

GRACE NEW TESTAMENT CHURCH EXPANSION

TRAFFIC IMPACT STUDY

EXECUTIVE SUMMARY



Prepared for:

The Town of Chapel Hill
Public Works Department
Traffic Engineering Division

Prepared by:

HNTB North Carolina, PC

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NCBELS License #: C-1554

January 2015

HNTB

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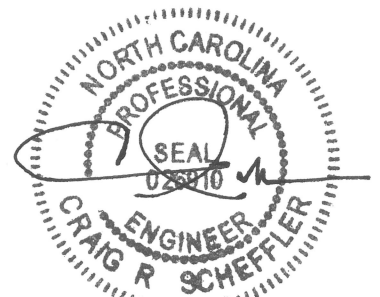
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1-20-15



EXECUTIVE SUMMARY

Project Overview

An expansion of the existing Grace New Testament Church facility, located along Coleridge Drive and Sage Road, is being proposed in Chapel Hill. The project proposes to construct an additional 22,923 square feet of space to the existing 15,000 square foot church building. **Figure ES-1** shows the general location of the site. The project is anticipated to be fully complete by 2016. This report analyzes the transportation impacts of the build-out scenario for the year 2017 (one year after anticipated completion), the no-build scenario for 2017, as well as 2014 existing year traffic conditions.

The proposed site concept plan shows the addition of a single full movement access driveway and new parking lot along Coleridge Drive. Two existing driveways and surface parking facilities will be retained and surface paved parking will be expanded in the current lot. No other vehicular access connections or transportation system changes are proposed. **Figure ES-2** displays the preliminary concept plan of the Grace New Testament Church Expansion and nearby land uses and roadways. The project is expected to provide 320 total parking spaces on the two surface parking lots, an increase from the 275 available currently on-site.

This report analyzes and presents the transportation impacts that the Grace New Testament Church Expansion will have on the following intersections in the project study area:

- Sage Road and Erwin Road
- Sage Road and Coleridge Drive (North) / Old Sterling Drive
- Sage Road and Coleridge Drive (South) / Lowe's Service Entrance
- Sage Road and Cosgrove Avenue / Lowe's Entrance
- Sage Road and US 15-501 (Fordham Boulevard)
- Coleridge Drive and Site Access South
- Coleridge Drive and Site Access North
- Coleridge Drive and Future Site Access

The impacts of the proposed site at the study area intersections will be evaluated during the highest peak hour of a Sunday morning. The proposed expansion is not expected to generate significant amounts of typical weekday peak period traffic.

Existing Conditions

Study Area

The site is located in northern Chapel Hill along Sage Road just to the north of the US 15-501 (Fordham Boulevard) corridor. The study area contains three signalized intersections and several unsignalized intersections. It also includes two existing driveway connections from the church to Coleridge Drive.

US 15-501 is a major arterial facility providing connectivity between Chapel Hill, Durham and the I-40 corridor. Remaining study area network roadways are either minor arterial/collector facilities or local neighborhood access streets.



Site Traffic Generation

With the addition of new peak hour trips during the Sunday AM peak hour (as estimated by current church service times and reported attendance), there are potential site traffic impacts to the study area intersections. **Table ES-1** shows the site trip generation details, with generation rates and methodologies taken from the *Institute of Transportation Engineers (ITE) Trip Generation Manual, Version 9* and compared to actual field data collected at site driveways. This data includes ITE AM and PM peak hour information, though these time periods were not specifically analyzed due to the insignificant additional potential traffic generation at these times.

Table ES-1
Weekday and Sunday Trip Generation Summary
Grace New Testament Church

Trip Generation Source – New Net Trips Due to Expansion	Weekday						Sunday				
	Daily Total	AM Peak Hour			PM Peak Hour			Daily Total	AM Peak Hour		
		Enter	Exit	Total	Enter	Exit	Total		Enter	Exit	Total
ITE Trip Generation Manual	208	8	5	13	6	7	13	840	135	141	276
Field-Collected Data	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	136	129	265

* - No ITE Data Available, Assumed Average of AM/PM Peak Hour Data

Actual field-collected data was used to derive future trip net trip generation data, as it reflects current trip generating conditions actually occurring at the church. The data also has very good correlation with ITE-predicted values.

