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August 15, 2018

Technical Memorandum

To: Megan Ledbetter, Village Planner
Village of Clemmons

From: Jayson B. Clapp, Jr., P.E., PTOE
Ramey Kemp & Associates, Inc. (License # C-0910)

Subject: Tharrington Senior Retirement Community
Clemmons, North Carolina

NORTH CAROLINA PROFESSIONAL SEAL 26379 ENGINEER JAYSON B. CLAPP, JR.
8.15.18

This technical memorandum has been prepared by Ramey Kemp & Associates, Inc. (RKA) to determine the potential impacts to the adjacent transportation network created by the additional traffic generated by the proposed senior retirement community that is to be located in the northeast quadrant of the Peace Haven Road/Harper Road intersection in Clemmons, NC. This analysis consists of the collection of existing traffic data and the projection of traffic volumes [including the approved Peace Haven Village development], trip generation and distribution for the proposed development, capacity analysis, and the recommendation of any necessary improvements to accommodate the traffic generated by the proposed development [that is anticipated to fully built out by the year 2020].

This memo summarizes the analysis that was performed for the existing (2018) and future (2020) 'no-build' and 'build' traffic conditions during the weekday AM and PM peak hours at the following intersections:

- Peace Haven Road and Harper Road
- Peace Haven Road and Jessie Village Drive/Village Club Lane
- Lewisville-Clemmons Road and Peace Haven Road
- Development Access Connection on Harper Road

Site Information

Based on the rezoning plan, the senior retirement community could consist of thirteen (13) lots [to be built out as 11 cottages and 2 duplexes] and 165 apartment units. Access to the development is to be provided via one (1) new full movement driveway on Harper Road located approximately 325 feet north of the Peace Haven Road roundabout. The study area was determined through coordination with the Village of Clemmons and North Carolina Department of Transportation (NCDOT). Refer to the attached appendix for the site location map and a copy of the rezoning plan.

Study Area Conditions

Harper Road (SR 1101) is a 2-lane facility with a posted speed limit of 45 miles per hour (mph) within the study area. Classified as a major collector, Harper Road carries approximately 2,800 vehicles per day (vpd) north of Peace Haven Road and 3,900 vpd to the south according to 2015 NCDOT Annual Average Daily Traffic (AADT) data [which is the most recent available].

Peace Haven Road is a 2-lane facility with a posted speed limit of 35 mph in the vicinity of the site. Auxiliary turn lanes are provided on Peace Haven Road at the intersections of Jessie Village Drive/Village Club Lane and Lewisville-Clemmons Road. Classified as a major collector, Peace Haven Road carries approximately 11,000 vehicles per day (vpd) between Village Club Lane and Lewisville-Clemmons Road according to 2015 NCDOT AADT data.

Existing lane configurations (number of traffic lanes on the intersection approach), storage capacities, and other intersection and roadway information were obtained from previous field reconnaissance by RKA and the roadway plans prepared for the approved Peace Haven Village development. Refer to the attached appendix for an illustration of the existing geometrics and traffic control within the study area.

Trip Generation

Trip generation for the proposed development was completed utilizing methodology contained within the 9th Edition of the Institute of Transportation Engineering (ITE) *Trip Generation* manual. Traffic was generated according to the peak hour of adjacent street traffic, utilizing the number of dwelling units as the independent variable for the land use of [detached] senior adult housing (ITE Code 251) and the occupied dwelling units as the independent variable for the land use of [attached] senior adult housing (ITE Code 252). The following average rates and directional distributions were utilized for the respective land uses:

Senior Adult Housing – Detached (251)

- Weekday – Average Rate: 3.68
- AM Peak Hour – Average Rate: 0.22, Directional Distribution: 35% entering, 65% exiting
- PM Peak Hour – Average Rate: 0.27, Directional Distribution: 61% entering, 39% exiting

Senior Adult Housing – Attached (252)

- Weekday – Average Rate: 3.44
- AM Peak Hour – Average Rate: 0.19, Directional Distribution: 35% entering, 65% exiting
- PM Peak Hour – Average Rate: 0.23, Directional Distribution: 60% entering, 40% exiting

Refer to Table 1 for a breakdown of the site generated traffic volumes.

TABLE 1
TRIP GENERATION

ITE Land Use (Code)	Independent Variable	Average Daily Traffic (vpd)	AM Peak Hour (vph)		PM Peak Hour (vph)	
			Enter	Exit	Enter	Exit
Senior Adult Housing - Detached (251)	15 Dwelling Units	55	1	2	2	2
Senior Adult Housing - Attached (252)	165 Occupied Dwelling Units	568	11	20	23	15
Total		623	12	22	25	17

It is estimated that the proposed development could generate 623 trips (in and out) during a typical weekday with 34 trips (12 entering and 22 exiting) generated during the AM peak hour and 42 trips (25 entering and 17 exiting) generated during the PM peak hour.

Site Trip Distribution & Assignment

The following trip distribution percentages were developed through coordination with the Village of Clemmons and were based on existing traffic patterns and engineering judgment. The trip distributions for the AM and PM peak hours are summarized below:

- 20% to/from the south via Harper Road
- 15% to/from the south via Jessie Village Drive
- 20% to/from the north via Lewisville-Clemmons Road
- 5% to/from the east via Peace Haven Road
- 40% to/from the south via Lewisville-Clemmons Road

Refer to attached appendix for illustrations of the site trip distribution and assignment.

Traffic Conditions

Existing weekday AM and PM peak hour traffic volumes were determined from turning movement counts that were conducted at Harper Road and Jessie Village Drive/Village Club Lane intersections on Peace Haven Road during the weekday AM (7:00 AM to 9:00 AM) and PM (4:00 PM to 6:00 PM) peak periods. Utilizing the recent traffic count data, adjustments were made to the northbound left turn [onto Peace Haven Road from Lewisville-Clemmons Road] and eastbound right turn [onto Lewisville-Clemmons Road from Peace Haven Road] peak hour traffic volumes at the intersection of Lewisville-Clemmons Road and Peace Haven Road that were utilized from the Peace Haven Village TIA [as agreed to by the Village and NCDOT] to account for the decrease in traffic that was anticipated with the completion of Village Point Drive Extension. Refer to the attached appendix for an illustration of the existing weekday AM and PM peak hour traffic volumes, traffic adjustments, and the adjusted (2018) traffic volumes (including traffic adjustments) in addition to a copy of the raw traffic count data.

There is one (1) approved development (Peace Haven Village) located within the study area that was not completely built out at the time traffic counts were conducted, and should be accounted for in this analysis. To estimate the remaining traffic associated with this development, a conservative approach was taken and the traffic associated with the supermarket land use was removed from the overall traffic generation. More detailed information regarding the generation and distribution of the approved development traffic can be found in the attached appendix. The 'no-build' (2020) peak hour traffic volumes were determined by adding the approved development traffic volumes to the adjusted (2018) peak hour traffic volumes. Refer to the attached appendix for an illustration of the approved development traffic volumes and the future (2020) 'no-build' traffic volumes.

In order to estimate the traffic conditions with the proposed site developed, the total site traffic was combined with the 'no-build' peak hour traffic volumes. Refer to the attached appendix for an illustration of the future (2020) 'build' peak hour traffic volumes.

Capacity Analysis

All study intersections were analyzed using the methodology outlined in the Highway Capacity Manual (HCM) that is published by the Transportation Research Board. The computer software package, Synchro (Version 9.2), was utilized to perform all analyses for the signalized and unsignalized intersections. Synchro was developed by Trafficware Corporation and allows the user to input data into Synchro software and calculate output based on methodologies in the HCM. The software package SIDRA INTERSECTION 6.1 was utilized for all roundabout analysis.

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.

For signalized intersections and roundabouts, LOS calculations are provided for all approaches as well as the overall intersection. Capacity analysis results for unsignalized intersections do not provide an overall LOS, but rather a LOS for movements and/or approaches that have a conflicting movement.

Refer to Table 2 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 2, an average control delay of 40 seconds at a signalized intersection results in a LOS D operation. Capacity analysis results for unsignalized intersections do not provide an overall level of service, but rather a level of service for movements and/or approaches that have a conflicting movement. Delay and level of service are the design criteria for this traffic analysis.

TABLE 2
HIGHWAY CAPACITY MANUAL LEVELS OF SERVICE AND DELAY

SIGNALIZED INTERSECTION		UNSIGNALIZED INTERSECTION / ROUNDABOUT	
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	10-20	B	10-15
C	20-35	C	15-25
D	35-55	D	25-35
E	55-80	E	35-50
F	>80	F	>50

Existing and future traffic conditions were analyzed utilizing the existing lane configurations and a peak hour factor (PHF) of 0.90. The results of the capacity analysis for the existing study intersections and the proposed development access are presented in Tables 3-6. Copies of the detailed capacity analysis reports can be found in the attached appendix. Please note that for movements with 'zero' volumes, a peak hour volume of four (4) vehicles [one (1) vehicle every 15 minutes] was assumed.

Intersection of Peace Haven Road and Harper Road

Under existing and all future traffic conditions, capacity analysis indicates that the roundabout is expected to operate at an overall LOS A during the weekday AM and PM peak hours. In addition, all approaches are expected to operate at LOS B or better. Refer to Table 3 for a summary of the capacity analysis results. Detailed capacity analysis reports can be found in the attached appendix.

TABLE 3
ANALYSIS SUMMARY OF PEACE HAVEN ROAD AND HARPER ROAD

Scenario	Approach	Lane Configurations	AM Peak Hour Level Of Service (Delay)		PM Peak Hour Level Of Service (Delay)	
			Approach	Overall	Approach	Overall
Existing (2018)	NB SB EB WB	1 LT-TH-RT 1 LT-TH-RT 1 LT-TH-RT 1 LT-TH-RT	A (8.7) A (6.2) A (9.7) A (5.4)	A (7.7)	A (7.3) A (7.2) A (6.5) A (8.4)	A (7.6)
'No-Build' (2020)	NB SB EB WB	1 LT-TH-RT 1 LT-TH-RT 1 LT-TH-RT 1 LT-TH-RT	A (9.1) A (6.3) B (10.1) A (5.5)	A (8.0)	A (7.5) A (7.4) A (6.8) A (8.7)	A (7.9)
'Build' (2020)	NB SB EB WB	1 LT-TH-RT 1 LT-TH-RT 1 LT-TH-RT 1 LT-TH-RT	A (9.4) A (6.7) B (10.6) A (5.6)	A (8.3)	A (7.8) A (7.8) A (6.9) A (9.2)	A (8.3)

Intersection of Peace Haven Road and Jessie Village Drive/Village Club Lane

Based on the signal plan (located in the attached appendix) and field observations, all left turn movements operate under permissive phasing with the exception of the westbound left turn movement [onto Jessie Village Drive] that operates under protected-permissive phasing. In addition right turns on red are permitted on all intersection approaches. Since the development is anticipated to be complete within the next two (2) years, and no geometric improvements are being proposed at this intersection, right turns on red were permitted under all traffic analyses in order to model the traffic operations that exist in the field. It is understood that this intersection currently operates under isolated conditions based on the Synchro timings file obtained from the NCDOT (located in the attached appendix). Utilizing the signal design for this intersection, and assuming a minimum cycle length of 70 seconds for the 3-phase signal, capacity analysis indicates that the signalized intersection operates at an overall LOS A during the weekday AM and PM peak hours under existing conditions. In addition, all intersection approaches operate at LOS B or better. Under all future traffic conditions, analysis indicates that the signalized intersection and approaches are expected to operate at an

overall LOS B or better during the peak hours. Refer to Table 4 for a summary of the capacity analysis results, and the attached appendix for copies of the detailed capacity analysis reports.

TABLE 4

ANALYSIS SUMMARY OF PEACE HAVEN ROAD AND JESSIE VILLAGE DRIVE/VILLAGE CLUB LANE

Scenario	Approach	Lane Configurations	AM Peak Hour Level Of Service (Delay)		PM Peak Hour Level Of Service (Delay)	
			Approach	Overall	Approach	Overall
Existing (2018)	NB SB EB WB	1 LT-TH, 1 RT 1 LT-TH-RT 1 LT, 1 TH, 1 RT 1 LT, 1 TH-RT	B (11.2) B (17.4) B (11.5) A (2.7)	A (8.5)	B (12.1) B (15.6) B (14.7) A (5.5)	A (9.5)
'No-Build' (2020)	NB SB EB WB	1 LT-TH, 1 RT 1 LT-TH-RT 1 LT, 1 TH, 1 RT 1 LT, 1 TH-RT	A (9.4) B (17.1) B (11.5) A (3.0)	A (8.5)	B (12.0) B (15.9) B (16.5) A (7.1)	B (11.1)
'Build' (2020)	NB SB EB WB	1 LT-TH, 1 RT 1 LT-TH-RT 1 LT, 1 TH, 1 RT 1 LT, 1 TH-RT	A (9.6) B (17.1) B (11.7) A (3.0)	A (8.7)	B (12.2) B (15.9) B (16.8) A (7.3)	B (11.3)

<u>Intersection of Lewisville-Clemmons Road and Peace Haven Road</u>

Based on the signal plan (located in the attached appendix) and field observations, the northbound and southbound left turn movements [on Lewisville-Clemmons Road] operate under protected-permissive phasing while the eastbound and westbound left turn movements [on Peace Haven Road] operate under protected-only phasing. In addition, right turns on red are permitted on all intersection approaches. Since the development is anticipated to be complete within the next two (2) years, and no geometric improvements are being proposed at this intersection, right turns on red were permitted under all traffic analyses in order to model the traffic operations that exist in the field. Utilizing the signal design for this intersection, and the signal system timing information obtained from NCDOT (located in the attached appendix) for all analyses, capacity analysis indicates that the signalized intersection operates at an overall LOS D or better during the weekday AM and PM peak hours under existing conditions. In addition, all intersection approaches operate at LOS D or better with the exceptions of the northbound and westbound approaches during the PM peak hour. Under all future traffic conditions, analysis indicates that the signalized intersection is expected to operate at an overall LOS C during the AM peak hour and LOS E during the PM peak hour. The intersection approaches are expected to operate at LOS D or better with the exceptions of the northbound and westbound approaches during the PM peak hour. It is not uncommon for side street approaches [like the westbound approach of Peace Haven Road during the PM peak hour] to operate at poorer levels of operations at signalized intersections that are located in a coordinated signal system where precedence is given to maximizing progression on the mainline. As for the northbound

approach, improved operation is expected considering that this signalized intersection operates in coordination with the adjacent traffic signals located to the south to maximize progression along Lewisville-Clemmons Road as previously stated. Refer to Table 5 for a summary of the capacity analysis results, and the attached appendix for copies of the detailed capacity analysis reports.

TABLE 5
ANALYSIS SUMMARY OF LEWISVILLE-CLEMMONS ROAD AND PEACE HAVEN ROAD

Scenario	Approach	Lane Configurations	AM Peak Hour Level Of Service (Delay)		PM Peak Hour Level Of Service (Delay)	
			Approach	Overall	Approach	Overall
Existing (2018)	NB SB EB WB	1 LT, 1 TH, 1 TH-RT 1 LT, 1 TH, 1 TH-RT 2 LT, 1 TH, 1 RT 2 LT, 1 TH-RT	C (27.5) C (27.3) C (29.3) D (42.4)	C (30.3)	E (62.1) C (34.0) C (28.5) F (82.6)	D (54.1)
'No-Build' (2020)	NB SB EB WB	1 LT, 1 TH, 1 TH-RT 1 LT, 1 TH, 1 TH-RT 2 LT, 1 TH, 1 RT 2 LT, 1 TH-RT	C (28.4) C (29.5) C (31.3) D (43.7)	C (31.9)	E(70.1) D (36.2) C (33.7) F (87.4)	E (58.9)
'Build' (2020)	NB SB EB WB	1 LT, 1 TH, 1 TH-RT 1 LT, 1 TH, 1 TH-RT 2 LT, 1 TH, 1 RT 2 LT, 1 TH-RT	C (28.5) C (29.9) C (31.4) D (44.0)	C (32.1)	E(70.1) D(36.9) C(33.5) F (87.9)	E (59.1)

Intersection of Peace Haven Road and Site Access

Based on a review of the turn lane warrants contained within NCDOT's "Policy on Street and Driveway Access to North Carolina Highways" and Roadway Design Manual, no auxiliary turn lanes are warranted at the proposed site access on Harper Road due to the low traffic generation associated with the senior retirement community. Under future 'build' conditions, capacity analysis indicates that the left turn movement into the site [from Harper Road] is expected to experience minor delays and operate at LOS A during the weekday AM and PM peak hours. The stop-controlled approach of the site access is expected to experience minor overall delays and operate at LOS B during the peak hours. Refer to Table 6 for a summary of the capacity analysis results. Detailed capacity analysis reports can be found in the attached appendix.

TABLE 6
ANALYSIS SUMMARY OF HARPER ROAD AND SITE ACCESS

Scenario	Approach	Lane Configurations	AM Peak Hour Level Of Service (Delay)		PM Peak Hour Level Of Service (Delay)	
			Approach	Overall	Approach	Overall
'Build' (2020)	NB SB[1] WB[2]	1 TH-RT 1 LT-TH 1 LT-RT	A (0.0) A (7.5) B (10.2)	N/A	A (0.0) A (7.8) B (11.1)	N/A

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 senior retirement community is not expected to have a significant impact on the study area. When compared to the future 'no-build' conditions, the increase in overall intersection and approach delays at the existing study intersections is expected to be less than a second per vehicle with the addition of development traffic. Furthermore, the peak hour of the senior retirement community does not typically coincide with the typical peak hour of the adjacent street traffic.

If you should have any questions regarding this analysis, please contact me at (336)-725-5470.

Attachments

TECHNICAL APPENDIX

FIGURES

LEGEND

Site Location

Existing Study Intersection

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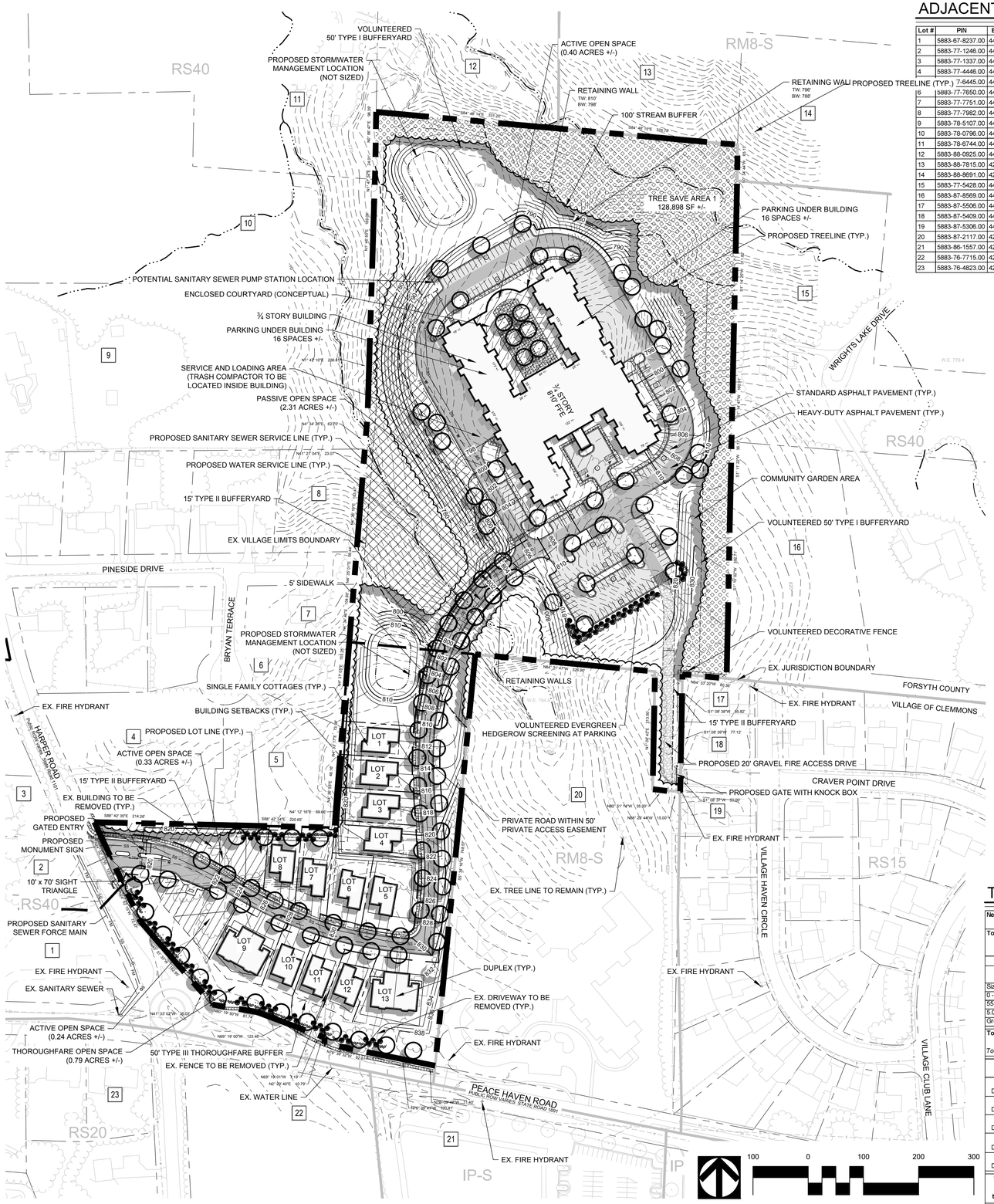
RAMEY KEMP & ASSOCIATES TRANSPORTATION ENGINEERS	Tharrington Senior Retirement Community Clemmons, North Carolina	Site Location and Study Area
		Scale: Not to Scale / Figure



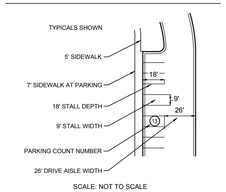
ADJACENT OWNERS

Lot #	PIN	Block Lot	Deed Bk-Pg	Property Owner	Property Owner Address		Zoning
1	5883-67-8237.00	4401011F	2651-258	Duke Power Company LLC	PO BOX 1028	Mandan ND 58554	RS40
2	5883-77-1246.00	4401012F	1843-1668	Brown, Joe & Karen	2290 Ashley Lake DR	Lewisville NC 27023	RS40
3	5883-77-1337.00	4401012E	3372-2581	Smith, Anthony W	7410 STYERS FERRY RD	CLEMMONS NC 27012	RS40
4	5883-77-4446.00	4401016D	2681-3537	Pyon, Choong H & Pyon, Ok M	3543 N Patterson Ave	Winston Salem NC 27105	RS40
5	5883-77-6445.00	4474008	3269-3442	Picciuto, Harry Edward; Clemmons, Megan Rene	2309 Bryan Ter	Clemmons NC 27012	RS40
6	5883-77-7650.00	4474007	3328-00316	Harkey, Michael E & Shirley A	2305 Bryan Ter	Clemmons NC 27012	RS40
7	5883-77-7751.00	4474006		Kruth, Patricia A	2655 Knob Hill Dr	Clemmons NC 27012	RS40
8	5883-77-7982.00	4474004B	1762-3431	Taber, Patricia A	2655 Knob Hill Dr	Clemmons NC 27012	RS40
9	5883-78-5107.00	4401016F	925-551	Caudle, Sam J & Paulette H	2797 Harper RD	Clemmons NC 27012	RS40
10	5883-78-0796.00	4401303	3383-2207	Tariq, Maimoona B	8990 CENTERGROVE PLACE DR	CLEMMONS NC 27012	RS40
11	5883-78-6744.00	4401025A	1724-4104	Pennington, John C & Melinda	PO BOX 1666	Clemmons NC 27012	RS40
12	5883-88-0925.00	4401024E	1724-4102	Pennington, John C & Melinda	PO BOX 1666	Clemmons NC 27012	RS40
13	5883-88-7815.00	4233Q000A	2351-3736	Shugart Enterprises LLC	221 Jonestown RD	Winston-Salem NC 27104	RM8-S
14	5883-88-8691.00	4233P000A	2344-4971	West Meadows Townhome HOA Inc	221 Jonestown RD	Winston-Salem NC 27104	RM8-S
15	5883-77-5428.00	4401311	2701-3680	Wrights, Kermit Olen & Jennifer Jones	2160 Wrights Lake Dr	Clemmons NC 27012	RS40
16	5883-87-8569.00	4401104B	2234-1225	Wrights, Allen L & Dorothy	2156 Lewisville Clemmons RD	Clemmons NC 27012	RS40
17	5883-87-5506.00	4401F012	1888-1167	Matuszak, Casimir J & Doris A	210 Village Haven CIR	Clemmons NC 27012	RS15
18	5883-87-5409.00	4401F011	1894-1303	Favara, Peter & Geraldine	PO BOX 785	CLEMMONS NC 27012	RS15
19	5883-87-5306.00	4401F010	2863-2522	McGladrigan, M Rae	190 Village Haven CIR	Clemmons NC 27012	RS15
20	5883-87-2117.00	4207620	3238-1481	GAHC3 Clemmons NC Alf LLC	18191 Von Karman AVE, STE 300	Irvine CA 92612	RM8-S
21	5883-86-1557.00	4207084T	1938-624	Craver, Roy A & Lucille S	1836 Courtney Huntsville Rd	Yadkinville NC 27055	IP-S
22	5883-76-7715.00	4207574	1296-617	Southern, Nancy C	3042 Harper RD	Clemmons NC 27012	RS20
23	5883-76-4823.00	4291032B	2587-846	Abalos, Gilbert; Matro, Liezell Klookie Anne	1200 S Peace Haven RD	Clemmons NC 27012	RS20

LOT LEGEND

Lot	Size	
1	0.18 AC +/-	7,737 SF +/-
2	0.18 AC +/-	7,961 SF +/-
3	0.19 AC +/-	8,453 SF +/-
4	0.21 AC +/-	8,970 SF +/-
5	0.27 AC +/-	11,697 SF +/-
6	0.20 AC +/-	8,512 SF +/-
7	0.20 AC +/-	8,904 SF +/-
8	0.17 AC +/-	7,557 SF +/-
9	0.27 AC +/-	11,660 SF +/-
10	0.14 AC +/-	6,305 SF +/-
11	0.15 AC +/-	6,444 SF +/-
12	0.16 AC +/-	6,997 SF +/-
13	0.42 AC +/-	18,079 SF +/-

PARKING LEGEND



TREE SAVE AREA LEGEND

New Development		Additions to Existing Development Phase 1 Area	
Total Site Size (in square feet)	927,180	Total Limits of Land Disturbance (in Square Feet)	

Total Site Area Excluded From TSA

Square Feet of Proposed R.O.W.s:	73,882	Square Feet of Existing Water Bodies and Stormwater Ponds:	0
Square Feet of Existing Utility Easements:	0	Total Excluded Area:	73,882

Minimum Tree Save Area Required:

Commercial, Institutional and Industrial (including Multifamily and Schools)		Residential - (Note: These requirements apply to major residential subdivisions not minor subdivisions or individual lot (s).)	
Size of Parcel:	Tree Save Area Required to Include:	Size of Parcel:	Tree Save Area Required to Include:
0 - 55,000 square feet	Eight percent (8%) of parcel area	0 - 55,000 square feet	Ten percent (10%) of parcel area
55,001 square feet - 5 acres	Nine percent (9%) of parcel area	55,001 square feet - 5 acres	Eleven percent (11%) of parcel area
5.01 - 10 acres	Ten percent (10%) of parcel area	5.01 - 10 acres	Twelve percent (12%) of parcel area
Greater than 10 acres	Twelve percent (12%) of parcel area	Greater than 10 acres	Fourteen percent (14%) of parcel area

Total Required Tree Save Area (in square feet)

927,180	-	73,882	X	0.12	=	102,396
Total Site Size / Limits of Land Disturbance		*Excluded Area*		*Minimum TSA*		*Total Required Tree Save Area*

Individual Tree Method Used:	Tree Stand Method Used:	New trees Used for TSA Credit:
Yes X No	X Yes No	Yes X No
Number of Trees 6-9"	List the Area of Each Tree Stand Being Saved:	Number of Large Variety Trees Planted
DBH: 0 X 500 SF = 0	Area 1: 128,898	Planted 0 X 750 SF = 0
Number of Trees 9.01-12"	Area 2:	
DBH: 0 X 750 SF = 0	Area 3:	
Number of Trees 12.01-24"	The tree stands contain a mix of evergreens and hardwoods, mainly oaks and maples. Trees are mature and healthy.	
DBH: 0 X 1800 SF = 0		
Number of Trees 24.01-36"		
DBH: 0 X 3000 SF = 0		
Number of Trees Larger Than 36.01"		
DBH: 0 X 4000 SF = 0		
Total Square Footage of Individual Trees Used to Satisfy Minimum TSA: 0	Tree Save Areas — Total Square Footage of Tree Stands Used to Satisfy Minimum TSA: 128,898	Canopy Trees Added — Total Square Footage of Individual Trees Used to Satisfy Minimum TSA: 0

Total Required TSA (in square feet)	102,396
Total TSA Provided (in square feet)	128,898

SITE DATA

Jurisdiction
Village of Clemmons, NC
Forsyth County, NC

Purpose Statement
The purpose of this request is to rezone from RS40 & RM8-S to RM18 to allow for the development of a senior retirement community.

Previous Docket
C-212

Zoning
Existing Zoning: RS40, RM8-S
Proposed Zoning: RM18

Proposed Uses
Residential Building, Single Family; Duplex; Townhouse; Twin Home; Multifamily; Congregate Care Facility, Life Care Community; Planned Residential Development; Swimming Pool, Private; Nursing Care Institution

Site Acreage
Total Site Acreage: 21.29 Acres +/-

Watershed Data
The site is located within the WS IV Yadkin River water supply watershed district.

