STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

J. ERIC BOYETTE
SECRETARY

October 13, 2021

The Conservancy at Jordan Lake

Traffic Impact Analysis Review Report
Congestion Management Section

TIA Project: SC-2021-029R2
Division: 8
County: Chatham

Doumit Y. Ishak, Regional Engineer
Clarence B. Bunting, IV, P.E. Project Engineer
Braden M. Walker, P.E. Project Design Engineer

Mailing Address:
NC DEPARTMENT OF TRANSPORTATION
TRANSPORTATION MOBILITY & SAFETY DIVISION
1561 MAIL SERVICE CENTER
RALEIGH, NC 27699-1561

Telephone: (919) 814-5000
Fax: (919) 771-2745
Customer Service: 1-877-368-4968

Website: www.ncdot.gov

Location:
750 N. GREENFIELD PARKWAY
GARNER, NC 27529

The Conservancy at Jordan Lake

SC-2021-029R2	Chatham County

Per your request, the Congestion Management Section (CMS) of the Transportation Mobility and Safety Division has completed a review of the subject site. The comments and recommendations contained in this review are based on data for background conditions presented in the Traffic Impact Analysis (TIA) and are subject to the approval of the local District Engineer's Office and appropriate local authorities.

Date Initially Received by CMS	09/15/21	Date of Site Plan	08/10/21
Date of Complete Information	09/15/21	Date of Sealed TIA	09/15/21

Proposed Development

The TIA assumes the development is to be constructed by 2033 and is to consist of the following:

Land Use	Land Use Code	Size
Single-Family Housing	210	1,575 d.u.

Trip Generation - Unadjusted Volumes During a Typical Weekday			
	IN	**OUT**	**TOTAL**
AM Peak Hour	281	842	1,123
PM Peak Hour	903	530	1,433
Daily Trips			13,200

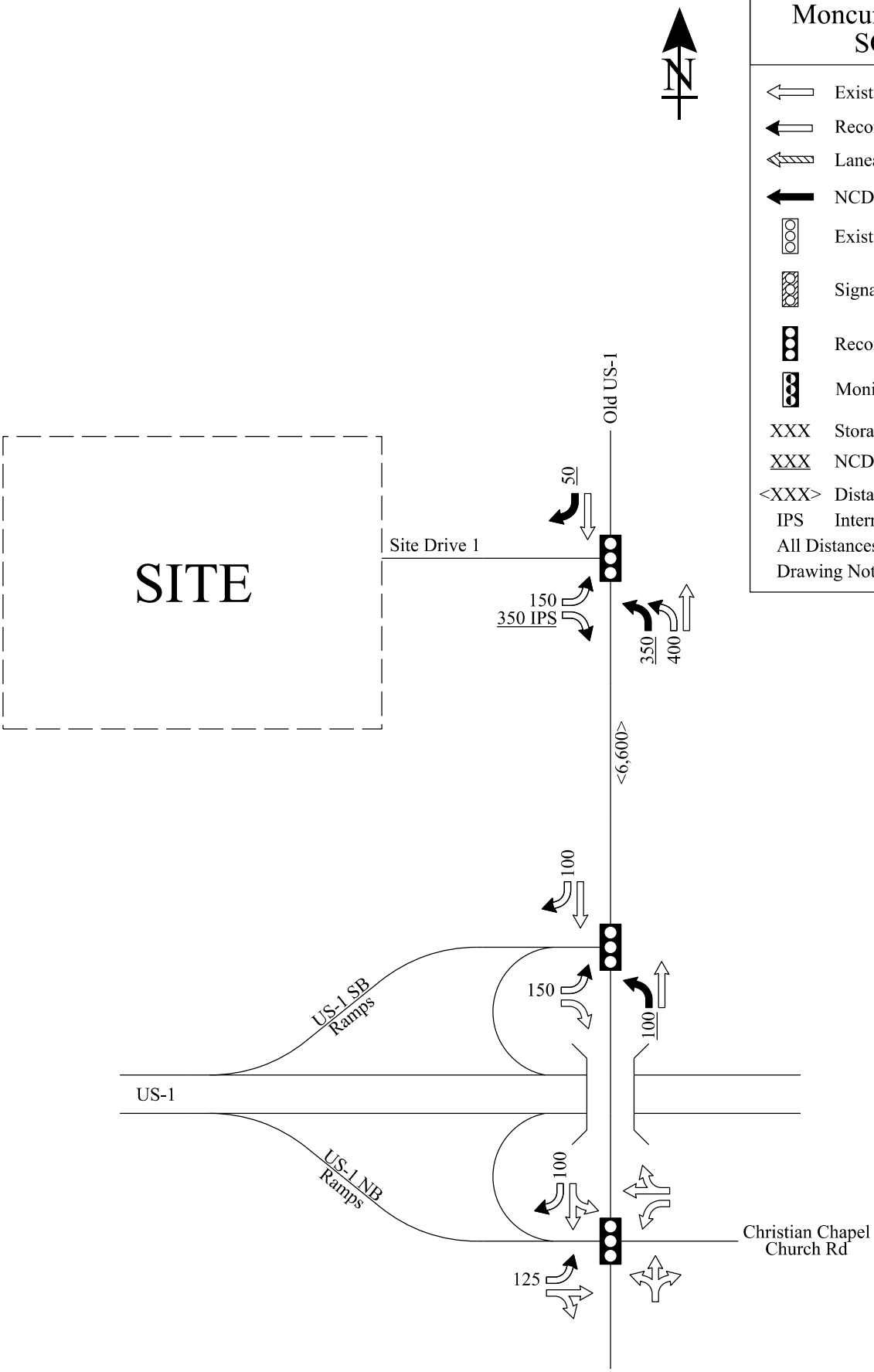
General Reference

For reference to various documents applicable to this review please reference the following link: *http://www.ncdot.org/doh/preconstruct/traffic/teppl/Topics/C-37/C-37.html*
Once the driveway permit has been approved and issued, a copy of the final driveway permit requirements should be forwarded to this office. If we can provide further assistance, please contact the Congestion Management Section.

Signalization

We defer to the District Engineer, the Division Traffic Engineer, and the Regional Traffic Engineer for final decisions regarding signalization.

The Conservancy at Jordan Lake
Moncure, Chatham County
SC-2021-029R2



RAMEY KEMP ASSOCIATES
Moving forward.

T 919 872 5115

5808 Faringdon Place
Raleigh, NC 27609

September 15, 2021

Jeron Monroe
District 1, Department of Transportation
300 DOT Drive
PO Box 1164
Asheboro, NC 27204
rjmonroe@ncdot.gov
(336) 318-4025

Subject: The Conservancy at Jordan Lake – **Traffic Study Update**
Chatham County, North Carolina

Dear Mr. Monroe,

This letter provides an updated capacity analysis and queuing summary for The Conservancy at Jordan Lake residential development, proposed to be located north of the intersection of Old US Hwy 1 and US 1 Ramps in Chatham County, North Carolina. The previous Traffic Impact Analysis (TIA) report was submitted by Ramey Kemp & Associates (RKA) in June of 2021. This traffic study update is provided to summarize the impacts of the proposed development's change in density and site access and provide a comparison of impacts by the proposed development between this update and the previously submitted study.

The previously submitted TIA assumed that the proposed development would consist of a maximum of 1,575 single-family homes and an 18-hole golf course. The proposed development is now expected to only consist of a maximum of 1,575 single-family homes. The exact residential land use is still being discussed. There is potential for some age restricted housing in this development; however, for the purpose of this study, land use code 210 for single-family homes was used for a conservative estimation of site traffic.

Site access for the proposed development was proposed via one (1) full movement intersection along Old US US Hwy 1 and one (1) connection to Lower Thrift Road in the previously submitted TIA. The proposed development is now expected to only provide site access via one (1) full movement intersection along Old US Hwy 1. Refer to the attachments for the updated preliminary site plan.

Study Area

Based on coordination with North Carolina Department of Transportation (NCDOT) staff members, the study area consists of the following intersections:

- Old US Hwy 1 and US 1 Southbound Ramps
- Old US Hwy 1 and US 1 Northbound Ramps / Christian Chapel Church Road

Refer to the attachments for the approved scope. Refer to Figure 1 in the attachments for the site location map and Figure 2 for the existing lane configurations figure.

Analysis Scenarios

All capacity analyses were performed utilizing Synchro (Version 10.3). All study intersections were analyzed during the weekday AM and PM peak hours under the build (2033) traffic conditions.

Existing (2020) and No-Build (2033) Traffic Conditions

Per coordination with NCDOT, existing and no-build peak hour traffic volumes were determined according to the methodology and rationale contained within the previously submitted TIA.

Refer to Figure 3 in the attachments for the existing (2020) traffic volume figure and Figure 4 for the no-build (2033) traffic volume figure.

Trip Generation

Based on recent site plan changes, the proposed development is now expected to consist of a maximum of 1,575 single-family homes. The exact residential land use is still being discussed. There is potential for some age restricted housing in this development; however, for the purpose of this study, ITE land use code 210 for single-family homes was used for a conservative estimation of site traffic. Average weekday daily, AM, and PM peak hour trips for the development were estimated using methodology contained within the ITE *Trip Generation Manual*, 10th Edition. A summary of trip generation potential for the proposed development compared to the previously submitted TIA is shown in Table 1, below.

Table 1: Trip Generation Summary

Land Use (ITE Code)	Intensity	Weekday Daily Traffic (vpd)	Weekday AM Peak Hour Trips (vph)		Weekday PM Peak Hour Trips (vph)	
			Enter	Exit	Enter	Exit
Single-Family Homes (210)	1,575 units	13,200	281	842	903	530
Golf Course (430)	18 holes	550	25	7	27	25
Total Trips *Previously Submitted TIA*		**13,750**	**306**	**849**	**930**	**555**
Single-Family Homes (210)	1,575 units	13,200	281	842	903	530
Difference in Trips		**-550**	**-25**	**-7**	**-27**	**-25**

Trip generation results from the previously submitted TIA are shown in BLUE.
Trip generation results based on the updated density are shown in GREEN.

It is estimated that the proposed development will now generate approximately 13,200 total site trips on the

roadway during a typical 24-hour weekday period. Of the daily traffic volume, it is anticipated that 1,123 trips (281 entering and 842 exiting) will occur during the weekday AM peak hour and 1,433 trips (903 entering and 530 exiting) are expected to occur during the weekday PM peak hour.

The new site plan is expected to generate 550 fewer total daily site trips, 32 fewer trips (-25 entering and -7 exiting) during the weekday AM peak hour, and 52 fewer trips (-27 entering and -25 exiting) during the weekday PM peak hour than shown in the previously submitted TIA.

Trip Distribution

It is estimated that the trips will be distributed as follows for the proposed development:

- 60% to/from the east via US 1
- 35% to/from the west via US 1
- 5% to/from the north via Old US Hwy 1

It should be noted that these trip distribution percentages were reviewed and approved during scoping.

Refer to Figure 5 in the attachments for the site trip distribution and Figure 6 for the site trip assignment figure.

Build (2033) Traffic Volumes

To estimate the build (2033) traffic conditions, the total site trips were added to the no-build (2033) traffic volumes. Refer to Figure 7 in the attachments for the build (2033) traffic volume figure.

Capacity Analysis

The study intersections were analyzed under build (2033) traffic conditions to determine the potential impact of the proposed development under full buildout. Capacity analysis results for build (2033) traffic conditions at each study intersection from the previously submitted TIA, dated June of 2021, are also included to compare the impacts of traffic between the previously submitted TIA and this traffic study update. Analysis was performed using the methodology outlined in the Highway Capacity Manual (HCM), 6th Edition published by the Transportation Research Board. Capacity and level of service are the design criteria for this traffic study. A computer software package, Synchro (Version 10.3), was used to complete the analyses for the study intersection. Please note that the unsignalized capacity analysis does not provide an overall level of service for an intersection; only delay for an approach with a conflicting movement. Refer to Table 2 for HCM levels of service and related average control delay per vehicle for unsignalized and signalized intersections. Control delay as defined by the HCM includes "initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay".

Table 2: Highway Capacity Manual – Levels-of-Service and Delay

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

Capacity analysis at all study intersections was completed according to the NCDOT Congestion Management Guidelines.

Old US Hwy 1 and US 1 Southbound Ramps

The existing unsignalized intersection of Old US Hwy 1 and US 1 Southbound Ramps was analyzed under build (2033) traffic conditions with the lane configurations and traffic control shown in Table 3. Refer to Table 3 for a summary of the capacity analysis results. The Synchro capacity analysis reports are included in the attachments.

Table 3: Analysis Summary of Old US Hwy 1 and US 1 Southbound Ramps

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall (seconds)	Approach	Overall (seconds)
Build (2033) Conditions	EB NB SB	1 LT, 1 RT* 1 LT-TH 1 TH, 1 RT	E[2] A[1] --	N/A	F[2] A[1] --	N/A
Build (2033) Conditions – **Signalized**	EB NB SB	1 LT, **1 RT** 1 LT-TH 1 TH, **1 RT**	B B A	B (11)	C C B	C (24)
Build (2033) Conditions	EB NB SB	1 LT, 1 RT* 1 LT-TH 1 TH, 1 RT	E[2] A[1] --	N/A	F[2] A[1] --	N/A
Build (2033) Conditions – **Signalized**	EB NB SB	1 LT, **1 RT** 1 LT-TH 1 TH, **1 RT**	B B A	B (10)	C C A	C (23)

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

*Based on existing pavement width, the eastbound approach is wide enough for a two-lane approach. This approach is currently unstriped; however, a 25-foot eastbound right-turn lane was analyzed to demonstrate anticipated field conditions.
Improvements by developer in **bold.**
Capacity analysis results from the previously submitted TIA are shown in BLUE.
Capacity analysis results based on the updated density are shown in GREEN.

In the previously submitted TIA, capacity analysis of build (2033) traffic conditions indicates the major-street left-turn movement at the intersection of Old US Hwy 1 and US 1 Southbound Ramps is expected to operate at LOS A during the weekday AM and PM peak hours. The minor-street approach is expected to operate at LOS E during the weekday AM peak hour and LOS F during the weekday PM peak hour. With a decrease in density and change in site access, the levels of service for the major-street left-turn movement and minor street approach at this intersection are expected to operate similarly to what was reported in the previously submitted TIA.

At this intersection, the previously submitted TIA recommended the following improvements:

- Monitor the intersection for signalization.

- Extend the storage at the southbound right-turn lane to at least 100 feet and appropriate deceleration and taper.
- Provide an eastbound right-turn lane with at least 150 feet of storage and appropriate deceleration and taper.

With these improvements, the intersection is expected to operate at an overall LOS B during the weekday AM peak hour and LOS C during the weekday PM peak hour.

The improvements recommended in the previously submitted TIA were considered and analyzed under build (2033) traffic conditions for this traffic study update. With these improvements and site access and density changes, the intersection is still expected to operate at an overall LOS B during the weekday AM peak hour and LOS C during the weekday PM peak hour. It should be noted that the delay at this intersection is expected to decrease by approximately one second (compared to the previously submitted TIA) during both peak hours analyzed. Additionally, a traffic signal is expected to improve queues and delay at the eastbound approach of this intersection during both peak hours analyzed based on SimTraffic reports.

Based on these results, the recommendations from the previously submitted TIA are still recommended at this intersection with the proposed development's density and access change.

Old US Hwy 1 and US 1 Northbound Ramps / Christian Chapel Church Road

The existing unsignalized intersection of Old US Hwy 1 and US 1 Northbound Ramps / Christian Chapel Church Road was analyzed under build (2033) traffic conditions with the lane configurations and traffic control shown in Table 4. Refer to Table 4 for a summary of the capacity analysis results. The Synchro capacity analysis reports are included in the attachments.

Table 4: Analysis Summary of Old US Hwy 1 and US 1 Northbound Ramps / Christian Chapel Church Road

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall (seconds)	Approach	Overall (seconds)
Build (2033) Conditions	EB WB NB SB	1 LT-TH-RT 1 LT, 1 TH-RT 1 LT-TH-RT 1 LT-TH, 1 RT	F[2] E[2] A[1] A[1]	N/A	F[2] D[2] A[1] A[1]	N/A
Build (2033) Conditions – **with Turn Lane Improvements**	EB WB NB SB	**1 LT**, 1 TH-RT 1 LT, 1 TH-RT 1 LT-TH-RT 1 LT-TH, **1 RT**	F[2] E[2] A[1] A[1]	N/A	F[2] D[2] A[1] A[1]	N/A
Build (2033) Conditions	EB WB NB SB	1 LT-TH-RT 1 LT, 1 TH-RT 1 LT-TH-RT 1 LT-TH, 1 RT	F[2] E[2] A[1] A[1]	N/A	F[2] D[2] A[1] A[1]	N/A
Build (2033) Conditions – **with Turn Lane Improvements**	EB WB NB SB	**1 LT**, 1 TH-RT 1 LT, 1 TH-RT 1 LT-TH-RT 1 LT-TH, **1 RT**	F[2] E[2] A[1] A[1]	N/A	F[2] D[2] A[1] A[1]	N/A

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

Improvements by developer in **bold.**
Capacity analysis results from the previously submitted TIA are shown in BLUE.
Capacity analysis results based on the updated density are shown in GREEN.

In the previously submitted TIA, capacity analysis of build (2033) traffic conditions indicates the major-street left-turn movements at the intersection of Old US Hwy 1 and US 1 Northbound Ramps / Christian Chapel Church Road are expected to operate at LOS A during the weekday AM and PM peak hours. The westbound minor-street approach is expected to operate at LOS E during the weekday AM peak hour and LOS D during the weekday PM peak hour. The eastbound minor-street approach is expected to operate at LOS F during the weekday AM and PM peak hour. With a decrease in density and change in site access, the levels of service for the major-street left-turn movement and minor street approach at this intersection are expected to operate similarly to what was reported in the previously submitted TIA. It should be noted that in both the previously submitted TIA and this traffic study update, SimTraffic results show minimal traffic queues during the weekday AM and PM peak hours that are contained on the US 1 Northbound Off-Ramp.

At this intersection, the previously submitted TIA recommended the following improvements:

- Provide an eastbound left-turn lane with at least 125 feet of storage and appropriate deceleration and taper.
- Provide a southbound right-turn lane with at least 100 feet of storage and appropriate deceleration and taper.

It should be noted that a traffic signal was considered in the previously submitted TIA at this intersection; however, warrants were not meet under build (2033) traffic conditions.

The improvements recommended in the previously submitted TIA were considered and analyzed under build (2033) traffic conditions for this traffic study update. With these improvements and site plan changes, the levels of service for the major-street left-turn movements and minor-street approaches at the intersection are expected to operate similarly to what was reported in the previously submitted TIA.

Based on these results, the recommendations from the previously submitted TIA are still recommended at this intersection with the proposed development's density and access change.

Old US Hwy 1 and Site Drive 1

The proposed intersection of Old US Hwy 1 and Site Drive 1 was analyzed under build (2033) traffic conditions with the lane configurations and traffic control shown in Table 5. Refer to Table 5 for a summary of the capacity analysis results. The Synchro capacity analysis reports are included in the attachments.

Table 5: Analysis Summary of Old US Hwy 1 and Site Drive 1

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall (seconds)	Approach	Overall (seconds)
Build (2033) Conditions	**EB** NB SB	**1 LT, 1 RT** **1 LT,** 1 TH 1 TH-**RT**	E[2] A[1] --	N/A	F[2] C[1] --	N/A
Build (2033) Conditions – **Signalized**	**EB** NB SB	**1 LT, 1 RT** **1 LT,** 1 TH 1 TH-**RT**	B A D	B (13)	B D D	C (32)
Build (2033) Conditions	**EB** NB SB	**1 LT, 1 RT** **1 LT,** 1 TH 1 TH-**RT**	E[2] A[1] --	N/A	F[2] C[1] --	N/A
Build (2033) Conditions – **Signalized**	**EB** NB SB	**1 LT, 1 RT** **1 LT,** 1 TH 1 TH-**RT**	B A D	B (15)	B D D	C (33)

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

Improvements by developer are shown in **bold**.
Capacity analysis results from the previously submitted TIA are shown in BLUE.
Capacity analysis results based on the updated density are shown in GREEN.

Capacity analysis of build (2033) traffic conditions in the previously submitted TIA indicates the major-street left-turn movement at the intersection of Old US Hwy 1 and Site Drive 1 is expected to operate at LOS C or better during the weekday AM and PM peak hours. The minor-street approach is expected to operate at LOS E during the weekday AM peak hour and LOS F during the weekday PM peak hour. With the decrease in density and change in site access, the levels of service for the major-street left-turn movement and minor street approach at this intersection are expected to operate similarly to what was reported in the previously submitted TIA.

At this intersection, the previously submitted TIA recommended the following improvements:

- Construct eastbound approach with one ingress lane and two egress lanes, with the left-turn lane providing at least 150 feet of storage and appropriate decel and taper and one right-turn lane with full storage.
- Provide a northbound left-turn lane with at least 400 feet of storage and appropriate deceleration and taper.
- Monitor the intersection for signalization.

With these improvements, the intersection is expected to operate at an overall LOS B during the weekday AM peak hour and LOS C during the weekday PM peak hour.

The improvements recommended in the previously submitted TIA were considered and analyzed under build (2033) traffic conditions for this traffic study update. With these improvements and site access and density changes, the intersection is still expected to operate at an overall LOS B during the weekday AM peak hour and LOS C during the weekday PM peak hour.

Based on these results, the recommendations from the previously submitted TIA are still recommended at this intersection with the proposed development's density and access change.

Conclusions and Recommendations

Based on the capacity analysis results, the proposed development's site plan changes are expected to have a similar impact on the study area compared to the previously submitted TIA dated June of 2021. Refer to Figure 8 in the attachments for the recommended lane configuration figure.

The recommended roadway improvements, which match the improvements from the June 2021 TIA submittal, are summarized below.

Recommended Improvements by Developer

Old US Hwy 1 and US 1 Southbound Ramps

- Provide an eastbound right-turn lane with at least 150 feet of storage and appropriate deceleration and taper.
- Extend the storage at the southbound right-turn lane to at least 100 feet of storage and appropriate deceleration and taper. This movement is currently channelized with approximately 25 feet of storage.
- Monitor intersection for signalization, and install traffic signal when warranted and approved by NCDOT.

Old US Hwy 1 and US 1 Northbound Ramps

- Provide an eastbound left-turn lane with at least 125 feet of storage and appropriate deceleration and taper.
- Provide a southbound right-turn lane with at least 100 feet of storage and appropriate deceleration and taper.

Old US Hwy 1 and Site Drive 1

- Construct eastbound approach with one ingress lane and two egress lanes, with the left-turn lane providing at least 150 feet of storage and appropriate decel and taper and one right-turn lane with full storage.
- Provide a northbound left-turn lane with at least 400 feet of storage and appropriate taper.
- Monitor intersection for signalization, and install traffic signal when warranted and approved by NCDOT.

If you should have any questions or comments regarding this letter, please feel free to contact me at (919) 872-5115.

Sincerely,

Joshua Reinke, P.E.
State Traffic Engineering Lead
RAMEY KEMP & ASSOCIATES, INC.

NC Corporate License #C-0910

09/15/2021

Attachments: Scope
Site Plan
Figures
Synchro Reports

ATTACHMENTS

SCOPE

RAMEY KEMP ASSOCIATES
Moving forward.

