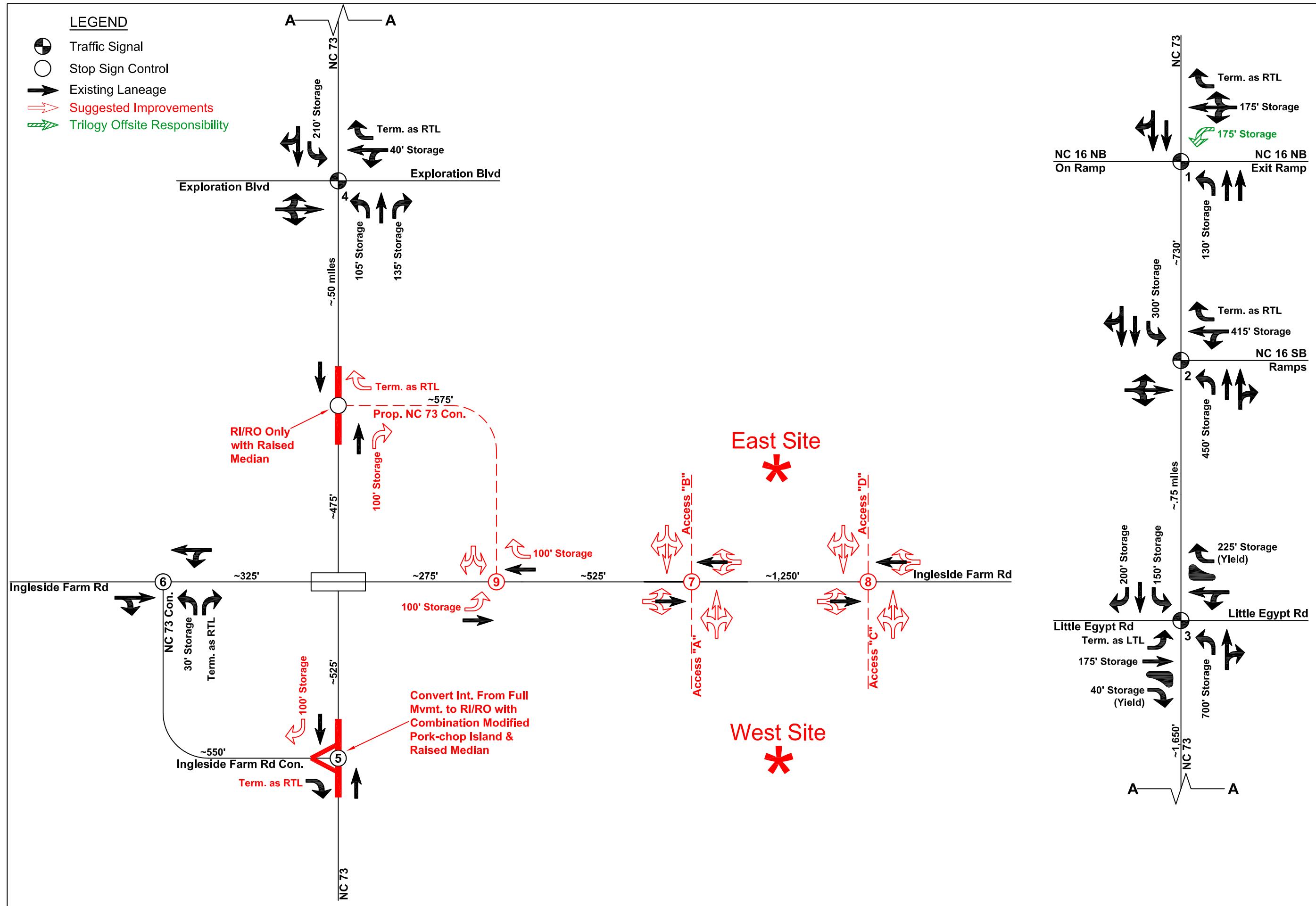
Preliminary Development Concept Plan

ESP Job # FM53.100

October 19, 2017



D.R. HORTON®
America's Builder
8001 Arrowridge Blvd. Charlotte, NC 28273



LANDSCAPE ARCHITECTURE
CIVIL ENGINEERING
TRANSPORTATION PLANNING

2459 Wilkinson Blvd, Ste 200 Charlotte, NC 28208
704.343.0608
www.drgrp.com

DR HORTON
8001 ARROWWOOD BLVD
CHARLOTTE, NC 28273
704-787-5622

INGLESIDE FARM TIA
LINCOLN COUNTY, NC

LINCOLN COUNTY, NC

SUGGESTED LITERATURE

NTS

PROJECT #: 681-001
DRAWN BY: MWW

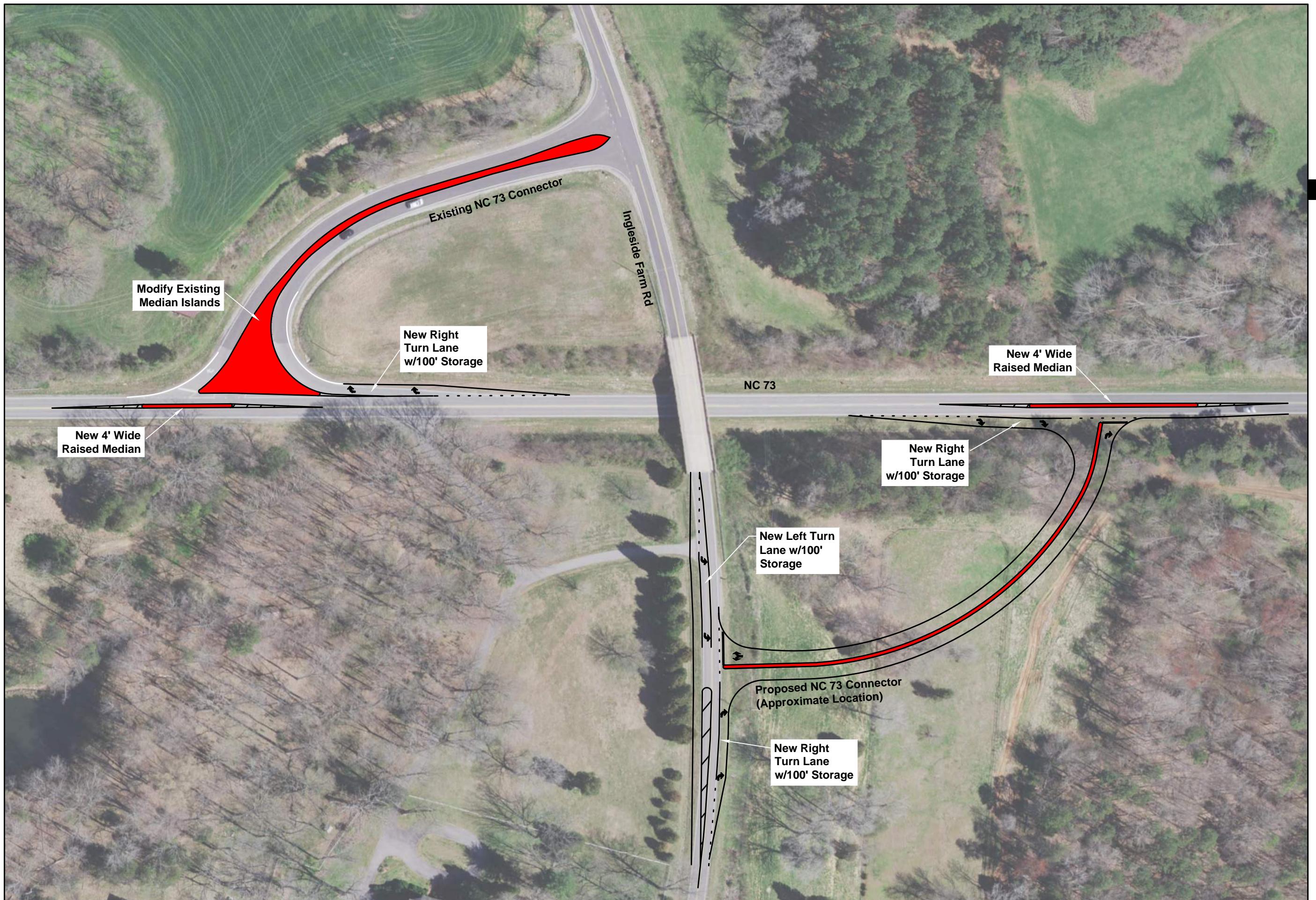
NOVEMBER 2017

EDITIONS:

ANSWER

Exhibit 1

INGLESIDE FARM TIA



SUGGESTED CONCEPTUAL IMPROVEMENTS

0 50 100 N
 SCALE: 1" = 100'

PROJECT #: 681-001
 DRAWN BY: MWW
 CHECKED BY: REG

NOVEMBER 2017

REVISIONS:



TABLE OF CONTENTS

EXECUTIVE SUMMARY	1
PROPOSED DEVELOPMENT	4
AREA CONDITIONS	7
PROJECTED TRAFFIC	10
TRAFFIC ANALYSIS	18
CONCLUSIONS	35
APPENDIX	36

LIST OF TABLES

TABLE 1: AVERAGE ANNUAL DAILY TRAFFIC VOLUMES (VEH. PER DAY)	8
TABLE 2: SITE TRIP GENERATION	10
TABLE 3: OFFSITE TRIP GENERATION	10
TABLE 4: LEVELS OF SERVICE	20
TABLE 5: 2022 VEHICLE QUEUE LENGTHS	23
TABLE 6: 2022 BUILD LOS TO MAINTAIN 2017 EXISTING CONDITIONS ANALYSIS RESULTS (NCDOT CONGESTION MANAGEMENT)	29
TABLE 7: 2032 NO BUILD TO 2032 BUILD LOS COMPARISON (LINCOLN COUNTY)	30

LIST OF FIGURES

FIGURE 1: AREA OF INFLUENCE	5
PRELIMINARY DEVELOPMENT CONCEPT PLAN	6
FIGURE 2: 2017 EXISTING PEAK HOUR TRAFFIC VOLUMES	9
FIGURE 3: SITE DIRECTIONAL DISTRIBUTION	11
FIGURE 4: 2022 AM PEAK NO BUILD TRAFFIC VOLUMES	12
FIGURE 5: 2022 PM PEAK NO BUILD TRAFFIC VOLUMES	13
FIGURE 6: 2022 AM PEAK BUILD TRAFFIC VOLUMES	14
FIGURE 7: 2022 PM PEAK BUILD TRAFFIC VOLUMES	15
FIGURE 8: 2022 + 10 AM/PM PEAK NO BUILD TRAFFIC VOLUMES	16
FIGURE 9: 2022 + 10 AM/PM PEAK BUILD TRAFFIC VOLUMES	17
FIGURE 10: EXISTING LANEAGE	32
FIGURE 11: SUGGESTED IMPROVEMENTS	33
FIGURE 12: SUGGESTED CONCEPTUAL IMPROVEMENTS	34

EXECUTIVE SUMMARY

DR Horton intends to construct 422 single family homes on the east and west sides of Ingleside Farm Road (SR 1383) (south of NC Hwy. 73) in Lincoln County, NC. The site is expected to be fully developed in 2022.

This report provides an analysis of the traffic operations within the area of influence, according to the standards set by the North Carolina Department of Transportation's (NCDOT) "Policy on Street and Driveway Access to North Carolina Highways, Chapter 4 Part C" and Lincoln County's UDO Section 9.8 for TIAs. It provides recommended access management for the site and intersection improvements needed for mitigating traffic impacts. This study evaluates the following scenarios:

- 2017 AM & PM Peak existing traffic conditions
- 2022 AM & PM Peak No Build
- 2022 AM & PM Peak Build
- 2022 AM & PM Peak Build comparison to 2017 Existing Conditions (NCDOT Congestion Management)
- 2022+10 (2032) AM & PM Peak Build comparison to 2032 No Build (Lincoln County UDO)

The area of influence of the study site includes the following six existing intersections and two proposed intersections:

1. NC Hwy. 73 & NC 16 Northbound Ramps (signalized)
2. NC Hwy. 73 & NC 16 Southbound Ramps (signalized)
3. NC Hwy. 73 & Little Egypt Road (SR 1386) (signalized)
4. NC Hwy. 73 & Exploration Boulevard (signalized)
5. NC Hwy. 73 & Ingleside Farm Road Connector (unsignalized)
6. Ingleside Farm Road (SR 1383) & NC Hwy. 73 Connector (unsignalized)
7. Ingleside Farm Road (SR 1383) & Proposed Accesses "A" & "B" (unsignalized)
8. Ingleside Farm Road (SR 1383) & Proposed Accesses "C" & "D" (unsignalized)

The Ingleside Farm project will include a new connector roadway on the southeast quadrant of NC 73 and Ingleside Farm Road (Proposed NC 73 Connector) as requested by NCDOT and Lincoln County. This new road will be full movement at Ingleside Farm Road and a right-in/right-out (RI/RO) only configuration at NC 73. In addition, the existing Ingleside Farm Road Connector on the northwest quadrant of this "intersection" will be modified to RI/RO only at NC 73. We recommend right turn lanes on NC 73 at both connector roadways as well as on Ingleside Farm Road at the new Proposed NC 73 Connector (with 100 feet of storage each).

Access to the development is expected to occur via four full movement four-legged unsignalized locations on Ingleside Farm Road:



Ingleside Farm Road Facing South Along Site

- Proposed Accesses “A” & “B” – located approximately 800 feet south of the existing bridge deck over NC Hwy. 73.
- Proposed Accesses “C” & “D” – located approximately 1,250 feet south of Proposed Accesses “A” & “B”.