Background Traffic

Background traffic growth for the 2017 analysis year is expected to come from two sources - ambient regional traffic growth and specific development-related traffic growth. Based on existing information, several Town-approved development projects near the project study area may be expected to contribute to background traffic growth by the 2017 analysis year, but in most cases the amount of traffic generated from these developments will be negligible on a Sunday morning. All remaining estimated traffic growth in the area is assumed to occur due to overall region-wide ambient growth. To account for this, an ambient area-wide traffic growth percentage of 1.0 percent per year was applied to existing traffic volumes, based on conservative growth projections based on historic daily traffic growth patterns in the project study area (NCDOT and Town of Chapel Hill daily traffic information).

Impact Analysis

Peak Hour Intersection Level of Service (LOS)

Study results indicate existing traffic operations at all study area intersections are acceptable during the Sunday AM peak hour. Even with the addition of peak hour site-generated trips to the projected 2017 background traffic volumes, only one study area intersection is projected to experience deficient traffic operations in the Sunday AM peak hour. However, closer inspection of peak hour traffic volume patterns, specifically within the peak hour itself, indicate that the traffic volumes at this intersection (Sage Road and Coleridge Drive – south) vary considerably as church-related traffic enters and exits the intersection at different times within the peak hour.



A summary of the traffic operations for each intersection, related to vehicular delays (intersection average as a whole if signalized, critical movement if stop-controlled) and the corresponding Level-of-Service (LOS) is shown in **Table ES-2**.

**Table ES-2. Grace New Testament Church Expansion
 LOS and Delay (Seconds/Vehicle) Summary**

Intersections	Peak Hour	2014 Existing		2017 No-Build		2017 Build		2017 Mitigated	
		LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
Sage Road & Erwin Road	Sunday AM	B	17.9	B	18.0	B	18.4	N/A	N/A
Sage Road & Coleridge Drive / Old Sterling Drive*	Sunday AM	B*	14.9*	C*	15.3*	C*	18.8*	N/A	N/A
Sage Road & Coleridge Drive / Lowe's Entrance*	Sunday AM	C*	16.8*	C*	17.3*	F*	53.3*	N/A**	N/A**
Sage Road & Cosgrove Avenue / Lowe's Entrance	Sunday AM	A	7.0	A	7.1	A	7.1	N/A	N/A
Sage Road & US 15-501 (Fordham Boulevard)	Sunday AM	D	35.8	D	36.5	D	39.0	N/A	N/A
Coleridge Drive & Site Driveway #1 / Sagebrook Apartment Driveway*	Sunday AM	B*	12.3*	B*	12.3*	D*	28.4*	N/A	N/A
Coleridge Drive & Site Driveway #2*	Sunday AM	A*	8.9*	A*	8.9*	A*	9.3*	N/A	N/A
Coleridge Drive & Proposed Site Driveway*	Sunday AM	N/A	N/A	N/A	N/A	A*	9.6*	N/A	N/A

BOLD/ITALICS – Critical Movement or Overall Intersection Requires Mitigation Per Town TIS Guidelines

* - Worst-Case LOS/Delay for Unsignalized/Stop-Controlled Critical Movement

** - No Mitigation Recommended – See Recommendations Section of Executive Summary

Access Analysis

Vehicular site access is to be accommodated by two existing and one proposed full movement access driveway connecting to Coleridge Drive. Design details related to driveway throat lengths are shown on the concept plan and provide approximately 50 to 75 foot driveway throat at the driveways. An internal driveway circulation system to all surface parking areas is also shown on the plans. The middle driveway is currently used primarily as a drop-off location, and it would continue to function as such in the future concept plan.

Driveway distances along Coleridge Drive from its intersections at Sage Road are approximately 400 feet (to the north intersection) and 500 feet (to the south intersection) and are acceptable, based on recommendations of 100 foot minimum corner clearance as set forth in the 2003 *NCDOT Policy on Street and Driveway Access to North Carolina Highways* and the 50 foot minimum along local streets specified in the 2005 *Town of Chapel Hill Design Manual*. The proposed spacings between the three driveways (225 feet and 350 feet) is more than the recommended 50 foot spacing along local streets (Table 4-A-1 in the Town Design Manual).

Access for pedestrians and bicyclists is adequate in the project study area. Sidewalk is present on both sides of Sage Road and on the opposite side of Coleridge Drive adjacent to the site and



exists along the major street connections along Sage Road. Crosswalk and pedestrian signals exist across the major Sage Road study area intersections near the Grace New Testament Church Expansion site. Specific bicycle amenities are present along the Sage Road and Old Sterling Drive roadway facilities, with striped lanes present in both directions.

