

March 9, 2015

Mr. Kent Guthrie, P.E.
City of Clemson
1250 Tiger Boulevard, Suite 4
Clemson, South Carolina 29631

**Subject: Traffic Impact Assessment for the Fendley and Earle Student Housing Development
Clemson, South Carolina**

Dear Mr. Guthrie:

This letter summarizes the findings of the Traffic Impact Assessment (TIA) that was performed by Ramey Kemp & Associates, Inc. for the Fendley and Earle Student Housing Development that is being proposed east of College Avenue in Clemson, South Carolina. Similar to other recent developments in this area, the primary mode of transportation for residents would not have to be one's own automobile.

The purpose of this study is to determine the potential impact at the existing signalized intersection of College Avenue and Keith Street, and the unsignalized intersection of College Avenue and Earle Street, created by the additional traffic generated by the proposed development that is anticipated to be built out by the year 2017. In order to accomplish this objective, this study analyzed existing (2015) traffic conditions and future (2017) 'no build' and 'build' traffic conditions for weekday AM, Midday, and PM peak hours.

Background

The site is currently occupied by an existing residential development, which will be replaced upon the construction of the proposed development, and is located on the east side of College Avenue. Access to the development's parking deck is to be provided via Fendley Street and Foy Creek Drive.

College Avenue is a two-lane facility that has a posted speed limit of 25 miles per hour (mph) within the vicinity of the site. Exclusive left turn lanes are provided on the northbound and southbound approaches of College Avenue at Keith Street. Keith Street is a two-lane facility with no posted speed limit, while Earle Street is a one-way facility to the east of College Avenue and has no posted speed limit. Refer to the attached appendix for the site location map, site plan, and an illustration of the existing lane configurations at the study intersections.

Traffic Analysis Procedure

Traffic analysis was performed using Synchro 7. Synchro 7 is a comprehensive software package developed by Trafficware that allows the user to determine delay and level of service. Synchro 7 is based on the 2000 Highway Capacity Manual (HCM). In addition, Synchro allows unsignalized analyses to be performed utilizing methodologies in the 2000 HCM.

Analysis results for signalized intersections provide level of service calculations for all approaches and an overall resulting level of service. The capacity analysis for an unsignalized intersection does not provide an overall level of service for the intersection, but rather a level of service for movements and/or approaches that have a conflicting movement.

The HCM defines capacity as “the maximum hourly rate at which persons or vehicles can reasonably be expected to traverse a point or uniform section of a lane or roadway during a given time period under prevailing roadway, traffic, and control conditions”. 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 greater vehicle delays are evident. Refer to Table 1 for HCM levels of service and related average control delay per vehicle. Control delay as defined by the HCM includes “initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay”. As shown in Table 1, an average control delay of 30 seconds at an unsignalized intersection results in level of service D operation at the intersection.

TABLE 1
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

Existing Traffic Conditions

Existing traffic volumes were obtained from turning movement counts that were conducted at the study intersections during the AM (7:00 to 9:00), Midday (11:00 AM to 1:00 PM) and PM (4:00 to 6:00) peak periods in January 2015 while Clemson University was in session. Also, turning movement counts were conducted at the access of the existing Campusview development on Earle Street during the same peak periods. These counts were used in estimating the trip generation for the residential components of the adjacent and proposed student housing developments. Refer to the attached appendix for an illustration of the existing (2015) peak hour traffic volumes as well as a copy of the raw traffic count data.

Future ‘No Build’ Traffic Conditions

In order to account for the growth of traffic and subsequent traffic conditions at a future year, background traffic projections are needed. Background traffic is that component of traffic due to growth of the community and surrounding area that is anticipated to occur regardless of whether the proposed site is developed. Based on an evaluation of the SCDOT Annual Average Daily Traffic (AADT) data, traffic volumes have fluctuated, and actually decreased from the years 2012 to 2013 on College Avenue.

In order to be conservative with our analysis, a compounded annual growth rate of 1% was applied to the existing traffic volumes to project traffic volumes for the future year 2017. Refer to the attached appendix for an illustration of the projected (2017) peak hour traffic volumes.

It is understood that there are two adjacent developments that would impact the study area, the retail component of the existing Campusview development and the Dukes Center student housing development that also includes a retail component. Based on information obtained for both developments, the Campusview development has 10,600 square feet of available retail space while the Dukes Center will consist of up to 417 beds and approximately 4,800 square feet of retail space. Using the existing counts from the Campusview access on Earle Street to estimate the number of trips per bed for the AM, Midday, and PM peak hours (see Table 2 for a breakdown of the residential trip generation for Campusview), the residential component of Dukes Center is expected to generate 21 trips (8 entering and 13 exiting) during the AM peak hour, 50 trips (21 entering and 29 exiting) during the Midday peak hour, and 80 trips (38 entering and 42 exiting) during the PM peak hour. Based on methodology contained within the 9th Edition of the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, the retail space for both of the adjacent developments is expected to generate a combined 15 trips (9 entering and 6 exiting) during the AM peak hour and 57 trips (28 entering and 29 exiting) during the PM peak hour. The Midday peak hour trips for the retail space were calculated using the average between the AM and PM peak hour entering and exiting trips. During the Midday peak hour, the adjacent developments are expected to generate a combined 37 retail trips (19 entering and 18 exiting). While it is expected that the majority of retail traffic would consist of residents and pedestrians, a conservative approach was taken and retail trips were not reduced. Adjacent development traffic, illustrated in the attached appendix, was added to the projected (2017) traffic totals to determine the future (2017) 'no-build' traffic volumes. These volumes are illustrated in the attached appendix.

Trip Generation

Based on discussions with the development team and provided information, it is understood that the Fendley and Earle Student Housing Development could consist of up to 730 beds and 4,100 square feet of retail space upon full build out. Currently, the housing that would be displaced on Foy Creek Drive as part of the proposed development consists of 96 beds. The AM, Midday and PM peak hour residential site trips for this assessment were calculated using the same method in which the adjacent residential trips were calculated. Using the estimated number of trips per bed from the Campusview development (see Table 2), the proposed residential component of the Fendley and Earle Student Housing Development could generate up to 37 trips (15 entering and 22 exiting) during the AM peak hour, 88 trips (37 entering and 51 exiting) during the Midday peak hour, and 139 trips (66 entering and 73 exiting) during the PM peak hour. However a portion of those trips currently exist as part of the existing housing that will be displaced. In order to account for the existing traffic, traffic was estimated utilizing the same method for the existing 96 beds. The existing residential development generates 5 trips (2 entering and 3 exiting) during the AM peak hour, 12 trips (5 entering and 7 exiting) during the Midday peak hour, and 19 trips (9 entering and 10 exiting) during the PM peak hour. With adjustments made to account for the existing trips, the residential component of the proposed development could generate up to 32 new trips (13 entering and 19 exiting) during the AM peak hour, 76 trips (32 entering and 44 exiting) during the Midday peak hour, and 120 trips (57 entering and 63 exiting) during the PM peak hour. Based on methodology contained within the 9th Edition of the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, the retail space for the proposed development is expected to generate 4 trips (2 entering and 2 exiting) during the AM peak hour and 15 trips (7 entering and 8

exiting) during the PM peak hour. The Midday peak hour trips for the retail space were calculated using the average between the AM and PM peak hour entering and exiting trips. During the Midday peak hour, the proposed development is expected to generate 10 retail trips (5 entering and 5 exiting). Refer to Table 3 for a detailed breakdown of the anticipated trip generation results.

TABLE 2
 SITE TRIP GENERATION – CAMPUSVIEW

Development	Independent Variable	AM Peak Hour (vph)		Midway Peak Hour (vph)		PM Peak Hour (vph)	
		Enter	Exit	Enter	Exit	Enter	Exit
Campusview (Residential)	352 Beds	7	10	17	23	32	36
Number of Trips Per Bed		0.02	0.03	0.05	0.07	0.09	0.10

TABLE 3
 SITE TRIP GENERATION – PROPOSED STUDENT HOUSING DEVELOPMENT

Development	Independent Variable	AM Peak Hour (vph)		Midway Peak Hour (vph)		PM Peak Hour (vph)	
		Enter	Exit	Enter	Exit	Enter	Exit
Fendley & Earle Student Housing - Residential	730 Beds	15	22	37	51	66	73
Existing Foy Creek Drive Student Housing	96 Beds	2	3	5	7	9	10
New Residential Trips		13	19	32	44	57	63
Fendley & Earle Student Housing – Retail Space	4.1 Th. Sq. Ft.	2	2	5	5	7	8
Total (New) Trips		15	21	37	49	64	71

It is estimated that the proposed development could generate up to 36 new trips (15 entering and 21 exiting) during the AM peak hour, 86 trips (37 entering and 49 exiting) during the Midday peak hour, and 135 trips (64 entering and 71 exiting) during the PM peak hour when completed.

Future ‘Build’ Traffic Conditions

For this study, primary distributions were developed based on existing traffic patterns and engineering judgment. An illustration of the site trip distributions for the residential and commercial land uses can be found in the attached appendix. In order to estimate traffic conditions with the Fendley and Earle Student Housing Development built out, the site-generated traffic was combined with the future (2017) ‘no-build’ peak hour traffic volumes. Refer to the attached appendix for an illustration of the future (2017) ‘build’ peak hour traffic volumes.

Capacity Analysis

College Avenue and Keith Street

Utilizing signal timings obtained from the City, capacity analysis indicates that the signalized intersection of College Avenue and Keith Street is expected to experience minor to moderate overall delays (of less than 16.5 seconds per vehicle) and operate at LOS B or better during the AM, Midday, and PM peak hours under existing and future 'no-build' traffic conditions. The intersection approaches are expected to experience minor to moderate delays (of less than 32.0 seconds per vehicle) and operate at LOS C or better. Increased delays could be expected when the pedestrian phase is activated.

With the development built out, the signalized intersection is expected to maintain the levels of operation anticipated under 'no-build' conditions during the AM and Midday peak hours. With the reallocation of 5 seconds of green time, taken from the main line and given to the side streets, the signalized intersection could also be expected to operate at similar levels of service experienced under 'no-build' conditions. As previously noted, increased delays could be expected when the pedestrian phase is activated.

Refer to Table 4 for analysis results at this signalized intersection, and the attached appendix for copies of the Synchro analysis reports, including the supplemental analysis with modified timings for 'build' conditions during the PM peak hour.

TABLE 4
ANALYSIS RESULTS FOR COLLEGE AVENUE AND KEITH STREET

INTERSECTION	A P P R O A C H	LANE CONFIGURATION	AM PEAK HOUR LEVEL OF SERVICE (DELAY)		MIDDAY PEAK HOUR LEVEL OF SERVICE (DELAY)		PM PEAK HOUR LEVEL OF SERVICE (DELAY)	
			LOS	Delay	LOS	Delay	LOS	Delay
EXISTING (2015) TRAFFIC CONDITIONS								
College Avenue & Keith Street	NB	1 LT, 1 TH-RT	A	7.5	B	10.9	B	12.1
	SB	1 LT, 1 TH-RT	A	7.8	B	11.0	B	10.9
	EB	1 LT-TH-RT	B	14.3	B	13.1	B	19.3
	WB	1 LT-TH-RT	B	13.6	C	21.7	C	20.7
	<i>Overall</i>			A	8.5	B	12.6	B
FUTURE (2017) 'NO-BUILD' TRAFFIC CONDITIONS								
College Avenue & Keith Street	NB	1 LT, 1 TH-RT	A	8.2	B	11.8	B	13.7
	SB	1 LT, 1 TH-RT	A	9.2	B	10.9	B	10.9
	EB	1 LT-TH-RT	B	14.0	B	13.3	B	19.7
	WB	1 LT-TH-RT	B	14.5	C	27.5	C	31.6
	<i>Overall</i>			A	9.8	B	14.0	B
FUTURE (2017) 'BUILD' TRAFFIC CONDITIONS								
College Avenue & Keith Street	NB	1 LT, 1 TH-RT	A	8.9	B	11.8	B*	17.0*
	SB	1 LT, 1 TH-RT	A	9.0	B	10.8	B*	13.3*
	EB	1 LT-TH-RT	B	14.2	B	13.4	B*	15.8*
	WB	1 LT-TH-RT	B	15.3	C	33.3	C*	34.1*
	<i>Overall</i>			A	9.9	B	15.6	B*

*LOS and Delay based on modified signal timings

College Avenue and Earle Street

Under all traffic conditions, capacity analysis indicates that the unsignalized left turn movement on College Avenue at Earle Street is expected to experience minimal delays (of less than 1.5 seconds per vehicle) and operate at LOS A during the AM, Midday, and PM peak hours. Increased delays could be expected on occasions if the northbound queue from the signalized intersection at Keith Street were to extend back past this intersection. Refer to Table 5 for analysis results at this unsignalized intersection, and the attached appendix for copies of the Synchro analysis reports.

TABLE 5
ANALYSIS RESULTS FOR COLLEGE AVENUE AND EARLE STREET

INTERSECTION	APPROACH	LANE CONFIGURATION	AM PEAK HOUR LEVEL OF SERVICE (DELAY)		MIDDAY PEAK HOUR LEVEL OF SERVICE (DELAY)		PM PEAK HOUR LEVEL OF SERVICE (DELAY)	
			LOS	Delay	LOS	Delay	LOS	Delay
EXISTING (2015) TRAFFIC CONDITIONS								
College Avenue & Earle Street	NB SB ¹	1 TH-RT 1 LT-TH	A	0.0	A	0.0	A	0.0
			A	0.6	A	0.7	A	0.8
FUTURE (2017) 'NO-BUILD' TRAFFIC CONDITIONS								
College Avenue & Earle Street	NB SB ¹	1 TH-RT 1 LT-TH	A	0.0	A	0.0	A	0.0
			A	0.6	A	0.9	A	1.2
FUTURE (2017) 'BUILD' TRAFFIC CONDITIONS								
College Avenue & Earle Street	NB SB ¹	1 TH-RT 1 LT-TH	A	0.0	A	0.0	A	0.0
			A	0.7	A	0.9	A	1.3

1. Major street left-turn movement for unsignalized intersection.
2. Stop controlled approach for unsignalized intersection.

Conclusions

In conclusion, our analysis results indicate that the additional traffic generated by the proposed Fendley and Earle Student Housing Development is not expected to have a significant impact on the study area. As previously noted, the primary mode of transportation for residents would not have to be one's own automobile, which helps to reduce new vehicular trips. On average the proposed development is only expected to generate about two (2) vehicles per minute. The signalized intersection of College Avenue and Keith Street is expected to continue operating at an acceptable overall level of service, along with all of its approaches. With the reallocation of green time from the main line through movements to the side streets during the PM peak hour, the signalized intersection is anticipated to operate at similar levels to those expected under 'no-build' conditions. In addition, the queues are not expected to increase by more than 2-3 vehicles.

Sincerely,

Ramey Kemp and Associates, Inc.