T 919 872 5115
5808 Faringdon Place
Raleigh, NC 27609

August 20, 2021

Jeron Monroe
District 1, Department of Transportation
300 DOT Drive
PO Box 1164
Asheboro, NC 27204
rjmonroe@ncdot.gov
(336) 318-4025

Reference: The Conservancy at Jordan Lake
Chatham County, North Carolina

SUBJECT: Memorandum of Understanding for TIA Report **UPDATE**

Dear Mr. Monroe:

The following is **an updated Memorandum of Understanding (MOU)** outlining the proposed scope of work and assumptions related to the Traffic Impact Analysis (TIA) for the proposed The Conservancy at Jordan Lake residential development located north of the Old US Hwy 1 and US 1 Ramps in Chatham County, North Carolina. It is our understanding that the proposed development is expected to consist of **a maximum of 1,575 homes** and be fully built-out by 2033.

Site access is proposed via one (1) full movement driveway along Old US Hwy 1. Refer to the attached preliminary site plan.

Study Area

Based on coordination with the North Carolina Department of Transportation (NCDOT), the study area is proposed to consist of the following existing intersections:

- Old US Hwy 1 and US 1 Southbound Ramps
- Old US Hwy1 and US 1 Northbound Ramps
- ~~**Pea Ridge Road and US 1 Southbound Ramps**~~
- ~~**Pea Ridge Road and US 1 Northbound Ramps**~~
- ~~**Pea Ridge Road and Lower Thrift Road**~~

~~It should be noted that additional intersections may be included in this study if site access is ultimately provided via New Elam Church Road.~~ ~~**As the homes of the proposed development are expected to be located on the southern side of the site and the Lower Thrift Road site access connection is located farther up Pea Ridge**~~

~~**Road than the previously proposed access location, traffic traveling to/from the site to/from the west via US 1 is expected to take the exit/entering ramps at Old US Hwy 1.**~~

Analysis Scenarios

All capacity analyses will be performed utilizing Synchro (Version 10.3). All study intersections will be analyzed during typical weekday AM and PM peak hours under the following proposed traffic scenarios:

- Existing (2020) Traffic Conditions
- No-Build (2033) Traffic Conditions
- Build (2033) Traffic Conditions

Existing Traffic Volumes

Peak hour turning movement counts were conducted by RKA at the study intersections in June of 2018 during weekday AM (7:00 to 9:00) and weekday PM (4:00 to 6:00) peak hours. Traffic counts were taken while schools were not in session. There are no schools located within the study area that are expected to have a significant impact on traffic conditions. Traffic volumes were grown to the year 2020 using a 1% growth rate based on historical data and were balanced between study intersections, where appropriate. Refer to the attached traffic count data and the existing (2020) traffic volumes figure.

Adjacent Developments

Per coordination with the North Carolina Department of Transportation of Chatham County (County), no adjacent developments are to be included in this study. Also, through coordination with the NCDOT and the County, the future adjacent development of Triangle Innovation Point will not be included in this study due to the preliminary and ambiguous nature of the site.

No-Build Traffic Volumes

Per coordination with the NCDOT Staff, no-build traffic volumes will be determined by projecting existing (2020) traffic volumes to the build-out year using a proposed 1% annual growth rate based on historical data within the study area.

Trip Generation

Average weekday daily, AM peak hour, and PM peak hour trips for **the proposed development consisting of 1,575 homes** was estimated using methodology contained within the ITE *Trip Generation Manual*, 10th Edition. The exact residential land use is still being discussed (there is potential for some age restricted housing in this development); however, for the purpose of this study, land use code 210 for single-family homes will be used for a conservative estimation of site traffic. Refer to Table 1, on the following page, for a detailed breakdown of the buildout site trip generation.

Table 1: Trip Generation Summary

Land Use (ITE Code)	Intensity	Daily Traffic (vpd)	AM Peak Hour Trips (vph)		PM Peak Hour Trips (vph)	
			Enter	Exit	Enter	Exit
Single-Family Homes (210)	**1,575 units**	**13,200**	**281**	**842**	**903**	**530**

It is estimated that the proposed development will generate approximately 13,200 total site trips on the roadway network during a typical 24-hour period. Of the daily traffic volume, it is anticipated 1,123 trips (281 entering and 842 exiting) will occur during the AM peak hour and 1,433 trips (903 entering and 530 exiting) will occur during the PM peak hour.

Trip Distribution

The primary site trips are distributed based on a combination of existing traffic patterns, population centers adjacent to the study area, and engineering judgment. A summary of the proposed regional residential and commercial trip distributions is below:

- 60% to/from the east via US 1
- **35%** to/from the west via US 1
- ~~5% to/from the north via Pea Ridge Road~~
- 5% to/from the north via Old US Hwy 1

Refer to the attachments for figures showing the updated anticipated site trip distribution for the site.

Future Roadway Improvements

Through coordination with the NCDOT Staff, no future improvements will be included in this analysis.

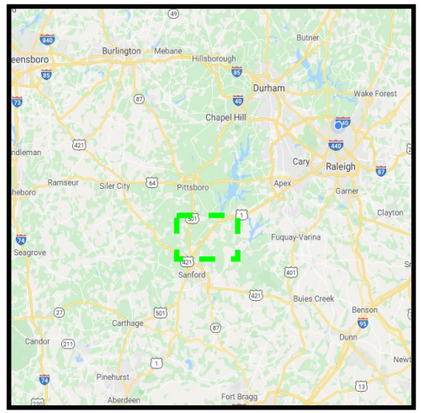
Report

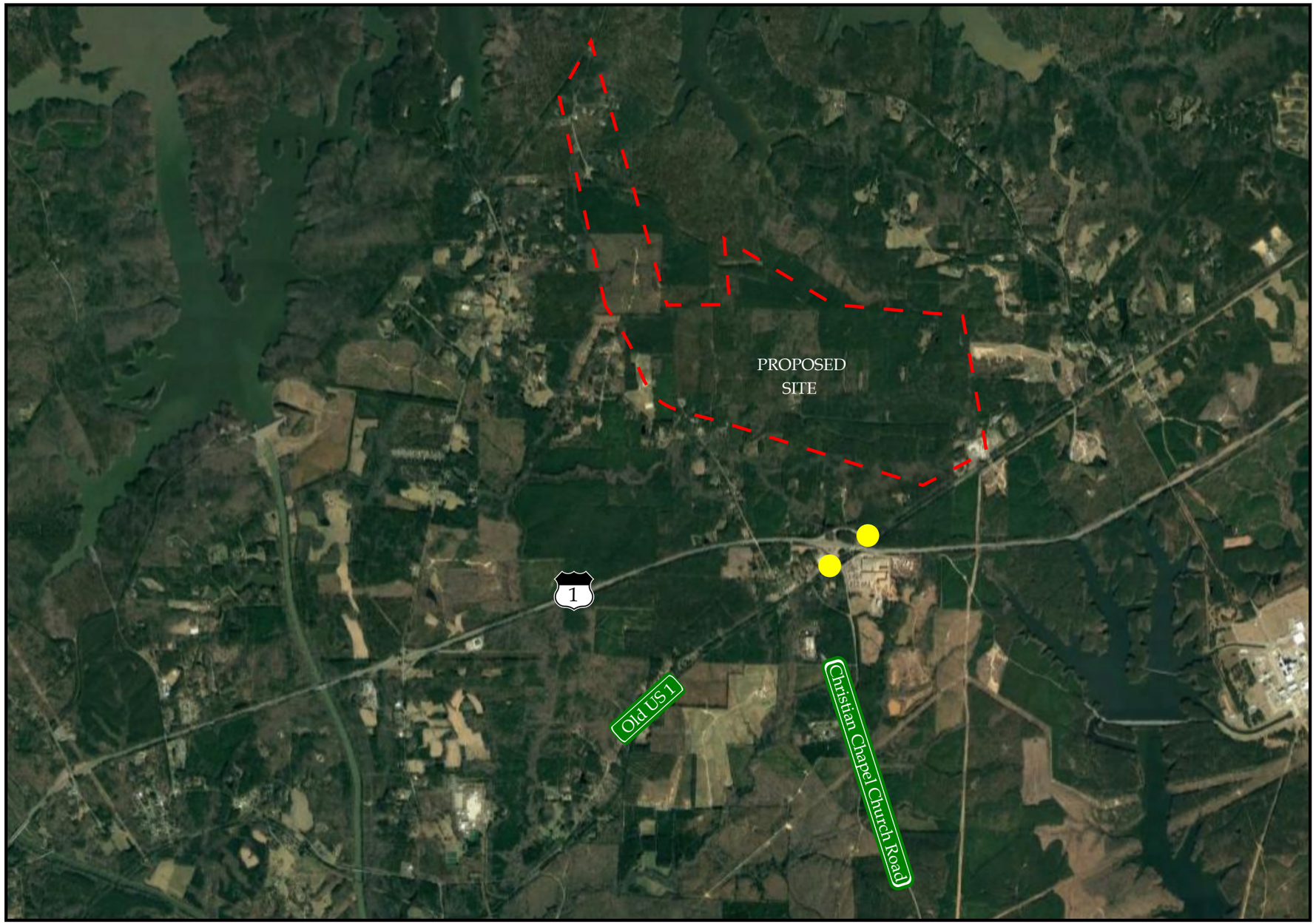
The Traffic Impact Analysis report will be prepared based on the NCDOT requirements. If you find this memorandum of understanding acceptable, please let me know so that we may include it in the TIA report. If you have any questions or concerns, please do not hesitate to contact me.

Sincerely,
Ramey Kemp & Associates, Inc.

Joshua Reinke, PE
State Traffic Engineering Lead

Attachments: Site Location Map
Preliminary Site Plan
Existing (2020) Traffic Volumes Figure
Site Trip Distribution Figure





LEGEND

- Proposed Site Location
- Study Intersection
- Study Area

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RKA
RAMEY KEMP ASSOCIATES

The Conservancy
at Jordan Lake Update
Chatham County, NC

Site Location Map

Scale: Not to Scale

CONSERVANCY SITE PLAN

CHATHAM COUNTY, NC

AUGUST 10, 2021

AGE RESTRICTED DEVELOPMENT QUANTITIES	
61' x 120' MIN. (209 UNITS)	
41' x 120' MIN. (313 UNITS) 51 x 120' MIN. (313 UNITS)	
TOTAL UNITS (AGE RESTRICTED) =	±835

TRADITIONAL DEVELOPMENT QUANTITIES	
41' x 125' (186 UNITS) (27.6%)	
55' x 130' (202 UNITS) (30%)	
75' x 135' (106 UNITS) (15.7%)	
TOWNHOME BLDG (180 UNITS) (26.7%)	
TOTAL UNITS (TRADITIONAL) =	±674

SITE DATA	
TOTAL PROJECT AREA=	±1,262.88 AC
TOTAL WETLAND / STREAM AREA=	±47.2 AC
NET TRACT AREA=	±1,215.68 AC
ALLOWABLE NET LOT YIELD W/ 15% BONUS=	±1,521
TOTAL UNITS ON PLAN=	±1,509

USACOE

PEA RIDGE RD. (SR 1972)

LOWER THRIFT RD. (SR 1907)

GARDNER CEMETERY LOT 1

SHADDOX DR.

SCM

WWTP

UPSET POND

IRRIGATION POND

EMERGENCY ACCESS DRIVE

NATURAL PRESERVATION AREA

AMENITY SITE #2

AMENITY SITE #1

PARK

COMMUNITY GARDEN

AGRICULTURE AREA

HOLT CEMETERY LOT 1

PARTIAN RD.

NEW CHURCH

OLD US 1

WAKE COUNTY

CHATHAM COUNTY

JORDAN LAKE

SITE

VICINITY MAP

NTS

NORTH

600' 0 600' 1200'

SCALE: 1" = 600'

CE GROUP

301 GLENWOOD AVE. 220
RALEIGH,NC 27603
PHONE: 919-367-8790
FAX: 919-322-0032

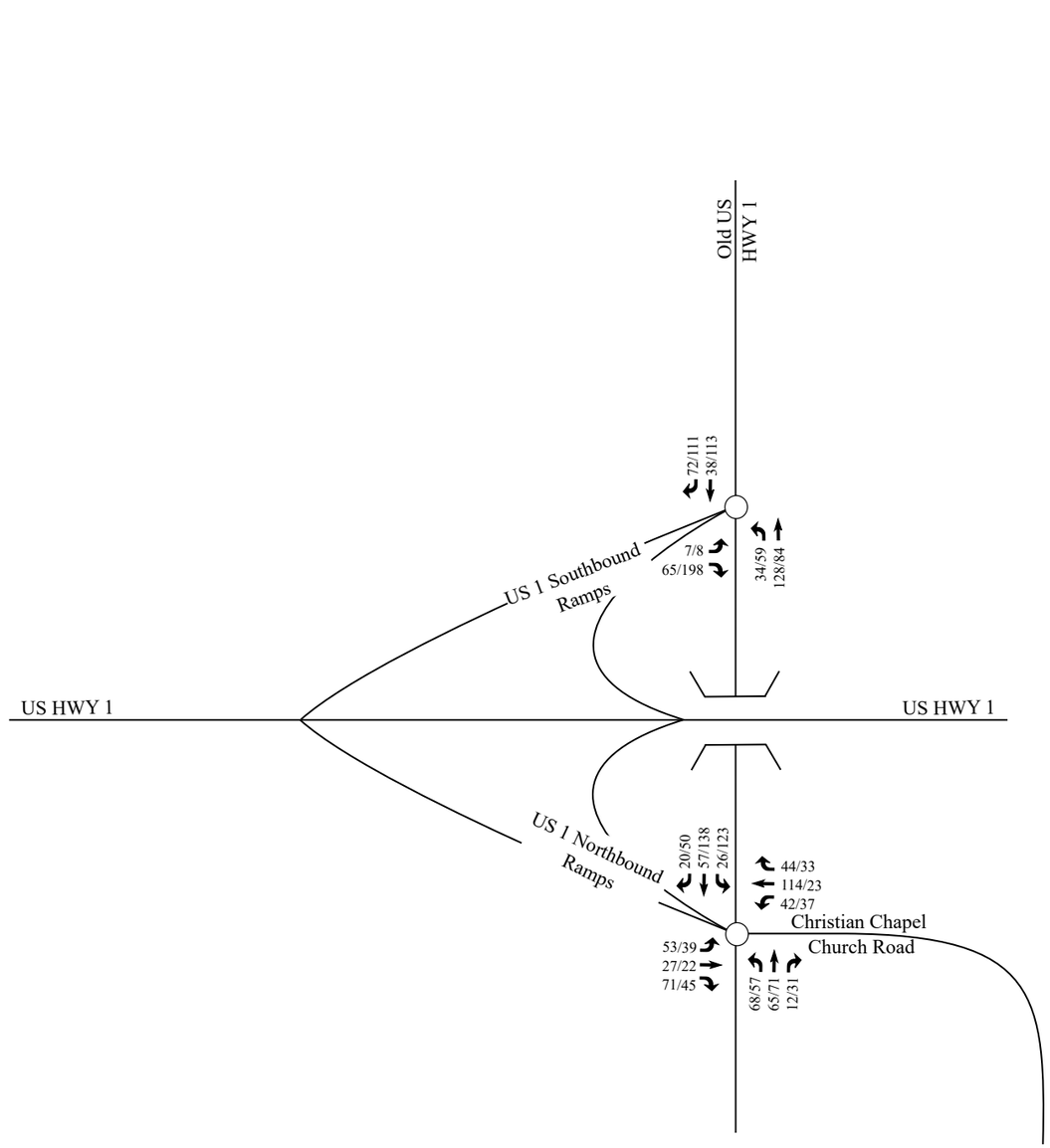
www.cegroupinc.com

License # C-1739

LEGEND

○ Unsignalized Intersection

X / Y → Weekday AM / PM Peak Hour Traffic



Moving forward.

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The Conservancy at Jordan Lake Update

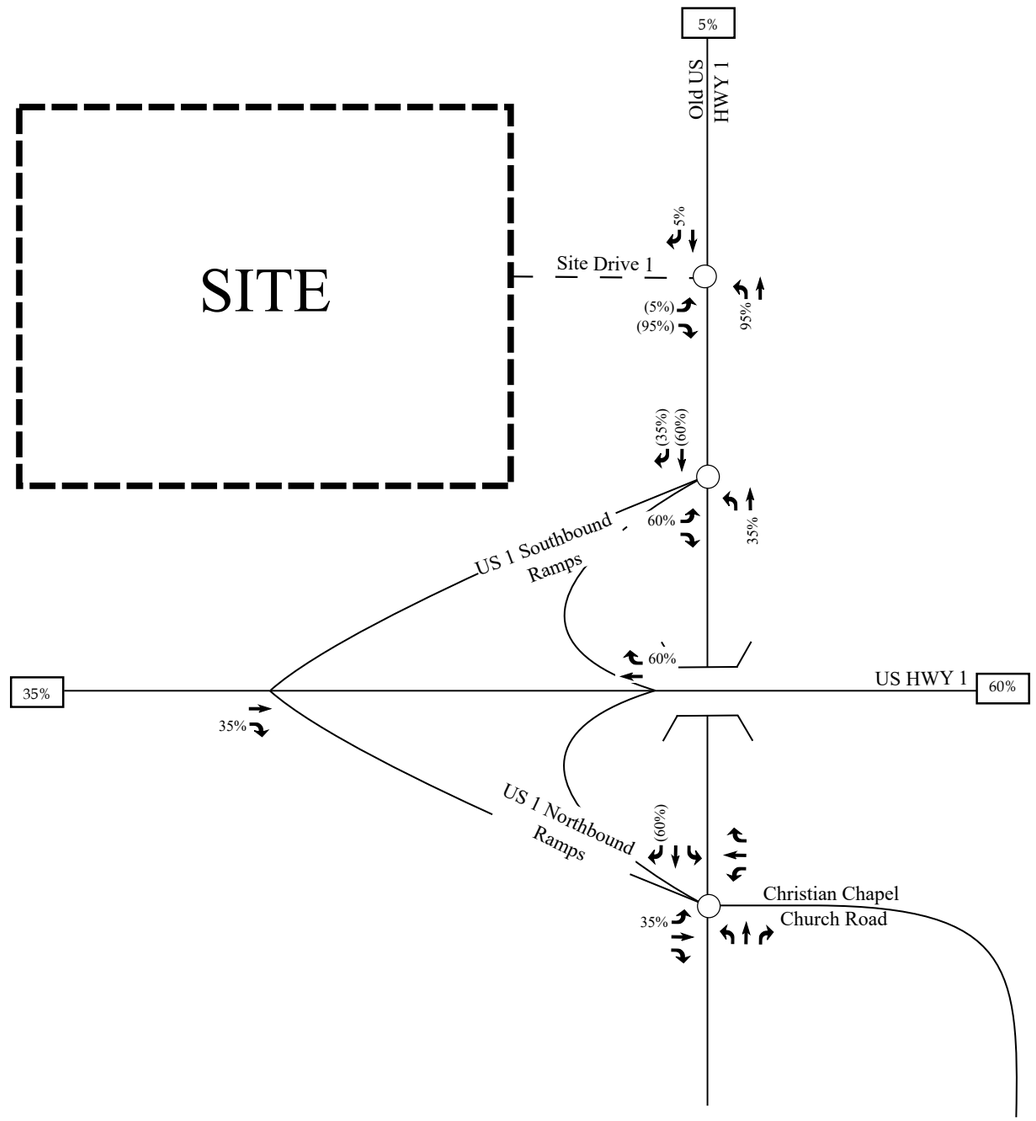
Chatham County, NC

Existing (2020) Peak Hour Traffic Volumes

Scale: Not to Scale

LEGEND

- Unsignalized Intersection
- X% → Entering Trip Distribution
- (Y)% → Exiting Trip Distribution
- XX% Regional Trip Distribution



Moving forward.
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The Conservancy at Jordan Lake Update
Chatham County, NC

Site
Trip Distribution

Scale: Not to Scale

SITE PLAN

CONSERVANCY SITE PLAN

CHATHAM COUNTY, NC

AUGUST 10, 2021

AGE RESTRICTED DEVELOPMENT QUANTITIES	
61' x 120' MIN. (209 UNITS)	
41' x 120' MIN. (313 UNITS) 51 x 120' MIN. (313 UNITS)	
TOTAL UNITS (AGE RESTRICTED) =	±835

TRADITIONAL DEVELOPMENT QUANTITIES	
41' x 125' (186 UNITS) (27.6%)	
55' x 130' (202 UNITS) (30%)	
75' x 135' (106 UNITS) (15.7%)	
TOWNHOME BLDG (180 UNITS) (26.7%)	
TOTAL UNITS (TRADITIONAL) =	±674

SITE DATA	
TOTAL PROJECT AREA=	±1,262.88 AC
TOTAL WETLAND / STREAM AREA=	±47.2 AC
NET TRACT AREA=	±1,215.68 AC
ALLOWABLE NET LOT YIELD W/ 15% BONUS=	±1,521
TOTAL UNITS ON PLAN=	±1,509

USACOE

PEA RIDGE RD. (SR 1972)

LOWER THRIFT RD. (SR 1907)

GARDNER CEMETERY LOT 1

SHADDOX DR.

SCM

WWTP

UPSET POND

IRRIGATION POND

EMERGENCY ACCESS DRIVE

NATURAL PRESERVATION AREA

AMENITY SITE #2

AMENITY SITE #1

PARK

COMMUNITY GARDEN

AGRICULTURE AREA

HOLT CEMETERY LOT 1

PARTIAN RD.