Signal Warrant Analysis

Based on projected 2017 traffic volumes and current/proposed access plans, no study area intersection would warrant the installation of a traffic signal, based on the methodology found in the *2009 Manual on Uniform Traffic Control Devices (MUTCD)*. The intersection of Sage Road and Coleridge Drive (south) was found to possibly experience deficient LOS F critical movement traffic operations in the 2017 with site traffic scenario. This intersection was tested for satisfaction of the Peak Hour Warrant thresholds and results indicated that it does not meet peak hour warrants with projected 2017 Sunday AM peak traffic volume estimates.

Other Transportation-Related Analyses

Other transportation-related analyses relevant to the 2001 Town of Chapel Hill Guidelines for the preparation of Traffic Impact Studies were completed as appropriate. The following topics listed in **Table ES-3** are germane to the scope of this study.

Table ES-3. Other Transportation-Related Analyses

Analysis	Comment
Long-Range Daily Volume-Capacity Analysis	Due to the fact that the proposed site expansion will add approximately 800 daily trips to the study area network, no long-range daily v/c analysis was conducted for this study.
Turn Lane Storage Requirements	Storage bay lengths at study area intersections were analyzed using Synchro and HCS 95 th percentile (max) queue length estimates for the 2017 Build Scenario. Existing southbound right-turn and northbound left-turn storage bays at the US 15-501/Sage Road intersection may have maximum queues exceeding existing storage bays. This condition also may occur during existing 2014 Sunday AM peak conditions. No other storage issues are noted. Given current intersection configurations and right-of-way limits, it may not be feasible to lengthen these storage bays without significant changes to the intersection and/or nearby frontage road.
Appropriateness of Acceleration / Deceleration Lanes	The site concept plan shows no specifics related to acceleration/deceleration lanes along Coleridge Drive. Based on the existing 25 mph speed limit on Coleridge Drive, the fact that it functions as a local access collector facility, and analysis results in this study, no specific acceleration or deceleration lanes are recommended at existing or proposed site access points. No other specific acceleration/deceleration lane issues were analyzed in the project study area.
Pedestrian and Bicycle Analysis	Existing pedestrian and bicycle access and connectivity is adequate in the project study area. Sidewalk exists along all major and minor study area roadways on at least one side of the road, with the exception of the US 15-501 corridor. Pedestrian crossings and signals are present along several Sage Road intersections. Delineated bicycle lanes are present in the project study area along the Sage Road extension. No sidewalk currently exists along the existing site frontage with Coleridge Drive and site plans do not indicate new sidewalk.



Table ES-3. (Continued) Other Transportation-Related Analyses

Analysis	Comment
Public Transportation Analysis	Public transportation service to the study area, and to the church site itself, is excellent with multiple bus stops and multiple local bus routes on Sage Road and Coleridge Drive proximate to the site. No CHT service exists in the project study area in the Sunday AM peak hour, however.

Mitigation Measures/Recommendations

Planned Improvements

There are no Town of Chapel Hill or North Carolina Department of Transportation improvement projects for study area roadway facilities within the analysis year time frame of 2014-2017.

Background Committed Improvements

There are no specific geometric or operational improvements to study area roadway intersections or facilities related to background private development projects that are expected to be completed between 2014 and 2017.

Applicant Committed Improvements

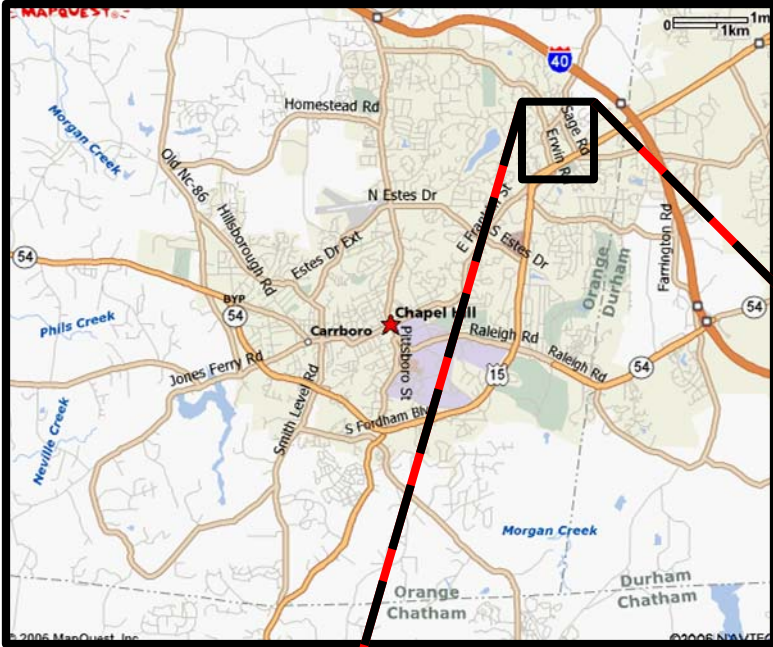
Based on the preliminary site concept plans and supporting development information provided, there are no specific external transportation-related improvements proposed adjacent to the Grace New Testament Church Expansion, other than the provision of an additional site access driveway.