Jayson B. Clapp, Jr.
 Jayson B. Clapp, Jr., P.E., PTOE
 Regional Manager

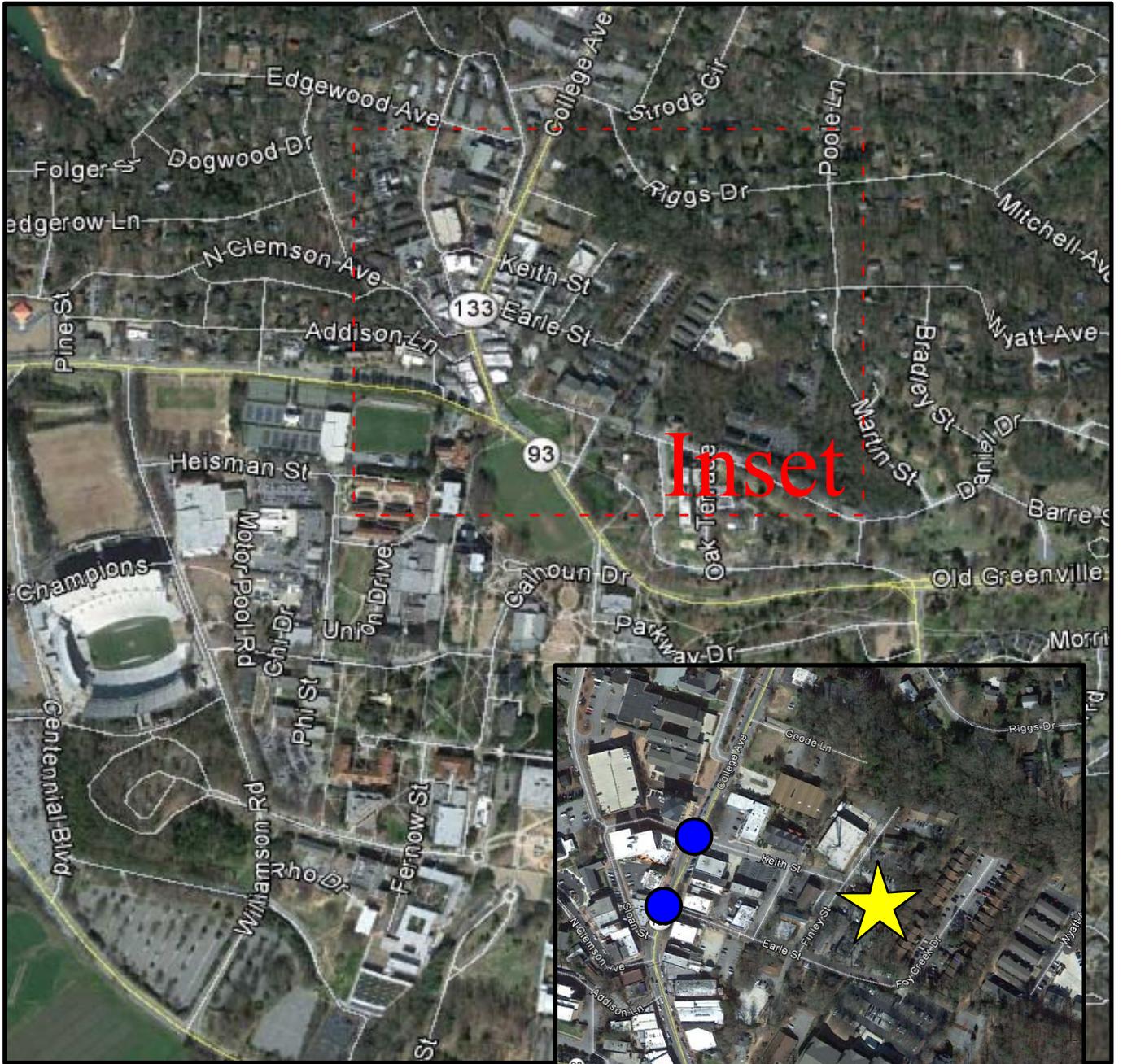


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Attachment

APPENDIX

**FIGURES
(INCLUDING SITE PLAN)**

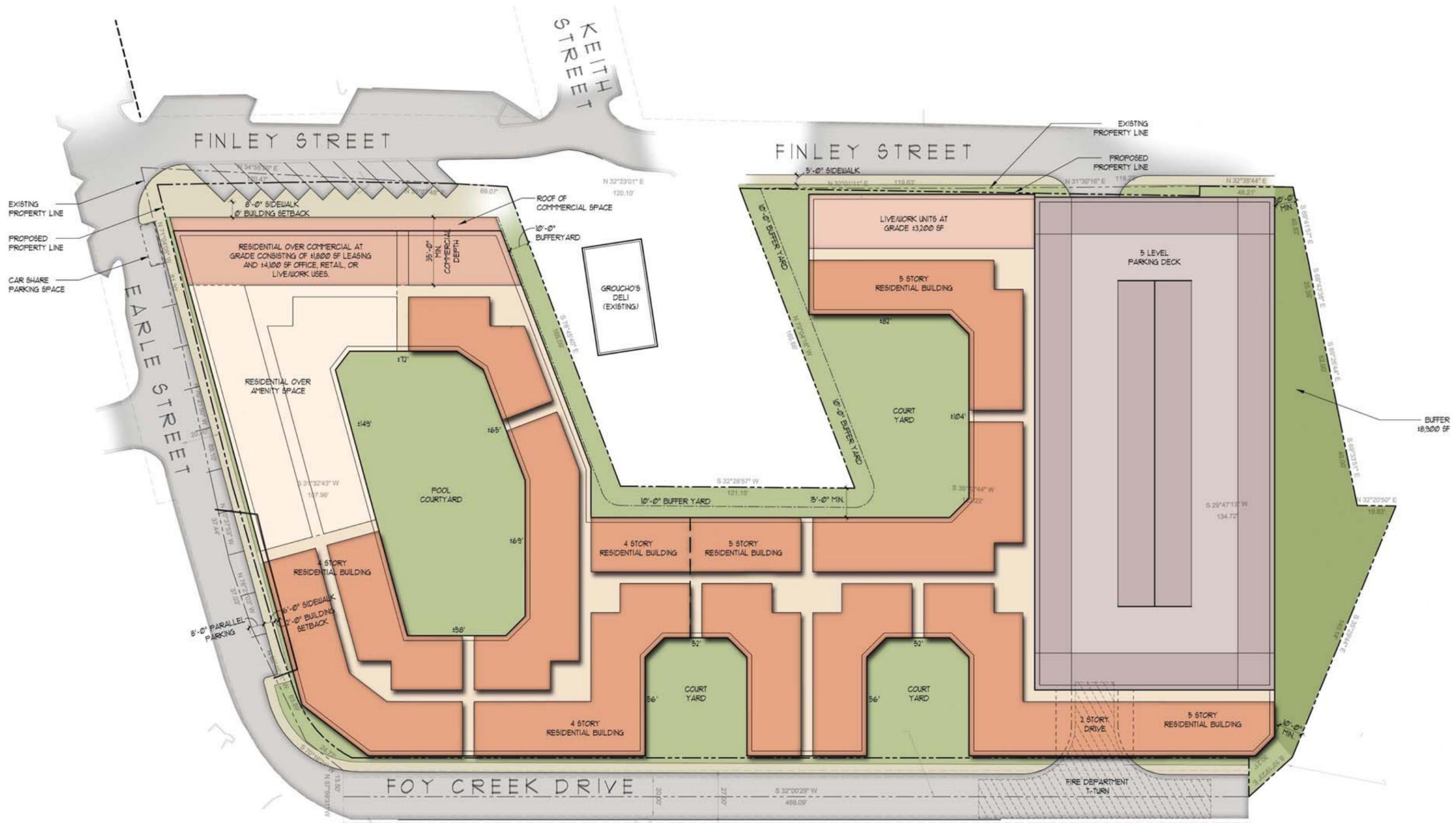


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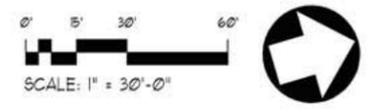
LEGEND


 Site Location
 Existing Study Intersection

 RAMEY KEMP & ASSOCIATES TRANSPORTATION ENGINEERS	Fendley & Earle Student Housing Clemson, South Carolina	Vicinity Map	
		Scale: Not to Scale	Figure 1

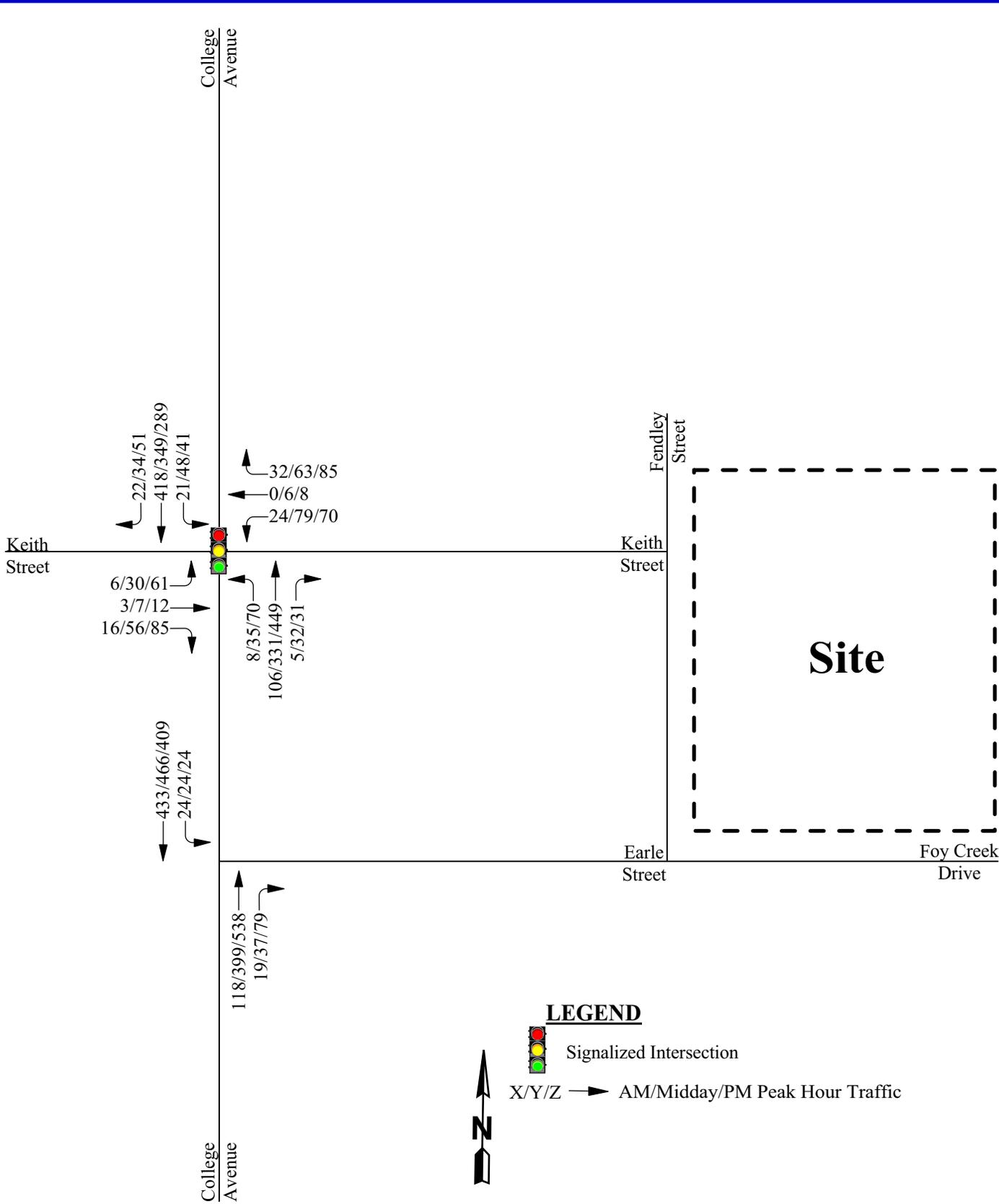


DENSITY STUDY
SCALE: 1" = 30'-0"