NEW CHURCH

OLD US 1

WAKE COUNTY

CHATHAM COUNTY

JORDAN LAKE

SITE

VICINITY MAP

NTS

NORTH

600' 0 600' 1200'

SCALE: 1" = 600'

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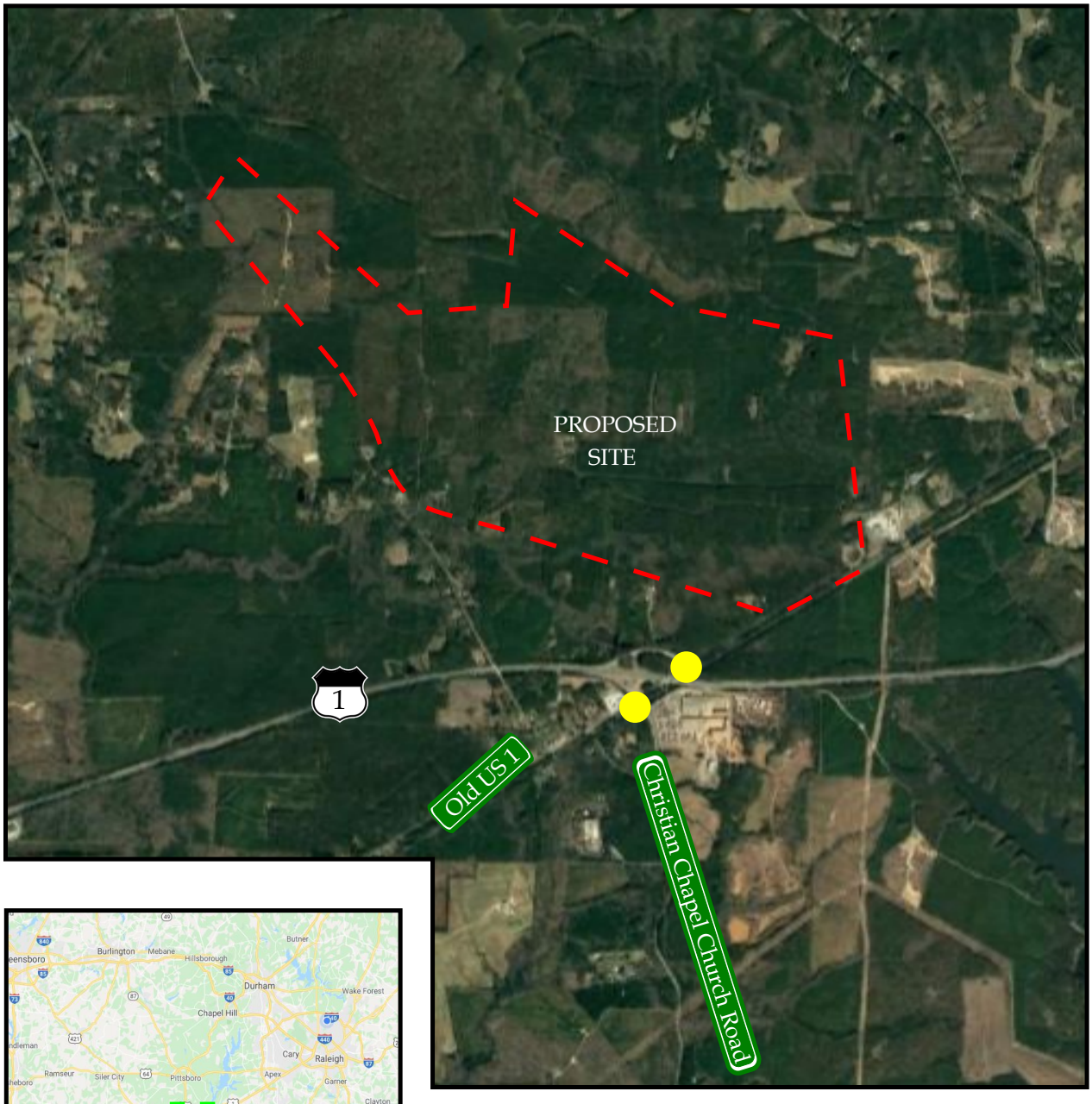
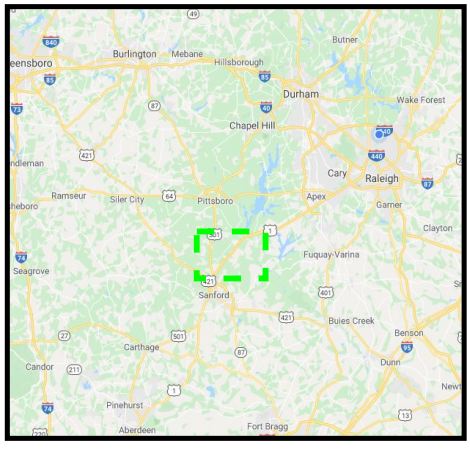
FIGURES





N

LEGEND

- Proposed Site Location
- Study Intersection
- Study Area

Moving forward.

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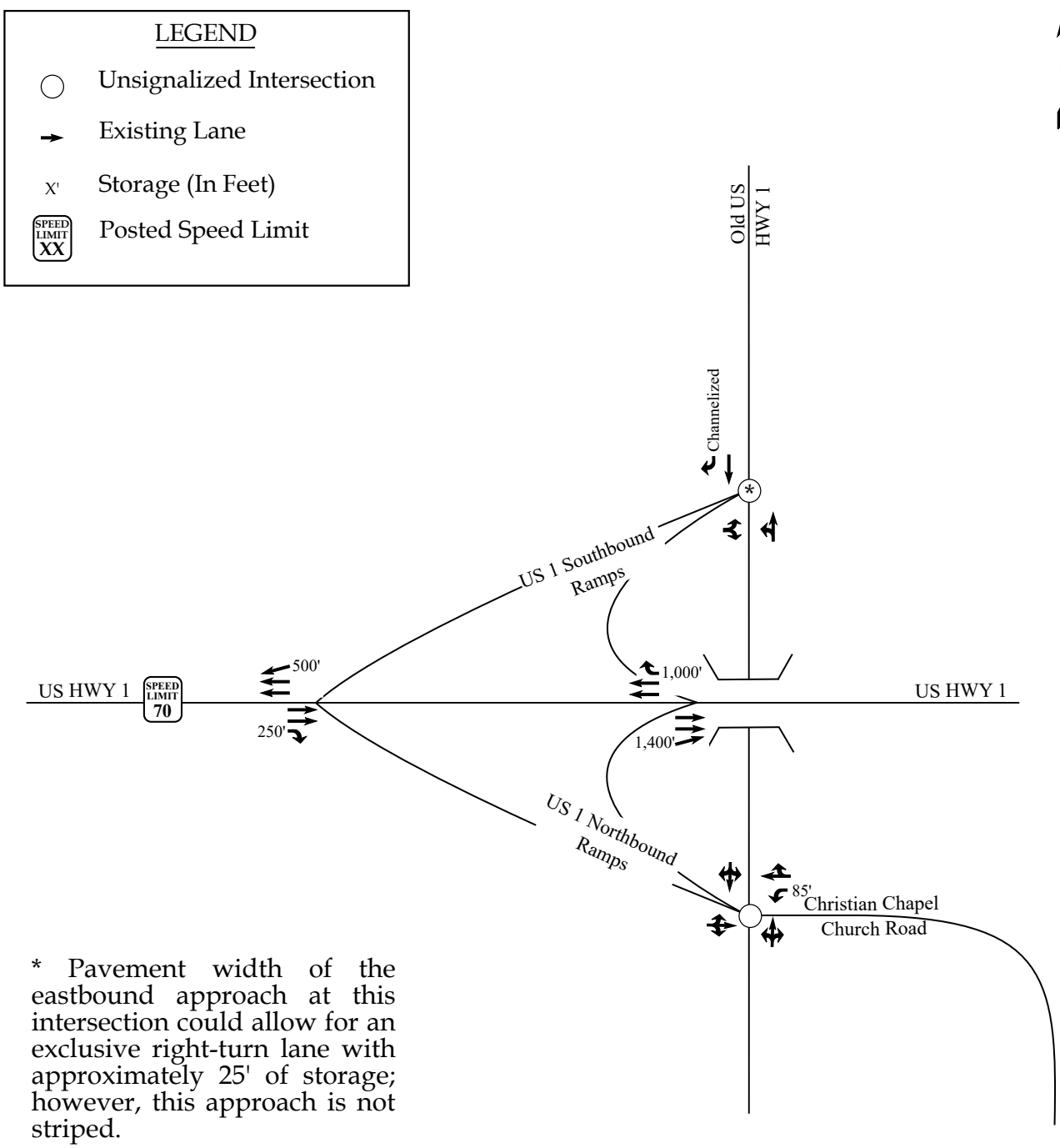
The Conservancy at Jordan Lake Update

Chatham County, NC

Site Location Map

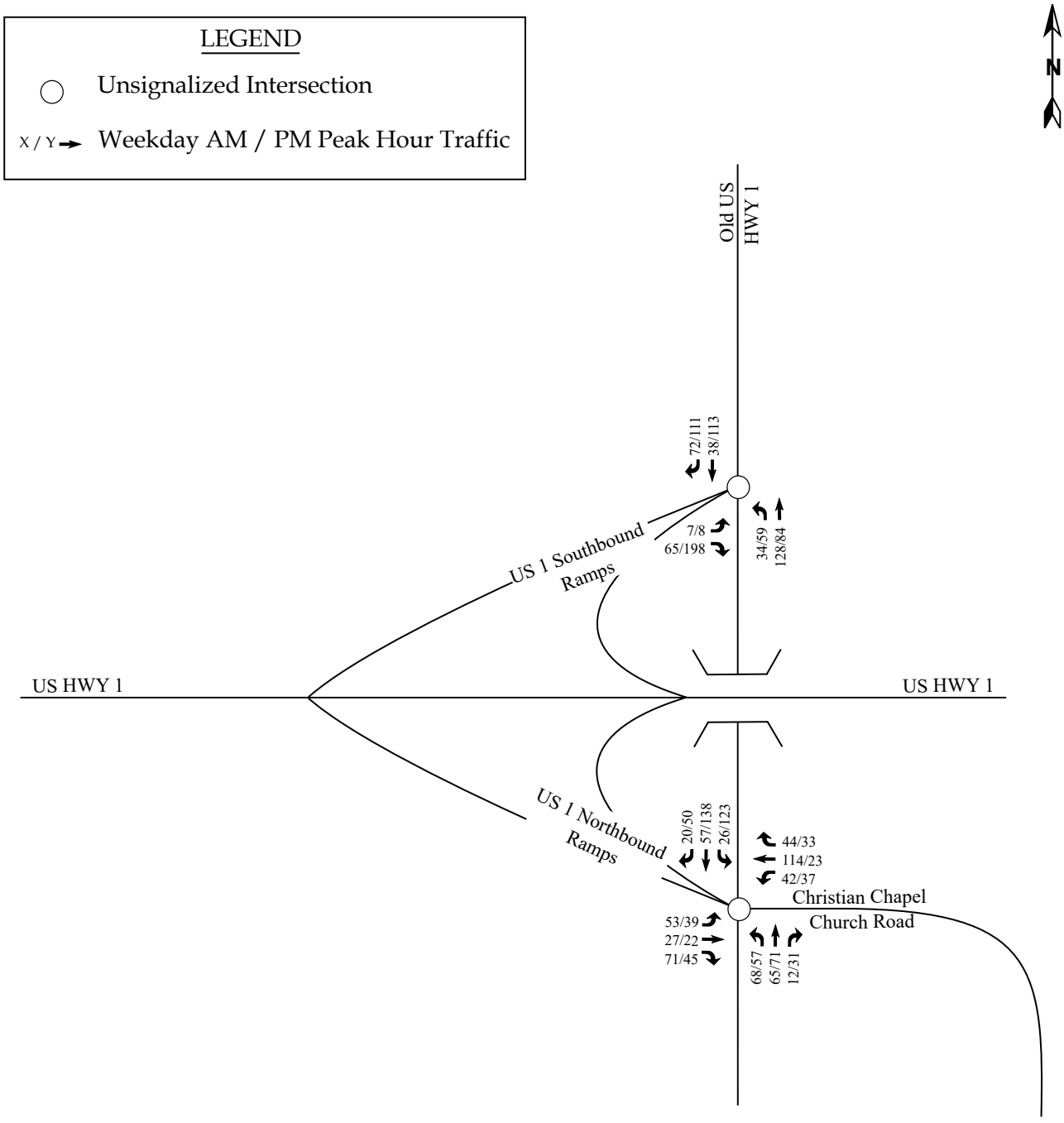
Scale: Not to Scale

Figure 1



* Pavement width of the eastbound approach at this intersection could allow for an exclusive right-turn lane with approximately 25' of storage; however, this approach is not striped.

Moving forward. RKA RAMEY KEMP ASSOCIATES	The Conservancy at Jordan Lake Update Chatham County, NC	2020 Existing Lane Configurations Scale: Not to Scale | Figure 2



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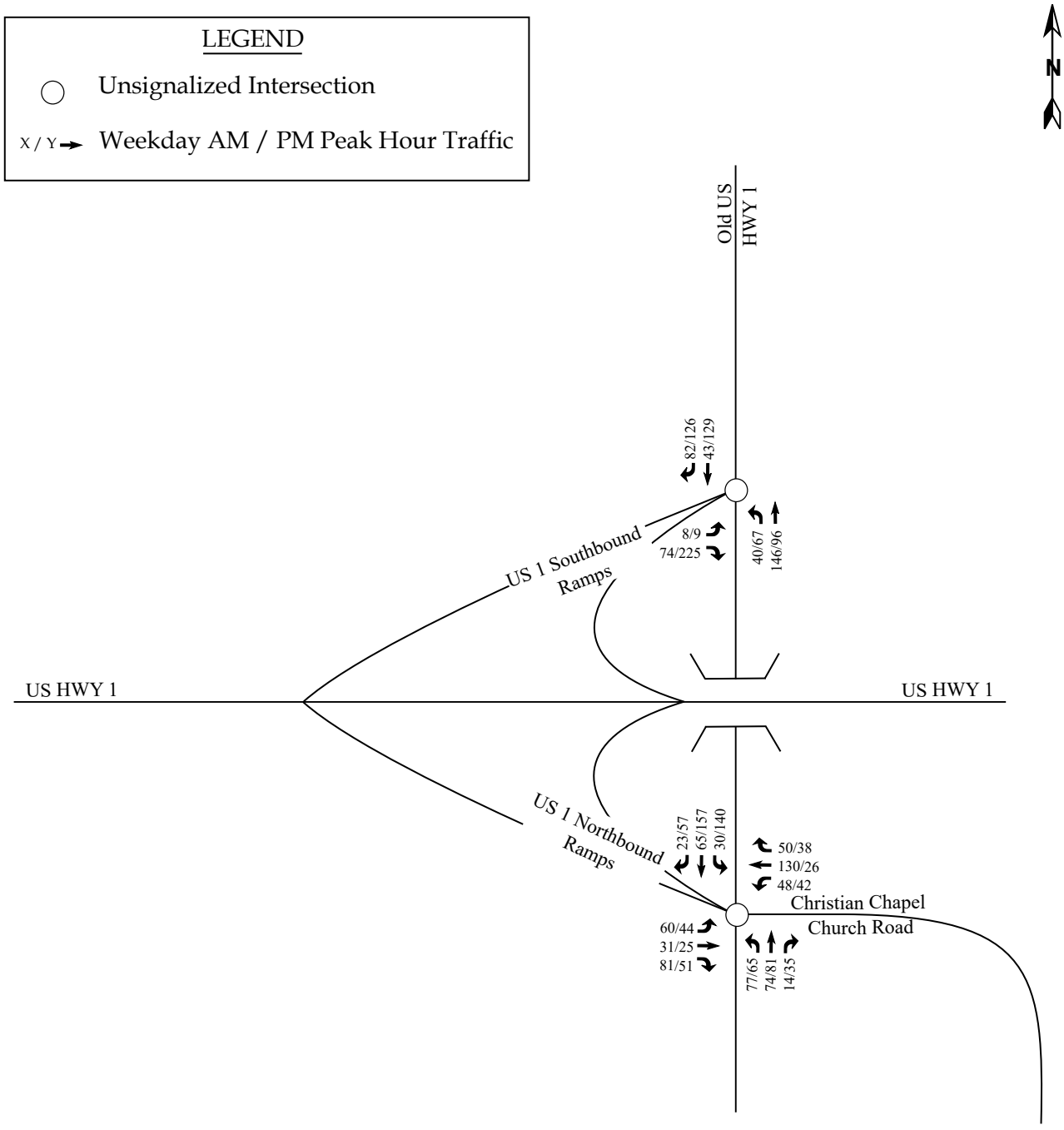
The Conservancy at Jordan Lake Update
Chatham County, NC

Existing (2020) Peak Hour Traffic

Scale: Not to Scale | Figure 3



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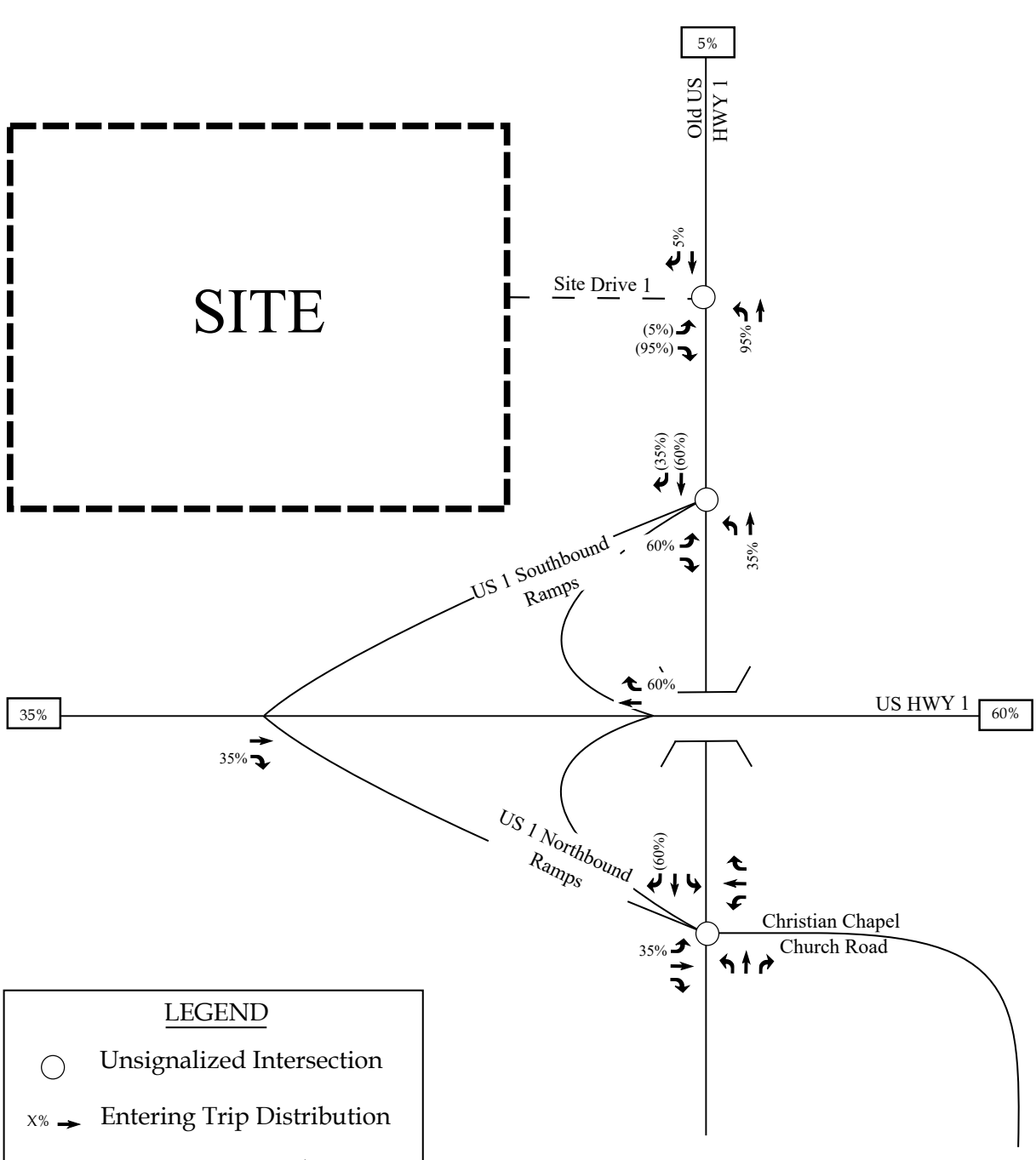
Chatham County, NC

No-Build (2033) Peak Hour Traffic

Scale: Not to Scale | Figure 4



LEGEND

- ○ Unsignalized Intersection
- X% → Entering Trip Distribution
- (Y)% → Exiting Trip Distribution
- XX% Regional Trip Distribution

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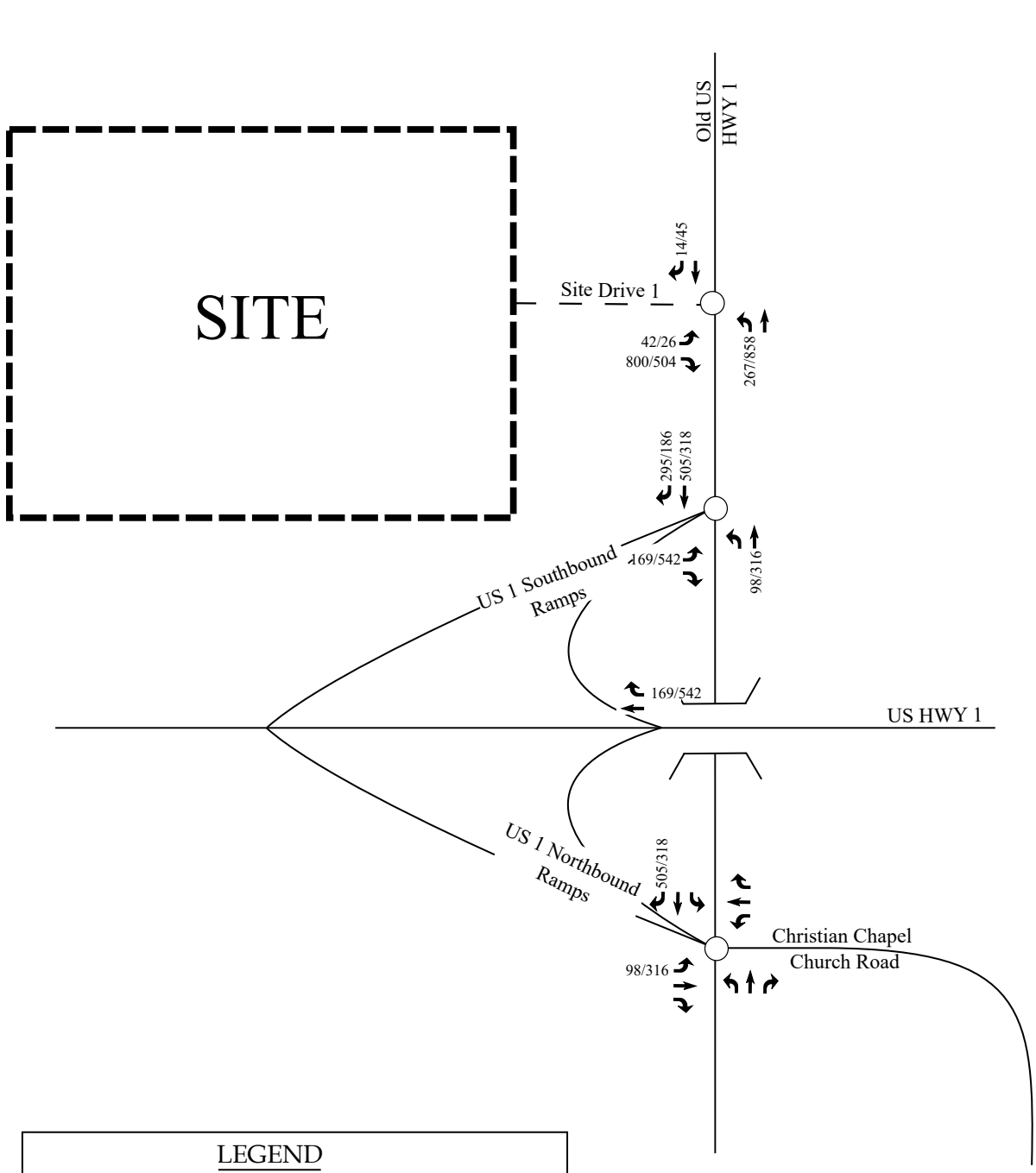
Chatham County, NC

