



Memorandum

To: Jimmy Terry, PE
TGS Engineers
4-C N. Lafayette Street
Shelby, NC 28150

Date: September 20, 2017

Project #: 38536.13

From: Andrew Topp, PE, PTOE

Re: STIP No. R-2588B, NC 191 Widening Capacity Analysis – Mills River,
North Carolina

This memorandum reports an assessment of the traffic operations related to the above referenced STIP Project No. R-2588B project in Mills River, North Carolina.

PROJECT BACKGROUND

STIP Project No. R-2588B proposes the widening of a 4.5-mile stretch of NC 191 in Mills River, North Carolina from NC 280 (Boylston Highway) to SR 1381 (Mountain Road). The project will consist of widening the existing two-lane roadway to a four-lane, median-divided facility. Additionally, intersection improvements were identified based on capacity or safety needs within the study area and are included in this memorandum.

The following intersections are included in the study area of this analysis:

1. NC 191 (Haywood Road) at NC 280 (Boylston Highway)
2. NC 191 (Haywood Road) at SR 1331 (Banner Farm Road)
3. NC 191 (Haywood Road) at SR 1314 (School House Road)
4. NC 191 (Haywood Road) at SR 1312/SR 1365 (Rugby Road)
5. NC 191 (Haywood Road) at SR 2044 (Haywood Knolls Drive)
6. NC 191 (Haywood Road) at SR 2044 (Alpine Drive)/West Henderson High School Entrance
7. NC 191 (Haywood Road) at SR 1380 (Bradley Road)
8. NC 191 (Haywood Road) at Rugby Middle School Entrance
9. NC 191 (Haywood Road) at SR 1381 (Mountain Road)/SR 1444 (Leverette Drive)

The capacity analysis was prepared in accordance with the North Carolina Department of Transportation (NCDOT) Congestion Management Analysis Guidelines. Future construction projects for the area were reviewed from the current French Broad River MPO (FBRMPO) 2040 Metropolitan Transportation Plan and incorporated into the Interim Year (2030) and Design Year (2040) scenarios. The Interim Year (2030) forecast was developed due to a proposed expressway coming online in 2030 that was expected to divert traffic from NC 191 to I-26. This diversion in traffic would help the Design Year (2040) scenario and result in the Interim Year (2030) being the worst-case scenario. After examining the 2030 and 2040 Build forecasts it was determined that NC 191 volumes continue to increase after the new expressway is open. The forecasted peak hour volumes used for the Interim Year (2030) and Design Year (2040) scenarios do account for the new four-lane expressway (Balfour Parkway) that is proposed to open between 2026 and 2030. The following scenarios were utilized for capacity analysis:

- Base Year (2017) No-Build: includes AM and PM peak hour analysis based on current lane configurations and forecasted 2017 peak hour volumes.
- Base Year (2017) Build: includes AM and PM peak hour analysis based on forecasted 2017 peak hour volumes. The analysis assumes the proposed widening and recommended intersection improvements in place.
- Interim Year (2030) No-Build: includes AM and PM peak hour analysis based on current lane configurations with any planned improvements and forecasted 2030 peak hour volumes.

- Interim Year (2030) Build: includes AM and PM peak hour analysis based on forecasted 2030 peak hour volumes. The analysis assumed the proposed widening and recommended intersection improvements in place.
- Design Year (2040) No-Build: includes AM and PM peak hour analysis based on current lane configurations with any planned improvements and forecasted 2040 peak hour volumes.
- Design Year (2040) Build: includes AM and PM peak hour analysis based on forecasted 2040 peak hour volumes. Analysis assumes the proposed widening and recommended intersection improvements in place.

Intersection peak hour turning movements were converted from the forecast data approved July 26, 2017 submitted by VHB using the NCDOT Intersection Analysis Utility (IAU). The forecast and completed IAU calculations are contained in Appendix A.

Existing (2017) Conditions

Roadway Conditions

This section describes the characteristics of the primary streets within the study area. Annual Average Daily Traffic (AADT) data for the surrounding roadway network was obtained from the forecast submitted by VHB. The AADT counts reported are representative of the Base Year (2017) No-Build forecast.

NC 191 (Haywood Road)

NC 191 is a predominately two-lane undivided roadway within the study area with partial segments that have a center two-way left-turn lane or other turn lanes. The roadway has a posted speed limit of 45 mph, except between French Broad River and Meriwood Lane where the posted speed limit is 55 mph. The roadway does have a school zone with a posted speed limit of 35 mph around West Henderson High School and Rugby Middle School. This roadway provides access to institutional, commercial, and residential uses within the study area. According to the project forecast, the 2017 AADT along NC 191 was 12,400 vehicles per day (vpd) east of NC 280 (Boylston Highway), and it carries volumes that vary between 9,700 vpd and 14,400 vpd throughout the rest of the study area.



Looking west along NC 191 (Haywood Road) between SR 1381 (Mountain Road) and Rugby Middle School



Looking east along NC 191 (Haywood Road) at the SR 1314 (Ladson Road) intersection

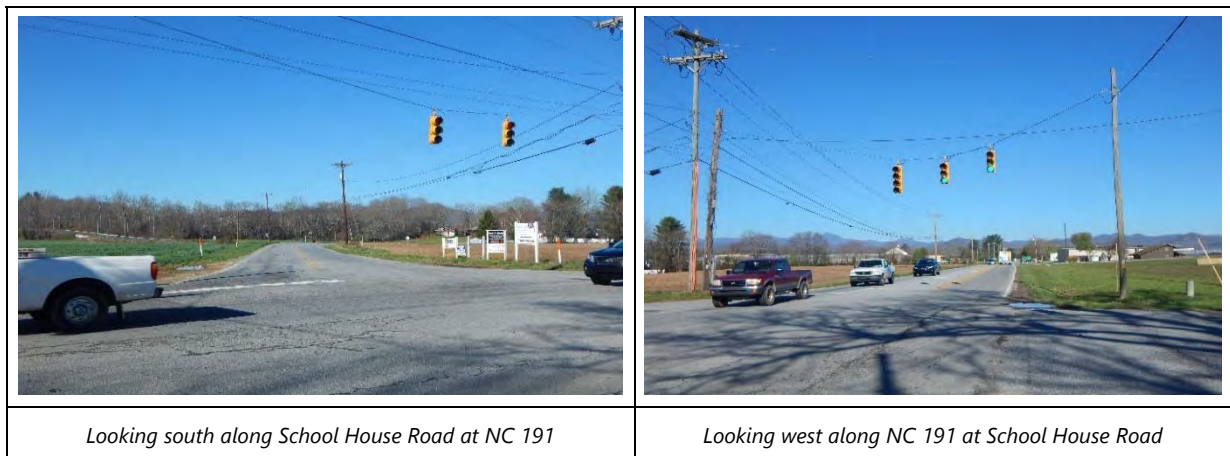
NC 280 (Boylston Highway)

NC 280 is a four-lane undivided facility with a posted speed limit of 45 mph through the study area. NC 280 approaches the intersection with NC 191 from the south where both roadways join together and travel north. The land uses along this roadway are institutional, residential, and commercial. According to the project forecast, the projected 2017 AADT along NC 280 north of the intersection with NC 191 was 29,400 vpd and 19,300 vpd south of the intersection.



SR 1314 (School House Road)

School House Road is a two-lane roadway with a posted speed limit of 45 mph that approaches NC 191 (Haywood Road) from the south. The land uses along School House Road are institutional, residential, and commercial. School House Road provides direct access to Mills River Elementary School. Another roadway of interest is SR 1314 (Ladson Road) which connects to School House Road right before the intersection with NC 191 (Haywood Road). It should be noted that School House Road carries a SR 1426 designation west of SR 1314 (Ladson Road) and then carries the SR 1314 designation north of Ladson Road. The land uses along SR 1314 (Ladson Road) are primarily residential. The forecasted 2017 AADT along SR 1314 (School House Road) was 4,800 vpd.



SR 1312/SR 1365 (Rugby Road)

Rugby Road is a two-lane roadway that has a posted speed limit of 35 mph south of the intersection with NC 191 (Haywood Road) and a posted speed limit of 45 mph north of the intersection. The land uses along Rugby Road are primarily institutional and residential. According to the project forecast, the 2017 AADT along Rugby Road, north of the intersection with NC 191, was 6,900 vpd and 6,400 vpd south of the intersection.



SR 1381 (Mountain Road)

SR 1381 (Mountain Road) is a two-lane roadway that ends at the intersection with NC 191 (Haywood Road). The posted speed limit along SR 1381 (Mountain Road) is 35 mph. The land uses along SR 1381 are primarily residential and institutional. Also at the intersection with NC 191 (Haywood Road) and SR 1381 (Mountain Road) is a small roadway, SR 1444 (Leverette Drive), with primarily residential land uses. According to the project forecast, the 2017 AADT along SR 1381 (Mountain Road) was 6,300 vpd.



Crash Analysis

Five-year crash data (6/1/2012 – 5/31/2017) was obtained from the NCDOT for NC 191 from NC 280 (Boylston Highway) to SR 1381 (Mountain Road) in Mills River, North Carolina. The NCDOT crash summary memorandum and 5-year strip analysis is attached in Appendix B. As shown in Table 1, NC 191 has a total crash rate that is higher than the statewide average rate and critical rate over the five-year period. In addition, the fatal, non-fatal injury, and wet crash rates are above statewide averages. There were three fatalities reported along the NC 191 corridor during the five-year study period. Two of the three fatalities occurred between the Rugby Road and School House Road intersections. The collisions involved high speed lane departure crashes (65 mph and 75 mph, respectively) with the single vehicles striking a tree along the roadway. The third fatal accident occurred at the Rugby Road intersection and was an accident involving a vehicle making a southeast left-turn maneuver and being hit by a high-speed vehicle travelling westbound on NC 191. As shown in Table 2, predominant crash types along the corridor were, in order: rear end, left turn, and struck object crashes. Table 3 shows that the intersection with NC 280 (Boylston Highway) and NC 191 had the highest number of collisions (51) over the five-year period.

Table 1: NC 191 from NC 280 (Boylston Highway) to SR 1381 (Mountain Road) Crash Rates (6/1/2012 – 5/31/2017)

Type	Crashes	Crashes per 100 MVM	Statewide Rate ¹	Critical Rate ²
Total	233	256.58	196.64	221.40
Fatal	3	3.30	1.73	4.55
Non-Fatal Injury	69	75.98	60.73	74.73
Night	32	35.24	54.13	67.38
Wet	40	44.05	23.91	32.90

¹2013-2015 statewide crash rate for rural 2-lane, undivided North Carolina Routes

²Based on the statewide crash rate (95% level of confidence)

Table 2: Crash Type

Crash Type	Crashes	%
Angle	10	4%
Animal	5	2%
Backing Up	2	1%
Head On	2	1%
Left Turn	42	18%
Overturn/Rollover	3	1%
Parked Vehicle	1	0%
Rear End	122	51%
Right Turn	6	3%
Sideswipe	11	5%
Struck Object	27	12%
Other	2	1%

Table 3: Total Crashes by Intersection

Intersection/Location	Angle	Left Turn	Rear End	Right Turn	Sideswipe	Struck Object	Other	Total
Mountain Rd/Leverette Dr	1	4	3		1	1	1	11
Shannon Rd		1	1			1		3
Cimarron Blvd			5			1	1	7
Rugby Middle School		3		1		1	1	6
Bradley Rd			6			1	1	8
Traditional Way			3		1	1		5
West Henderson High School		2	12			1		15
Haywood Knolls Dr			9				1	10
N Hills Dr			5					5
E Grandview Ln		1	3					4
Rugby Rd	5	8	10				1	24
Mile 4.49			3			2		5
Mile 4.59			4					4
Mile 4.68			1			2		3
Mile 4.78					1	1	1	3
Mile 5.10			1			1	2	4
Structure: 440121			1			1	1	3
Ladson Rd/School House Rd			5	1			1	7
Banner Farm Rd		2	3	1		1		7
Mills River Hardware			3	1				4
Waycaster Tire & Auto			2		1			3
NC 280 (Boylston Highway)	4	18	20	2	5	2		51

There are a substantial number of crashes around the NC 280 (Boylston Highway) intersection. The area around the intersection sees a lot of congestion during the peak hours which could lead to a higher amount of crashes. Another area with a high amount of crashes is along NC 191 around the SR 1312/SR 1365 (Rugby Road) intersection. The intersection sits along a horizontal curve with the roadway speed limit set at 45 mph. These conditions may contribute to the higher amount of crashes and possibly the fatal accident that occurred. The design should strive to improve the sight distance along NC 191 at this intersection when widening the roadway. The widening of NC 191 will help mitigate many of the capacity related crashes and the new median should help reduce left-turn, angle, and head on crashes at mid-block locations.

It is important to note that the number of crashes reported in Table 2 (233) does not match the number of crashes reported in Table 3 (192). Crashes along this corridor occurred more sporadically than a corridor in a more urban area; therefore, not as many crashes were reported at intersections or areas of interest.

Level of Service Analysis

Peak hour level of service (LOS) measures the adequacy of the intersection geometrics and traffic controls of an intersection or approach for the given turning volumes. Levels of service range from A through F, based on the average

control delay experienced by vehicles traveling through the intersection during the peak hour. Control delay represents the portion of total delay attributed to traffic control devices (e.g., signals or stop signs). The engineering profession generally accepts LOS D as an acceptable operating condition for signalized intersections in urban areas and LOS C for rural areas.

At unsignalized intersections, LOS E is generally considered acceptable only if the side street encounters delay. Nevertheless, side streets sometimes function at LOS F during peak traffic periods; however, the traffic volumes often do not warrant a traffic signal to assist side street traffic. Table 4 provides a general description of various levels of service categories and delay ranges.

Table 4: Level of Service Description for Intersections

Level of Service	Description	Signalized Intersection	Unsignalized Intersection
A	Little or no delay	<= 10 sec.	<= 10 sec.
B	Short traffic delay	10-20 sec.	10-15 sec.
C	Average traffic delay	20-35 sec.	15-25 sec.
D	Long traffic delay	35-55 sec.	25-35 sec.
E	Very long traffic delay	55-80 sec.	35-50 sec.
F	Unacceptable delay	> 80 sec.	> 50 sec.

For all scenarios, signalized and unsignalized intersection levels of service (LOS) analyses were performed for the calculated weekday AM and PM peak hours using *Synchro/SimTraffic Professional Version 9*. Signal phasing information was obtained from the signal plans which are contained in Appendix C. Signal cycle lengths and splits were optimized in accordance with the NCDOT Congestion Management Capacity Analysis Guidelines for all six scenarios and are reported in Appendix D.

Base Year (2017) No-Build Conditions

No-Build (2017) analyses were conducted based on current roadway geometrics. Intersection peak hour turning movements are calculated from the forecast submitted using the NCDOT IAU tool. The forecast sheets used for the IAU tool are provided in Appendix A. Figure 3 shows the Base Year (2017) No-Build lane configuration and traffic control, and Figure 4 illustrates the Base Year (2017) No-Build turning movement volumes for the AM and PM peak hours. Signal phasing data was obtained from the signal plans provided in Appendix C. Signal timings for the corridor were optimized for this scenario and are displayed in Appendix D.

As reported in Table 5, all signalized intersections operate at an acceptable overall LOS during the AM and PM peak hours. Two approaches at the intersection of NC 191 (Haywood Road) and NC 280 (Boylston Highway) operate at LOS E or LOS F during the AM peak. All stop-controlled approaches operate at an acceptable LOS during both the AM and PM peak hour. Detailed capacity analysis results for this scenario are shown in Appendix D.

Table 5: Base Year (2017) No-Build LOS Results

ID	Intersection and Approach	Traffic Control	Base Year (2017) No-Build	
			AM	PM
1	NC 191 at NC 280 (Boylston Highway)	Signalized	D (47.1 sec/veh)	C (33.3 sec/veh)
	Eastbound		F-80.8	D-52.7
	Westbound		D-43.3	C-33.8
	Northbound		E-56.8	D-44.4
	Southbound		D-35.9	C-26.2
2	NC 191 at SR 1331 (Banner Farm Road)	Unsignalized	-	-
	Northbound		D-28.9	D-27.4
3	NC 191 at SR 1314 (School House Road)	Signalized	B (19.0 sec/veh)	B (16.7 sec/veh)
	Eastbound		C-23.2	C-22.3
	Westbound		A-8.9	A-8.2
	Northbound		C-29.5	C-29.4
	Southbound		A-0.0	A-0.0
4	NC 191 at SR 1312/SR 1365 (Rugby Road)	Signalized	D (40.4 sec/veh)	D (36.8 sec/veh)
	Eastbound		D-36.5	C-29.3
	Westbound		D-35.4	C-31.5
	Northbound		D-47.3	D-54.1
	Southbound		D-49.1	D-47.7
5	NC 191 at SR 2044 (Haywood Knolls Drive)	Unsignalized	-	-
	Northbound		C-17.5	C-19.4
6	NC 191 at SR 2044 (Alpine Drive)/West Henderson High School Entrance	Signalized	B (12.8 sec/veh)	B (16.0 sec/veh)
	Eastbound		A-6.8	A-6.1
	Westbound		B-18.5	C-20.7
	Northbound		C-30.6	D-36.3
	Southbound		C-20.7	C-25.3
7	NC 191 at SR 1380 (Bradley Road)	Unsignalized	-	-
	Northbound		C-23.7	C-23.4
	Southbound		B-13.5	B-14.7
8	NC 191 at Rugby Middle School Entrance	Signalized	B (12.1 sec/veh)	B (11.2 sec/veh)
	Eastbound		B-13.9	B-13.0
	Westbound		A-3.2	A-7.2
	Northbound		C-33.9	B-17.8
9	NC 191 at SR 1381 (Mountain Road)/SR 1444 (Leverette Drive)	Signalized	B (14.6 sec/veh)	B (17.3 sec/veh)
	Eastbound		A-7.1	A-7.1
	Westbound		C-20.0	C-22.6
	Northbound		C-31.4	C-34.0
	Southbound		C-21.1	C-22.8

LEGEND: **X (X sec/veh)** = Overall intersection LOS (average delay), X-XX = Approach LOS and average delay

Interim Year (2030) No-Build Conditions

Peak hour volumes for the Interim Year (2030) No-Build scenario were calculated from the forecast submitted using the NCDOT IAU tool. This scenario assumes no additions or improvements to the existing lane geometry except for two added turn lanes to the intersection at SR 1331 (Banner Farm Road). Vaughn & Melton indicated that these lanes are currently being studied and will be added for safety and operations including truck accommodations using economic development funds. These intersection improvements are shown in Figure 5. The Interim Year (2030) No-Build peak hour turning movements developed are shown in Figure 6. The Interim Year (2030) No-Build scenario does account for a new four-lane expressway that will run between I-26 and NC 191. This new expressway has a proposed opening date between 2026 and 2030. Optimized signal timings used for this scenario are shown with the capacity analysis results in Appendix D.