Fendley & Earle Student Housing
Clemson, South Carolina

Site Plan	
Scale: Not to Scale	Figure 2



LEGEND



Signalized Intersection



X/Y/Z → AM/Midday/PM Peak Hour Traffic

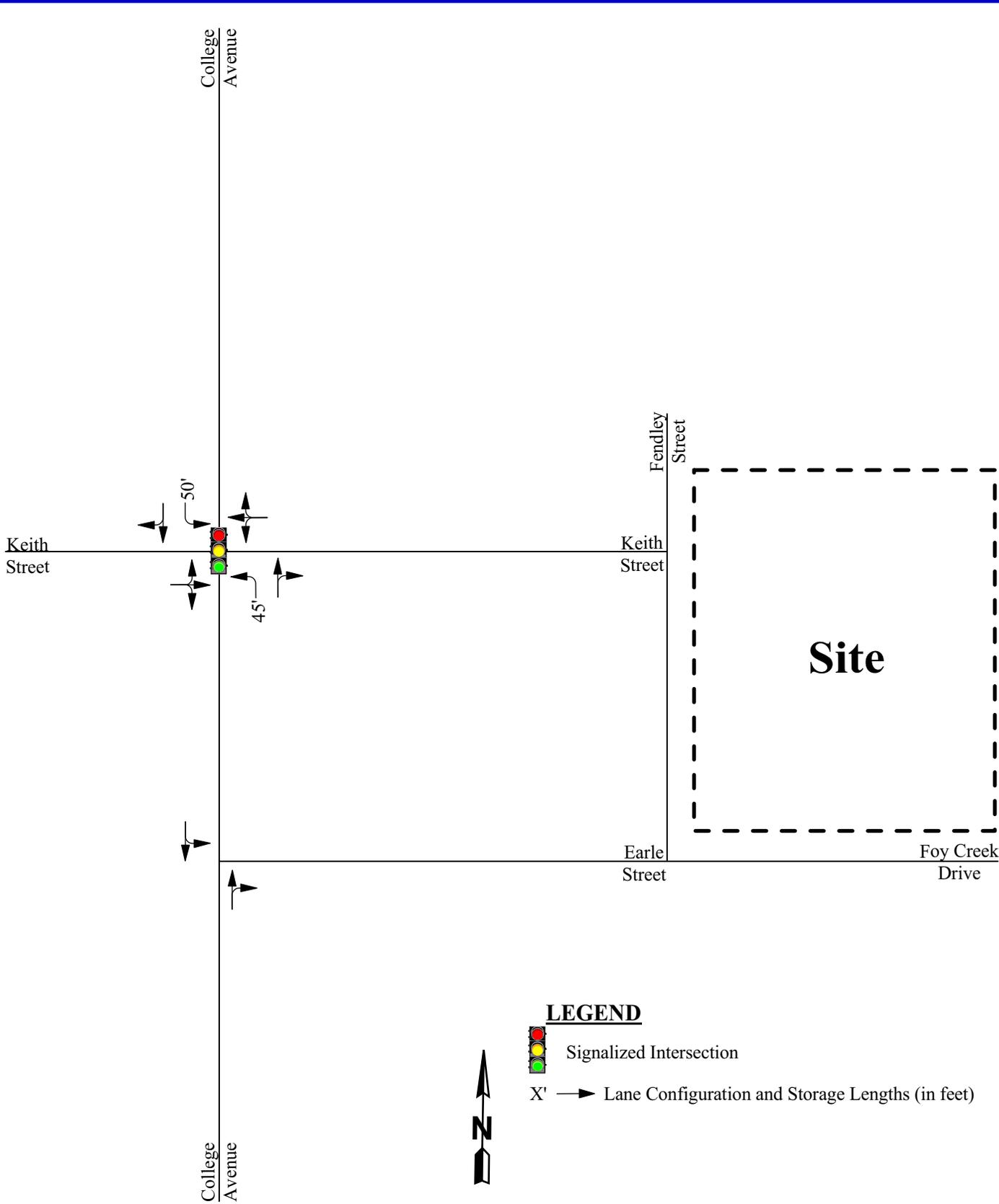


Fendley & Earle Student Housing
Clemson, South Carolina

Existing (2015)
Traffic Volumes

Scale: Not to Scale

Figure 3

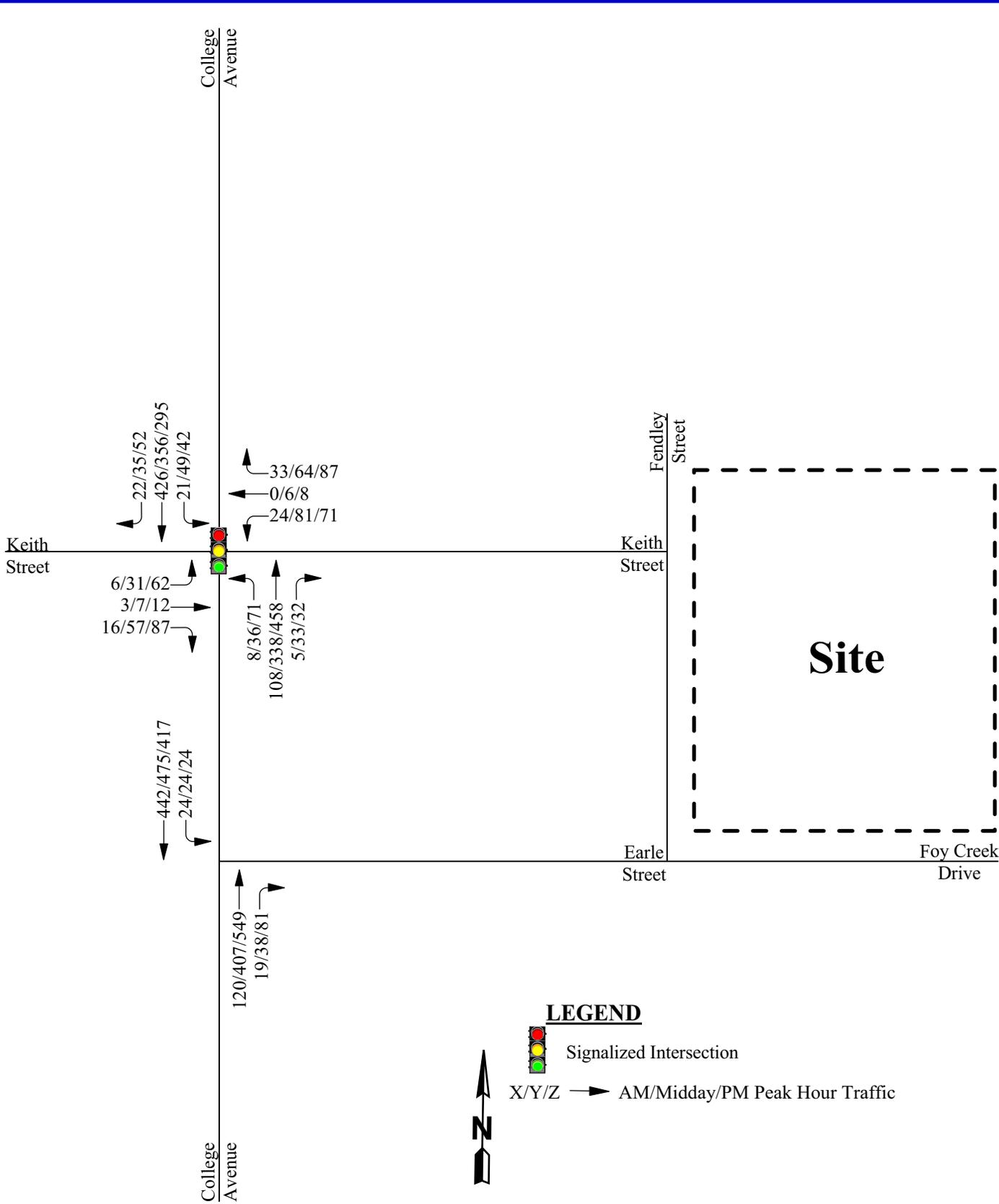


Fendley & Earle Student Housing
Clemson, South Carolina

Existing Geometrics
and Traffic Control

Scale: Not to Scale

Figure 4



LEGEND



Signalized Intersection



X/Y/Z → AM/Midday/PM Peak Hour Traffic

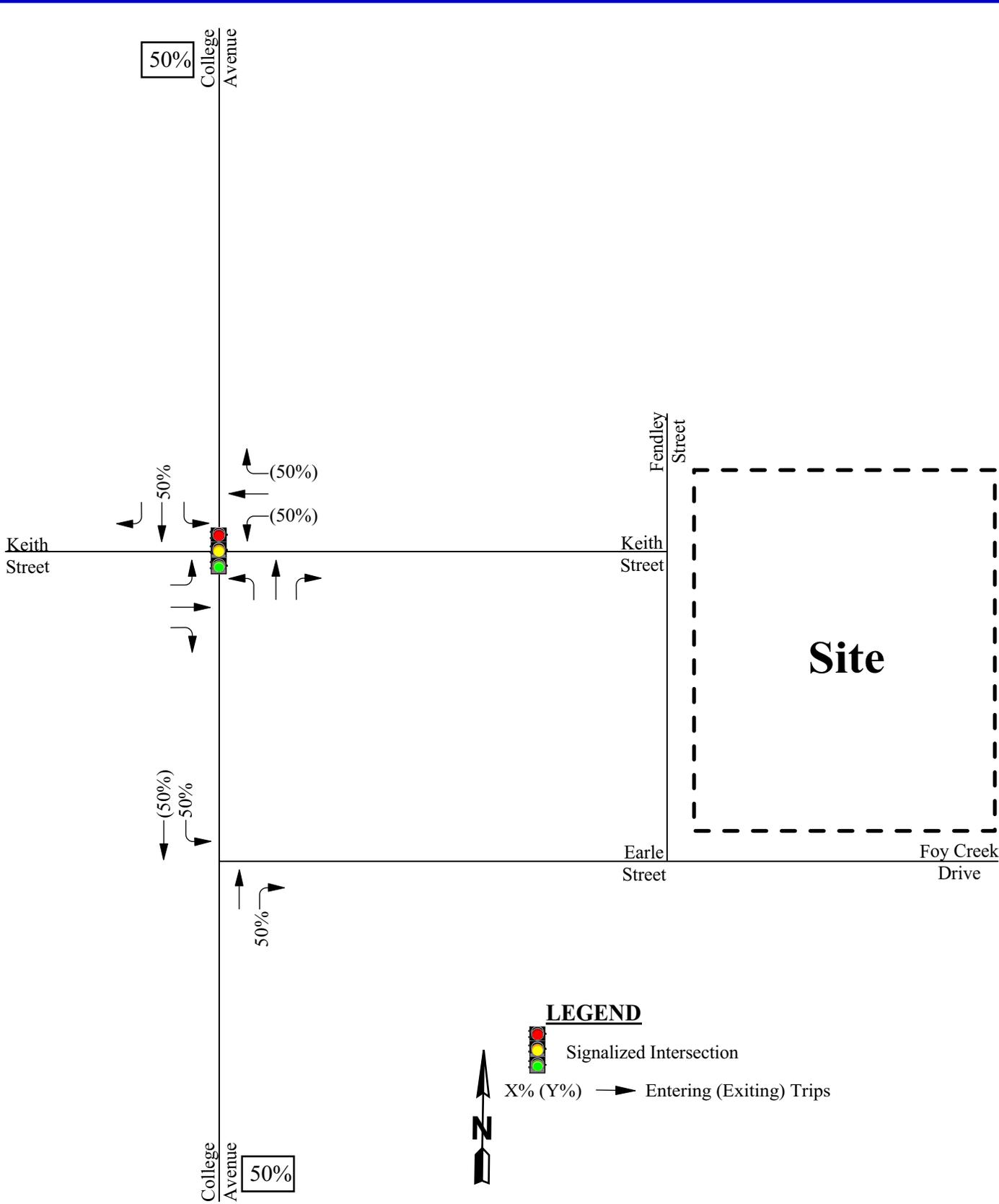


Fendley & Earle Student Housing
Clemson, South Carolina

Projected (2017)
Traffic Volumes

Scale: Not to Scale

Figure 5

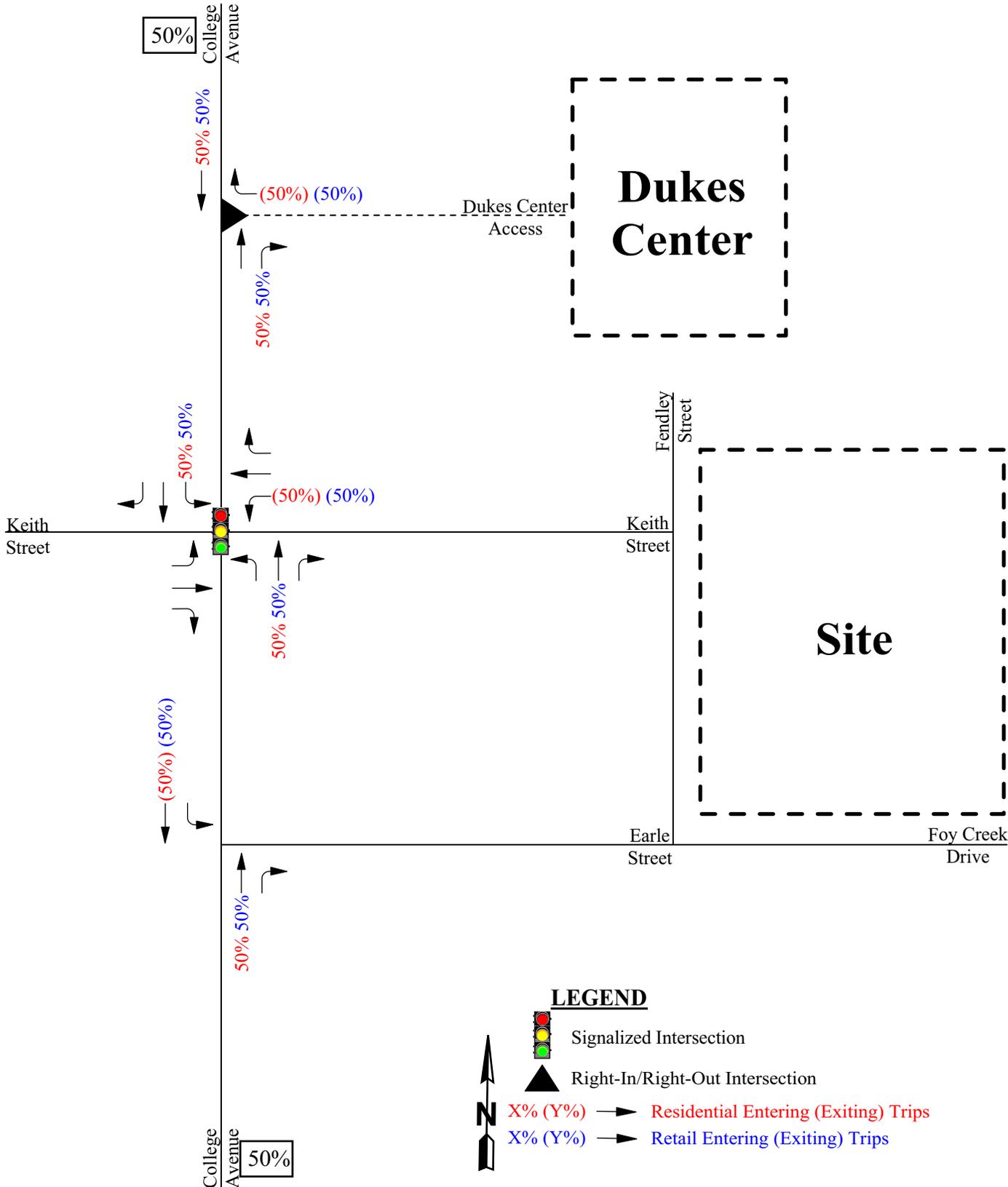


Fendley & Earle Student Housing
Clemson, South Carolina

Trip Distribution
[Campusview Retail]

Scale: Not to Scale

Figure 6

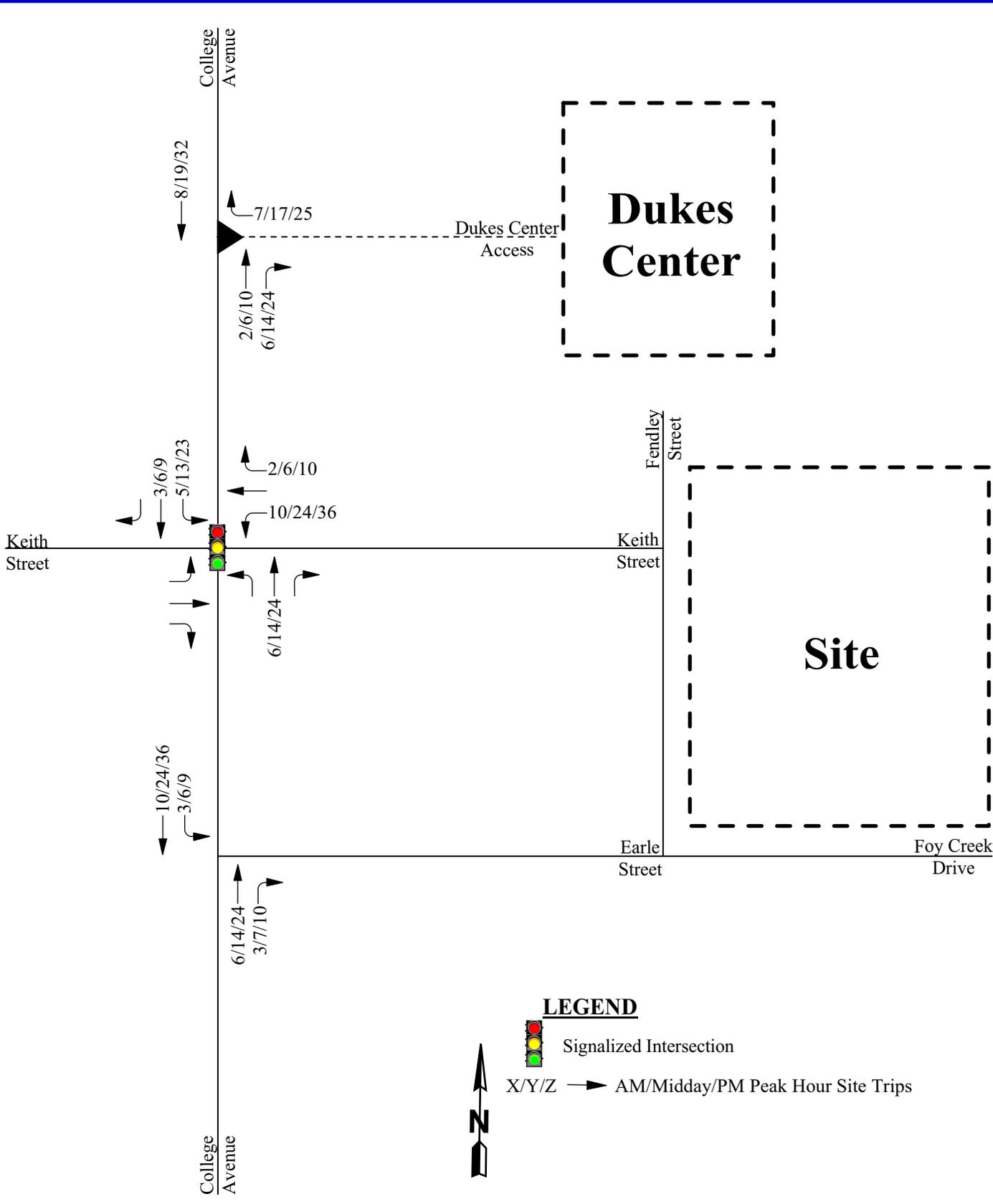


Fendley & Earle Student Housing
Clemson, South Carolina

Trip Distribution
[Dukes Center]