Site Coverage

Maximum Impervious Area Permitted:		70.00 %
Building to Land:	2.32 Acres +/-	10.90 %
Pavement to Land:	4.09 Acres +/-	19.21 %
Open Space:	14.88 Acres +/-	69.89 %
Parcel Total:	21.29 Acres +/-	100.00 %
Total Impervious:	6.41 Acres +/-	30.11 %

(Excludes Single Family lots)

Infrastructure

Water	Public		
Sewer	Public & Private		
Road	Private	1,386	LF +/-

Building Setbacks

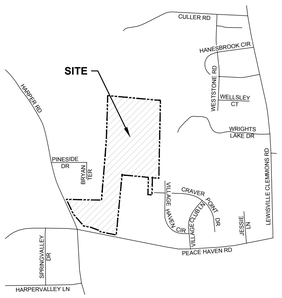
Front:	10' Minimum per PRD
Rear:	25' for Perimeter Lots
Front / Rear Facing Front:	30' Minimum
Rear Facing Rear:	30' Minimum
Front Facing Side:	14' Minimum
Side / Rear Facing Side:	14' Minimum

Bufferyards

Type Required:	50' Type III Thoroughfare Min. 15' Type II adjacent to RS40
Type Provided:	50' Type III Thoroughfare along Peace Haven Road 15' Type II adjacent to RS40 Volunteered 50' Type I adjacent to neighboring parcels 12, 15, 16

VICINITY MAP

SCALE: NOT TO SCALE



SITE DATA CONTINUED

Streetyards
Type Required: Minimum 10'
Type Provided: N/A

Common Open Space Calculations

Required Open Space (15%):	3.19 Acres +/-
Required Active Open Space:	0.48 Acres +/-

Open Space Provided

Thoroughfare Open Space:	0.79 Acres +/-
Passive Open Space:	2.31 Acres +/-
Active Open Space:	0.97 Acres +/-
Total Open Space Provided:	4.07 Acres +/-

Building Data
Max. Building Height: 60'

Building Unit Count

3/4 Split Story Apartments	165 Units +/-
Single Family Cottages:	11 Units +/-
Duplexes:	4 Units +/-
Overall Total Units:	180 Units +/-

Overall Density: 8.45 Units Per Acre

Parking Calculations
Vehicular Parking

Residential Building - Elderly Housing (0.75 spaces per unit)	
Parking Required:	125 Spaces
Parking Provided:	179 Spaces +/-
Residential Building - Single Family (2 spaces per unit)	
Parking Required:	22 Spaces
Parking Provided:	22 Spaces +/-
Residential Building - Duplex (2 spaces per unit)	
Parking Required:	8 Spaces
Parking Provided:	8 Spaces +/-
Total Parking Required:	155 Spaces +/-
Total Parking Provided:	209 Spaces +/-

NOTES

Topographic information from …
Digital WSFC planimetric data.

Boundary information from …
Digital WSFC GIS data.

General Notes
1. Architectural footprints may change per final architectural design. Modifications to the building footprint and any subsequent site layout modifications shall require review by Planning Staff.
2. Landscaping within buffers, streetyards, and parking lots are conceptual. Final landscape plans shall be required to meet ordinance requirements and any additional conditions as part of the zoning approval.
3. Option for sewer to be gravity line to Harper Road pump station if easement can be accquired from adjacent properties.
4. Proposed stormwater management devices, storm drainage, and utility layouts are schematic. Final layout may change per final engineered documents. Modifications to the proposed location of stormwater devices shall require review by Planning Staff.
5. Bearings and distances based on digital WSFC GIS tax parcel data.
6. All bufferyard plantings will preserve existing trees where feasible and supplement with new plantings.
7. Proposed Tree Save Areas may shift per final engineering & grading plans

THARRINGTON - CLEMMONS

OWNERS/PETITIONERS:

PIN#: 5883-88-1192.00
Deed Bk-Pg: 3148-2512
David V. Liner Revocable Trust
1078 Riverbend Drive
Advance, NC 27006

PIN#: 5883-77-6141.00
Deed Bk-Pg: 2990-3644
Larry B. Jarvis
2043 Harper Road
Clemmons, NC 27012

PIN#: 5883-77-8081.00
Deed Bk-Pg: 2541-2488
Peacehaven Development LLC
1321 Westbrook Plaza Drive
Suite 220
Winston-Salem, NC 27103

PIN#: 5883-77-6218.00
Deed Bk-Pg: 2005-4345
William E. Alexander
4605 Woodsman Way
Winston-Salem, NC 27103

stimmel
LANDSCAPE ARCHITECTURE CIVIL ENGINEERING LAND PLANNING
601 N. TRADE STREET, SUITE 200
WINSTON-SALEM, NC 27101
P: 336.723.1067 F: 336.723.1069
E: frontdesk@stimmelpa.com
www.stimmelpa.com

SEALS:
PRELIMINARY DRAWING
NOT APPROVED FOR CONSTRUCTION

PROJECT NAME & LOCATION:

Tharrington - Clemmons
CLEMMONS, NC

PLANS FOR:
- ☐ PRE-SUBMITTAL
- ☐ SUBMITTAL
- ☒ REVISED SUBMITTAL

CLIENT:
DENNIS THARRINGTON
MISSION DEVELOPMENT, LLC
430 S. WOODLAND ROAD
HENDERSON, NC 27536
(252) 436-9126
dennis@igbinc.com

REVISIONS:

07/09/18	Per Village Comments

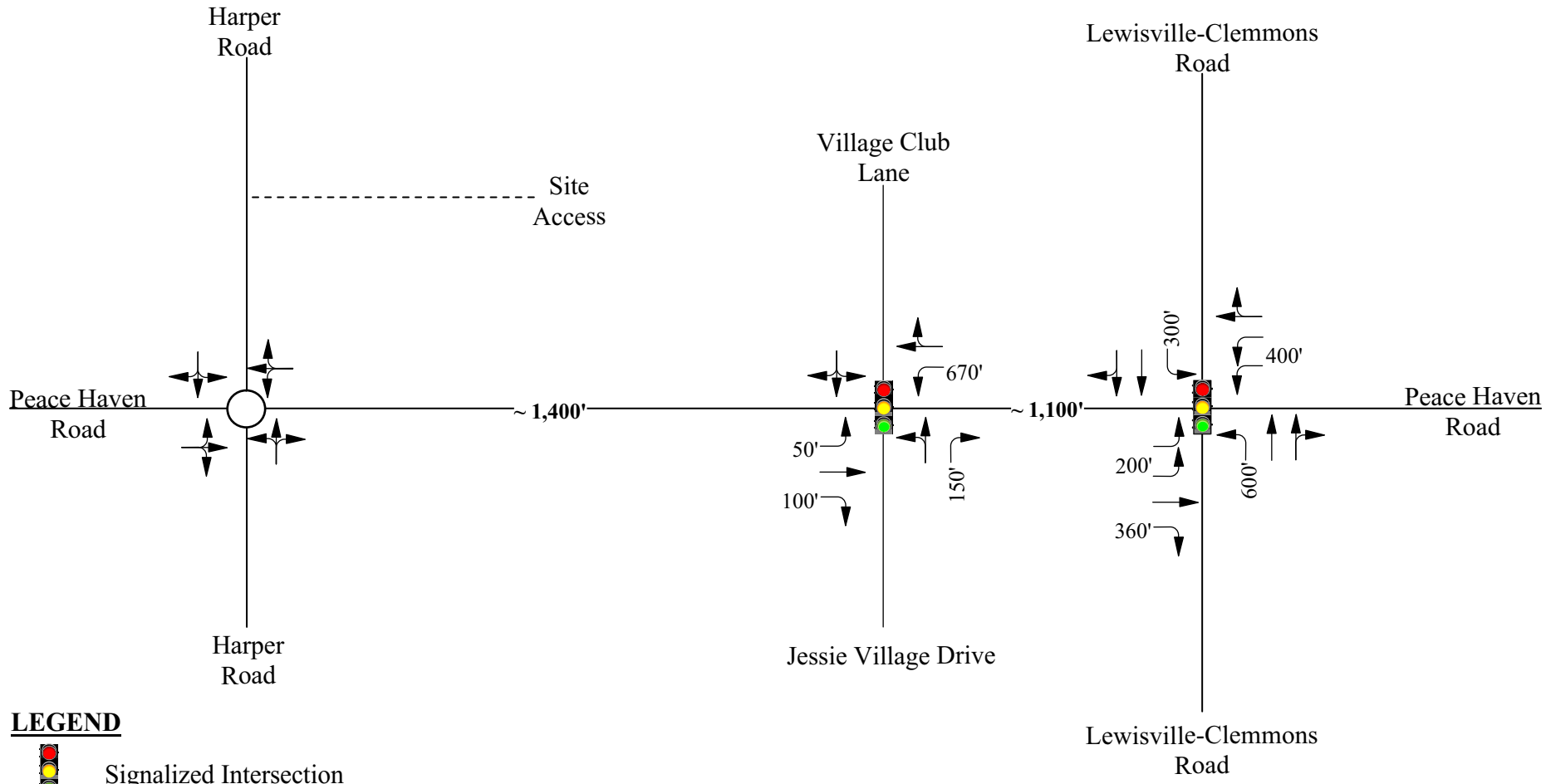
SUBMITTAL DATE:	06/07/18
PROJECT NO:	18-011
DRAWN BY:	WGH, BMR

© STIMMEL ASSOCIATES, P.A.

SHEET TITLE:
Rezoning Submittal

G-801

C:\CAD_Temp\AcPublish_14132\18-011 Rezoning.dwg - 24x36 07/09/18 11:28am



LEGEND

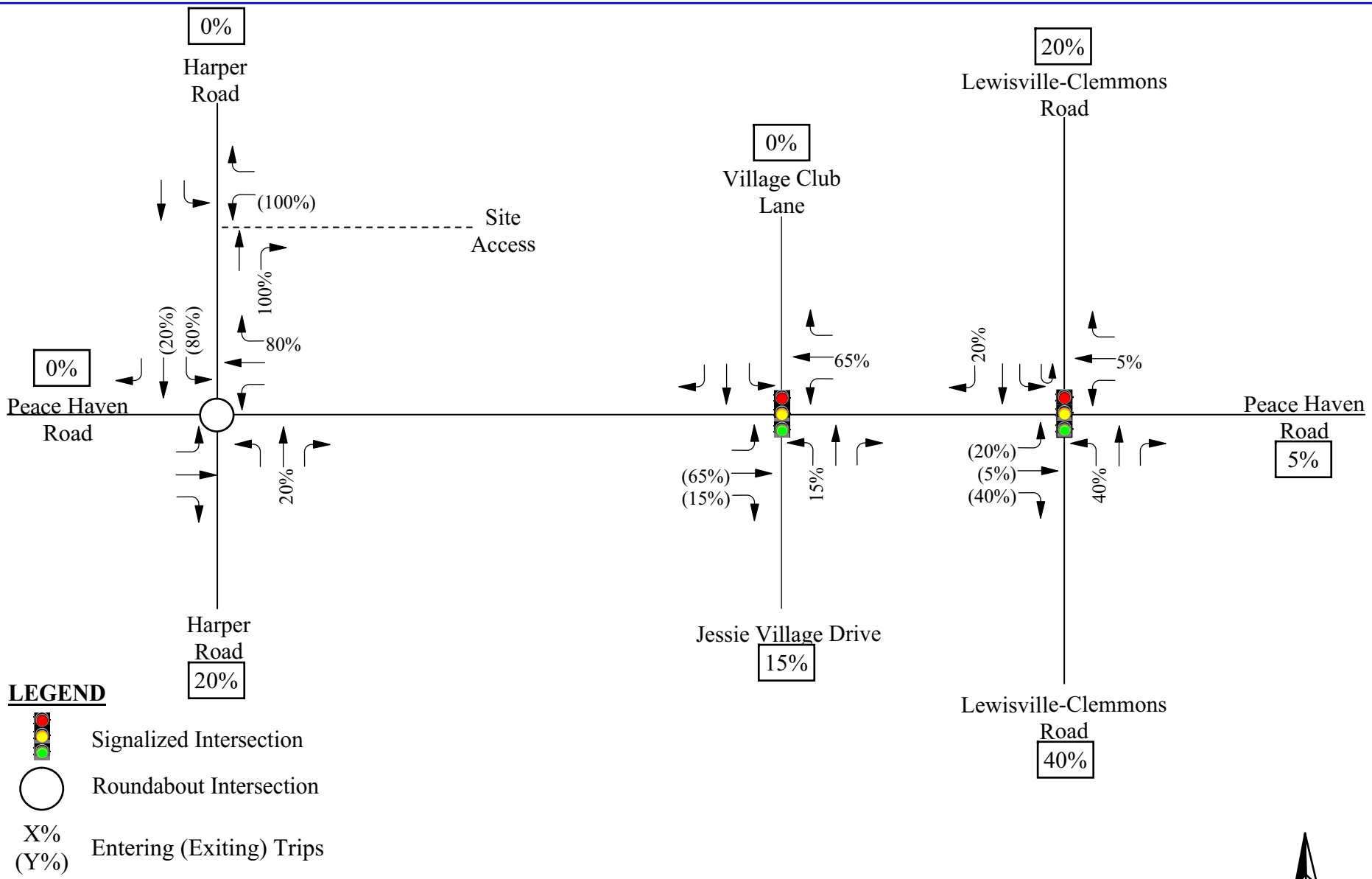
Signalized Intersection

Roundabout Intersection

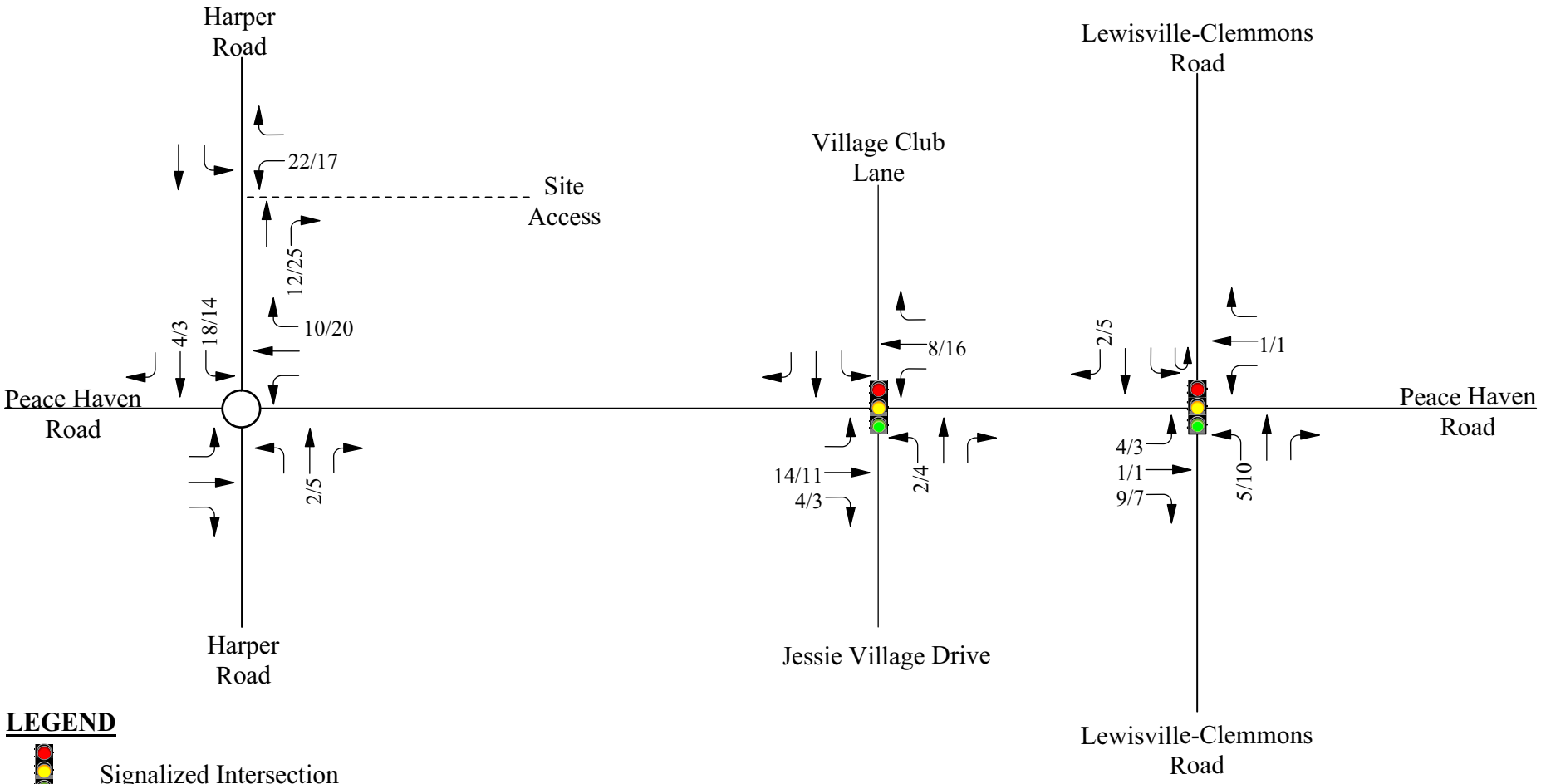
X' → Lane Configuration and Storage Lengths (in feet)

TWLTL Two-Way Left Turn Lane

RAMEY KEMP & ASSOCIATES TRANSPORTATION ENGINEERS	Tharrington Senior Retirement Community Clemmons, North Carolina	Existing Geometrics and Traffic Control	
		Scale: Not to Scale	Figure



RAMEY KEMP & ASSOCIATES TRANSPORTATION ENGINEERS	Tharrington Senior Retirement Community Clemmons, North Carolina	Trip Distribution
		Scale: Not to Scale / Figure



LEGEND

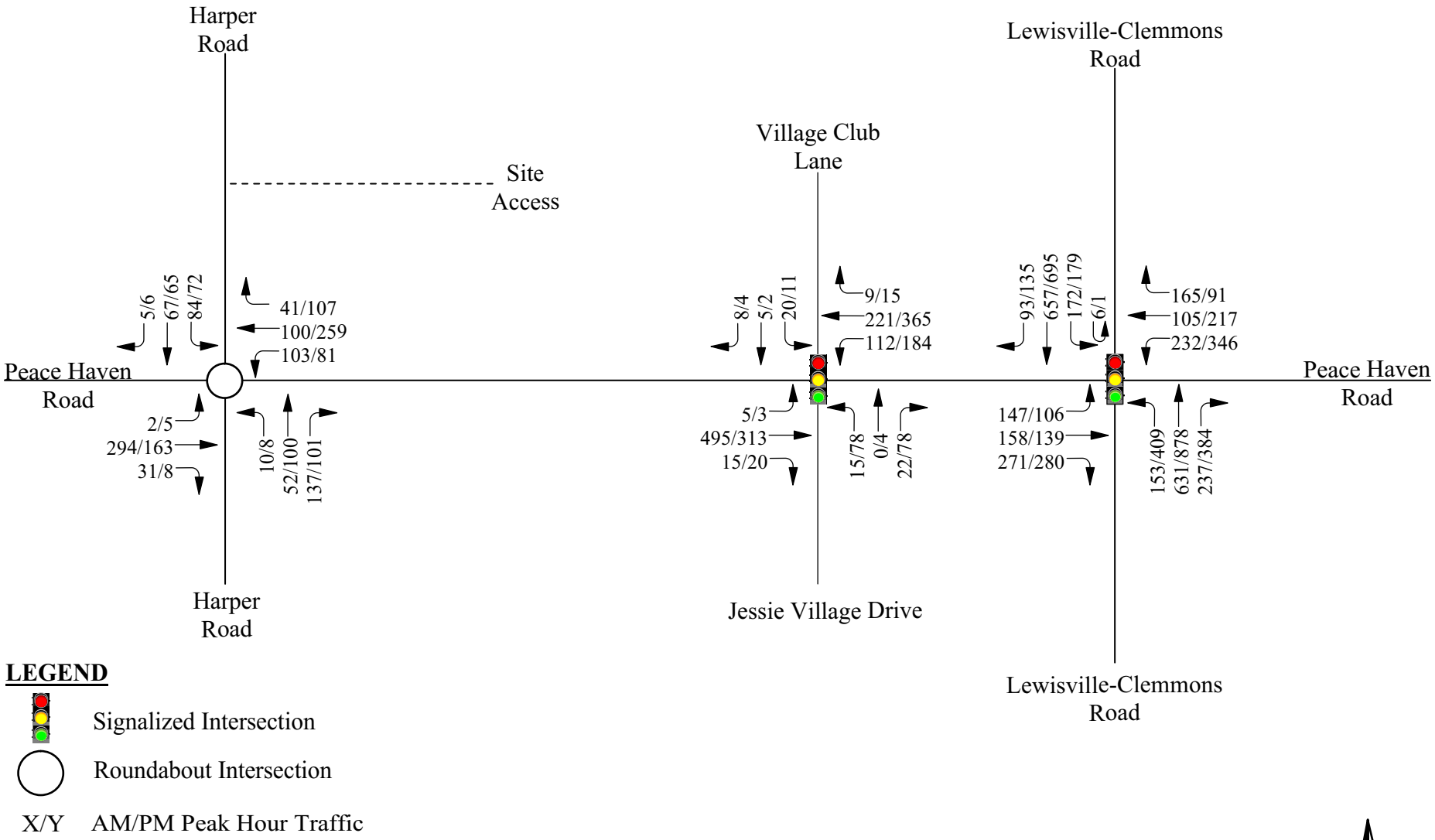
Signalized Intersection

Roundabout Intersection

X/Y AM/PM Peak Hour Site Traffic

RAMEY KEMP & ASSOCIATES TRANSPORTATION ENGINEERS	Tharrington Senior Retirement Community Clemmons, North Carolina	Total Site Trip Assignment
		Scale: Not to Scale / Figure

N



LEGEND

Signalized Intersection

Roundabout Intersection

X/Y AM/PM Peak Hour Traffic

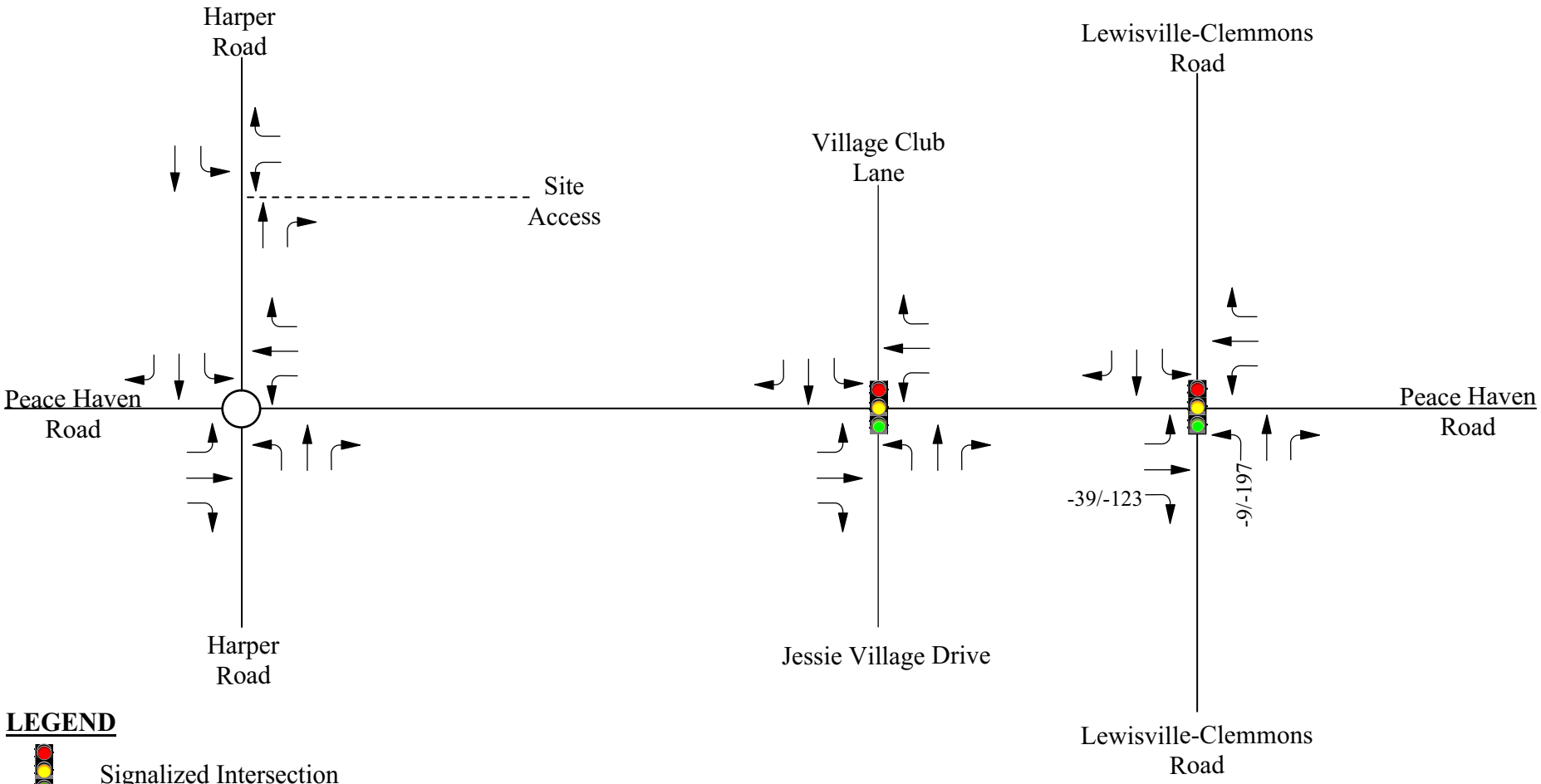
RAMEY KEMP & ASSOCIATES
TRANSPORTATION ENGINEERS

Tharrington Senior Retirement Community
Clemmons, North Carolina

Existing (2018) Traffic Volumes

Scale: Not to Scale

Figure



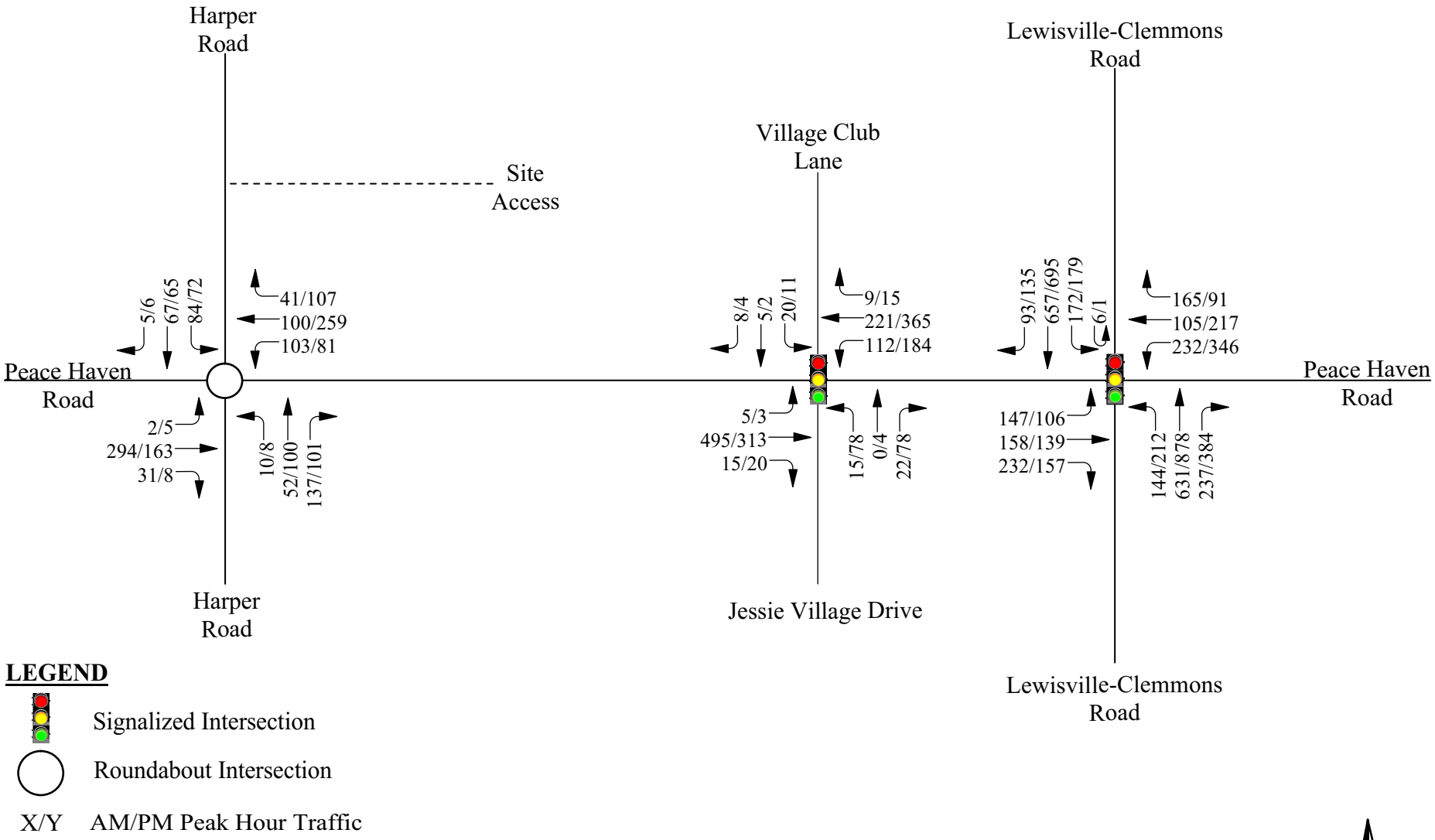
LEGEND

Signalized Intersection

Roundabout Intersection

X/Y AM/PM Peak Hour Traffic Adjustment

RAMEY KEMP & ASSOCIATES TRANSPORTATION ENGINEERS	Tharrington Senior Retirement Community Clemmons, North Carolina	Traffic Adjustments	
		Scale: Not to Scale	Figure