Necessary Improvements






Based on traffic capacity analyses for the 2017 design year, and analyses of existing study area turning bay storage lengths and site access, the following improvements are recommended as being necessary for adequate transportation network operations (see **Figure ES-3**).


- 1) Provide sidewalk connection between existing sidewalk along Sage Road and the proposed site to better accommodate any potential future pedestrian trips to/from the site.

2017 capacity analyses of the Sage Road and Coleridge Drive (south) / Lowes Service Driveway intersection indicate that the westbound stop-controlled Lowes Driveway approach may operate at a LOS F in the Sunday AM peak hour with the addition of site expansion traffic volumes added to the eastbound Coleridge Drive approach at this intersection. Further investigation of existing traffic volume peaking characteristics within the peak hour indicate that peak traffic volumes entering the vicinity of the Grace New Testament Church do not coincide with exiting volumes during the period between church services. In addition, further analysis of peak hour signal warrant thresholds with 2017 site expansion traffic volumes included shows that this intersection would not meet warrants for signalization. Maximum predicted queue lengths for the westbound approach are approximately two vehicles and total volumes (45 vehicles) are not excessive. Therefore, no mitigation is recommended for this intersection due to site expansion-related impacts.

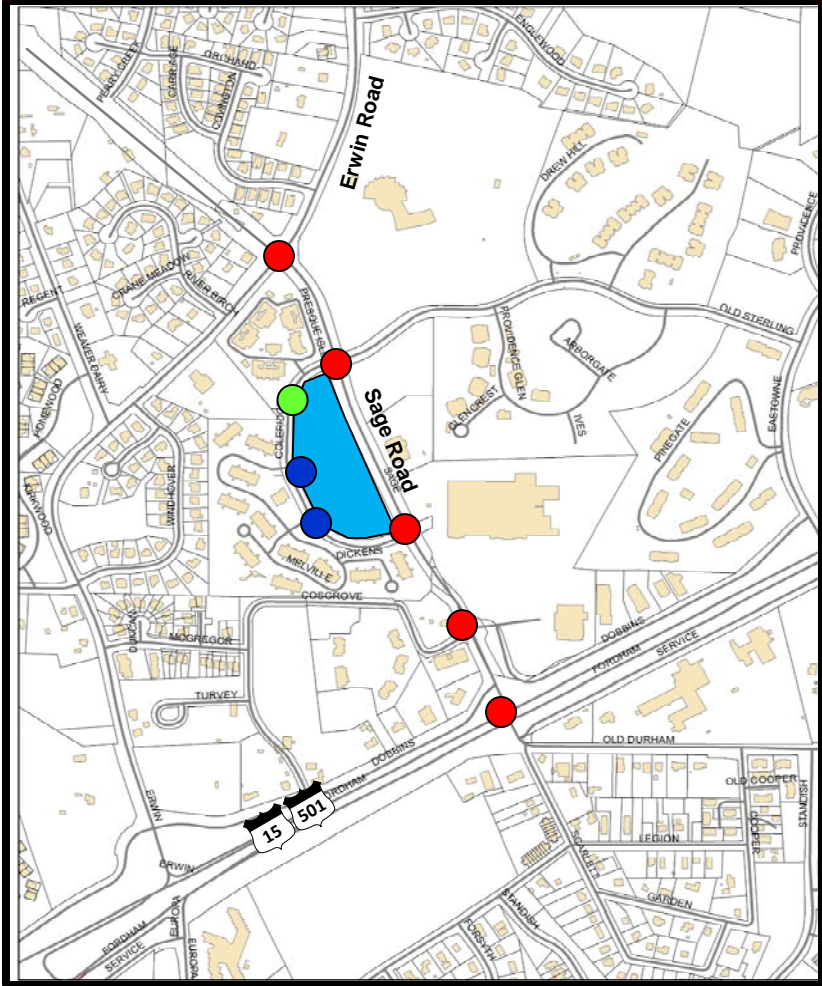


LEGEND

-  = Existing Building Footprint
-  = Existing Study Area Intersection
-  = Existing Site Driveway
-  = Proposed Site Driveway
-  = Proposed Site Parcel