Site Trip Distribution

Scale: Not to Scale | Figure 5



LEGEND

◯ Unsignalized Intersection

X / Y → Weekday AM / PM Peak Site Trips

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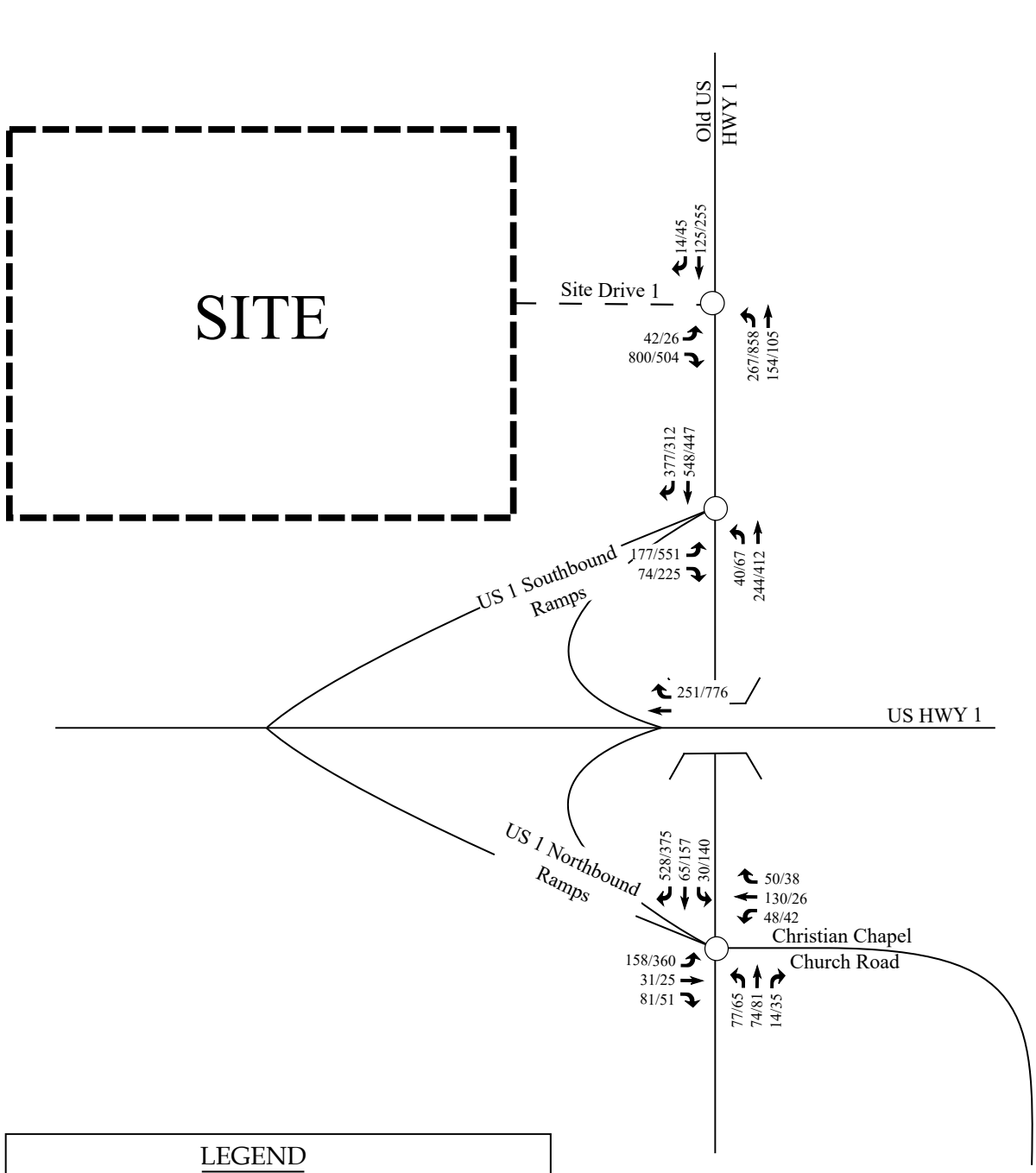
The Conservancy at Jordan Lake Update
Chatham County, NC

Site Trip Assignment

Scale: Not to Scale | Figure 6



LEGEND

○ Unsignalized Intersection

X / Y → Weekday AM / PM Peak Hour Traffic

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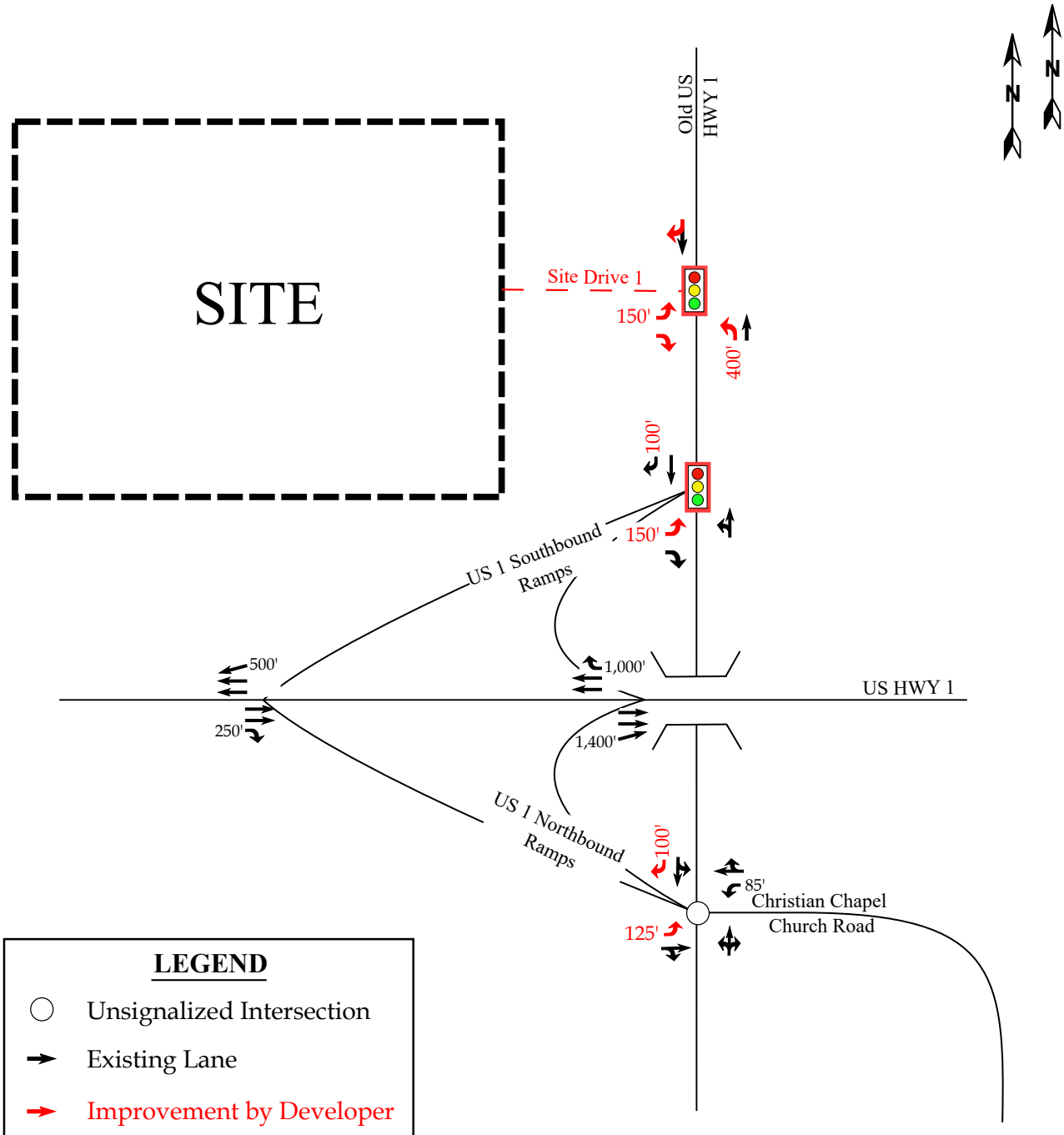
Chatham County, NC

Build (2033)
Peak Hour Traffic

Scale: Not to Scale | Figure 7



LEGEND

- Unsignalized Intersection
- Existing Lane
- Improvement by Developer
- Monitor Intersection for Signalization
- X' Storage (In Feet)

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The Conservancy at Jordan Lake Update
Chatham County, NC

Recommended Lane Configurations

Scale: Not to Scale | Figure 8

SYNCHRO REPORTS

Intersection	
Int Delay, s/veh	6.8

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	177	74	40	244	548	377
Future Vol, veh/h	177	74	40	244	548	377
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	Yield
Storage Length	0	25	-	-	-	25
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	197	82	44	271	609	419

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	968	609	609	0	-	0
Stage 1	609	-	-	-	-	-
Stage 2	359	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	282	495	970	-	-	-
Stage 1	543	-	-	-	-	-
Stage 2	707	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	267	495	970	-	-	-
Mov Cap-2 Maneuver	267	-	-	-	-	-
Stage 1	514	-	-	-	-	-
Stage 2	707	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	38.3	1.3	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	970	-	267	495	-	-
HCM Lane V/C Ratio	0.046	-	0.737	0.166	-	-
HCM Control Delay (s)	8.9	0	48.6	13.7	-	-
HCM Lane LOS	A	A	E	B	-	-
HCM 95th %tile Q(veh)	0.1	-	5.3	0.6	-	-

Intersection	
Int Delay, s/veh	247.4

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	551	225	67	412	447	312
Future Vol, veh/h	551	225	67	412	447	312
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	Yield
Storage Length	0	25	-	-	-	25
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	612	250	74	458	497	347

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1103	497	497	0	-	0
Stage 1	497	-	-	-	-	-
Stage 2	606	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	~ 234	573	1067	-	-	-
Stage 1	~ 611	-	-	-	-	-
Stage 2	~ 545	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 212	573	1067	-	-	-
Mov Cap-2 Maneuver	~ 212	-	-	-	-	-
Stage 1	~ 554	-	-	-	-	-
Stage 2	~ 545	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s$	641.4	1.2	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1067	-	212	573	-	-
HCM Lane V/C Ratio	0.07	-	2.888	0.436	-	-
HCM Control Delay (s)	8.6	0$	896.7	16.1	-	-
HCM Lane LOS	A	A	F	C	-	-
HCM 95th %tile Q(veh)	0.2	-	54.3	2.2	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

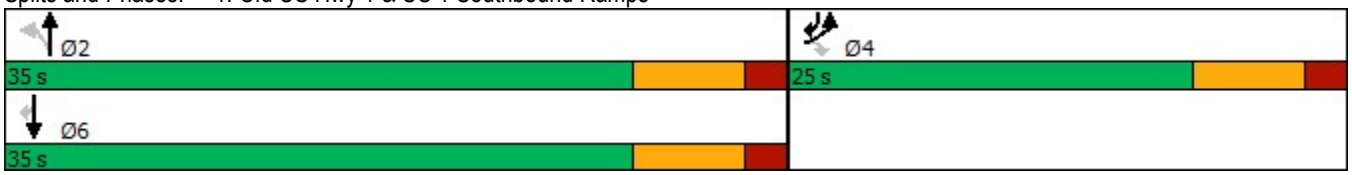
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	177	74	40	244	548	377
Future Volume (vph)	177	74	40	244	548	377
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	150	0			100
Storage Lanes	1	1	0			1
Taper Length (ft)	100		100			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950			0.993		
Satd. Flow (prot)	1770	1583	0	1850	1863	1583
Flt Permitted	0.950			0.843		
Satd. Flow (perm)	1770	1583	0	1570	1863	1583
Right Turn on Red		No				No
Satd. Flow (RTOR)						
Link Speed (mph)	30			55	55	
Link Distance (ft)	829			1170	6749	
Travel Time (s)	18.8			14.5	83.7	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	197	82	44	271	609	419
Shared Lane Traffic (%)						
Lane Group Flow (vph)	197	82	0	315	609	419
Turn Type	Prot	Perm	Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases		4	2			6
Detector Phase	4	4	2	2	6	4
Switch Phase						
Minimum Initial (s)	7.0	7.0	14.0	14.0	14.0	7.0
Minimum Split (s)	14.0	14.0	21.0	21.0	21.0	14.0
Total Split (s)	25.0	25.0	35.0	35.0	35.0	25.0
Total Split (%)	41.7%	41.7%	58.3%	58.3%	58.3%	41.7%
Maximum Green (s)	18.0	18.0	28.0	28.0	28.0	18.0
Yellow Time (s)	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
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0	-2.0
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None
Act Effct Green (s)	13.3	13.3		22.2	22.2	45.9
Actuated g/C Ratio	0.29	0.29		0.48	0.48	1.00
v/c Ratio	0.39	0.18		0.42	0.68	0.26
Control Delay	16.6	14.5		10.1	14.1	0.4
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	16.6	14.5		10.1	14.1	0.4
LOS	B	B		B	B	A
Approach Delay	16.0			10.1	8.5	
Approach LOS	B			B	A	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Queue Length 50th (ft)	40	16		45	103	0
Queue Length 95th (ft)	99	47		117	250	0
Internal Link Dist (ft)	749			1090	6669	
Turn Bay Length (ft)		150				100
Base Capacity (vph)	803	718		1113	1321	1552
Starvation Cap Reductn	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0
Reduced v/c Ratio	0.25	0.11		0.28	0.46	0.27

Intersection Summary

Area Type: Other
Cycle Length: 60
Actuated Cycle Length: 45.9
Natural Cycle: 40
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.68
Intersection Signal Delay: 10.1 Intersection LOS: B
Intersection Capacity Utilization 64.9% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 1: Old US Hwy 1 & US 1 Southbound Ramps



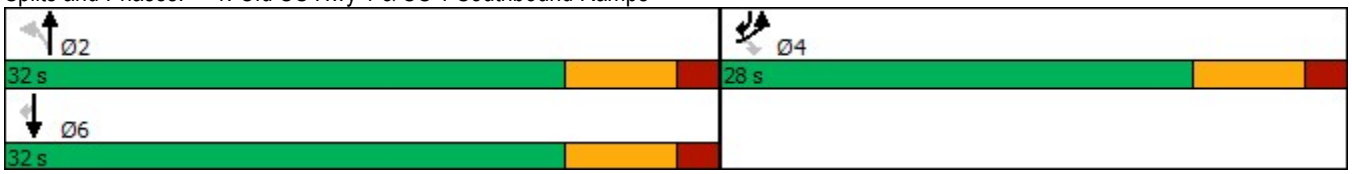
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	551	225	67	412	447	312
Future Volume (vph)	551	225	67	412	447	312
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	150	0			100
Storage Lanes	1	1	0			1
Taper Length (ft)	100		100			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected	0.950			0.993		
Satd. Flow (prot)	1770	1583	0	1850	1863	1583
Flt Permitted	0.950			0.754		
Satd. Flow (perm)	1770	1583	0	1405	1863	1583
Right Turn on Red		No				No
Satd. Flow (RTOR)						
Link Speed (mph)	30			55	55	
Link Distance (ft)	829			1170	6749	
Travel Time (s)	18.8			14.5	83.7	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	612	250	74	458	497	347
Shared Lane Traffic (%)						
Lane Group Flow (vph)	612	250	0	532	497	347
Turn Type	Prot	Perm	Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases		4	2			6
Detector Phase	4	4	2	2	6	4
Switch Phase						
Minimum Initial (s)	7.0	7.0	14.0	14.0	14.0	7.0
Minimum Split (s)	14.0	14.0	21.0	21.0	21.0	14.0
Total Split (s)	28.0	28.0	32.0	32.0	32.0	28.0
Total Split (%)	46.7%	46.7%	53.3%	53.3%	53.3%	46.7%
Maximum Green (s)	21.0	21.0	25.0	25.0	25.0	21.0
Yellow Time (s)	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
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0	-2.0
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None
Act Effct Green (s)	22.3	22.3		25.0	25.0	57.4
Actuated g/C Ratio	0.39	0.39		0.44	0.44	1.00
v/c Ratio	0.89	0.41		0.87	0.61	0.22
Control Delay	35.8	15.8		32.6	16.4	0.3
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	35.8	15.8		32.6	16.4	0.3
LOS	D	B		C	B	A
Approach Delay	30.0			32.6	9.8	
Approach LOS	C			C	A	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Queue Length 50th (ft)	202	64		161	127	0
Queue Length 95th (ft)	#385	118		#332	212	0
Internal Link Dist (ft)	749			1090	6669	
Turn Bay Length (ft)		150				100
Base Capacity (vph)	714	638		666	882	1574
Starvation Cap Reductn	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0
Reduced v/c Ratio	0.86	0.39		0.80	0.56	0.22

Intersection Summary

Area Type: Other
Cycle Length: 60
Actuated Cycle Length: 57.4
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.89
Intersection Signal Delay: 23.0 Intersection LOS: C
Intersection Capacity Utilization 91.9% ICU Level of Service F
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Old US Hwy 1 & US 1 Southbound Ramps



Intersection												
Int Delay, s/veh	34											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	158	31	81	48	130	50	77	74	14	30	65	528
Future Vol, veh/h	158	31	81	48	130	50	77	74	14	30	65	528
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	87	-	-	-	-	-	-	-	25
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	176	34	90	53	144	56	86	82	16	33	72	587

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	500	408	72	756	987	90	659	0	0	98	0	0
Stage 1	138	138	-	262	262	-	-	-	-	-	-	-
Stage 2	362	270	-	494	725	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	481	533	990	325	247	968	929	-	-	1495	-	-
Stage 1	865	782	-	743	691	-	-	-	-	-	-	-
Stage 2	657	686	-	557	430	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	189	462	990	251	214	968	929	-	-	1495	-	-
Mov Cap-2 Maneuver	189	462	-	251	214	-	-	-	-	-	-	-
Stage 1	780	752	-	670	623	-	-	-	-	-	-	-
Stage 2	429	619	-	464	413	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	122.7	42.2	4.3	0.4
HCM LOS	F	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	929	-	-	274	251	273	1495	-	-
HCM Lane V/C Ratio	0.092	-	-	1.095	0.212	0.733	0.022	-	-
HCM Control Delay (s)	9.3	0	-	122.7	23.2	47.3	7.5	0	-
HCM Lane LOS	A	A	-	F	C	E	A	A	-
HCM 95th %tile Q(veh)	0.3	-	-	12.4	0.8	5.2	0.1	-	-

Intersection												
Int Delay, s/veh	168.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	360	25	51	42	26	38	65	81	35	140	157	375
Future Vol, veh/h	360	25	51	42	26	38	65	81	35	140	157	375
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	87	-	-	-	-	-	-	-	25
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	400	28	57	47	29	42	72	90	39	156	174	417

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	775	759	174	991	1157	110	591	0	0	129	0	0
Stage 1	486	486	-	254	254	-	-	-	-	-	-	-
Stage 2	289	273	-	737	903	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	~ 315	336	869	225	196	943	985	-	-	1457	-	-
Stage 1	563	551	-	750	697	-	-	-	-	-	-	-
Stage 2	719	684	-	410	356	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 211	257	869	158	150	943	985	-	-	1457	-	-
Mov Cap-2 Maneuver	~ 211	257	-	158	150	-	-	-	-	-	-	-
Stage 1	519	457	-	691	642	-	-	-	-	-	-	-
Stage 2	604	630	-	298	295	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 530.1	27.2	3.2	1.6
HCM LOS	F	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	985	-	-	234	158	300	1457	-	-
HCM Lane V/C Ratio	0.073	-	-	2.07	0.295	0.237	0.107	-	-
HCM Control Delay (s)	8.9	0	-	$ 530.1	37.1	20.7	7.8	0	-
HCM Lane LOS	A	A	-	F	E	C	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	36.3	1.2	0.9	0.4	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	21.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	158	31	81	48	130	50	77	74	14	30	65	528
Future Vol, veh/h	158	31	81	48	130	50	77	74	14	30	65	528
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	125	-	-	87	-	-	-	-	-	-	-	100
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	176	34	90	53	144	56	86	82	16	33	72	587

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	500	408	72	756	987	90	659	0	0	98	0	0
Stage 1	138	138	-	262	262	-	-	-	-	-	-	-
Stage 2	362	270	-	494	725	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	481	533	990	325	247	968	929	-	-	1495	-	-
Stage 1	865	782	-	743	691	-	-	-	-	-	-	-
Stage 2	657	686	-	557	430	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	189	462	990	251	214	968	929	-	-	1495	-	-
Mov Cap-2 Maneuver	189	462	-	251	214	-	-	-	-	-	-	-
Stage 1	780	752	-	670	623	-	-	-	-	-	-	-
Stage 2	429	619	-	464	413	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	62.2	42.2	4.3	0.4
HCM LOS	F	E		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	929	-	-	189	752	251	273	1495	-	-
HCM Lane V/C Ratio	0.092	-	-	0.929	0.165	0.212	0.733	0.022	-	-
HCM Control Delay (s)	9.3	0	-	98.7	10.7	23.2	47.3	7.5	0	-
HCM Lane LOS	A	A	-	F	B	C	E	A	A	-
HCM 95th %tile Q(veh)	0.3	-	-	7.3	0.6	0.8	5.2	0.1	-	-

Intersection	
Int Delay, s/veh	122.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	360	25	51	42	26	38	65	81	35	140	157	375
Future Vol, veh/h	360	25	51	42	26	38	65	81	35	140	157	375
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	125	-	-	87	-	-	-	-	-	-	-	100
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	400	28	57	47	29	42	72	90	39	156	174	417

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	775	759	174	991	1157	110	591	0	0	129	0	0
Stage 1	486	486	-	254	254	-	-	-	-	-	-	-
Stage 2	289	273	-	737	903	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	~ 315	336	869	225	196	943	985	-	-	1457	-	-
Stage 1	563	551	-	750	697	-	-	-	-	-	-	-
Stage 2	719	684	-	410	356	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	~ 211	257	869	158	150	943	985	-	-	1457	-	-
Mov Cap-2 Maneuver	~ 211	257	-	158	150	-	-	-	-	-	-	-
Stage 1	519	457	-	691	642	-	-	-	-	-	-	-
Stage 2	604	630	-	298	295	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	$ 381	27.2	3.2	1.6
HCM LOS	F	D		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	EBLn2	WBLn1	WBLn2	SBL	SBT	SBR
Capacity (veh/h)	985	-	-	211	487	158	300	1457	-	-
HCM Lane V/C Ratio	0.073	-	-	1.896	0.173	0.295	0.237	0.107	-	-
HCM Control Delay (s)	8.9	0	-	$ 458.5	13.9	37.1	20.7	7.8	0	-
HCM Lane LOS	A	A	-	F	B	E	C	A	A	-
HCM 95th %tile Q(veh)	0.2	-	-	28.8	0.6	1.2	0.9	0.4	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

Intersection	
Int Delay, s/veh	30

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	42	800	267	154	125	14
Future Vol, veh/h	42	800	267	154	125	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	150	0	400	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	47	889	297	171	139	16

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	912	147	155	0	-	0
Stage 1	147	-	-	-	-	-
Stage 2	765	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	304	900	1425	-	-	-
Stage 1	880	-	-	-	-	-
Stage 2	459	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	241	900	1425	-	-	-
Mov Cap-2 Maneuver	241	-	-	-	-	-
Stage 1	697	-	-	-	-	-
Stage 2	459	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	47.3	5.2	0
HCM LOS	E		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1425	-	241	900	-	-
HCM Lane V/C Ratio	0.208	-	0.194	0.988	-	-
HCM Control Delay (s)	8.2	-	23.5	48.5	-	-
HCM Lane LOS	A	-	C	E	-	-
HCM 95th %tile Q(veh)	0.8	-	0.7	17.6	-	-