As reported in Table 6, three of the six signalized intersections operate at LOS E or LOS F during the AM peak hour, and the intersection at Rugby Road performs at LOS E during the PM peak hour. The signalized intersection at Rugby Road sees delays of over 90 sec/veh for multiple approaches during the AM and PM peak hours. In addition, the signalized intersections at NC 280 (Boylston Highway) and SR 1381 (Mountain Road) have approaches that do not operate at acceptable levels despite the overall LOS being below LOS E. Two of the three unsignalized intersections have northbound approaches that operate at LOS F during both peak hours. Also, the southbound approach at the signalized intersection with SR 2044 (Alpine Drive)/West Henderson High School Entrance degrades from LOS C to LOS E during the AM peak hour.

Design Year (2040) No-Build Conditions

Peak hour volumes for the Design Year (2040) No-Build scenario were calculated from the forecast submitted using the NCDOT IAU tool. The resulting Design Year (2040) No-Build AM and PM peak hour trips are shown in Figure 7. The lane geometry analyzed in this scenario assumes no changes from the Interim Year (2030) No-Build scenario. The Design Year (2040) No-Build scenario does account for future developments with proposed openings between the year 2030 and 2040 in accordance with the FBRMPO 2040 Metropolitan Transportation Plan. These developments are expected to divert some mainline traffic away from the NC 191 corridor, slowing the growth of the peak hour volumes. The only improvement made to the No-Build (2040) scenario was the optimization of signal timings which are shown below with the capacity analysis results.

As reported in Table 7, three of the six signalized intersections operate at LOS E or LOS F during the AM peak, and two of the six signalized intersections operate at a LOS E or worse during the PM peak hour. Although operating at an acceptable LOS, the NC 191 at SR 1381 (Mountain Road) intersection is projected to experience substantial queuing in the northbound direction (over 1,000 feet during the PM peak). Multiple movements at the Rugby Road intersection see delays of over 100 sec/veh during both peak hours. Two of the three unsignalized intersections have a northbound approach that operates at a LOS F during both the AM and PM peak hour. The delays at the intersection with SR 1331 (Banner Farm Road) are over 120 sec/veh during the AM peak. The northbound and southbound approach at the SR 2044 (Alpine Drive) intersection operates at LOS E during the PM peak hour. At the intersection with SR 1381/SR 1444 (Mountain Road/Leverette Drive) the northbound approach operates at LOS E the southbound approach operates at LOS F during the PM peak.

Table 6: Interim Year (2030) No-Build LOS Results

ID	Intersection and Approach	Traffic Control	Interim Year (2030) No-Build	
			AM	PM
1	NC 191 at NC 280 (Boylston Highway)	Signalized	E (55.9 sec/veh)	D (38.5 sec/veh)
	Eastbound		F-100.5	D-54.0
	Westbound		D-48.4	D-36.5
	Northbound		E-70.6	D-54.6
	Southbound		D-41.8	C-31.0
2	NC 191 at SR 1331 (Banner Farm Road)	Unsignalized	-	-
	Northbound		F-83.8	F-70.2
	Southbound		C-19.9	C-20.2
3	NC 191 at SR 1314 (School House Road)	Signalized	E (61.9 sec/veh)	D (47.8 sec/veh)
	Eastbound		E-70.4	E-55.1
	Westbound		D-45.9	D-37.4
	Northbound		E-74.6	E-61.2
	Southbound		A-0.0	A-0.0
4	NC 191 at SR 1312/SR 1365 (Rugby Road)	Signalized	F (80.2 sec/veh)	E (67.1 sec/veh)
	Eastbound		E-70.7	D-40.2
	Westbound		E-68.7	E-62.9
	Northbound		F-94.3	F-113.1
	Southbound		F-117.0	F-95.2
5	NC 191 at SR 2044 (Haywood Knolls Drive)	Unsignalized	-	-
	Northbound		F-61.3	F-56.2
6	NC 191 at SR 2044 (Alpine Drive)/West Henderson High School Entrance	Signalized	C (22.8 sec/veh)	C (27.7 sec/veh)
	Eastbound		B-16.0	A-9.9
	Westbound		C-27.5	D-36.2
	Northbound		D-52.3	D-53.0
	Southbound		D-43.9	D-53.5
7	NC 191 at SR 1380 (Bradley Road)	Unsignalized	-	-
	Northbound		F-65.2	F-65.2
	Southbound		D-33.7	E-36.5
8	NC 191 at Rugby Middle School Entrance	Signalized	B (17.2 sec/veh)	B (18.3 sec/veh)
	Eastbound		C-23.7	C-20.8
	Westbound		A-6.2	B-12.7
	Northbound		D-38.4	D-36.4
9	NC 191 at SR 1381(Mountain Road)/SR 1444 (Leverette Drive)	Signalized	C (23.7 sec/veh)	C (24.7 sec/veh)
	Eastbound		B-13.7	A-9.2
	Westbound		C-30.5	C-28.3
	Northbound		D-49.1	D-49.2
	Southbound		D-41.8	E-55.8

LEGEND: **X (X sec/veh)** = Overall intersection LOS (average delay), X-XX = Approach LOS and average delay

Table 7: Design Year (2040) No-Build LOS Results

ID	Intersection and Approach	Traffic Control	Design Year (2040) No-Build	
			AM	PM
1	NC 191 at NC 280 (Boylston Highway)	Signalized	E (65.1 sec/veh)	D (41.9 sec/veh)
	Eastbound		F-112.8	E-61.2
	Westbound		D-54.9	D-42.4
	Northbound		F-83.3	E-61.2
	Southbound		D-49.0	C-31.7
2	NC 191 at SR 1331 (Banner Farm Road)	Unsignalized	-	-
	Northbound		F-121.5	F-98.1
	Southbound		C-22.1	C-22.5
3	NC 191 at SR 1314 (School House Road)	Signalized	F (80.4 sec/veh)	E (63.8 sec/veh)
	Eastbound		F-87.6	E-67.5
	Westbound		E-62.2	D-49.7
	Northbound		F-97.3	F-88.1
	Southbound		A-0.0	A-0.0
4	NC 191 at SR 1312/SR 1365 (Rugby Road)	Signalized	F (104.4 sec/veh)	F (94.0 sec/veh)
	Eastbound		F-94.6	E-65.2
	Westbound		F-94.4	F-94.8
	Northbound		F-115.1	F-128.3
	Southbound		F-140.8	F-118.7
5	NC 191 at SR 2044 (Haywood Knolls Drive)	Unsignalized	-	-
	Northbound		F-85.3	F-79.6
6	NC 191 at SR 2044 (Alpine Drive)/West Henderson High School Entrance	Signalized	C (29.9 sec/veh)	C (32.2 sec/veh)
	Eastbound		C-24.0	B-12.0
	Westbound		C-34.4	D-38.7
	Northbound		D-54.7	E-66.8
	Southbound		D-45.6	E-75.0
7	NC 191 at SR 1380 (Bradley Road)	Unsignalized	-	-
	Northbound		F-89.1	F-89.1
	Southbound		F-59.8	F-68.2
8	NC 191 at Rugby Middle School Entrance	Signalized	C (20.8 sec/veh)	B (18.4 sec/veh)
	Eastbound		C-29.9	B-18.2
	Westbound		A-6.8	B-14.8
	Northbound		D-40.5	D-42.1
9	NC 191 at SR 1381 (Mountain Road)/SR 1444 (Leverette Drive)	Signalized	C (27.1 sec/veh)	C (28.8 sec/veh)
	Eastbound		B-18.1	B-11.4
	Westbound		C-33.3	C-30.3
	Northbound		D-50.4	D-49.3
	Southbound		D-43.6	E-73.3

LEGEND: **X (X sec/veh)** = Overall intersection LOS (average delay), X-XX = Approach LOS and average delay

Design Alternatives Assessment

STIP No. R-2588B proposes the widening of NC 191 (Haywood Road) from its current two-lane cross section to a four-lane, median-divided facility. Close spacing of intersections along NC 191 (Haywood Road) and the new 17.5-foot wide median being placed are constraints along this corridor that were looked at when considering new intersection improvements. The design criteria used for the NC 191 corridor are shown in Table 8. Additional design criteria for individual segments can be found in the full forecast located in Appendix A.

Table 8: Design Data

ROUTE	NC 191 east of SR 1331	NC 191 east of SR 2044
ADT 2017 =	9,700	14,400
ADT 2040 =	13,400	27,900
TTST	1%	1%
DUALS	3%	3%
DHV	8%	8%
DIR	55%	55%

One constraint along the corridor involved the spacing of intersections between Rugby Road and the entrance to Rugby Middle School. The NCDOT Median Crossover Guideline Statement states that you must have 1,200 feet between full median openings on divided highways without full control access. Due to the close spacing of intersections along this section of NC 191 (Haywood Road), it was determined that access to NC 191 would need to be altered at the two stop-controlled intersections along this section. It is recommended that stop-controlled intersections at SR 2044 (Haywood Knolls Road) and SR 1380 (Bradley Road) be converted to right-in and right-out only access points. Vehicles wishing to make left-turns will need to travel to the Rugby Road or SR 2044 (Alpine Drive) signalized intersections to make a U-turn. A left-turning movement will still be allowed for eastbound left-turning vehicles on to SR 1380 (Bradley Road).

The addition of a 17.5-foot wide median across the corridor restricts the amount of left-turns that can be made from side-streets. Due to this limited left-turning ability, it is recommended to add median openings with exclusive left-turn lanes with 150 feet of storage to help accommodate vehicles wishing to make U-turns along the corridor. It is recommended to add these median openings between the SR 1331 (Banner Farm Road) intersection and SR 1314 (Ladson Road) intersection, as well as between the SR 1314 (Ladson Road) intersection and SR 1312/SR 1365 (Rugby Road) intersection. Figure 8 shows the recommended locations for additional median openings. In addition to the widening of NC 191 (Haywood Road), further intersection improvements and storage recommendations were made based on the *Synchro 9/SimTraffic* analysis of all scenarios. These recommendations were applied to all three Build scenarios and are as follows:

- NC 191 (Haywood Road) and SR 280 (Beystone Highway) right-turn lanes form a dual right-turning movement. The outside right-turn lane should have a minimum of 350 feet of storage and the inside right-turn lane will have continuous storage.
 - Provide a second exclusive southbound left-turn lane with at least 350 feet of storage.

NC 191 at SR 1331 (Banner Farm Road) (Intersection #2)

- Signalize the intersection
- Provide an exclusive eastbound left-turn lane with at least 150 feet of storage and appropriate taper.
- Provide an exclusive eastbound right-turn lane with at least 175 feet of storage and appropriate taper.
- Provide an exclusive westbound left-turn lane with at least 150 feet of storage and appropriate taper.
- Provide an exclusive northbound left-turn lane with at least 150 feet of storage and appropriate taper.

NC 191 at SR 1314 (Ladson Road)/School House Road (Intersection #3)

- Extend the storage of the exclusive westbound left-turn lane to 375 feet with appropriate taper.
- Construct an exclusive northbound right-turn lane with at least 225 feet of storage and appropriate taper. Add a new overlap phase to this northbound right-turning movement.

NC 191 at SR 1312/SR 1365 (Rugby Road) (Intersection #4)

- Extend the storage of the exclusive eastbound left-turn lane to at least 250 feet of storage with appropriate taper.
- Extend the storage of the exclusive westbound left-turn lane to at least 450 feet with appropriate taper.
- Extend the storage of the exclusive northbound left-turn lane to at least 175 feet with appropriate taper.
- Construct an exclusive northbound right-turn lane with 200 feet of storage and appropriate taper. Add a new overlap phase to this northbound right-turning movement.
- Extend the storage of the exclusive southbound left-turn lane to at least 225 feet with appropriate taper.

NC 191 at SR 2044 (Haywood Knolls Road) (Intersection #5)

- Restrict access to right-turn in and right-turn out only movements for the northbound approach.

NC 191 at SR 2044 (Alpine Drive)/West Henderson High School Entrance

- Modify the exclusive westbound left-turn lane to have at least 150 feet of storage with appropriate taper.

NC 191 at SR 1380 (Bradley Road) (Intersection #7)

- Restrict access to right-turn in and right-turn out only movements for the northbound and southbound approaches. Keep the exclusive eastbound left-turn lane and allow vehicles to make the left-turning movement on to SR 1380 (Bradley Road). Provide at least 150 feet of storage for the exclusive left-turn lane.

NC 191 at Rugby Middle School Entrance

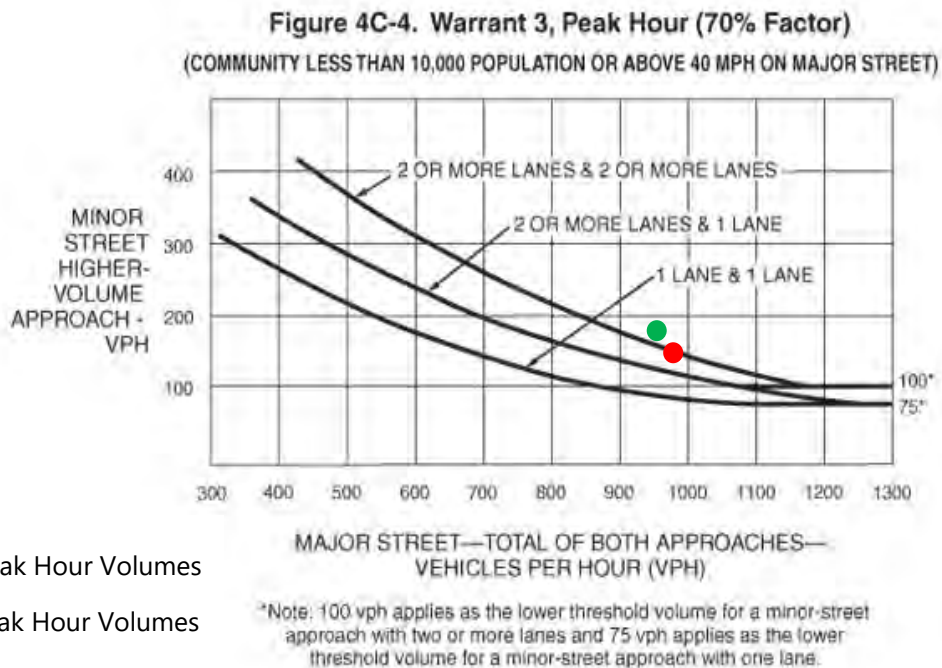
- Provide an exclusive eastbound U-Turn lane with at least 100 feet of storage and appropriate taper.

NC 191 at SR 1381/SR 1444 (Mountain Road/Leverette Drive) (Intersection #9)

- Extend the storage of the eastbound left-turn lane to at least 225 feet with appropriate taper.
- Provide an exclusive westbound left-turn lane with at least 100 feet of storage and appropriate taper.
- Continue the second eastbound through-lane 1000 feet east of the intersection.
- Start the second westbound through-lane 500 feet east of the intersection.

Signal Warrant Study

The three unsignalized intersections along the NC 191 corridor were analyzed to determine if signalization of these intersections would be required in future (2030 and 2040) scenarios. Warrant 3 out of Chapter 4C from the Manual on Uniform Traffic Control Devices (MUTCD) was used to determine if peak hour turning movements warranted a signal at any of the three unsignalized intersections. Figure 4C-4 below shows the Design Year (2040) Build AM and PM peak hour volumes for the intersection at SR 1331 (Banner Farm Road) compared against Warrant 3 in Chapter 4C of the MUTCD. The 70% Factor rule was allowed due to the speed limit of the proposed widening being greater than 40 mph. The Base Year (2016) volumes are shown for signal warrants since they represent the current scenario for the intersection, and volumes for future scenarios will only increase.



After analyzing the stop-controlled intersection of NC 191 and SR 1331 (Banner Farm Road), it was determined that future volumes for the Base Year (2016) Build scenario did warrant the signalization of the stop-controlled study intersection. Figure 4C-3 shows that the Base Year (2016) Build volumes warrant a signal at the Banner Farm Road intersection even with the proposed widening in place. The addition of a signal at the SR 1331 (Banner Farm Road) intersection helps reduce delays and long queues seen in future scenarios.

Base Year (2017) Build Conditions

Turning movements used for the Base Year (2017) Build scenario were calculated from the forecast submitted by VHB. The scenario assumes the proposed widening and recommended intersection improvements are in place. Figure 9 shows the Build scenario lane configuration and traffic control, and Figure 10 illustrates the Base Year (2017) Build turning movements for the AM and PM peak hours. Optimized signal timings are shown below with the capacity analysis results in the Appendix.

Table 9 displays the LOS and delays for all stop-controlled and signalized approaches across the NC 191 corridor, as well as overall LOS and delays for signalized intersections. All signalized intersections and stop-controlled approaches operate at acceptable levels of service for the Base Year (2017) Build scenario. The northbound stop-controlled approach at SR 1331 (Banner Farm Road) improves from a LOS D to LOS C during the AM peak hour from the No-Build (2017) scenario with the signalization of the intersection. In addition, all signalized intersections see improvement with queues and levels of service.