LEGEND

Signalized Intersection

Roundabout Intersection

X/Y AM/PM Peak Hour Traffic

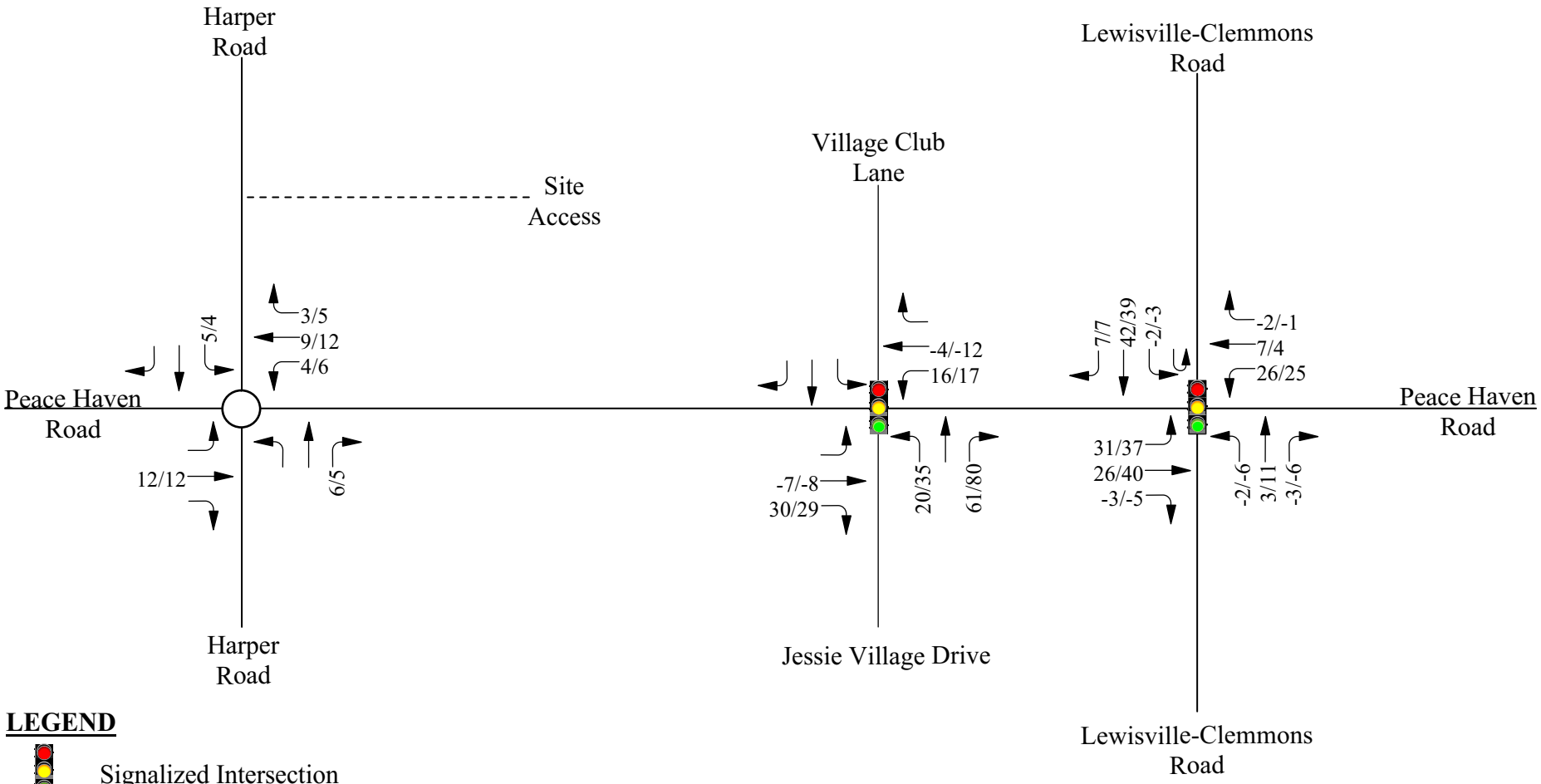
RAMEY KEMP & ASSOCIATES
TRANSPORTATION ENGINEERS

Tharrington Senior Retirement Community
Clemmons, North Carolina

Adjusted (2018) Traffic Volumes

Scale: Not to Scale

Figure



LEGEND

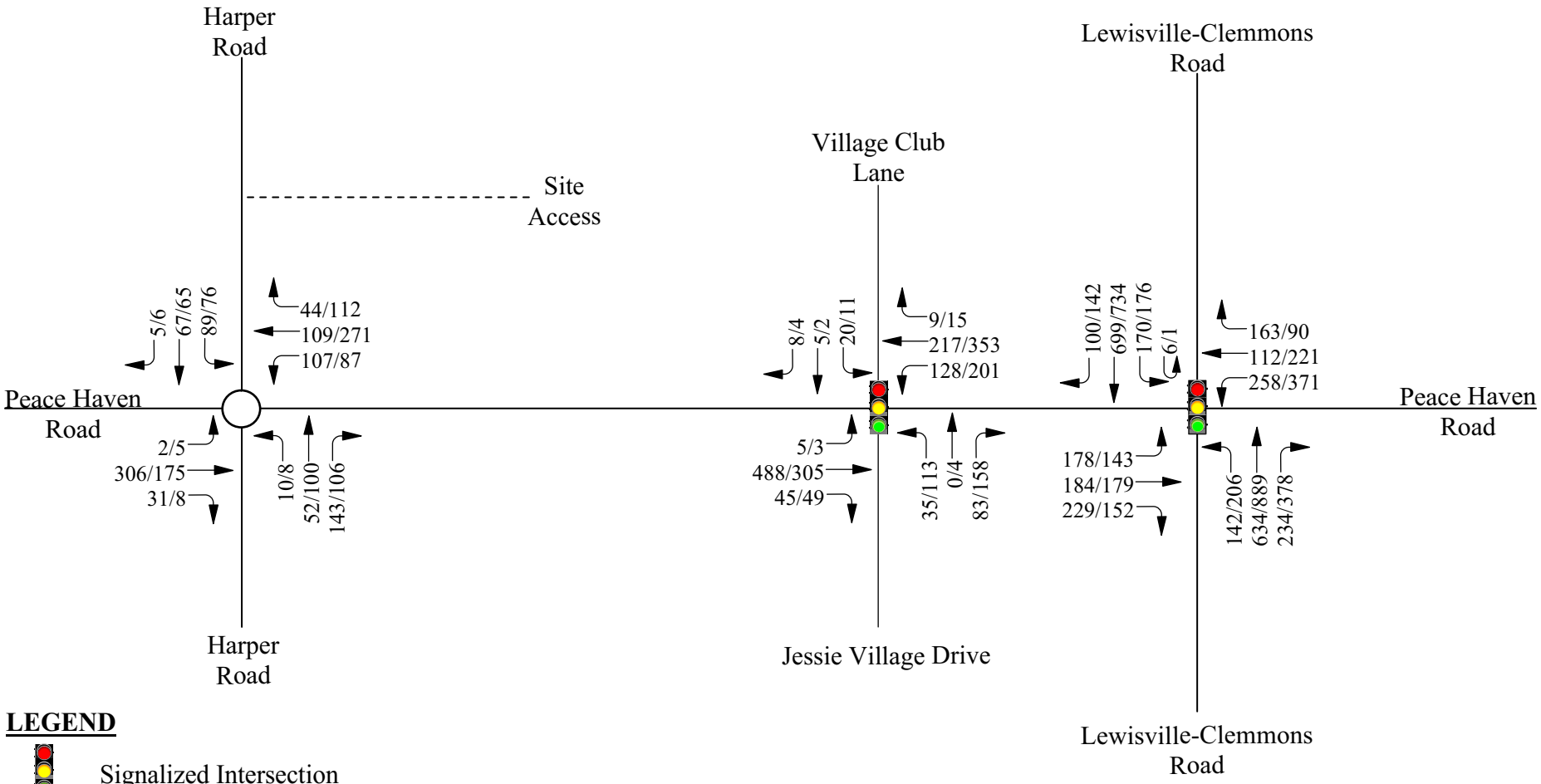
Signalized Intersection

Roundabout Intersection

X/Y AM/PM Peak Hour Traffic

RAMEY KEMP & ASSOCIATES TRANSPORTATION ENGINEERS	Tharrington Senior Retirement Community Clemmons, North Carolina	Approved Development Traffic Volumes
		Scale: Not to Scale / Figure

N



LEGEND

Signalized Intersection

Roundabout Intersection

X/Y AM/PM Peak Hour Traffic

RAMEY KEMP & ASSOCIATES
TRANSPORTATION ENGINEERS

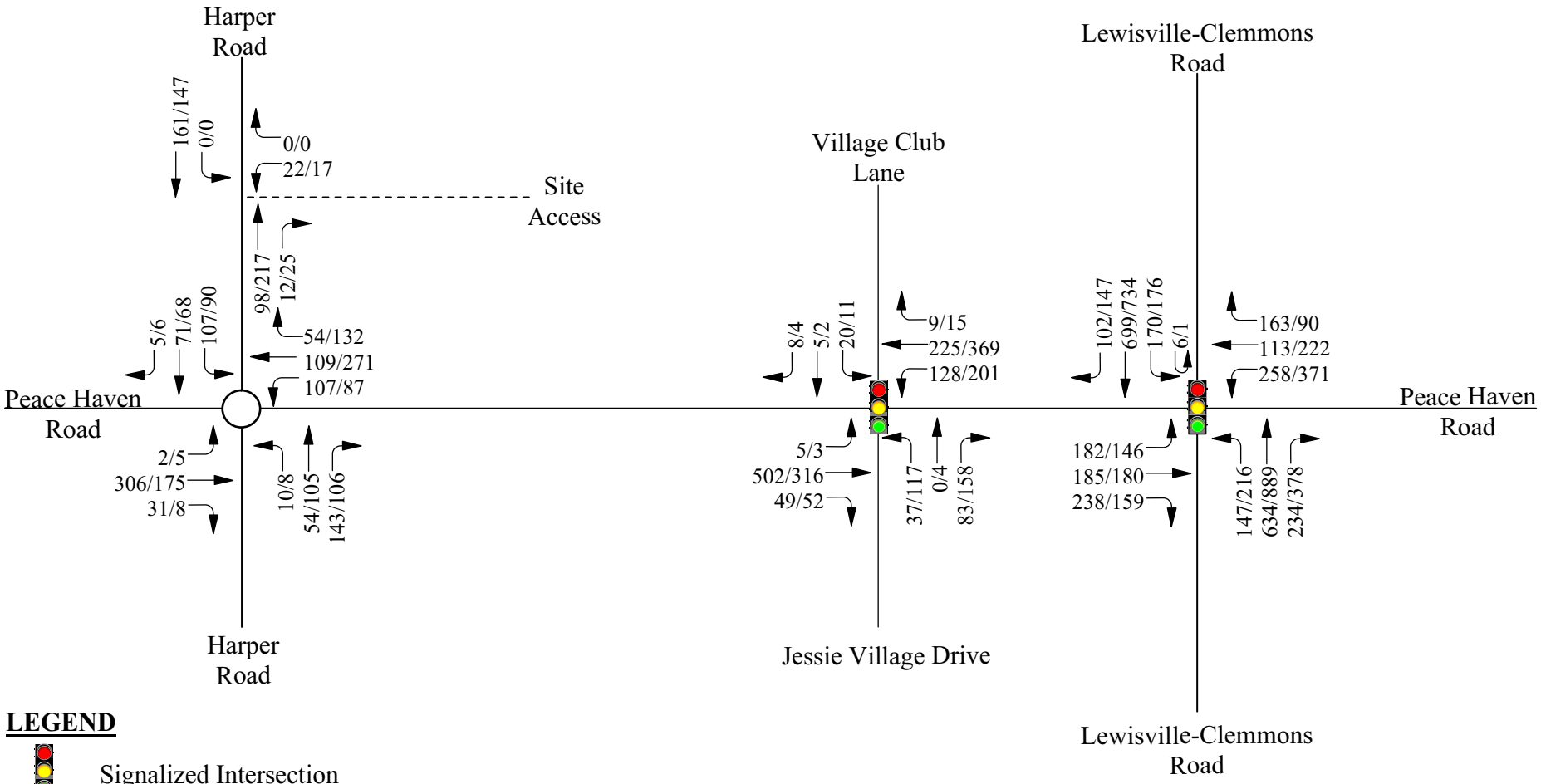
Tharrington Senior Retirement Community
Clemmons, North Carolina

No-Build' (2020) Traffic Volumes

Scale: Not to Scale

Figure

N



LEGEND

Signalized Intersection

Roundabout Intersection

X/Y AM/PM Peak Hour Traffic

RAMEY KEMP & ASSOCIATES
TRANSPORTATION ENGINEERS

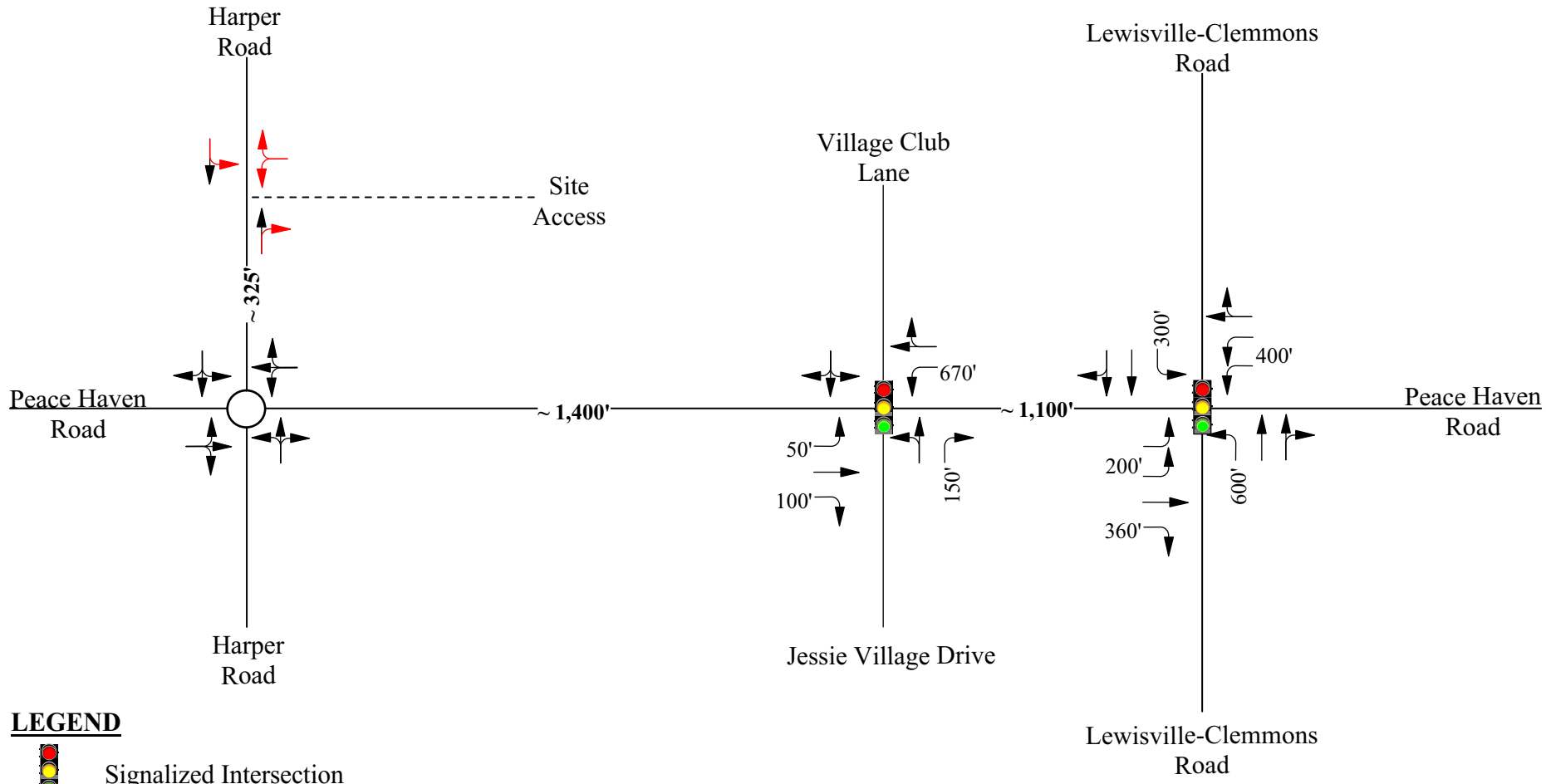
Tharrington Senior Retirement Community
Clemmons, North Carolina

Build (2020) Traffic Volumes

Scale: Not to Scale

Figure

N



LEGEND

Signalized Intersection

Roundabout Intersection

X' → Existing Lane Configuration and Storage Lengths (in feet)

X' → Recommended Lane Configuration and Storage Lengths (in feet)

TWLTL Two-Way Left Turn Lane

RAMEY KEMP & ASSOCIATES TRANSPORTATION ENGINEERS	Tharrington Senior Retirement Community Clemmons, North Carolina	Recommended Improvements	
		Scale: Not to Scale	Figure

N

TRAFFIC COUNT DATA

Burns Service Inc.

1202 Langdon Terrace Drive
Indian Trail, NC, 28079

We Count because YOU Count

File Name : Clemmons(Peace Haven and Harper) AM Peak
Site Code :
Start Date : 6/6/2018
Page No : 1

Groups Printed- Cars + - Trucks

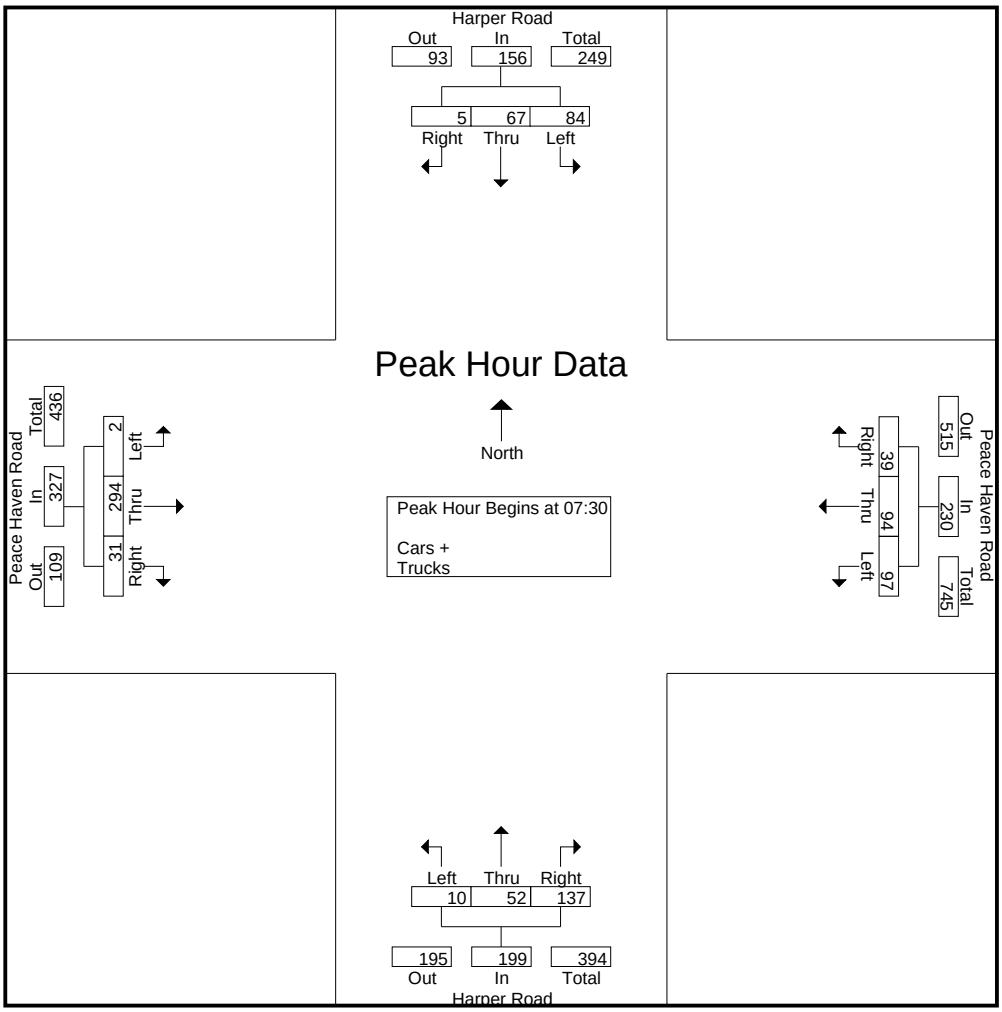
	Harper Road Southbound				Peace Haven Road Westbound				Harper Road Northbound				Peace Haven Road Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
07:00	0	19	21	40	5	20	13	38	14	3	3	20	2	63	2	67	165
07:15	0	19	15	34	4	18	33	55	17	10	1	28	12	63	1	76	193
07:30	3	13	28	44	9	13	43	65	42	14	4	60	15	57	1	73	242
07:45	1	21	24	46	8	23	25	56	39	15	2	56	8	71	1	80	238
Total	4	72	88	164	26	74	114	214	112	42	10	164	37	254	5	296	838
08:00	0	12	14	26	13	30	13	56	28	16	2	46	3	75	0	78	206
08:15	1	21	18	40	9	28	16	53	28	7	2	37	5	91	0	96	226
08:30	0	22	19	41	6	21	13	40	32	12	1	45	6	72	0	78	204
08:45	3	16	17	36	9	37	15	61	16	16	2	34	1	45	2	48	179
Total	4	71	68	143	37	116	57	210	104	51	7	162	15	283	2	300	815
Grand Total	8	143	156	307	63	190	171	424	216	93	17	326	52	537	7	596	1653
Apprch %	2.6	46.6	50.8		14.9	44.8	40.3		66.3	28.5	5.2		8.7	90.1	1.2		
Total %	0.5	8.7	9.4	18.6	3.8	11.5	10.3	25.7	13.1	5.6	1	19.7	3.1	32.5	0.4	36.1	
Cars +	8	142	156	306	63	190	171	424	215	93	17	325	52	537	7	596	1651
% Cars +	100	99.3	100	99.7	100	100	100	100	99.5	100	100	99.7	100	100	100	100	99.9
Trucks	0	1	0	1	0	0	0	0	1	0	0	1	0	0	0	0	2
% Trucks	0	0.7	0	0.3	0	0	0	0	0.5	0	0	0.3	0	0	0	0	0.1

Burns Service Inc.

1202 Langdon Terrace Drive
Indian Trail, NC, 28079
We Count because YOU Count

File Name : Clemmons(Peace Haven and Harper) AM Peak
Site Code :
Start Date : 6/6/2018
Page No : 2

	Harper Road Southbound				Peace Haven Road Westbound				Harper Road Northbound				Peace Haven Road Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30																	
07:30	3	13	28	44	9	13	43	65	**42**	14	**4**	**60**	**15**	57	**1**	73	**242**
07:45	1	**21**	24	**46**	8	23	25	56	39	15	2	56	8	71	1	80	238
08:00	0	12	14	26	**13**	**30**	13	56	28	**16**	2	46	3	75	0	78	206
08:15	1	21	18	40	9	28	16	53	28	7	2	37	5	**91**	0	**96**	226
Total Volume	5	67	84	156	39	94	97	230	137	52	10	199	31	294	2	327	912
% App. Total	3.2	42.9	53.8		17	40.9	42.2		68.8	26.1	5		9.5	89.9	0.6		
PHF	.417	.798	.750	.848	.750	.783	.564	.885	.815	.813	.625	.829	.517	.808	.500	.852	.942



Burns Service Inc.

1202 Langdon Terrace Drive
Indian Trail, NC, 28079

We Count because YOU Count

File Name : Clemmons(Peace Haven and Harper) PM Peak
Site Code :
Start Date : 6/6/2018
Page No : 1

Groups Printed- Cars + - Trucks

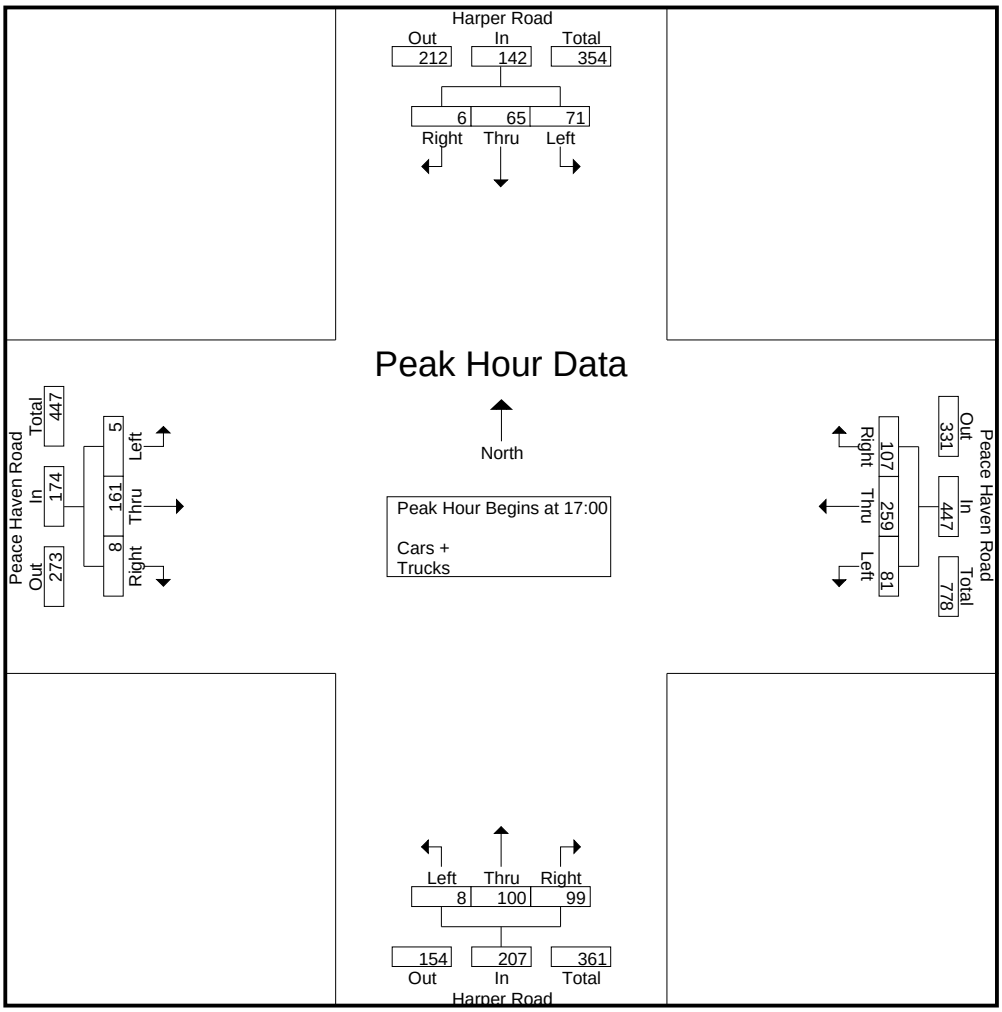
	Harper Road Southbound				Peace Haven Road Westbound				Harper Road Northbound				Peace Haven Road Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
16:00	3	9	15	27	24	54	14	92	11	23	1	35	4	44	3	51	205
16:15	0	8	13	21	17	58	9	84	18	14	5	37	2	49	0	51	193
16:30	3	23	17	43	24	55	21	100	19	21	1	41	1	35	1	37	221
16:45	0	13	18	31	22	49	13	84	21	20	4	45	1	47	1	49	209
Total	6	53	63	122	87	216	57	360	69	78	11	158	8	175	5	188	828
17:00	0	16	11	27	24	61	20	105	18	27	1	46	3	40	0	43	221
17:15	3	20	22	45	31	65	22	118	36	26	3	65	1	48	1	50	278
17:30	3	17	21	41	23	63	15	101	23	22	3	48	2	34	2	38	228
17:45	0	12	17	29	29	70	24	123	22	25	1	48	2	39	2	43	243
Total	6	65	71	142	107	259	81	447	99	100	8	207	8	161	5	174	970
Grand Total	12	118	134	264	194	475	138	807	168	178	19	365	16	336	10	362	1798
Apprch %	4.5	44.7	50.8		24	58.9	17.1		46	48.8	5.2		4.4	92.8	2.8		
Total %	0.7	6.6	7.5	14.7	10.8	26.4	7.7	44.9	9.3	9.9	1.1	20.3	0.9	18.7	0.6	20.1	
Cars +	12	116	134	262	194	475	138	807	167	178	19	364	16	335	10	361	1794
% Cars +	100	98.3	100	99.2	100	100	100	100	99.4	100	100	99.7	100	99.7	100	99.7	99.8
Trucks	0	2	0	2	0	0	0	0	1	0	0	1	0	1	0	1	4
% Trucks	0	1.7	0	0.8	0	0	0	0	0.6	0	0	0.3	0	0.3	0	0.3	0.2

Burns Service Inc.

1202 Langdon Terrace Drive
Indian Trail, NC, 28079
We Count because YOU Count

File Name : Clemmons(Peace Haven and Harper) PM Peak
Site Code :
Start Date : 6/6/2018
Page No : 2

	Harper Road Southbound				Peace Haven Road Westbound				Harper Road Northbound				Peace Haven Road Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 17:00																	
17:00	**0**	**16**	**11**	**27**	**24**	**61**	**20**	**105**	**18**	27	1	46	3	40	0	43	221
17:15	3	20	**22**	**45**	**31**	65	22	118	**36**	26	**3**	**65**	1	**48**	1	**50**	**278**
17:30	3	17	21	41	23	63	15	101	23	22	3	48	2	34	**2**	38	228
17:45	0	12	17	29	29	**70**	**24**	**123**	22	25	1	48	2	39	2	43	243
Total Volume	6	65	71	142	107	259	81	447	99	100	8	207	8	161	5	174	970
% App. Total	4.2	45.8	50		23.9	57.9	18.1		47.8	48.3	3.9		4.6	92.5	2.9		
PHF	.500	.813	.807	.789	.863	.925	.844	.909	.688	.926	.667	.796	.667	.839	.625	.870	.872



Burns Service Inc.