Intersection	
Int Delay, s/veh	41.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	26	504	858	105	255	45
Future Vol, veh/h	26	504	858	105	255	45
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	150	0	400	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	29	560	953	117	283	50

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2331	308	333	0	-	0
Stage 1	308	-	-	-	-	-
Stage 2	2023	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	41	732	1226	-	-	-
Stage 1	745	-	-	-	-	-
Stage 2	112	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 9	732	1226	-	-	-
Mov Cap-2 Maneuver	~ 9	-	-	-	-	-
Stage 1	166	-	-	-	-	-
Stage 2	112	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	111.6	15.4	0
HCM LOS	F		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	1226	-	9	732	-	-
HCM Lane V/C Ratio	0.778	-	3.21	0.765	-	-
HCM Control Delay (s)	17.3	-	$ 1810.5	24	-	-
HCM Lane LOS	C	-	F	C	-	-
HCM 95th %tile Q(veh)	8.4	-	4.8	7.3	-	-

Notes

~: Volume exceeds capacity $: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

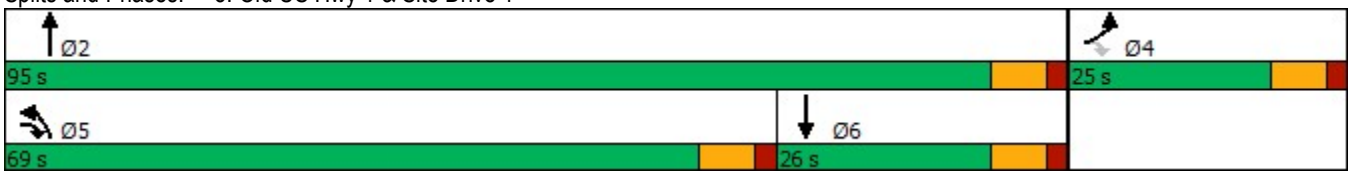
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	42	800	267	154	125	14
Future Volume (vph)	42	800	267	154	125	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150	0	400			0
Storage Lanes	1	1	1			0
Taper Length (ft)	100		100			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.986	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1770	1583	1770	1863	1837	0
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	1770	1583	1770	1863	1837	0
Right Turn on Red		No				No
Satd. Flow (RTOR)						
Link Speed (mph)	25			55	55	
Link Distance (ft)	2428			6749	1241	
Travel Time (s)	66.2			83.7	15.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	47	889	297	171	139	16
Shared Lane Traffic (%)						
Lane Group Flow (vph)	47	889	297	171	155	0
Turn Type	Prot	pm+ov	Prot	NA	NA	
Protected Phases	4	5	5	2	6	
Permitted Phases		4				
Detector Phase	4	5	5	2	6	
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	14.0	14.0	
Minimum Split (s)	14.0	14.0	14.0	21.0	21.0	
Total Split (s)	25.0	69.0	69.0	95.0	26.0	
Total Split (%)	20.8%	57.5%	57.5%	79.2%	21.7%	
Maximum Green (s)	18.0	62.0	62.0	88.0	19.0	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	None	
Act Effct Green (s)	11.7	60.7	52.8	61.6	19.9	
Actuated g/C Ratio	0.14	0.75	0.65	0.76	0.25	
v/c Ratio	0.18	0.75	0.26	0.12	0.34	
Control Delay	43.0	13.9	11.2	2.4	38.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	43.0	13.9	11.2	2.4	38.1	
LOS	D	B	B	A	D	
Approach Delay	15.3			8.0	38.1	
Approach LOS	B			A	D	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Queue Length 50th (ft)	24	282	86	18	76	
Queue Length 95th (ft)	69	541	161	37	168	
Internal Link Dist (ft)	2348			6669	1161	
Turn Bay Length (ft)	150		400			
Base Capacity (vph)	518	1392	1385	1732	565	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.09	0.64	0.21	0.10	0.27	

Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 80.9
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.75
Intersection Signal Delay: 15.4 Intersection LOS: B
Intersection Capacity Utilization 69.5% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 5: Old US Hwy 1 & Site Drive 1



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	26	504	858	105	255	45
Future Volume (vph)	26	504	858	105	255	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150	0	400			0
Storage Lanes	1	1	1			0
Taper Length (ft)	100		100			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850			0.980	
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1770	1583	1770	1863	1825	0
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	1770	1583	1770	1863	1825	0
Right Turn on Red		No				No
Satd. Flow (RTOR)						
Link Speed (mph)	25			55	55	
Link Distance (ft)	2428			6749	1241	
Travel Time (s)	66.2			83.7	15.4	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	29	560	953	117	283	50
Shared Lane Traffic (%)						
Lane Group Flow (vph)	29	560	953	117	333	0
Turn Type	Prot	pm+ov	Prot	NA	NA	
Protected Phases	4	5	5	2	6	
Permitted Phases		4				
Detector Phase	4	5	5	2	6	
Switch Phase						
Minimum Initial (s)	7.0	7.0	7.0	14.0	14.0	
Minimum Split (s)	14.0	14.0	14.0	21.0	21.0	
Total Split (s)	14.0	59.0	59.0	106.0	47.0	
Total Split (%)	11.7%	49.2%	49.2%	88.3%	39.2%	
Maximum Green (s)	7.0	52.0	52.0	99.0	40.0	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	
Lead/Lag		Lead	Lead		Lag	
Lead-Lag Optimize?		Yes	Yes		Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Recall Mode	None	None	None	None	None	
Act Effct Green (s)	9.2	62.6	55.0	87.4	24.9	
Actuated g/C Ratio	0.09	0.64	0.56	0.89	0.25	
v/c Ratio	0.17	0.55	0.96	0.07	0.72	
Control Delay	48.9	13.4	44.5	1.6	43.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	48.9	13.4	44.5	1.6	43.1	
LOS	D	B	D	A	D	
Approach Delay	15.1			39.8	43.1	
Approach LOS	B			D	D	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Queue Length 50th (ft)	18	180	~684	11	204	
Queue Length 95th (ft)	51	344	#1053	20	301	
Internal Link Dist (ft)	2348			6669	1161	
Turn Bay Length (ft)	150		400			
Base Capacity (vph)	166	1014	997	1789	799	
Starvation Cap Reductn	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	
Reduced v/c Ratio	0.17	0.55	0.96	0.07	0.42	

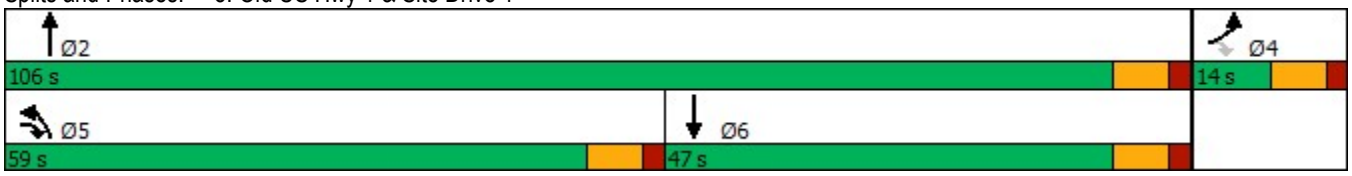
Intersection Summary

Area Type: Other
Cycle Length: 120
Actuated Cycle Length: 97.7
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.96
Intersection Signal Delay: 33.0 Intersection LOS: C
Intersection Capacity Utilization 82.0% 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: 5: Old US Hwy 1 & Site Drive 1



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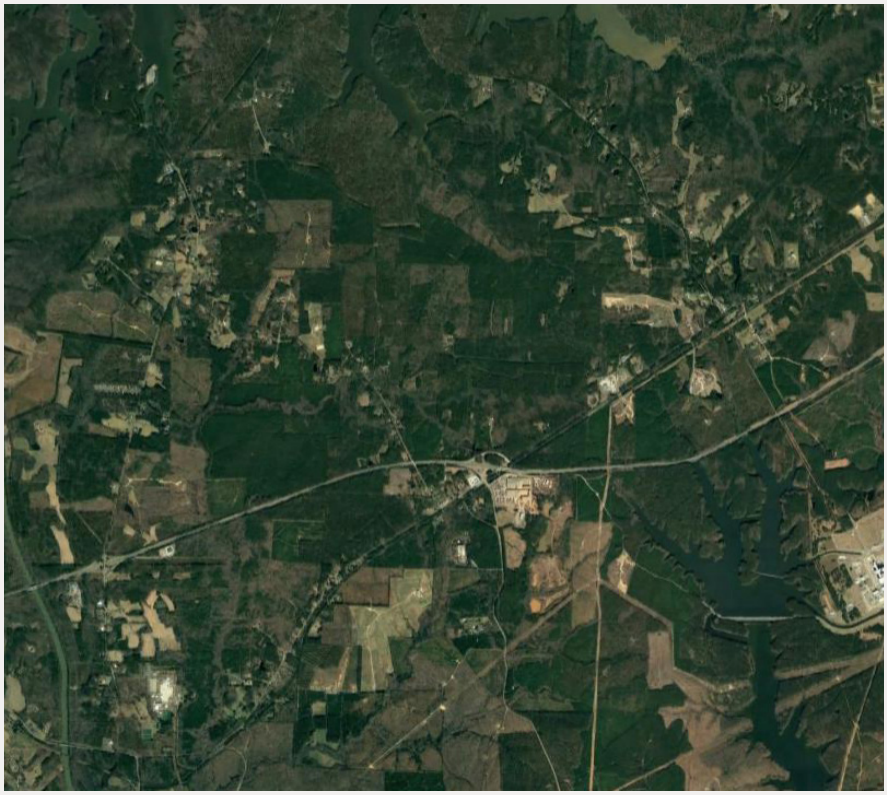

The Conservancy at Jordan Lake

Traffic Impact Analysis Update
Chatham County, North Carolina

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Transportation
Consulting
that moves us
forward.

TRAFFIC IMPACT ANALYSIS

FOR

THE CONSERVANCY AT JORDAN LAKE

LOCATED

IN

CHATHAM COUNTY, NORTH CAROLINA

Prepared For:
THE CONSERVANCY REAL ESTATE GROUP, LLC.
4201 Taylor Hall Place
Chapel Hill, North Carolina 27517

06/11/2021

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

JUNE 2021

RKA Project No. 20405

Prepared By: MR

Reviewed By: JR

TRAFFIC IMPACT ANALYSIS UPDATE
THE CONSERVANCY AT JORDAN LAKE
CHATHAM COUNTY, NORTH CAROLINA

EXECUTIVE SUMMARY

1. Development Overview

A Traffic Impact Analysis (TIA) was conducted for The Conservancy at Jordan Lake residential development in accordance with the North Carolina Department of Transportation (NCDOT) capacity analysis guidelines. The proposed development is to be located north of the intersection of Old US Hwy 1 and US 1 Ramps in Chatham County, North Carolina. The proposed development, anticipated to be completed in 2033, was assumed to consist of a maximum of 1,500 single-family homes in the previously submitted TIA. The proposed development is now assumed to consist of a maximum of 1,575 single-family homes and an 18-hole golf course. The exact residential land use is still being discussed. There is potential for some age restricted housing in this development; however, for the purpose of this study, it was assumed that the proposed development would consist of single-family homes to provide a conservative estimation of site traffic.

Additionally, in the previously submitted TIA, site access is proposed via two (2) full movement intersections, one along Old US Hwy 1 and one along Pea Ridge Road. The proposed development is now assumed to provide site access via one (1) full movement intersection along Old US Hwy 1 and one (1) connection to Lower Thrift Road.

2. Existing Traffic Conditions

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

- Old US Hwy 1 and US 1 Southbound Ramps
- Old US Hwy 1 and US 1 Northbound Ramps / Christian Chapel Church Road
- Pea Ridge Road and Lower Thrift Road Connection

Existing peak hour traffic volumes were determined based on traffic counts conducted at the study intersections listed above, in June of 2018 during a typical weekday AM (7:00 AM – 9:00 AM) and PM (4:00 PM – 6:00 PM) peak periods.

Traffic volumes were grown to the year 2020 using 1% growth rate based on historical data. Traffic counts were taken while schools were not in session. There are no schools located within the study area that are expected to have a significant impact on traffic conditions. It should be noted that methodology involving the utilization of traffic counts from the year 2020 was approved in the MOU for this TIA update. Turning movement counts were not collected at the intersection of Pea Ridge Road and Lower Thrift Road Connection; however, through movement volumes along Pea Ridge Road from the year 2020 were used for this intersection in addition to assuming minimum volumes of "4" at the turning movements, per Congestion Management guidelines. Weekday AM and PM traffic volumes were balanced between study intersections, where appropriate.

3. Site Trip Generation

To provide a conservative estimate of trips expected, the proposed development is assumed to consist of a maximum of 1,500 single-family homes in the previously submitted TIA. The proposed development is now assumed to consist of a maximum of 1,575 single-family homes and an 18-hole golf course. Average weekday daily, AM peak hour, and PM peak hour trips for the proposed development were estimated using methodology contained within the ITE *Trip Generation Manual*, 10th Edition. The exact residential land use is still being discussed. There is potential for some age restricted housing in this development; however, for the purpose of this study, land use code 210 for single-family homes was used for a conservative estimation of site traffic. Table E-1 provides a summary of the trip generation potential for the site.

Table E-1: Site Trip Generation

LAND USE (ITE Code)	INTENSITY	DAILY TRIPS (VPD)	WEEKDAY AM PEAK HOUR (VPH)		WEEKDAY PM PEAK HOUR (VPH)	
			Enter	Exit	Enter	Exit
Single-Family Homes (210)	1,575 units	13,200	281	842	903	530
Golf Course (430)	18 holes	550	25	7	27	25
Total Trips		**13,750**	**306**	**849**	**930**	**555**

4. Future Traffic Conditions

Through coordination with NCDOT, it was determined that an annual growth rate of 1% would be used to generate no-build (2033) weekday AM and PM peak hour traffic volumes. Based on coordination with NCDOT there were no adjacent developments or future roadway improvements to consider with this study. Also, through coordination with NCDOT, the future adjacent development of Triangle Innovation Point was not included in this study due to the preliminary and ambiguous nature of the site.

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

- Existing (2020) Traffic Conditions
- No-Build (2033) Traffic Conditions
- Build (2033) Traffic Conditions

5. Capacity Analysis Summary

The analysis considered weekday AM and PM peak hour traffic for existing (2020), no-build (2033), and build (2033) conditions. Refer to Section 7 of the report for the capacity analysis summary performed at each study intersection.

6. Recommendations

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

Old US Hwy 1 and US 1 Southbound Ramps

- Provide an eastbound right-turn lane with at least 150 feet of storage and appropriate deceleration and taper.
- Extend the storage at the southbound right-turn lane to at least 100 feet of storage and appropriate deceleration and taper. This movement is currently channelized with approximately 25 feet of storage.
- Monitor intersection for signalization, and install traffic signal when warranted and approved by NCDOT.

Old US Hwy 1 and US 1 Northbound Ramps

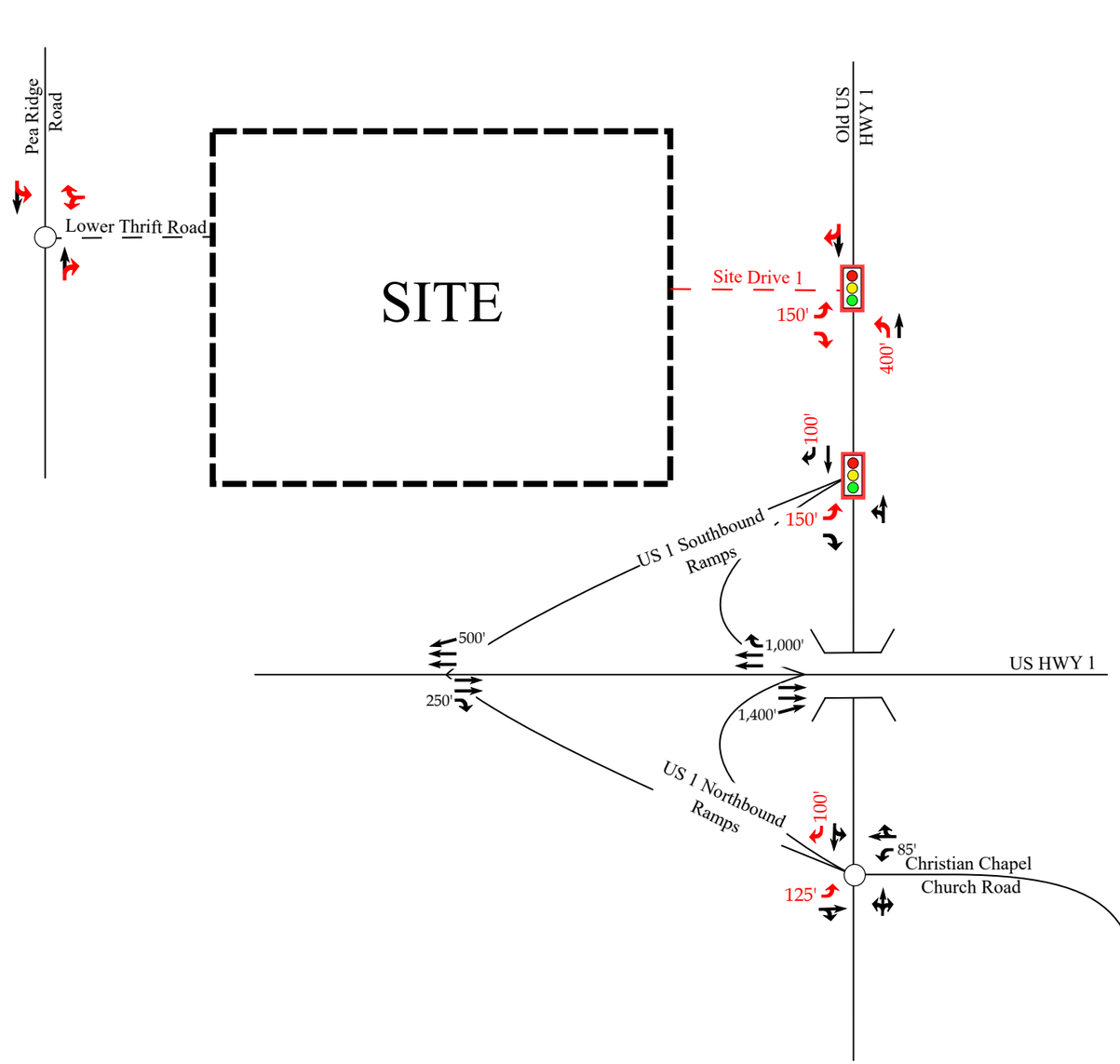
- Provide an eastbound left-turn lane with at least 125 feet of storage and appropriate deceleration and taper.
- Provide a southbound right-turn lane with at least 100 feet of storage and appropriate deceleration and taper.

Old US Hwy 1 and Site Drive 1

- Construct eastbound approach with one ingress lane and two egress lanes, one left-turn lane with at least 150 feet of storage and appropriate decel and taper and one right-turn lane with full storage.
- Provide a northbound left-turn lane with at least 400 feet of storage and appropriate taper.
- Monitor intersection for signalization, and install traffic signal when warranted and approved by NCDOT.

LEGEND

- Unsignalized Intersection
- Existing Lane
- Improvement by Developer
- Monitor Intersection for Signalization
- X' Storage (In Feet)



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The Conservancy at Jordan Lake Update
Chatham County, NC

Recommended Lane Configurations

Scale: Not to Scale | Figure E-1

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

TECHNICAL APPENDIX

TRAFFIC IMPACT ANALYSIS UPDATE
THE CONSERVANCY AT JORDAN LAKE
CHATHAM COUNTY, NORTH CAROLINA

1. INTRODUCTION

The contents of this report present the findings of an update to the Traffic Impact Analysis (TIA) conducted for The Conservancy at Jordan Lake residential development, proposed to be located north of the intersection of Old US Hwy 1 and US 1 Ramps in Chatham County, North Carolina. The purpose of this study is to determine the potential impacts to the surrounding transportation system created by traffic generated by the proposed development, as well as recommend improvements to mitigate the impacts.

The proposed development, anticipated to be completed in 2033, was assumed to consist of a maximum of 1,500 single-family homes in the previously submitted TIA. The proposed development is now assumed to consist of a maximum of 1,575 single-family homes and an 18-hole golf course.

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

- Existing (2020) Traffic Conditions
- No-Build (2033) Traffic Conditions
- Build (2033) Traffic Conditions

1.1. Site Location and Study Area

The development is proposed to be located north of the intersection of Old US Hwy 1 and US 1 Ramps in Chatham County, North Carolina. Refer to Figure 1 for the site location map.

The study area for the TIA was determined through coordination with the North Carolina Department of Transportation (NCDOT) staff members and consists of the following existing intersections:

- Old US Hwy 1 and US 1 Southbound Ramps
- Old US Hwy 1 and US 1 Northbound Ramps / Christian Chapel Church Road

- Pea Ridge Road and Lower Thrift Road Connection

Refer to Appendix A for the approved scoping documentation.

1.2. Proposed Land Use and Site Access

The site is expected to be located north of the intersection of Old US Hwy 1 and US 1 Ramps. The proposed development, anticipated to be completed in 2033, was assumed to consist of a maximum of 1,500 single-family homes in the previously submitted TIA. The proposed development is now assumed to consist of a maximum of 1,575 single-family homes and an 18-hole golf course. The exact residential land use is still being discussed. There is potential for some age restricted housing in this development; however, for the purpose of this study, it was assumed that the proposed development would consist of single-family homes to provide a conservative estimation of site traffic.

In the previously submitted TIA, site access is proposed via two (2) full movement intersections, one along Old US Hwy 1 and one along Pea Ridge Road. The proposed development is now assumed to provide site access via one (1) full movement intersection along Old US Hwy 1 and one (1) connection to Lower Thrift Road. Refer to Figure 2 for a copy of the preliminary site plan.