Table 9: Base Year (2017) Build LOS Results

ID	Intersection and Approach	Traffic Control	Base Year (2017) Build	
			AM	PM
1	NC 191 at NC 280 (Boylston Highway)	Signalized	C (33.9 sec/veh)	C (28.9 sec/veh)
	Eastbound		D-53.0	D-48.0
	Westbound		C-26.6	C-22.2
	Northbound		D-40.0	D-37.6
	Southbound		C-29.4	C-26.0
2	NC 191 at SR 1331 (Banner Farm Road)	Signalized	B (14.5 sec/veh)	B (10.5 sec/veh)
	Eastbound		B-13.9	B-11.4
	Westbound		B-10.8	A-8.3
	Northbound		C-23.8	B-14.0
3	NC 191 at SR 1314 (School House Road)	Signalized	B (11.8 sec/veh)	B (11.4 sec/veh)
	Eastbound		B-14.1	B-14.8
	Westbound		A-8.5	A-8.4
	Northbound		B-13.2	B-12.7
	Southbound		A-0.0	A-0.0
4	NC 191 at SR 1312/SR 1365 (Rugby Road)	Signalized	C (30.7 sec/veh)	C (31.9 sec/veh)
	Eastbound		C-31.1	C-33.8
	Westbound		C-28.4	C-28.9
	Northbound		C-29.5	C-30.8
	Southbound		D-36.4	D-36.2
5	NC 191 at SR 2044 (Haywood Knolls Drive)	Unsignalized	-	-
	Northbound		B-11.3	B-10.5
6	NC 191 at SR 2044 (Alpine Drive)/West Henderson High School Entrance	Signalized	B (11.0 sec/veh)	B (13.3 sec/veh)
	Eastbound		A-6.2	A-6.1
	Westbound		B-16.0	B-17.8
	Northbound		C-25.3	C-27.8
	Southbound		B-16.3	B-18.0
7	NC 191 at SR 1380 (Bradley Road)	Unsignalized	-	-
	Northbound		B-10.2	A-9.8
	Southbound		B-10.4	B-11.0
8	NC 191 at Rugby Middle School Entrance	Signalized	A (8.7 sec/veh)	A (9.5 sec/veh)
	Eastbound		B-10.6	B-11.7
	Westbound		A-4.8	A-5.7
	Northbound		B-14.2	B-14.8
9	NC 191 at SR 1381 (Mountain Road)/SR 1444 (Leverette Drive)	Signalized	B (15.9 sec/veh)	B (16.3 sec/veh)
	Eastbound		B-12.2	B-12.4
	Westbound		B-19.9	B-19.3
	Northbound		C-29.0	C-29.5
	Southbound		B-16.9	B-16.8

LEGEND: **X (X sec/veh)** = Overall intersection LOS (average delay), X-XX = Approach LOS and average delay

Interim Year (2030) Build Conditions

The Interim Year (2030) Build scenario tests future operations with the proposed widening of NC 191 (Haywood Road) and upgraded signal plans. Peak hour turning movements for the Interim Year (2030) Build scenario are shown in Figure 11. This scenario assumes the proposed widening and recommended intersection improvements in place, as well as the proposed Balfour Parkway in use. Upgraded signal phasing and timings for this scenario can be found in the Appendix with the capacity analysis results.

As shown in Table 10, all signalized and unsignalized intersections are operating at an acceptable level of service during the AM and PM peak hours. The addition of a signal at the intersection with SR 1331 (Banner Farm Road) brings the northbound approach level of service from LOS F to LOS B during both the AM and PM peak hours. Overall levels of service at the NC 280 (Boylston Highway), SR 1314 (School House Road), and Rugby Road intersections improve to acceptable levels with the widening of NC 191 and other recommended intersection improvements in place. All other movements that did not operate at acceptable levels during the No-Build (2030) scenario are brought back to an acceptable level of service with the widening of NC 191 and upgraded signal plans in place. Overall levels of service at the NC 280 (Boylston Highway), SR 1314 (School House Road), and Rugby Road intersections improve to acceptable levels with the widening of NC 191 and other recommended intersection improvements in place. All other movements that did not operate at acceptable levels during the No-Build (2030) scenario are brought back to an acceptable level of service with the widening of NC 191 and upgraded signal plans in place.

Design Year (2040) Build Conditions

The Design Year (2040) Build scenario tests future operations with the proposed widening of NC 191 (Haywood Road) and upgraded signal plans. The proposed volumes for this scenario are included in Figure 12, and the new recommended signal timings are below in the Appendix. The scenario also accounts for future development projects in the area scheduled to be completed between 2030 and 2040, and the peak hour volumes calculated from the IAU tool reflect these developments.

The projected traffic growth in the future year results in some additional delays at the study area intersections. As reported in Table 10, the proposed improvements mitigate these impacts, bringing all intersections back to acceptable overall operations and generally accommodating projected queue lengths. With the restriction of access at the SR 2044 (Haywood Knolls Drive) and SR 1380 (Bradley Road) intersections, the LOS of all stop-controlled approaches operate at an acceptable level. The addition of a signal at SR 1331 (Banner Farm Road) brings operations at the intersection back down below LOS F. The northbound approach improves from LOS F to LOS B during both the AM and PM peak hours. Only two approaches, the eastbound approach at NC 280 (Boylston Highway) and the southbound approach at Rugby Road, see a LOS E during either the AM or PM peak hour. Capacity analysis results can be found in Appendix D. Queuing results for the Design Year (2040) Build scenario are shown in Table 12.

Table 10: Interim Year (2030) Build LOS Results

ID	Intersection and Approach	Traffic Control	Interim Year (2030) Build	
			AM	PM
1	NC 191 at NC 280 (Boylston Highway)	Signalize d	D (35.8 sec/veh)	C (29.7 sec/veh)
	Eastbound		D-54.6	D-49.7
	Westbound		C-26.9	C-22.4
	Northbound		D-43.2	D-40.1
	Southbound		C-31.5	C-26.7
2	NC 191 at SR 1331 (Banner Farm Road)	Signalize d	B (12.4 sec/veh)	B (12.5 sec/veh)
	Eastbound		B-13.0	B-14.3
	Westbound		A-9.2	A-8.6
	Northbound		B-16.6	B-18.1
	Southbound		B-13.6	B-15.1
3	NC 191 at SR 1314 (School House Road)	Signalize d	B (17.9 sec/veh)	B (17.3 sec/veh)
	Eastbound		C-22.2	C-24.2
	Westbound		B-15.1	B-14.8
	Northbound		B-17.2	B-15.1
	Southbound		A-0.0	A-0.0
4	NC 191 at SR 1312/SR 1365 (Rugby Road)	Signalize d	D (36.1 sec/veh)	D (39.2 sec/veh)
	Eastbound		D-37.9	D-44.3
	Westbound		C-30.3	C-31.7
	Northbound		C-34.7	D-38.4
	Southbound		D-51.7	D-53.8
5	NC 191 at SR 2044 (Haywood Knolls Drive)	Unsignalize d	-	-
	Northbound		C-15.1	B-12.8
6	NC 191 at SR 2044 (Alpine Drive)/West Henderson High School Entrance	Signalize d	B (13.8 sec/veh)	B (15.7 sec/veh)
	Eastbound		A-8.2	A-7.1
	Westbound		B-18.9	B-19.7
	Northbound		C-34.9	D-39.0
	Southbound		C-24.4	C-28.2
7	NC 191 at SR 1380 (Bradley Road)	Unsignalize d	-	-
	Northbound		B-12.9	B-11.7
	Southbound		B-12.1	B-13.6
8	NC 191 at Rugby Middle School Entrance	Signalize d	A (9.2 sec/veh)	B (10.3 sec/veh)
	Eastbound		B-11.5	B-12.9
	Westbound		A-4.9	A-6.7
	Northbound		B-19.7	B-18.4
9	NC 191 at SR 1381(Mountain Road)/SR 1444 (Leverette Drive)	Signalize d	B (18.2 sec/veh)	B (18.1 sec/veh)
	Eastbound		B-12.5	B-11.3
	Westbound		C-22.5	C-21.2
	Northbound		D-42.5	D-41.3
	Southbound		C-26.7	C-26.6

LEGEND: **X (X sec/veh)** = Overall intersection LOS (average delay), X-XX = Approach LOS and average delay

Table 11: Design Year (2040) Build LOS Results

ID	Intersection and Approach	Traffic Control	Design Year (2040) Build	
			AM	PM
1	NC 191 at NC 280 (Boylston Highway)	Signalize d	D (44.1 sec/veh)	C (33.0 sec/veh)
	Eastbound		E-65.3	D-52.0
	Westbound		D-38.0	C-30.6
	Northbound		D-51.9	D-42.4
	Southbound		D-38.1	C-28.6
2	NC 191 at SR 1331 (Banner Farm Road)	Signalize d	B (12.4 sec/veh)	B (12.4 sec/veh)
	Eastbound		B-12.9	B-14.2
	Westbound		A-9.2	A-8.7
	Northbound		B-17.6	B-18.4
	Southbound		B-14.5	B-15.3
3	NC 191 at SR 1314 (School House Road)	Signalize d	B (19.2 sec/veh)	B (18.6 sec/veh)
	Eastbound		C-24.1	C-26.9
	Westbound		B-15.3	B-15.6
	Northbound		B-19.2	B-16.0
	Southbound		A-0.0	A-0.0
4	NC 191 at SR 1312/SR 1365 (Rugby Road)	Signalize d	D (39.7 sec/veh)	D (43.7 sec/veh)
	Eastbound		D-40.5	D-49.1
	Westbound		C-32.7	D-35.5
	Northbound		D-39.0	D-42.7
	Southbound		E-59.0	E-59.2
5	NC 191 at SR 2044 (Haywood Knolls Drive)	Unsignalize d	-	-
	Northbound		C-16.7	B-13.7
6	NC 191 at SR 2044 (Alpine Drive)/West Henderson High School Entrance	Signalize d	B (14.3 sec/veh)	B (16.3 sec/veh)
	Eastbound		A-8.6	A-6.9
	Westbound		B-19.2	C-20.1
	Northbound		D-37.9	D-44.5
	Southbound		C-27.2	C-33.3
7	NC 191 at SR 1380 (Bradley Road)	Unsignalize d	-	-
	Northbound		B-13.9	B-12.4
	Southbound		B-13.2	C-15.3
8	NC 191 at Rugby Middle School Entrance	Signalize d	B (10.2 sec/veh)	B (10.6 sec/veh)
	Eastbound		B-12.9	B-13.0
	Westbound		A-5.4	A-7.0
	Northbound		C-22.7	C-20.8
9	NC 191 at SR 1381 (Mountain Road)/SR 1444 (Leverette Drive)	Signalize d	C (24.5 sec/veh)	C (25.5 sec/veh)
	Eastbound		B-17.3	B-16.6
	Westbound		C-30.3	C-30.1
	Northbound		D-48.1	D-50.0
	Southbound		D-35.5	D-35.5

LEGEND: **X (X sec/veh)** = Overall intersection LOS (average delay), X-XX = Approach LOS and average delay

Table 12: Design Year (2040) Build Queueing Results

ID	Intersection/Movement	Existing Storage (ft)	Synchro 95th Queue		SimTraffic Max Queue		Storage Recommendation (ft)
			AM	PM	AM	PM	
NC 191 and NC 280 (Boylston Highway)							
1	Eastbound Right-Turn	75	14	17	23	25	75
	Westbound Right-Turn	600, Cont.	289	298	208	149	350, Cont.
	Northbound Left-Turn	TWLTL	8	7	95	78	TWLTL
	Southbound Left-Turn	TWLTL	#425	296	327	256	350, TWLTL
NC 191 and SR 1331 (Banner Farm Road)							
2	Eastbound Left-Turn	-	7	7	24	20	150
	Eastbound Right-Turn	100	103	113	118	146	175
	Westbound Left-Turn	-	13	15	32	49	150
	Northbound Left-Turn	100	135	108	132	128	150
NC 191 and SR 1314 (Ladson Road)/School House Road							
3	Eastbound Left-Turn	150	6	4	10	1	150
	Westbound Left-Turn	250	284	338	271	350	375
	Northbound Right-Turn	-	258	159	139	89	250
NC 191 and SR 1312/SR 1365 (S Rugby Road/N Rugby Road)							
4	Eastbound Left-Turn	150	126	109	198	234	250
	Westbound Left-Turn	125	#249	#461	267	416	450
	Northbound Left-Turn	100	150	#117	155	118	175
	Northbound Right-Turn	-	188	84	155	61	200
	Southbound Left-Turn	125	215	204	204	232	225
NC 191 and SR 2044 (Haywood Knolls Road)							
5	Northbound Right-Turn	-	22	9	46	5	Cont.
NC 191 and SR 2044 (Alpine Drive)/High School Entrance							
6	Eastbound Left-Turn	375 + TWLTL	44	25	112	73	375
	Westbound Left-Turn	225 + TWLTL	38	38	57	62	150
	Westbound Right-Turn	225	15	24	52	76	225
	Southbound Right-Turn	300	49	98	87	125	300
NC 191 and SR 1380 (Bradley Road)							
7	Eastbound Left-Turn	225 + TWLTL	5	4	31	21	150
	Northbound Right-Turn	-	0	0	6	3	Cont.
	Southbound Right-Turn	-	5	6	0	0	Cont.
NC 191 and Middle School Entrance							
8	Eastbound U-Turn	-	2	3	10	8	100
	Eastbound Right-Turn	175	14	8	59	40	175
	Westbound Left-Turn	175	7	7	43	40	175
	Northbound Right-Turn	350	13	16	26	28	350
NC 191 and SR 1381/SR 1444 (Mountain Road/Leverette Drive)							
9	Eastbound Left-Turn	255 + TWLTL	213	178	182	152	225
	Westbound Left-Turn	-	6	11	50	98	100
	Westbound Through	Cont.	403	476	327	365	500, Cont.
	Southbound Right-Turn	150	128	145	136	151	150

Findings and Conclusions

As indicated in the traffic operations analyses, the proposed intersection improvements would result in improved traffic operations at the study area intersections during the analyzed future year.

NC 191 at NC 280 (Boylston Highway) (Intersection #1)

Multiple movements operate at LOS E or LOS F during the AM and PM peak hour during the Design Year (2040) No-Build scenario. It is recommended to add a second exclusive southbound left-turn lane to help with the increased left-turning volumes (619 vph in the AM peak and 539 vph in the PM peak). The addition of the second left-turn lane improves the level of service of the southbound approach from LOS F to LOS C. It is also recommended to provide an additional westbound right-turn lane to accommodate the heavy queue for this movement. The additional westbound through-lane provided from the widening of NC 191 (Haywood Road) can drop at this intersection and provide the second recommended right-turn lane. Putting these recommended intersection improvements in place brings the performance of the intersection back down to acceptable levels during future scenarios.

NC 191 at SR 1331 (Banner Farm Road) (Intersection #2)

The northbound approach for this intersection operates at a LOS F during multiple future scenarios and sees long queues during both the AM and PM peak hours. Warrant 3 from Chapter 4C of the MUTCD explains that the volumes present during the Base Year (2017) of this study warrant the signalization of this intersection. The recommended new signal phasing information for this intersection is located in Appendix D. It is assumed that for future scenarios the southbound approach from the Water Treatment Plant will be reconstructed as a two-way driveway lined up directly with the new signalized intersection. It is also recommended to add exclusive eastbound and westbound left-turn lanes at this intersection, both with 150 feet of storage. The new median restricts the amount of full access points across the corridor, so left-turn lanes should be added at this intersection to assist U-turning vehicles. Future No-Build scenarios account for the addition of an exclusive northbound left-turn lane and an exclusive eastbound right-turn lane at the intersection. It is recommended to keep these intersection improvements when the widening of NC 191 is put in place. The addition of the signal at the intersection, along with the previously planned intersection improvements, bring all approaches at the intersection back to an acceptable level of delay for all future scenarios.

NC 191 at SR 1314 (Ladson Road)/School House Road (Intersection #3)

The overall level of service at this intersection did degrade to LOS F during the PM peak for the Design Year (2040) No-Build scenario. All approaches operate at unacceptable levels of service during both peak hours during the Design Year (2040) No-Build scenario. An exclusive northbound right-turn lane with at least 250 feet of storage is recommended to help with the long queue seen for this movement. It is also recommended to add an overlap phase to the signal plan for this exclusive northbound right-turn lane. These recommended intersection improvements, along with the proposed widening of NC 191 (Haywood Road) bring all levels of service back within acceptable limits for all Build scenarios.

NC 191 at SR 1312/SR 1365 (Rugby Road) (Intersection #4)

The overall level of service at this intersection does degrade to a LOS F during both peak hours for the Design Year (2040) No-Build scenario. It is recommended to construct an exclusive northbound right-turn lane with at least 200 feet of storage to help with the long queue seen during simulation. Additionally, it is recommended to add an overlap phase to the signal plan for this exclusive northbound right-turn lane. It is also recommended to extend the storage of the northbound left-turn lane to at least 175 feet. Long queues are seen for the eastbound, westbound, and southbound left-turn movements as well. It is recommended to extend the storage of the eastbound left-turn lane to 250 feet and

westbound left-turn lane to at least 450 feet. It is also recommended to increase the storage of the southbound left-turn lane to at least 225 feet. These storage increases help with the increased queues in the Design Year (2040) No-Build scenario. The proposed widening of NC 191 (Haywood Road), along with the recommended improvements to the intersection, bring the LOS of the intersection back down to acceptable limits for all Build scenarios.

NC 191 at SR 2044 (Haywood Knolls Road) (Intersection #5)

The northbound approach LOS at this intersection does degrade to LOS F during the 2030 and 2040 No-Build scenarios. After consulting with the NCDOT Median Crossover Guidelines Statement, it was determined that access at this intersection would need to be restricted to not have two full median openings within 1,200 feet of each other. It is recommended to restrict access for the northbound approach to right-turn in and right-turn out movements only. Existing left-turns can be accommodated via U-turning at the adjacent upstream and downstream signals at Rugby Road and the high school entrance. This access restriction, along with the proposed widening of NC 191 (Haywood Road), brings the LOS for the northbound approach back to acceptable limits for the 2030 and 2040 Build scenarios.

NC 191 at SR 2044 (Alpine Drive)/West Henderson High School Entrance (Intersection #6)

The overall level of service at this intersection did not degrade to an unacceptable overall LOS for any scenario. With the proposed widening of NC 191 (Haywood Road) in place, no other improvements are recommended for this intersection.

NC 191 at SR 1380 (Bradley Road) (Intersection #7)

The southbound approach at this intersection does degrade to LOS F during the AM and PM peak hour for the Design Year (2040) No-Build scenario. Additionally, after consulting the NCDOT Median Crossover Guidelines Statement, it was determined that access at this intersection would need to be restricted to not have two full median openings within 1,200 feet of each other. It is recommended to restrict access for the northbound and southbound approaches to right-turn in and right-turn out only movements. However, the eastbound left-turning movement should still be allowed instead of sending vehicles to the Rugby Middle School intersection to make a U-turn. This recommended access restriction, along with the proposed widening of NC 191 (Haywood Road) decreases delay and bring the LOS of the southbound approach back to an acceptable value.

NC 191 at Rugby Middle School Entrance (Intersection #8)

The overall level of service at this intersection did not degrade to an unacceptable LOS for any study scenario. Since access at Tradition Way will need to be restricted to right-in and right-out only due to the road's close proximity to the Middle School signal, provide an exclusive eastbound U-turn lane with at least 100 feet of storage to accommodate the U-turning movement back to the Tradition Way residential area. During VHB's site observation, we noticed traffic spilling back onto NC 191 from the drop-off loop during the AM peak. We recommend conducting a school study to evaluate options to contain this queueing internally on site. Providing a second stacking lane from the parking lot to the signal may be an option, however, a more detailed evaluation is required to determine the specific needs here.