The trip generation results indicate that the development is expected to generate 305 AM peak hour trips and 384 PM peak hour trips.

One nearby approved (offsite) development was included in the 2022 analyses:

- Trilogy – 1,080 senior adult detached housing units (left to be built) located on the south side of NC Hwy. 73 opposite the E. Lincoln High School (immediately east of the proposed Ingleside Farms development). The remaining site is expected to generate 214 AM peak hour trips and 267 PM peak hour trips.

Currently, the four signalized intersections along the NC 73 corridor operate with a LOS “D” or better in both peak hours. The unsignalized intersection of NC 73 & Ingleside Farm Road Connector operates with a LOS “F” in the AM peak hour and a LOS “E” in the PM peak hour; the unsignalized intersection of Ingleside Farm Road & NC 73 Connector operates with a LOS “A” in both peak hours. Typically, an intersection is said to be operating at capacity at a volume-to-capacity (v/c) ratio of 1.00 and acceptable at a LOS “D” or better.

With the results of our analyses (specifics are described in the Traffic Analysis section of this report) we suggest the following improvements/modifications at the study intersections and proposed accesses:

2022 Build Scenario Suggested Recommendations:

1. NC 73 & NC 16 Northbound Ramps (signalized)

- Construct a northbound left turn lane on the NC 16 Northbound Exit Ramp with 175 feet of storage and an appropriate bay taper. This is an identified and yet to be constructed improvement by the Trilogy offsite project and should not be the responsibility of the Ingleside Farm developer.

5. NC 73 & Ingleside Farm Road Connector (unsignalized – converted to RI/RO only)

With the conversion of this existing intersection from full movement to RI/RO only we suggest the following recommendations:

- Construct a westbound right turn lane on NC 73 with 100 feet of storage and an appropriate bay taper.
- Remove the existing southbound left turn lane on Ingleside Farm Road Connector and modify the existing travel lane to terminate as a right turn lane.

- Install a combination modified “pork-chop” island and four-foot wide median on NC 73 a minimum of 50-feet west beyond the connector roadway limits in order to eliminate eastbound left turn movements from NC 73 and southbound left turn movements from Ingleside Farm Road Connector.

7. Ingleside Farm Road & Proposed Accesses “A” & “B” (unsignalized)

We suggest the following intersection configuration:

- Construct Proposed Accesses “A” & “B” with one ingress lane and one egress lane each.
- We do not recommend left or right turn lanes on Ingleside Farm Road at the accesses based on the average daily traffic (ADT) of Ingleside Farm Road in the vicinity of the site (less than 2,000 vehicles per day [vpd])

8. Ingleside Farm Road & Proposed Accesses “C” & “D” (unsignalized)

We suggest the following intersection configuration:

- Construct Proposed Accesses “C” & “D” with one ingress lane and one egress lane each.
- We do not recommend left or right turn lanes on Ingleside Farm Road at the accesses based on the ADT of Ingleside Farm Road in the vicinity of the site (less than 2,000 vpd)

9. Ingleside Farm Road & Proposed NC 73 Connector (unsignalized)

We suggest the following intersection configuration:

- Construct a northbound right turn lane on Ingleside Farm Road with 100 feet of storage
- Construct the NC 73 Connector with one eastbound lane and one westbound lane; no separate left and right turn lanes should be necessary.

NC 73 & Proposed Ingleside Farm Road Connector (unsignalized RI/RO only)

We suggest the following RI/RO intersection configuration:

- Construct an eastbound right turn lane on NC 73 with 100 feet of storage and an appropriate bay taper.
- Construct Proposed Ingleside Farm Road Connector with one southbound lane and one northbound lane on Proposed Ingleside Farm Road Connector that terminates as a right turn lane at NC 73.
- Install a four-foot wide median on NC 73 a minimum of 50-feet beyond the connector roadway limits in order to eliminate westbound left turn movements from NC 73 and northbound left turn movements from the Proposed Ingleside Farm Road Connector.

The proposed Ingleside Farm residential subdivision is not expected to create extensive roadway/intersection issues, especially with the implementation of the recommended roadway improvements and new Ingleside Farm Road Connector to mitigate the estimated number of trips expected to be generated by this development.

PROPOSED DEVELOPMENT

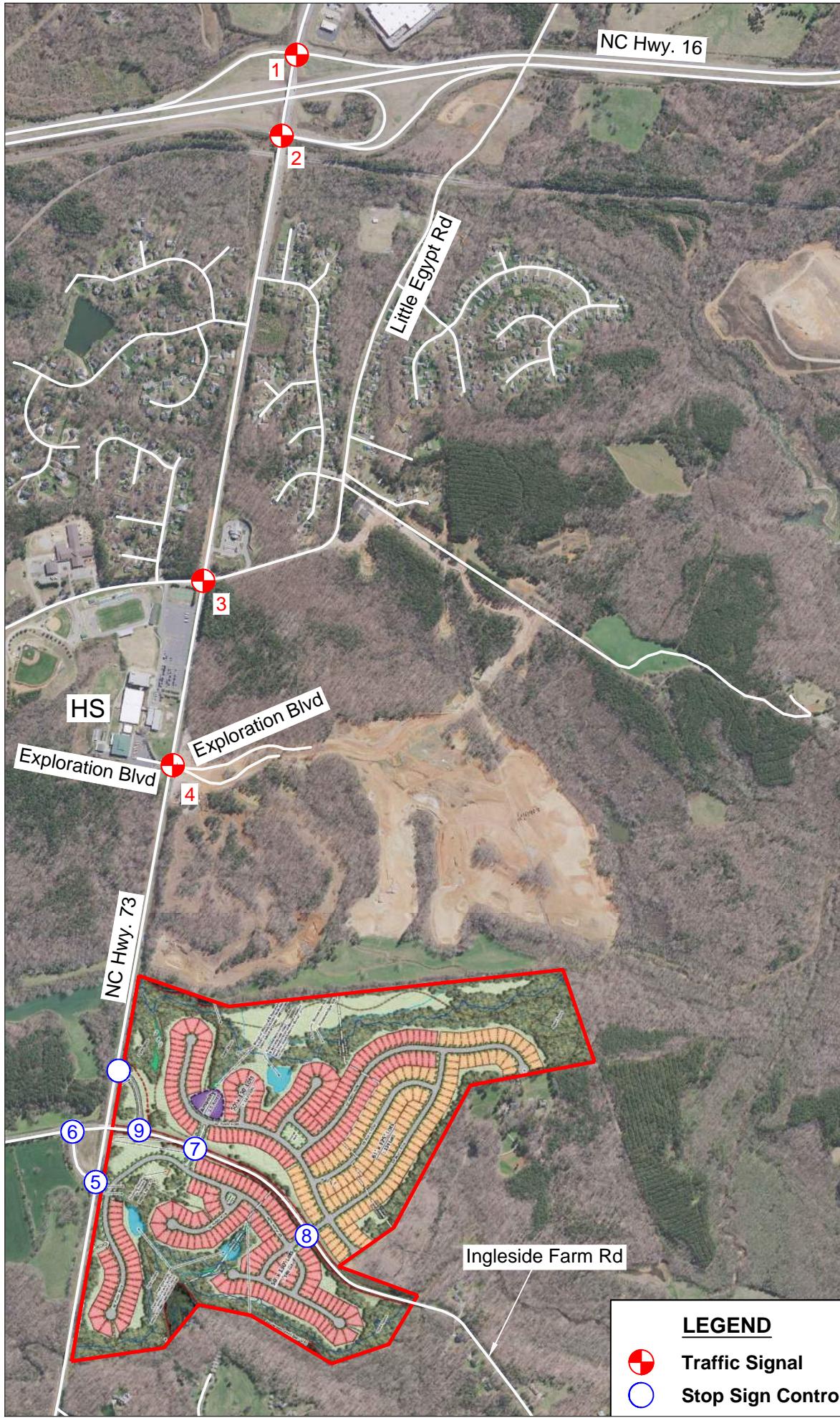
DR Horton intends to construct 422 single family homes on the east and west sides of Ingleside Farm Road (SR 1383) (south of NC Hwy. 73) in Lincoln County, NC. The site is expected to be fully developed in 2022 (see Figure 1).

Access to the development is expected to occur via four full movement unsignalized locations on Ingleside Farm Road (see Preliminary Development Concept Plan):

- Proposed Accesses “A” & “B” – located approximately 800 feet south of the existing bridge deck over NC Hwy. 73.
- Proposed Accesses “C” & “D” – located approximately 1,250 feet south of Proposed Accesses “A” & “B”.



Ingleside Farm Road Facing North Along Site



INGLESIDE FARM TIA

LINCOLN COUNTY, NC

DR HORTON
8001 ARROWOOD BLVD
CHARLOTTE, NC 28273
704-787-5622

AREA of INFLUENCE MAP

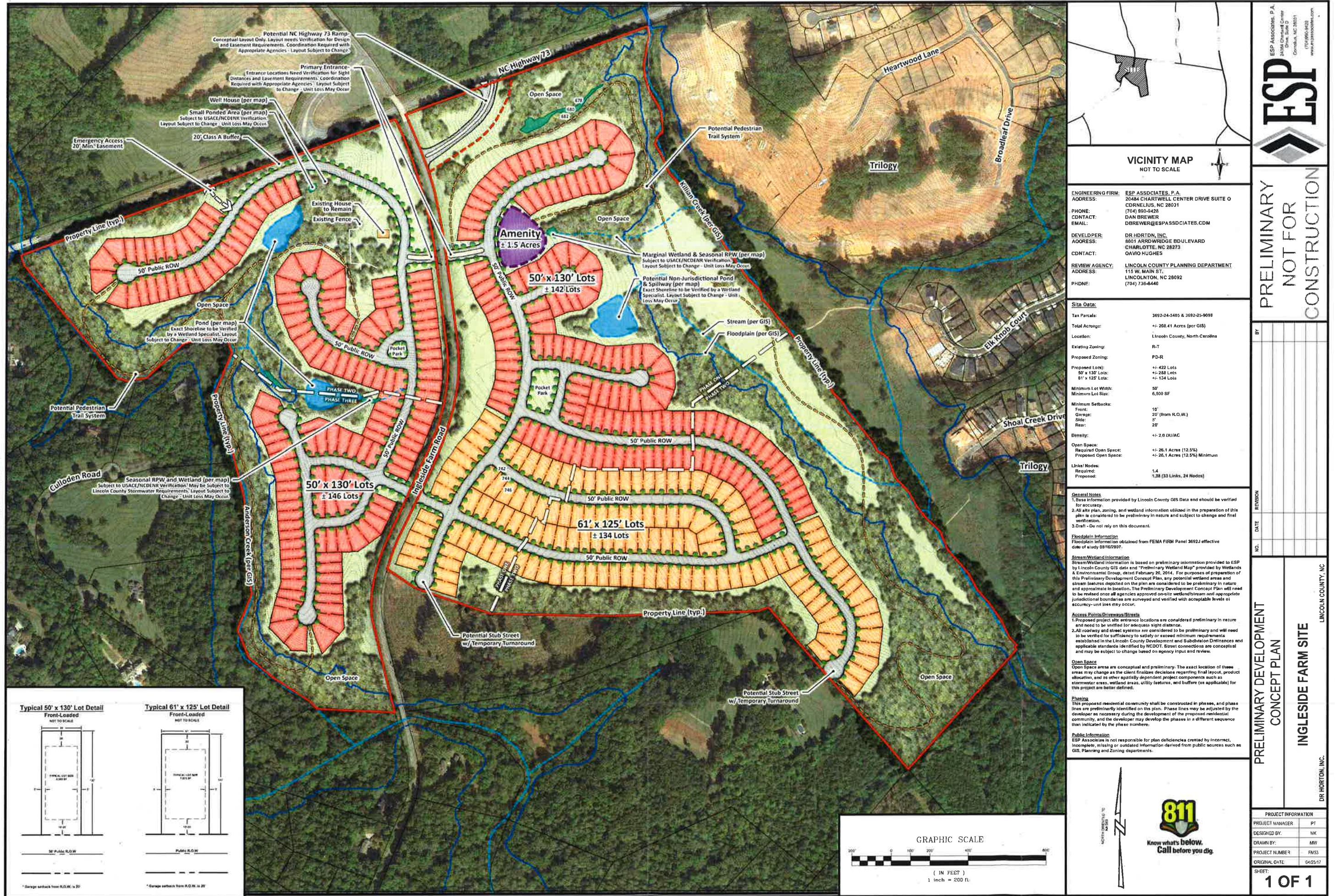
0 600 1,200

SCALE: 1"=1,200'

PROJECT #: 681-001
DRAWN BY: MWV
CHECKED BY: REG

APRIL 2017

REVISIONS:



AREA CONDITIONS

The area of influence of the study site includes the following six existing intersections and two proposed intersections:

1. NC Hwy. 73 & NC 16 Northbound Ramps (signalized)
2. NC Hwy. 73 & NC 16 Southbound Ramps (signalized)
3. NC Hwy. 73 & Little Egypt Road (SR 1386) (signalized)
4. NC Hwy. 73 & Exploration Boulevard (signalized)
5. NC Hwy. 73 & Ingleside Farm Road Connector (unsignalized)
6. Ingleside Farm Road (SR 1383) & NC Hwy. 73 Connector (unsignalized)
7. Ingleside Farm Road (SR 1383) & Proposed Accesses "A" & "B" (unsignalized)
8. Ingleside Farm Road (SR 1383) & Proposed Accesses "C" & "D" (unsignalized)