1202 Langdon Terrace Drive
Indian Trail, NC, 28079

We Count because YOU Count

File Name : Clemmons(Peace Haven and Village Club) AM Peak
Site Code :
Start Date : 6/6/2018
Page No : 1

Groups Printed- Cars + - Trucks

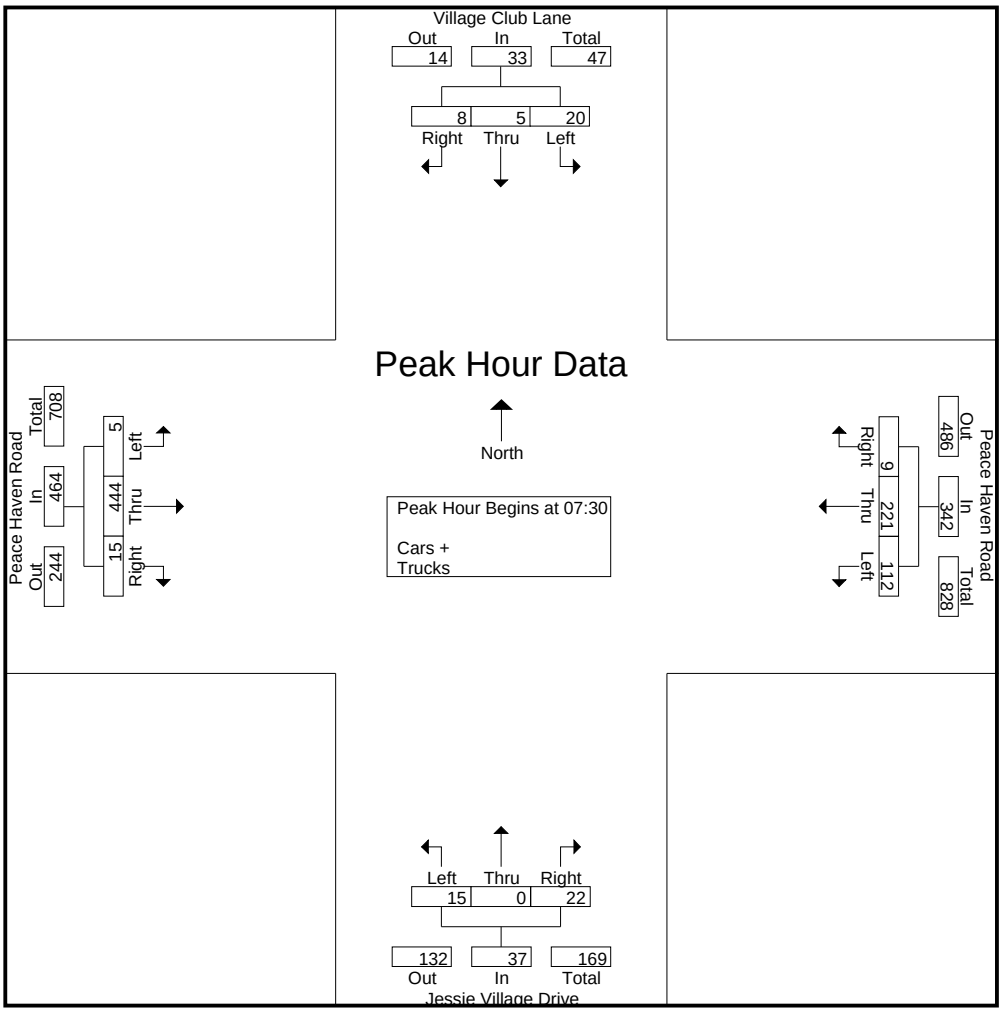
	Village Club Lane Southbound				Peace Haven Road Westbound				Jessie Village Drive Northbound				Peace Haven Road Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
07:00	0	1	4	5	4	34	15	53	9	0	7	16	1	97	0	98	172
07:15	1	2	3	6	3	48	15	66	4	0	3	7	2	89	0	91	170
07:30	4	1	5	10	2	63	18	83	7	0	2	9	6	122	1	129	231
07:45	1	0	6	7	3	59	26	88	2	0	4	6	3	117	0	120	221
Total	6	4	18	28	12	204	74	290	22	0	16	38	12	425	1	438	794
08:00	2	2	3	7	3	54	27	84	3	0	2	5	3	99	2	104	200
08:15	1	2	6	9	1	45	41	87	10	0	7	17	3	106	2	111	224
08:30	0	1	8	9	2	36	18	56	7	1	7	15	2	125	0	127	207
08:45	1	0	1	2	4	56	35	95	8	0	10	18	2	76	0	78	193
Total	4	5	18	27	10	191	121	322	28	1	26	55	10	406	4	420	824
Grand Total	10	9	36	55	22	395	195	612	50	1	42	93	22	831	5	858	1618
Apprch %	18.2	16.4	65.5		3.6	64.5	31.9		53.8	1.1	45.2		2.6	96.9	0.6		
Total %	0.6	0.6	2.2	3.4	1.4	24.4	12.1	37.8	3.1	0.1	2.6	5.7	1.4	51.4	0.3	53	
Cars +	9	9	36	54	22	387	191	600	49	1	41	91	22	820	5	847	1592
% Cars +	90	100	100	98.2	100	98	97.9	98	98	100	97.6	97.8	100	98.7	100	98.7	98.4
Trucks	1	0	0	1	0	8	4	12	1	0	1	2	0	11	0	11	26
% Trucks	10	0	0	1.8	0	2	2.1	2	2	0	2.4	2.2	0	1.3	0	1.3	1.6

Burns Service Inc.

1202 Langdon Terrace Drive
Indian Trail, NC, 28079
We Count because YOU Count

File Name : Clemmons(Peace Haven and Village Club) AM Peak
Site Code :
Start Date : 6/6/2018
Page No : 2

	Village Club Lane Southbound				Peace Haven Road Westbound				Jessie Village Drive Northbound				Peace Haven Road Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 07:00 to 08:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30																	
07:30	4	1	5	10	2	63	18	83	7	0	2	9	6	**122**	1	**129**	**231**
07:45	1	0	**6**	7	**3**	59	26	**88**	2	0	4	6	3	117	0	120	221
08:00	2	**2**	3	7	3	54	27	84	3	0	2	5	3	99	**2**	104	200
08:15	1	2	6	9	1	45	**41**	87	**10**	0	**7**	**17**	3	106	2	111	224
Total Volume	8	5	20	33	9	221	112	342	22	0	15	37	15	444	5	464	876
% App. Total	24.2	15.2	60.6		2.6	64.6	32.7		59.5	0	40.5		3.2	95.7	1.1		
PHF	.500	.625	.833	.825	.750	.877	.683	.972	.550	.000	.536	.544	.625	.910	.625	.899	.948



Burns Service Inc.

1202 Langdon Terrace Drive
Indian Trail, NC, 28079

We Count because YOU Count

File Name : Clemmons(Peace Haven and Village Club) PM Peak
Site Code :
Start Date : 6/10/2018
Page No : 1

Groups Printed- Cars + - Trucks

	Village Club Lane Southbound				Peace Haven Road Westbound				Jessie Village Drive Northbound				Peace Haven Road Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
16:00	0	1	2	3	5	76	25	106	9	1	14	24	5	73	1	79	212
16:15	0	0	0	0	3	66	24	93	11	2	20	33	10	63	2	75	201
16:30	1	0	2	3	1	86	36	123	15	1	10	26	6	72	0	78	230
16:45	1	0	2	3	0	76	40	116	9	1	18	28	7	75	1	83	230
Total	2	1	6	9	9	304	125	438	44	5	62	111	28	283	4	315	873
17:00	0	0	4	4	2	75	46	123	23	1	23	47	3	72	0	75	249
17:15	1	2	1	4	4	97	47	148	16	2	20	38	10	79	0	89	279
17:30	3	0	4	7	2	80	42	124	20	0	13	33	6	76	1	83	247
17:45	0	0	2	2	7	101	49	157	19	1	22	42	1	86	2	89	290
Total	4	2	11	17	15	353	184	552	78	4	78	160	20	313	3	336	1065
Grand Total	6	3	17	26	24	657	309	990	122	9	140	271	48	596	7	651	1938
Apprch %	23.1	11.5	65.4		2.4	66.4	31.2		45	3.3	51.7		7.4	91.6	1.1		
Total %	0.3	0.2	0.9	1.3	1.2	33.9	15.9	51.1	6.3	0.5	7.2	14	2.5	30.8	0.4	33.6	
Cars +	6	3	17	26	24	655	308	987	122	9	140	271	48	590	7	645	1929
% Cars +	100	100	100	100	100	99.7	99.7	99.7	100	100	100	100	100	99	100	99.1	99.5
Trucks	0	0	0	0	0	2	1	3	0	0	0	0	0	6	0	6	9
% Trucks	0	0	0	0	0	0.3	0.3	0.3	0	0	0	0	0	1	0	0.9	0.5

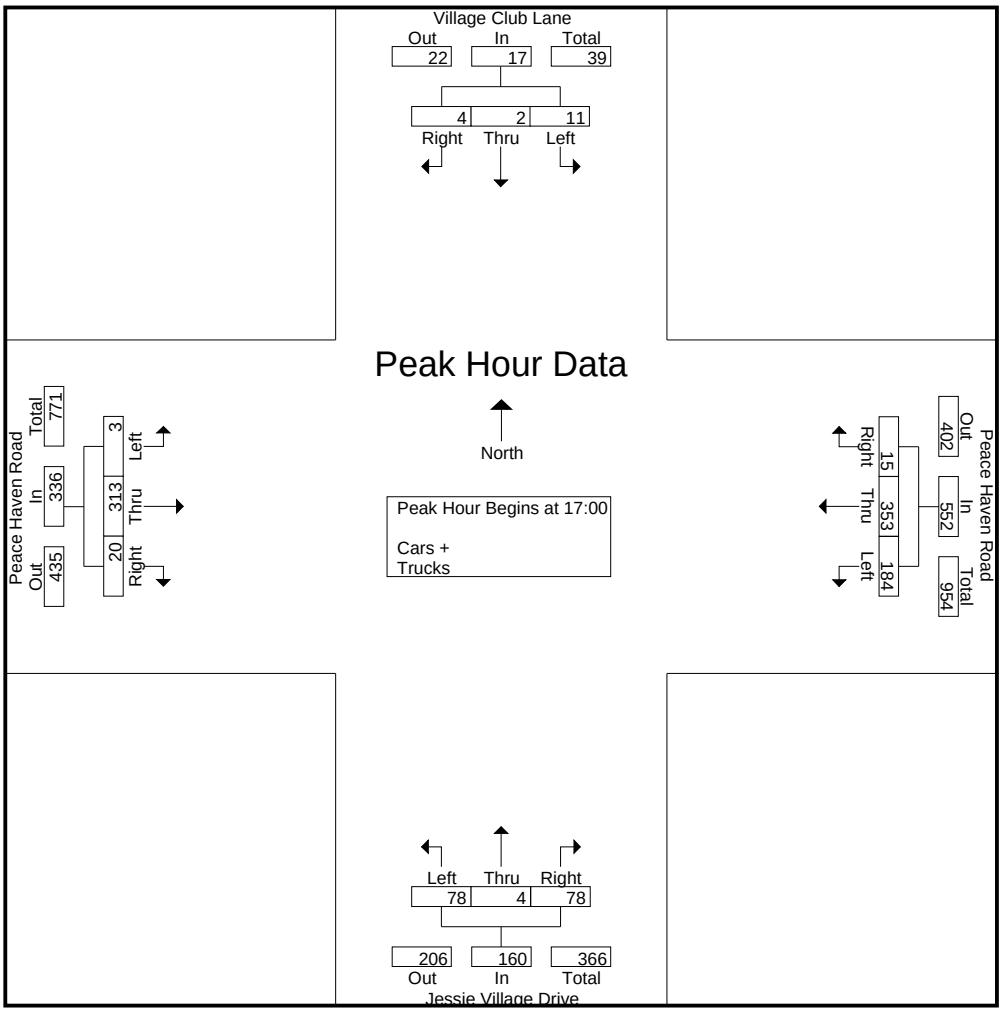
Burns Service Inc.

1202 Langdon Terrace Drive
Indian Trail, NC, 28079

We Count because YOU Count

File Name : Clemmons(Peace Haven and Village Club) PM Peak
Site Code :
Start Date : 6/10/2018
Page No : 2

	Village Club Lane Southbound				Peace Haven Road Westbound				Jessie Village Drive Northbound				Peace Haven Road Eastbound				
Start Time	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Right	Thru	Left	App. Total	Int. Total
Peak Hour Analysis From 16:00 to 17:45 - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 17:00																	
17:00	**0**	**0**	4	4	2	75	46	123	23	1	23	47	3	72	0	75	249
17:15	1	**2**	1	4	4	97	47	148	16	**2**	20	38	**10**	79	0	**89**	279
17:30	**3**	0	4	**7**	2	80	42	124	20	0	13	33	6	76	1	83	247
17:45	0	0	2	2	**7**	**101**	**49**	**157**	19	1	22	42	1	**86**	**2**	89	**290**
Total Volume	4	2	11	17	15	353	184	552	78	4	78	160	20	313	3	336	1065
% App. Total	23.5	11.8	64.7		2.7	63.9	33.3		48.8	2.5	48.8		6	93.2	0.9		
PHF	.333	.250	.688	.607	.536	.874	.939	.879	.848	.500	.848	.851	.500	.910	.375	.944	.918



Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

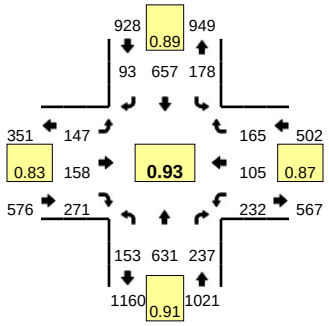
LOCATION: Lewisville-Clemmons Rd -- Peace Haven Rd

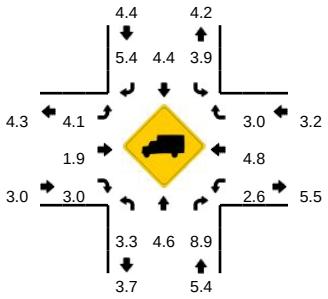
QC JOB #: 13356104

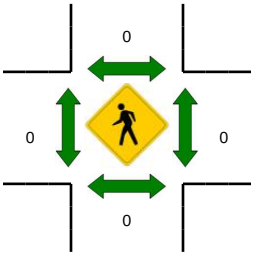
CITY/STATE: Clemmons, NC

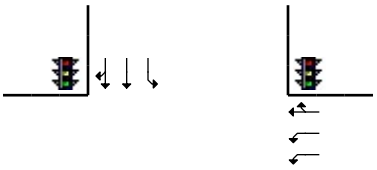
DATE: Thu, Apr 23 2015

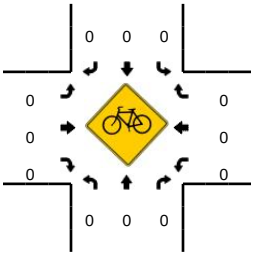
Peak-Hour: 7:45 AM -- 8:45 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

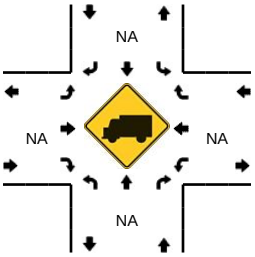


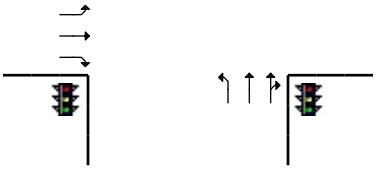


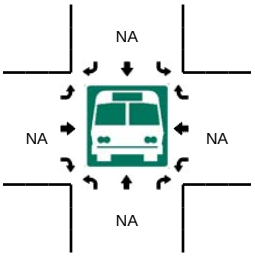












15-Min Count Period Beginning At	Lewisville-Clemmons Rd (Northbound)				Lewisville-Clemmons Rd (Southbound)				Peace Haven Rd (Eastbound)				Peace Haven Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	12	73	36	0	18	92	9	1	20	31	74	0	60	21	15	0	462	
7:15 AM	18	108	33	0	26	140	23	0	25	32	63	0	59	42	23	0	592	
7:30 AM	25	126	63	0	36	143	24	2	35	66	70	0	60	69	15	0	734	
7:45 AM	24	143	71	0	50	181	28	3	41	66	81	0	61	38	31	0	818	2606
8:00 AM	41	147	54	0	42	154	16	2	27	43	77	0	52	19	34	0	708	2852
8:15 AM	46	159	54	0	49	158	32	0	36	21	55	0	72	32	50	0	764	3024
8:30 AM	42	182	58	0	31	164	17	1	43	28	58	0	47	16	50	0	737	3027
8:45 AM	37	118	40	0	56	187	19	0	10	26	54	0	78	22	20	0	667	2876

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	96	572	284	0	200	724	112	12	164	264	324	0	244	152	124	0	3272
Heavy Trucks	0	24	28		12	36	8		0	4	8		0	8	8		136
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 4/28/2015 12:31 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Type of peak hour being reported: Intersection Peak

Method for determining peak hour: Total Entering Volume

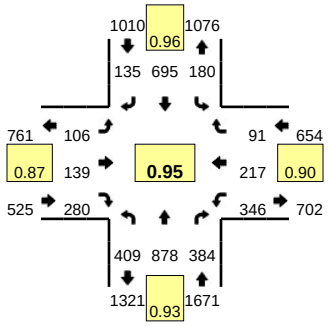
LOCATION: Lewisville-Clemmons Rd -- Peace Haven Rd

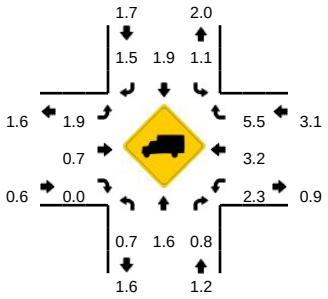
CITY/STATE: Clemmons, NC

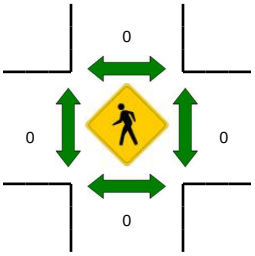
QC JOB #: 13356105

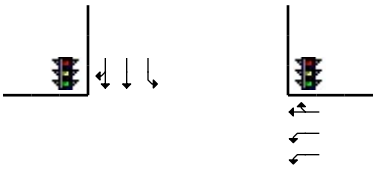
DATE: Thu, Apr 23 2015

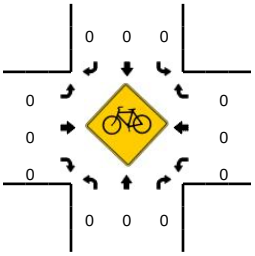
Peak-Hour: 5:00 PM -- 6:00 PM
Peak 15-Min: 5:15 PM -- 5:30 PM

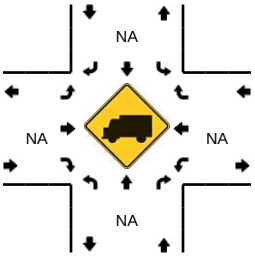


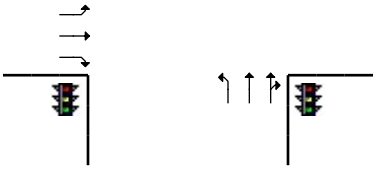


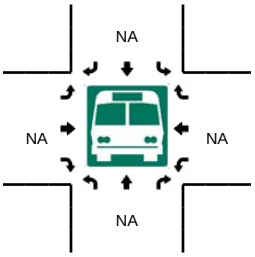












15-Min Count Period Beginning At	Lewisville-Clemmons Rd (Northbound)				Lewisville-Clemmons Rd (Southbound)				Peace Haven Rd (Eastbound)				Peace Haven Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	57	178	72	0	56	204	37	1	24	28	41	0	77	39	35	0	849	
4:15 PM	62	195	67	0	29	155	21	0	25	29	53	0	73	26	25	0	760	
4:30 PM	57	166	73	1	34	169	19	0	27	38	36	0	83	33	24	0	760	
4:45 PM	92	206	83	0	49	189	24	0	26	39	55	0	87	31	17	0	898	3267
5:00 PM	91	187	97	0	43	174	31	0	25	35	66	0	89	69	24	0	931	3349
5:15 PM	113	244	93	0	48	165	38	0	33	36	82	0	87	56	19	0	1014	3603
5:30 PM	101	218	101	0	54	163	32	1	23	44	63	0	84	59	26	0	969	3812
5:45 PM	104	229	93	0	34	193	34	0	25	24	69	0	86	33	22	0	946	3860

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	452	976	372	0	192	660	152	0	132	144	328	0	348	224	76	0	4056
Heavy Trucks	4	8	4		0	24	4		0	0	0		0	4	4		52
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Railroad																	
Stopped Buses																	

Comments:

Report generated on 4/28/2015 12:31 PM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

APPROVED DEVELOPMENT DATA

ITE Land Use (Code)	Independent Variable		Daily Traffic	AM Peak Hour		PM Peak Hour		Pass-By %		Pass-By Trips	
				Enter	Exit	Enter	Exit	AM	PM	AM	PM
Medical Office (720)	25.5	Th. Sq. Ft	828	61	30	42	66				
Retail (820)	21.24	Th. Sq. Ft	907	13	8	38	41		20%		8
Drive-In Bank (912)	2	Drive-In Lanes	279	11	7	33	34	29%	35%	3	12
High-Turnover (Sit-Down) Restaurant (932)	6.0	Th. Sq. Ft	763	36	29	35	24		43%		13
Fast-Food Restaurant with Drive-Thru (934)	3.15	Th. Sq. Ft	1,563	73	70	53	49	49%	50%	35	26
Sub-Total			9,019	194	144	201	214			***38***	***59***
Pass-By Trips (Midday Capped at 10%)				*38*	*38*	*59*	*59*			38	142
Primary (New) Trips				**156**	**106**	**142**	**155**			151	193

	Primary Trips										Pass-By Trips				Total Trips	
	Distribution				Site Trips				Primary Trips		AM PB %	AM PB Assign	PM PB %	PM PB Assign	Site Trips	
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM	PM					AM	PM
	Enter	Exit	Enter	Exit	Enter	Exit	Enter	Exit								
					156	106	142	155				38		59		
Lewisville-Clemmons Road & Peave Haven Road																
SBR	5%		5%		8		7		8	7	-3%	-1			7	7
SBT	25%		25%		39		36		39	36	9%	3	5%	3	42	39
SBL											-6%	-2	-5%	-3	-2	-3
SBU																
WBR											-5%	-2	-2%	-1	-2	-1
WBT	5%		5%		8		7		8	7	-3%	-1	-4%	-3	7	4
WBL	15%		15%		23		21		23	21	8%	3	6%	4	26	25
NBR											-8%	-3	-10%	-6	-3	-6
NBT		10%		10%		11		16	11	16	-21%	-8	-8%	-5	3	11
NBL											-5%	-2	-11%	-6	-2	-6
EBR											-9%	-3	-7%	-5	-3	-5
EBT		20%		20%		21		31	21	31	14%	5	15%	9	26	40
EBL		20%		20%		21		31	21	31	26%	10	10%	6	31	37
Peace Haven Road and Village Club Lane																
SBR																
SBT																
SBL																
WBR																
WBT											-11%	-4	-20%	-12	-4	-12
WBL	10%		10%		16		14		16	14			5%	3	16	17
NBR		40%		40%		42		62	42	62	50%	19	31%	18	61	80
NBT																
NBL		15%		15%		16		23	16	23	11%	4	20%	12	20	35
EBR	15%		15%		23		21		23	21	19%	7	15%	8	30	29
EBT											-19%	-7	-15%	-8	-7	-8
EBL																
Peace Haven Road & Harper Road																
SBR																
SBT																
SBL	3%		3%		5		4		5	4					5	4
WBR		3%		3%		3		5	3	5					3	5
WBT		8%		8%		9		12	9	12					9	12
WBL		4%		4%		4		6	4	6					4	6
NBR	4%		4%		6		5		6	5					6	5
NBT																
NBL																
EBR																
EBT	8%		8%		12		12		12	12					12	12
EBL																
Harper Road & Site Access																
SBT	3%		3%		5		4		5	4					5	4
SBL																
WBR																
WBL																
NBR																
NBT		3%		3%		3		5	3	5					3	5

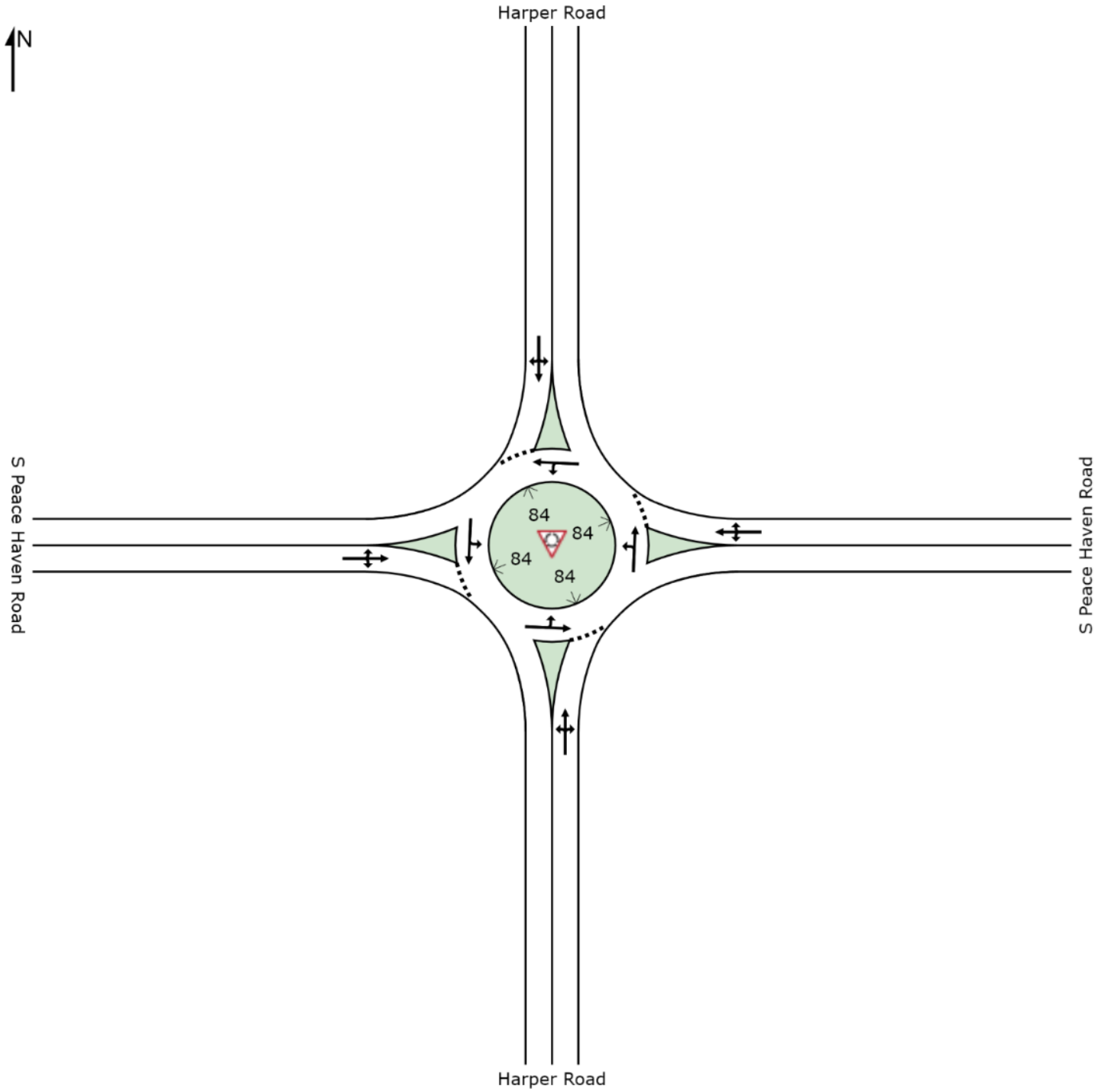
PEACE HAVEN ROAD
&
HARPER ROAD

SITE LAYOUT

Site: Existing 2018 AM

Harper Road and S Peace Haven Road

Roundabout



SIDRA INTERSECTION 6.1 | Copyright © 2000-2015 Akcelik and Associates Pty Ltd | sidrasolutions.com
Organisation: RAMEY KEMP & ASSOCIATES, INC. | Created: Monday, June 18, 2018 3:54:07 PM
Project: Not Saved

INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: Existing 2018 AM

Harper Road and S Peace Haven Road

Roundabout

Volume Display Method: Total and Veh

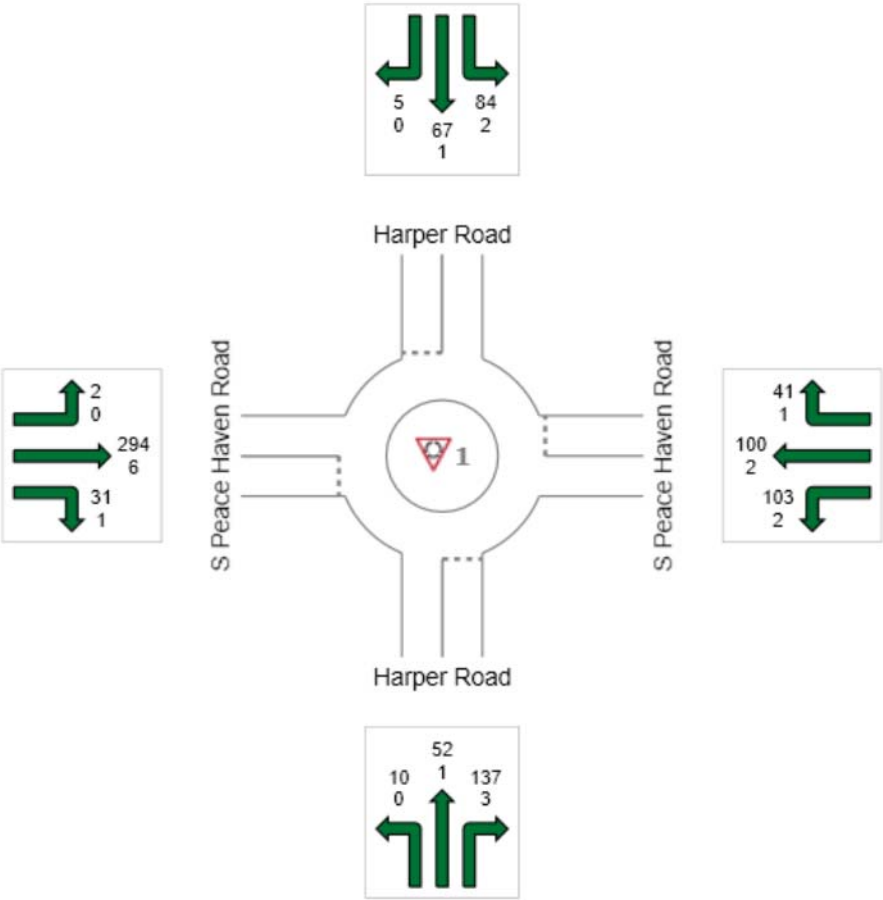
Volumes are shown for Movement Class(es): All Classes and Heavy Vehicles

Total Intersection Volumes (veh)

All Movement Classes: 926

Light Vehicles (LV): 907

Heavy Vehicles (HV): 19



MOVEMENT SUMMARY

Site: Existing 2018 AM

Harper Road and S Peace Haven Road

Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Harper Road											
3	L2	11	2.0	0.307	8.7	LOS A	1.2	31.0	0.54	0.52	32.5
8	T1	58	2.0	0.307	8.7	LOS A	1.2	31.0	0.54	0.52	34.9
18	R2	152	2.0	0.307	8.7	LOS A	1.2	31.0	0.54	0.52	31.6
Approach		221	2.0	0.307	8.7	LOS A	1.2	31.0	0.54	0.52	32.4
East: S Peace Haven Road											
1	L2	114	2.0	0.239	5.4	LOS A	1.0	25.6	0.20	0.10	32.7
6	T1	111	2.0	0.239	5.4	LOS A	1.0	25.6	0.20	0.10	30.7
16	R2	46	2.0	0.239	5.4	LOS A	1.0	25.6	0.20	0.10	32.0
Approach		271	2.0	0.239	5.4	LOS A	1.0	25.6	0.20	0.10	31.7
North: Harper Road											
7	L2	93	2.0	0.199	6.2	LOS A	0.8	19.4	0.38	0.29	32.6
4	T1	74	2.0	0.199	6.2	LOS A	0.8	19.4	0.38	0.29	34.9
14	R2	6	2.0	0.199	6.2	LOS A	0.8	19.4	0.38	0.29	31.7
Approach		173	2.0	0.199	6.2	LOS A	0.8	19.4	0.38	0.29	33.6
West: S Peace Haven Road											
5	L2	2	2.0	0.432	9.7	LOS A	2.1	52.2	0.52	0.45	31.7
2	T1	327	2.0	0.432	9.7	LOS A	2.1	52.2	0.52	0.45	29.8
12	R2	34	2.0	0.432	9.7	LOS A	2.1	52.2	0.52	0.45	31.1
Approach		363	2.0	0.432	9.7	LOS A	2.1	52.2	0.52	0.45	29.9
All Vehicles		1029	2.0	0.432	7.7	LOS A	2.1	52.2	0.41	0.34	31.5

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: Existing 2018 PM

Harper Road and S Peace Haven Road

Roundabout

Volume Display Method: Total and Veh

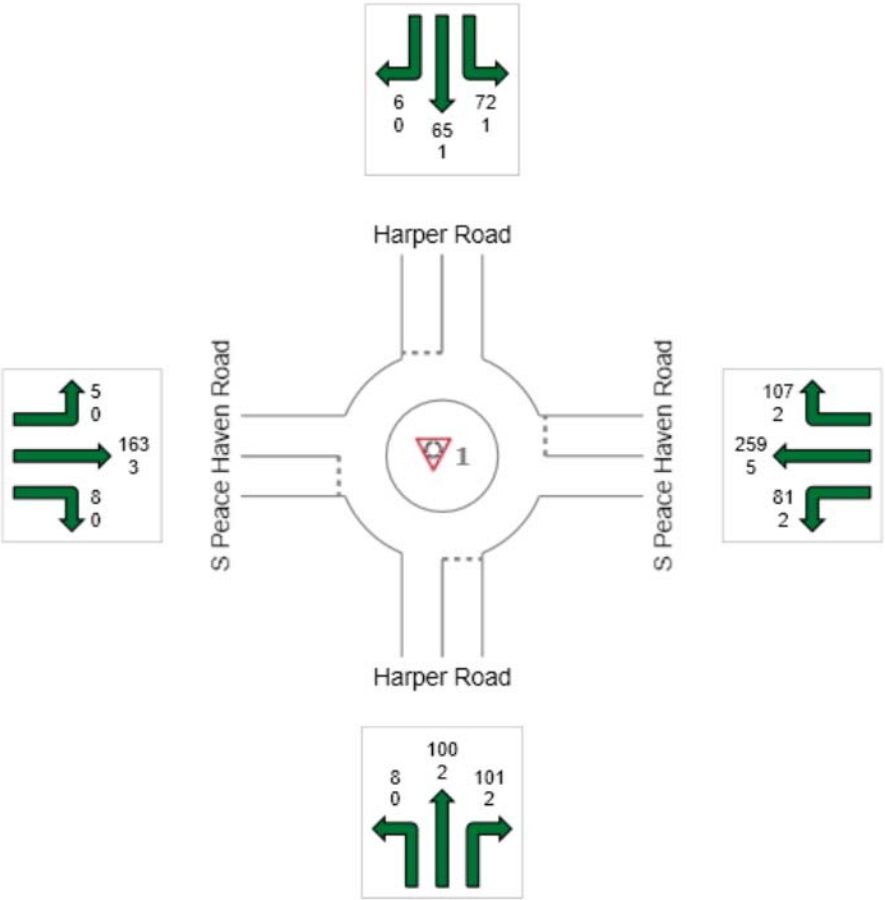
Volumes are shown for Movement Class(es): All Classes and Heavy Vehicles

Total Intersection Volumes (veh)

All Movement Classes: 975

Light Vehicles (LV): 956

Heavy Vehicles (HV): 20



MOVEMENT SUMMARY

Site: Existing 2018 PM

Harper Road and S Peace Haven Road

Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Harper Road											
3	L2	9	2.0	0.275	7.3	LOS A	1.1	28.5	0.43	0.35	33.3
8	T1	111	2.0	0.275	7.3	LOS A	1.1	28.5	0.43	0.35	35.8
18	R2	112	2.0	0.275	7.3	LOS A	1.1	28.5	0.43	0.35	32.3
Approach		232	2.0	0.275	7.3	LOS A	1.1	28.5	0.43	0.35	33.9
East: S Peace Haven Road											
1	L2	90	2.0	0.459	8.4	LOS A	2.5	63.8	0.36	0.23	31.8
6	T1	288	2.0	0.459	8.4	LOS A	2.5	63.8	0.36	0.23	29.9
16	R2	119	2.0	0.459	8.4	LOS A	2.5	63.8	0.36	0.23	31.2
Approach		497	2.0	0.459	8.4	LOS A	2.5	63.8	0.36	0.23	30.6
North: Harper Road											
7	L2	80	2.0	0.213	7.2	LOS A	0.8	20.2	0.48	0.44	32.2
4	T1	72	2.0	0.213	7.2	LOS A	0.8	20.2	0.48	0.44	34.5
14	R2	7	2.0	0.213	7.2	LOS A	0.8	20.2	0.48	0.44	31.3
Approach		159	2.0	0.213	7.2	LOS A	0.8	20.2	0.48	0.44	33.2
West: S Peace Haven Road											
5	L2	6	2.0	0.226	6.5	LOS A	0.9	22.5	0.40	0.31	33.1
2	T1	181	2.0	0.226	6.5	LOS A	0.9	22.5	0.40	0.31	31.0
12	R2	9	2.0	0.226	6.5	LOS A	0.9	22.5	0.40	0.31	32.5
Approach		196	2.0	0.226	6.5	LOS A	0.9	22.5	0.40	0.31	31.2
All Vehicles		1083	2.0	0.459	7.6	LOS A	2.5	63.8	0.40	0.30	31.7

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: No-Build 2020 AM

Harper Road and S Peace Haven Road

Roundabout

Volume Display Method: Separate

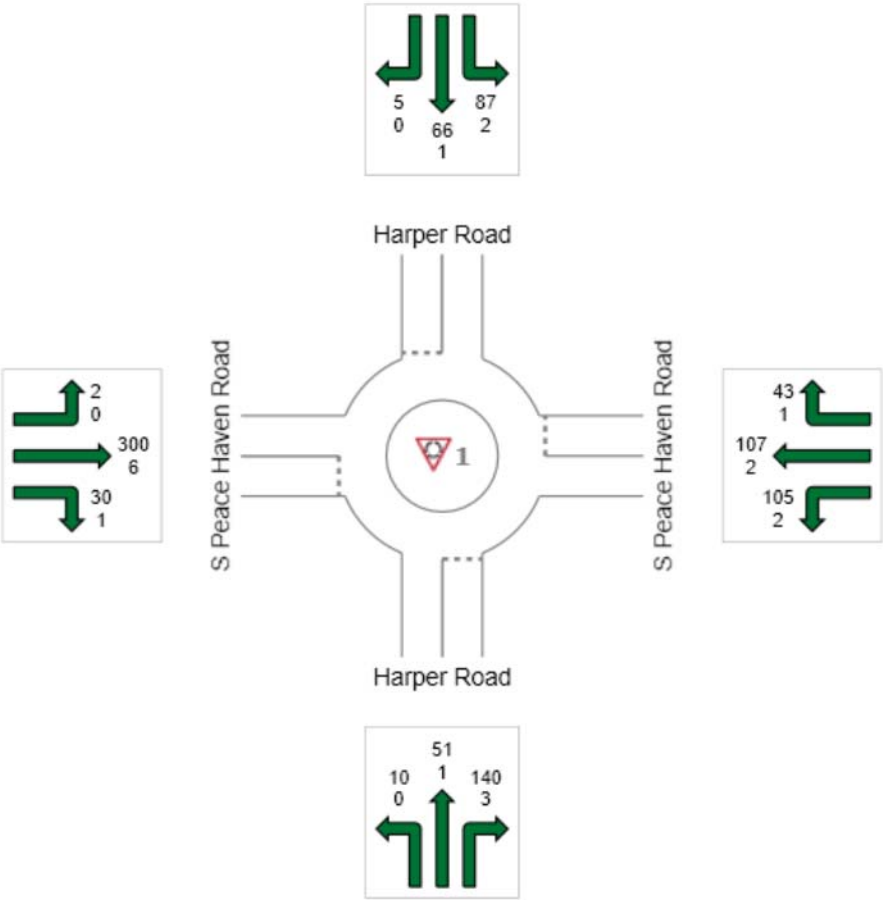
Volumes are shown for Movement Class(es): Light Vehicles and Heavy Vehicles

Total Intersection Volumes (veh)

All Movement Classes: 965

Light Vehicles (LV): 946

Heavy Vehicles (HV): 19



MOVEMENT SUMMARY

Site: No-Build 2020 AM

Harper Road and S Peace Haven Road

Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Harper Road											
3	L2	11	2.0	0.322	9.1	LOS A	1.3	32.7	0.55	0.54	32.3
8	T1	58	2.0	0.322	9.1	LOS A	1.3	32.7	0.55	0.54	34.7
18	R2	159	2.0	0.322	9.1	LOS A	1.3	32.7	0.55	0.54	31.4
Approach		228	2.0	0.322	9.1	LOS A	1.3	32.7	0.55	0.54	32.2
East: S Peace Haven Road											
1	L2	119	2.0	0.253	5.5	LOS A	1.1	27.6	0.20	0.10	32.6
6	T1	121	2.0	0.253	5.5	LOS A	1.1	27.6	0.20	0.10	30.6
16	R2	49	2.0	0.253	5.5	LOS A	1.1	27.6	0.20	0.10	32.0
Approach		289	2.0	0.253	5.5	LOS A	1.1	27.6	0.20	0.10	31.7
North: Harper Road											
7	L2	99	2.0	0.209	6.3	LOS A	0.8	20.4	0.40	0.31	32.5
4	T1	74	2.0	0.209	6.3	LOS A	0.8	20.4	0.40	0.31	34.8
14	R2	6	2.0	0.209	6.3	LOS A	0.8	20.4	0.40	0.31	31.6
Approach		179	2.0	0.209	6.3	LOS A	0.8	20.4	0.40	0.31	33.4
West: S Peace Haven Road											
5	L2	2	2.0	0.453	10.1	LOS B	2.2	56.7	0.54	0.48	31.5
2	T1	340	2.0	0.453	10.1	LOS B	2.2	56.7	0.54	0.48	29.6
12	R2	34	2.0	0.453	10.1	LOS B	2.2	56.7	0.54	0.48	30.9
Approach		377	2.0	0.453	10.1	LOS B	2.2	56.7	0.54	0.48	29.7
All Vehicles		1072	2.0	0.453	8.0	LOS A	2.2	56.7	0.43	0.36	31.3

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: No-Build 2020 PM

Harper Road and S Peace Haven Road

Roundabout

Volume Display Method: Separate

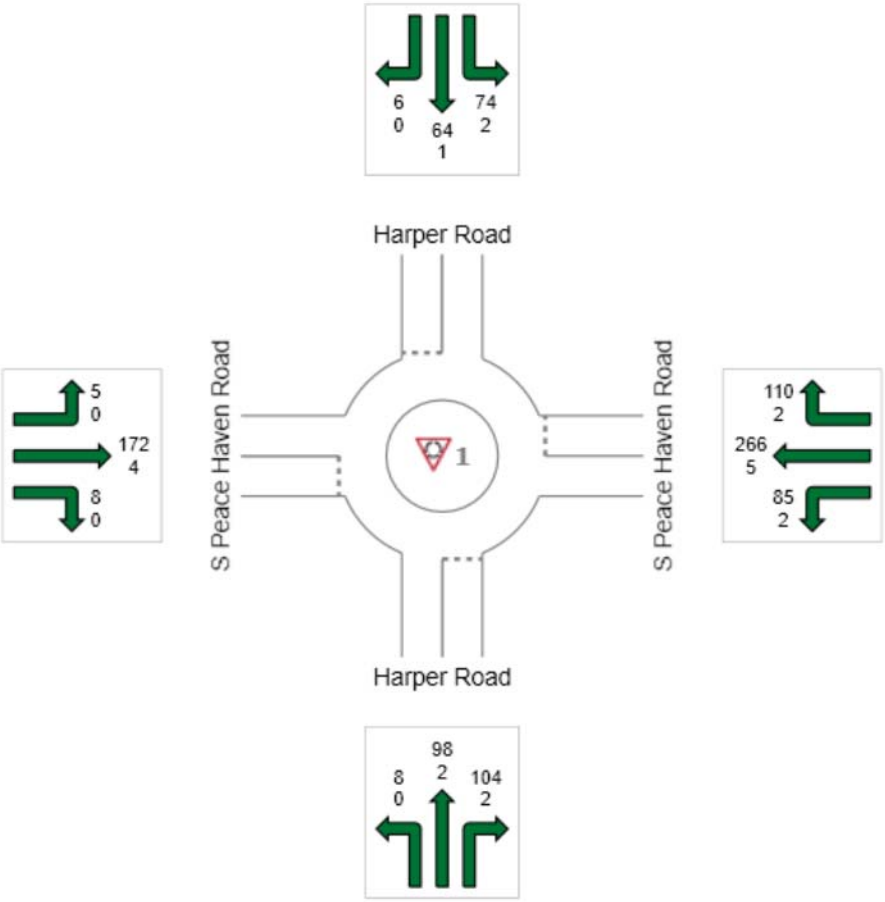
Volumes are shown for Movement Class(es): Light Vehicles and Heavy Vehicles

Total Intersection Volumes (veh)

All Movement Classes: 1019

Light Vehicles (LV): 999

Heavy Vehicles (HV): 20



MOVEMENT SUMMARY

Site: No-Build 2020 PM

Harper Road and S Peace Haven Road

Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Harper Road											
3	L2	9	2.0	0.287	7.5	LOS A	1.2	29.9	0.45	0.38	33.2
8	T1	111	2.0	0.287	7.5	LOS A	1.2	29.9	0.45	0.38	35.6
18	R2	118	2.0	0.287	7.5	LOS A	1.2	29.9	0.45	0.38	32.2
Approach		238	2.0	0.287	7.5	LOS A	1.2	29.9	0.45	0.38	33.7
East: S Peace Haven Road											
1	L2	97	2.0	0.480	8.7	LOS A	2.7	68.9	0.37	0.24	31.7
6	T1	301	2.0	0.480	8.7	LOS A	2.7	68.9	0.37	0.24	29.8
16	R2	124	2.0	0.480	8.7	LOS A	2.7	68.9	0.37	0.24	31.1
Approach		522	2.0	0.480	8.7	LOS A	2.7	68.9	0.37	0.24	30.4
North: Harper Road											
7	L2	84	2.0	0.223	7.4	LOS A	0.8	21.2	0.49	0.46	32.1
4	T1	72	2.0	0.223	7.4	LOS A	0.8	21.2	0.49	0.46	34.3
14	R2	7	2.0	0.223	7.4	LOS A	0.8	21.2	0.49	0.46	31.2
Approach		163	2.0	0.223	7.4	LOS A	0.8	21.2	0.49	0.46	33.0
West: S Peace Haven Road											
5	L2	6	2.0	0.244	6.8	LOS A	1.0	24.7	0.41	0.33	33.0
2	T1	194	2.0	0.244	6.8	LOS A	1.0	24.7	0.41	0.33	30.9
12	R2	9	2.0	0.244	6.8	LOS A	1.0	24.7	0.41	0.33	32.3
Approach		209	2.0	0.244	6.8	LOS A	1.0	24.7	0.41	0.33	31.0
All Vehicles		1132	2.0	0.480	7.9	LOS A	2.7	68.9	0.41	0.31	31.5

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: Build 2020 AM

Harper Road and S Peace Haven Road

Roundabout

Volume Display Method: Separate

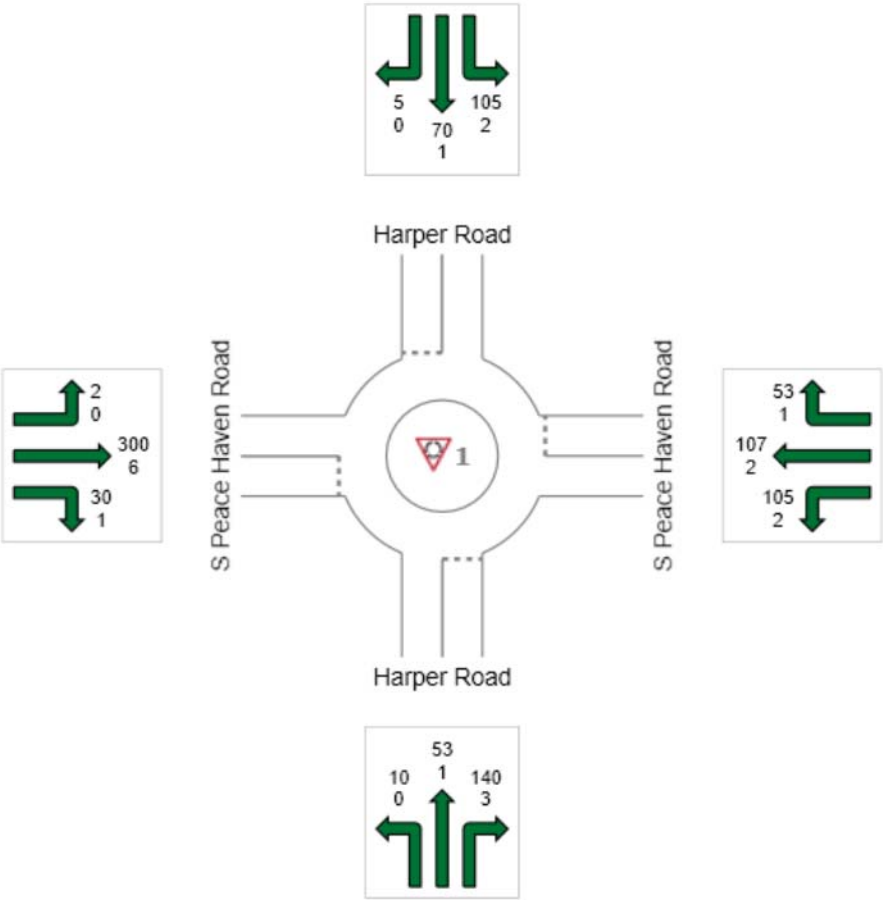
Volumes are shown for Movement Class(es): Light Vehicles and Heavy Vehicles

Total Intersection Volumes (veh)

All Movement Classes: 999

Light Vehicles (LV): 979

Heavy Vehicles (HV): 20



MOVEMENT SUMMARY

Site: Build 2020 AM

Harper Road and S Peace Haven Road

Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Harper Road											
3	L2	11	2.0	0.332	9.4	LOS A	1.3	33.7	0.56	0.56	32.2
8	T1	60	2.0	0.332	9.4	LOS A	1.3	33.7	0.56	0.56	32.1
18	R2	159	2.0	0.332	9.4	LOS A	1.3	33.7	0.56	0.56	31.2
Approach		230	2.0	0.332	9.4	LOS A	1.3	33.7	0.56	0.56	31.5
East: S Peace Haven Road											
1	L2	119	2.0	0.263	5.6	LOS A	1.1	29.0	0.21	0.10	32.6
6	T1	121	2.0	0.263	5.6	LOS A	1.1	29.0	0.21	0.10	32.8
16	R2	60	2.0	0.263	5.6	LOS A	1.1	29.0	0.21	0.10	32.0
Approach		300	2.0	0.263	5.6	LOS A	1.1	29.0	0.21	0.10	32.6
North: Harper Road											
7	L2	119	2.0	0.237	6.7	LOS A	0.9	23.8	0.41	0.32	32.3
4	T1	79	2.0	0.237	6.7	LOS A	0.9	23.8	0.41	0.32	32.2
14	R2	6	2.0	0.237	6.7	LOS A	0.9	23.8	0.41	0.32	31.4
Approach		203	2.0	0.237	6.7	LOS A	0.9	23.8	0.41	0.32	32.2
West: S Peace Haven Road											
5	L2	2	2.0	0.467	10.6	LOS B	2.4	60.4	0.56	0.53	31.3
2	T1	340	2.0	0.467	10.6	LOS B	2.4	60.4	0.56	0.53	31.4
12	R2	34	2.0	0.467	10.6	LOS B	2.4	60.4	0.56	0.53	30.7
Approach		377	2.0	0.467	10.6	LOS B	2.4	60.4	0.56	0.53	31.3
All Vehicles		1110	2.0	0.467	8.3	LOS A	2.4	60.4	0.44	0.38	31.9

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

INPUT VOLUMES

Vehicles and pedestrians per 60 minutes

Site: Build 2020 PM

Harper Road and S Peace Haven Road

Roundabout

Volume Display Method: Separate

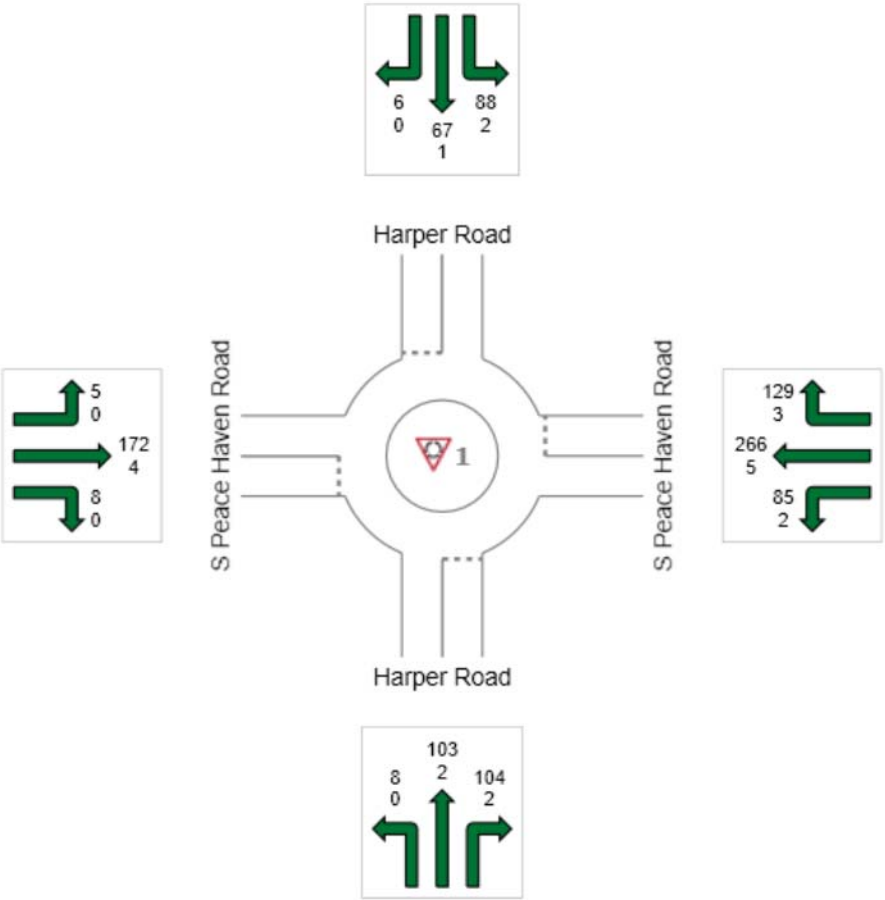
Volumes are shown for Movement Class(es): Light Vehicles and Heavy Vehicles

Total Intersection Volumes (veh)

All Movement Classes: 1061

Light Vehicles (LV): 1040

Heavy Vehicles (HV): 21



MOVEMENT SUMMARY

Site: Build 2020 PM

Harper Road and S Peace Haven Road

Roundabout

Movement Performance - Vehicles											
Mov ID	OD Mov	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance ft	Prop. Queued	Effective Stop Rate per veh	Average Speed mph
South: Harper Road											
3	L2	9	2.0	0.298	7.8	LOS A	1.2	31.2	0.46	0.40	33.0
8	T1	117	2.0	0.298	7.8	LOS A	1.2	31.2	0.46	0.40	32.9
18	R2	118	2.0	0.298	7.8	LOS A	1.2	31.2	0.46	0.40	32.0
Approach		243	2.0	0.298	7.8	LOS A	1.2	31.2	0.46	0.40	32.5
East: S Peace Haven Road											
1	L2	97	2.0	0.504	9.2	LOS A	2.9	74.5	0.39	0.25	31.5
6	T1	301	2.0	0.504	9.2	LOS A	2.9	74.5	0.39	0.25	31.6
16	R2	147	2.0	0.504	9.2	LOS A	2.9	74.5	0.39	0.25	30.9
Approach		544	2.0	0.504	9.2	LOS A	2.9	74.5	0.39	0.25	31.4
North: Harper Road											
7	L2	100	2.0	0.249	7.8	LOS A	1.0	24.1	0.50	0.47	31.9
4	T1	76	2.0	0.249	7.8	LOS A	1.0	24.1	0.50	0.47	31.8
14	R2	7	2.0	0.249	7.8	LOS A	1.0	24.1	0.50	0.47	31.0
Approach		182	2.0	0.249	7.8	LOS A	1.0	24.1	0.50	0.47	31.8
West: S Peace Haven Road											
5	L2	6	2.0	0.249	6.9	LOS A	1.0	25.1	0.43	0.35	32.9
2	T1	194	2.0	0.249	6.9	LOS A	1.0	25.1	0.43	0.35	33.1
12	R2	9	2.0	0.249	6.9	LOS A	1.0	25.1	0.43	0.35	32.3
Approach		209	2.0	0.249	6.9	LOS A	1.0	25.1	0.43	0.35	33.0
All Vehicles		1179	2.0	0.504	8.3	LOS A	2.9	74.5	0.43	0.33	32.0

Level of Service (LOS) Method: Delay & v/c (HCM 2010).
Roundabout LOS Method: Same as Sign Control.
Vehicle movement LOS values are based on average delay and v/c ratio (degree of saturation) per movement
LOS F will result if v/c > 1 irrespective of movement delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all movements (v/c not used as specified in HCM 2010).
Roundabout Capacity Model: US HCM 2010.
HCM Delay Formula option is used. Control Delay does not include Geometric Delay since Exclude Geometric Delay option applies.
Gap-Acceptance Capacity: Traditional M1.
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

PEACE HAVEN ROAD
&
JESSIE VILLAGE
DRIVE/VILLAGE CLUB LANE

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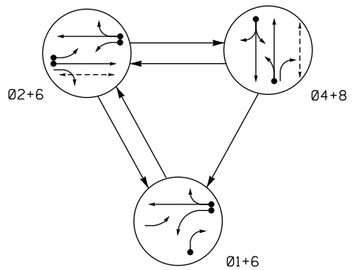
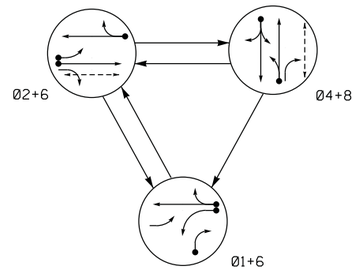
PROJECT REFERENCE NO.	SHEET NO.
36249.3615	Sig-1

DEFAULT PHASING DIAGRAM

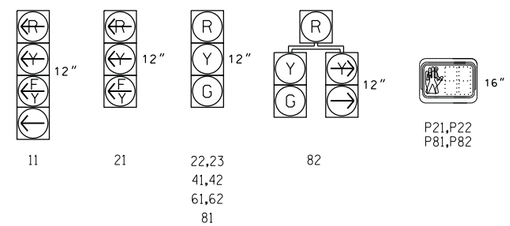


ALTERNATE PHASING DIAGRAM



SIGNAL FACE I.D.