NC 191 at SR 1381/SR 1444 (Mountain Road/Leverette Drive)

The overall level of service did not degrade to an unacceptable level under any scenario at this intersection. Substantial queueing was projected in the northbound and southbound directions. To improve this queueing, the additional through lanes along NC 191 should be carried through this intersection as opposed to stopping at this intersection. The second southbound lane should extend through this intersection and drop approximately 1,000 feet south of this

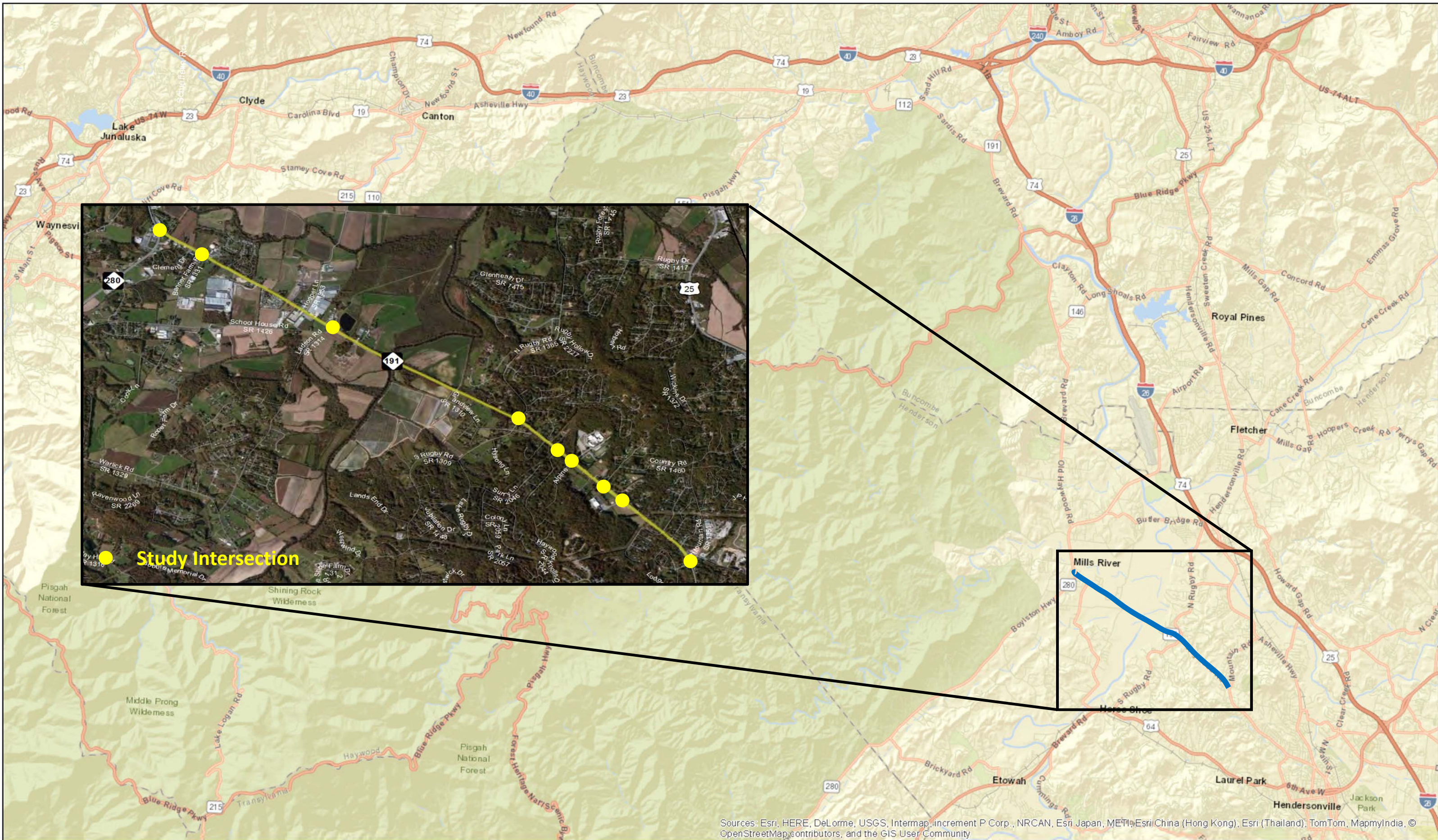
intersection to allow for utilization of the second lane. The second northbound lane should have at least 500 feet of full storage. The eastbound and westbound left-turn lanes should have storage lengths of 225 feet and 100 feet, respectively. With these proposed widening recommendations, all movements operate at acceptable levels of service during all Build scenarios.

Note that low volume driveways and intersections were not evaluated as part of this study, however, it is recommended to consider additional median openings where there are long stretches without one. This reduces distances for U-turning vehicles travelling to driveways that have been converted to right-in and right-out only access. Specifically, one to two openings should be considered between the intersections at Banner Farm Road and School House Road which are approximately 5,460 feet apart. One could be considered at a Van Wingerden International driveway so that the heavy truck volume would not have to U-turn and a second opening at the Mills River Park entrance are two possible median openings. Similarly, spacing between intersections at School House Road and Rugby Road is long enough to warrant multiple median openings. Where an opening is located, a left-turn lane with a minimum of 100 feet of full storage with necessary deceleration lengths based on the road's design speed should be added.



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- Figure 3: Base Year (2017) No-Build Lane Configuration and Traffic Control
- Figure 4: Base Year (2017) No-Build AM and PM Peak Hour Volumes
- Figure 5: Interim Year (2030) and Design Year (2040) No-Build Lane Configuration and Traffic Control
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- Figure 8: Median Opening Access Considerations
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- Figure 11: Interim Year (2030) Build AM and PM Peak Hour Volumes
- Figure 12: Design Year (2040) Build AM and PM Peak Hour Volumes



Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

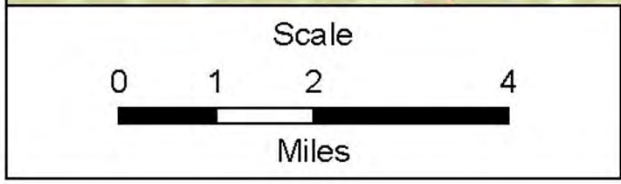


Figure 1:
Vicinity Map

STIP Project No. R-2588B
 NC 191 Widening, Mills River, NC
 Traffic Capacity Analysis
 Project No.: 38536.13



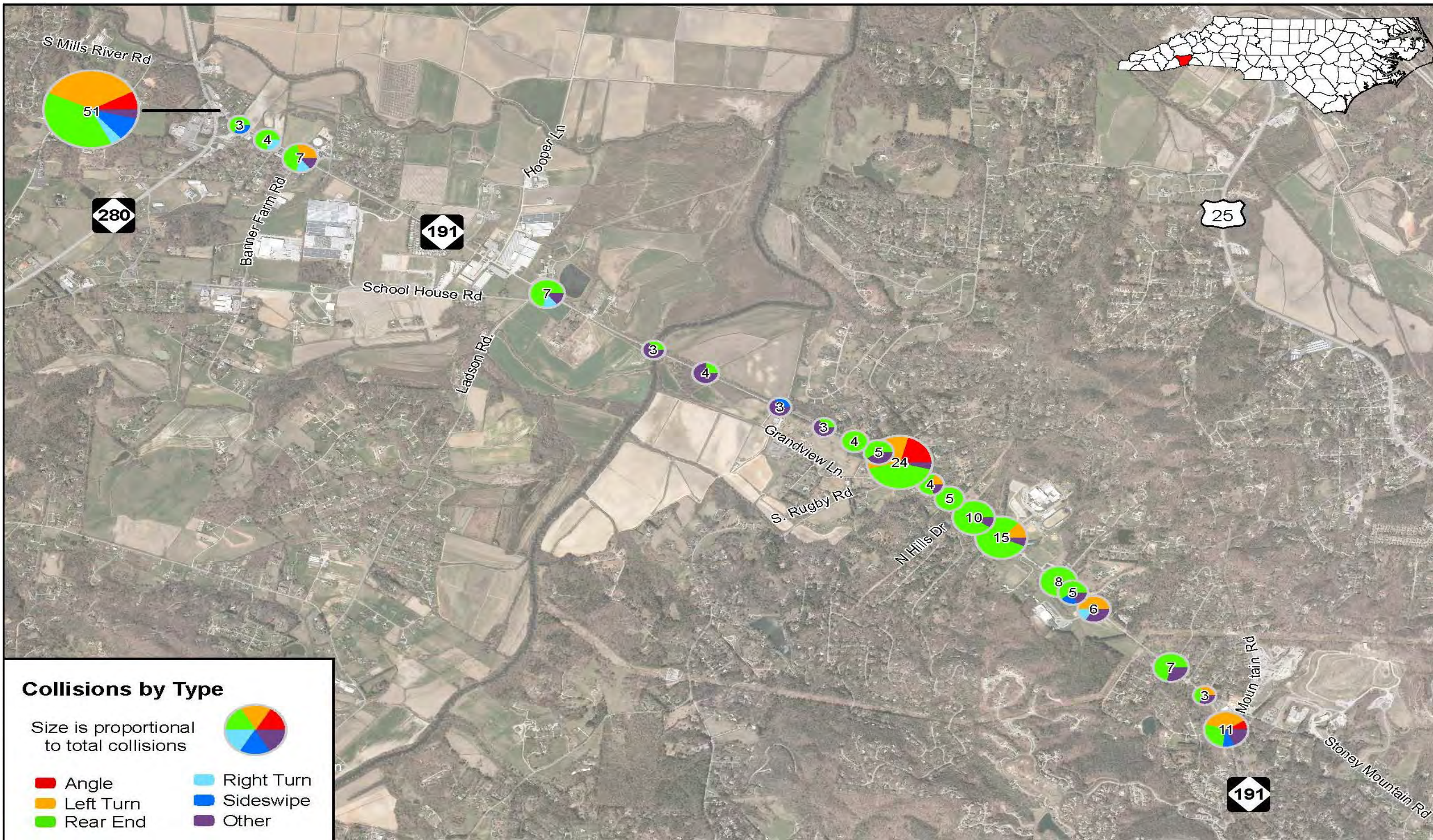
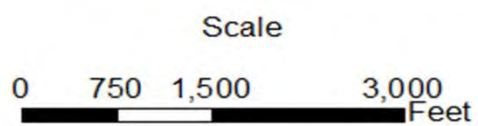


Figure 2:
Total Collisions by Type and Location

STIP Project No. R-2588B
NC 191 Widening, Mills River, NC
Traffic Capacity Analysis

Project No.: 38536.13



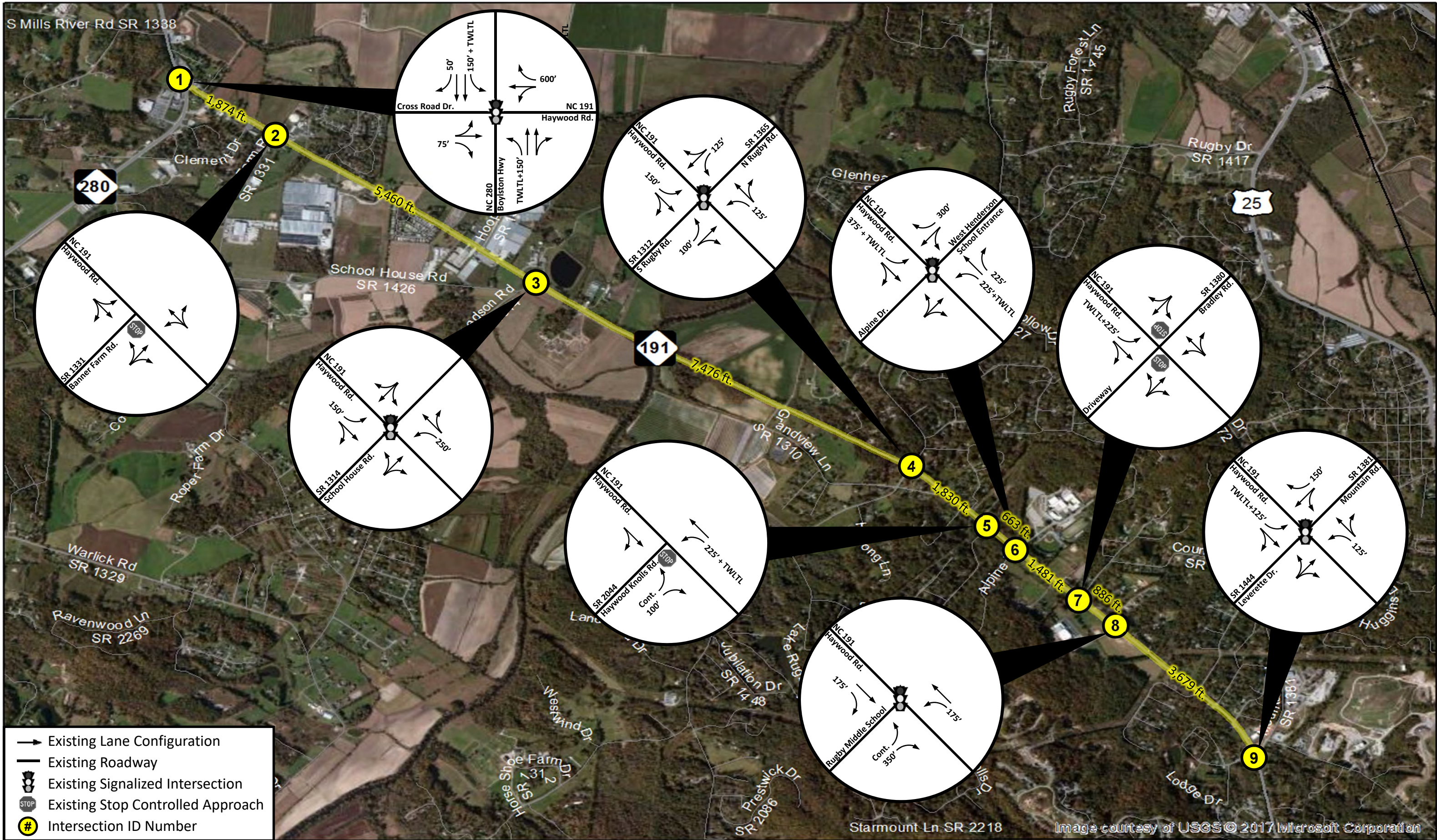
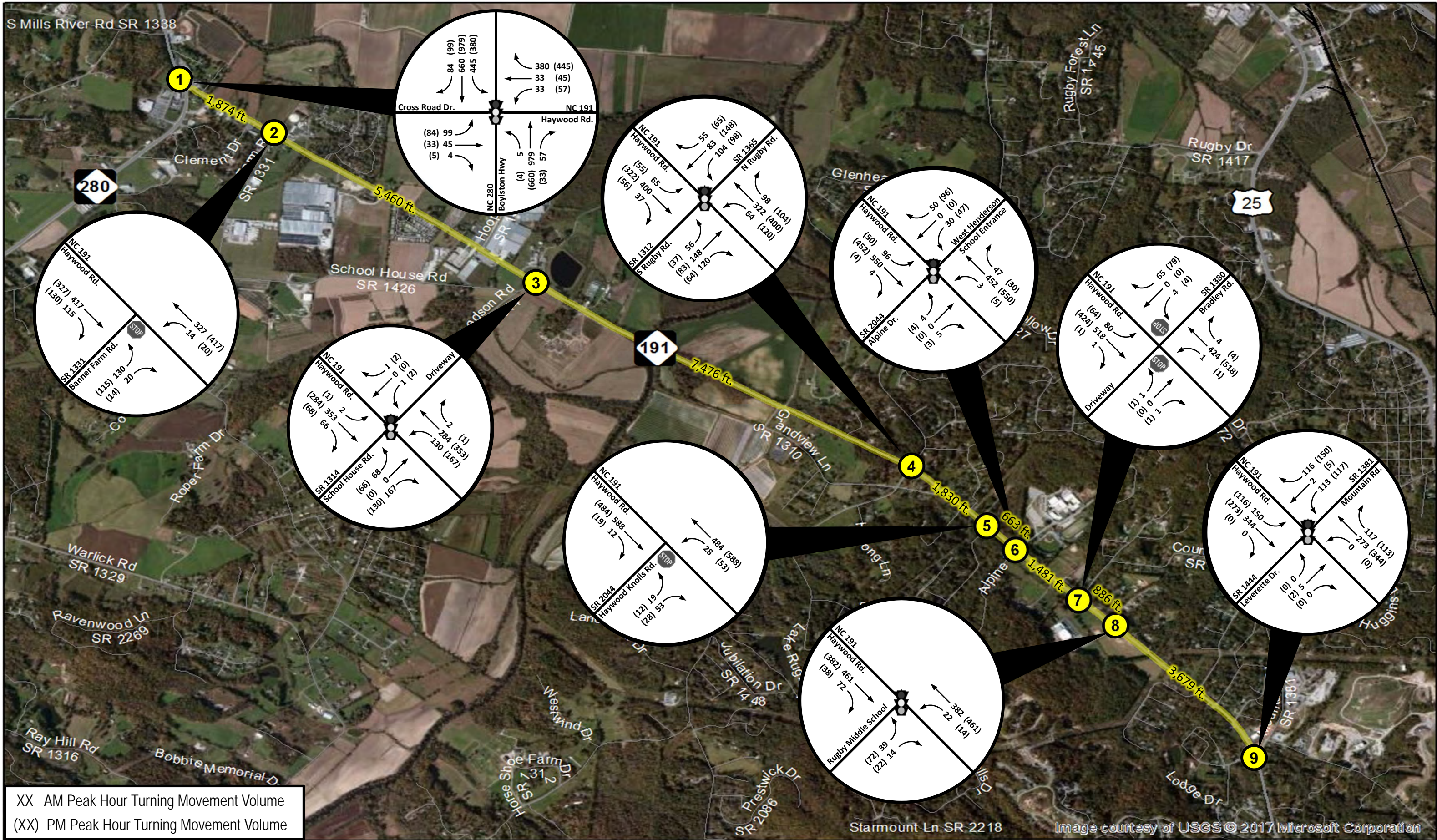
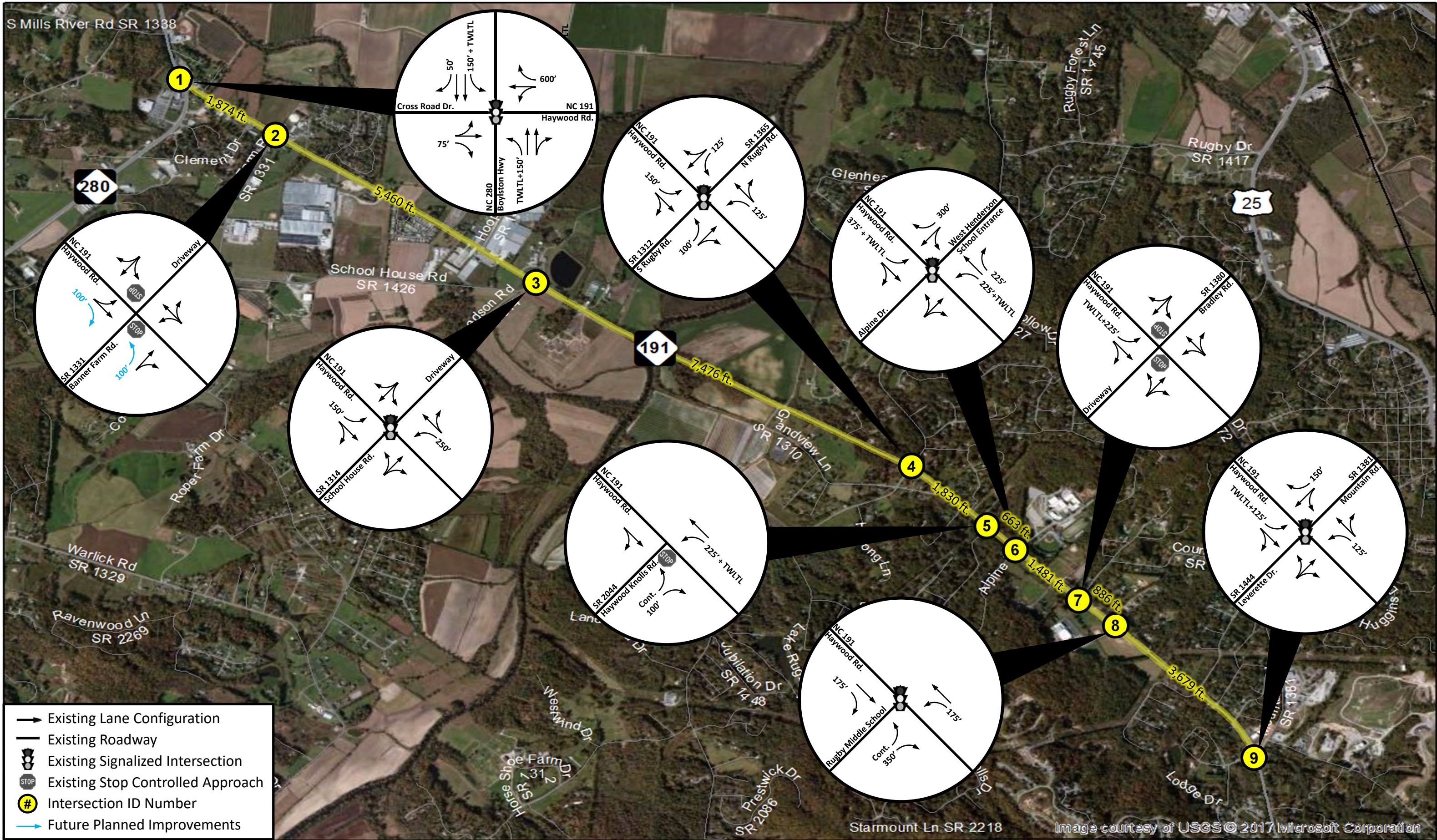
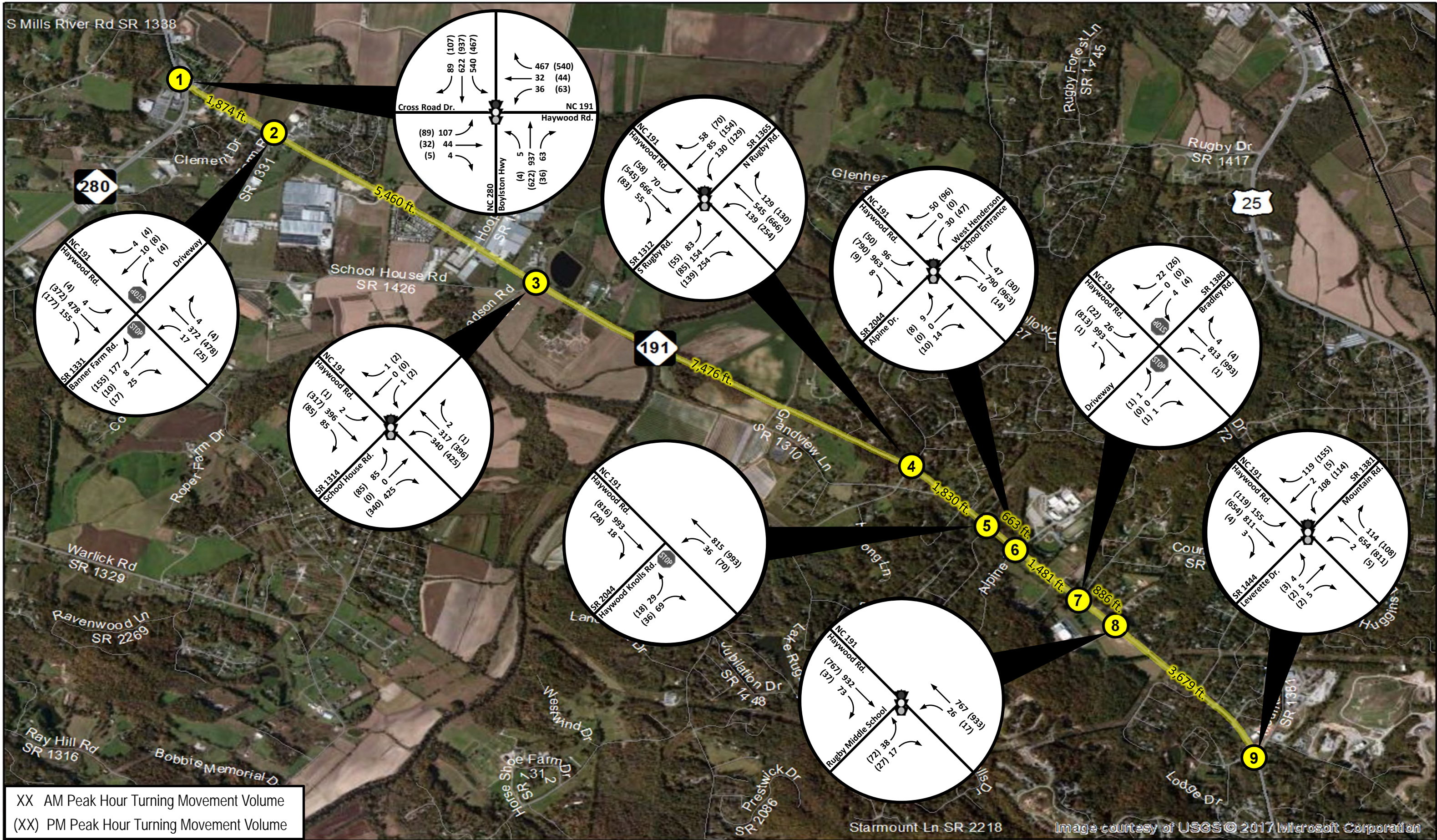