Ingleside Farm Road Facing North Toward NC 73



NC 73 Facing East Near Proposed Connector

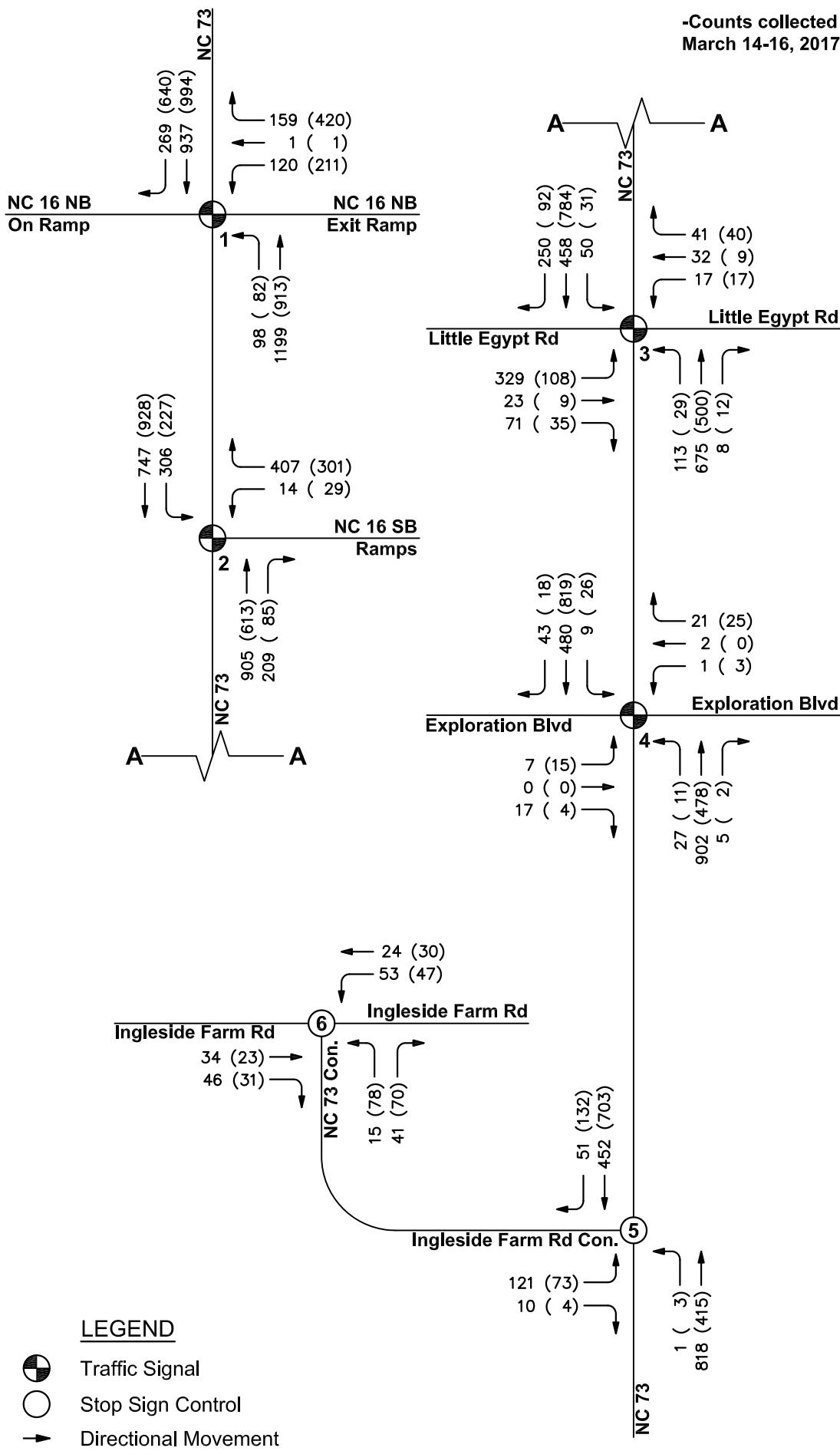
According to NCDOT's Roadway Functional Classification information, Ingleside Farm Road (SR 1383) is a local roadway with a posted speed limit of 45 mph. Ingleside Farm Road is a two-way roadway two lanes wide and is rural in nature. The roadway has no curb/gutter, bike lanes, planting strips, or sidewalk. Sight distance on Ingleside Farm Road is adequate at Proposed Accesses "A" thru "D", meeting or exceeding normal NCDOT requirements for a 45-mph posted roadway (50 mph design speed = 500 feet of sight distance).

Morning (7-9 AM) and afternoon (4-6 PM) peak period turning movement counts were conducted at the six existing intersections between Tuesday March 14 and Thursday March 16, 2017 (while school was in session). Figure 2 shows the 2017 existing traffic volumes for the AM and PM peak hours. It should be noted that the volumes were not balanced between study intersections due to existing school and subdivision accesses/streets located between study intersections (primarily between intersections 2 and 5).

In addition to the intersection turning movement counts, NCDOT is the source for average annual two-way daily traffic (AADT) volumes within the area of influence. The AADT volumes are depicted in Table 1.

Table 1: Average Annual Daily Traffic Volumes (veh. per day)

Roadway	AADT (Year)
NC 73 east of Ingleside Farm Rd.	11,000 (2015)
Ingleside Farm Rd. north of NC 73	1,500 (2015)
NC 73 east of NC 16	26,000 (2015)
Little Egypt Rd. north of NC 73	3,400 (2014)



INGLESIDE FARM TIA

LINCOLN COUNTY, NC

DR HORTON
8001 ARROWOOD BLVD
CHARLOTTE, NC 28273
704-787-5622

2017 EXISTING PEAK HOUR TRAFFIC VOLUMES

0 NTS
SCALE: NTS

PROJECT #: 681-001
DRAWN BY: MWB
CHECKED BY: REG

APRIL 2017

REVISIONS:

Figure 2

PROJECTED TRAFFIC

The projected background peak hour traffic volumes used in the analyses were developed from the existing (year 2017) peak-hour-turning-movement-count data. The existing intersection turning-movement volumes were increased using a 1 percent per year growth rate for the area to obtain 2022 and 2032 background volumes (which was approved by NCDOT and Lincoln County). The projected traffic volumes used in the horizon year 2022 and 2032 analyses are a compilation of three values: background traffic, offsite trip generation, and site trip generation.

The daily and peak-hour-trip-generation data for the development is presented in Table 2. The trips generated by the site are obtained from the Institute of Transportation Engineers, Trip Generation Manual, 9th Edition, 2012.

Table 2: Site Trip Generation

Land Use [ITE Code 210]	Weekday Daily	AM Peak Hour			PM Peak Hour			
		Enter	Exit	Total	Enter	Exit	Total	
Single Family Homes	422 DUs	3,950	76	229	305	242	142	384

Reference: Trip Generation, 9th Edition, Institute of Transportation Engineers, Washington, DC. 2012.

The trip generation results indicate that the development is expected to generate 305 AM peak hour trips and 384 PM peak hour trips.

One nearby approved (offsite) development was included in the 2022 analyses (see Table 3):

- Trilogy – 1,080 senior adult detached housing units (left to be built) located on the south side of NC Hwy. 73 opposite the E. Lincoln High School (immediately east of the proposed Ingleside Farms development). The remaining site is expected to generate 214 AM peak hour trips and 267 PM peak hour trips.

Table 3: Offsite Trip Generation

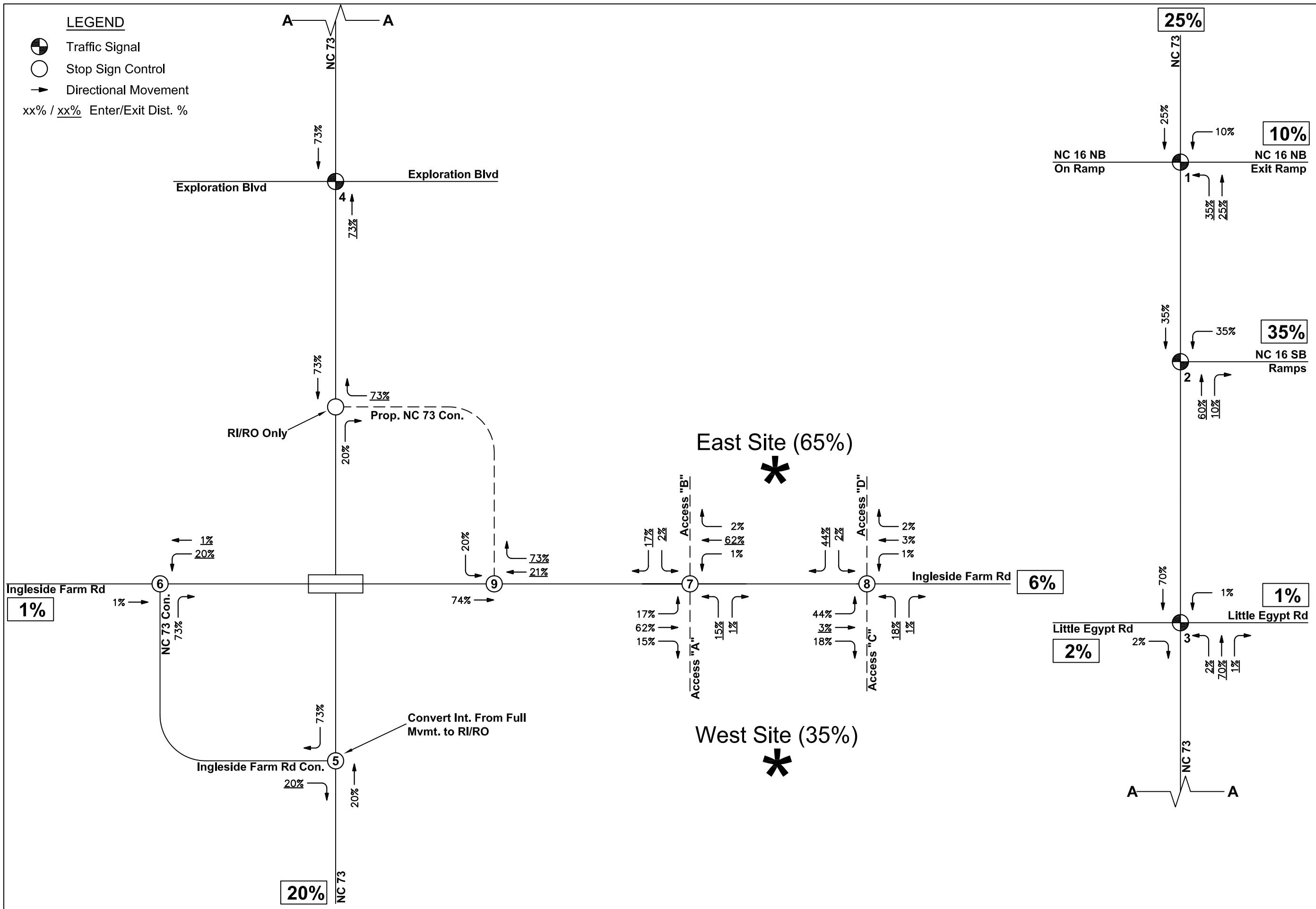
Land Use [ITE Code 252]	Weekday Daily	AM Peak Hour			PM Peak Hour			
		Enter	Exit	Total	Enter	Exit	Total	
Sr. Detached Homes	1,080 DUs	3,930	75	139	214	163	104	267

Reference: Trip Generation, 9th Edition, Institute of Transportation Engineers, Washington, DC. 2012.