All Heads L.E.D.



PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 01+6	PHASE 02+6	PHASE 04+8	FLASH
11	←	FY	R	Y
21	FY	FY	R	Y
22,23	R	G	R	Y
41,42	R	R	G	R
61,62	G	G	R	Y
81	R	R	G	R
82	R↗	R	G	R
P21,P22	DW	W	DW	DRK
P81,P82	DW	DW	W	DRK

ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 01+6	PHASE 02+6	PHASE 04+8	FLASH
11	←	R	R	Y
21	FY	FY	R	Y
22,23	R	G	R	Y
41,42	R	R	G	R
61,62	G	G	R	Y
81	R	R	G	R
82	R↗	R	G	R
P21,P22	DW	W	DW	DRK
P81,P82	DW	DW	W	DRK

OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	Y	1	Y	Y	-	-	✳15	-	Y
					✳✳6	Y	Y	-	-	-	-	Y
1B	6X40	0	2-4-2	Y	1	Y	Y	-	-	15	-	Y
2A	6X6	70	4	Y	2	Y	Y	-	-	-	-	Y
2B	6X40	0	2-4-2	Y	2	Y	Y	-	-	-	-	Y
4A	6X40	0	2-4-2	Y	4	Y	Y	-	-	10	-	Y
6A	6X6	70	4	Y	6	Y	Y	-	-	-	-	Y
8A	6X40	0	2-4-2	Y	8	Y	Y	-	-	3	-	Y

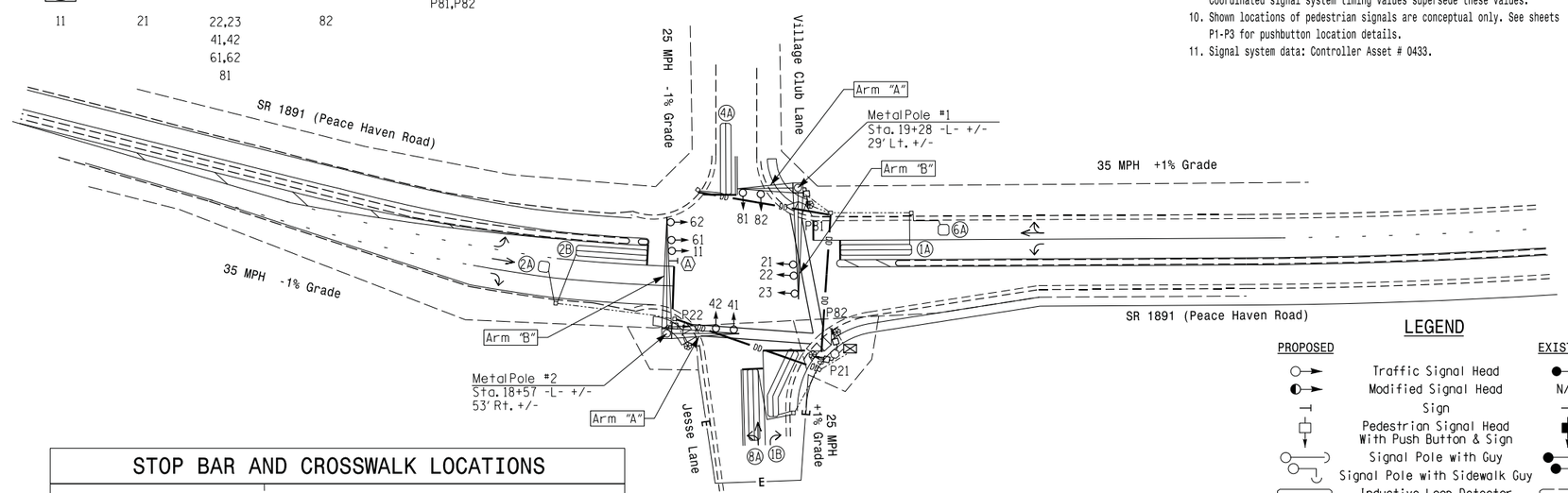
✳ Disable Delay During Alternate Phasing Operation.

✳✳ Disable Phase 6 Call for Loop 1A During Alternate Phasing.

3 Phase
Fully Actuated
(Lewisville-Clemmons Road CLS)

NOTES

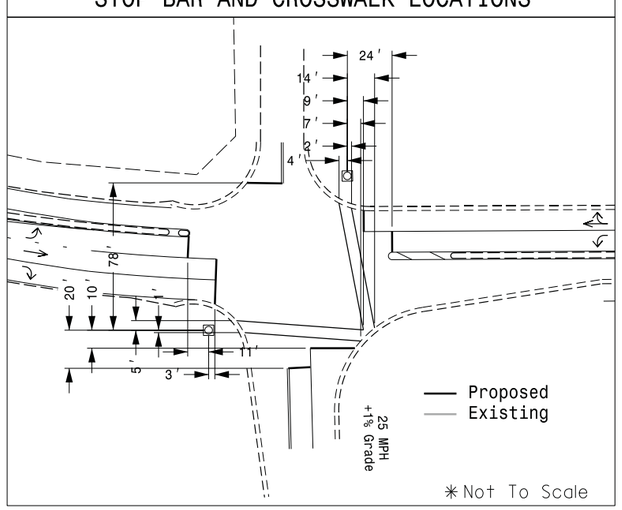
1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012, "Standard Specifications for Roads and Structures" dated January 2012, and all applicable sections of the latest version of the generic Project Special Provisions. The PSP can be accessed at the following website: https://connect.ncdot.gov/resources/safety/pages/its-and-pages.aspx
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 may be lagged.
4. Set all detector units to presence mode.
5. Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
6. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
7. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
8. The Division Traffic Engineer will determine the hours of use for each phasing plan.
9. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
10. Shown locations of pedestrian signals are conceptual only. See sheets P1-P3 for pushbutton location details.
11. Signal system data: Controller Asset # 0433.



LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
DD	Directional Drill	N/A
	Metal Pole with Mastarm	
	Type I Pushbutton Post	
	Type II Signal Pedestal	
E	Permanent Construction Maintenance Easement	N/A
A	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	A

STOP BAR AND CROSSWALK LOCATIONS



OASIS 2070 TIMING CHART

FEATURE	PHASE 1	PHASE 2	PHASE 4	PHASE 6	PHASE 8
Min Green 1 *	7	10	7	10	7
Extension 1 *	2.0	3.0	2.0	3.0	2.0
Max Green 1 *	20	45	21	45	21
Yellow Clearance	3.0	3.9	3.2	3.9	3.1
Red Clearance	2.6	1.8	2.1	1.8	2.7
Walk 1 *	-	7	-	-	4
Don't Walk 1	-	17	-	-	17
Seconds Per Actuation *	-	-	-	-	-
Max Variable Initial *	-	-	-	-	-
Time Before Reduction *	-	-	-	-	-
Time To Reduce *	-	-	-	-	-
Minimum Gap	-	-	-	-	-
Recall Mode	-	MIN RECALL	-	MIN RECALL	-
Vehicle Call Memory	-	YELLOW	-	YELLOW	-
Dual Entry	-	-	ON	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

NC Dept of Transportation
Division of Highways

Final Drawing Date: 3/13/2017

DocuSigned by: Brad J. Beck
ITS & Signals Unit

Prepared in the offices of:

RAMEY KEMP & ASSOCIATES, INC.
Transportation Engineers
5808 Faringdon Place, Suite 100
Raleigh, North Carolina 27609
919-872-5115 Tel. 919-878-9418 Fax.
www.rameykemp.com

New Installation

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared for: Transportation Mobility and Safety Division, Signal Design Section, STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

750 N.Greenfield Pkwy,Garner,NC 27529

SR 1891 (Peace Haven Road)
At
Village Club Lane/
Jesse Lane

Division 9 Forsyth County Clemmons

PLAN DATE:	March 2017	REVIEWED BY:	WJ Hamilton
PREPARED BY:	NE Burns	RKA PROJ NO:	15089 (040)

SCALE 0 40 1"=40'

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 32396 ENGINEER WILLIAM J. HAMILTON

DocuSigned by: William J. Hamilton 3/20/2017
SIGNATURE DATE

SIG. INVENTORY NO. 09-0433

24: Jessie Lane/Village Club Lane

Timing Plan: Default

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Protected Phases		2		1	6		8	1		4
Permitted Phases	2		2	6		8		8	4	
Minimum Initial (s)	10.0	10.0	10.0	7.0	10.0	7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	29.7	29.7	29.7	12.6	15.7	26.8	26.8	12.6	12.3	12.3
Total Split (s)	50.7	50.7	50.7	25.6	50.7	26.8	26.8	25.6	26.3	26.3
Total Split (%)	49.2%	49.2%	49.2%	24.8%	49.2%	26.0%	26.0%	24.8%	25.5%	25.5%
Maximum Green (s)	45.0	45.0	45.0	20.0	45.0	21.0	21.0	20.0	21.0	21.0
Yellow Time (s)	3.9	3.9	3.9	3.0	3.9	3.1	3.1	3.0	3.2	3.2
All-Red Time (s)	1.8	1.8	1.8	2.6	1.8	2.7	2.7	2.6	2.1	2.1
Lead/Lag	Lag	Lag	Lag	Lead				Lead		
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				Yes		
Vehicle Extension (s)	3.0	3.0	3.0	2.0	3.0	2.0	2.0	2.0	2.0	2.0
Minimum Gap (s)	3.0	3.0	3.0	2.0	3.0	2.0	2.0	2.0	2.0	2.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Recall Mode	Min	Min	Min	None	Min	None	None	None	None	None
Walk Time (s)	7.0	7.0	7.0			4.0	4.0			
Flash Dont Walk (s)	17.0	17.0	17.0			17.0	17.0			
Pedestrian Calls (#/hr)	0	0	0			0	0			

Intersection Summary

Cycle Length: 103.1
Actuated Cycle Length: 60.4
Control Type: Actuated-Uncoordinated

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	495	15	112	221	9	15	4	22	20	5	8
Future Volume (vph)	5	495	15	112	221	9	15	4	22	20	5	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	50		100	670		0	0		150	0		0
Storage Lanes	1		1	1		0	0		1	0		0
Taper Length (ft)	150			200			25			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			0.850		0.994				0.850		0.967	
Flt Protected	0.950			0.950				0.961			0.971	
Satd. Flow (prot)	1770	1863	1583	1770	1852	0	0	1790	1583	0	1749	0
Flt Permitted	0.601			0.285								
Satd. Flow (perm)	1120	1863	1583	531	1852	0	0	1863	1583	0	1801	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			131		4				42		9	
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		1401			1083			501			658	
Travel Time (s)		27.3			21.1			13.7			17.9	
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)	6	550	17	124	246	10	17	4	24	22	6	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	6	550	17	124	256	0	0	21	24	0	37	0
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases		2		1	6			8	1		4	
Permitted Phases	2		2	6			8		8	4		
Detector Phase	2	2	2	1 6	6		8	8	1	4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	7.0	10.0		7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	29.7	29.7	29.7	12.6	15.7		26.8	26.8	12.6	12.3	12.3	
Total Split (s)	30.0	30.0	30.0	13.0	43.0		27.0	27.0	13.0	27.0	27.0	
Total Split (%)	42.9%	42.9%	42.9%	18.6%	61.4%		38.6%	38.6%	18.6%	38.6%	38.6%	
Yellow Time (s)	3.9	3.9	3.9	3.0	3.9		3.1	3.1	3.0	3.2	3.2	
All-Red Time (s)	1.8	1.8	1.8	2.6	1.8		2.7	2.7	2.6	2.1	2.1	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)	5.7	5.7	5.7	5.6	5.7			5.8	5.6		5.3	
Lead/Lag	Lag	Lag	Lag	Lead					Lead			
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					Yes			
Recall Mode	Min	Min	Min	None	Min		None	None	None	None	None	
Act Effct Green (s)	24.5	24.5	24.5	32.9	37.1			7.5	11.4		7.6	
Actuated g/C Ratio	0.57	0.57	0.57	0.77	0.87			0.18	0.27		0.18	
v/c Ratio	0.01	0.52	0.02	0.20	0.16			0.06	0.05		0.11	
Control Delay	8.4	11.8	0.1	3.2	2.5			20.5	3.1		17.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0			0.0	0.0		0.0	
Total Delay	8.4	11.8	0.1	3.2	2.5			20.5	3.1		17.4	
LOS	A	B	A	A	A			C	A		B	
Approach Delay		11.5			2.7			11.2			17.4	
Approach LOS		B			A			B			B	
Queue Length 50th (ft)	1	67	0	0	0			3	0		4	
Queue Length 95th (ft)	6	232	0	24	47			23	8		30	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		1321			1003			421			578	
Turn Bay Length (ft)	50		100	670					150			
Base Capacity (vph)	725	1206	1070	687	1601			982	467		976	
Starvation Cap Reductn	0	0	0	0	0			0	0		0	
Spillback Cap Reductn	0	0	0	0	0			0	0		0	
Storage Cap Reductn	0	0	0	0	0			0	0		0	
Reduced v/c Ratio	0.01	0.46	0.02	0.18	0.16			0.02	0.05		0.04	

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 42.8
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.52
Intersection Signal Delay: 8.5 — Intersection LOS: A
Intersection Capacity Utilization 54.6% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 2: Jessie Village Drive/Village Club Lane & Peace Haven Road

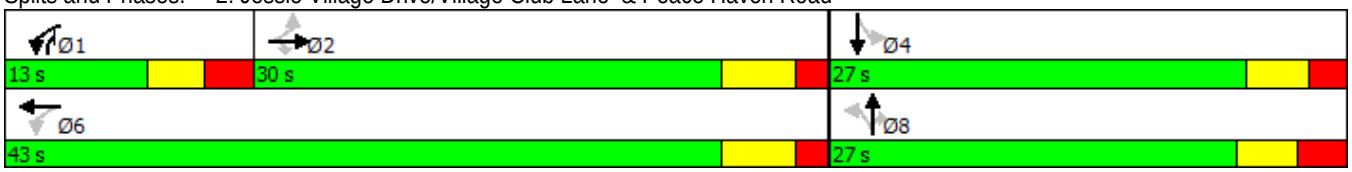
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	313	20	184	365	15	78	4	78	11	2	4
Future Volume (vph)	3	313	20	184	365	15	78	4	78	11	2	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	50		100	670		0	0		150	0		0
Storage Lanes	1		1	1		0	0		1	0		0
Taper Length (ft)	150			200			25			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			0.850		0.994				0.850		0.970	
Flt Protected	0.950			0.950				0.954			0.968	
Satd. Flow (prot)	1770	1863	1583	1770	1852	0	0	1777	1583	0	1749	0
Flt Permitted	0.515			0.382				0.767			0.744	
Satd. Flow (perm)	959	1863	1583	712	1852	0	0	1429	1583	0	1344	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			131		5				87		4	
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		1402			1083			501			658	
Travel Time (s)		27.3			21.1			13.7			17.9	
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)	3	348	22	204	406	17	87	4	87	12	2	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	3	348	22	204	423	0	0	91	87	0	18	0
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases		2		1	6			8	1		4	
Permitted Phases	2		2	6			8		8	4		
Detector Phase	2	2	2	1 6	6		8	8	1	4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	7.0	10.0		7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	29.7	29.7	29.7	12.6	15.7		26.8	26.8	12.6	12.3	12.3	
Total Split (s)	30.0	30.0	30.0	13.0	43.0		27.0	27.0	13.0	27.0	27.0	
Total Split (%)	42.9%	42.9%	42.9%	18.6%	61.4%		38.6%	38.6%	18.6%	38.6%	38.6%	
Yellow Time (s)	3.9	3.9	3.9	3.0	3.9		3.1	3.1	3.0	3.2	3.2	
All-Red Time (s)	1.8	1.8	1.8	2.6	1.8		2.7	2.7	2.6	2.1	2.1	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)	5.7	5.7	5.7	5.6	5.7			5.8	5.6		5.3	
Lead/Lag	Lag	Lag	Lag	Lead					Lead			
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					Yes			
Recall Mode	Min	Min	Min	None	Min		None	None	None	None	None	
Act Effct Green (s)	16.9	16.9	16.9	30.4	33.2			8.7	15.7		8.9	
Actuated g/C Ratio	0.38	0.38	0.38	0.68	0.75			0.20	0.35		0.20	
v/c Ratio	0.01	0.49	0.03	0.31	0.31			0.33	0.14		0.07	
Control Delay	12.0	15.7	0.1	5.8	5.4			20.7	3.2		15.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0			0.0	0.0		0.0	
Total Delay	12.0	15.7	0.1	5.8	5.4			20.7	3.2		15.6	
LOS	B	B	A	A	A			C	A		B	
Approach Delay		14.7			5.5			12.1			15.6	
Approach LOS		B			A			B			B	
Queue Length 50th (ft)	1	76	0	21	49			21	0		3	
Queue Length 95th (ft)	5	160	0	54	115			60	19		17	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		1322			1003			421			578	
Turn Bay Length (ft)	50		100	670					150			
Base Capacity (vph)	553	1075	969	773	1578			715	624		690	
Starvation Cap Reductn	0	0	0	0	0			0	0		0	
Spillback Cap Reductn	0	0	0	0	0			0	0		0	
Storage Cap Reductn	0	0	0	0	0			0	0		0	
Reduced v/c Ratio	0.01	0.32	0.02	0.26	0.27			0.13	0.14		0.03	

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 44.5
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.49
Intersection Signal Delay: 9.5 — Intersection LOS: A
Intersection Capacity Utilization 50.0% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 2: Jessie Village Drive/Village Club Lane & Peace Haven Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	488	45	128	217	9	35	4	83	20	5	8
Future Volume (vph)	5	488	45	128	217	9	35	4	83	20	5	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	50		100	670		0	0		150	0		0
Storage Lanes	1		1	1		0	0		1	0		0
Taper Length (ft)	150			200			25			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			0.850		0.994				0.850		0.967	
Flt Protected	0.950			0.950				0.957			0.971	
Satd. Flow (prot)	1770	1863	1583	1770	1852	0	0	1783	1583	0	1749	0
Flt Permitted	0.603			0.278								
Satd. Flow (perm)	1123	1863	1583	518	1852	0	0	1863	1583	0	1801	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			131		5				92		9	
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		1401			1083			501			658	
Travel Time (s)		27.3			21.1			13.7			17.9	
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)	6	542	50	142	241	10	39	4	92	22	6	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	6	542	50	142	251	0	0	43	92	0	37	0
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases		2		1	6			8	1		4	
Permitted Phases	2		2	6			8		8	4		
Detector Phase	2	2	2	1 6	6		8	8	1	4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	7.0	10.0		7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	29.7	29.7	29.7	12.6	15.7		26.8	26.8	12.6	12.3	12.3	
Total Split (s)	30.0	30.0	30.0	13.0	43.0		27.0	27.0	13.0	27.0	27.0	
Total Split (%)	42.9%	42.9%	42.9%	18.6%	61.4%		38.6%	38.6%	18.6%	38.6%	38.6%	
Yellow Time (s)	3.9	3.9	3.9	3.0	3.9		3.1	3.1	3.0	3.2	3.2	
All-Red Time (s)	1.8	1.8	1.8	2.6	1.8		2.7	2.7	2.6	2.1	2.1	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)	5.7	5.7	5.7	5.6	5.7			5.8	5.6		5.3	
Lead/Lag	Lag	Lag	Lag	Lead					Lead			
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					Yes			
Recall Mode	Min	Min	Min	None	Min		None	None	None	None	None	
Act Effct Green (s)	22.8	22.8	22.8	31.7	36.0			7.8	11.6		7.9	
Actuated g/C Ratio	0.55	0.55	0.55	0.76	0.86			0.19	0.28		0.19	
v/c Ratio	0.01	0.53	0.05	0.23	0.16			0.12	0.18		0.11	
Control Delay	9.0	12.5	0.1	3.5	2.7			20.2	4.4		17.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0			0.0	0.0		0.0	
Total Delay	9.0	12.5	0.1	3.5	2.7			20.2	4.4		17.1	
LOS	A	B	A	A	A			C	A		B	
Approach Delay		11.5			3.0			9.4			17.1	
Approach LOS		B			A			A			B	
Queue Length 50th (ft)	1	66	0	0	0			6	0		4	
Queue Length 95th (ft)	7	241	0	30	50			37	23		30	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		1321			1003			421			578	
Turn Bay Length (ft)	50		100	670					150			
Base Capacity (vph)	757	1256	1110	688	1601			1025	521		1018	
Starvation Cap Reductn	0	0	0	0	0			0	0		0	
Spillback Cap Reductn	0	0	0	0	0			0	0		0	
Storage Cap Reductn	0	0	0	0	0			0	0		0	
Reduced v/c Ratio	0.01	0.43	0.05	0.21	0.16			0.04	0.18		0.04	

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 41.7
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.53
Intersection Signal Delay: 8.5 — Intersection LOS: A
Intersection Capacity Utilization 55.1% — ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 2: Jessie Village Drive/Village Club Lane & Peace Haven Road

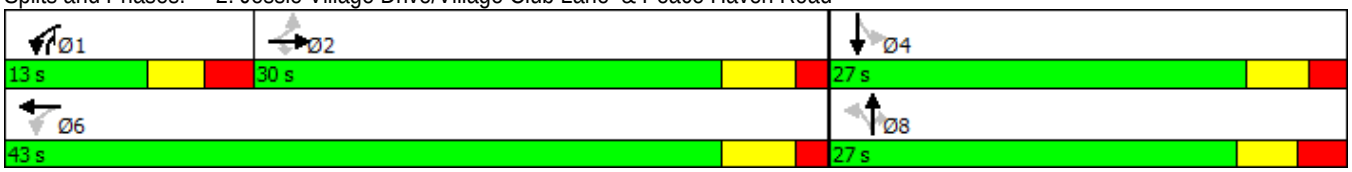
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	305	49	201	353	15	113	4	158	11	2	4
Future Volume (vph)	3	305	49	201	353	15	113	4	158	11	2	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	50		100	670		0	0		150	0		0
Storage Lanes	1		1	1		0	0		1	0		0
Taper Length (ft)	150			200			25			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			0.850		0.994				0.850		0.970	
Flt Protected	0.950			0.950				0.954			0.968	
Satd. Flow (prot)	1770	1863	1583	1770	1852	0	0	1777	1583	0	1749	0
Flt Permitted	0.522			0.357				0.720			0.752	
Satd. Flow (perm)	972	1863	1583	665	1852	0	0	1341	1583	0	1359	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			131		5				176		4	
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		1402			1083			501			658	
Travel Time (s)		27.3			21.1			13.7			17.9	
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)	3	339	54	223	392	17	126	4	176	12	2	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	3	339	54	223	409	0	0	130	176	0	18	0
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases		2		1	6			8	1		4	
Permitted Phases	2		2	6			8		8	4		
Detector Phase	2	2	2	1 6	6		8	8	1	4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	7.0	10.0		7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	29.7	29.7	29.7	12.6	15.7		26.8	26.8	12.6	12.3	12.3	
Total Split (s)	30.0	30.0	30.0	13.0	43.0		27.0	27.0	13.0	27.0	27.0	
Total Split (%)	42.9%	42.9%	42.9%	18.6%	61.4%		38.6%	38.6%	18.6%	38.6%	38.6%	
Yellow Time (s)	3.9	3.9	3.9	3.0	3.9		3.1	3.1	3.0	3.2	3.2	
All-Red Time (s)	1.8	1.8	1.8	2.6	1.8		2.7	2.7	2.6	2.1	2.1	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)	5.7	5.7	5.7	5.6	5.7			5.8	5.6		5.3	
Lead/Lag	Lag	Lag	Lag	Lead					Lead			
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					Yes			
Recall Mode	Min	Min	Min	None	Min		None	None	None	None	None	
Act Effct Green (s)	14.6	14.6	14.6	28.5	30.3			10.0	19.7		10.3	
Actuated g/C Ratio	0.31	0.31	0.31	0.61	0.65			0.22	0.42		0.22	
v/c Ratio	0.01	0.58	0.09	0.38	0.34			0.45	0.23		0.06	
Control Delay	12.7	19.2	0.3	7.6	6.9			24.3	2.8		15.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0			0.0	0.0		0.0	
Total Delay	12.7	19.2	0.3	7.6	6.9			24.3	2.8		15.9	
LOS	B	B	A	A	A			C	A		B	
Approach Delay		16.5			7.1			12.0			15.9	
Approach LOS		B			A			B			B	
Queue Length 50th (ft)	1	79	0	26	52			32	0		3	
Queue Length 95th (ft)	5	165	0	67	125			88	29		18	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		1322			1003			421			578	
Turn Bay Length (ft)	50		100	670					150			
Base Capacity (vph)	546	1047	947	721	1481			657	779		684	
Starvation Cap Reductn	0	0	0	0	0			0	0		0	
Spillback Cap Reductn	0	0	0	0	0			0	0		0	
Storage Cap Reductn	0	0	0	0	0			0	0		0	
Reduced v/c Ratio	0.01	0.32	0.06	0.31	0.28			0.20	0.23		0.03	

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 46.5
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.58
Intersection Signal Delay: 11.1 — Intersection LOS: B
Intersection Capacity Utilization 51.1% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 2: Jessie Village Drive/Village Club Lane & Peace Haven Road



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	502	49	128	225	9	37	4	83	20	5	8
Future Volume (vph)	5	502	49	128	225	9	37	4	83	20	5	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	50		100	670		0	0		150	0		0
Storage Lanes	1		1	1		0	0		1	0		0
Taper Length (ft)	150			200			25			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			0.850		0.994				0.850		0.967	
Flt Protected	0.950			0.950				0.956			0.971	
Satd. Flow (prot)	1770	1863	1583	1770	1852	0	0	1781	1583	0	1749	0
Flt Permitted	0.599			0.269								
Satd. Flow (perm)	1116	1863	1583	501	1852	0	0	1863	1583	0	1801	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			131		4				92		9	
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		1400			1083			369			658	
Travel Time (s)		27.3			21.1			10.1			17.9	
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)	6	558	54	142	250	10	41	4	92	22	6	9
Shared Lane Traffic (%)												
Lane Group Flow (vph)	6	558	54	142	260	0	0	45	92	0	37	0
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases		2		1	6			8	1		4	
Permitted Phases	2		2	6			8		8	4		
Detector Phase	2	2	2	1 6	6		8	8	1	4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	7.0	10.0		7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	29.7	29.7	29.7	12.6	15.7		26.8	26.8	12.6	12.3	12.3	
Total Split (s)	30.0	30.0	30.0	13.0	43.0		27.0	27.0	13.0	27.0	27.0	
Total Split (%)	42.9%	42.9%	42.9%	18.6%	61.4%		38.6%	38.6%	18.6%	38.6%	38.6%	
Yellow Time (s)	3.9	3.9	3.9	3.0	3.9		3.1	3.1	3.0	3.2	3.2	
All-Red Time (s)	1.8	1.8	1.8	2.6	1.8		2.7	2.7	2.6	2.1	2.1	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)	5.7	5.7	5.7	5.6	5.7			5.8	5.6		5.3	
Lead/Lag	Lag	Lag	Lag	Lead					Lead			
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					Yes			
Recall Mode	Min	Min	Min	None	Min		None	None	None	None	None	
Act Effct Green (s)	23.3	23.3	23.3	32.0	36.3			7.8	11.7		7.9	
Actuated g/C Ratio	0.55	0.55	0.55	0.76	0.86			0.19	0.28		0.19	
v/c Ratio	0.01	0.54	0.06	0.23	0.16			0.13	0.18		0.11	
Control Delay	9.0	12.8	0.1	3.6	2.7			20.2	4.3		17.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0			0.0	0.0		0.0	
Total Delay	9.0	12.8	0.1	3.6	2.7			20.2	4.3		17.1	
LOS	A	B	A	A	A			C	A		B	
Approach Delay		11.7			3.0			9.6			17.1	
Approach LOS		B			A			A			B	
Queue Length 50th (ft)	1	68	0	0	0			7	0		4	
Queue Length 95th (ft)	7	252	1	31	53			38	23		30	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		1320			1003			289			578	
Turn Bay Length (ft)	50		100	670					150			
Base Capacity (vph)	742	1239	1096	673	1599			1011	518		1004	
Starvation Cap Reductn	0	0	0	0	0			0	0		0	
Spillback Cap Reductn	0	0	0	0	0			0	0		0	
Storage Cap Reductn	0	0	0	0	0			0	0		0	
Reduced v/c Ratio	0.01	0.45	0.05	0.21	0.16			0.04	0.18		0.04	

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 42.1
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.54
Intersection Signal Delay: 8.7 — Intersection LOS: A
Intersection Capacity Utilization 55.9% — ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 2: Jessie Village Drive/Village Club Lane & Peace Haven Road