Figure 3:
Base Year (2017) No-Build Lane Configuration and Traffic Control







XX AM Peak Hour Turning Movement Volume
 (XX) PM Peak Hour Turning Movement Volume

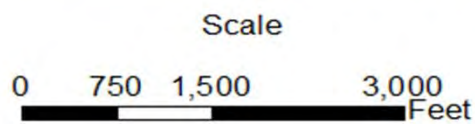


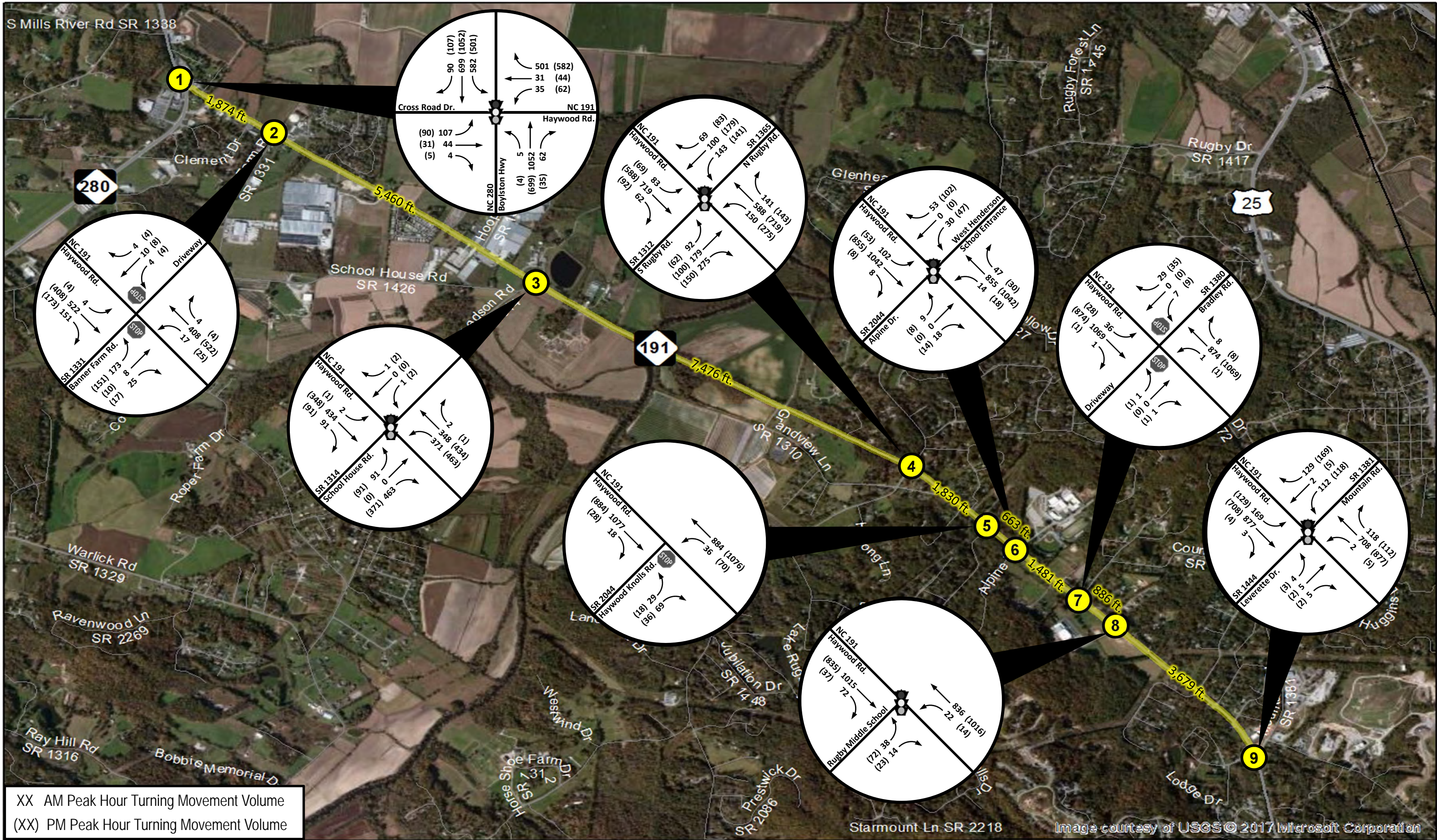
Figure 6:
 Interim Year (2030) No-Build AM and PM Peak Hour Volumes

Image courtesy of USGS © 2017 Microsoft Corporation

STIP Project No. R-2588B
 NC 191 Widening, Mills River, NC
 Traffic Capacity Analysis

Project No.: 38536.13





XX AM Peak Hour Turning Movement Volume
 (XX) PM Peak Hour Turning Movement Volume

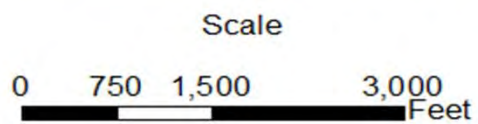


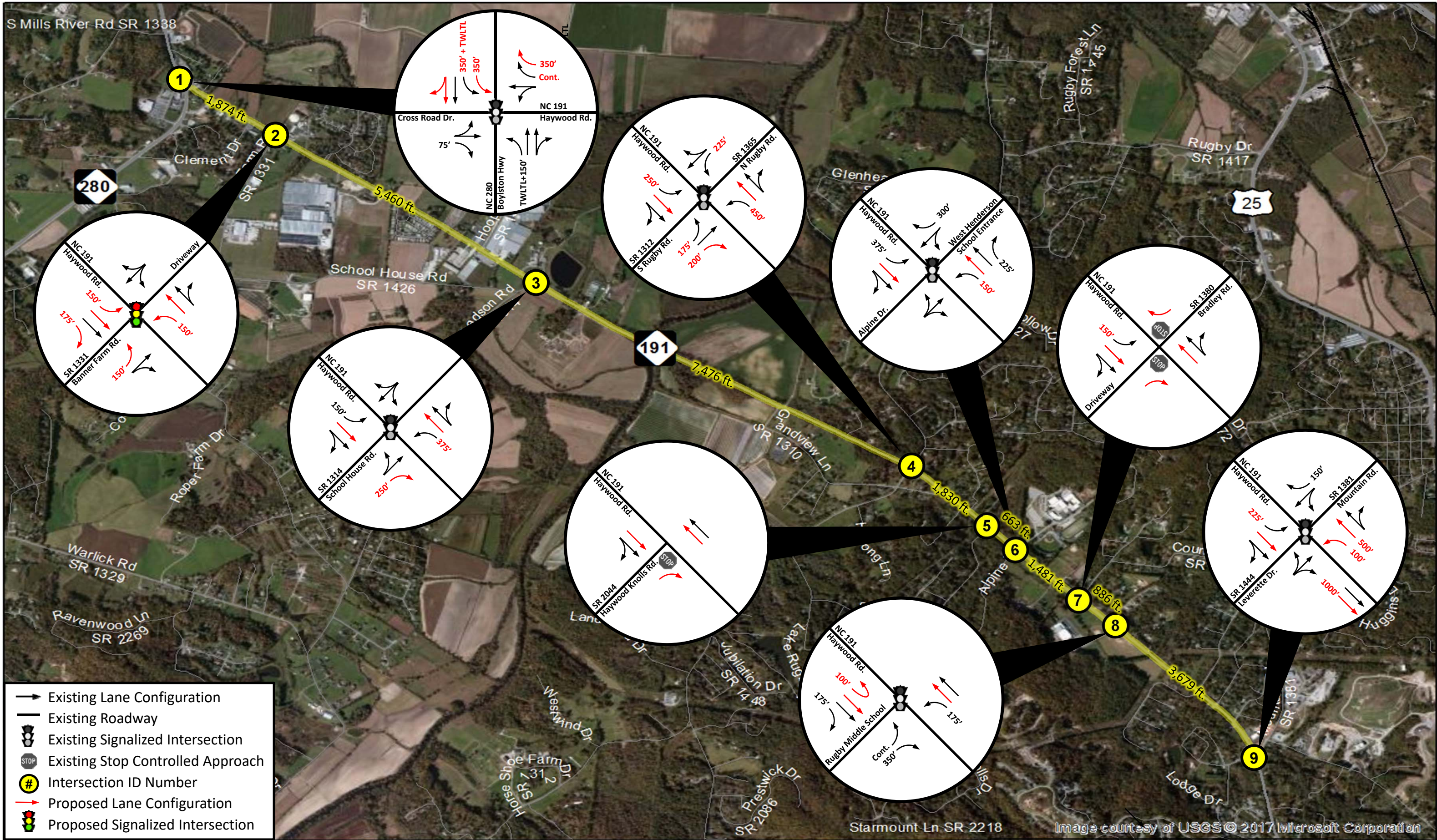
Figure 7:
 Design Year (2040) No-Build AM and PM Peak Hour Volumes

Image courtesy of USGS © 2017 Microsoft Corporation

STIP Project No. R-2588B
 NC 191 Widening, Mills River, NC
 Traffic Capacity Analysis