1.3. Adjacent Land Uses

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

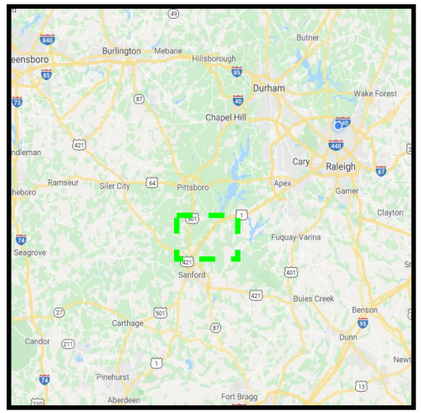
1.4. Existing Roadways

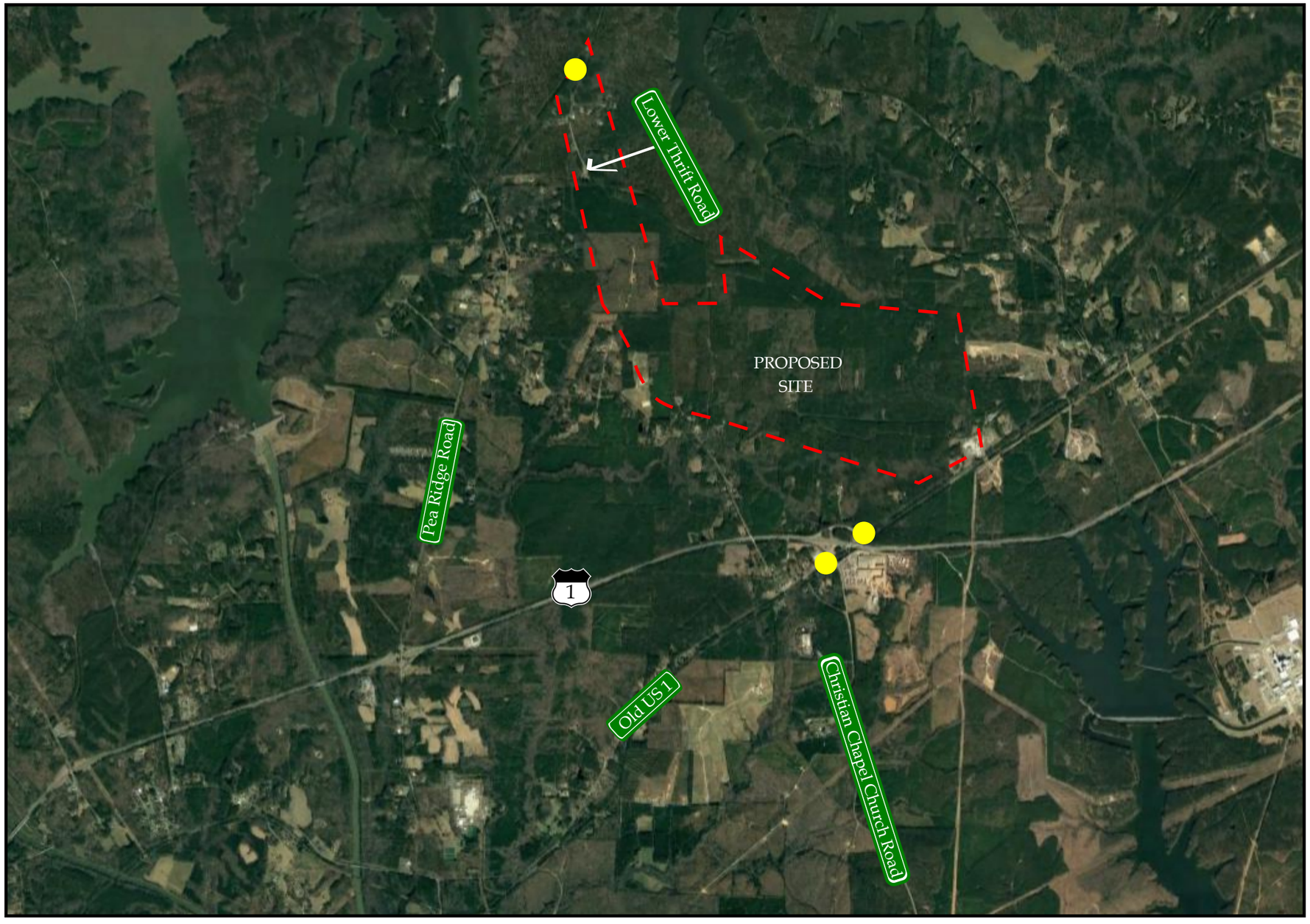
Existing lane configurations (number of traffic lanes on each intersection approach), lane widths, storage capacities, and other intersection and roadway information within the study area are shown in Figure 3. Table 1, on the following page, provides a summary of this information, as well.

Table 1: Existing Roadway Inventory

Road Name	Route Number	Typical Cross Section	Speed Limit	Maintained By	2019 AADT (vpd)
Old US Hwy 1	SR 1011	2-lane undivided	55 mph	NCDOT	2,600
US 1	US 1	4-lane divided	70 mph	NCDOT	34,000
Pea Ridge Road	SR 1972	2-lane undivided	45 mph	NCDOT	1,300
Christian Chapel Church Road	SR 1912	2-lane undivided	55 mph (assumed)	NCDOT	2,520*

*ADT based on the traffic counts from 2020 and assuming the weekday PM peak hour volume is 10% of the average daily traffic.





LEGEND

- Proposed Site Location
- Study Intersection
- Study Area

N

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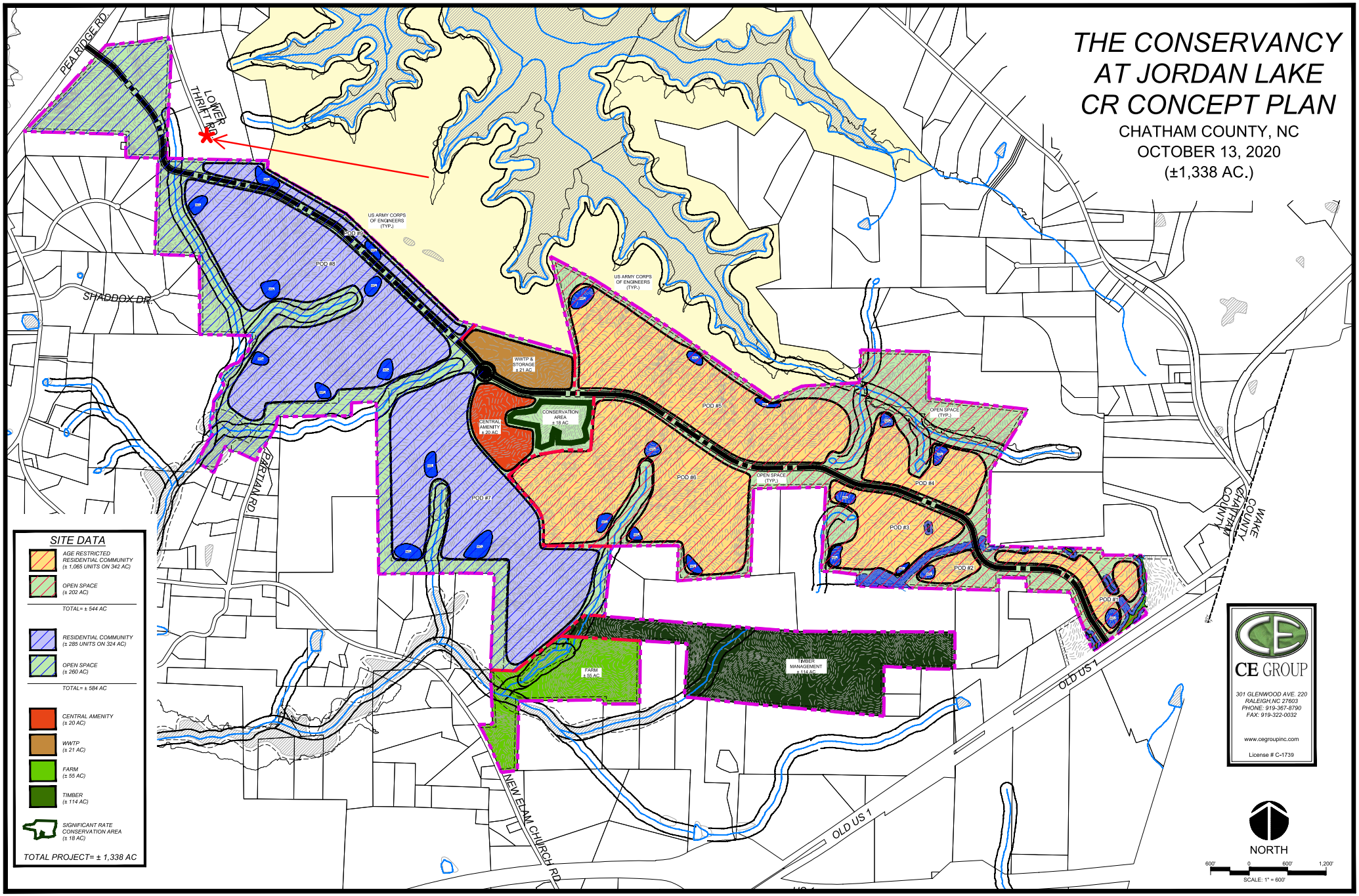
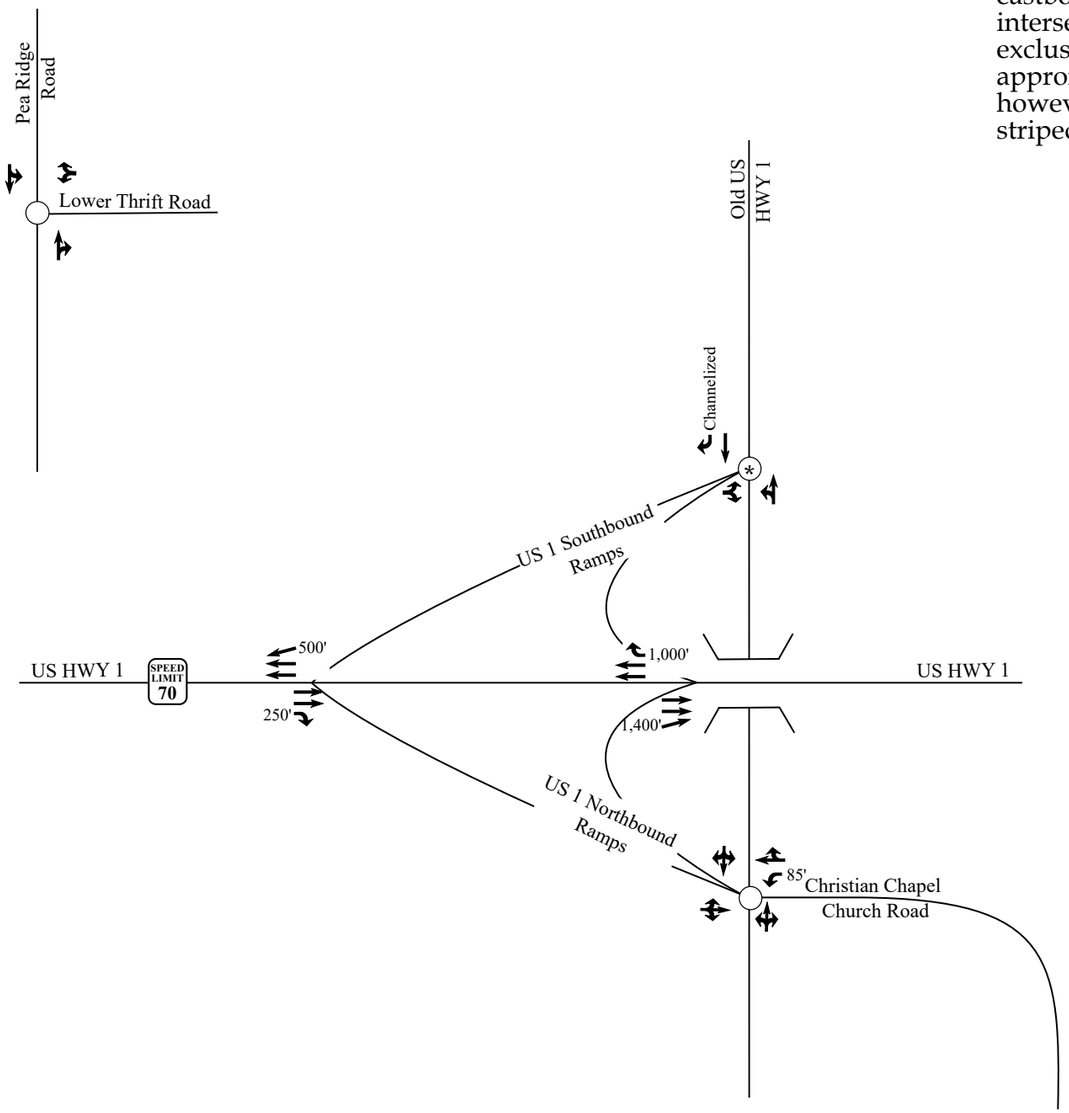
Site Location Map

Scale: Not to Scale | Figure 1


THE CONSERVANCY
AT JORDAN LAKE
CR CONCEPT PLAN
CHATHAM COUNTY, NC
OCTOBER 13, 2020
(±1,338 AC.)
PEA RIDGE RD.
LOWER THRIFT RD.
SHADDOX DR.
PARTIAN RD.
NEW ELAM CHURCH RD.
OLD US 1
WAKE COUNTY
CHATHAM COUNTY
US ARMY CORPS OF ENGINEERS (TYP.)
POD #8
POD #7
POD #6
POD #5
POD #4
POD #3
POD #2
POD #1
WWTP & STORAGE ± 21 AC.
CONSERVATION AREA ± 18 AC.
CENTRAL AMENITY ± 20 AC.
OPEN SPACE (TYP.)
FARM ± 55 AC.
TIMBER MANAGEMENT ± 114 AC.
SITE DATA
AGE RESTRICTED RESIDENTIAL COMMUNITY (± 1,065 UNITS ON 342 AC)
OPEN SPACE (± 202 AC)
TOTAL= ± 544 AC
RESIDENTIAL COMMUNITY (± 285 UNITS ON 324 AC)
OPEN SPACE (± 260 AC)
TOTAL= ± 584 AC
CENTRAL AMENITY (± 20 AC)
WWTP (± 21 AC)
FARM (± 55 AC)
TIMBER (± 114 AC)
SIGNIFICANT RATE CONSERVATION AREA (± 18 AC)
TOTAL PROJECT= ± 1,338 AC
CE GROUP
301 GLENWOOD AVE. 220
RALEIGH,NC 27603
PHONE: 919-367-8790
FAX: 919-322-0032
www.cegroupinc.com
License # C-1739
NORTH
600' 0 600' 1,200'
SCALE: 1" = 600'

LEGEND

- Unsignalized Intersection
- Existing Lane
- X' Storage (In Feet)
- SPEED LIMIT XX Posted Speed Limit



* Pavement width of the eastbound approach at this intersection could allow for an exclusive right-turn lane with approximately 25' of storage; however, this approach is not striped.

N

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Chatham County, NC

2020 Existing Lane Configurations

Scale: Not to Scale | Figure 3

2. EXISTING (2020) PEAK HOUR CONDITIONS

2.1. Existing (2020) Peak Hour Traffic

Due to COVID-19, existing peak hour traffic volumes were determined based on traffic counts conducted by RKA at the study intersections listed below, in June of 2018 during weekday AM (7:00-9:00) and weekday PM (4:00-6:00) peak hours. Traffic volumes were grown to the year 2020 using 1% growth rate based on historical data and were balanced between study intersections, where appropriate:

- Old US Hwy 1 and US 1 Southbound Ramps
- Old US Hwy 1 and US 1 Northbound Ramps / Christian Chapel Church Road

Traffic counts were taken while schools were not in session. There are no schools located within the study area that are expected to have a significant impact on traffic conditions. It should be noted that methodology involving the utilization of traffic counts from the year 2020 was approved in the MOU for this TIA update. Turning movement counts were not collected at the intersection of Pea Ridge Road and Lower Thrift Road Connection; however, through movement volumes along Pea Ridge Road from the year 2020 were used for this intersection in addition to assuming minimum volumes of "4" at the turning movements, per Congestion Management guidelines. Weekday AM and PM traffic volumes were balanced between study intersections, where appropriate. Refer to Figure 4 for existing (2020) weekday AM and PM peak hour traffic volumes. A copy of the count data is located in Appendix B of this report.

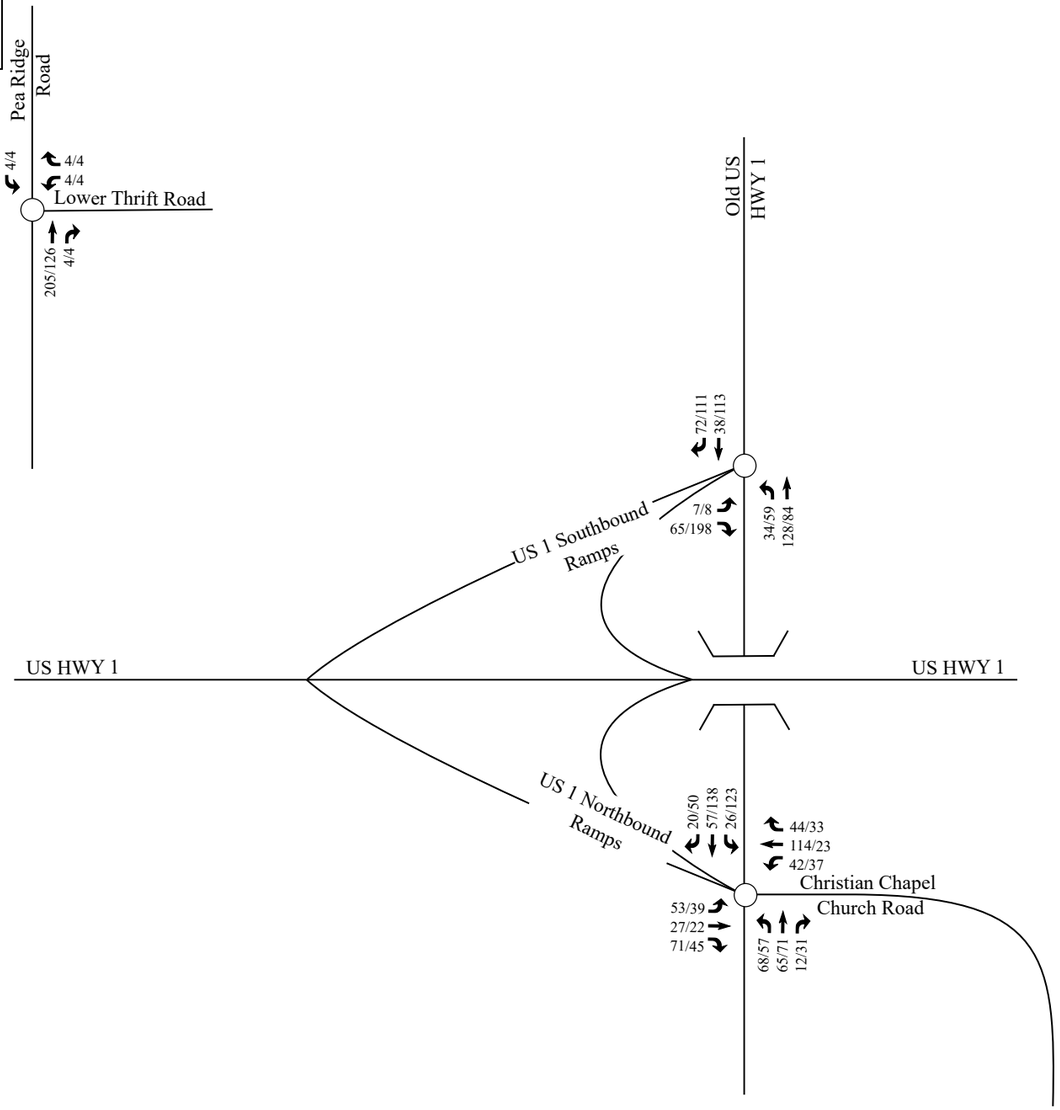
2.2. Analysis of Existing (2020) Peak Hour Traffic

The existing (2020) weekday AM and PM peak hour traffic volumes were analyzed to determine the current levels of service at the study intersections under existing roadway conditions. The results of the analysis are presented in Section 7 of this report.

LEGEND

○ Unsignalized Intersection

X / Y → Weekday AM / PM Peak Hour Traffic



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The Conservancy at Jordan Lake Update
Chatham County, NC

Existing (2020) Peak Hour Traffic Volumes

Scale: Not to Scale | Figure 4

3. NO-BUILD (2033) PEAK HOUR CONDITIONS

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

3.1. Ambient Traffic Growth

Through coordination with the NCDOT, it was determined that an annual growth rate of 1% based on historical data would be used to generate projected (2033) weekday AM and PM peak hour traffic volumes.

3.2. Adjacent Development Traffic

Based on coordination with the NCDOT, it was determined there were no adjacent developments to consider with this study. Also, through coordination with the NCDOT, the future adjacent development of Triangle Innovation Point was not included in this study due to the preliminary and ambiguous nature of the site.

3.3. Future Roadway Improvements

Based on coordination with the NCDOT, it was determined there were no future roadway improvements to consider with this study.

3.4. No-Build (2033) Peak Hour Traffic Volumes

The no-build (2033) traffic volumes were determined by projecting the existing (2020) peak hour traffic to the year 2033. Refer to Figure 5 for an illustration of the no-build (2033) peak hour traffic volumes at the study intersections.

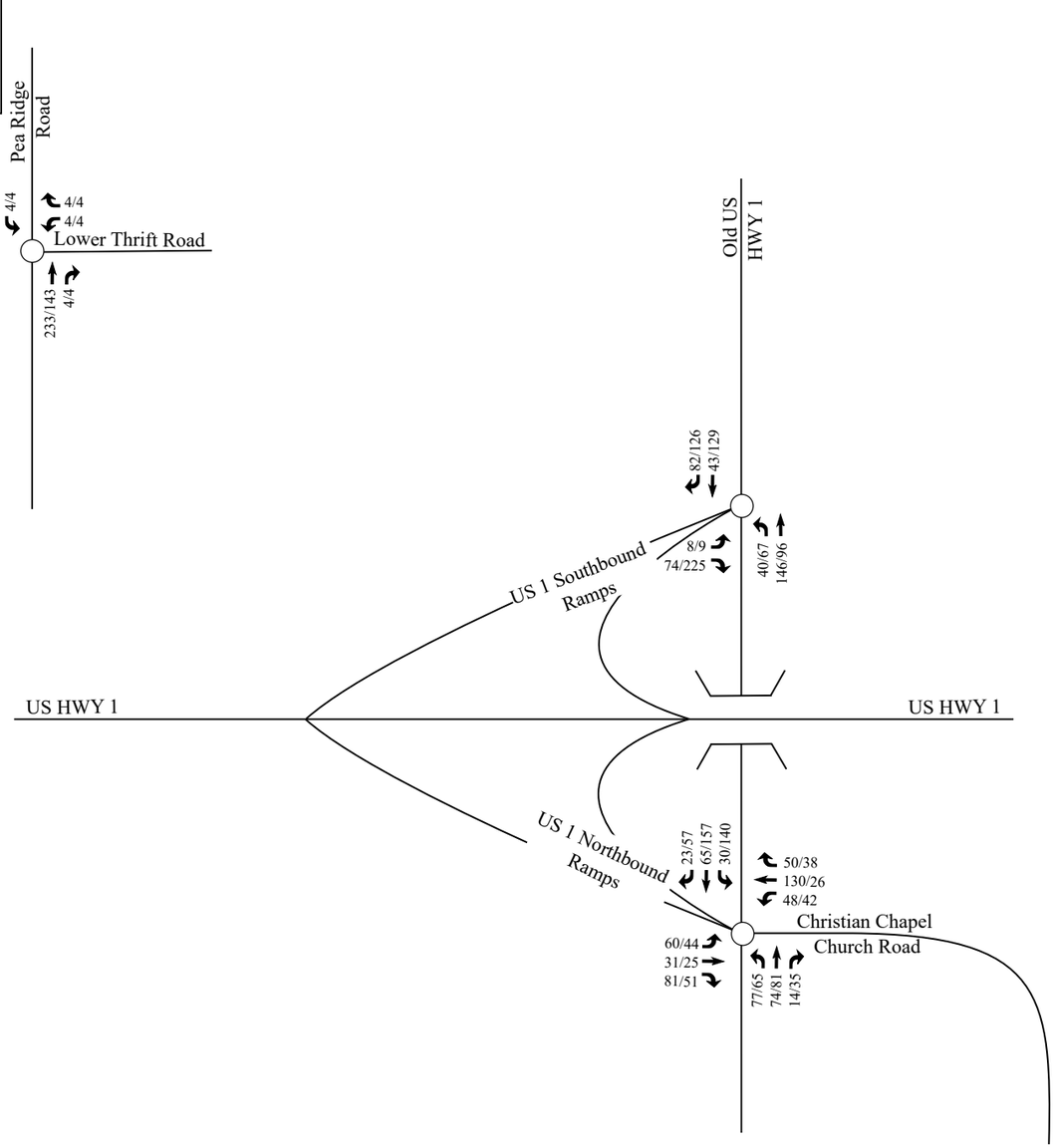
3.5. Analysis of No-Build (2033) Peak Hour Traffic Conditions

The no-build (2033) AM and PM peak hour traffic volumes at the study intersections were analyzed with future geometric roadway conditions and traffic control. The analysis results are presented in Section 7 of this report.