Scale: Not to Scale

Figure 7

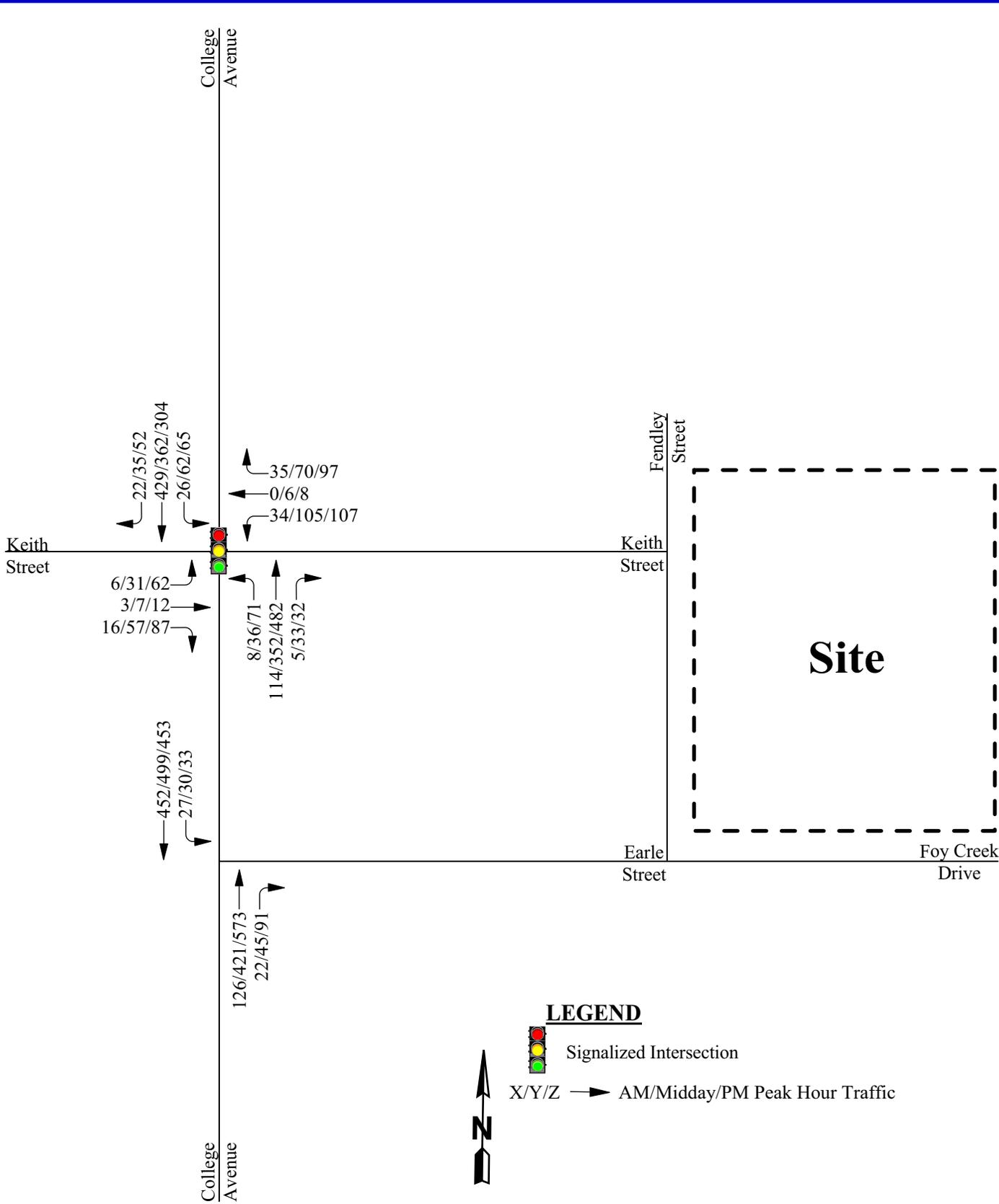


Fendley & Earle Student Housing
Clemson, South Carolina

Adjacent Development
Traffic Volumes

Scale: Not to Scale

Figure 8



LEGEND



Signalized Intersection



X/Y/Z → AM/Midday/PM Peak Hour Traffic

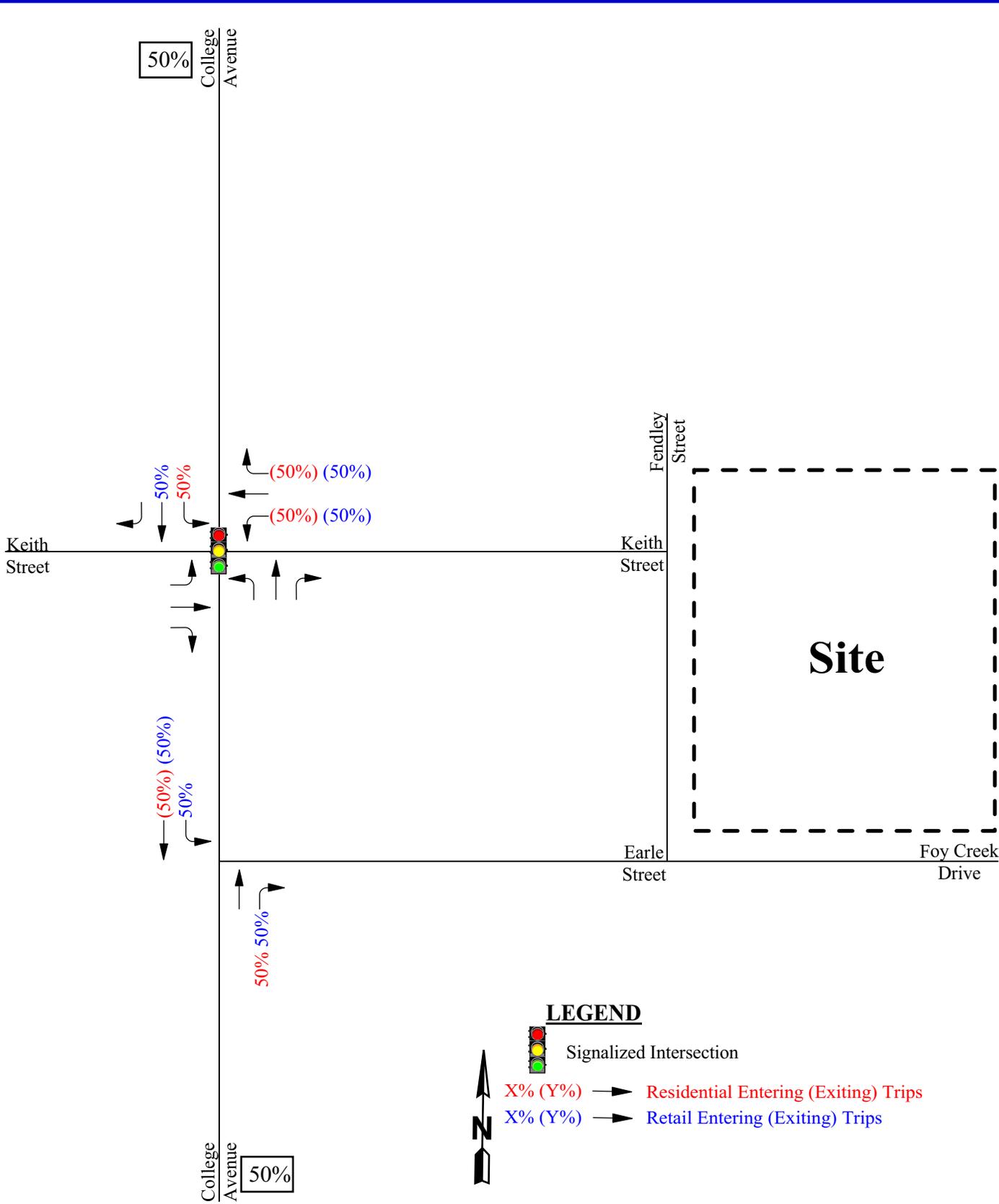


Fendley & Earle Student Housing
Clemson, South Carolina

Future (2017) 'No-Build'
Traffic Volumes

Scale: Not to Scale

Figure 9

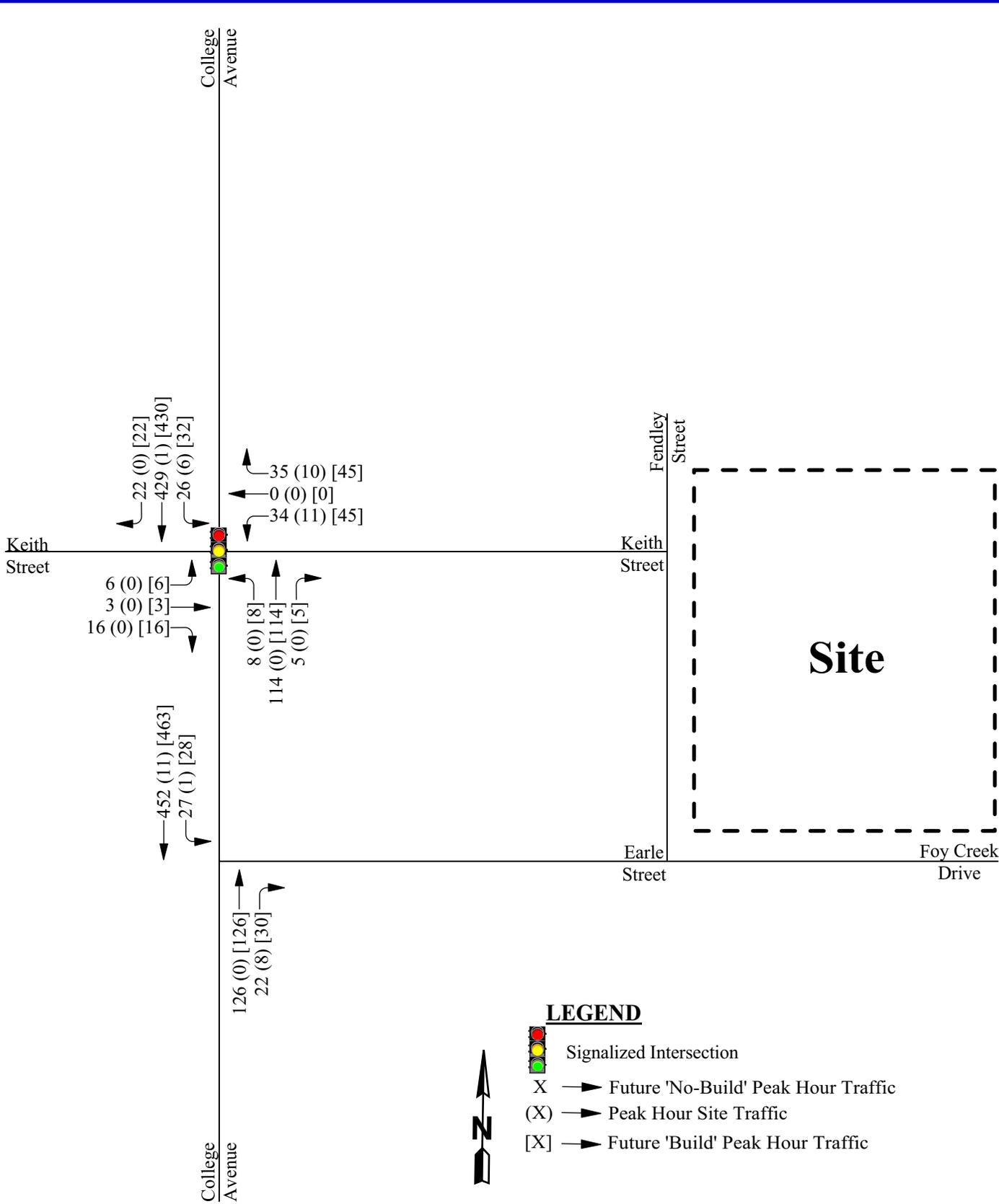


Fendley & Earle Student Housing
Clemson, South Carolina

Site Trip Distribution
[Fendley & Earle]

Scale: Not to Scale

Figure 10

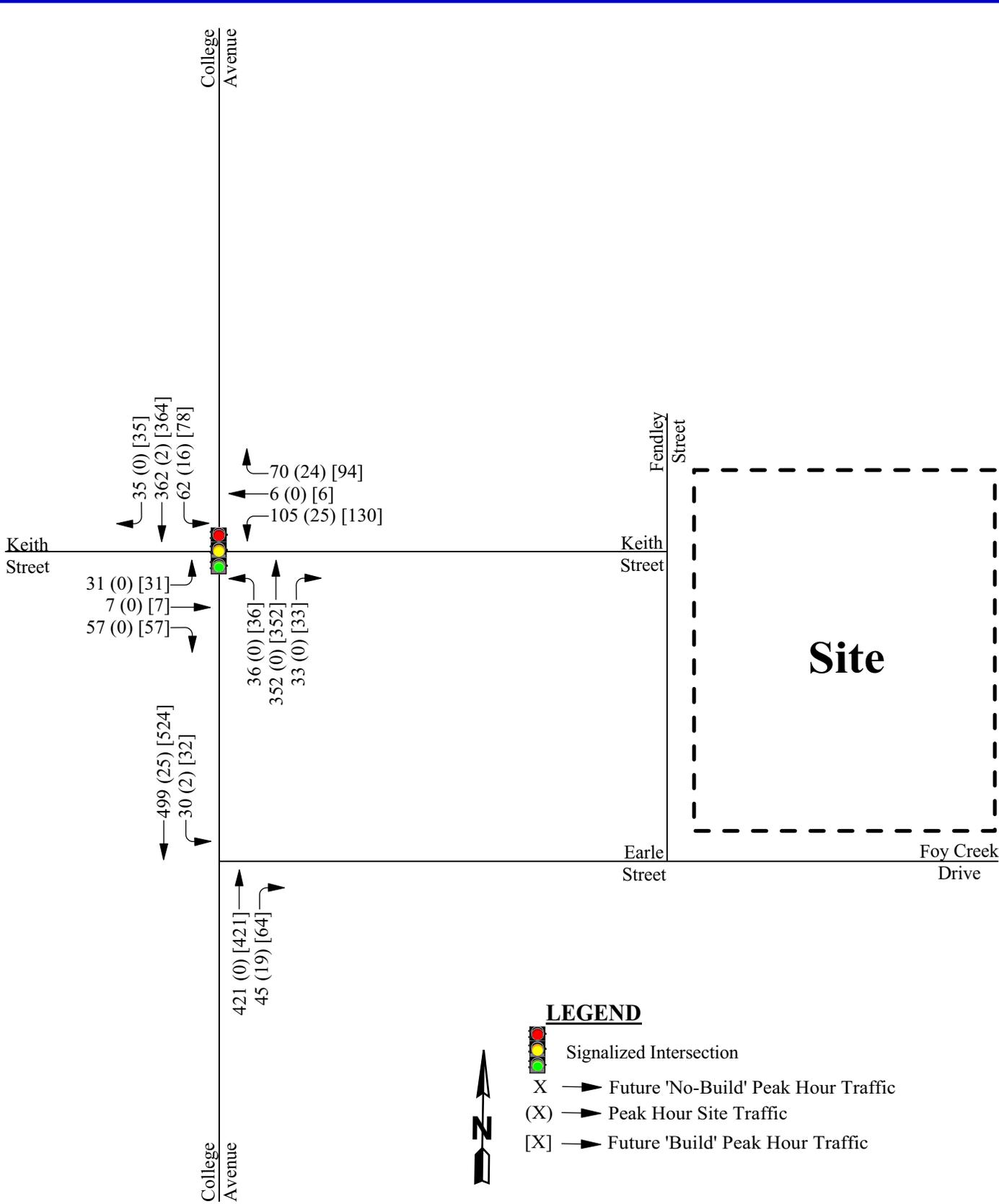


LEGEND

-  Signalized Intersection
- X  Future 'No-Build' Peak Hour Traffic
- (X)  Peak Hour Site Traffic
- [X]  Future 'Build' Peak Hour Traffic