Project No.: 38536.13





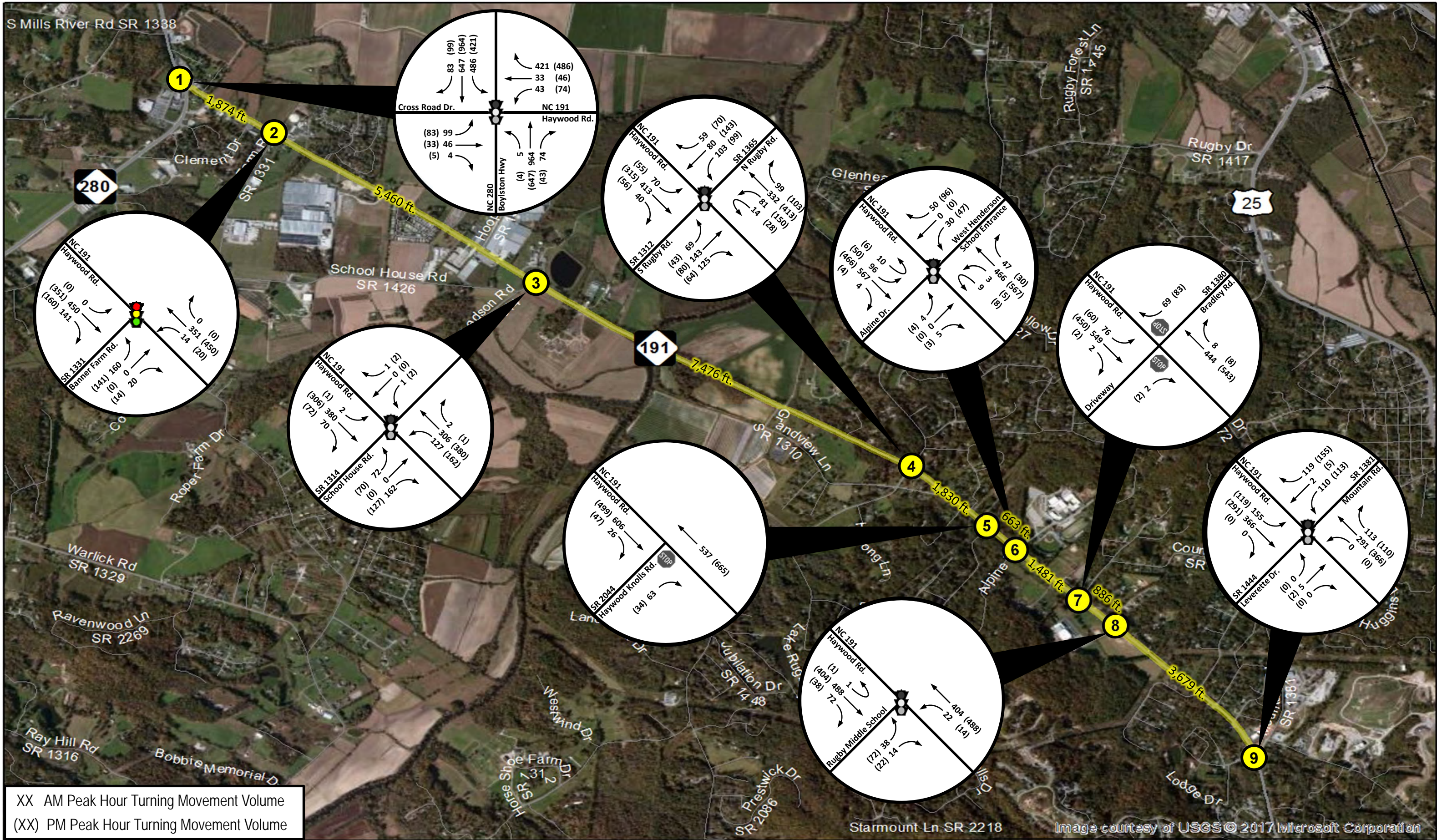
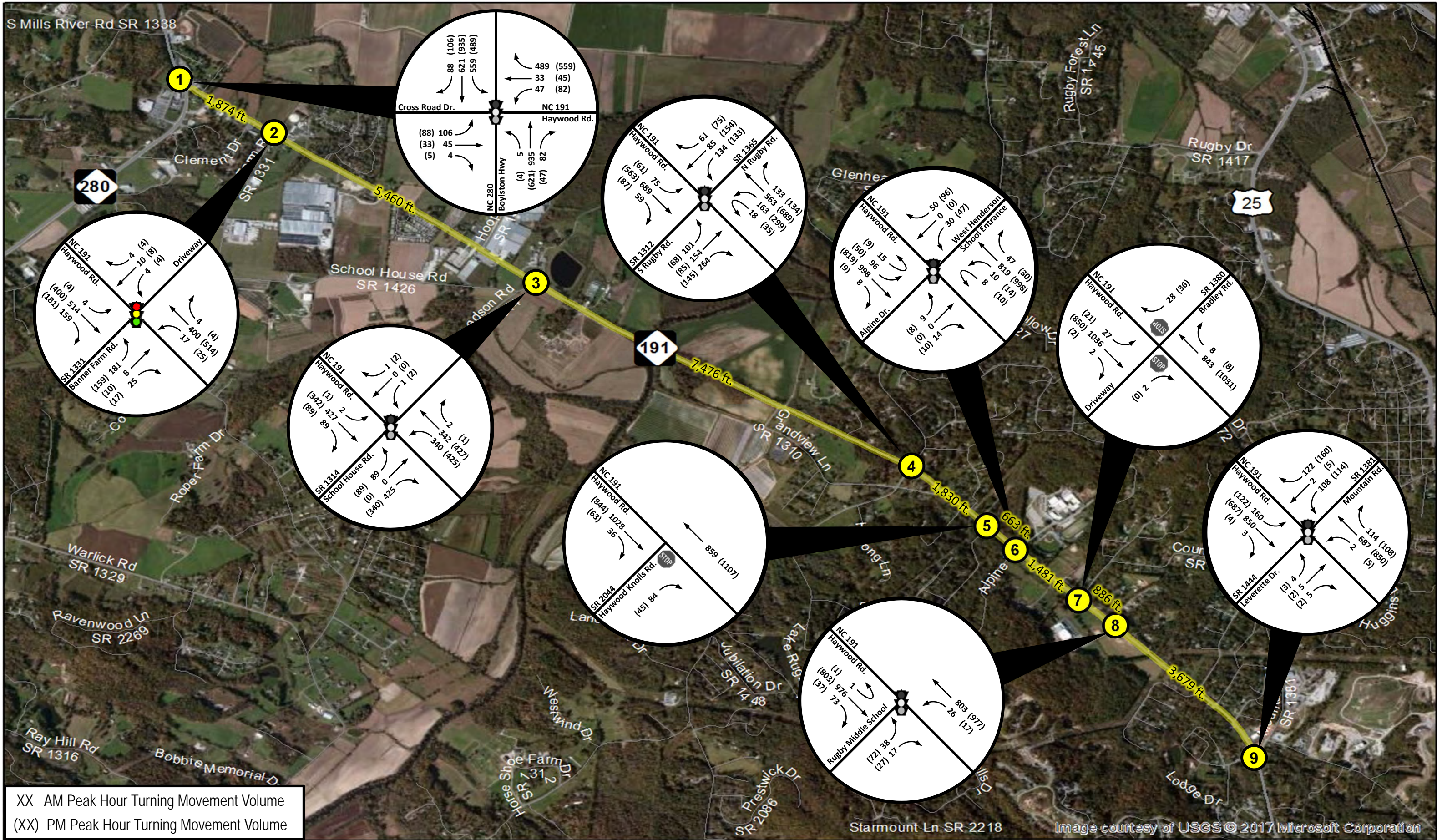


Figure 10:
 Base Year (2017) Build AM and PM Peak Hour Volumes



XX AM Peak Hour Turning Movement Volume
 (XX) PM Peak Hour Turning Movement Volume

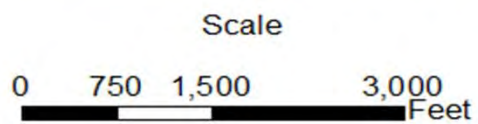


Figure 11:
 Interim Year (2030) Build AM and PM Peak Hour Volumes

Image courtesy of USGS © 2017 Microsoft Corporation

STIP Project No. R-2588B
 NC 191 Widening, Mills River, NC
 Traffic Capacity Analysis

Project No.: 38536.13



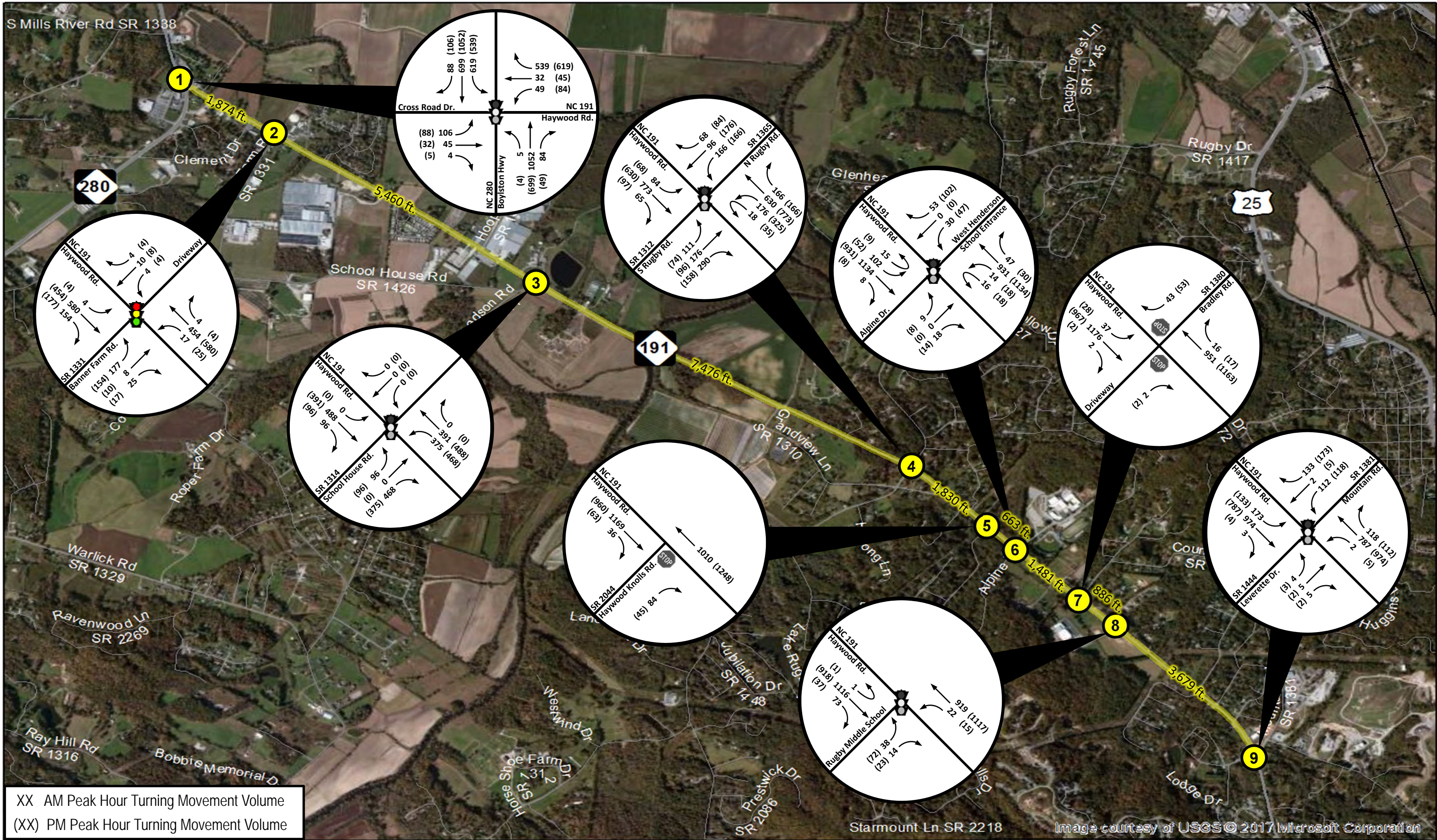


Figure 12:
 Design Year (2040) Build AM and PM Peak Hour Volumes

STIP Project No. R-2588B
 NC 191 Widening, Mills River, NC
 Traffic Capacity Analysis

Project No.: 38536.13



Appendices

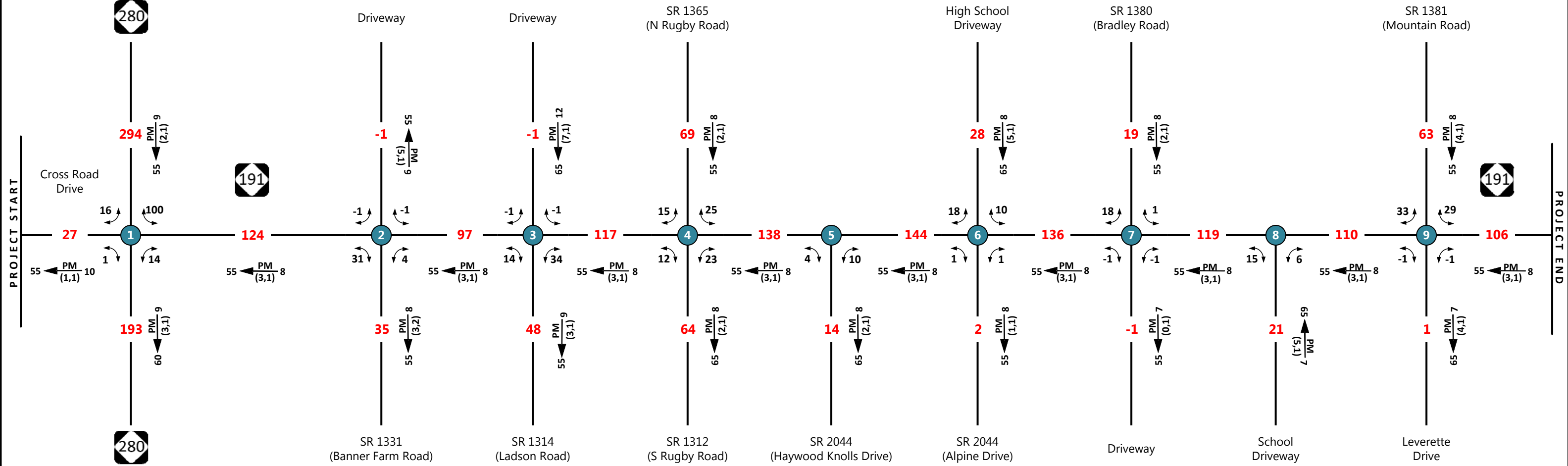
Appendix A – Forecast Sheets and IAU Calculations

Appendix B – Crash Data

Appendix C – Traffic Signal Plans

Appendix D – Capacity Analysis Results

Appendix A
Forecast Sheets and IAU Calculations



2017 Average Annual Daily Traffic

No-Build Alternative (Scenario 1) Sheet 1 of 1

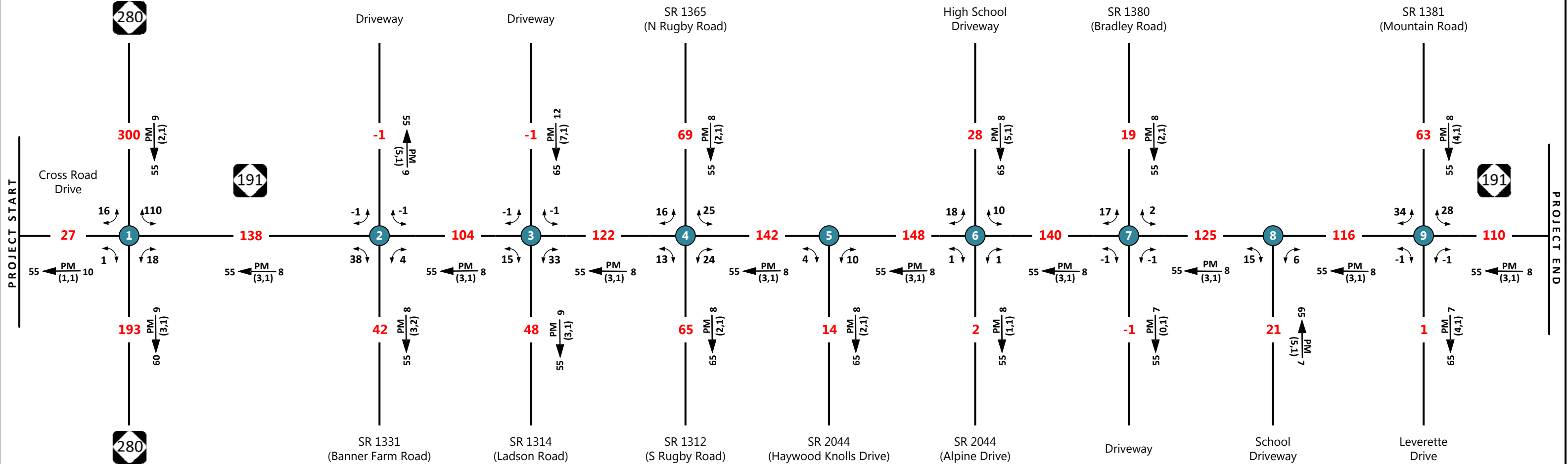
LEGEND

No. of Vehicles per Day (VPD) in 100s

— Existing Roadway

$D \leftarrow \frac{PM}{(d,t)} K$
 PM PM Peak Hour
 D Peak Hour Directional Split (%)
 Indicates Direction of D
 (d,t) Duals, TTSTs (%)
 K Design Hour Factor (%)
 X Movement Prohibited
 -1 Less than 50 VPD

TIP: R-2588B
WBS: 34473.1.3
DIVISION: 14
COUNTY: Henderson
DATE: 07/27/2017
PREPARED BY: VHB Engineering NC, P.C.
LOCATION: NC 191 (Haywood Road) from SR 1381 (Mountain Road) to NC 280 south of Mills River
PROJECT: NC 191 (Haywood Road) Feasibility Study



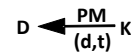
2017 Average Annual Daily Traffic

Build Alternative (Scenario 2) Sheet 1 of 1

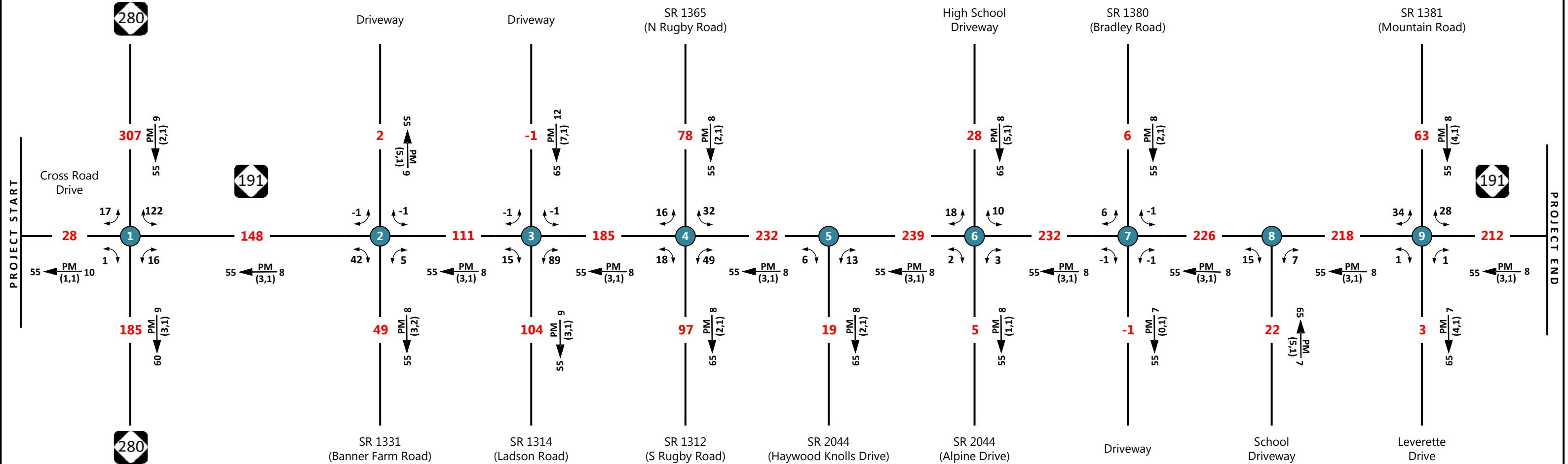
LEGEND

No. of Vehicles per Day (VPD) in 100s
 — Existing Roadway

PM PM Peak Hour
 D Peak Hour Directional Split (%)
 Indicates Direction of D
 (d,t) Duals, TTSTs (%)
 K Design Hour Factor (%)
 X Movement Prohibited
 -1 Less than 50 VPD



TIP: R-2588B
WBS: 34473.1.3
DIVISION: 14
COUNTY: Henderson
DATE: 07/27/2017
PREPARED BY: VHB Engineering NC, P.C.
LOCATION: NC 191 (Haywood Road) from SR 1381 (Mountain Road) to NC 280 south of Mills River
PROJECT: NC 191 (Haywood Road) Feasibility Study