LEGEND

Unsignalized Intersection

X / Y → Weekday AM / PM Peak Hour Traffic



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Chatham County, NC

No-Build (2033) Peak Hour Traffic

Scale: Not to Scale | Figure 5

4. SITE TRIP GENERATION AND DISTRIBUTION

4.1. Trip Generation

To provide a conservative estimate of trips expected, the proposed development was assumed to consist of a maximum of 1,500 single-family homes in the previously submitted TIA. The proposed development is now assumed to consist of a maximum of 1,575 single-family homes and an 18-hole golf course. Average weekday daily, AM peak hour, and PM peak hour trips for the proposed development were estimated using methodology contained within the ITE *Trip Generation Manual*, 10th Edition. The exact residential land use is still being discussed. There is potential for some age restricted housing in this development; however, for the purpose of this study, land use code 210 for single-family homes was used for a conservative estimation of site traffic. Table 2 provides a summary of the trip generation potential for the site.

Table 2: Trip Generation Summary

Land Use (ITE Code)	Intensity	Daily Traffic (vpd)	Weekday AM Peak Hour Trips (vph)		Weekday PM Peak Hour Trips (vph)	
			Enter	Exit	Enter	Exit
Single-Family Homes (210)	1,575 units	13,200	281	842	903	530
Golf Course (430)	18 holes	550	25	7	27	25
Total Trips		**13,750**	**306**	**849**	**930**	**555**

It is estimated that the proposed development will generate approximately 13,750 total site trips on the roadway network during a typical 24-hour period. Of the daily traffic volume, it is anticipated 1,155 trips (306 entering and 849 exiting) will occur during the AM peak hour and 1,485 trips (930 entering and 555 exiting) will occur during the PM peak hour. It should be noted that although it is likely that many of the future residents would utilize the golf course, no reduction was applied to provide conservative analysis results.

4.2. Site Trip Distribution and Assignment

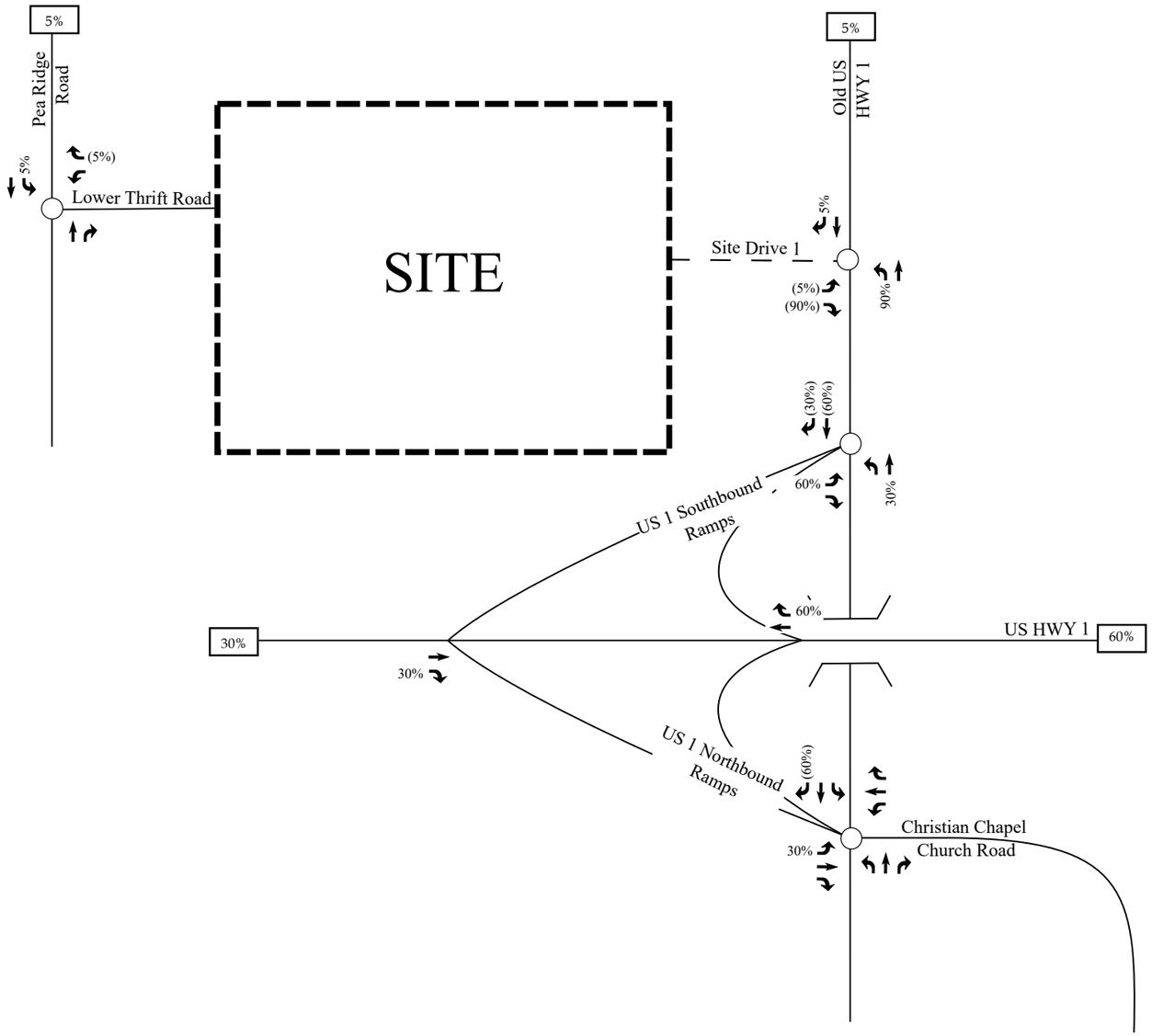
Trip distribution percentages used in assigning site traffic for this development were estimated based on a combination of existing traffic patterns, population centers adjacent to the study area, and engineering judgment. These trip distribution percentages were reviewed and approved in the Memorandum of Understanding (MOU). It is estimated that residential and recreational trips will be distributed as follows for the proposed development:

- 60% to/from the east via US 1
- 30% to/from the west via US 1
- 5% to/from the north via Pea Ridge Road
- 5% to/from the north via Old US Hwy 1

The site trip distribution for the proposed development is shown in Figure 6. Refer to Figures 7a and 7b for the residential and recreational site trip assignment, respectively. The total site trip assignment for the proposed development is shown in Figure 8.

LEGEND

- Unsignalized Intersection
- X% → Entering Trip Distribution
- (Y)% → Exiting Trip Distribution
- [XX%] Regional Trip Distribution



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Chatham County, NC

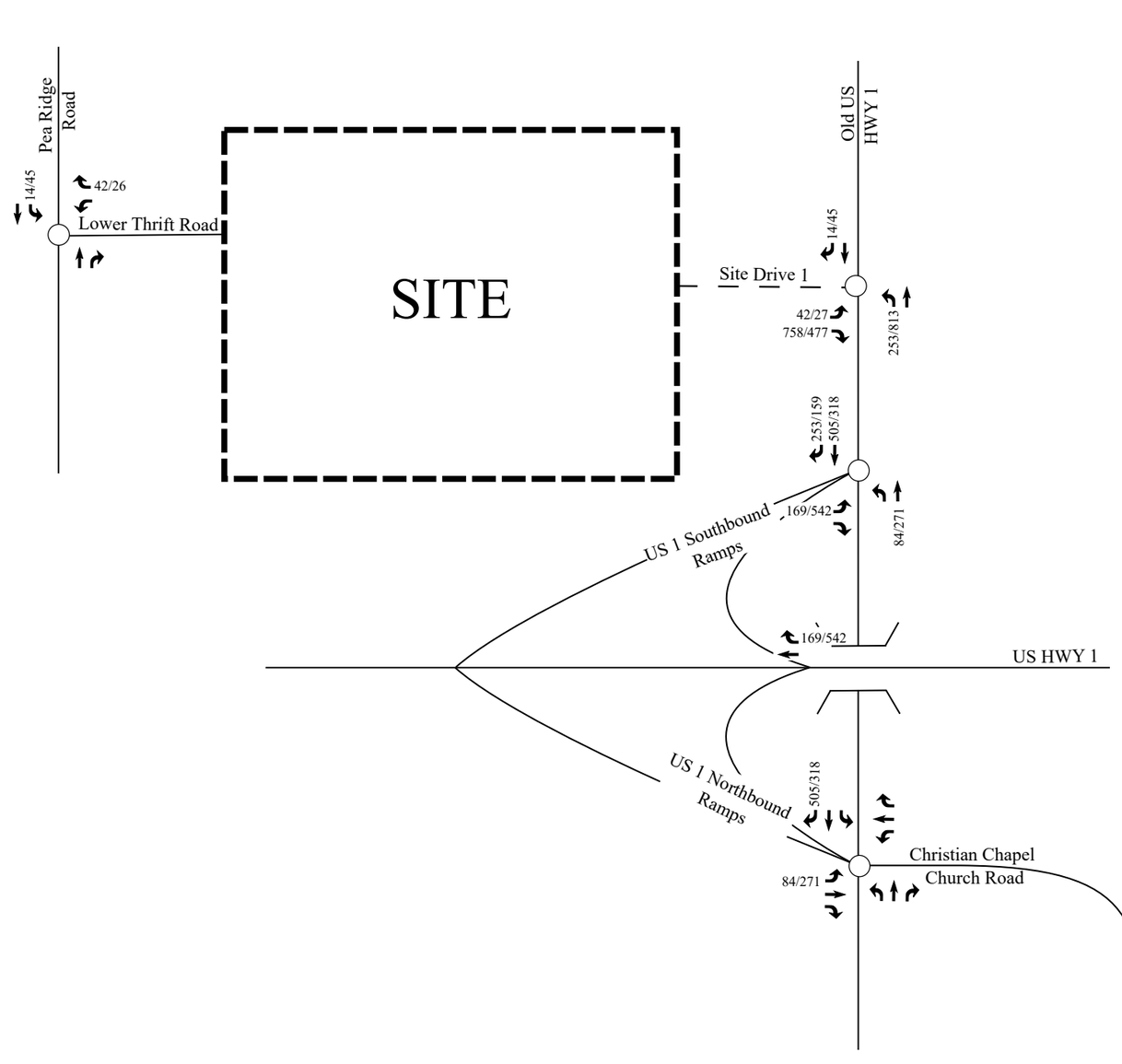
Site Trip Distribution

Scale: Not to Scale | Figure 6

LEGEND

○ Unsignalized Intersection

X / Y → Weekday AM / PM Peak Site Trips



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The Conservancy at Jordan Lake Update

Chatham County, NC

Residential Site Trip Assignment

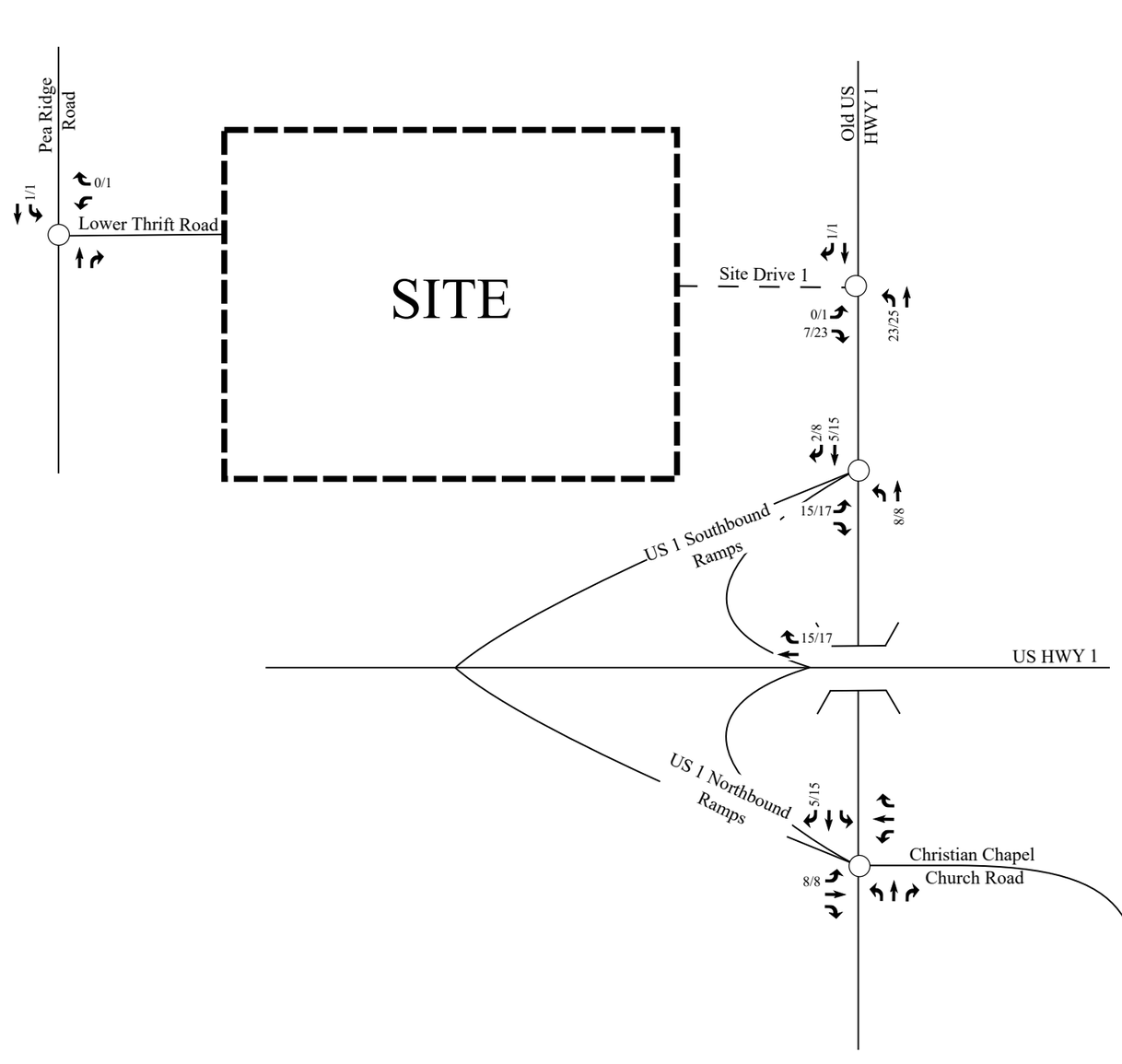
Scale: Not to Scale

Figure 7a

LEGEND

○ Unsignalized Intersection

X / Y → Weekday AM / PM Peak Site Trips



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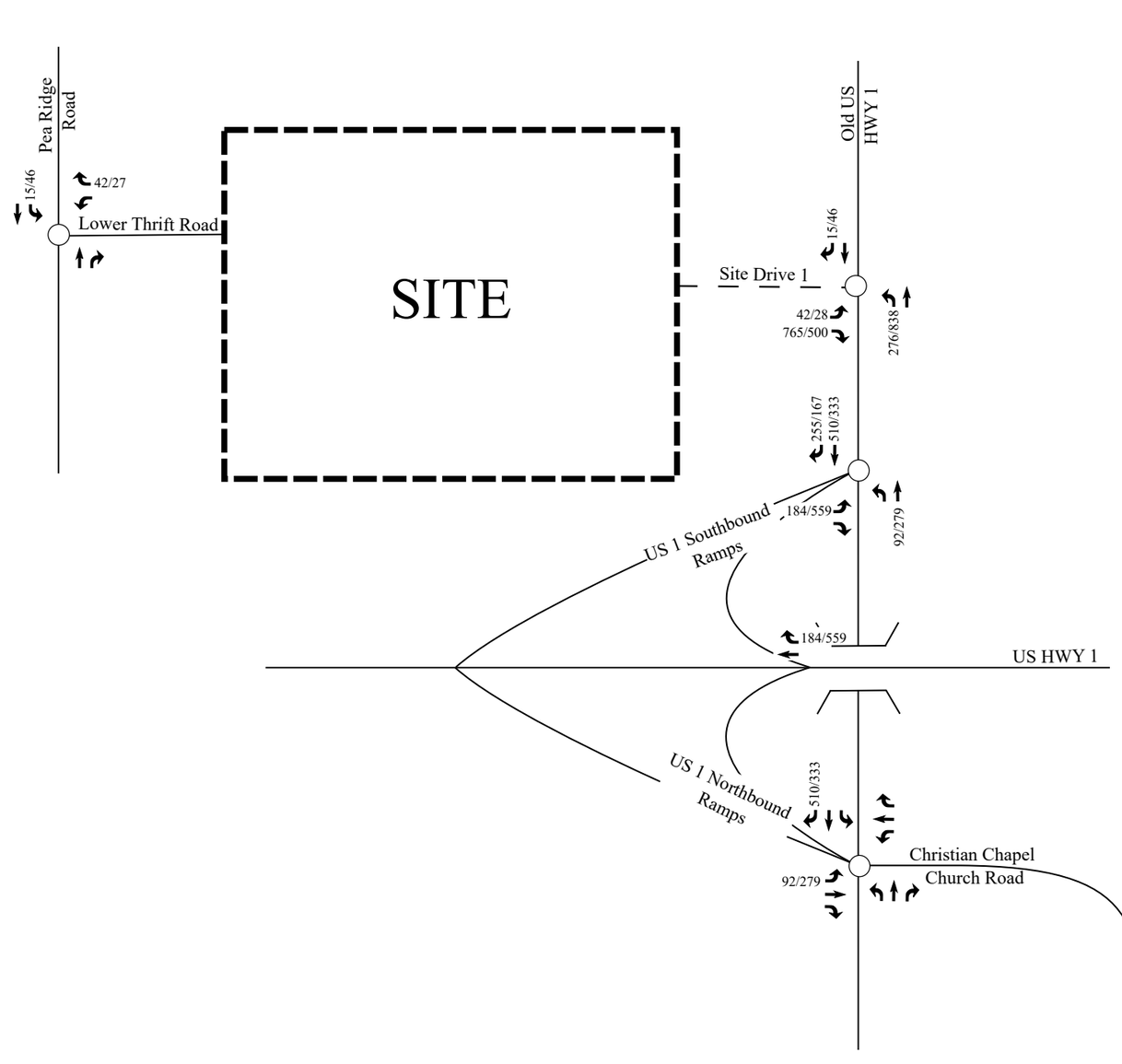
Recreational Site Trip Assignment

Scale: Not to Scale | Figure 7b

LEGEND

○ Unsignalized Intersection

X / Y → Weekday AM / PM Peak Site Trips



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Chatham County, NC

Total Site Trip Assignment

Scale: Not to Scale

Figure 8

5. BUILD (2033) TRAFFIC CONDITIONS

5.1. Build (2033) Peak Hour Traffic Volumes

To estimate traffic conditions with the site fully built-out, the total site trips were added to the no-build (2033) traffic volumes to determine the build (2033) traffic volumes. Refer to Figure 9 for an illustration of the build (2033) peak hour traffic volumes with the proposed site fully developed.

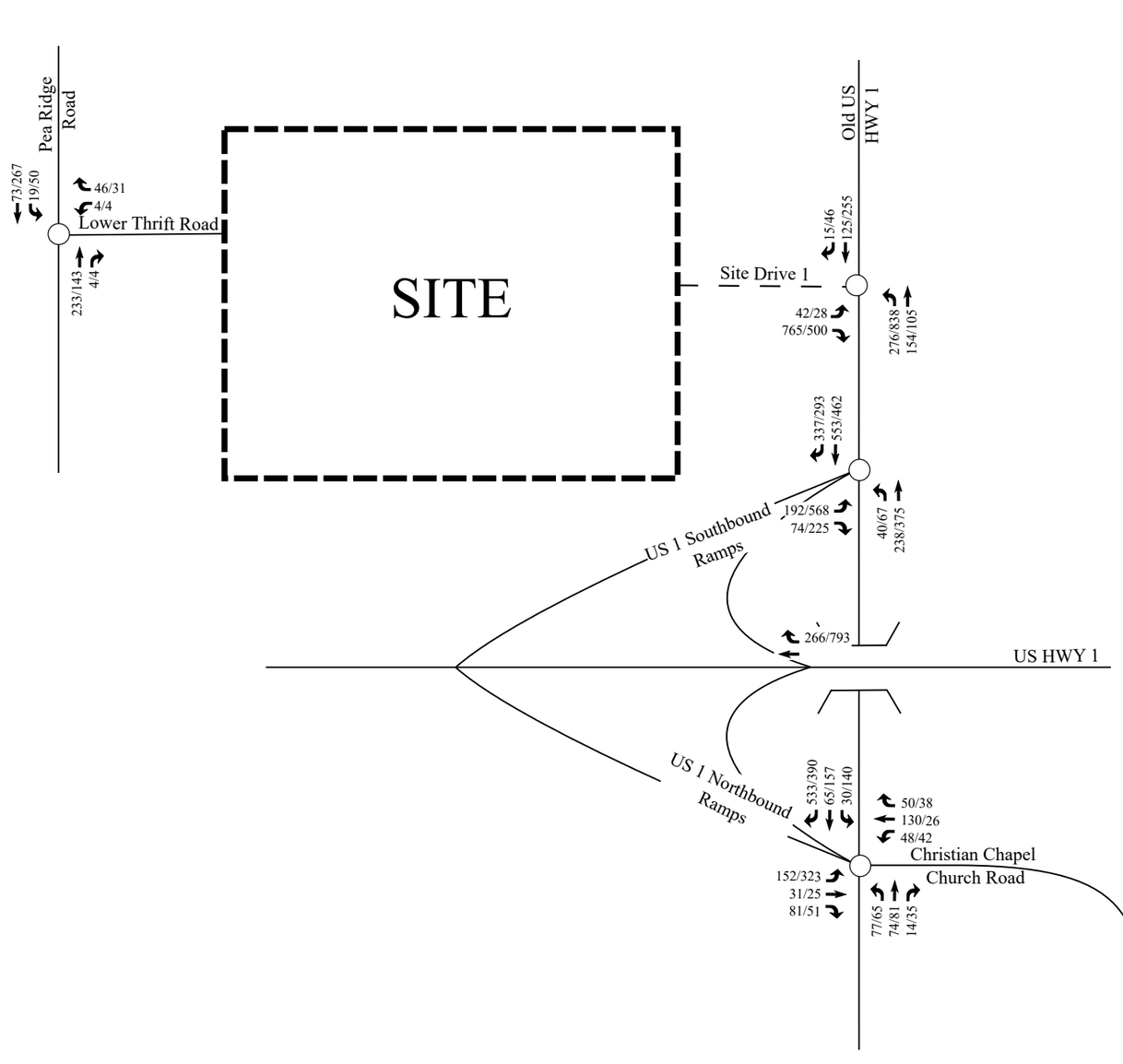
5.2. Analysis of Build (2033) Peak Hour Traffic

Study intersections were analyzed with the build (2033) traffic volumes using the same methodology previously discussed for existing and no-build traffic conditions. Intersections were analyzed with improvements necessary to accommodate future traffic volumes. The results of the capacity analysis for each intersection are presented in Section 7 of this report.