 <p>RAMEY KEMP & ASSOCIATES TRANSPORTATION ENGINEERS</p>	<p>Fendley & Earle Student Housing Clemson, South Carolina</p>		<p>Future (2017) 'Build' Traffic Volumes [AM Peak]</p>	
			<p>Scale: Not to Scale</p>	<p>Figure 11</p>



LEGEND

- Signalized Intersection
- X Future 'No-Build' Peak Hour Traffic
- (X) Peak Hour Site Traffic
- [X] Future 'Build' Peak Hour Traffic

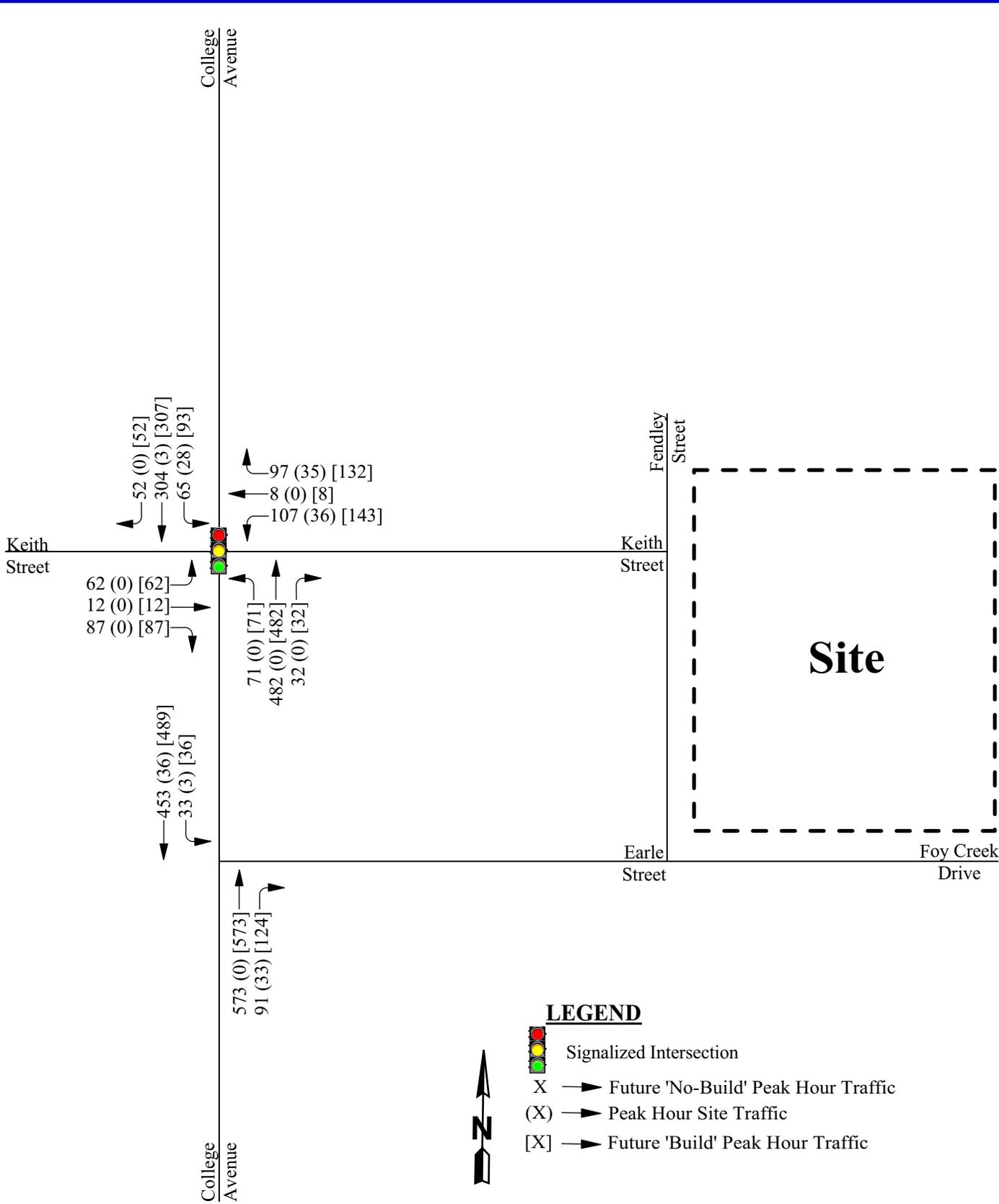


Fendley & Earle Student Housing
Clemson, South Carolina

Future (2017) 'Build' Traffic Volumes [Midday Peak]

Scale: Not to Scale

Figure 12



LEGEND

- Signalized Intersection
- X Future 'No-Build' Peak Hour Traffic
- (X) Peak Hour Site Traffic
- [X] Future 'Build' Peak Hour Traffic



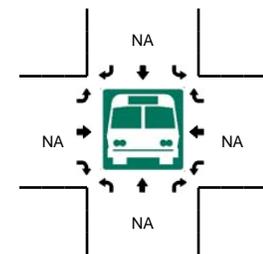
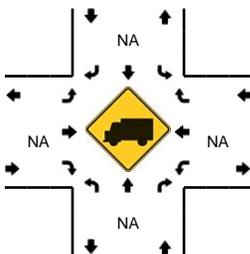
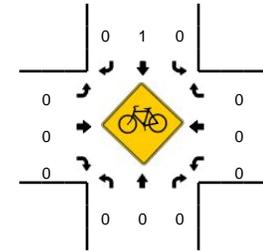
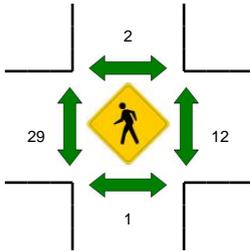
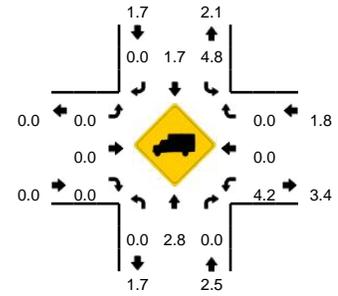
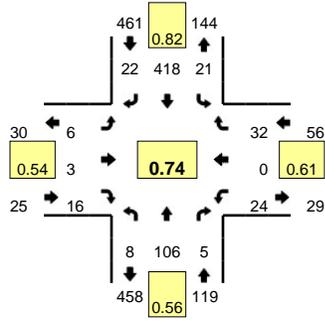
	Fendley & Earle Student Housing Clemson, South Carolina		Future (2017) 'Build' Traffic Volumes [PM Peak]	
			Scale: Not to Scale	Figure 13

TRAFFIC COUNT DATA

LOCATION: College Ave -- Keith St
CITY/STATE: Clemson, SC

QC JOB #: 13187707
DATE: Wed, Jan 28 2015

Peak-Hour: 8:00 AM -- 9:00 AM
Peak 15-Min: 8:45 AM -- 9:00 AM



15-Min Count Period Beginning At	College Ave (Northbound)				College Ave (Southbound)				Keith St (Eastbound)				Keith St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	19	0	0	1	48	2	0	0	0	2	0	1	0	2	0	75	
7:15 AM	0	14	0	0	4	62	0	0	0	0	3	0	1	0	3	0	87	
7:30 AM	1	15	1	0	2	124	2	0	0	1	2	0	1	0	8	0	157	
7:45 AM	3	22	3	0	5	103	9	0	0	0	13	0	6	0	7	0	171	490
8:00 AM	1	22	3	0	2	95	11	0	1	1	2	0	1	0	6	0	145	560
8:15 AM	1	21	1	0	1	72	3	0	0	1	3	0	5	0	6	0	114	587
8:30 AM	1	16	0	0	5	134	2	0	2	0	5	0	5	0	10	0	180	610
8:45 AM	5	47	1	0	13	117	6	0	3	1	6	0	13	0	10	0	222	661

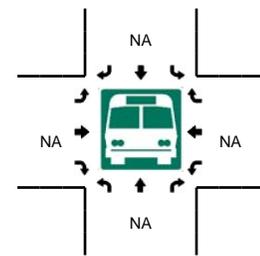
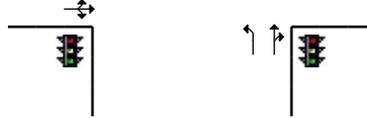
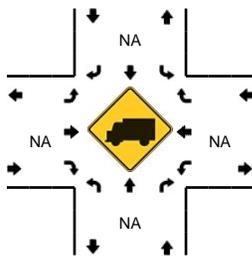
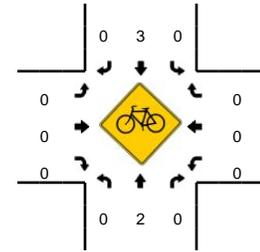
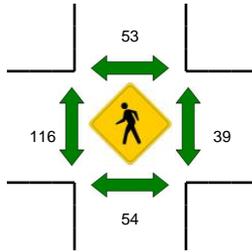
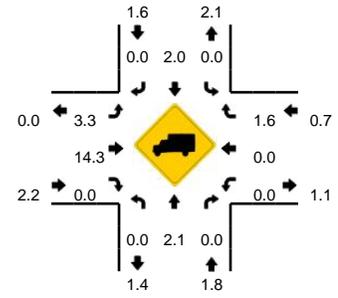
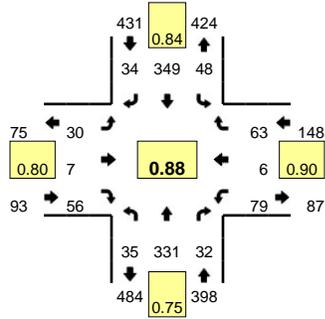
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	20	188	4	0	52	468	24	0	12	4	24	0	52	0	40	0	888
Heavy Trucks	0	8	0	0	0	8	0	0	0	0	0	0	0	0	0	0	16
Pedestrians	0	0	0	0	0	4	0	0	0	72	0	0	0	12	0	0	88
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Railroad																	
Stopped Buses																	

Comments:

LOCATION: College Ave -- Keith St
CITY/STATE: Clemson, SC

QC JOB #: 13187709
DATE: Wed, Jan 28 2015

Peak-Hour: 12:00 PM -- 1:00 PM
Peak 15-Min: 12:15 PM -- 12:30 PM



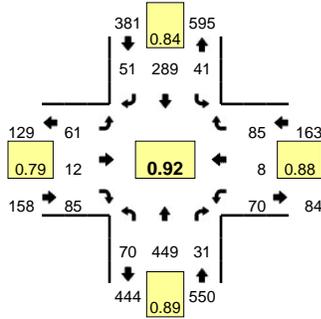
15-Min Count Period Beginning At	College Ave (Northbound)				College Ave (Southbound)				Keith St (Eastbound)				Keith St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
11:00 AM	1	89	2	0	7	67	1	0	5	0	7	0	7	0	15	0	201	
11:15 AM	5	100	11	0	6	71	8	0	6	0	5	0	8	0	7	0	227	
11:30 AM	3	61	10	0	8	62	9	0	11	1	7	0	17	1	17	0	207	
11:45 AM	6	79	4	0	6	92	3	0	11	0	7	0	8	0	10	0	226	861
12:00 PM	7	90	7	0	16	101	11	0	9	3	17	0	23	1	17	0	302	962
12:15 PM	13	113	11	0	13	92	4	0	9	2	10	0	23	0	15	0	305	1040
12:30 PM	6	72	5	0	11	71	11	0	7	1	9	0	15	2	21	0	231	1064
12:45 PM	9	56	9	0	8	85	8	0	5	1	20	0	18	3	10	0	232	1070

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	52	452	44	0	52	368	16	0	36	8	40	0	92	0	60	0	1220
Heavy Trucks	0	12	0		0	4	0		0	4	0		0	0	0		20
Pedestrians		56				40				208				36			340
Bicycles	0	0	0		0	1	0		0	0	0		0	0	0		1
Railroad																	
Stopped Buses																	

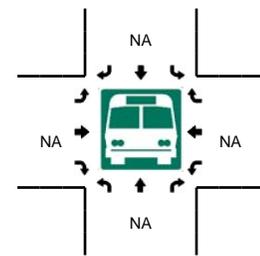
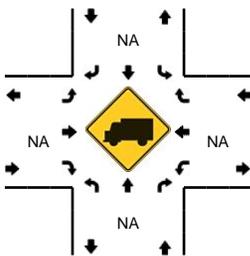
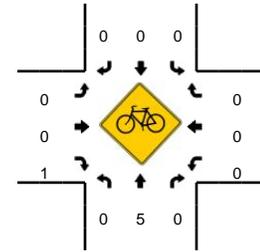
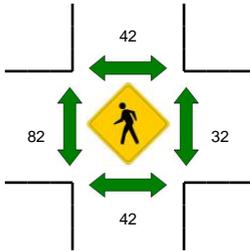
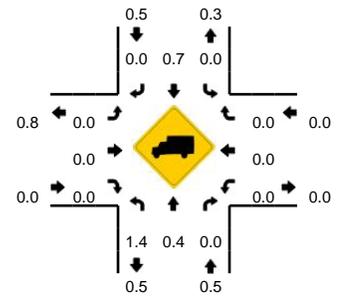
Comments:

LOCATION: College Ave -- Keith St
CITY/STATE: Clemson, SC

QC JOB #: 13187708
DATE: Wed, Jan 28 2015



Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 5:30 PM -- 5:45 PM



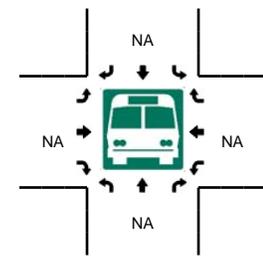
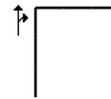
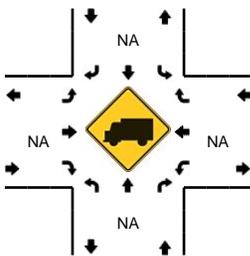
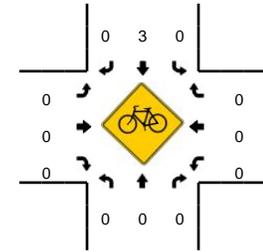
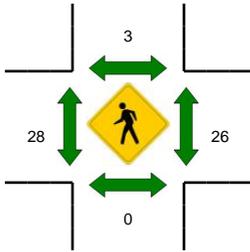
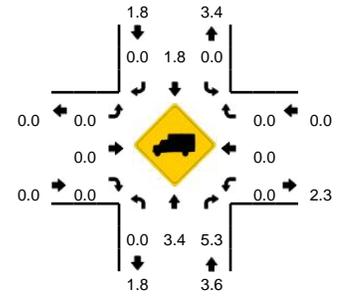
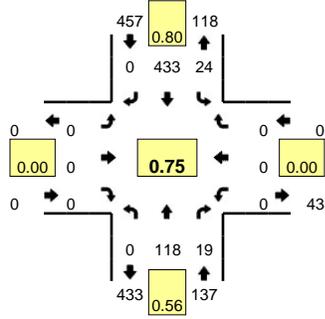
15-Min Count Period Beginning At	College Ave (Northbound)				College Ave (Southbound)				Keith St (Eastbound)				Keith St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	3	107	5	0	10	54	5	0	4	3	8	0	14	1	19	0	233	
4:15 PM	11	92	7	0	8	70	7	0	11	1	10	0	11	1	28	0	257	
4:30 PM	8	104	9	0	14	82	6	0	11	0	14	0	14	4	27	0	293	
4:45 PM	18	107	8	0	14	74	15	0	12	2	18	0	18	0	19	0	305	1088
5:00 PM	14	106	8	0	8	64	11	0	17	2	31	0	19	3	21	0	304	1159
5:15 PM	17	111	7	0	11	65	14	0	18	3	12	0	18	1	24	0	301	1203
5:30 PM	21	125	8	0	8	86	11	0	14	5	24	0	15	4	21	0	342	1252
5:45 PM	19	81	5	0	17	87	14	0	14	0	14	0	23	4	23	0	301	1248
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
All Vehicles	84	500	32	0	32	344	44	0	56	20	96	0	60	16	84	0	1368	
Heavy Trucks	4	0	0		0	0	0		0	0	0		0	0	0		4	
Pedestrians		32				64				72				40			208	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Railroad																		
Stopped Buses																		

Comments:

LOCATION: College Ave -- Earle St
CITY/STATE: Clemson, SC

QC JOB #: 13187704
DATE: Wed, Jan 28 2015

Peak-Hour: 8:00 AM -- 9:00 AM
Peak 15-Min: 8:45 AM -- 9:00 AM



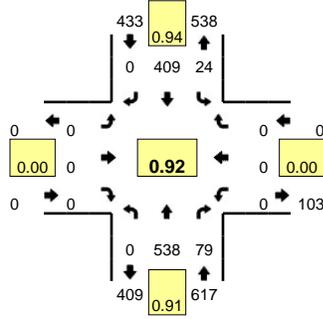
15-Min Count Period Beginning At	College Ave (Northbound)				College Ave (Southbound)				Earle St (Eastbound)				Earle St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	19	7	0	0	53	0	0	0	0	0	0	0	0	0	0	79	
7:15 AM	0	14	2	0	2	66	0	0	0	0	0	0	0	0	0	0	84	
7:30 AM	0	17	3	0	2	119	0	0	0	0	0	0	0	0	0	0	141	
7:45 AM	0	26	6	0	4	123	0	0	0	0	0	0	0	0	0	0	159	463
8:00 AM	0	26	3	0	4	88	0	0	0	0	0	0	0	0	0	0	121	505
8:15 AM	0	23	5	0	6	79	0	0	0	0	0	0	0	0	0	0	113	534
8:30 AM	0	16	3	0	7	136	0	0	0	0	0	0	0	0	0	0	162	555
8:45 AM	0	53	8	0	7	130	0	0	0	0	0	0	0	0	0	0	198	594

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	212	32	0	28	520	0	0	0	0	0	0	0	0	0	0	792
Heavy Trucks	0	8	0	0	0	8	0	0	0	0	0	0	0	0	0	0	16
Pedestrians	0	0	0	0	0	4	0	0	68	0	0	0	28	0	0	0	100
Bicycles	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2
Railroad																	
Stopped Buses																	

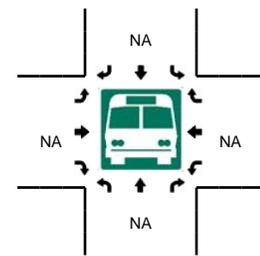
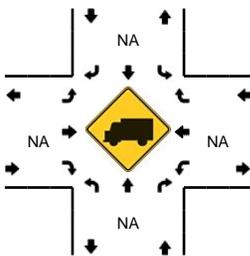
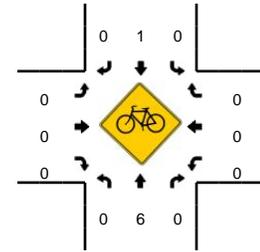
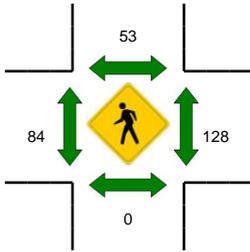
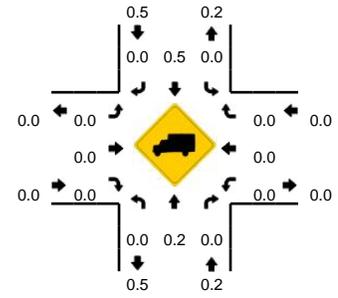
Comments:

LOCATION: College Ave -- Earle St
CITY/STATE: Clemson, SC

QC JOB #: 13187705
DATE: Wed, Jan 28 2015



Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 5:30 PM -- 5:45 PM



15-Min Count Period Beginning At	College Ave (Northbound)				College Ave (Southbound)				Earle St (Eastbound)				Earle St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	110	17	0	5	66	0	0	0	0	0	0	0	0	0	0	198	
4:15 PM	0	111	18	0	5	86	0	0	0	0	0	0	0	0	0	0	220	
4:30 PM	0	125	10	0	3	108	0	0	0	0	0	0	0	0	0	0	246	
4:45 PM	0	133	20	0	6	103	0	0	0	0	0	0	0	0	0	0	262	926
5:00 PM	0	123	19	0	8	105	0	0	0	0	0	0	0	0	0	0	255	983
5:15 PM	0	132	21	0	6	90	0	0	0	0	0	0	0	0	0	0	249	1012
5:30 PM	0	150	19	0	4	111	0	0	0	0	0	0	0	0	0	0	284	1050
5:45 PM	0	105	12	0	10	107	0	0	0	0	0	0	0	0	0	0	234	1022
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	0	600	76	0	16	444	0	0	0	0	0	0	0	0	0	0	1136	
Heavy Trucks	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Pedestrians	0	0	0	0	0	72	0	0	0	76	0	0	0	164	0	0	312	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Railroad	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Stopped Buses	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

Comments:

TURNING MOVEMENT DEVELOPMENT DATA

Dukes Center Retail Distribution and Assignment

	Retail Trip Distribution						Retail Site Trips						Total Retail Site Trips		
	AM		Midday		PM		AM		Midday		PM		AM	Midday	PM
	Enter	Exit	Enter	Exit	Enter	Exit	Enter	Exit	Enter	Exit	Enter	Exit			
Intersection 1: College Avenue & Keith Street							3	2	6	6	9	9			
SBR															
SBT															
SBL	50%		50%		50%		1		3		4		1	3	4
WBR															
WBT															
WBL		50%		50%		50%		1		3		5	1	3	5
NBR															
NBT	50%		50%		50%		2		3		5		2	3	5
NBL															
EBR															
EBT															
EBL															
Intersection 2: College Avenue & Earle Street															
SBR															
SBT		50%		50%		50%		1		3		5	1	3	5
SBL															
WBR															
WBT															
WBL															
NBR															
NBT	50%		50%		50%		2		3		5		2	3	5
NBL															
EBR															
EBT															
EBL															
Intersection 3: College Avenue & Dukes Center Access															
SBR															
SBT	50%		50%		50%		1		3		4		1	3	4
SBL															
WBR		50%		50%		50%		1		3		4	1	3	4
WBT															
WBL															
NBR	50%		50%		50%		2		3		5		2	3	5
NBT															
NBL															
EBR															
EBT															
EBL															

Fendley & Earle Residential Distribution and Assignment

	Residential Trip Distribution						Residential Site Trips						Total Residential Site Trips		
	AM		Midday		PM		AM		Midday		PM		AM	Midday	PM
	Enter	Exit	Enter	Exit	Enter	Exit	Enter	Exit	Enter	Exit	Enter	Exit			
Intersection 1: College Avenue & Keith Street							13	19	32	44	57	63			
SBR															
SBT															
SBL	50%		50%		50%		6		16		28		6	16	28
WBR		50%		50%		50%		9		22		31	9	22	31
WBT															
WBL		50%		50%		50%		10		22		32	10	22	32
NBR															
NBT															
NBL															
EBR															
EBT															
EBL															
Intersection 2: College Avenue & Earle Street															
SBR															
SBT		50%		50%		50%		10		22		32	10	22	32
SBL															
WBR															
WBT															
WBL															
NBR	50%		50%		50%		7		16		29		7	16	29
NBT															
NBL															
EBR															
EBT															
EBL															

CAPACITY ANALYSIS

[EXISTING TRAFFIC CONDITIONS]

Fendley & Earle Student Housing
1: Keith Street & College Avenue

Existing (2015)
Timing Plan: AM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	6	3	16	24	0	32	8	106	5	21	418	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	12
Storage Length (ft)	0		0	0		0	45		0	50		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25		25	25		25	45		25	50		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.913			0.923			0.993			0.993	
Flt Protected		0.988			0.979		0.950			0.950		
Satd. Flow (prot)	0	1624	0	0	1627	0	1770	1850	0	1770	1850	0
Flt Permitted		0.931			0.871		0.447			0.664		
Satd. Flow (perm)	0	1531	0	0	1448	0	833	1850	0	1237	1850	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18			36			5			5	
Link Speed (mph)		30			30			25			25	
Link Distance (ft)		1000			1000			240			1000	
Travel Time (s)		22.7			22.7			6.5			27.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	7	3	18	27	0	36	9	118	6	23	464	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	28	0	0	63	0	9	124	0	23	488	0
Turn Type	Perm			Perm			pm+pt			pm+pt		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		6.0	43.0		6.0	43.0	
Minimum Split (s)	25.0	25.0		25.0	25.0		9.0	48.0		9.0	48.0	
Total Split (s)	25.0	25.0	0.0	25.0	25.0	0.0	9.0	48.0	0.0	9.0	48.0	0.0
Total Split (%)	30.5%	30.5%	0.0%	30.5%	30.5%	0.0%	11.0%	58.5%	0.0%	11.0%	58.5%	0.0%
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-1.0	0.0
Total Lost Time (s)	5.0	4.0	4.0	5.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None										
Act Effect Green (s)		22.3			22.3		49.8	49.0		50.2	50.4	
Actuated g/C Ratio		0.33			0.33		0.75	0.74		0.75	0.76	
v/c Ratio		0.05			0.12		0.01	0.09		0.02	0.35	
Control Delay		14.3			13.6		5.0	7.7		5.0	8.0	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		14.3			13.6		5.0	7.7		5.0	8.0	
LOS		B			B		A	A		A	A	
Approach Delay		14.3			13.6			7.5			7.8	
Approach LOS		B			B			A			A	
Queue Length 50th (ft)		3			9		1	20		4	105	
Queue Length 95th (ft)		23			41		6	54		11	224	

Fendley & Earle Student Housing
1: Keith Street & College Avenue

Existing (2015)
Timing Plan: AM Peak

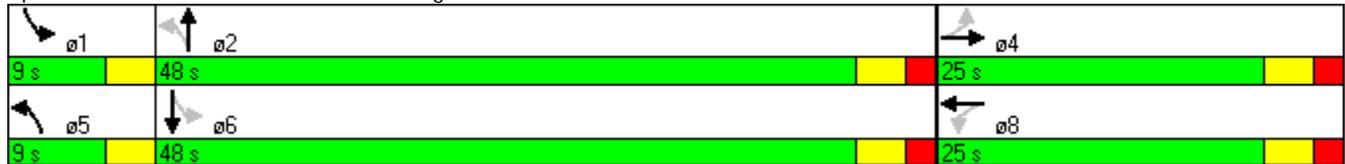
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		920			920			160			920	
Turn Bay Length (ft)							45			50		
Base Capacity (vph)		525			509		712	1361		984	1402	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.05			0.12		0.01	0.09		0.02	0.35	

Intersection Summary

Area Type: Other
 Cycle Length: 82
 Actuated Cycle Length: 66.6
 Natural Cycle: 85
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.35
 Intersection Signal Delay: 8.5
 Intersection Capacity Utilization 59.2%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service B

Splits and Phases: 1: Keith Street & College Avenue



Fendley & Earle Student Housing
2: Earle Street & College Avenue

Existing (2015)
Timing Plan: AM Peak

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	0	118	19	24	433
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	0	131	21	27	481
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						240
pX, platoon unblocked	0.89					
vC, conflicting volume	676	142			152	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	569	142			152	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			98	
cM capacity (veh/h)	420	906			1429	
Direction, Lane #	NB 1	SB 1				
Volume Total	152	508				
Volume Left	0	27				
Volume Right	21	0				
cSH	1700	1429				
Volume to Capacity	0.09	0.02				
Queue Length 95th (ft)	0	1				
Control Delay (s)	0.0	0.6				
Lane LOS		A				
Approach Delay (s)	0.0	0.6				
Approach LOS						
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			38.1%	ICU Level of Service		A
Analysis Period (min)			15			