2030 Average Annual Daily Traffic

No-Build Alternative

(Scenario 3) Sheet 1 of 1

LEGEND

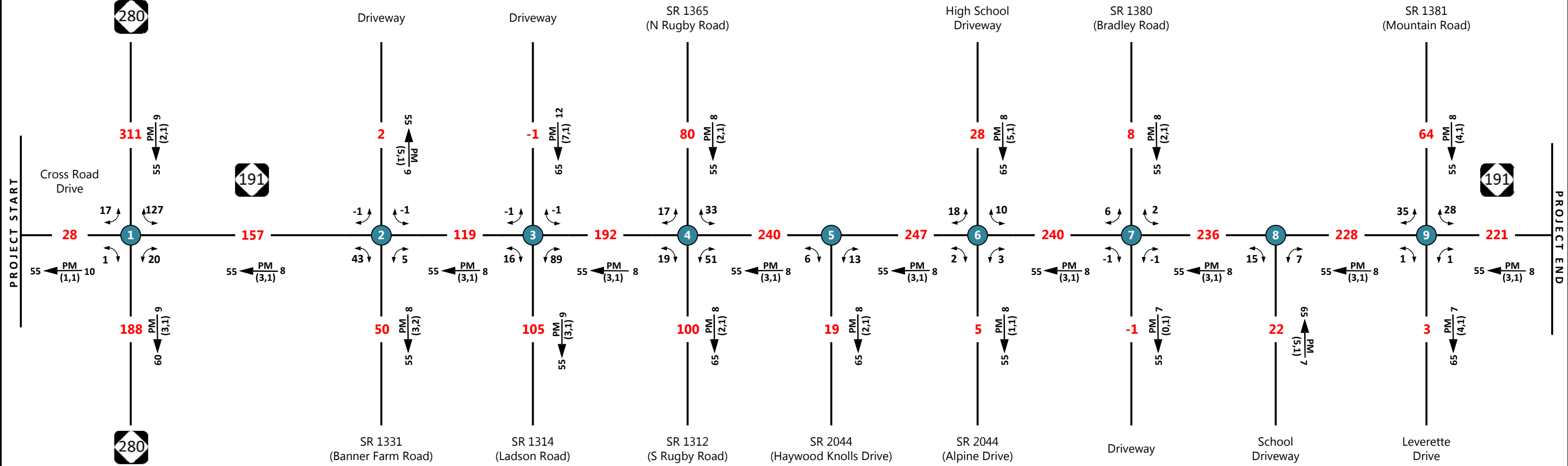
No. of Vehicles per Day (VPD) in 100s

— Existing Roadway

PM PM Peak Hour
 D Peak Hour Directional Split (%)
 Indicates Direction of D
 (d,t) Duals, TTSTs (%)
 K Design Hour Factor (%)
 X Movement Prohibited
 -1 Less than 50 VPD

D $\frac{PM}{(d,t)}$ K

TIP: R-2588B
WBS: 34473.1.3
DIVISION: 14
COUNTY: Henderson
DATE: 07/27/2017
PREPARED BY: VHB Engineering NC, P.C.
LOCATION: NC 191 (Haywood Road) from SR 1381 (Mountain Road) to NC 280 south of Mills River
PROJECT: NC 191 (Haywood Road) Feasibility Study



2030 Average Annual Daily Traffic

Build Alternative (Scenario 4) Sheet 1 of 1

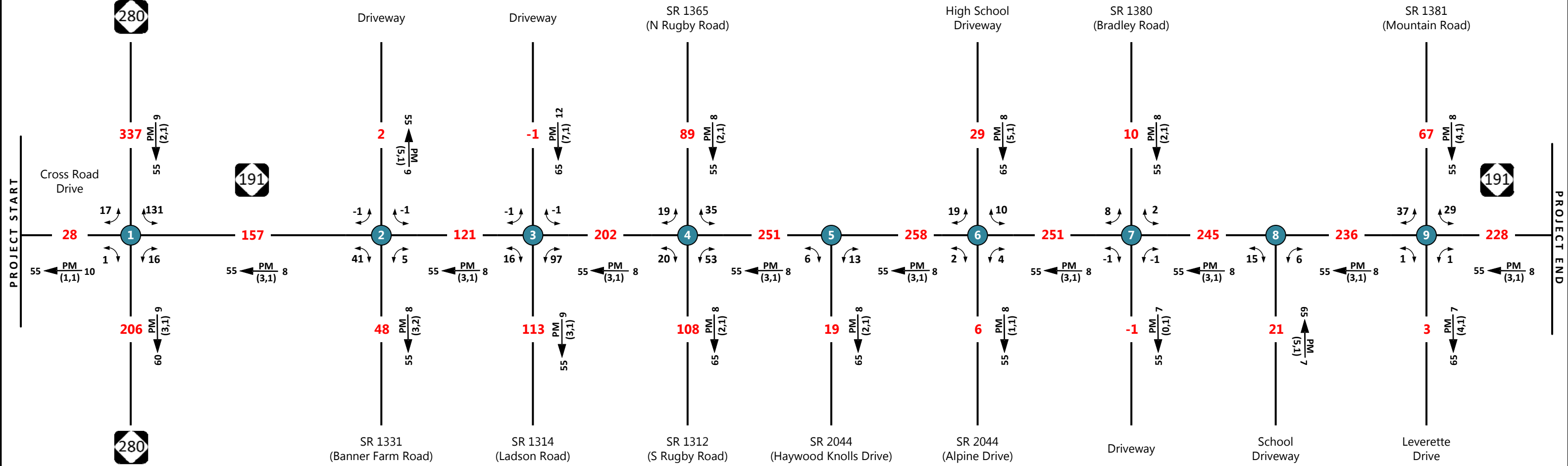
LEGEND

No. of Vehicles per Day (VPD) in 100s

— Existing Roadway

$D \leftarrow \frac{PM}{(d,t)} K$
 PM PM Peak Hour
 D Peak Hour Directional Split (%)
 Indicates Direction of D
 (d,t) Duals, TTSTs (%)
 K Design Hour Factor (%)
 X Movement Prohibited
 -1 Less than 50 VPD

TIP: R-2588B
WBS: 34473.1.3
DIVISION: 14
COUNTY: Henderson
DATE: 07/27/2017
PREPARED BY: VHB Engineering NC, P.C.
LOCATION: NC 191 (Haywood Road) from SR 1381 (Mountain Road) to NC 280 south of Mills River
PROJECT: NC 191 (Haywood Road) Feasibility Study



2040 Average Annual Daily Traffic

No-Build Alternative

(Scenario 5) Sheet 1 of 1

LEGEND

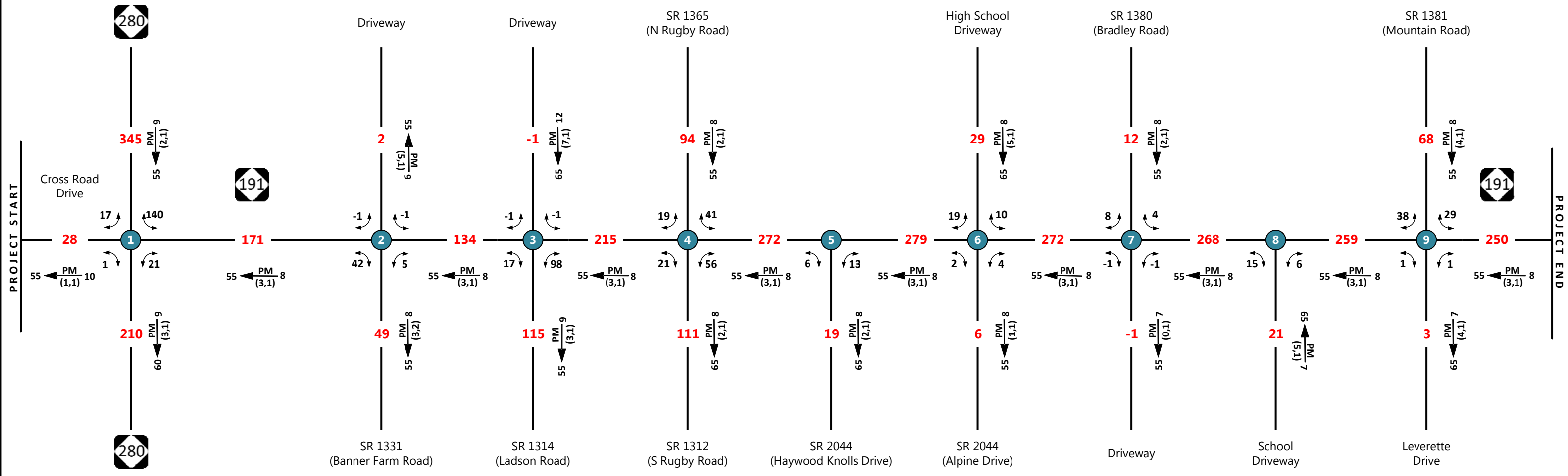
No. of Vehicles per Day (VPD) in 100s

— Existing Roadway

PM PM Peak Hour
 D Peak Hour Directional Split (%)
 Indicates Direction of D
 (d,t) Duals, TTSTs (%)
 K Design Hour Factor (%)
 X Movement Prohibited
 -1 Less than 50 VPD

D $\frac{PM}{(d,t)}$ K

TIP: R-2588B
WBS: 34473.1.3
DIVISION: 14
COUNTY: Henderson
DATE: 07/27/2017
PREPARED BY: VHB Engineering NC, P.C.
LOCATION: NC 191 (Haywood Road) from SR 1381 (Mountain Road) to NC 280 south of Mills River
PROJECT: NC 191 (Haywood Road) Feasibility Study



2040 Average Annual Daily Traffic

Build Alternative (Scenario 6) Sheet 1 of 1

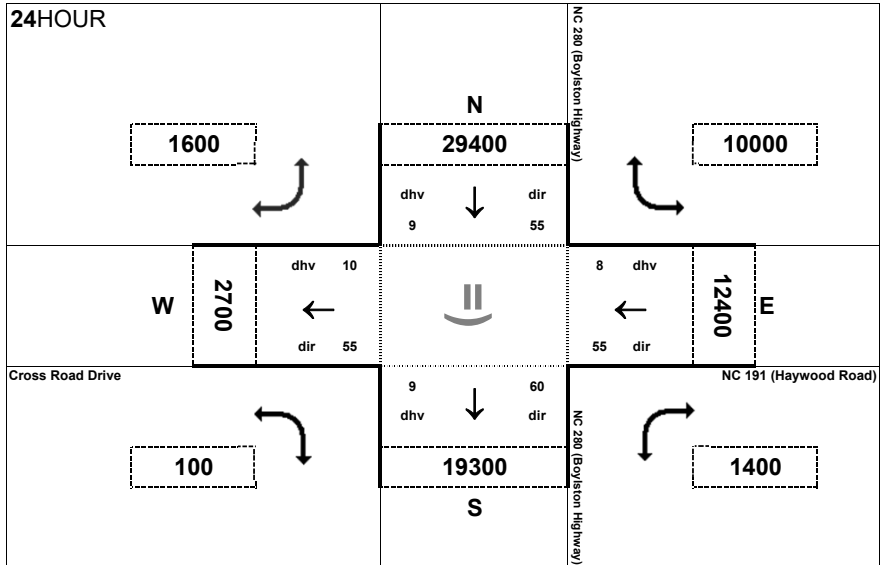
LEGEND

No. of Vehicles per Day (VPD) in 100s

— Existing Roadway

$D \leftarrow \frac{PM}{(d,t)} K$
 PM PM Peak Hour
 D Peak Hour Directional Split (%)
 Indicates Direction of D
 (d,t) Duals, TTSTs (%)
 K Design Hour Factor (%)
 X Movement Prohibited
 -1 Less than 50 VPD

TIP: R-2588B
WBS: 34473.1.3
DIVISION: 14
COUNTY: Henderson
DATE: 07/27/2017
PREPARED BY: VHB Engineering NC, P.C.
LOCATION: NC 191 (Haywood Road) from SR 1381 (Mountain Road) to NC 280 south of Mills River
PROJECT: NC 191 (Haywood Road) Feasibility Study

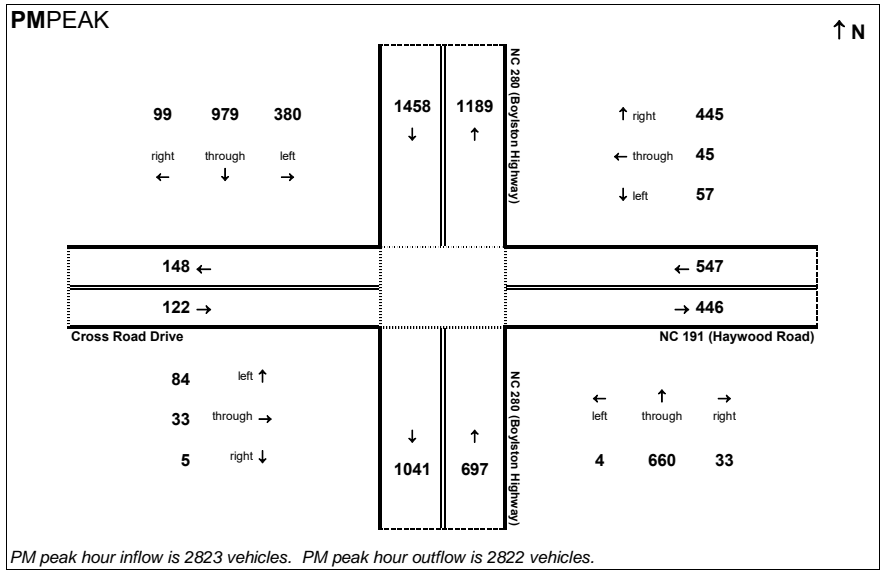
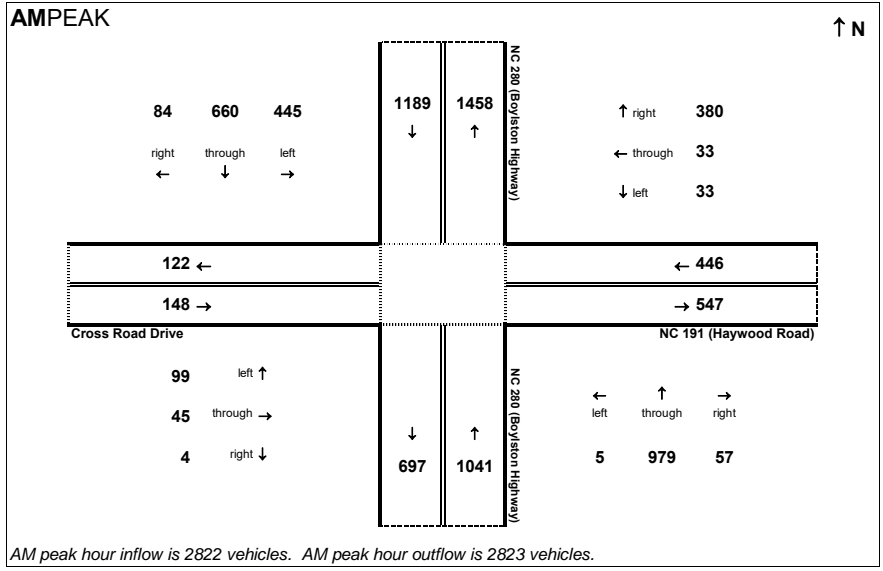


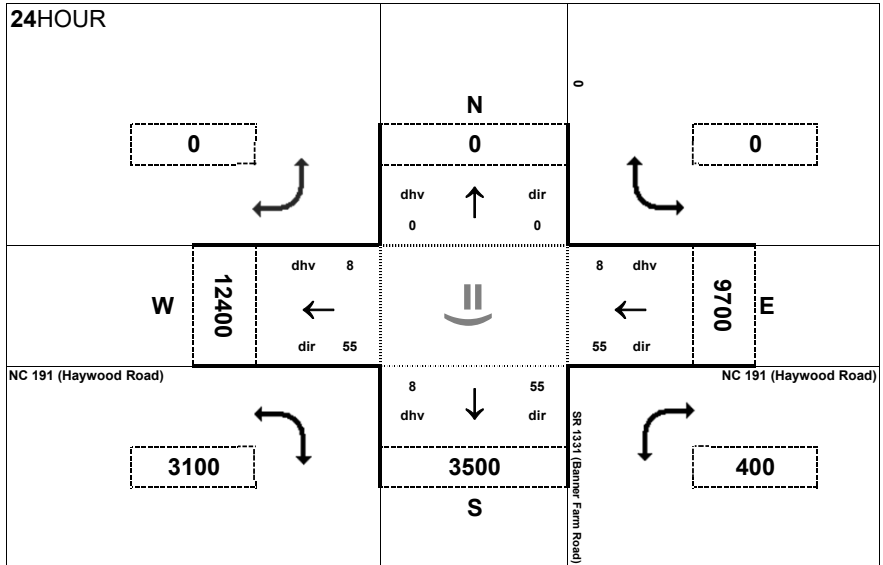
Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and NC 280 (Boylston Highway)

Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2017 Existing

Project:
 R - 2588B



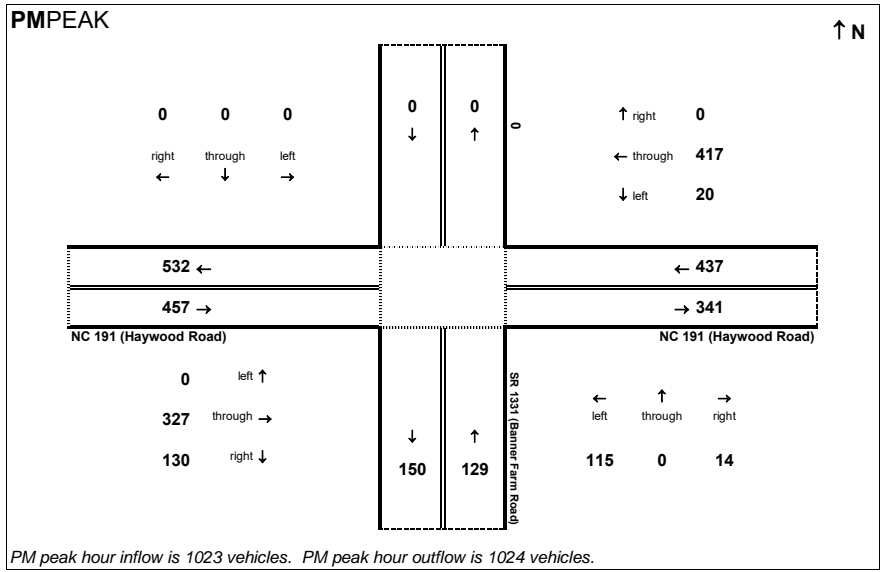
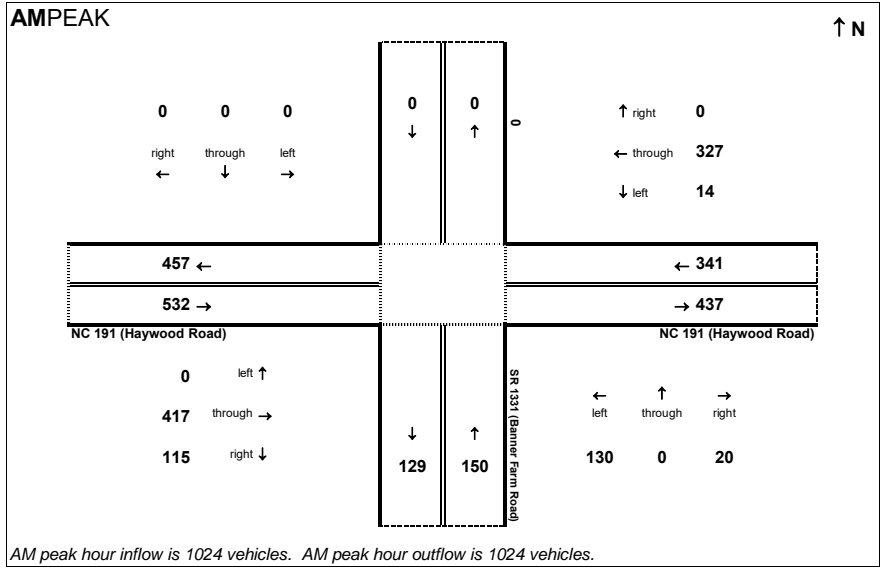