The directional trip distribution of the site traffic is provided in Figure 3. The trip assignments for the 2022 and 2032 AM and PM peak hour traffic volumes are presented in Figures 4 through 9 (depending on scenario). The background traffic is indicated to the far left of the movement arrows, followed by the offsite traffic in brackets, and the site traffic in parentheses. The two or three volumes (depending on scenario) are added to obtain the projected total traffic for that movement:

$$\text{Background} + [\text{Offsite}] + (\text{Site}) = \text{Total}$$

INGLESIDE FARM TIA

 DR HORTON
8001 ARROWOOD BLVD
CHARLOTTE, NC 28273
704-787-5622


INGLESIDE FARM TIA

LINCOLN COUNTY, NC

DR HORTON
8001 ARROWOOD BLVD
CHARLOTTE, NC 28273
704-787-5622

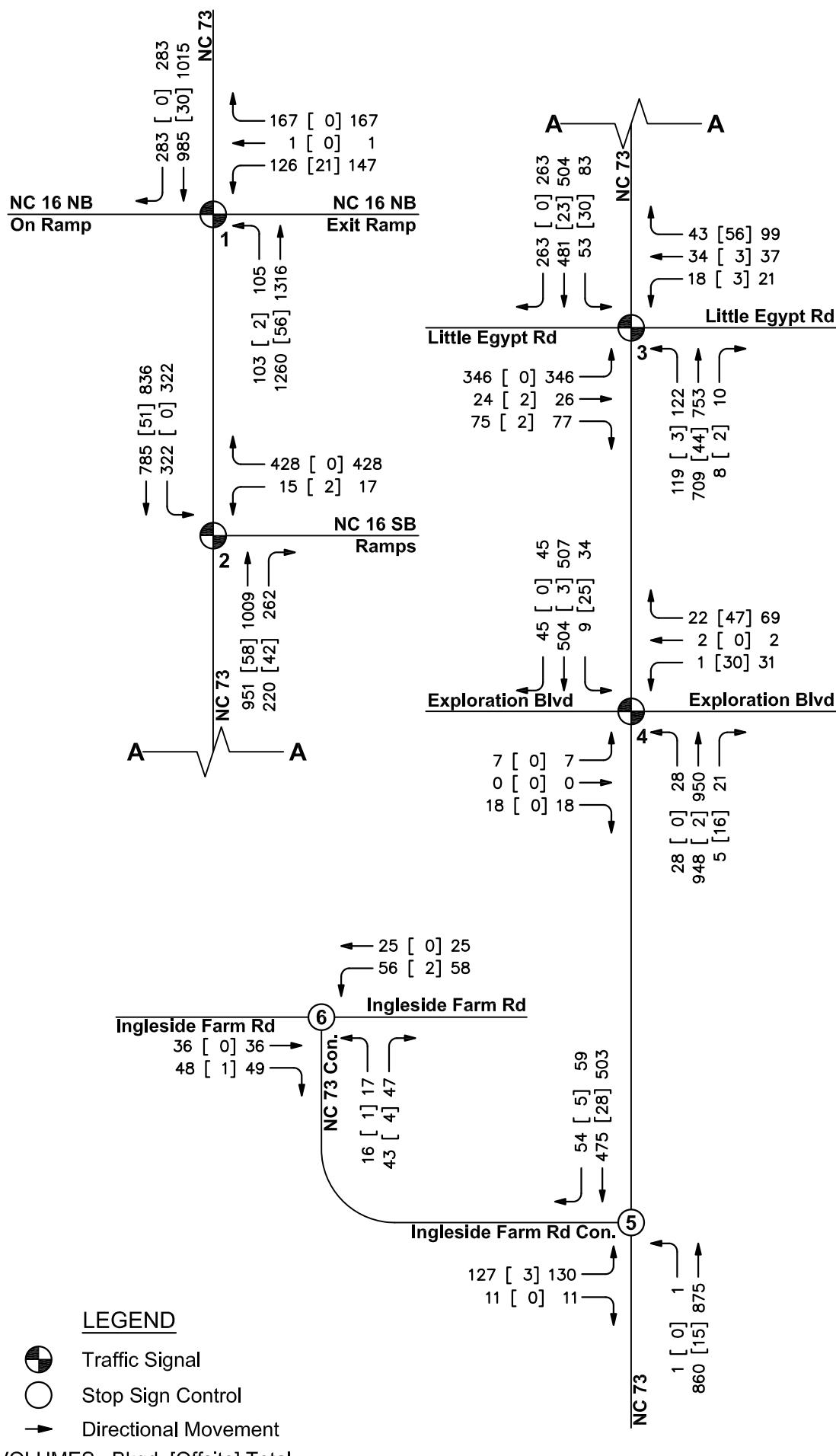
2022 NO BUILD AM PEAK HOUR TRAFFIC VOLUMES

0 NTS
SCALE: NTS

PROJECT #: 681-001
DRAWN BY: MWB
CHECKED BY: REG

APRIL 2017

REVISIONS:



INGLESIDE FARM TIA

LINCOLN COUNTY, NC

DR HORTON
8001 ARROWOOD BLVD
CHARLOTTE, NC 28273
704-787-5622

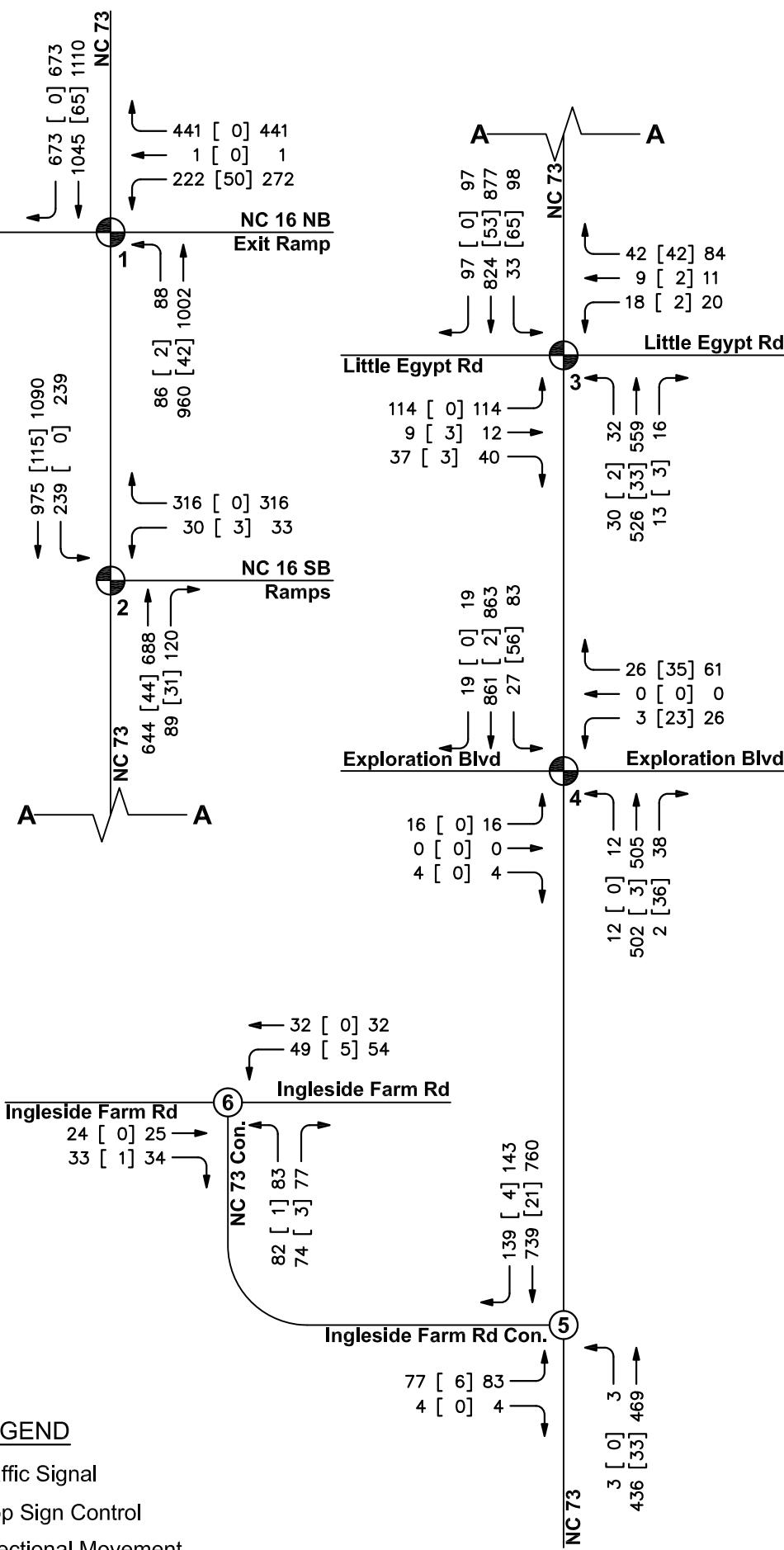
2022 NO BUILD PM PEAK HOUR TRAFFIC VOLUMES

0 NTS
SCALE: NTS

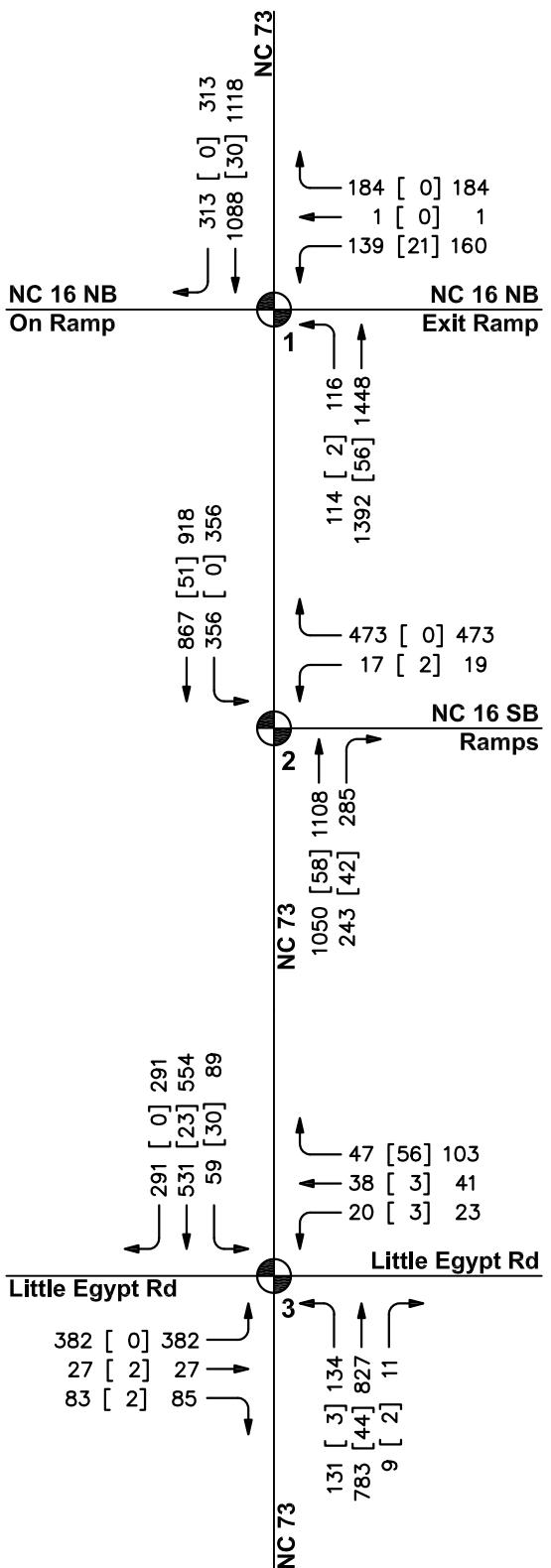
PROJECT #: 681-001
DRAWN BY: MWB
CHECKED BY: REG

APRIL 2017

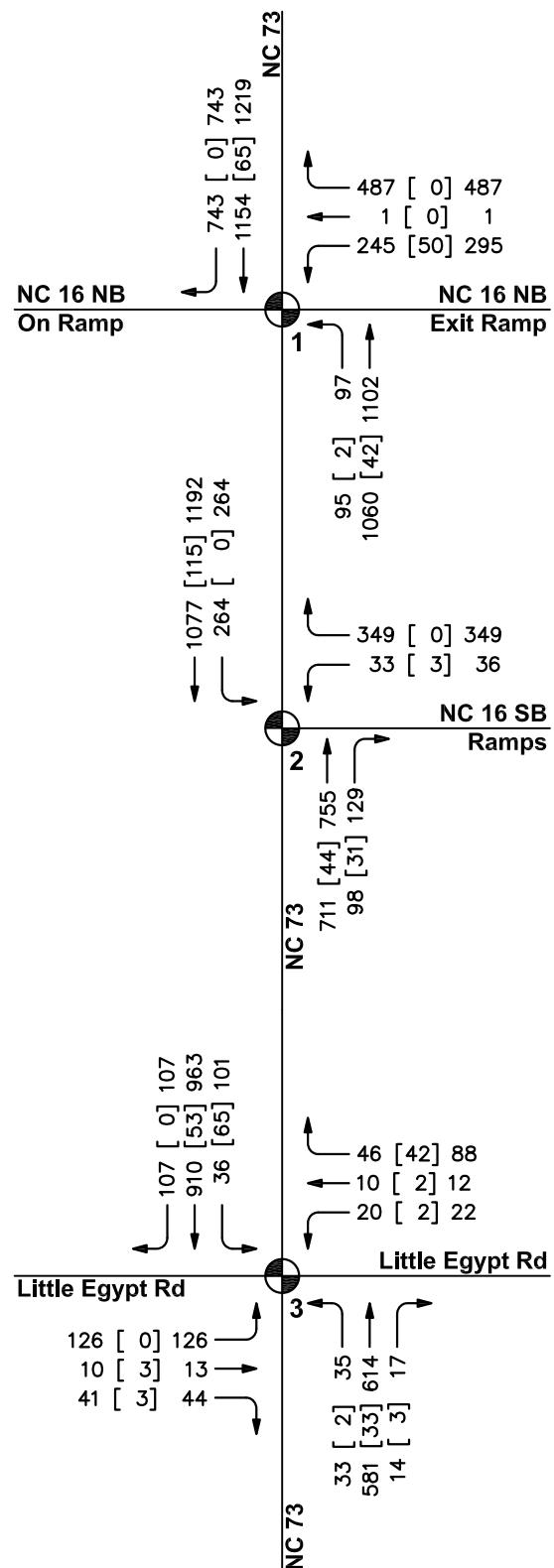
REVISIONS:



2022 + 10 NO BUILD AM PEAK
HOUR TRAFFIC VOLUMES



2022 + 10 NO BUILD PM PEAK
HOUR TRAFFIC VOLUMES



LANDSCAPE ARCHITECTURE
CIVIL ENGINEERING
TRANSPORTATION PLANNING

O 2459 Wilkinson Blvd, Ste 200 Charlotte, NC 28208
P 704.343.0608
W www.drgp.com

INGLESIDE FARM TIA

LINCOLN COUNTY, NC

DR HORTON
8001 ARROWOOD BLVD
CHARLOTTE, NC 28273
704-787-5622

2022 + 10 NO
BUILD PEAK HOUR
TRAFFIC
VOLUMES

0 NTS
SCALE: NTS

PROJECT #: 681-001
DRAWN BY: MWB
CHECKED BY: REG

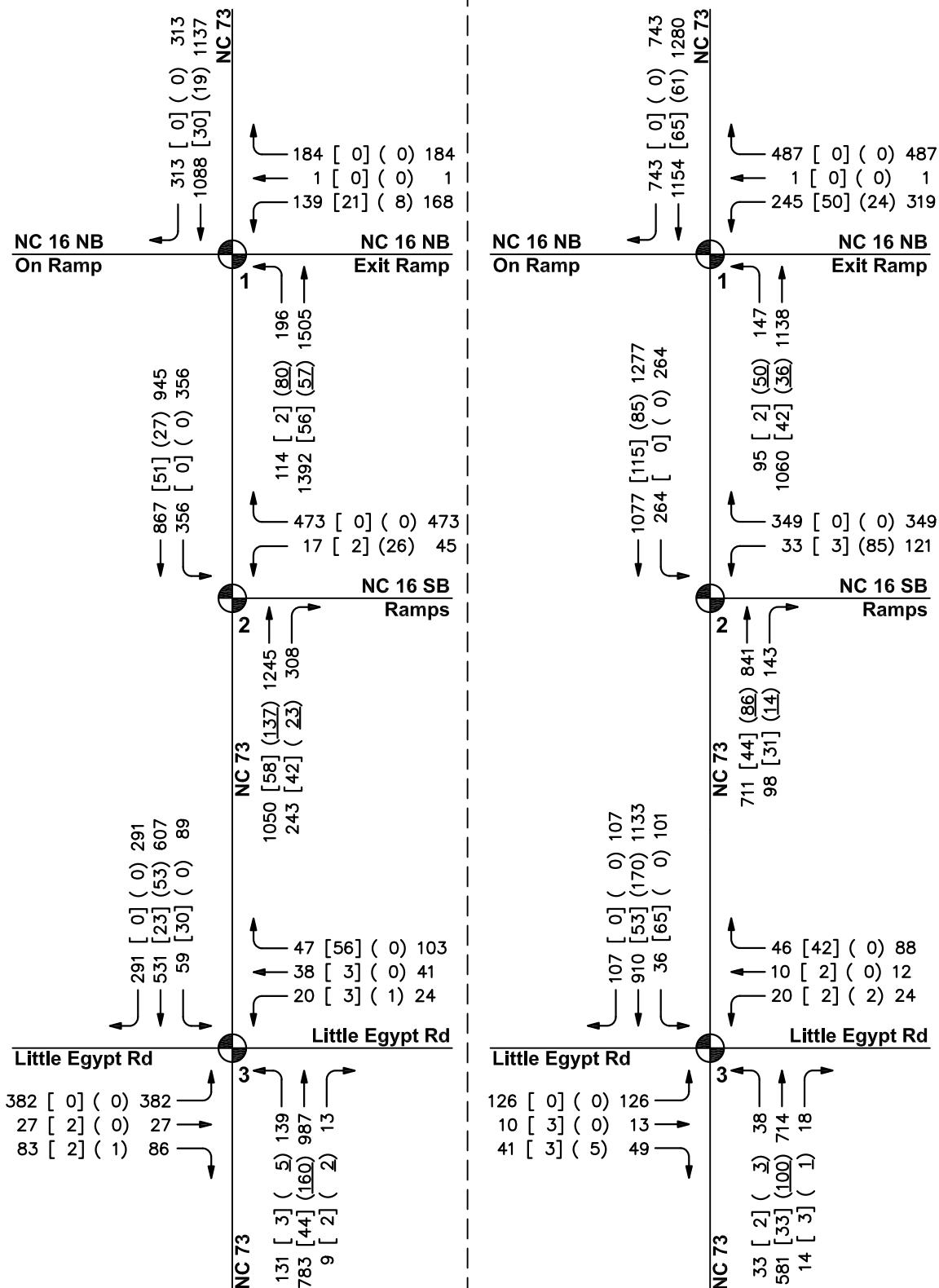
APRIL 2017

REVISIONS:

VOLUMES: Bkgd. [Offsite] Total

2022 + 10 BUILD AM PEAK HOUR
TRAFFIC VOLUMES

2022 + 10 BUILD PM PEAK HOUR
TRAFFIC VOLUMES



LEGEND



Traffic Signal



Stop Sign Control



Directional Movement

VOLUMES: Bkgd. [Offsite] (Site) Total

INGLESIDE FARM TIA

LINCOLN COUNTY, NC

DR HORTON
8001 ARROWOOD BLVD
CHARLOTTE, NC 28273
704-787-5622

**2022 + 10 BUILD
PEAK HOUR
TRAFFIC
VOLUMES**

0 NTS
SCALE: NTS

PROJECT #: 681-001
DRAWN BY: MWB
CHECKED BY: REG

APRIL 2017

REVISIONS:

Figure 9

TRAFFIC ANALYSIS

The intersections identified within the area of influence were analyzed to identify the traffic impact that the development has under the build scenario. The traffic analysis is based on the LOS analysis at the identified intersections. The intersections were analyzed assuming the completion of the project in 2022.

LOS is a qualitative measurement of traffic operations. It is a measure of delay time. The Transportation Research Board's Highway Capacity Manual¹ (HCM) defines six levels of service for intersections with LOS "A" representing the best operating condition and LOS "F" the worst. The table below gives the criteria for both signalized (Exhibit 19-8) and unsignalized (Exhibit 20-2) intersections.

Intersection LOS	Exhibit 19-8 Signalized Intersection Control Delay per Vehicle (sec/vehicle)	Exhibit 20-2 Unsignalized Intersection Control Delay per Vehicle (sec/vehicle)
A	<10.0	< 10.0
B	> 10.0 and < 20.0	> 10.0 and < 15.0
C	> 20.0 and < 35.0	> 15.0 and < 25.0
D	> 35.0 and < 55.0	> 25.0 and < 35.0
E	> 55.0 and < 80.0	> 35.0 and < 50.0
F	>80.0	> 50.0

SYNCHRO 9.1 was the software tool used in determining the delay, capacity and corresponding level of service at the study intersections. The intersection worksheet reports are provided in the Appendix.

For the analysis of unsignalized intersections, the vehicular movements that must stop at the intersection experience delay (i.e. the minor leg of the intersection). For descriptive purposes:

- LOS results between "A" and "C" for the side (minor) street approach are assumed to represent short vehicle delays
- LOS results between "D" and "E" for the side (minor) street approach are assumed to represent moderate delays
- LOS results of "F" for the side (minor) street approach is assumed to represent long delays.

It should be noted that stop sign controlled streets/driveways intersecting major streets typically 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 report provides analysis of the traffic operations within the area of influence, according to the standards set by the North Carolina Department of Transportation's (NCDOT) "Policy on Street and Driveway Access to North Carolina Highways, Chapter 4 Part C" and Lincoln County's UDO Section 9.8 for TIAs. It provides intersection improvements needed for mitigating traffic impacts. This study evaluates the following scenarios:

¹ National Research Council. Transportation Research Board. Highway Capacity Manual 6th Ed., Washington, DC. 2016.

- 2017 AM & PM Peak existing traffic conditions
- 2022 AM & PM Peak No Build
- 2022 AM & PM Peak Build
- 2022 AM & PM Peak Build comparison to 2017 Existing Conditions (NCDOT Congestion Management)
- 2022+10 (2032) AM & PM Peak Build comparison to 2032 No Build (Lincoln County UDO)

Currently, the four signalized intersections along the NC 73 corridor operate with a LOS "D" or better in both peak hours. The unsignalized intersection of NC 73 & Ingleside Farm Road Connector operates with a LOS "F" in the AM peak hour and a LOS "E" in the PM peak hour; the unsignalized intersection of Ingleside Farm Road & NC 73 Connector operates with a LOS "A" in both peak hours. Typically, an intersection is said to be operating at capacity at a volume-to-capacity (v/c) ratio of 1.00 and acceptable at a LOS "D" or better. The results of the analyses are presented in Table 4.

NCDOT ANALYSIS REQUIREMENTS - In order to determine the mitigation responsibility of the developer, this study compares 2022 Build results to the 2022 No Build results (see Table 4).

Chapter 5, Section J of the *July 2003 NCDOT Policy on Street and Driveway Access to North Carolina Highways*, the applicant shall be required to identify mitigation improvements to the roadway network if at least one of the following conditions exists when comparing base network conditions to project conditions:

- *The total average delay at an intersection or an individual approach increases by 25% or greater, while maintaining the same level of service,*
- *The Level of Service (LOS) degrades by at least one level at an intersection or an individual approach,*
- *Or the Level of Service is "F" for an intersection or an individual approach.*

This section of the access policy also states that, *mitigation improvements shall be identified when the analysis indicates that the 95th percentile queue exceeds the storage capacity of the existing lane.*

Table 4: Levels of Service

Intersection	Intersection/ Approach	AM Peak			PM Peak		
		Delay (sec/veh)	Capacity (v/c)	LOS	Delay (sec/veh)	Capacity (v/c)	LOS
2017 Existing Conditions							
1. NC 73 & NC 16 NB Ramps		13.4	0.73	B	29.3	0.95	C
2. NC 73 & NC 16 SB Ramps/Driveway		15.8	0.84	B	8.4	0.81	A
3. NC 73 & Little Egypt Rd.		50.7	1.11	D	19.1	0.83	B
4. NC 73 & Exploration Blvd.		8.8	0.67	A	7.1	0.65	A
5. NC 73 & Ingleside Farm Rd. Connector		115.6	145/154	F	42.2	85/180	E
6. Ingleside Farm Rd. & NC 73 Connector		9.1	17/749	A	9.5	87/782	A
2022 No Build w/Offsite							
1. NC 73 & NC 16 NB Ramps	Intersection	18.5	0.77	B	64.4	1.11	E
	Northbound	56.3	-	E	126.6	-	F
	Eastbound	8.3	-	A	16.8	-	B
	Westbound	20.4	-	C	68.6	-	E
2. NC 73 & NC 16 SB Ramps/Driveway	Intersection	18.9	0.89	B	16.7	0.65	B
	Northbound	47.3	-	D	44.0	-	D
	Southbound	38.2	-	D	56.7	-	E
	Eastbound	15.0	-	B	16.3	-	B
	Westbound	11.9	-	B	9.3	-	A
3. NC 73 & Little Egypt Rd.	Intersection	87.4	1.26	F	35.9	0.93	D
	Northbound	116.9	-	F	24.9	-	C
	Southbound	145.9	-	F	81.7	-	F
	Eastbound	75.4	-	E	27.2	-	C
	Westbound	48.7	-	D	30.0	-	C
4. NC 73 & Exploration Blvd.	Intersection	20.3	0.83	C	15.7	0.69	B
	Northbound	33.5	-	C	52.7	-	D
	Southbound	46.2	-	D	71.8	-	E
	Eastbound	21.8	-	C	11.2	-	B
	Westbound	13.4	-	B	12.2	-	B
5. NC 73 & Ingleside Farm Rd. Connector	Intersection	*	156/130	F	65.1	96/149	F
	Southbound	*	-	F	65.1	-	F
	Eastbound	0.0	-	A	0.1	-	A
	Westbound	0.0	-	A	0.0	-	A
6. Ingleside Farm Rd. & NC 73 Connector	Intersection	9.1	19/733	A	9.7	92/755	A
	Northbound	5.3	-	A	4.8	-	A
	Southbound	0.0	-	A	0.0	-	A
	Eastbound	9.1	-	A	9.7	-	A

* Results are not meaningful (i.e. delay >180 sec. and/or v/c >1.50)

Table 4: Levels of Service (cont.)