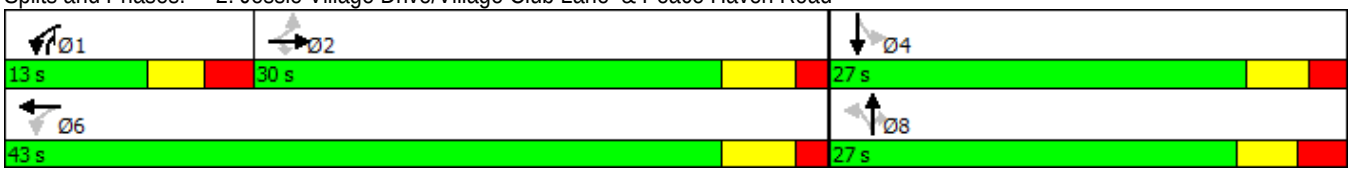
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	316	52	201	369	15	117	4	158	11	2	4
Future Volume (vph)	3	316	52	201	369	15	117	4	158	11	2	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	50		100	670		0	0		150	0		0
Storage Lanes	1		1	1		0	0		1	0		0
Taper Length (ft)	150			200			25			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			0.850		0.994				0.850		0.970	
Flt Protected	0.950			0.950				0.954			0.968	
Satd. Flow (prot)	1770	1863	1583	1770	1852	0	0	1777	1583	0	1749	0
Flt Permitted	0.514			0.346				0.719			0.754	
Satd. Flow (perm)	957	1863	1583	645	1852	0	0	1339	1583	0	1362	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			131		5				176		4	
Link Speed (mph)		35			35			25			25	
Link Distance (ft)		1400			1083			369			658	
Travel Time (s)		27.3			21.1			10.1			17.9	
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)	3	351	58	223	410	17	130	4	176	12	2	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	3	351	58	223	427	0	0	134	176	0	18	0
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases		2		1	6			8	1		4	
Permitted Phases	2		2	6			8		8	4		
Detector Phase	2	2	2	1 6	6		8	8	1	4	4	
Switch Phase												
Minimum Initial (s)	10.0	10.0	10.0	7.0	10.0		7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	29.7	29.7	29.7	12.6	15.7		26.8	26.8	12.6	12.3	12.3	
Total Split (s)	30.0	30.0	30.0	13.0	43.0		27.0	27.0	13.0	27.0	27.0	
Total Split (%)	42.9%	42.9%	42.9%	18.6%	61.4%		38.6%	38.6%	18.6%	38.6%	38.6%	
Yellow Time (s)	3.9	3.9	3.9	3.0	3.9		3.1	3.1	3.0	3.2	3.2	
All-Red Time (s)	1.8	1.8	1.8	2.6	1.8		2.7	2.7	2.6	2.1	2.1	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0			0.0	0.0		0.0	
Total Lost Time (s)	5.7	5.7	5.7	5.6	5.7			5.8	5.6		5.3	
Lead/Lag	Lag	Lag	Lag	Lead					Lead			
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					Yes			
Recall Mode	Min	Min	Min	None	Min		None	None	None	None	None	
Act Effct Green (s)	14.9	14.9	14.9	28.7	30.5			10.1	19.9		10.5	
Actuated g/C Ratio	0.32	0.32	0.32	0.61	0.65			0.22	0.42		0.22	
v/c Ratio	0.01	0.59	0.10	0.38	0.35			0.46	0.23		0.06	
Control Delay	12.7	19.6	0.3	7.7	7.1			24.6	2.8		15.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0			0.0	0.0		0.0	
Total Delay	12.7	19.6	0.3	7.7	7.1			24.6	2.8		15.9	
LOS	B	B	A	A	A			C	A		B	
Approach Delay		16.8			7.3			12.2			15.9	
Approach LOS		B			A			B			B	
Queue Length 50th (ft)	1	83	0	26	56			33	0		3	
Queue Length 95th (ft)	5	173	1	68	134			91	29		18	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		1320			1003			289			578	
Turn Bay Length (ft)	50		100	670					150			
Base Capacity (vph)	533	1038	940	703	1468			651	778		680	
Starvation Cap Reductn	0	0	0	0	0			0	0		0	
Spillback Cap Reductn	0	0	0	0	0			0	0		0	
Storage Cap Reductn	0	0	0	0	0			0	0		0	
Reduced v/c Ratio	0.01	0.34	0.06	0.32	0.29			0.21	0.23		0.03	

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 46.9
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.59
Intersection Signal Delay: 11.3 — Intersection LOS: B
Intersection Capacity Utilization 52.2% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 2: Jessie Village Drive/Village Club Lane & Peace Haven Road



LEWISVILLE-CLEMMONS ROAD
&
PEACE HAVEN ROAD

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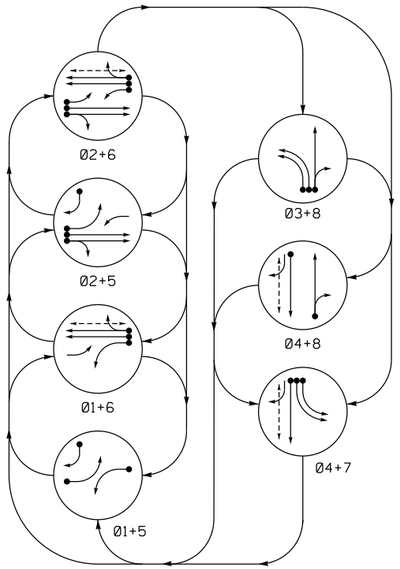
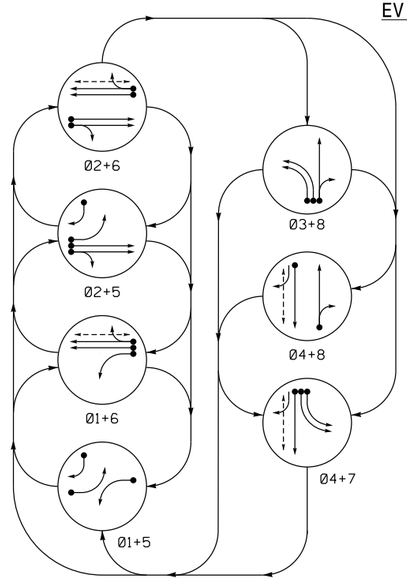
PROJECT REFERENCE NO.	SHEET NO.
36249.3615	Sig-7

7 Phase Fully Actuated With Emergency Vehicle Preemption (Lewisville-Clemmons Road CLS)

DEFAULT PHASING DIAGRAM

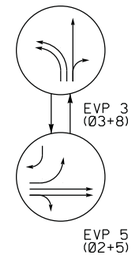


ALTERNATE PHASING DIAGRAM



ALTERNATE EV PREEMPT PHASES

(Medium Priority)



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03+8	04+8	04+7	EVP3	EVP5	FLASH
11	↚	↚	F Y	F Y	R̸	R̸	R̸	R̸	F Y	Y̸
21, 22	R	R	G	G	R	R	R	R	G	Y
31, 32	R̸	R̸	R̸	R̸	↚	R̸	R̸	↚	R̸	R̸
41	R	R	R	R	R	G	G	R	R	R
42	R/	R	R/	R	R	G	G	R	R/	R
51	↚	F Y	↚	F Y	R̸	R̸	R̸	R̸	↚	Y̸
61, 62	R	G	R	G	R	R	R	R	R	Y
71, 72	R̸	R̸	R̸	R̸	R̸	R̸	↚	R̸	R̸	R̸
81, 82	R	R	R	R	G	G	R	G	R	R
P41,P42	DW	DW	DW	DW	DW	W	W	DW	DW	DRK
P61,P62	DW	W	DW	W	DW	DW	DW	DW	DW	DRK

OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

INDUCTIVE LOOPS					DETECTOR PROGRAMMING							
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	PHASE	CALLING	EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	-	1	Y	Y	-	-	✳15	-	-
					✳✳6	Y	Y	Y	-	3	-	-
2A	6X6	300	5	Y	2	Y	Y	-	-	-	-	-
2B	6X6	300	5	Y	2	Y	Y	-	-	-	-	-
3A	6X40	0	2-4-2	-	3	Y	Y	-	-	3	-	-
3B	6X40	0	2-4-2	-	3	Y	Y	-	-	-	-	-
4A	6X40	0	2-4-2	Y	4	Y	Y	-	-	-	-	-
5A	6X40	0	2-4-2	Y	5	Y	Y	-	-	✳15	-	-
					✳✳2	Y	Y	Y	-	3	-	-
5B	6X50	+5	2-4-2	Y	5	Y	Y	-	-	15	-	-
6A	6X6	300	EXISTING	-	6	Y	Y	-	-	-	-	-
6B	6X6	300	EXISTING	-	6	Y	Y	-	-	-	-	-
7A	6X40	0	2-4-2	Y	7	Y	Y	-	-	-	-	-
7B	6X40	0	2-4-2	Y	7	Y	Y	-	-	-	-	Y
8A	6X40	0	2-4-2	-	8	Y	Y	-	-	10	-	-
8B	6X6	0	EXISTING	-	8	Y	Y	-	-	15	-	-
S1	6X6	+165	4	Y	-	-	-	-	-	-	Y	-
S2	6X6	+165	4	Y	-	-	-	-	-	-	Y	-

✳ Disable Delay During Alternate Phasing Operation.

✳✳ Disable Phase 2 and/or 6 Call for Loop 1A and 5A During Alternate Phasing.

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012, "Standard Specifications for Roads and Structures" dated January 2012, and all applicable sections of the latest version of the generic Project Special Provisions. The PSP can be accessed at the following website: https://connect.ncdot.gov/resources/safety/pages/its-and-signals.aspx
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Phase 1 and/or 5 may be lagged.
4. The order of phase 3 and phase 7 may be reversed, but phase 3 and phase 7 shall not operate simultaneously.
5. Reposition existing signal heads numbered 41, 42, and 71.
6. Set all detector units to presence mode.
7. Omit "WALK" and flashing "DON'T WALK" with no pedestrian calls.
8. Program pedestrian heads to countdown the flashing "Don't Walk" time only.
9. This intersection features a GPS preemption system. Shown locations of optical detectors are conceptual only.
10. Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
11. Shown locations of pedestrian signals are conceptual only. See sheets P1-P3 for pushbutton location details.
12. The Division Traffic Engineer will determine the hours of use for each phasing plan.
13. Signal system data: Master Asset # 10915, Controller Asset # 0486.

SIGNAL FACE I.D.

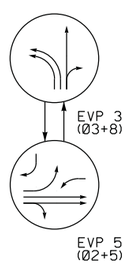
All Heads L.E.D.

PHASING DIAGRAM DETECTION LEGEND

- DETECTED MOVEMENT
- UNDETECTED MOVEMENT (OVERLAP)
- UNSIGNALIZED MOVEMENT
- PEDESTRIAN MOVEMENT

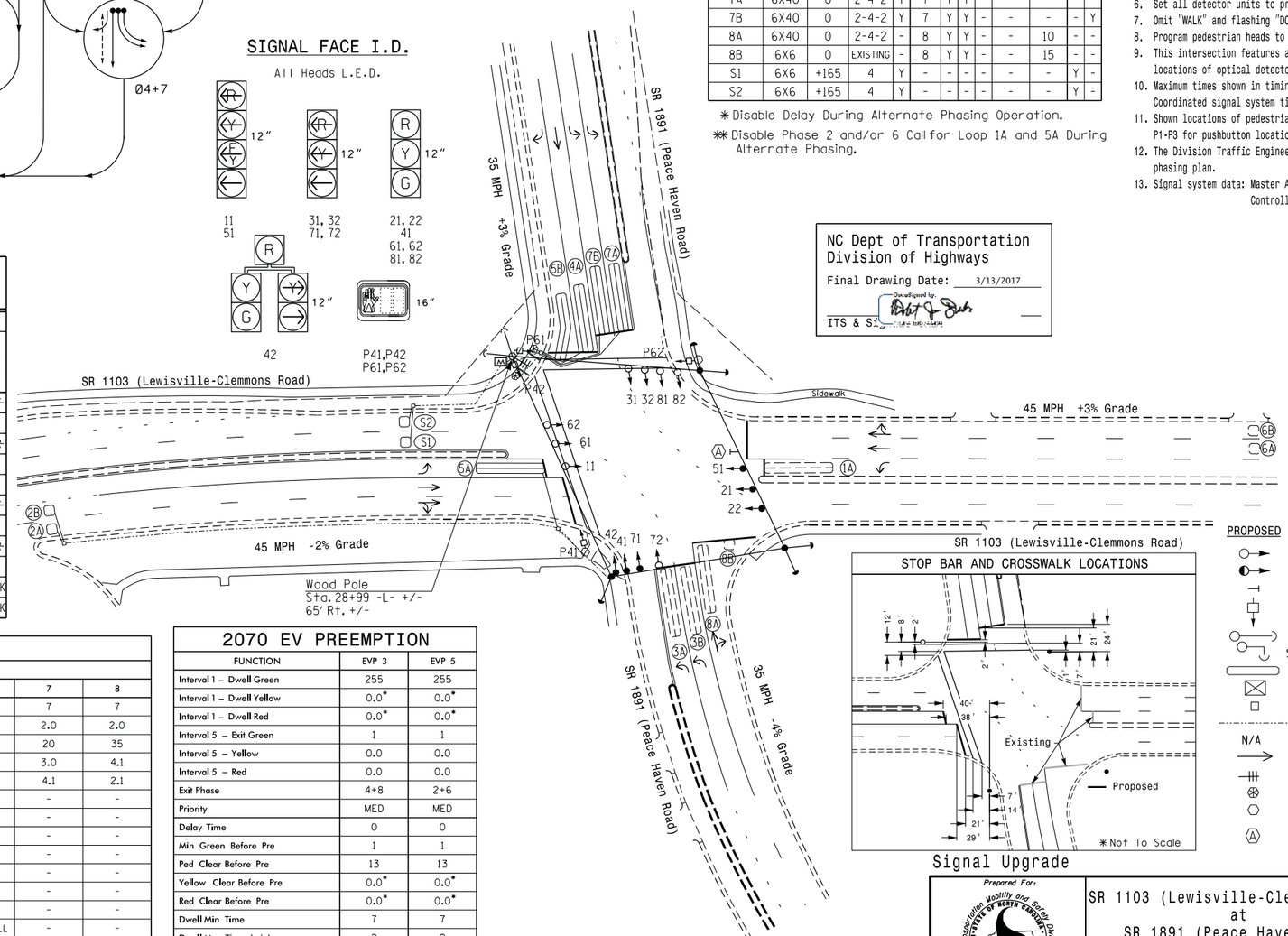
DEFAULT EV PREEMPT PHASES

(Medium Priority)



ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE 01+5	01+6	02+5	02+6	03+8	04+8	04+7	EVP3	EVP5	FLASH
11	↚	↚	R̸	R̸	R̸	R̸	R̸	R̸	R̸	Y̸
21, 22	R	R	G	G	R	R	R	R	G	Y
31, 32	R̸	R̸	R̸	R̸	↚	R̸	R̸	↚	R̸	R̸
41	R	R	R	R	R	G	G	R	R	R
42	R/	R	R/	R	R	G	G	R	R/	R
51	↚	R̸	↚	R̸	R̸	R̸	R̸	R̸	↚	Y̸
61, 62	R	G	R	G	R	R	R	R	R	Y
71, 72	R̸	R̸	R̸	R̸	R̸	R̸	↚	R̸	R̸	R̸
81, 82	R	R	R	R	G	G	R	G	R	R
P41,P42	DW	DW	DW	DW	DW	W	W	DW	DW	DRK
P61,P62	DW	W	DW	W	DW	DW	DW	DW	DW	DRK



STOP BAR AND CROSSWALK LOCATIONS

LEGEND

PROPOSED		EXISTING
	Traffic Signal Head	
	Modified Signal Head	N/A
	Sign	
	Pedestrian Signal Head With Push Button & Sign	
	Signal Pole with Guy	
	Signal Pole with Sidewalk Guy	
	Inductive Loop Detector	
	Controller & Cabinet	
	Junction Box	
	2-in Underground Conduit	
N/A	Right of Way	
	Directional Arrow	
	Opticom GPS Antenna	
	Type I Pushbutton Post	
	Type II Signal Pedestal	
	"U-TURN YIELD TO RIGHT TURN" Sign (R10-16)	

OASIS 2070 TIMING CHART

FEATURE	PHASE 1	2	3	4	5	6	7	8
Min Green 1 *	7	12	7	7	7	12	7	7
Extension 1 *	2.0	6.0	2.0	2.0	2.0	6.0	2.0	2.0
Max Green 1 *	20	100	25	35	20	100	20	35
Yellow Clearance	3.0	4.7	3.0	3.7	3.0	4.7	3.0	4.1
Red Clearance	2.8	1.7	3.6	2.2	3.1	1.7	4.1	2.1
Walk 1 *	-	-	-	7	-	7	-	-
Don't Walk 1	-	-	-	25	-	18	-	-
Seconds Per Actuation *	-	1.5	-	-	-	1.5	-	-
Max Variable Initial *	-	34	-	-	-	34	-	-
Time Before Reduction *	-	15	-	-	-	15	-	-
Time To Reduce *	-	50	-	-	-	50	-	-
Minimum Gap	-	3.0	-	-	-	3.0	-	-
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL	-	-
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW	-	-
Dual Entry	-	-	-	-	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON	ON	ON	ON	ON

* These values may be field adjusted. Do not adjust Min Green and Extension times for phases 2 and 6 lower than what is shown. Min Green for all other phases should not be lower than 4 seconds.

2070 EV PREEMPTION

FUNCTION	EVP 3	EVP 5
Interval 1 – Dwell Green	255	255
Interval 1 – Dwell Yellow	0.0*	0.0*
Interval 1 – Dwell Red	0.0*	0.0*
Interval 5 – Exit Green	1	1
Interval 5 – Yellow	0.0	0.0
Interval 5 – Red	0.0	0.0
Exit Phase	4+8	2+6
Priority	MED	MED
Delay Time	0	0
Min Green Before Pre	1	1
Ped Clear Before Pre	13	13
Yellow Clear Before Pre	0.0*	0.0*
Red Clear Before Pre	0.0*	0.0*
Dwell Min Time	7	7
Dwell Max Time (min)	2	2
Enable Backup Protection	N	N
Ped Clear Through Yellow	Y	Y
Preempt Extend**	2	2

* Time defaults to time used for phase during normal operation
** Program Timing on Optical Detection Unit

NC Dept of Transportation
Division of Highways

Final Drawing Date: 3/13/2017

ITS & Signal Design Section

DocuSigned by: Robert J. Burns 3/13/2017

Signal Upgrade

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared For:
Transportation Mobility and Safety Division
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
Signal Design Section
750 N.Greenfield Pkwy, Garner, NC 27529

Prepared in the offices of:
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Raleigh, North Carolina 27609
919-872-5115 Tel. 919-876-5416 Fax.
www.rameykemp.com

SCALE 0 40
1"=40'

SR 1103 (Lewisville-Clemmons Road)
at
SR 1891 (Peace Haven Road)

Division 9	Forsyth County	Clemmons
PLAN DATE: March 2017	REVIEWED BY: WJ Hamilton	
PREPARED BY: NE Burns	RKA PROJ NO: 15089 (040)	

REVISIONS	INIT.	DATE

SEAL
NORTH CAROLINA PROFESSIONAL SEAL 32396 ENGINEER WILLIAM J. HAMILTON

DocuSigned by: William J. Hamilton 3/7/2017
ENGINEER'S SIGNATURE DATE

SIG. INVENTORY NO. 09-0486

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Protected Phases	7	4	5	3	8	5	2	1	6
Permitted Phases			4			2		6	
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	12.0	7.0	12.0
Minimum Split (s)	14.1	12.9	13.1	13.6	13.2	13.1	18.4	12.8	18.4
Total Split (s)	19.0	22.0	17.0	19.0	22.0	17.0	32.0	17.0	32.0
Total Split (%)	21.1%	24.4%	18.9%	21.1%	24.4%	18.9%	35.6%	18.9%	35.6%
Maximum Green (s)	11.9	16.1	10.9	12.4	15.8	10.9	25.6	11.2	25.6
Yellow Time (s)	3.0	3.7	3.0	3.0	4.1	3.0	4.7	3.0	4.7
All-Red Time (s)	4.1	2.2	3.1	3.6	2.1	3.1	1.7	2.8	1.7
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	6.0	2.0	6.0
Minimum Gap (s)	2.0	2.0	2.0	2.0	2.0	2.0	3.0	2.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	15.0	0.0	15.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	50.0	0.0	50.0
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max
Walk Time (s)									
Flash Dont Walk (s)									
Pedestrian Calls (#/hr)									

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Offset: 60 (67%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Control Type: Actuated-Coordinated

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Protected Phases	7	4	5	3	8	5	2	1	6
Permitted Phases			4			2		6	
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	12.0	7.0	12.0
Minimum Split (s)	14.1	12.9	13.1	13.6	13.2	13.1	18.4	12.8	31.4
Total Split (s)	18.0	20.0	25.0	18.0	20.0	25.0	39.0	18.0	32.0
Total Split (%)	18.9%	21.1%	26.3%	18.9%	21.1%	26.3%	41.1%	18.9%	33.7%
Maximum Green (s)	10.9	14.1	18.9	11.4	13.8	18.9	32.6	12.2	25.6
Yellow Time (s)	3.0	3.7	3.0	3.0	4.1	3.0	4.7	3.0	4.7
All-Red Time (s)	4.1	2.2	3.1	3.6	2.1	3.1	1.7	2.8	1.7
Lead/Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	6.0	2.0	6.0
Minimum Gap (s)	2.0	2.0	2.0	2.0	2.0	2.0	3.0	2.0	3.0
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	15.0	0.0	15.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	50.0	0.0	50.0
Recall Mode	None	None	None	None	None	None	C-Max	None	C-Max
Walk Time (s)									
Flash Dont Walk (s)									
Pedestrian Calls (#/hr)									

Intersection Summary

Cycle Length: 95
Actuated Cycle Length: 95
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Control Type: Actuated-Coordinated

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	147	158	232	232	105	165	144	631	237	6	172	657
Future Volume (vph)	147	158	232	232	105	165	144	631	237	6	172	657
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	11	11	13	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%				3%
Storage Length (ft)	200		360	400		0	600		0		300	
Storage Lanes	2		1	2		0	1		0		1	
Taper Length (ft)	200			200			100				100	
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.95
Frt			0.850		0.908			0.959				0.981
Flt Protected	0.950			0.950			0.950				0.950	
Satd. Flow (prot)	3319	1863	1531	3319	1748	0	1770	3394	0	0	1743	3420
Flt Permitted	0.950			0.950			0.210				0.132	
Satd. Flow (perm)	3319	1863	1531	3319	1748	0	391	3394	0	0	242	3420
Right Turn on Red			Yes			Yes			Yes			
Satd. Flow (RTOR)			121		78			62				18
Link Speed (mph)		35			35			45				45
Link Distance (ft)		1083			851			1056				1428
Travel Time (s)		21.1			16.6			16.0				21.6
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)	163	176	258	258	117	183	160	701	263	7	191	730
Shared Lane Traffic (%)												
Lane Group Flow (vph)	163	176	258	258	300	0	160	964	0	0	198	833
Turn Type	Prot	NA	pm+ov	Prot	NA		pm+pt	NA		pm+pt	pm+pt	NA
Protected Phases	7	4	5	3	8		5	2		1	1	6
Permitted Phases			4				2			6	6	
Detector Phase	7	4	5	3	8		2 5	2		1 6	1	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	12.0		7.0	7.0	12.0
Minimum Split (s)	14.1	12.9	13.1	13.6	13.2		13.1	18.4		12.8	12.8	18.4
Total Split (s)	19.0	22.0	17.0	19.0	22.0		17.0	32.0		17.0	17.0	32.0
Total Split (%)	21.1%	24.4%	18.9%	21.1%	24.4%		18.9%	35.6%		18.9%	18.9%	35.6%
Yellow Time (s)	3.0	3.7	3.0	3.0	4.1		3.0	4.7		3.0	3.0	4.7
All-Red Time (s)	4.1	2.2	3.1	3.6	2.1		3.1	1.7		2.8	2.8	1.7
Lost Time Adjust (s)	-1.8	-1.2	-1.4	-2.1	-1.6		-1.4	-1.7			-0.9	-1.3
Total Lost Time (s)	5.3	4.7	4.7	4.5	4.6		4.7	4.7			4.9	5.1
Lead/Lag	Lag	Lag	Lead	Lead	Lead		Lead	Lag		Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	None	C-Max
Act Effct Green (s)	11.0	14.5	29.4	12.9	15.7		43.3	33.1			44.3	33.4
Actuated g/C Ratio	0.12	0.16	0.33	0.14	0.17		0.48	0.37			0.49	0.37
v/c Ratio	0.40	0.59	0.44	0.54	0.82		0.47	0.75			0.67	0.65
Control Delay	39.0	42.8	14.0	40.1	44.4		16.5	29.3			27.2	27.3
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0	0.0
Total Delay	39.0	42.8	14.0	40.1	44.4		16.5	29.3			27.2	27.3
LOS	D	D	B	D	D		B	C			C	C
Approach Delay		29.3			42.4			27.5				27.3
Approach LOS		C			D			C				C

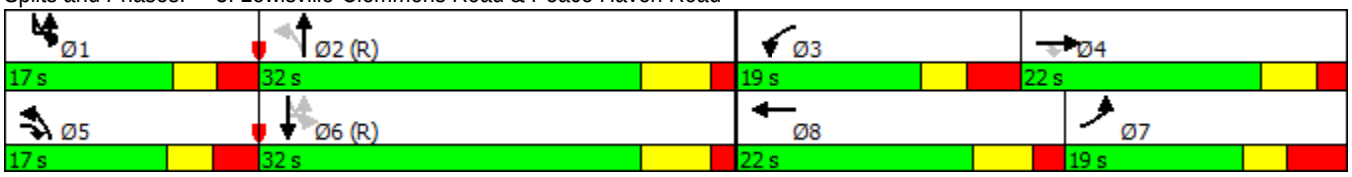
Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	93
Future Volume (vph)	93
Ideal Flow (vphpl)	1900
Lane Width (ft)	12
Grade (%)	
Storage Length (ft)	0
Storage Lanes	0
Taper Length (ft)	
Lane Util. Factor	0.95
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	Yes
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	0.90
Adj. Flow (vph)	103
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Queue Length 50th (ft)	45	93	56	70	120		45	240			57	203
Queue Length 95th (ft)	72	155	114	107	#238		85	#377			#135	297
Internal Link Dist (ft)		1003			771			976				1348
Turn Bay Length (ft)	200		360	400			600				300	
Base Capacity (vph)	505	358	614	534	400		385	1287			329	1279
Starvation Cap Reductn	0	0	0	0	0		0	0			0	0
Spillback Cap Reductn	0	0	0	0	0		0	0			0	0
Storage Cap Reductn	0	0	0	0	0		0	0			0	0
Reduced v/c Ratio	0.32	0.49	0.42	0.48	0.75		0.42	0.75			0.60	0.65

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.82
Intersection Signal Delay: 30.3 Intersection LOS: C
Intersection Capacity Utilization 72.6% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Lewisville-Clemmons Road & Peace Haven Road



Lane Group	SBR
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	106	139	157	346	217	91	212	878	384	1	179	695
Future Volume (vph)	106	139	157	346	217	91	212	878	384	1	179	695
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	11	11	13	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%				3%
Storage Length (ft)	200		360	400		0	600		0		300	
Storage Lanes	2		1	2		0	1		0		1	
Taper Length (ft)	200			200			100				100	
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.95
Frt			0.850		0.956			0.954				0.976
Flt Protected	0.950			0.950			0.950				0.950	
Satd. Flow (prot)	3319	1863	1531	3319	1840	0	1770	3376	0	0	1743	3402
Flt Permitted	0.950			0.950			0.191				0.189	
Satd. Flow (perm)	3319	1863	1531	3319	1840	0	356	3376	0	0	347	3402
Right Turn on Red			Yes			Yes			Yes			
Satd. Flow (RTOR)			188		19			81				24
Link Speed (mph)		35			35			45				45
Link Distance (ft)		1083			851			1056				1428
Travel Time (s)		21.1			16.6			16.0				21.6
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)	118	154	174	384	241	101	236	976	427	1	199	772
Shared Lane Traffic (%)												
Lane Group Flow (vph)	118	154	174	384	342	0	236	1403	0	0	200	922
Turn Type	Prot	NA	pm+ov	Prot	NA		pm+pt	NA		pm+pt	pm+pt	NA
Protected Phases	7	4	5	3	8		5	2		1	1	6
Permitted Phases			4				2			6	6	
Detector Phase	7	4	5	3	8		2 5	2		1 6	1	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	12.0		7.0	7.0	12.0
Minimum Split (s)	14.1	12.9	13.1	13.6	13.2		13.1	18.4		12.8	12.8	18.4
Total Split (s)	18.0	20.0	25.0	18.0	20.0		25.0	39.0		18.0	18.0	32.0
Total Split (%)	18.9%	21.1%	26.3%	18.9%	21.1%		26.3%	41.1%		18.9%	18.9%	33.7%
Yellow Time (s)	3.0	3.7	3.0	3.0	4.1		3.0	4.7		3.0	3.0	4.7
All-Red Time (s)	4.1	2.2	3.1	3.6	2.1		3.1	1.7		2.8	2.8	1.7
Lost Time Adjust (s)	-1.8	-1.2	-1.4	-2.1	-1.6		-1.4	-1.7			-0.9	-1.3
Total Lost Time (s)	5.3	4.7	4.7	4.5	4.6		4.7	4.7			4.9	5.1
Lead/Lag	Lag	Lag	Lead	Lead	Lead		Lead	Lead		Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	None	C-Max
Act Effct Green (s)	10.8	13.4	33.1	13.5	15.4		36.2	36.2			34.3	34.1
Actuated g/C Ratio	0.11	0.14	0.35	0.14	0.16		0.38	0.38			0.36	0.36
v/c Ratio	0.31	0.59	0.27	0.82	1.09		0.66	1.05			0.63	0.74
Control Delay	40.5	47.6	3.3	54.7	114.0		31.0	67.3			43.0	32.1
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0	0.0
Total Delay	40.5	47.6	3.3	54.7	114.0		31.0	67.3			43.0	32.1
LOS	D	D	A	D	F		C	E			D	C
Approach Delay		28.5			82.6			62.1				34.0
Approach LOS		C			F			E				C