NOT TO SCALE

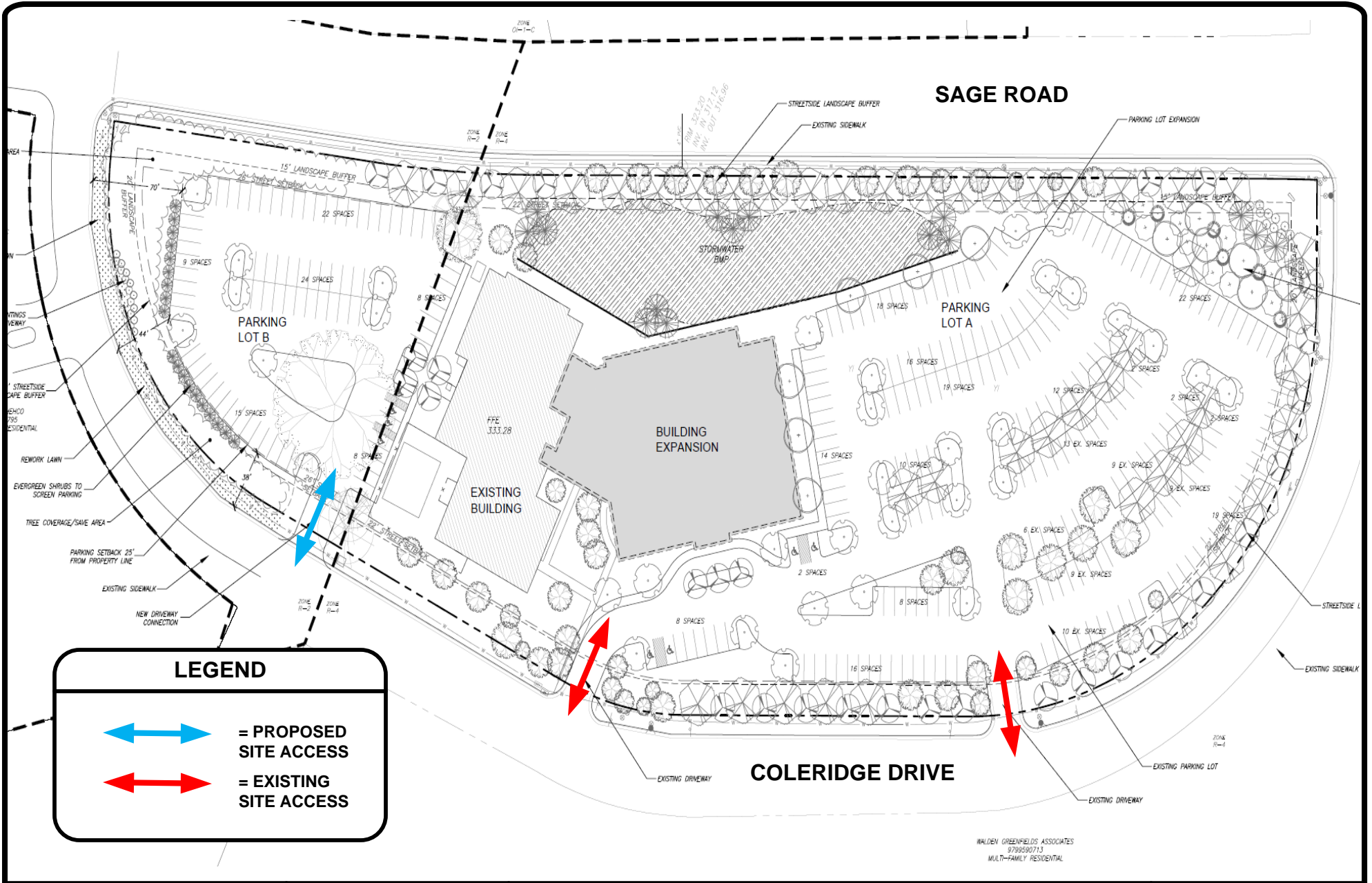


**Grace New Testament Church Expansion
Traffic Impact Study**

DATE: January 2015

PROJECT STUDY AREA MAP

FIGURE ES-1



			NOT TO SCALE	Grace New Testament Church Expansion Traffic Impact Study	DATE: January 2015
				SITE CONCEPT PLAN	FIGURE ES-2