Intersection	Intersection/ Approach	AM Peak			PM Peak		
		Delay (sec/veh)	Capacity (v/c)	LOS	Delay (sec/veh)	Capacity (v/c)	LOS
2022 Build w/Offsite							
1. NC 73 & NC 16 NB Ramps	Intersection	19.6	0.84	B	76.6	1.21	E
	Northbound	59.8	-	E	137.5	-	F
	Eastbound	7.6	-	A	30.8	-	C
	Westbound	23.8	-	C	81.3	-	F
1a. NC 73 & NC 16 NB Ramps ¹	Intersection	18.3	0.83	B	54.4	1.03	D
	Northbound	51.6	-	D	106.2	-	F
	Eastbound	7.5	-	A	21.0	-	C
	Westbound	23.0	-	C	54.9	-	D
1b. NC 73 & NC 16 NB Ramps ²	Intersection	17.6	0.69	B	33.5	0.90	C
	Northbound	40.9	-	D	69.7	-	E
	Eastbound	9.8	-	A	18.0	-	B
	Westbound	21.0	-	C	28.8	-	C
2. NC 73 & NC 16 SB Ramps/Driveway	Intersection	21.4	0.89	C	20.1	0.70	C
	Northbound	47.3	-	D	43.8	-	D
	Southbound	38.3	-	D	46.9	-	D
	Eastbound	18.2	-	B	21.7	-	C
	Westbound	14.8	-	B	11.6	-	B
2a. NC 73 & NC 16 SB Ramps/Driveway ³	Intersection	16.9	0.82	B	18.3	0.69	B
	Northbound	37.8	-	D	41.9	-	D
	Southbound	38.3	-	D	45.4	-	D
	Eastbound	12.6	-	B	16.7	-	B
	Westbound	13.4	-	B	11.8	-	B
3. NC 73 & Little Egypt Rd.	Intersection	109.6	1.29	F	48.0	1.06	D
	Northbound	122.3	-	F	26.3	-	C
	Southbound	145.7	-	F	104.8	-	F
	Eastbound	135.0	-	F	27.8	-	C
	Westbound	54.8	-	D	48.2	-	D
3a. NC 73 & Little Egypt Rd. ⁴	Intersection	51.4	0.90	D	32.6	0.95	C
	Northbound	55.7	-	E	26.3	-	C
	Southbound	74.0	-	E	78.8	-	E
	Eastbound	44.8	-	D	18.2	-	B
	Westbound	41.2	-	D	30.4	-	C
4. NC 73 & Exploration Blvd.	Intersection	29.0	0.98	C	15.1	0.81	B
	Northbound	33.5	-	C	56.2	-	E
	Southbound	46.2	-	D	80.3	-	F
	Eastbound	38.5	-	D	10.9	-	B
	Westbound	10.5	-	B	11.7	-	B
4a. NC 73 & Exploration Blvd. ⁵	Intersection	15.3	0.59	B	14.4	0.83	B
	Northbound	30.8	-	C	49.6	-	D
	Southbound	43.1	-	D	67.7	-	E
	Eastbound	12.4	-	B	9.9	-	A
	Westbound	15.7	-	B	12.1	-	B
5a. Exist. NC 73 & Ingleside Farm Rd. Connector (RI/RO) ⁶	Intersection	12.7	63/529	B	16.0	37/363	C
	Southbound	12.7	-	B	16.0	-	C
	Eastbound	0.0	-	A	0.0	-	A
	Westbound	0.0	-	A	0.0	-	A

Table 4: Levels of Service (cont.)

Intersection	Intersection/ Approach	AM Peak			PM Peak		
		Delay (sec/veh)	Capacity (v/c)	LOS	Delay (sec/veh)	Capacity (v/c)	LOS
2022 Build w/Offsite							
6. Exist. (North) Ingleside Farm Rd. & NC 73 Connector	<i>Intersection</i>	9.3	19/729	A	10.0	84/801	A
	Northbound	5.0	-	A	3.6	-	A
	Southbound	0.0	-	A	0.0	-	A
	Eastbound	9.3	-	A	10.0	-	A
7. Ingleside Farm Rd. & Prop. Accesses "A" & "B" ⁷	<i>Intersection</i>	13.7	46/459	B	14.6	31/405	B
	Northbound	0.1	-	A	0.2	-	A
	Southbound	0.8	-	A	1.3	-	A
	Eastbound	13.7	-	B	14.6	-	B
	Westbound	10.8	-	B	10.7	-	B
8. Ingleside Farm Rd. & Prop. Accesses "C" & "D" ⁷	<i>Intersection</i>	13.5	122/869	B	14.6	37/412	B
	Northbound	0.2	-	A	0.3	-	A
	Southbound	2.1	-	A	3.7	-	A
	Eastbound	13.5	-	B	14.6	-	B
	Westbound	9.8	-	A	9.7	-	A
9a. Prop. (South) Ingleside Farm Rd. & NC 73 Connector ⁸	<i>Intersection</i>	10.4	22/683	B	12.0	61/573	B
	Northbound	0.0	-	A	0.0	-	A
	Southbound	2.3	-	A	1.1	-	A
	Westbound	10.4	-	B	12.0	-	B
Prop. NC 73 & Ingleside Farm Rd. Connector (RI/RO) ⁹	<i>Intersection</i>	111.6	330/306	F	15.3	208/555	C
	Northbound	111.6	-	F	15.3	-	C
	Eastbound	0.0	-	A	0.0	-	A
	Westbound	0.0	-	A	0.0	-	A

¹ Imp. includes a NB left turn lane on NC 16 NB Exit Ramp (Trilogy offsite imp.)

² Test imps. to calc. a LOS "E" or better for approaches (**NOT RECOMMENDED – FOR INFO. PURPOSES ONLY**) include a WB right turn lane on NC 73, modifying NB comb. left-thru-right lane on NC 16 NB Exit Ramp to a comb. left-thru lane and construct a 2nd NB right turn lane on NC 16 NB Exit Ramp

³ Test imp. includes an EB right turn lane on NC 73 ("Yield" control) (**NOT FEASIBLE – FOR INFO. PURPOSES ONLY**)

⁴ Test imps. to calc. a LOS "E" or better for approaches (**NOT RECOMMENDED – FOR INFO. PURPOSES ONLY**) include a 2nd SB left turn lane on Little Egypt Rd. and a 2nd EB thru lane on NC 73 (with a 2nd EB receiving lane on NC 73)

⁵ Test imps. to calc. a LOS "E" or better for approaches (**NOT RECOMMENDED – FOR INFO. PURPOSES ONLY**) include a 2nd EB thru lane on NC 73 (with a 2nd EB receiving lane on NC 73)

⁶ Intersection converted from full movement to RI/RO only (removal of EB left turn movements from NC 73 and SB left turn movements from Ingleside Farm Rd. Connector). Improvement includes a WB right turn lane on NC 73

⁷ Laneage includes one entering lane and one exiting lane on Prop. Accesses

⁸ New full movement intersection includes a SB comb. left-thru lane on Ingleside Farm Rd., a NB right turn lane on Ingleside Farm Rd. Prop. NC 73 Connector includes a WB combined left-right lane and one EB lane.

⁹ New RI/RO only intersection includes an EB right turn lane on NC 73. Ingleside Farm Rd. Connector includes one SB entering lane and a NB lane that terminates as a right turn lane at NC 73.

Table 5 shows the 2022 maximum queue lengths calculated by SimTraffic 9.1, a traffic simulation software application for unsignalized and signalized intersections, or the calculated 95th % queue in Synchro 9, - whichever produced the higher length.

Table 5: 2022 Vehicle Queue Lengths

Intersection/ Direction		Existing (Proposed) Storage (feet)		AM Peak Queue Length (ft)			PM Peak Queue Length (ft)		
		Left	Right	Left	Thru	Right	Left	Thru	Right
2022 No Build w/Offsite									
1. NC 73 & NC 16 NB Ramps	NB	175' LTR	Term.	#213'	198'		#651'		>1000'
	EB	130'	-	123'	203'x2	-	234'	220'x2	-
	WB	-	-	-	459'x2		-	>1000'x2	
2. NC 73 & NC 16 SB Ramps/ Driveway	NB	415' LT	Term.	36'	411'		94'		305'
	SB	-	-	50'			53'		
	EB	450'	-	29'	436'x2		52'	347'x2	
	WB	300'	-	#328'	319'x2		202'	224'x2	
3. NC 73 & Little Egypt Rd.	NB	LT	225' Yield	140'	142'		74'		55'
	SB	Term.	175' TR Yield	538'	#325'		179'		107'
	EB	700'	-	204'	1307'		108'		395'
	WB	150'	200'	#279'	951'	#310'	#280'	>1000'	#310'
4. NC 73 & Exploration Blvd.	NB	40' LT	Term.	62'	196'		#68'		83'
	SB	-	-	77'			74'		
	EB	105'	135'	#209'	818'	31'	56'	246'	55'
	WB	210'	-	68'	485'		#309'		527'
5. NC 73 & Ingleside Farm Rd. Connector	SB	Term.	40'	222'	-	#75'	140'	-	54'
	EB	-	-	27'		-	25'		-
	WB	-	-	-	0'		-		31'
6. Ingleside Farm Rd. & NC 73 Connector	NB	-	-	31'		-	28'		-
	SB	-	-	-	0'		-		0'
	EB	30'	Term.	30'	-	31'	#50'	-	67'

Table 5: 2022 Vehicle Queue Lengths (cont.)

Intersection/ Direction		Existing (Proposed) Storage (feet)		AM Peak Queue Length (ft)			PM Peak Queue Length (ft)		
		Left	Right	Left	Thru	Right	Left	Thru	Right
2022 Build w/Offsite									
1a. NC 73 & NC 16 NB Ramps ¹	NB	(175')/ 175' LTR	Term.	142'x2	142'		466'x2	520'	
	EB	130'	-	#222'	131'x2	-	#289'	241'x2	-
	WB	-	-	-	458x2		-	>1000'x2	
2. NC 73 & NC 16 SB Ramps/ Driveway	NB	415' LT	Term.	114'	411'		244'	304'	
	SB	-	-	53'			53'		
	EB	450'	-	27'	392'x2		27'	360'x2	
	WB	300'	-	#376'	142'x2		307'	236'x2	
3. NC 73 & Little Egypt Rd.	NB	LT	225' Yield	155'	155'		74'	98'	
	SB	Term.	175' TR Yield	482'	#325'		155'	133'	
	EB	700'	-	700'	>1000'		91'	448'	
	WB	150'	200'	#279'	950'	#310'	#280'	>1000'	#310'
4. NC 73 & Exploration Blvd.	NB	40' LT	Term.	#72'	130'		#104'	109'	
	SB	-	-	54'			77'		
	EB	105'	135'	#214'	>1000'	#240'	53'	327'	#240'
	WB	210'	-	89'	338'		#309'	491'	
5a. Exist. NC 73 & Ingleside Farm Rd. Connector (RI/RO) ²	SB	-	Term.	-	-	42'	-	-	58'
	WB	-	(100')	-	0'	0'	-	0'	0'
6. Ingleside Farm Rd. & NC 73 Connector	NB	-	-	27'	-		26'	-	
	SB	-	-	-	116'		-	0'	
	EB	30'	Term.	#50'	-	160'	#52'	-	68'
7. Ingleside Farm Rd. & Prop. Accesses "A" & "B" ³	NB	-	-	28'			0'		
	SB	-	-	28'			31'		
	EB	-	-	56'			31'		
	WB	-	-	68'			55'		
8. Ingleside Farm Rd. & Prop. Accesses "C" & "D" ³	NB	-	-	0'			0'		
	SB	-	-	50'			50'		
	EB	-	-	68'			78'		
	WB	-	-	72'			55'		
9a. Prop. (South) Ingleside Farm Rd. & NC 73 Conn. ⁴	NB	-	(100')	-	374'	200'	-	0'	0'
	SB	-	-	553'		-	53'		-
	WB	-	-	23'			42'		
Prop. NC 73 & Ingleside Farm Rd. Connector (RI/RO) ⁵	NB	-	Term.	-	-	272'	-	-	114'
	EB	-	(100')	-	0'	0'	-	0'	0'

Queue extends into adjacent thru lane

¹ Imp. includes a NB left turn lane on NC 16 NB Exit Ramp (Trilogy offsite imp.)

² Intersection converted from full movement to RI/RO only (removal of EB left turn movements from NC 73 and SB left turn movements from Ingleside Farm Rd. Connector). Improvement includes a WB right turn lane on NC 73

³ Laneage includes one entering lane and one exiting lane on Prop. Accesses

⁴ New full movement intersection includes a SB comb. left-thru lane on Ingleside Farm Rd., a NB right turn lane on Ingleside Farm Rd. Prop. NC 73 Connector includes a WB combined left-right lane and one EB lane.

⁵ New RI/RO only intersection includes an EB right turn lane on NC 73. Ingleside Farm Rd. Connector includes one SB entering lane and a NB lane that terminates as a right turn lane at NC 73.



2022 No Build w/Offsite Analysis Results:

1. NC 73 & NC 16 Northbound Ramps (signalized)

The intersection operates with a LOS “B” in the AM peak hour and a LOS “E” in the PM peak hour.

2. NC 73 & NC 16 Southbound Ramps (signalized)

The intersection operates with a LOS “B” in both peak hours.

3. NC 73 & Little Egypt Road (signalized)

The intersection operates with a LOS “F” in the AM peak hour and a LOS “D” in the PM peak hour.

4. NC 73 & Exploration Boulevard (signalized)

The intersection operates with a LOS “C” in the AM peak hour and a LOS “B” in the PM peak hour.

5. NC 73 & Ingleside Farm Road Connector (unsignalized)

The unsignalized intersection operates with a LOS “F” in both peak hours.

6. Ingleside Farm Road & NC 73 Connector (unsignalized)

The unsignalized intersection operates with a LOS “A” in both peak hours.

2022 Build w/Offsite Analysis Results/Suggested Recommendations:

When comparing the results of the 2022 No Build traffic and the 2022 Build traffic, four of the six existing study intersections exceed some parameters during one or both of the peak hours.

1. NC 73 & NC 16 Northbound Ramps (signalized)

When comparing the impact of the 2022 buildout to the 2022 No Build conditions the intersection remains a LOS “B” in the AM peak hour and remains an “E” in the PM peak hour. The increase in intersection vehicle delay is 6% in the AM peak hour and 19% in the PM peak hour. In addition, some of the approaches exceeded the allowed parameters in the PM peak hour. A test improvement includes:

- Construct a northbound left turn lane on the NC 16 Northbound Exit Ramp (Trilogy offsite improvement).

With this offsite improvement in place, the intersection LOS remains an "E" in the AM peak hour and becomes a LOS "D" in the PM peak hour. The intersection delay between the No Build and Build scenario is 1% less in the AM peak hour and 18% less in the PM peak hour; some of the approaches still exceeded the allowed parameters in the PM peak hour. Based on the traffic volumes for this northbound left turn movement, the development only contributes 5.1% of the traffic movements in the AM peak hour and 8.1% of the traffic movement in the PM peak hour (which is minimal).