Fendley & Earle Student Housing
1: Keith Street & College Avenue

Existing (2015)
Timing Plan: Midday Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	7	56	79	6	63	35	331	32	48	349	34
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	12
Storage Length (ft)	0		0	0		0	45		0	50		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25		25	25		25	45		25	50		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.919			0.943			0.987			0.987	
Flt Protected		0.984			0.974		0.950			0.950		
Satd. Flow (prot)	0	1628	0	0	1654	0	1770	1839	0	1770	1839	0
Flt Permitted		0.878			0.819		0.430			0.448		
Satd. Flow (perm)	0	1453	0	0	1391	0	801	1839	0	835	1839	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		62			43			9			9	
Link Speed (mph)		30			30			25			25	
Link Distance (ft)		1000			1000			240			1000	
Travel Time (s)		22.7			22.7			6.5			27.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	33	8	62	88	7	70	39	368	36	53	388	38
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	103	0	0	165	0	39	404	0	53	426	0
Turn Type	Perm			Perm			pm+pt			pm+pt		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		6.0	43.0		6.0	43.0	
Minimum Split (s)	25.0	25.0		25.0	25.0		9.0	48.0		9.0	48.0	
Total Split (s)	25.0	25.0	0.0	25.0	25.0	0.0	9.0	48.0	0.0	9.0	48.0	0.0
Total Split (%)	30.5%	30.5%	0.0%	30.5%	30.5%	0.0%	11.0%	58.5%	0.0%	11.0%	58.5%	0.0%
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-1.0	0.0
Total Lost Time (s)	5.0	4.0	4.0	5.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None										
Act Effect Green (s)		21.1			21.1		48.6	44.1		48.6	44.1	
Actuated g/C Ratio		0.27			0.27		0.62	0.56		0.62	0.56	
v/c Ratio		0.24			0.41		0.07	0.39		0.09	0.41	
Control Delay		13.1			21.7		5.3	11.4		5.4	11.7	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		13.1			21.7		5.3	11.4		5.4	11.7	
LOS		B			C		A	B		A	B	
Approach Delay		13.1			21.7			10.9			11.0	
Approach LOS		B			C			B			B	
Queue Length 50th (ft)		16			51		6	112		8	120	
Queue Length 95th (ft)		55			108		16	176		20	188	

Fendley & Earle Student Housing
1: Keith Street & College Avenue

Existing (2015)
Timing Plan: Midday Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		920			920			160			920	
Turn Bay Length (ft)							45			50		
Base Capacity (vph)		436			405		571	1039		590	1039	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.24			0.41		0.07	0.39		0.09	0.41	

Intersection Summary

Area Type: Other
 Cycle Length: 82
 Actuated Cycle Length: 78.4
 Natural Cycle: 85
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.41
 Intersection Signal Delay: 12.6
 Intersection Capacity Utilization 63.2%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 1: Keith Street & College Avenue



Fendley & Earle Student Housing
2: Earle Street & College Avenue

Existing (2015)
Timing Plan: Midday Peak

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	0	399	37	24	466
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	0	443	41	27	518
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						240
pX, platoon unblocked	0.87					
vC, conflicting volume	1035	464			484	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	967	464			484	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			98	
cM capacity (veh/h)	240	598			1078	
Direction, Lane #	NB 1	SB 1				
Volume Total	484	544				
Volume Left	0	27				
Volume Right	41	0				
cSH	1700	1078				
Volume to Capacity	0.28	0.02				
Queue Length 95th (ft)	0	2				
Control Delay (s)	0.0	0.7				
Lane LOS		A				
Approach Delay (s)	0.0	0.7				
Approach LOS						
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			47.4%		ICU Level of Service	A
Analysis Period (min)			15			

Fendley & Earle Student Housing
1: Keith Street & College Avenue

Existing (2015)
Timing Plan: PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	61	12	85	70	8	85	70	449	31	41	289	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	12
Storage Length (ft)	0		0	0		0	45		0	50		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25		25	25		25	45		25	50		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.927			0.930			0.990			0.977	
Flt Protected		0.981			0.979		0.950			0.950		
Satd. Flow (prot)	0	1637	0	0	1639	0	1770	1844	0	1770	1820	0
Flt Permitted		0.823			0.797		0.454			0.362		
Satd. Flow (perm)	0	1374	0	0	1335	0	846	1844	0	674	1820	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		68			64			6			17	
Link Speed (mph)		30			30			25			25	
Link Distance (ft)		1000			1000			240			1000	
Travel Time (s)		22.7			22.7			6.5			27.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	68	13	94	78	9	94	78	499	34	46	321	57
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	175	0	0	181	0	78	533	0	46	378	0
Turn Type	Perm			Perm			pm+pt			pm+pt		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		6.0	43.0		6.0	43.0	
Minimum Split (s)	25.0	25.0		25.0	25.0		9.0	48.0		9.0	48.0	
Total Split (s)	25.0	25.0	0.0	25.0	25.0	0.0	9.0	48.0	0.0	9.0	48.0	0.0
Total Split (%)	30.5%	30.5%	0.0%	30.5%	30.5%	0.0%	11.0%	58.5%	0.0%	11.0%	58.5%	0.0%
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-1.0	0.0
Total Lost Time (s)	5.0	4.0	4.0	5.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None										
Act Effect Green (s)		21.0			21.0		50.4	45.9		49.8	44.1	
Actuated g/C Ratio		0.26			0.26		0.63	0.57		0.62	0.55	
v/c Ratio		0.43			0.45		0.13	0.50		0.09	0.38	
Control Delay		19.3			20.7		5.6	13.1		5.4	11.6	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		19.3			20.7		5.6	13.1		5.4	11.6	
LOS		B			C		A	B		A	B	
Approach Delay		19.3			20.7			12.1			10.9	
Approach LOS		B			C			B			B	
Queue Length 50th (ft)		44			49		12	164		7	100	
Queue Length 95th (ft)		102			110		26	253		18	161	

Fendley & Earle Student Housing
1: Keith Street & College Avenue

Existing (2015)
Timing Plan: PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		920			920			160			920	
Turn Bay Length (ft)							45			50		
Base Capacity (vph)		410			398		601	1057		500	1008	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.43			0.45		0.13	0.50		0.09	0.38	

Intersection Summary

Area Type: Other
 Cycle Length: 82
 Actuated Cycle Length: 80.2
 Natural Cycle: 85
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.50
 Intersection Signal Delay: 13.8
 Intersection Capacity Utilization 67.5%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service C

Splits and Phases: 1: Keith Street & College Avenue



Fendley & Earle Student Housing
2: Earle Street & College Avenue

Existing (2015)
Timing Plan: PM Peak

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	0	538	79	24	409
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	0	598	88	27	454
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						240
pX, platoon unblocked	0.90					
vC, conflicting volume	1149	642			686	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1111	642			686	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			97	
cM capacity (veh/h)	202	474			908	
Direction, Lane #	NB 1	SB 1				
Volume Total	686	481				
Volume Left	0	27				
Volume Right	88	0				
cSH	1700	908				
Volume to Capacity	0.40	0.03				
Queue Length 95th (ft)	0	2				
Control Delay (s)	0.0	0.8				
Lane LOS		A				
Approach Delay (s)	0.0	0.8				
Approach LOS						
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			44.5%	ICU Level of Service		A
Analysis Period (min)			15			

CAPACITY ANALYSIS

[FUTURE (2017) 'NO-BUILD' TRAFFIC CONDITIONS]

Fendley & Earle Student Housing
1: Keith Street & College Avenue

Future (2017) 'No-Build'
Timing Plan: AM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	6	3	16	34	0	35	8	114	5	26	429	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	12
Storage Length (ft)	0		0	0		0	45		0	50		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25		25	25		25	45		25	50		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.913			0.932			0.993			0.993	
Flt Protected		0.988			0.976		0.950			0.950		
Satd. Flow (prot)	0	1624	0	0	1638	0	1770	1850	0	1770	1850	0
Flt Permitted		0.942			0.862		0.420			0.656		
Satd. Flow (perm)	0	1549	0	0	1447	0	782	1850	0	1222	1850	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18			39			4			5	
Link Speed (mph)		30			30			25			25	
Link Distance (ft)		1000			1000			240			1000	
Travel Time (s)		22.7			22.7			6.5			27.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	7	3	18	38	0	39	9	127	6	29	477	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	28	0	0	77	0	9	133	0	29	501	0
Turn Type	Perm			Perm			pm+pt			pm+pt		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		6.0	43.0		6.0	43.0	
Minimum Split (s)	25.0	25.0		25.0	25.0		9.0	48.0		9.0	48.0	
Total Split (s)	25.0	25.0	0.0	25.0	25.0	0.0	9.0	48.0	0.0	9.0	48.0	0.0
Total Split (%)	30.5%	30.5%	0.0%	30.5%	30.5%	0.0%	11.0%	58.5%	0.0%	11.0%	58.5%	0.0%
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-1.0	0.0
Total Lost Time (s)	5.0	4.0	4.0	5.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	None		None	None	
Act Effect Green (s)		21.8			21.8		48.9	47.0		49.4	48.5	
Actuated g/C Ratio		0.30			0.30		0.68	0.66		0.69	0.68	
v/c Ratio		0.06			0.16		0.01	0.11		0.03	0.40	
Control Delay		14.0			14.5		5.0	8.5		5.2	9.5	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		14.0			14.5		5.0	8.5		5.2	9.5	
LOS		B			B		A	A		A	A	
Approach Delay		14.0			14.5			8.2			9.2	
Approach LOS		B			B			A			A	
Queue Length 50th (ft)		3			13		1	22		5	108	
Queue Length 95th (ft)		23			49		6	58		13	232	

Fendley & Earle Student Housing
1: Keith Street & College Avenue

Future (2017) 'No-Build'
Timing Plan: AM Peak

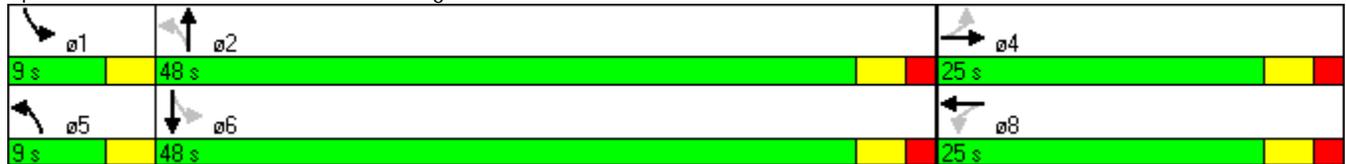
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		920			920			160			920	
Turn Bay Length (ft)							45			50		
Base Capacity (vph)		485			469		620	1215		891	1255	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.06			0.16		0.01	0.11		0.03	0.40	

Intersection Summary

Area Type: Other
 Cycle Length: 82
 Actuated Cycle Length: 71.6
 Natural Cycle: 85
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.40
 Intersection Signal Delay: 9.8
 Intersection Capacity Utilization 59.2%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service B

Splits and Phases: 1: Keith Street & College Avenue



Fendley & Earle Student Housing
2: Earle Street & College Avenue

Future (2017) 'No-Build'
Timing Plan: AM Peak

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	0	126	22	27	452
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	0	140	24	30	502
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						240
pX, platoon unblocked	0.86					
vC, conflicting volume	714	152			164	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	588	152			164	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			98	
cM capacity (veh/h)	397	894			1414	
Direction, Lane #	NB 1	SB 1				
Volume Total	164	532				
Volume Left	0	30				
Volume Right	24	0				
cSH	1700	1414				
Volume to Capacity	0.10	0.02				
Queue Length 95th (ft)	0	2				
Control Delay (s)	0.0	0.6				
Lane LOS		A				
Approach Delay (s)	0.0	0.6				
Approach LOS						
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			39.9%	ICU Level of Service		A
Analysis Period (min)			15			

Fendley & Earle Student Housing
1: Keith Street & College Avenue

Future (2017) 'No-Build'
Timing Plan: Midday Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	31	7	57	105	6	70	36	352	33	62	362	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	12
Storage Length (ft)	0		0	0		0	45		0	50		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25		25	25		25	45		25	50		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.919			0.948			0.987			0.987	
Flt Protected		0.984			0.972		0.950			0.950		
Satd. Flow (prot)	0	1628	0	0	1659	0	1770	1839	0	1770	1839	0
Flt Permitted		0.882			0.774		0.434			0.414		
Satd. Flow (perm)	0	1460	0	0	1321	0	808	1839	0	771	1839	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		63			37			9			9	
Link Speed (mph)		30			30			25			25	
Link Distance (ft)		1000			1000			240			1000	
Travel Time (s)		22.7			22.7			6.5			27.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	34	8	63	117	7	78	40	391	37	69	402	39
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	105	0	0	202	0	40	428	0	69	441	0
Turn Type	Perm			Perm			pm+pt			pm+pt		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		6.0	43.0		6.0	43.0	
Minimum Split (s)	25.0	25.0		25.0	25.0		9.0	48.0		9.0	48.0	
Total Split (s)	25.0	25.0	0.0	25.0	25.0	0.0	9.0	48.0	0.0	9.0	48.0	0.0
Total Split (%)	30.5%	30.5%	0.0%	30.5%	30.5%	0.0%	11.0%	58.5%	0.0%	11.0%	58.5%	0.0%
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-1.0	0.0
Total Lost Time (s)	5.0	4.0	4.0	5.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	None		None	None	
Act Effect Green (s)		21.0			21.0		49.8	44.1		50.4	45.9	
Actuated g/C Ratio		0.26			0.26		0.62	0.55		0.63	0.57	
v/c Ratio		0.24			0.54		0.07	0.42		0.12	0.42	
Control Delay		13.3			27.5		5.2	12.4		5.6	11.7	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		13.3			27.5		5.2	12.4		5.6	11.7	
LOS		B			C		A	B		A	B	
Approach Delay		13.3			27.5			11.8			10.9	
Approach LOS		B			C			B			B	
Queue Length 50th (ft)		17			73		6	121		11	126	
Queue Length 95th (ft)		55			141		16	189		24	196	

Fendley & Earle Student Housing
1: Keith Street & College Avenue

Future (2017) 'No-Build'
Timing Plan: Midday Peak

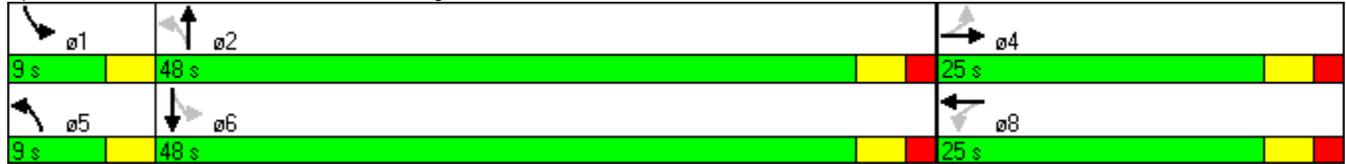
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		920			920			160			920	
Turn Bay Length (ft)							45			50		
Base Capacity (vph)		430			374		574	1015		559	1055	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.24			0.54		0.07	0.42		0.12	0.42	

Intersection Summary

Area Type: Other
 Cycle Length: 82
 Actuated Cycle Length: 80.2
 Natural Cycle: 85
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.54
 Intersection Signal Delay: 14.0
 Intersection Capacity Utilization 67.9%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service C

Splits and Phases: 1: Keith Street & College Avenue



Fendley & Earle Student Housing
2: Earle Street & College Avenue

Future (2017) 'No-Build'
Timing Plan: Midday Peak

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	0	421	45	30	499
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	0	468	50	33	554
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						240
pX, platoon unblocked	0.87					
vC, conflicting volume	1114	493			518	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1055	493			518	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			97	
cM capacity (veh/h)	210	576			1048	
Direction, Lane #	NB 1	SB 1				
Volume Total	518	588				
Volume Left	0	33				
Volume Right	50	0				
cSH	1700	1048				
Volume to Capacity	0.30	0.03				
Queue Length 95th (ft)	0	2				
Control Delay (s)	0.0	0.9				
Lane LOS		A				
Approach Delay (s)	0.0	0.9				
Approach LOS						
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			54.1%	ICU Level of Service		A
Analysis Period (min)			15			