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	135
Future Volume (vph)	135
Ideal Flow (vphpl)	1900
Lane Width (ft)	12
Grade (%)	
Storage Length (ft)	0
Storage Lanes	0
Taper Length (ft)	
Lane Util. Factor	0.95
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	Yes
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	0.90
Adj. Flow (vph)	150
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Queue Length 50th (ft)	34	88	0	117	~224		100	~472			86	246
Queue Length 95th (ft)	59	149	32	#187	#397		168	#631			#174	#405
Internal Link Dist (ft)		1003			771			976				1348
Turn Bay Length (ft)	200		360	400			600				300	
Base Capacity (vph)	443	300	730	471	314		437	1337			318	1238
Starvation Cap Reductn	0	0	0	0	0		0	0			0	0
Spillback Cap Reductn	0	0	0	0	0		0	0			0	0
Storage Cap Reductn	0	0	0	0	0		0	0			0	0
Reduced v/c Ratio	0.27	0.51	0.24	0.82	1.09		0.54	1.05			0.63	0.74

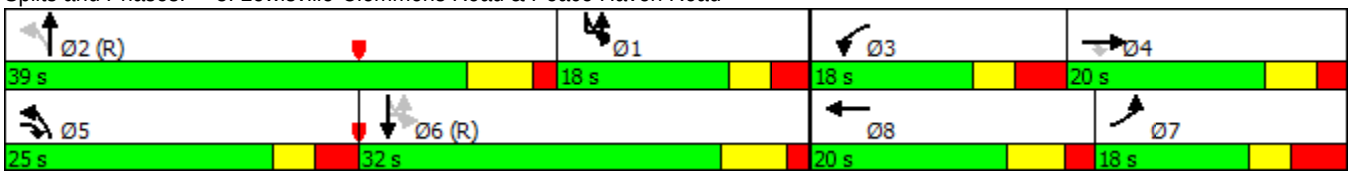
Intersection Summary

Area Type: Other
Cycle Length: 95
Actuated Cycle Length: 95
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.09
Intersection Signal Delay: 54.1 Intersection LOS: D
Intersection Capacity Utilization 85.6% ICU Level of Service E
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Lewisville-Clemmons Road & Peace Haven Road



Lane Group	SBR
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	178	184	229	258	112	163	142	634	234	6	170	699
Future Volume (vph)	178	184	229	258	112	163	142	634	234	6	170	699
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	11	11	13	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%				3%
Storage Length (ft)	200		360	400		0	600		0		300	
Storage Lanes	2		1	2		0	1		0		1	
Taper Length (ft)	200			200			100				100	
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.95
Frt			0.850		0.911			0.960				0.981
Flt Protected	0.950			0.950			0.950				0.950	
Satd. Flow (prot)	3319	1863	1531	3319	1754	0	1770	3398	0	0	1743	3420
Flt Permitted	0.950			0.950			0.176				0.128	
Satd. Flow (perm)	3319	1863	1531	3319	1754	0	328	3398	0	0	235	3420
Right Turn on Red			Yes			Yes			Yes			
Satd. Flow (RTOR)			121		72			60				18
Link Speed (mph)		35			35			45				45
Link Distance (ft)		1083			851			1986				1428
Travel Time (s)		21.1			16.6			30.1				21.6
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)	198	204	254	287	124	181	158	704	260	7	189	777
Shared Lane Traffic (%)												
Lane Group Flow (vph)	198	204	254	287	305	0	158	964	0	0	196	888
Turn Type	Prot	NA	pm+ov	Prot	NA		pm+pt	NA		pm+pt	pm+pt	NA
Protected Phases	7	4	5	3	8		5	2		1	1	6
Permitted Phases			4				2			6	6	
Detector Phase	7	4	5	3	8		2 5	2		1 6	1	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	12.0		7.0	7.0	12.0
Minimum Split (s)	14.1	12.9	13.1	13.6	13.2		13.1	18.4		12.8	12.8	18.4
Total Split (s)	19.0	22.0	17.0	19.0	22.0		17.0	32.0		17.0	17.0	32.0
Total Split (%)	21.1%	24.4%	18.9%	21.1%	24.4%		18.9%	35.6%		18.9%	18.9%	35.6%
Yellow Time (s)	3.0	3.7	3.0	3.0	4.1		3.0	4.7		3.0	3.0	4.7
All-Red Time (s)	4.1	2.2	3.1	3.6	2.1		3.1	1.7		2.8	2.8	1.7
Lost Time Adjust (s)	-1.8	-1.2	-1.4	-2.1	-1.6		-1.4	-1.7			-0.9	-1.3
Total Lost Time (s)	5.3	4.7	4.7	4.5	4.6		4.7	4.7			4.9	5.1
Lead/Lag	Lag	Lag	Lead	Lead	Lead		Lead	Lag		Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	None	C-Max
Act Effct Green (s)	11.6	14.9	29.9	13.3	15.9		42.8	32.5			43.2	32.5
Actuated g/C Ratio	0.13	0.17	0.33	0.15	0.18		0.48	0.36			0.48	0.36
v/c Ratio	0.46	0.66	0.43	0.59	0.83		0.49	0.76			0.68	0.71
Control Delay	39.6	45.5	13.4	40.8	46.4		17.8	30.1			29.2	29.6
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0	0.0
Total Delay	39.6	45.5	13.4	40.8	46.4		17.8	30.1			29.2	29.6
LOS	D	D	B	D	D		B	C			C	C
Approach Delay		31.3			43.7			28.4				29.5
Approach LOS		C			D			C				C

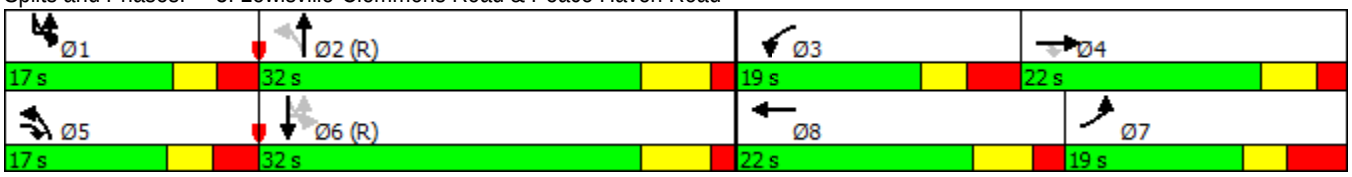
Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	100
Future Volume (vph)	100
Ideal Flow (vphpl)	1900
Lane Width (ft)	12
Grade (%)	
Storage Length (ft)	0
Storage Lanes	0
Taper Length (ft)	
Lane Util. Factor	0.95
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	Yes
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	0.90
Adj. Flow (vph)	111
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Queue Length 50th (ft)	54	109	54	78	127		45	244			58	225
Queue Length 95th (ft)	86	178	111	118	#251		84	#378			#135	#348
Internal Link Dist (ft)		1003			771			1906				1348
Turn Bay Length (ft)	200		360	400			600				300	
Base Capacity (vph)	505	358	621	534	397		360	1265			319	1248
Starvation Cap Reductn	0	0	0	0	0		0	0			0	0
Spillback Cap Reductn	0	0	0	0	0		0	0			0	0
Storage Cap Reductn	0	0	0	0	0		0	0			0	0
Reduced v/c Ratio	0.39	0.57	0.41	0.54	0.77		0.44	0.76			0.61	0.71

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.83
Intersection Signal Delay: 31.9 Intersection LOS: C
Intersection Capacity Utilization 72.7% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Lewisville-Clemmons Road & Peace Haven Road



Lane Group	SBR
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	143	179	152	371	221	90	206	889	378	1	176	734
Future Volume (vph)	143	179	152	371	221	90	206	889	378	1	176	734
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	11	11	13	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%				3%
Storage Length (ft)	200		360	400		0	600		0		300	
Storage Lanes	2		1	2		0	1		0		1	
Taper Length (ft)	200			200			100				100	
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.95
Frt			0.850		0.957			0.955				0.976
Flt Protected	0.950			0.950			0.950				0.950	
Satd. Flow (prot)	3319	1863	1531	3319	1842	0	1770	3380	0	0	1743	3402
Flt Permitted	0.950			0.950			0.197				0.194	
Satd. Flow (perm)	3319	1863	1531	3319	1842	0	367	3380	0	0	356	3402
Right Turn on Red			Yes			Yes			Yes			
Satd. Flow (RTOR)			188		18			78				24
Link Speed (mph)		35			35			45				45
Link Distance (ft)		1083			851			1986				1428
Travel Time (s)		21.1			16.6			30.1				21.6
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)	159	199	169	412	246	100	229	988	420	1	196	816
Shared Lane Traffic (%)												
Lane Group Flow (vph)	159	199	169	412	346	0	229	1408	0	0	197	974
Turn Type	Prot	NA	pm+ov	Prot	NA		pm+pt	NA		pm+pt	pm+pt	NA
Protected Phases	7	4	5	3	8		5	2		1	1	6
Permitted Phases			4				2			6	6	
Detector Phase	7	4	5	3	8		2 5	2		1 6	1	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	12.0		7.0	7.0	12.0
Minimum Split (s)	14.1	12.9	13.1	13.6	13.2		13.1	18.4		12.8	12.8	18.4
Total Split (s)	18.0	20.0	25.0	18.0	20.0		25.0	39.0		18.0	18.0	32.0
Total Split (%)	18.9%	21.1%	26.3%	18.9%	21.1%		26.3%	41.1%		18.9%	18.9%	33.7%
Yellow Time (s)	3.0	3.7	3.0	3.0	4.1		3.0	4.7		3.0	3.0	4.7
All-Red Time (s)	4.1	2.2	3.1	3.6	2.1		3.1	1.7		2.8	2.8	1.7
Lost Time Adjust (s)	-1.8	-1.2	-1.4	-2.1	-1.6		-1.4	-1.7			-0.9	-1.3
Total Lost Time (s)	5.3	4.7	4.7	4.5	4.6		4.7	4.7			4.9	5.1
Lead/Lag	Lag	Lag	Lead	Lead	Lead		Lead	Lead		Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	None	C-Max
Act Effct Green (s)	11.5	14.1	33.7	13.5	15.4		35.5	35.5			33.7	33.5
Actuated g/C Ratio	0.12	0.15	0.35	0.14	0.16		0.37	0.37			0.35	0.35
v/c Ratio	0.39	0.72	0.25	0.87	1.11		0.64	1.07			0.62	0.80
Control Delay	41.2	53.7	3.1	60.7	119.2		30.9	76.4			42.8	34.8
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0	0.0
Total Delay	41.2	53.7	3.1	60.7	119.2		30.9	76.4			42.8	34.8
LOS	D	D	A	E	F		C	E			D	C
Approach Delay		33.7			87.4			70.1				36.2
Approach LOS		C			F			E				D

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	142
Future Volume (vph)	142
Ideal Flow (vphpl)	1900
Lane Width (ft)	12
Grade (%)	
Storage Length (ft)	0
Storage Lanes	0
Taper Length (ft)	
Lane Util. Factor	0.95
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	Yes
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	0.90
Adj. Flow (vph)	158
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Queue Length 50th (ft)	45	114	0	127	~230		100	~498			87	275
Queue Length 95th (ft)	76	#200	30	#208	#405		162	#635			#168	#443
Internal Link Dist (ft)		1003			771			1906				1348
Turn Bay Length (ft)	200		360	400			600				300	
Base Capacity (vph)	443	300	741	471	313		436	1310			317	1213
Starvation Cap Reductn	0	0	0	0	0		0	0			0	0
Spillback Cap Reductn	0	0	0	0	0		0	0			0	0
Storage Cap Reductn	0	0	0	0	0		0	0			0	0
Reduced v/c Ratio	0.36	0.66	0.23	0.87	1.11		0.53	1.07			0.62	0.80

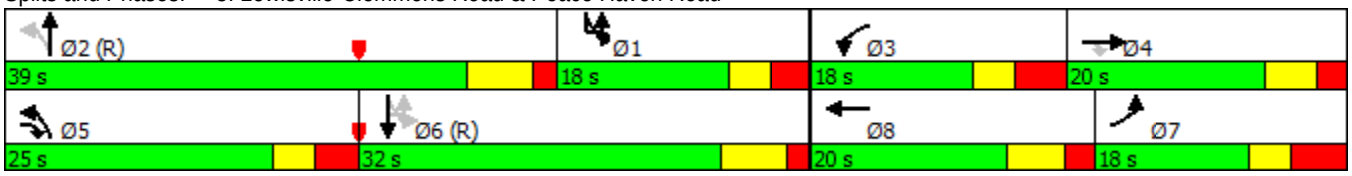
Intersection Summary

Area Type: Other
Cycle Length: 95
Actuated Cycle Length: 95
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.11
Intersection Signal Delay: 58.9 Intersection LOS: E
Intersection Capacity Utilization 85.7% ICU Level of Service E
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Lewisville-Clemmons Road & Peace Haven Road



Lane Group	SBR
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	182	185	238	258	113	163	147	634	234	6	170	699
Future Volume (vph)	182	185	238	258	113	163	147	634	234	6	170	699
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	11	11	13	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%				3%
Storage Length (ft)	200		360	400		0	600		0		300	
Storage Lanes	2		1	2		0	1		0		1	
Taper Length (ft)	200			200			100				100	
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.95
Frt			0.850		0.912			0.960				0.981
Flt Protected	0.950			0.950			0.950				0.950	
Satd. Flow (prot)	3319	1863	1531	3319	1755	0	1770	3398	0	0	1743	3420
Flt Permitted	0.950			0.950			0.172				0.126	
Satd. Flow (perm)	3319	1863	1531	3319	1755	0	320	3398	0	0	231	3420
Right Turn on Red			Yes			Yes			Yes			
Satd. Flow (RTOR)			121		71			60				18
Link Speed (mph)		35			35			45				45
Link Distance (ft)		1083			851			1056				1428
Travel Time (s)		21.1			16.6			16.0				21.6
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)	202	206	264	287	126	181	163	704	260	7	189	777
Shared Lane Traffic (%)												
Lane Group Flow (vph)	202	206	264	287	307	0	163	964	0	0	196	890
Turn Type	Prot	NA	pm+ov	Prot	NA		pm+pt	NA		pm+pt	pm+pt	NA
Protected Phases	7	4	5	3	8		5	2		1	1	6
Permitted Phases			4				2			6	6	
Detector Phase	7	4	5	3	8		2 5	2		1 6	1	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	12.0		7.0	7.0	12.0
Minimum Split (s)	14.1	12.9	13.1	13.6	13.2		13.1	18.4		12.8	12.8	18.4
Total Split (s)	19.0	22.0	17.0	19.0	22.0		17.0	32.0		17.0	17.0	32.0
Total Split (%)	21.1%	24.4%	18.9%	21.1%	24.4%		18.9%	35.6%		18.9%	18.9%	35.6%
Yellow Time (s)	3.0	3.7	3.0	3.0	4.1		3.0	4.7		3.0	3.0	4.7
All-Red Time (s)	4.1	2.2	3.1	3.6	2.1		3.1	1.7		2.8	2.8	1.7
Lost Time Adjust (s)	-1.8	-1.2	-1.4	-2.1	-1.6		-1.4	-1.7			-0.9	-1.3
Total Lost Time (s)	5.3	4.7	4.7	4.5	4.6		4.7	4.7			4.9	5.1
Lead/Lag	Lag	Lag	Lead	Lead	Lead		Lead	Lag		Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	None	C-Max
Act Effct Green (s)	11.6	15.1	30.1	13.3	16.0		42.7	32.4			43.0	32.3
Actuated g/C Ratio	0.13	0.17	0.33	0.15	0.18		0.47	0.36			0.48	0.36
v/c Ratio	0.47	0.66	0.45	0.59	0.83		0.51	0.76			0.69	0.72
Control Delay	39.7	45.5	14.0	40.8	47.0		18.4	30.2			29.8	29.9
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0	0.0
Total Delay	39.7	45.5	14.0	40.8	47.0		18.4	30.2			29.8	29.9
LOS	D	D	B	D	D		B	C			C	C
Approach Delay		31.4			44.0			28.5				29.9
Approach LOS		C			D			C				C

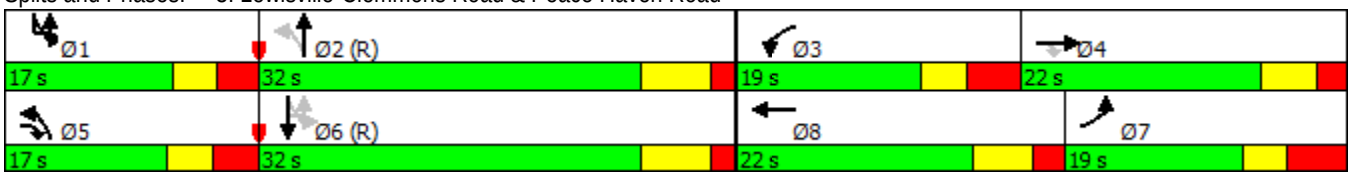
Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	102
Future Volume (vph)	102
Ideal Flow (vphpl)	1900
Lane Width (ft)	12
Grade (%)	
Storage Length (ft)	0
Storage Lanes	0
Taper Length (ft)	
Lane Util. Factor	0.95
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	Yes
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	0.90
Adj. Flow (vph)	113
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Queue Length 50th (ft)	55	110	59	78	129		47	245			58	227
Queue Length 95th (ft)	87	179	118	118	#254		86	#378			#137	#350
Internal Link Dist (ft)		1003			771			976				1348
Turn Bay Length (ft)	200		360	400			600				300	
Base Capacity (vph)	505	358	623	534	396		356	1261			317	1239
Starvation Cap Reductn	0	0	0	0	0		0	0			0	0
Spillback Cap Reductn	0	0	0	0	0		0	0			0	0
Storage Cap Reductn	0	0	0	0	0		0	0			0	0
Reduced v/c Ratio	0.40	0.58	0.42	0.54	0.78		0.46	0.76			0.62	0.72

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.83
Intersection Signal Delay: 32.1 Intersection LOS: C
Intersection Capacity Utilization 72.8% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Lewisville-Clemmons Road & Peace Haven Road



Lane Group	SBR
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

Intersection Summary

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	146	180	159	371	222	90	216	889	378	1	176	734
Future Volume (vph)	146	180	159	371	222	90	216	889	378	1	176	734
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	11	11	13	12	12	12	12	12	12	12
Grade (%)		0%			0%			0%				3%
Storage Length (ft)	200		360	400		0	600		0		300	
Storage Lanes	2		1	2		0	1		0		1	
Taper Length (ft)	200			200			100				100	
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	1.00	0.95	0.95	0.95	1.00	0.95
Frt			0.850		0.957			0.955				0.975
Flt Protected	0.950			0.950			0.950				0.950	
Satd. Flow (prot)	3319	1863	1531	3319	1842	0	1770	3380	0	0	1743	3399
Flt Permitted	0.950			0.950			0.201				0.198	
Satd. Flow (perm)	3319	1863	1531	3319	1842	0	374	3380	0	0	363	3399
Right Turn on Red			Yes			Yes			Yes			
Satd. Flow (RTOR)			188		18			78				24
Link Speed (mph)		35			35			45				45
Link Distance (ft)		1083			851			1056				1428
Travel Time (s)		21.1			16.6			16.0				21.6
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)	162	200	177	412	247	100	240	988	420	1	196	816
Shared Lane Traffic (%)												
Lane Group Flow (vph)	162	200	177	412	347	0	240	1408	0	0	197	979
Turn Type	Prot	NA	pm+ov	Prot	NA		pm+pt	NA		pm+pt	pm+pt	NA
Protected Phases	7	4	5	3	8		5	2		1	1	6
Permitted Phases			4				2			6	6	
Detector Phase	7	4	5	3	8		2 5	2		1 6	1	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	12.0		7.0	7.0	12.0
Minimum Split (s)	14.1	12.9	13.1	13.6	13.2		13.1	18.4		12.8	12.8	18.4
Total Split (s)	18.0	20.0	25.0	18.0	20.0		25.0	39.0		18.0	18.0	32.0
Total Split (%)	18.9%	21.1%	26.3%	18.9%	21.1%		26.3%	41.1%		18.9%	18.9%	33.7%
Yellow Time (s)	3.0	3.7	3.0	3.0	4.1		3.0	4.7		3.0	3.0	4.7
All-Red Time (s)	4.1	2.2	3.1	3.6	2.1		3.1	1.7		2.8	2.8	1.7
Lost Time Adjust (s)	-1.8	-1.2	-1.4	-2.1	-1.6		-1.4	-1.7			-0.9	-1.3
Total Lost Time (s)	5.3	4.7	4.7	4.5	4.6		4.7	4.7			4.9	5.1
Lead/Lag	Lag	Lag	Lead	Lead	Lead		Lead	Lead		Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	C-Max		None	None	C-Max
Act Effct Green (s)	11.6	14.2	34.1	13.5	15.4		35.4	35.4			33.3	33.1
Actuated g/C Ratio	0.12	0.15	0.36	0.14	0.16		0.37	0.37			0.35	0.35
v/c Ratio	0.40	0.72	0.26	0.87	1.11		0.66	1.08			0.62	0.82
Control Delay	41.3	53.9	3.4	60.7	120.2		31.6	76.7			42.9	35.7
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0	0.0
Total Delay	41.3	53.9	3.4	60.7	120.2		31.6	76.7			42.9	35.7
LOS	D	D	A	E	F		C	E			D	D
Approach Delay		33.5			87.9			70.1				36.9
Approach LOS		C			F			E				D

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	147
Future Volume (vph)	147
Ideal Flow (vphpl)	1900
Lane Width (ft)	12
Grade (%)	
Storage Length (ft)	0
Storage Lanes	0
Taper Length (ft)	
Lane Util. Factor	0.95
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	Yes
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	0.90
Adj. Flow (vph)	163
Shared Lane Traffic (%)	
Lane Group Flow (vph)	0
Turn Type	
Protected Phases	
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	
Minimum Split (s)	
Total Split (s)	
Total Split (%)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Queue Length 50th (ft)	46	115	0	127	~231		106	~498			88	280
Queue Length 95th (ft)	77	#201	34	#208	#406		170	#635			#167	#446
Internal Link Dist (ft)		1003			771			976				1348
Turn Bay Length (ft)	200		360	400			600				300	
Base Capacity (vph)	443	300	741	471	313		437	1309			317	1199
Starvation Cap Reductn	0	0	0	0	0		0	0			0	0
Spillback Cap Reductn	0	0	0	0	0		0	0			0	0
Storage Cap Reductn	0	0	0	0	0		0	0			0	0
Reduced v/c Ratio	0.37	0.67	0.24	0.87	1.11		0.55	1.08			0.62	0.82

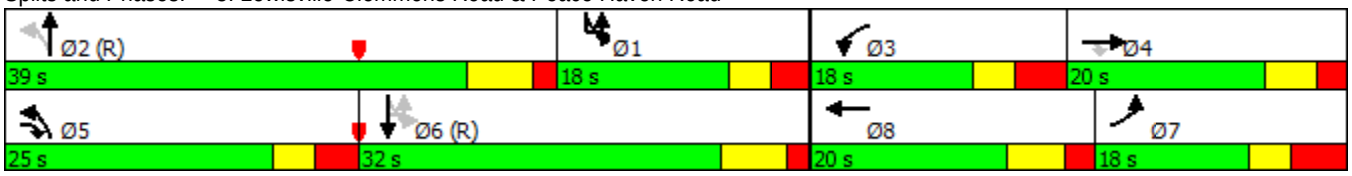
Intersection Summary

Area Type: Other
Cycle Length: 95
Actuated Cycle Length: 95
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.11
Intersection Signal Delay: 59.1 Intersection LOS: E
Intersection Capacity Utilization 85.7% ICU Level of Service E
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Lewisville-Clemmons Road & Peace Haven Road



Lane Group	SBR
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	

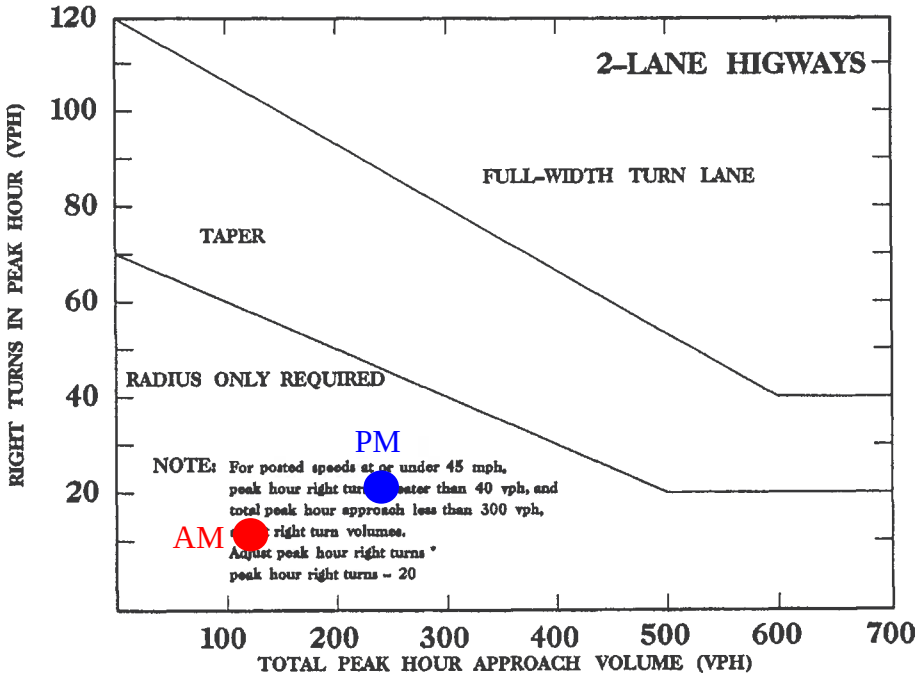
Intersection Summary

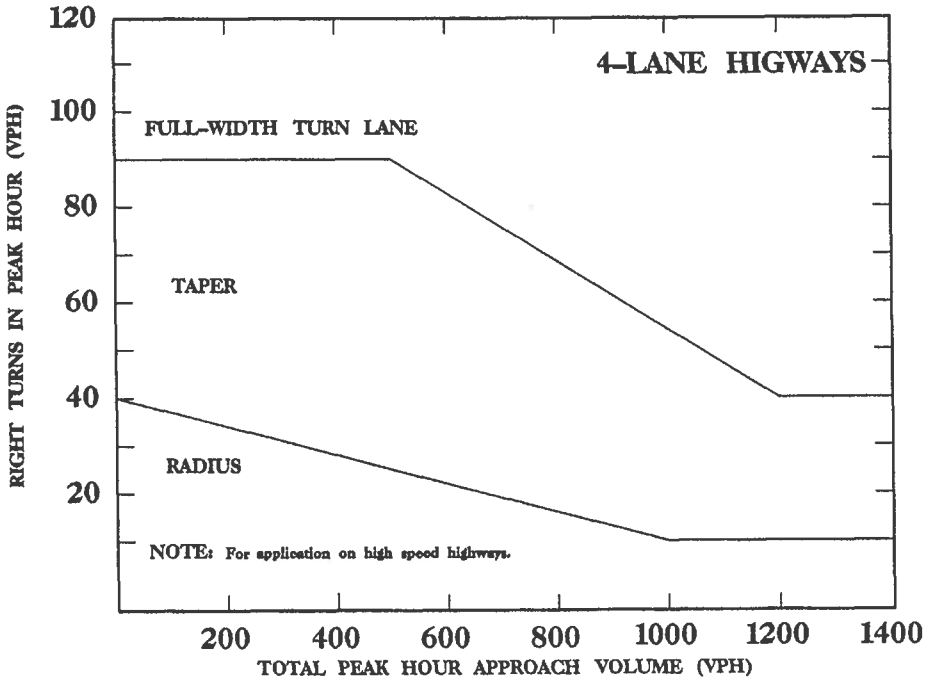
PEACE HAVEN ROAD
&
SITE ACCESS

FIGURE 4 **9 - 1**

F – 4 C

RIGHT TURN LANE WARRANTS





Intersection						
Int Delay, s/veh	1					

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	22	4	98	12	4	161
Future Vol, veh/h	22	4	98	12	4	161
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	24	4	109	13	4	179

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	304	116	0	0	122	0
Stage 1	116	-	-	-	-	-
Stage 2	188	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	688	936	-	-	1465	-
Stage 1	909	-	-	-	-	-
Stage 2	844	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	686	936	-	-	1465	-
Mov Cap-2 Maneuver	686	-	-	-	-	-
Stage 1	909	-	-	-	-	-
Stage 2	841	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.2	0	0.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	715	1465	-
HCM Lane V/C Ratio	-	-	0.04	0.003	-
HCM Control Delay (s)	-	-	10.2	7.5	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-

Intersection	
Int Delay, s/veh	0.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	17	4	217	25	4	147
Future Vol, veh/h	17	4	217	25	4	147
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	19	4	241	28	4	163

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	427	255	0	0	269	0
Stage 1	255	-	-	-	-	-
Stage 2	172	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	584	784	-	-	1295	-
Stage 1	788	-	-	-	-	-
Stage 2	858	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	582	784	-	-	1295	-
Mov Cap-2 Maneuver	582	-	-	-	-	-
Stage 1	788	-	-	-	-	-
Stage 2	855	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.1	0	0.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	612	1295	-
HCM Lane V/C Ratio	-	-	0.038	0.003	-
HCM Control Delay (s)	-	-	11.1	7.8	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.1	0	-