Additional test improvements in order to attempt to calculate parameters within NCDOT's acceptable guidelines include:

- Construct a westbound right turn lane on NC 73.
- Construct a 2nd northbound right turn lane on the NC 16 Northbound Exit Ramp

With these improvements in place, the intersection remains a LOS "B" in the AM peak hour and becomes a "C" in the PM peak hour. The intersection delay between the No Build and Build scenario is 5% less in the AM peak hour and 92% less in the PM peak hour; all of the approaches are within the allowed parameters in both peak hours. Based on the traffic volumes for the overall intersection (the proposed project does not contribute volumes to either of these movements at the intersection), the development only contributes 5.1% of the traffic volume in the AM peak hour and 4.6% of the traffic movement in the PM peak hour (which is also minimal).

Even though some of the approaches exceeded the allowed parameters in the PM peak hour we feel no improvements should be required for mitigation based on the minor amount of traffic at the site by the proposed Ingleside Farm project.

2. NC 73 & NC 16 Southbound Ramps (signalized)

When comparing the impact of the 2022 buildout to the 2022 No Build conditions the intersection drops from LOS "B" to "C" in both peak hours. The increase in intersection vehicle delay is 13% in the AM peak hour and 20% in the PM peak hour. In addition, some of the approaches exceeded the allowed parameters in the PM peak hour. A test improvement includes:

- Construct an eastbound right turn lane on NC 73. This improvement is not feasible due to an existing bridge deck over railroad tracks.

With this improvement in place, the intersection LOS returns to "B" in both peak hours. The intersection delay between the No Build and Build scenario is 12% less in the AM peak hour and is 10% more in the PM peak hour; the westbound approach still exceeded the allowed LOS parameter in the PM peak hour. Based on the traffic volumes for this eastbound right turn movement, the development only contributes 8.1% of the traffic movements in the AM peak hour and 10.4% of the traffic movement in the PM peak hour (which is minimal).

Based on the traffic volumes for the overall intersection, the development only contributes 6.9% of the traffic volume in the AM peak hour and 9.8% of the traffic movement in the PM peak hour (which is also minimal).

Even though some of the approaches exceeded the allowed parameters in the PM peak hour we feel no improvements should be required for mitigation based on the minor amount of traffic at the site by the proposed Ingleside Farm project.

3. NC 73 & Little Egypt Road (signalized)

When comparing the impact of the 2022 buildout to the 2022 No Build conditions the intersection remains a LOS "F" in the AM peak hour and remains a LOS "D" in the PM peak hour. The increase in intersection vehicle delay is 25% in the AM peak hour and 34% in the PM peak hour. In addition, some of the approaches exceeded the allowed parameters in both peak hours. A test improvement includes:

- Construct a 2nd southbound left turn lane on Little Egypt Road. This improvement will also require a 2nd eastbound receiving lane on NC 73.

With this improvement in place, the intersection LOS becomes a "D" in the AM peak hour and a LOS "C" in the PM peak hour. The intersection delay between the No Build and Build scenario is 70% less in the AM peak hour and 10% less in the PM peak hour; all of the approaches are within the allowed parameters in both peak hours. Based on the traffic volumes for the overall intersection (the proposed project does not contribute volumes to this southbound movement at the intersection), the development only contributes 8.7% of the traffic volume in the AM peak hour and 12.5% of the traffic movement in the PM peak hour (which is minimal).

Even though some of the approaches exceeded the allowed parameters in both peak hours we feel no improvements should be required for mitigation based on the minor amount of traffic at the site by the proposed Ingleside Farm project.

4. NC 73 & Exploration Boulevard (signalized)

When comparing the impact of the 2022 buildout to the 2022 No Build conditions the intersection remains a LOS "C" in the AM peak hour and remains a LOS "B" in the PM peak hour. The increase in intersection vehicle delay is 43% in the AM peak hour and is 4% less in the PM peak hour. In addition, some of the approaches exceeded the allowed parameters in both peak hours. A test improvement includes:

- Construct a 2nd eastbound thru lane on NC 73.

With this improvement in place, the intersection LOS becomes a "B" in the AM peak hour and remains a LOS "B" in the PM peak hour. The intersection delay between the No Build and Build scenario is 33% less in the AM peak hour and 9% less in the PM peak hour; all of the approaches are within the allowed parameters in both peak hours. Based on the traffic volumes for the overall intersection, the development only contributes 11.5% of the traffic volume in the AM peak hour and 14.7% of the traffic movement in the PM peak hour (which is minimal).

Even though some of the approaches exceeded the allowed parameters in both peak hours we feel no improvements should be required for mitigation based on the minor amount of traffic at the site by the proposed Ingleside Farm project.

5. NC 73 & Ingleside Farm Road Connector (unsignalized – converted to RI/RO only)

With the conversion of this existing intersection from full movement to RI/RO only the intersection has a LOS “B” in the AM peak hour and a LOS “C” in the PM peak hour (in the No Build analyses the LOS is “F” in both peak hours).

6. Ingleside Farm Road & NC 73 Connector (unsignalized)

When comparing the impact of the 2022 buildout to the 2022 No Build conditions the intersection remains a LOS “A” in both peak hours. The increase in intersection vehicle delay is 2% in the AM peak hour and 3% in the PM peak hour. In addition, all of the approaches are within the allowed parameters in both peak hours. Therefore, no roadway improvements should be deemed necessary.

7. Ingleside Farm Road & Proposed Accesses “A” & “B” (unsignalized)

The intersection operates with a LOS “A” in both peak hours with the following configuration:

- One ingress lane and one egress lane on Proposed Accesses “A” & “B”.

Due to the ADT of Ingleside Farm Road in the vicinity of the site (less than 2,000 vpd) we do not recommend left or right turn lanes on Ingleside Farm Road at the driveways.

8. Ingleside Farm Road & Proposed Accesses “C” & “D” (unsignalized)

The intersection operates with a LOS “A” in both peak hours with the following configuration:

- One ingress lane and one egress lane on Proposed Accesses “C” & “D”.

Due to the ADT of Ingleside Farm Road in the vicinity of the site (less than 2,000 vpd) we do not recommend left or right turn lanes on Ingleside Farm Road at the driveways.

9. Proposed Ingleside Farm Road & NC 73 Connector (unsignalized)

The intersection operates with a LOS “B” in both peak hours with the following configuration:

- A combined southbound left-thru lane on Ingleside Farm Road.
- A northbound right turn lane on Ingleside Farm Road with 100 feet of storage (in addition to the existing northbound thru lane).
- One eastbound lane and one westbound lane on NC 73 Connector.

NC 73 & Proposed Ingleside Farm Road Connector (unsignalized RI/RO only)

The intersection operates with a LOS "F" in the AM peak hour and a LOS "C" in the PM peak hour with the following configuration:

- An eastbound right turn lane on NC 73 with 100 feet of storage (in addition to the existing eastbound thru lane).
- One southbound lane and one northbound lane on Proposed Ingleside Farm Road Connector that terminates as a right turn lane at NC 73.

The existing/suggested laneage is shown on Figures 10 and 11; Figure 12 shows the conceptual designs of the suggested improvements.

In addition to the comparison of the 2022 No Build to the 2022 Build scenarios, an analysis evaluation was performed between the 2017 Existing Conditions and 2022 Build scenario (NCDOT Congestion Management scenario) (see Table 6). This comparison is performed **(for informational purposes only)** to determine the improvements necessary to mitigate the 2022 Build scenario to within the acceptable parameters for the intersection when compared to the 2017 Existing Conditions results. It should be noted these improvements are typically not feasible (i.e. multiple lanes per approach, etc.). Also, the signal timings for the 2017 Existing Conditions were not adjusted to NCDOT's typical minimum green, RTOR, etc. analysis parameters in order to eliminate the analysis of the additional base scenario (which is not typically recorded in the report).

Table 6: 2022 Build LOS to Maintain 2017 Existing Conditions Analysis Results (NCDOT Congestion Management)

Intersection	AM Peak			PM Peak		
	Delay (sec/veh)	Capacity (v/c)	LOS	Delay (sec/veh)	Capacity (v/c)	LOS
1a. NC 73 & NC 16 NB Ramps ¹	16.2	0.65	B	31.8	0.89	C
2a. NC 73 & NC 16 SB Ramps/ Driveway ²	13.7	0.56	B	9.9	0.40	A
3a, NC 73 & Little Egypt Rd. ³	51.4	0.83	D	18.6	0.64	B
4a. NC 73 & Exploration Blvd. ⁴	10.0	0.38	A	8.1	0.43	A
5a. Exist. NC 73 & Ingleside Farm Rd. Connector (RI/RO) ⁵	12.7	63/529	B	16.0	37/363	C
6. Ingleside Farm Rd. & NC 73 Connector	9.3	19/729	A	10.0	84/801	A

¹ Imps. include a WB right turn lane on NC 73 (Yield control), a NB left turn lane on NC 16 NB Exit Ramp, and a 2nd NB right turn lane on NC 16 NB Exit Ramp

² Imps. include (2) add'l. EB/WB thru lanes on NC 73, an EB right turn lane on NC 73 (Yield control), a 2nd WB left turn lane on NC 73, (2) NB left turn lanes on NC 16 SB Exit Ramp, and a 2nd NB right turn lane on NC 16 SB Exit Ramp

³ Imps. include an add'l. EB thru lane on NC 73, (2) add'l. WB thru lanes on NC 73, and a 2nd SB left turn lane on Little Egypt Rd.

⁴ Imps. include an add'l. WB thru lane on NC 73 and (2) add'l. EB thru lanes on NC 73

⁵ Intersection converted from full movement to RI/RO only (removal of EB left turn movements from NC 73 and SB left turn movements from Ingleside Farm Rd. Connector). Improvement includes a WB right turn lane on NC 73

Per Lincoln County's UDO Section 9.8 for Traffic Impact Analyses, an analysis comparison was performed between the 2032 (buildout + 10 years) No Build and 2032 Build scenario for key intersections (see Table 7). This evaluation is performed (for informational purposes only) to determine the improvements necessary to mitigate the 2032 Build scenario to within the acceptable parameters for the intersection (LOS "C" or match the 2032 No Build results).

Table 7: 2032 No Build to 2032 Build LOS Comparison (Lincoln County) – Key Ints.

Intersection	Intersection/ Approach	AM Peak			PM Peak		
		Delay (sec/veh)	Capacity (v/c)	LOS	Delay (sec/veh)	Capacity (v/c)	LOS
2022 + 10 No Build w/Offsite							
1. NC 73 & NC 16 NB Ramps	Intersection	22.9	0.90	C	93.0	1.22	F
	Northbound	64.6	-	E	162.8	-	F
	Eastbound	8.8	-	A	17.8	-	B
	Westbound	28.2	-	C	111.0	-	F
2. NC 73 & NC 16 SB Ramps/Driveway	Intersection	21.6	0.93	C	17.3	0.68	B
	Northbound	51.5	-	D	43.4	-	D
	Southbound	38.3	-	D	56.2	-	E
	Eastbound	19.8	-	B	17.8	-	B
	Westbound	11.9	-	B	9.7	-	A
3. NC 73 & Little Egypt Rd.	Intersection	115.7	1.42	F	43.4	1.05	D
	Northbound	147.9	-	F	26.4	-	C
	Southbound	185.9	-	F	102.3	-	F
	Eastbound	116.6	-	F	31.6	-	C
	Westbound	55.8	-	E	36.2	-	D
2022 + 10 Build w/Offsite							
1. NC 73 & NC 16 NB Ramps	Intersection	25.9	0.94	C	106.5	1.29	F
	Northbound	65.7	-	E	175.5	-	F
	Eastbound	10.9	-	B	33.4	-	C
	Westbound	33.8	-	C	125.3	-	F
2. NC 73 & NC 16 SB Ramps/Driveway	Intersection	27.7	1.00	C	20.1	0.72	C
	Northbound	51.7	-	D	43.1	-	D
	Southbound	38.3	-	D	46.7	-	D
	Eastbound	28.6	-	C	21.8	-	C
	Westbound	16.9	-	B	11.9	-	B
3. NC 73 & Little Egypt Rd.	Intersection	141.7	1.43	F	71.6	1.17	E
	Northbound	150.9	-	F	28.7	-	C
	Southbound	185.6	-	F	127.1	-	F
	Eastbound	184.3	-	F	35.3	-	D
	Westbound	64.4	-	E	82.9	-	F
3a, NC 73 & Little Egypt Rd. ¹	Intersection	105.8	1.33	F	51.3	1.06	D
	Northbound	54.2	-	D	28.7	-	C
	Southbound	61.6	-	E	97.6	-	F
	Eastbound	184.3	-	F	29.3	-	C
	Westbound	66.2	-	E	54.7	-	D

¹ Imps. include a 2nd SB left turn lane on Little Egypt Rd. (which requires an add'l. EB thru lane on NC 73) (**NOT FEASIBLE**)

Based on the results from Table 7, the two key NC 16 intersections (intersections #1 and #2) are within Lincoln County's UDO TIA parameters for Traffic Impact Analyses (i.e. LOS "C" for the intersection/approaches or match the 2032 No Build results).