LEGEND

○ Unsignalized Intersection

X / Y → Weekday AM / PM Peak Hour Traffic



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RKA

RAMEY KEMP ASSOCIATES

The Conservancy at Jordan Lake Update

Chatham County, NC

Build (2033) Peak Hour Traffic

Scale: Not to Scale

Figure 9

6. TRAFFIC ANALYSIS PROCEDURE

Study intersections were analyzed using the methodology outlined in the *Highway Capacity Manual* (HCM), 6th Edition published by the Transportation Research Board. Capacity and level of service are the design criteria for this traffic study. A computer software package, Synchro (Version 10.3), was used to complete the analyses for most of the study area intersections. Please note that the unsignalized capacity analysis does not provide an overall level of service for an intersection; only delay for an approach with a conflicting movement.

The HCM defines capacity as "the maximum hourly rate at which persons or vehicles can reasonably be expected to traverse a point or uniform section of a lane or roadway during a given time period under prevailing roadway, traffic, and control conditions." Level of service (LOS) is a term used to represent different driving conditions, and is defined as a "qualitative measure describing operational conditions within a traffic stream, and their perception by motorists and/or passengers." Level of service varies from Level "A" representing free flow, to Level "F" where breakdown conditions are evident. Refer to Table 3 for HCM levels of service and related average control delay per vehicle for both signalized and unsignalized intersections. Control delay as defined by the HCM includes "initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay". An average control delay of 50 seconds at a signalized intersection results in LOS "D" operation at the intersection.

Table 3: Highway Capacity Manual – Levels-of-Service and Delay

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

6.1. Adjustments to Analysis Guidelines

Capacity analysis at all study intersections was completed according to the NCDOT Congestions Management Guidelines.

7. CAPACITY ANALYSIS

7.1. Old US Hwy 1 and US 1 Southbound Ramps

The existing unsignalized intersection of Old US Hwy 1 and US 1 Southbound Ramps was analyzed under existing (2020), no-build (2033), and build (2033) traffic conditions with lane configurations and traffic control shown in Table 4. Under existing (2020) traffic conditions, the eastbound minor-street approach is unstriped; however, the eastbound approach pavement lane is wide enough for a two-lane approach. The intersection was analyzed under all traffic conditions with a 25-foot eastbound right-turn lane to demonstrate field conditions. Refer to Table 4 for a summary of the analysis results. Refer to Appendix C for the Synchro capacity analysis reports.

Table 4: Analysis Summary of Old US Hwy 1 and US 1 Southbound Ramps

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall (seconds)	Approach	Overall (seconds)
Existing (2020) Conditions	EB NB SB	1 LT, 1 RT* 1 LT-TH 1 TH, 1 RT	A[2] A[1] --	N/A	B[2] A[1] --	N/A
No-Build (2033) Conditions	EB NB SB	1 LT, 1 RT* 1 LT-TH 1 TH, 1 RT	A[2] A[1] --	N/A	B[2] A[1] --	N/A
Build (2033) Conditions	EB NB SB	1 LT, 1 RT* 1 LT-TH 1 TH, 1 RT	E[2] A[1] --	N/A	F[2] A[1] --	N/A
Build (2033) Conditions – **with Turn Lane Improvements**	EB NB SB	1 LT, **1 RT** 1 LT-TH 1 TH, **1 RT**	E[2] A[1] --	N/A	F[2] A[1] --	N/A
Build (2033) Conditions – **Signalized**	EB NB SB	1 LT, **1 RT** 1 LT-TH 1 TH, **1 RT**	B B A	B (11)	C C B	C (24)

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

*Based on existing pavement width, the eastbound approach is wide enough for a two-lane approach. This approach is currently unstriped; however, a 25-foot eastbound right-turn lane was analyzed to demonstrate anticipated field conditions.

Improvements by developer in **bold.**

Capacity analysis of existing (2020) and no-build (2033) traffic conditions, the major-street left-turn movement and minor-street approach at the intersection of Old US Hwy 1 and US 1 Southbound Ramps are expected to operate at LOS B or better during both the weekday AM and PM peak hours. Under build (2033) traffic conditions indicates the major street left-turn movement of the intersection is expected to operate at LOS A during both weekday AM and PM peak hours. The minor-street approach is expected to operate at LOS E during the weekday AM peak hour and LOS F during the weekday PM peak hour. While these levels of service are not uncommon for an unsignalized minor-street approach with heavy through volumes on the mainline approach (Old US Hwy 1), SimTraffic results show significant traffic queues during the weekday PM peak hour that extend onto US 1.

An eastbound right-turn lane with a minimum of 150 feet of storage was considered under build (2033) traffic conditions. Additionally, the southbound right-turn lane storage was extended to a minimum of 100 feet of storage and was analyzed at this intersection. With these improvements, the minor-street approach at this intersection is expected to operate at slightly similar levels of service, queues, and delays as build (2033) traffic conditions with a 25-foot eastbound right-turn lane; therefore, this improvement is not recommended.

In addition to the turn lanes, a traffic signal was also considered at this intersection due to the degradation in level of service for the minor-street approach. The intersection is expected to meet the weekday PM peak hour warrant for signalization under build (2033) traffic conditions. It should be noted that the intersection is not expected to meet the weekday AM peak hour or the 4- and 8-hour warrants for signalization. NCDOT typically favors the 4- and 8-hour warrants for installation of a traffic signal. With a traffic signal and turn lane improvements, the intersection is expected to operate at an overall LOS B during the weekday AM peak hour and LOS C during the weekday PM peak hour. A traffic signal is also expected to improve queues and delay at the eastbound approach of this intersection during both the weekday AM and PM peak hours based on SimTraffic reports.

Due to the delays and queues at the intersection, it is recommended that the developer monitor the intersection for signalization and provide eastbound and southbound right-turn lanes.

7.2. Old US Hwy 1 and US 1 Northbound Ramps / Christian Chapel Church Road

The existing unsignalized intersection of Old US Hwy 1 and US 1 Northbound Ramps / Christian Chapel Church Road was analyzed under existing (2020), no-build (2033), and build (2033) traffic conditions with existing lane configurations and traffic control. Refer to Table 5 for a summary of the analysis results. Refer to Appendix D for the Synchro capacity analysis reports.

Table 5: Analysis Summary of Old US Hwy 1 and US 1 Northbound Ramps / Christian Chapel Church Road

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall (seconds)	Approach	Overall (seconds)
Existing (2020) Conditions	EB WB NB SB	1 LT-TH-RT 1 LT, 1 TH-RT 1 LT-TH-RT 1 LT-TH, 1 RT	B[2] B[2] A[1] A[1]	N/A	C[2] C[2] A[1] A[1]	N/A
No-Build (2033) Conditions	EB WB NB SB	1 LT-TH-RT 1 LT, 1 TH-RT 1 LT-TH-RT 1 LT-TH, 1 RT	C[2] C[2] A[1] A[1]	N/A	C[2] C[2] A[1] A[1]	N/A
Build (2033) Conditions	EB WB NB SB	1 LT-TH-RT 1 LT, 1 TH-RT 1 LT-TH-RT 1 LT-TH, 1 RT	F[2] E[2] A[1] A[1]	N/A	F[2] D[2] A[1] A[1]	N/A
Build (2033) Conditions – **with Turn Lane Improvements**	EB WB NB SB	**1 LT**, 1 TH-RT 1 LT, 1 TH-RT 1 LT-TH-RT 1 LT-TH, **1 RT**	F[2] E[2] A[1] A[1]	N/A	F[2] D[2] A[1] A[1]	N/A

Improvements by developer in **bold.**
1. Level of service for major-street left-turn movement.
2. Level of service for minor-street approach.

Capacity analysis of existing (2020) and no-build (2033) traffic conditions, the major-street left-turn movements and minor-street approaches at the intersection of Old US Hwy 1 and US 1 Northbound Ramps / Christian Chapel Church Road are expected to operate at LOS C or better during both the weekday AM and PM peak hours. Under build (2033) traffic conditions

indicates the major street left-turn movements of the intersection are expected to operate at LOS A during both weekday AM and PM peak hours. The westbound minor-street approach is expected to operate at LOS E during the weekday AM peak hour and LOS D during the weekday PM peak hour. The eastbound minor-street approach is expected to operate at LOS F during the weekday AM and PM peak hour. While these levels of service are not uncommon for an unsignalized minor-street approach with heavy through volumes on the mainline approach (Old US Hwy 1), SimTraffic results show minimal traffic queues during the weekday AM and PM peak hours that are contained on the US 1 Northbound Off-Ramp.

A traffic signal was considered at this intersection due to the degradation in level of service for the minor-street approach. The intersection is not expected to meet weekday AM or PM peak hour warrants for signalization under build (2033) traffic conditions. It should be noted that the intersection is not expected to meet 4- and 8-hour warrants for signalization, which NCDOT typically favors for installation of a traffic signal. Since the peak hour warrants are not met and the 4- and 8-hour warrants are not expected to be met, a traffic signal is not recommended at this intersection at this time by the developer.

An eastbound left-turn lane was recommended in addition to extending the southbound right-turn lane to have a minimum of 100 feet of storage.

7.3. Old US Hwy 1 and Site Drive 1

The proposed intersection of Old US Hwy 1 and Site Drive 1 was analyzed under build (2033) traffic conditions with the lane configurations and traffic control shown in Table 6. Refer to Table 6 for a summary of the analysis results. Refer to Appendix E for the Synchro capacity analysis reports.

Table 6: Analysis Summary of Old US Hwy 1 and Site Drive 1

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall (seconds)	Approach	Overall (seconds)
Build (2033) Conditions	**EB** NB SB	**1 LT, 1 RT** **1 LT,** 1 TH 1 TH-**RT**	E[2] A[1] --	N/A	F[2] C[1] --	N/A
Build (2033) Conditions – **Signalized**	**EB** NB SB	**1 LT, 1 RT** **1 LT,** 1 TH 1 TH-**RT**	B A D	B (13)	B C D	C (23)

Improvements by developer in **bold.**
1. Level of service for major-street left-turn movement.
2. Level of service for minor-street approach.

Capacity analysis of build (2033) traffic conditions indicates the minor-street approach at proposed intersection of Old US Hwy 1 and Site Drive 1 is expected to operate at LOS E during the weekday AM peak hour and LOS F during the weekday PM peak hour.

Turn lanes were considered based on the NCDOT *Policy on Street and Driveway Access to North Carolina Highways*. A northbound left-turn lane is recommended at this intersection.

A traffic signal was also considered at this intersection due to the heavy queuing and low levels of service at the minor-street approach. It should be noted that the intersection is expected to meet weekday AM and PM peak hour warrants, but not the 4- and 8-hour warrants for signalization. NCDOT typically favors the 4- and 8-hour warrants for installation of a traffic signal. With a traffic signal, the intersection is expected to operate at an overall

LOS C or better during the weekday AM and PM peak hours. It is recommended that the developer monitor the intersection for signalization.

7.4. Pea Ridge Road and Lower Thrift Road Connection

The unsignalized site access connection of Pea Ridge Road and Lower Thrift Road Connection was analyzed under existing (2020), no-build (2033), and build (2033) traffic conditions with lane configurations and traffic control shown in Table 7. Refer to Table 7 for a summary of the analysis results. Refer to Appendix F for the Synchro capacity analysis reports.

Table 7: Analysis Summary of Pea Ridge Road and Lower Thrift Road Connection

ANALYSIS SCENARIO	APPROACH	LANE CONFIGURATIONS	WEEKDAY AM PEAK HOUR LEVEL OF SERVICE		WEEKDAY PM PEAK HOUR LEVEL OF SERVICE	
			Approach	Overall (seconds)	Approach	Overall (seconds)
Existing (2020) Conditions	WB NB SB	1 LT-RT 1 TH-RT 1 LT-TH	A[2] -- A[1]	N/A	B[2] -- A[1]	N/A
No-Build (2033) Conditions	WB NB SB	1 LT-RT 1 TH-RT 1 LT-TH	B[2] -- A[1]	N/A	B[2] -- A[1]	N/A
Build (2033) Conditions	WB NB SB	1 LT-RT 1 TH-RT 1 LT-TH	B[1] -- A[2]	N/A	A[1] -- A[2]	N/A

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

Capacity analysis of existing (2020), no-build (2033), and build (2033) traffic conditions indicates the major-street left-turn movement and minor-street approach at the intersection of Pea Ridge Road and Lower Thrift Road Connection are expected to operate at LOS B or better during both weekday AM and PM peak hours.

Turn lanes were considered based on the NCDOT *Policy on Street and Driveway Access to North Carolina Highways*; however, since Pea Ridge Road is not expected to meet the 4,000 ADT threshold for turn lane warrants, no turn lanes are recommended at this intersection.

8. CONCLUSIONS

This Traffic Impact Analysis was conducted to determine the potential traffic impacts of The Conservancy at Jordan Lake residential development, proposed to be located north of the intersection of Old US Hwy 1 and US 1 Ramps in Chatham County, North Carolina. The proposed development, expected to be build out in 2033, was assumed to consist of a maximum of 1,500 single-family homes in the previously submitted TIA. The proposed development is now assumed to consist of a maximum of 1,575 single-family homes and an 18-hole golf course. Additionally, in the previously submitted TIA, site access was proposed via two (2) full movement intersections, one along Old US Hwy 1 and one along Pea Ridge Road. The proposed development is now assumed to provide site access via one (1) full movement intersection along Old US Hwy 1 and one (1) connection to Lower Thrift Road.

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

- Existing (2020) Traffic Conditions
- No-Build (2033) Traffic Conditions
- Build (2033) Traffic Conditions

Trip Generation

It is estimated that the proposed development will generate approximately 13,750 total site trips on the roadway network during a typical 24-hour period. Of the daily traffic volume, it is anticipated 1,155 trips (306 entering and 849 exiting) will occur during the AM peak hour and 1,485 trips (930 entering and 555 exiting) will occur during the PM peak hour.

Adjustments to Analysis Guidelines

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

Intersection Capacity Analysis Summary

All the study area intersections (including the proposed site driveways) are expected to operate at acceptable levels-of-service under existing and future year conditions with the exception of the intersections listed below. A summary of the study area intersections that are expected to need improvements are as follows:

Old US Hwy 1 and US 1 Southbound Ramps

An eastbound right-turn lane with a minimum of 150 feet of storage was considered under build (2033) traffic conditions. Additionally, the southbound right-turn lane storage was extended to a minimum of 100 feet of storage and was analyzed at this intersection. With these improvements, the minor-street approach at this intersection is expected to operate at slightly similar levels of service, queues, and delays as build (2033) traffic conditions with a 25-foot eastbound right-turn lane; therefore, this improvement is not recommended.

In addition to the turn lanes, a traffic signal was also considered at this intersection due to the degradation in level of service for the minor-street approach. The intersection is expected to meet the weekday PM peak hour warrant for signalization under build (2033) traffic conditions. It should be noted that the intersection is not expected to meet the weekday AM peak hour or the 4- and 8-hour warrants for signalization. NCDOT typically favors the 4- and 8-hour warrants for installation of a traffic signal. With a traffic signal and turn lane improvements, the intersection is expected to operate at an overall LOS B during the weekday AM peak hour and LOS C during the weekday PM peak hour. A traffic signal is also expected to improve queues and delay at the eastbound approach of this intersection during both the weekday AM and PM peak hours based on SimTraffic reports.

Due to the delays and queues at the intersection, it is recommended that the developer monitor the intersection for signalization and provide eastbound and southbound right-turn lanes.

Old US Hwy 1 and US 1 Northbound Ramps

The westbound minor-street approach is expected to operate at LOS E during the weekday AM peak hour and LOS D during the weekday PM peak hour. The eastbound minor-street approach is expected to operate at LOS F during the weekday AM and PM peak hour. While these levels of service are not uncommon for an unsignalized minor-street approach with heavy through volumes on the mainline approach (Old US Hwy 1), SimTraffic results show minimal traffic queues during the weekday AM and PM peak hours that are contained on the US 1 Northbound Off-Ramp.

A traffic signal was considered at this intersection due to the degradation in level of service for the minor-street approach. The intersection is not expected to meet weekday AM or PM peak hour warrants for signalization under build (2033) traffic conditions. It should be noted that the intersection is not expected to meet 4- and 8-hour warrants for signalization, which NCDOT typically favors for installation of a traffic signal. Since the peak hour warrants are not met and the 4- and 8-hour warrants are not expected to be met, a traffic signal is not recommended at this intersection at this time by the developer.

An eastbound left-turn lane was recommended in addition to extending the southbound right-turn lane to have a minimum of 100 feet of storage.

Old US Hwy 1 and Site Drive 1

Turn lanes were considered based on the NCDOT *Policy on Street and Driveway Access to North Carolina Highways*. A northbound left-turn lane is recommended at this intersection.

A traffic signal was also considered at this intersection due to the heavy queuing and low levels of service at the minor-street approach. It should be noted that the intersection is expected to meet weekday AM and PM peak hour warrants, but not the 4- and 8-hour warrants for signalization. NCDOT typically favors the 4- and 8-hour warrants for installation of a traffic signal. With a traffic signal, the intersection is expected to operate at an overall LOS C or better during the weekday AM and PM peak hours. It is recommended that the developer monitor the intersection for signalization.

9. RECOMMENDATIONS

Based on the findings of this study, specific geometric improvements have been identified and are recommended to accommodate future traffic conditions. See a more detailed description of the recommended improvements below. Refer to Figure 10 for an illustration of the recommended lane configurations for the proposed development.

Recommended Improvements by Developer

Old US Hwy 1 and US 1 Southbound Ramps

- Provide an eastbound right-turn lane with at least 150 feet of storage and appropriate deceleration and taper.
- Extend the storage at the southbound right-turn lane to at least 100 feet of storage and appropriate deceleration and taper. This movement is currently channelized with approximately 25 feet of storage.
- Monitor intersection for signalization, and install traffic signal when warranted and approved by NCDOT.

Old US Hwy 1 and US 1 Northbound Ramps

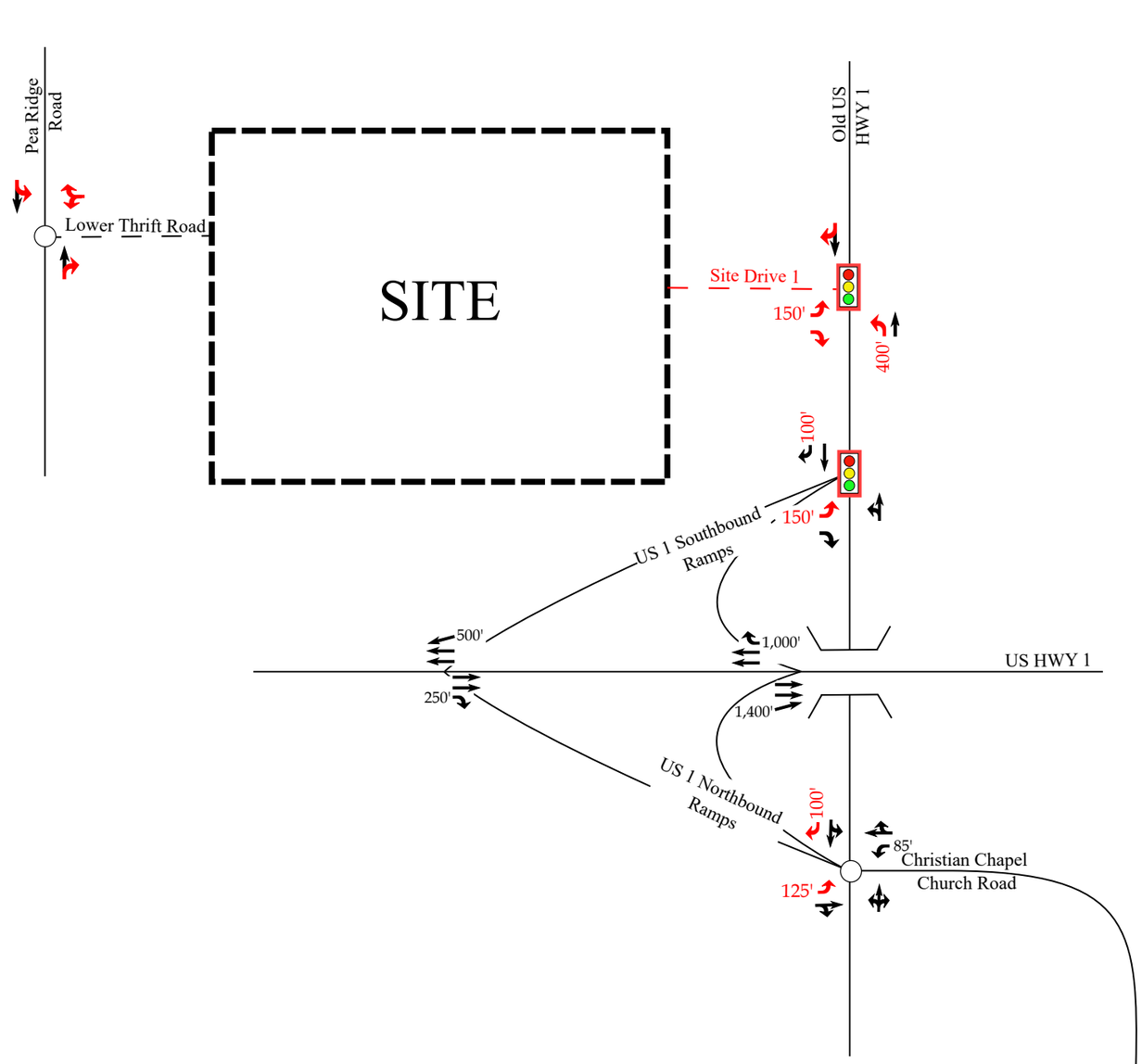
- Provide an eastbound left-turn lane with at least 125 feet of storage and appropriate deceleration and taper.
- Provide a southbound right-turn lane with at least 100 feet of storage and appropriate deceleration and taper.

Old US Hwy 1 and Site Drive 1

- Construct eastbound approach with one ingress lane and two egress lanes, one left-turn lane with at least 150 feet of storage and appropriate decel and taper and one right-turn lane with full storage.
- Provide a northbound left-turn lane with at least 400 feet of storage and appropriate taper.
- Monitor intersection for signalization, and install traffic signal when warranted and approved by NCDOT.

LEGEND

- Unsignalized Intersection
- Existing Lane
- Improvement by Developer
- Monitor Intersection for Signalization
- X' Storage (In Feet)



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Chatham County, NC

Recommended Lane Configurations

Scale: Not to Scale | Figure 10