Fendley & Earle Student Housing
1: Keith Street & College Avenue

Future (2017) 'No-Build'
Timing Plan: PM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	62	12	87	107	8	97	71	482	32	65	304	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	12
Storage Length (ft)	0		0	0		0	45		0	50		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25		25	25		25	45		25	50		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.927			0.938			0.991			0.978	
Flt Protected		0.981			0.975		0.950			0.950		
Satd. Flow (prot)	0	1637	0	0	1647	0	1770	1846	0	1770	1822	0
Flt Permitted		0.799			0.723		0.451			0.313		
Satd. Flow (perm)	0	1334	0	0	1221	0	840	1846	0	583	1822	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		70			50			6			16	
Link Speed (mph)		30			30			25			25	
Link Distance (ft)		1000			1000			240			1000	
Travel Time (s)		22.7			22.7			6.5			27.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	69	13	97	119	9	108	79	536	36	72	338	58
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	179	0	0	236	0	79	572	0	72	396	0
Turn Type	Perm			Perm			pm+pt			pm+pt		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		6.0	43.0		6.0	43.0	
Minimum Split (s)	25.0	25.0		25.0	25.0		9.0	48.0		9.0	48.0	
Total Split (s)	25.0	25.0	0.0	25.0	25.0	0.0	9.0	48.0	0.0	9.0	48.0	0.0
Total Split (%)	30.5%	30.5%	0.0%	30.5%	30.5%	0.0%	11.0%	58.5%	0.0%	11.0%	58.5%	0.0%
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-1.0	0.0
Total Lost Time (s)	5.0	4.0	4.0	5.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	None		None	None	
Act Effect Green (s)		21.0			21.0		49.8	44.1		49.8	44.1	
Actuated g/C Ratio		0.26			0.26		0.62	0.55		0.62	0.55	
v/c Ratio		0.45			0.66		0.13	0.56		0.16	0.39	
Control Delay		19.7			31.6		5.6	14.8		5.9	11.8	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		19.7			31.6		5.6	14.8		5.9	11.8	
LOS		B			C		A	B		A	B	
Approach Delay		19.7			31.6			13.7			10.9	
Approach LOS		B			C			B			B	
Queue Length 50th (ft)		45			86		13	182		11	107	
Queue Length 95th (ft)		105			#183		27	278		25	170	

Fendley & Earle Student Housing
1: Keith Street & College Avenue

Future (2017) 'No-Build'
Timing Plan: PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		920			920			160			920	
Turn Bay Length (ft)							45			50		
Base Capacity (vph)		402			357		591	1017		451	1009	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.45			0.66		0.13	0.56		0.16	0.39	

Intersection Summary

Area Type: Other
 Cycle Length: 82
 Actuated Cycle Length: 80.2
 Natural Cycle: 85
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.66
 Intersection Signal Delay: 16.3
 Intersection Capacity Utilization 68.7%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Intersection LOS: B
 ICU Level of Service C

Splits and Phases: 1: Keith Street & College Avenue



Fendley & Earle Student Housing
2: Earle Street & College Avenue

Future (2017) 'No-Build'
Timing Plan: PM Peak

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	0	573	91	33	453
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	0	637	101	37	503
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						240
pX, platoon unblocked	0.89					
vC, conflicting volume	1264	687			738	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1235	687			738	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			96	
cM capacity (veh/h)	166	447			868	
Direction, Lane #	NB 1	SB 1				
Volume Total	738	540				
Volume Left	0	37				
Volume Right	101	0				
cSH	1700	868				
Volume to Capacity	0.43	0.04				
Queue Length 95th (ft)	0	3				
Control Delay (s)	0.0	1.2				
Lane LOS		A				
Approach Delay (s)	0.0	1.2				
Approach LOS						
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			54.3%		ICU Level of Service	A
Analysis Period (min)			15			

CAPACITY ANALYSIS

[FUTURE (2017) 'BUILD' TRAFFIC CONDITIONS]

Fendley & Earle Student Housing
1: Keith Street & College Avenue

Future (2017) 'Build'
Timing Plan: AM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	6	3	16	45	0	45	8	114	5	32	430	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	12
Storage Length (ft)	0		0	0		0	45		0	50		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25		25	25		25	45		25	50		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.913			0.932			0.993			0.993	
Flt Protected		0.988			0.976		0.950			0.950		
Satd. Flow (prot)	0	1624	0	0	1638	0	1770	1850	0	1770	1850	0
Flt Permitted		0.938			0.850		0.430			0.643		
Satd. Flow (perm)	0	1542	0	0	1426	0	801	1850	0	1198	1850	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18			50			4			5	
Link Speed (mph)		30			30			25			25	
Link Distance (ft)		1000			1000			240			1000	
Travel Time (s)		22.7			22.7			6.5			27.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	7	3	18	50	0	50	9	127	6	36	478	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	28	0	0	100	0	9	133	0	36	502	0
Turn Type	Perm			Perm			pm+pt			pm+pt		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		6.0	43.0		6.0	43.0	
Minimum Split (s)	25.0	25.0		25.0	25.0		9.0	48.0		9.0	48.0	
Total Split (s)	25.0	25.0	0.0	25.0	25.0	0.0	9.0	48.0	0.0	9.0	48.0	0.0
Total Split (%)	30.5%	30.5%	0.0%	30.5%	30.5%	0.0%	11.0%	58.5%	0.0%	11.0%	58.5%	0.0%
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-1.0	0.0
Total Lost Time (s)	5.0	4.0	4.0	5.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	None		None	None	
Act Effect Green (s)		21.9			21.9		50.2	47.2		51.3	50.4	
Actuated g/C Ratio		0.30			0.30		0.68	0.64		0.70	0.69	
v/c Ratio		0.06			0.22		0.01	0.11		0.04	0.39	
Control Delay		14.2			15.3		5.0	9.1		5.1	9.3	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		14.2			15.3		5.0	9.1		5.1	9.3	
LOS		B			B		A	A		A	A	
Approach Delay		14.2			15.3			8.9			9.0	
Approach LOS		B			B			A			A	
Queue Length 50th (ft)		4			20		1	31		6	109	
Queue Length 95th (ft)		23			58		6	58		15	232	

Fendley & Earle Student Housing
1: Keith Street & College Avenue

Future (2017) 'Build'
Timing Plan: AM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		920			920			160			920	
Turn Bay Length (ft)							45			50		
Base Capacity (vph)		473			461		630	1190		886	1272	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.06			0.22		0.01	0.11		0.04	0.39	

Intersection Summary

Area Type: Other
 Cycle Length: 82
 Actuated Cycle Length: 73.4
 Natural Cycle: 85
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.39
 Intersection Signal Delay: 9.9
 Intersection Capacity Utilization 59.2%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service B

Splits and Phases: 1: Keith Street & College Avenue



Fendley & Earle Student Housing
2: Earle Street & College Avenue

Future (2017) 'Build'
Timing Plan: AM Peak

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	0	126	30	28	463
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	0	140	33	31	514
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						240
pX, platoon unblocked	0.86					
vC, conflicting volume	733	157			173	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	613	157			173	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			98	
cM capacity (veh/h)	385	889			1403	
Direction, Lane #	NB 1	SB 1				
Volume Total	173	546				
Volume Left	0	31				
Volume Right	33	0				
cSH	1700	1403				
Volume to Capacity	0.10	0.02				
Queue Length 95th (ft)	0	2				
Control Delay (s)	0.0	0.7				
Lane LOS		A				
Approach Delay (s)	0.0	0.7				
Approach LOS						
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			41.0%		ICU Level of Service	A
Analysis Period (min)			15			

Fendley & Earle Student Housing
1: Keith Street & College Avenue

Future (2017) 'Build'
Timing Plan: Midday Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	31	7	57	130	6	94	36	352	33	78	364	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	12
Storage Length (ft)	0		0	0		0	45		0	50		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25		25	25		25	45		25	50		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.919			0.945			0.987			0.987	
Flt Protected		0.984			0.973		0.950			0.950		
Satd. Flow (prot)	0	1628	0	0	1656	0	1770	1839	0	1770	1839	0
Flt Permitted		0.865			0.776		0.432			0.414		
Satd. Flow (perm)	0	1431	0	0	1320	0	805	1839	0	771	1839	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		63			41			9			9	
Link Speed (mph)		30			30			25			25	
Link Distance (ft)		1000			1000			240			1000	
Travel Time (s)		22.7			22.7			6.5			27.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	34	8	63	144	7	104	40	391	37	87	404	39
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	105	0	0	255	0	40	428	0	87	443	0
Turn Type	Perm			Perm			pm+pt			pm+pt		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		6.0	43.0		6.0	43.0	
Minimum Split (s)	25.0	25.0		25.0	25.0		9.0	48.0		9.0	48.0	
Total Split (s)	25.0	25.0	0.0	25.0	25.0	0.0	9.0	48.0	0.0	9.0	48.0	0.0
Total Split (%)	30.5%	30.5%	0.0%	30.5%	30.5%	0.0%	11.0%	58.5%	0.0%	11.0%	58.5%	0.0%
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-1.0	0.0
Total Lost Time (s)	5.0	4.0	4.0	5.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	None		None	None	
Act Effect Green (s)		21.0			21.0		49.8	44.1		50.4	45.9	
Actuated g/C Ratio		0.26			0.26		0.62	0.55		0.63	0.57	
v/c Ratio		0.25			0.68		0.07	0.42		0.16	0.42	
Control Delay		13.4			33.3		5.3	12.4		5.8	11.8	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		13.4			33.3		5.3	12.4		5.8	11.8	
LOS		B			C		A	B		A	B	
Approach Delay		13.4			33.3			11.8			10.8	
Approach LOS		B			C			B			B	
Queue Length 50th (ft)		17			99		6	121		14	127	
Queue Length 95th (ft)		56			#202		16	189		29	197	

Fendley & Earle Student Housing
1: Keith Street & College Avenue

Future (2017) 'Build'
Timing Plan: Midday Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		920			920			160			920	
Turn Bay Length (ft)							45			50		
Base Capacity (vph)		422			377		572	1015		559	1055	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.25			0.68		0.07	0.42		0.16	0.42	

Intersection Summary

Area Type: Other
 Cycle Length: 82
 Actuated Cycle Length: 80.2
 Natural Cycle: 85
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.68
 Intersection Signal Delay: 15.6
 Intersection Capacity Utilization 70.8%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 1: Keith Street & College Avenue



Fendley & Earle Student Housing
2: Earle Street & College Avenue

Future (2017) 'Build'
Timing Plan: Midday Peak

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	0	421	64	32	524
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	0	468	71	36	582
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						240
pX, platoon unblocked	0.87					
vC, conflicting volume	1157	503			539	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1104	503			539	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			97	
cM capacity (veh/h)	196	568			1029	
Direction, Lane #	NB 1	SB 1				
Volume Total	539	618				
Volume Left	0	36				
Volume Right	71	0				
cSH	1700	1029				
Volume to Capacity	0.32	0.03				
Queue Length 95th (ft)	0	3				
Control Delay (s)	0.0	0.9				
Lane LOS		A				
Approach Delay (s)	0.0	0.9				
Approach LOS						
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			57.1%		ICU Level of Service	B
Analysis Period (min)			15			

Fendley & Earle Student Housing
1: Keith Street & College Avenue

Future (2017) 'Build' - Modified Timings

Timing Plan: PM Peak

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	62	12	87	143	8	132	71	482	32	93	307	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	12
Storage Length (ft)	0		0	0		0	45		0	50		0
Storage Lanes	0		0	0		0	1		0	1		0
Taper Length (ft)	25		25	25		25	45		25	50		25
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.927			0.937			0.991			0.978	
Flt Protected		0.981			0.975		0.950			0.950		
Satd. Flow (prot)	0	1637	0	0	1645	0	1770	1846	0	1770	1822	0
Flt Permitted		0.784			0.734		0.428			0.281		
Satd. Flow (perm)	0	1309	0	0	1238	0	797	1846	0	523	1822	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		76			56			6			14	
Link Speed (mph)		30			30			25			25	
Link Distance (ft)		1000			1000			240			1000	
Travel Time (s)		22.7			22.7			6.5			27.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	69	13	97	159	9	147	79	536	36	103	341	58
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	179	0	0	315	0	79	572	0	103	399	0
Turn Type	Perm			Perm			pm+pt			pm+pt		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0		6.0	43.0		6.0	43.0	
Minimum Split (s)	25.0	25.0		25.0	25.0		9.0	48.0		9.0	48.0	
Total Split (s)	30.0	30.0	0.0	30.0	30.0	0.0	9.0	43.0	0.0	9.0	43.0	0.0
Total Split (%)	36.6%	36.6%	0.0%	36.6%	36.6%	0.0%	11.0%	52.4%	0.0%	11.0%	52.4%	0.0%
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		0.0	2.0		0.0	2.0	
Lost Time Adjust (s)	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-1.0	0.0	0.0	-1.0	0.0
Total Lost Time (s)	5.0	4.0	4.0	5.0	4.0	4.0	3.0	4.0	4.0	3.0	4.0	4.0
Lead/Lag							Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None		None	None		None	None		None	None	
Act Effect Green (s)		23.6			23.6		44.9	39.2		44.9	39.2	
Actuated g/C Ratio		0.30			0.30		0.58	0.50		0.58	0.50	
v/c Ratio		0.40			0.76		0.15	0.61		0.26	0.43	
Control Delay		15.8			34.1		7.4	18.3		8.5	14.6	
Queue Delay		0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay		15.8			34.1		7.4	18.3		8.5	14.6	
LOS		B			C		A	B		A	B	
Approach Delay		15.8			34.1			17.0			13.3	
Approach LOS		B			C			B			B	
Queue Length 50th (ft)		39			118		14	199		19	119	
Queue Length 95th (ft)		93			#241		33	321		41	199	

Fendley & Earle Student Housing
1: Keith Street & College Avenue

Future (2017) 'Build' - Modified Timings

Timing Plan: PM Peak

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		920			920			160			920	
Turn Bay Length (ft)							45			50		
Base Capacity (vph)		490			453		535	933		399	925	
Starvation Cap Reductn		0			0		0	0		0	0	
Spillback Cap Reductn		0			0		0	0		0	0	
Storage Cap Reductn		0			0		0	0		0	0	
Reduced v/c Ratio		0.37			0.70		0.15	0.61		0.26	0.43	

Intersection Summary

Area Type: Other
 Cycle Length: 82
 Actuated Cycle Length: 77.8
 Natural Cycle: 85
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.76
 Intersection Signal Delay: 19.0
 Intersection Capacity Utilization 74.1%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Intersection LOS: B
 ICU Level of Service D

Splits and Phases: 1: Keith Street & College Avenue



Fendley & Earle Student Housing
2: Earle Street & College Avenue

Future (2017) 'Build'
Timing Plan: PM Peak

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	0	573	124	36	489
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	0	637	138	40	543
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						240
pX, platoon unblocked	0.89					
vC, conflicting volume	1329	706			774	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1308	706			774	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			95	
cM capacity (veh/h)	149	436			841	
Direction, Lane #	NB 1	SB 1				
Volume Total	774	583				
Volume Left	0	40				
Volume Right	138	0				
cSH	1700	841				
Volume to Capacity	0.46	0.05				
Queue Length 95th (ft)	0	4				
Control Delay (s)	0.0	1.3				
Lane LOS		A				
Approach Delay (s)	0.0	1.3				
Approach LOS						
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			58.7%		ICU Level of Service	B
Analysis Period (min)			15			