For key intersection #3 (NC 73 & Little Egypt Road), the intersection LOS drops from "D" to "E" and some of the approaches also dropped when compared to the No Build results. Improvements necessary to calculate back to the 2032 No Build results include a 2nd southbound left turn lane on Little Egypt Road (with a 2nd eastbound receiving lane on NC 73). **It should be noted that this is only an identified improvement and should not be a mitigation requirement of the Ingleside Farm developer.**

INGLESIDE FARM TIA

LINCOLN COUNTY, NC

DR HORTON
8001 ARROWOOD BLVD
CHARLOTTE, NC 28273
704-787-5622

EXISTING LANEAGE

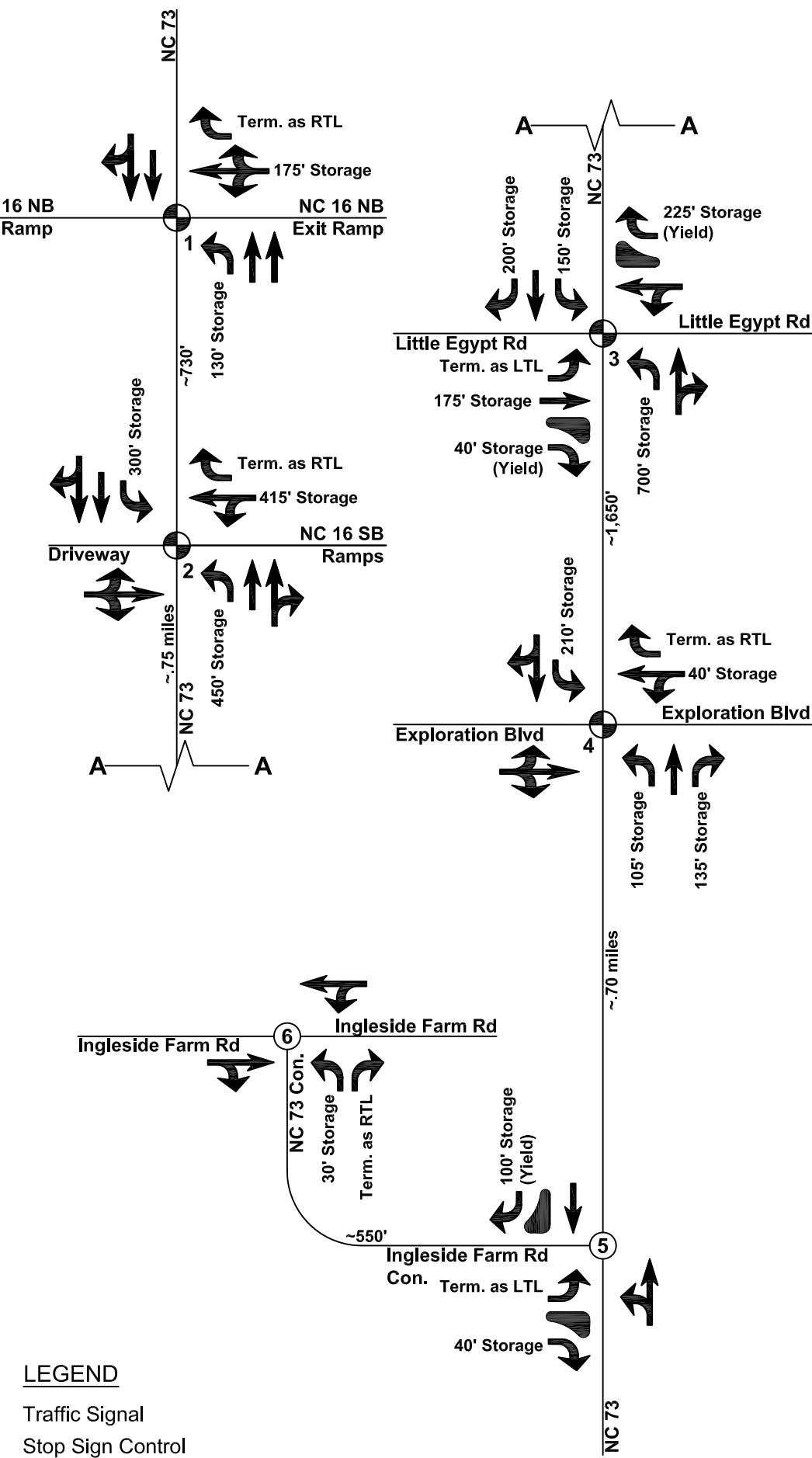
0 NTS
SCALE: NTS

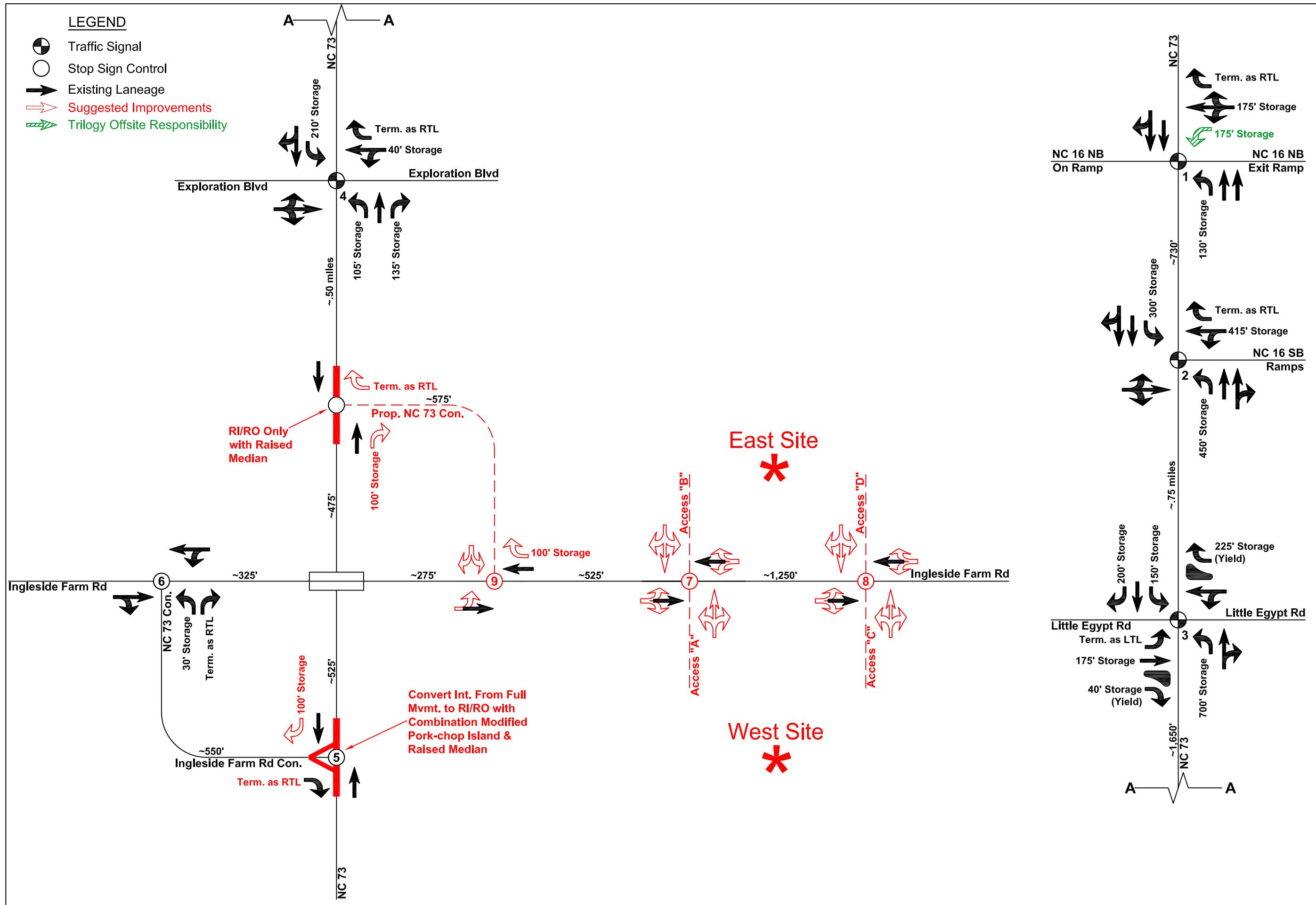
PROJECT #: 681-001
DRAWN BY: MWB
CHECKED BY: REG

APRIL 2017

REVISIONS:

Figure 10





LANDSCAPE ARCHITECTURE
CIVIL ENGINEERING
TRANSPORTATION PLANNING

2459 Wilkinson Blvd, Ste 200 Charlotte, NC 28208
704.343.0608
www.drgrp.com

DR HORTON
8001 ARROWWOOD BLVD
CHARLOTTE, NC 28273
704-787-5622

INGLESIDE FARM TIA

LINCOLN COUNTY, NC

INSIDE FARI LINCOLN COUNTY, NC

SUGGESTED L ANFAGE

0 NTS

PROJECT #: 681-001
DRAWN BY: MWW

APRIL 2017

REVISIONS:

Figure 11

INGLESIDE FARM TIA

LINCOLN COUNTY, NC

SUGGESTED CONCEPTUAL IMPROVEMENTS

0 50 100 N
 SCALE: 1" = 100'

PROJECT #: 681-001
 DRAWN BY: MWW
 CHECKED BY: REG

APRIL 2017

REVISIONS:

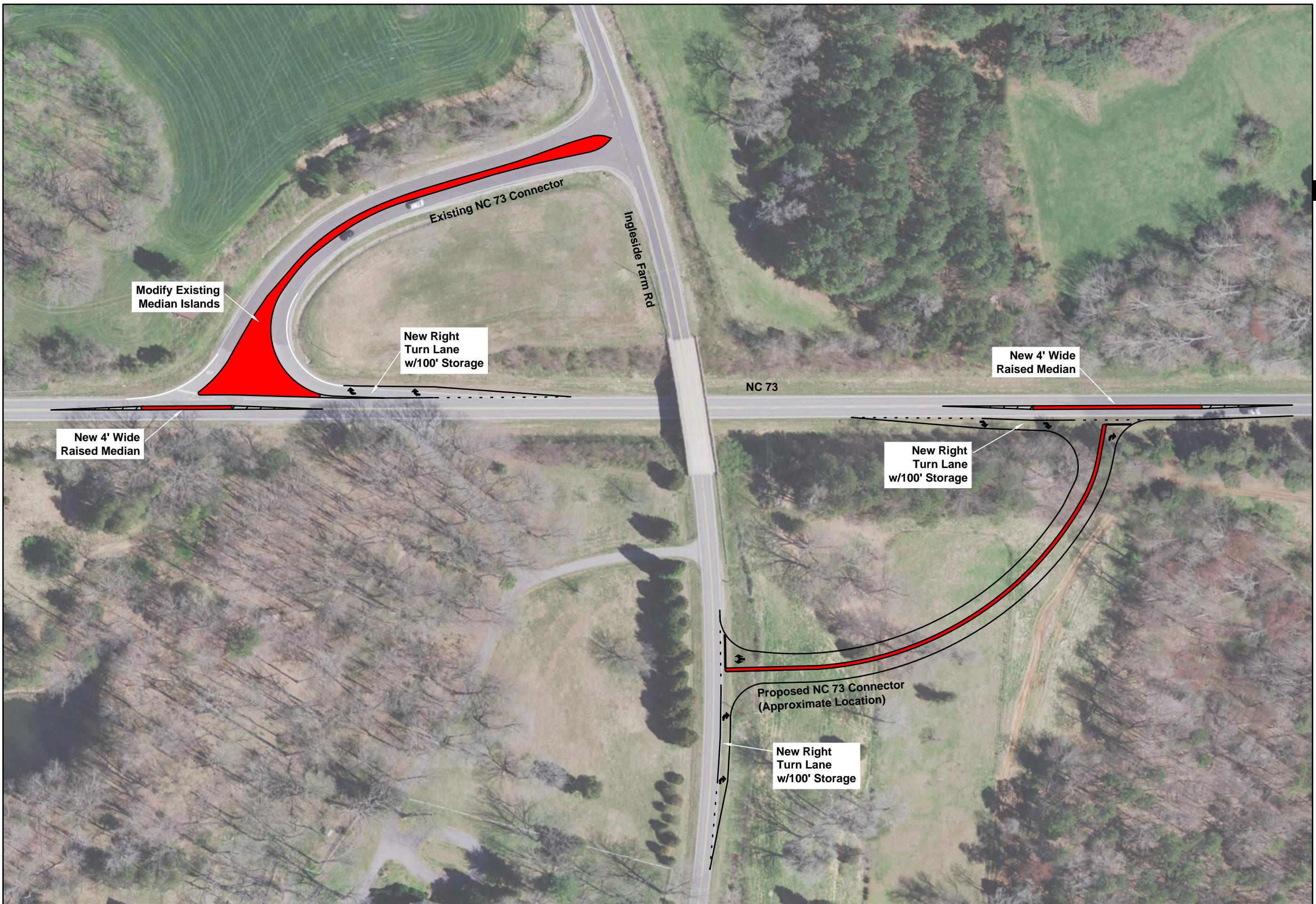


Figure 12



CONCLUSIONS

In conclusion, the proposed Ingleside Farm residential subdivision is not expected to create extensive roadway/intersection issues, especially with the implementation of the recommended roadway improvements and new Ingleside Farm Road Connector to mitigate the estimated number of trips expected to be generated by this development.

The suggested mitigation for the study intersections are illustrated in detail conceptually on Figure 12.



APPENDIX