LEGEND

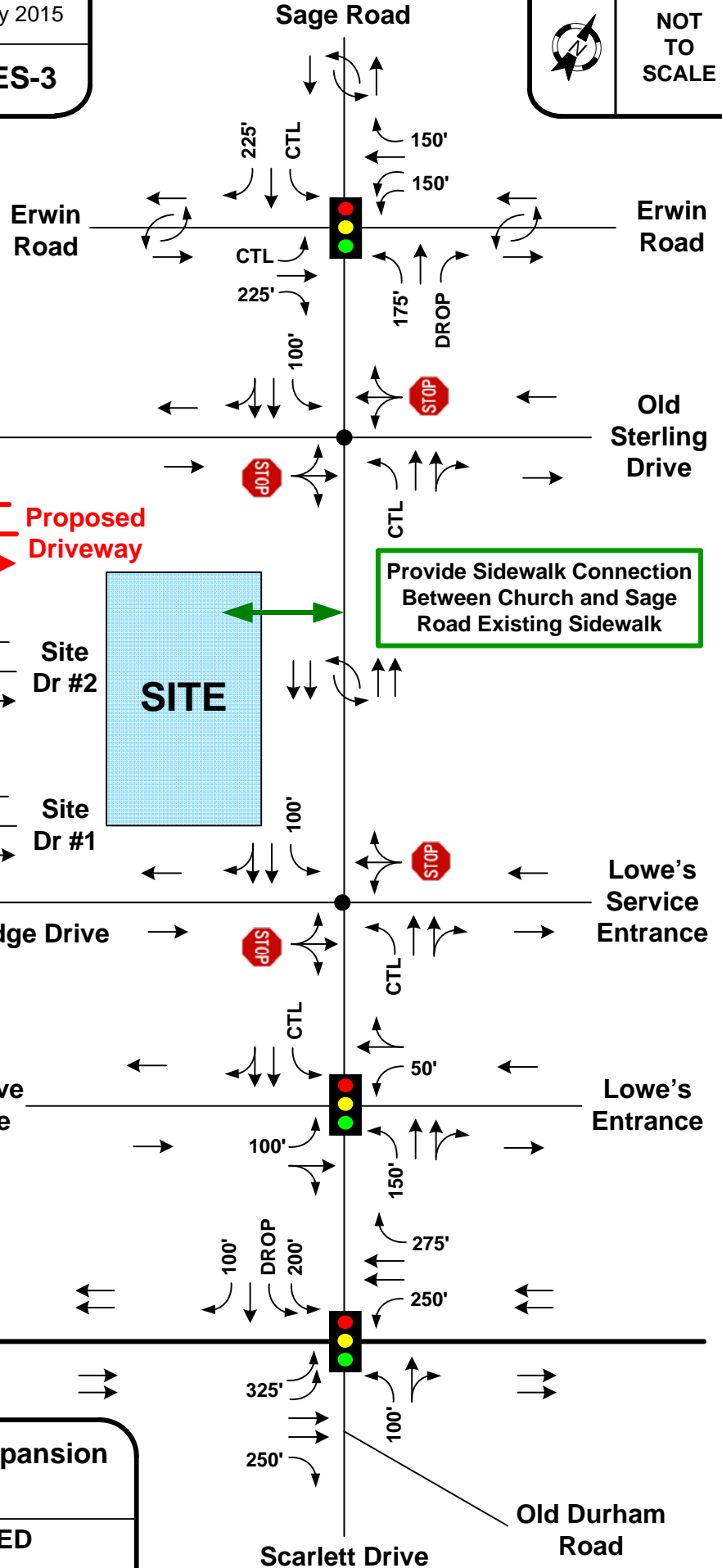


= APPLICANT COMMITTED IMPROVEMENT



= RECOMMENDED SIDEWALK IMPROVEMENT

Sagebrook Apartments



Grace New Testament Church Expansion
Traffic Impact Study

COMMITTED & RECOMMENDED
IMPROVEMENTS