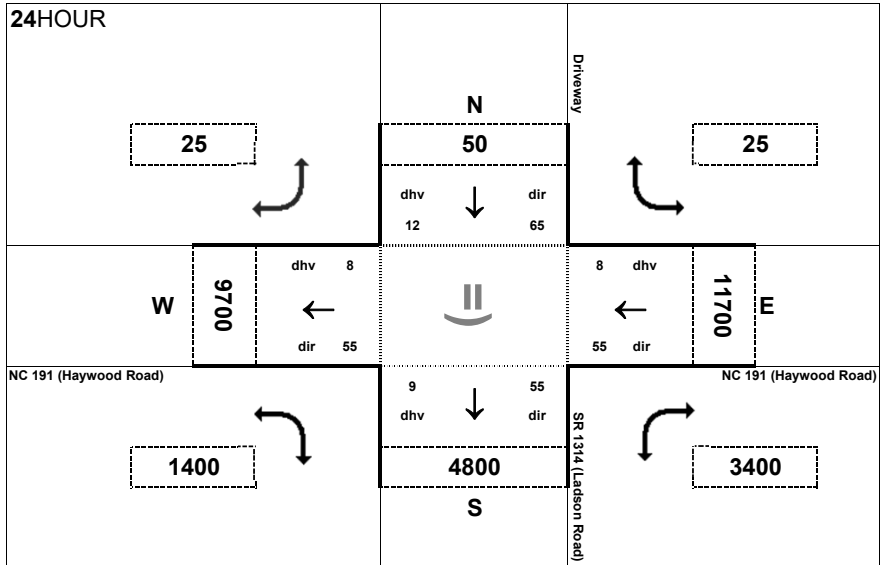
Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and SR 1331 (Banner Farm Road)

Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2017 Existing

Project:
 R - 2588B



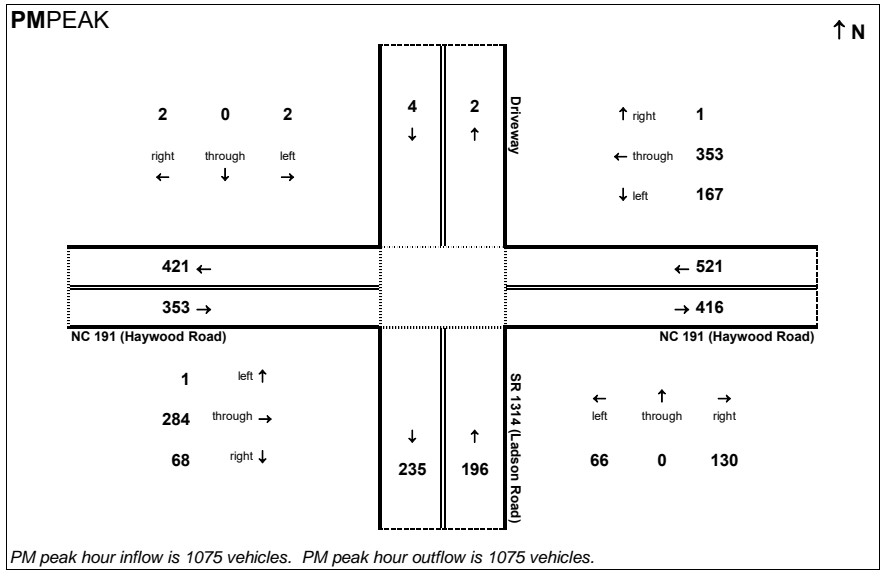
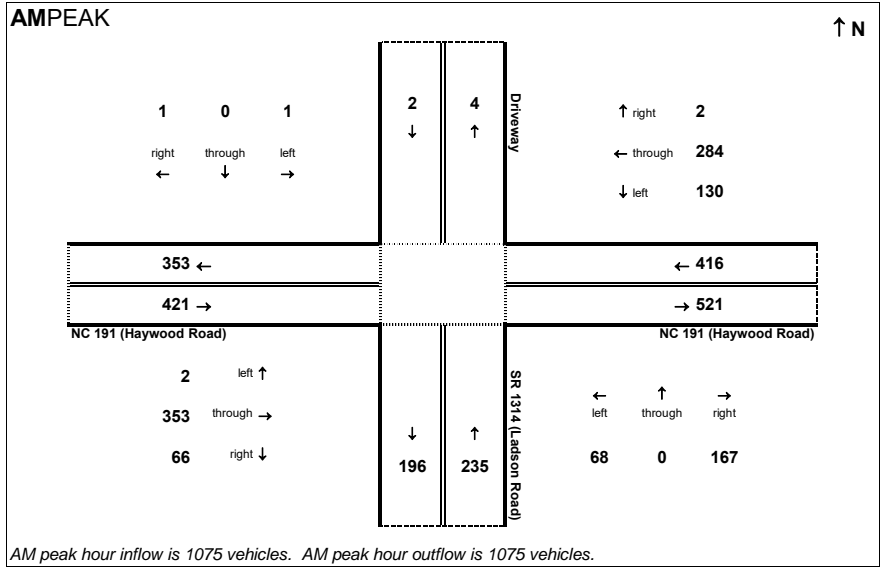


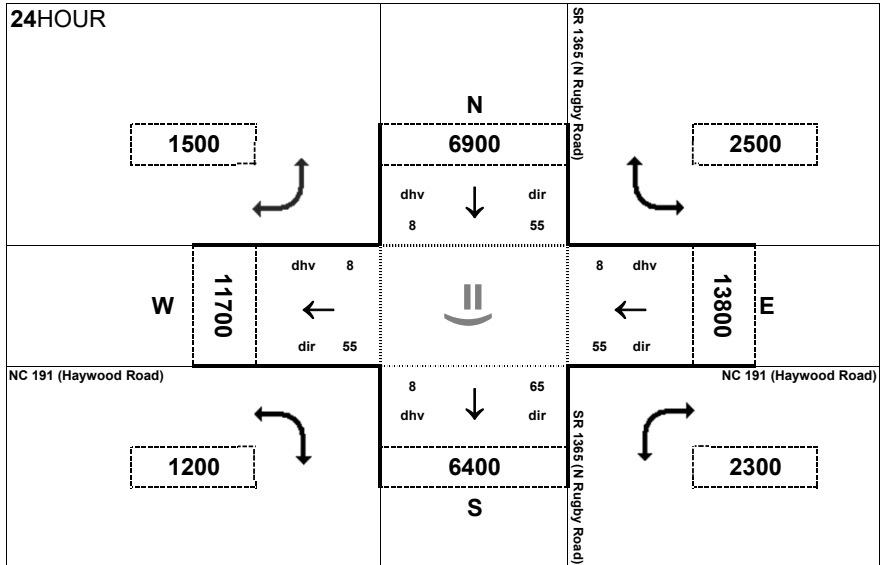
Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and SR 1314 (Ladson Road)

Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2017 Existing

Project:
 R - 2588B



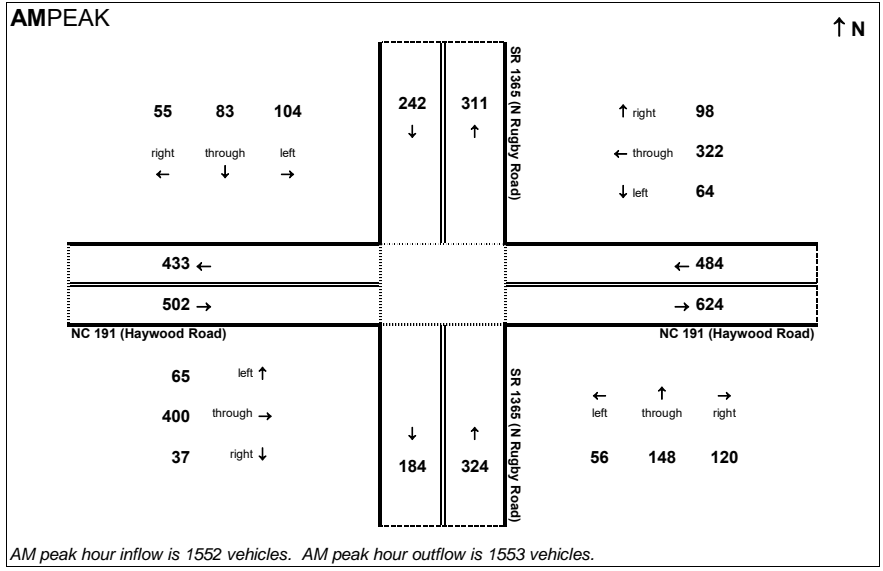


Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and SR 1365 (N Rugby Road)

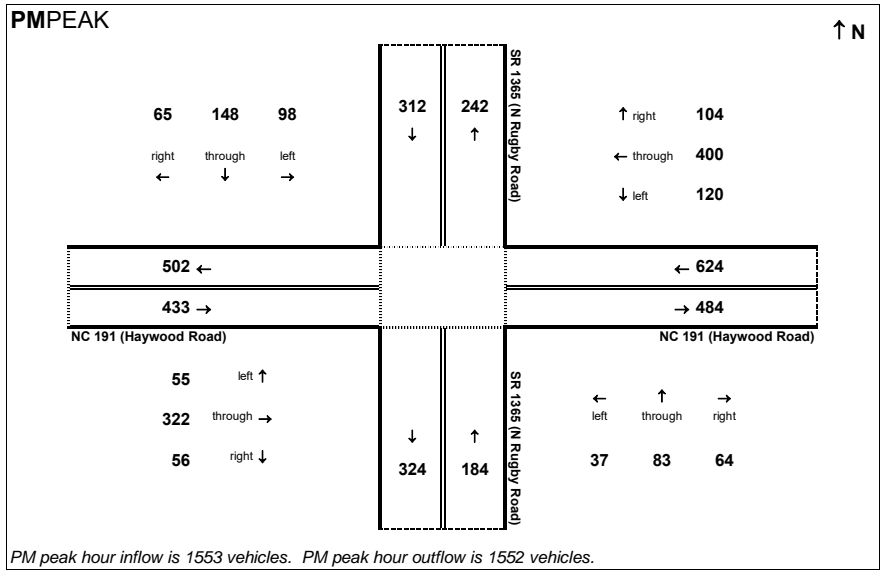
Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2017 Existing

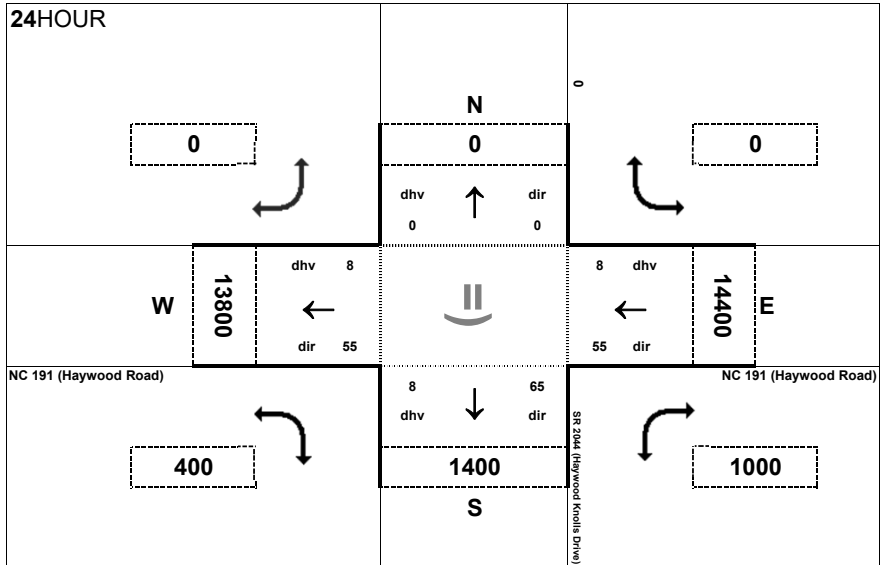
Project:
 R - 2588B



AM peak hour inflow is 1552 vehicles. AM peak hour outflow is 1553 vehicles.



PM peak hour inflow is 1553 vehicles. PM peak hour outflow is 1552 vehicles.

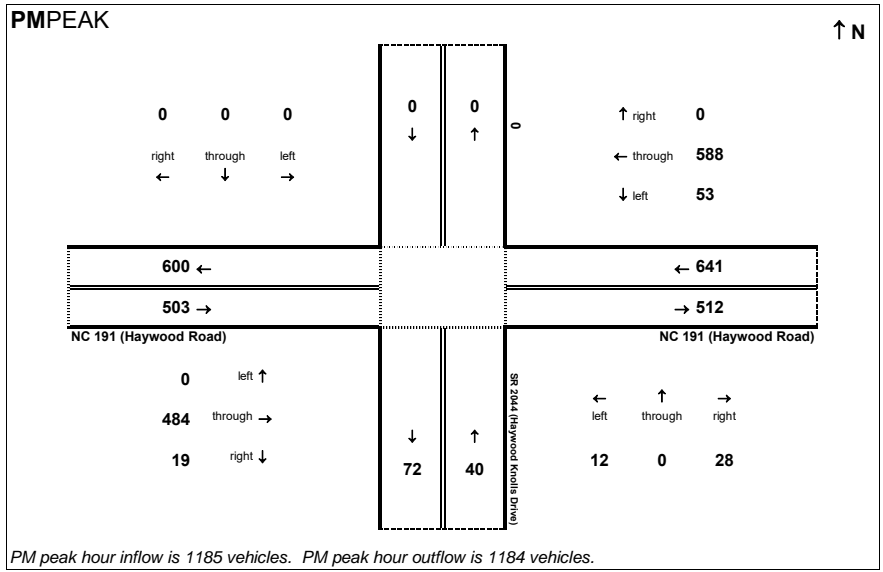
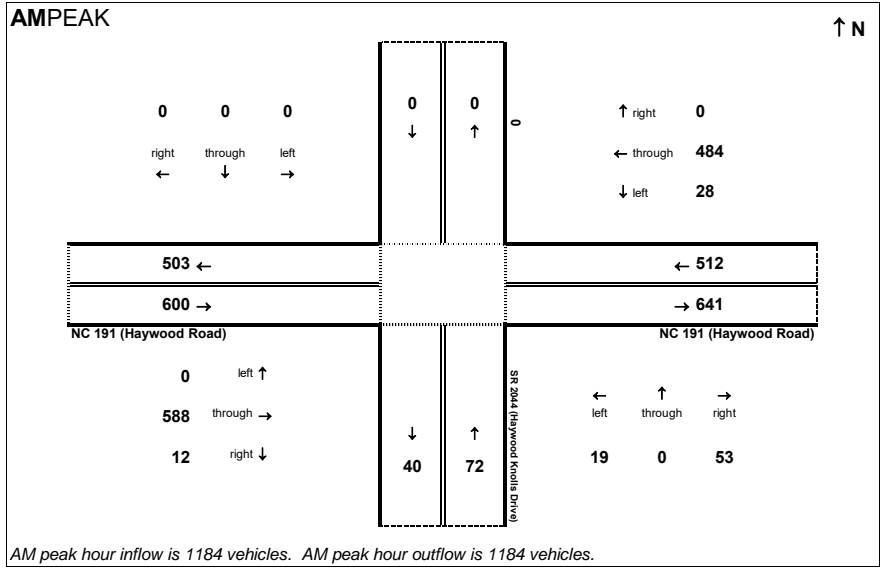


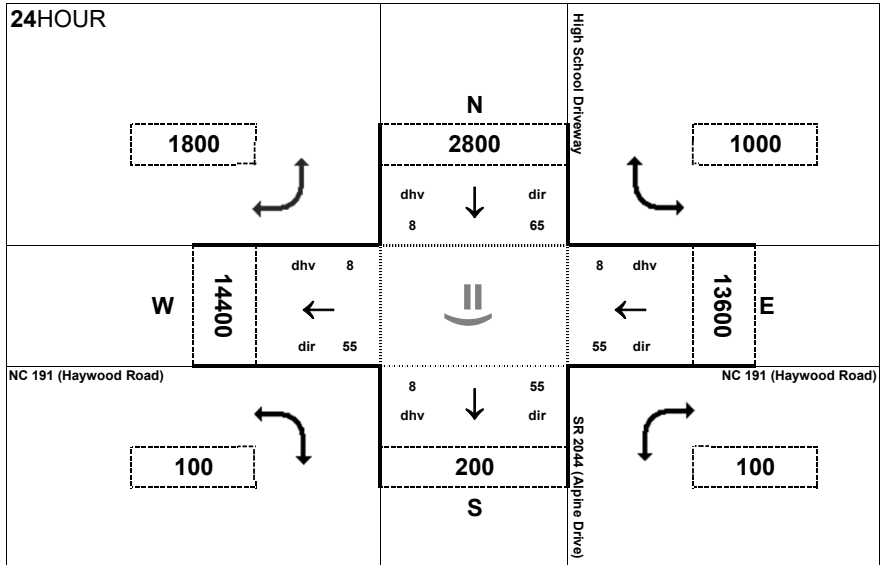
Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and SR 2044 (Haywood Knolls Drive)

Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2017 Existing

Project:
 R - 2588B



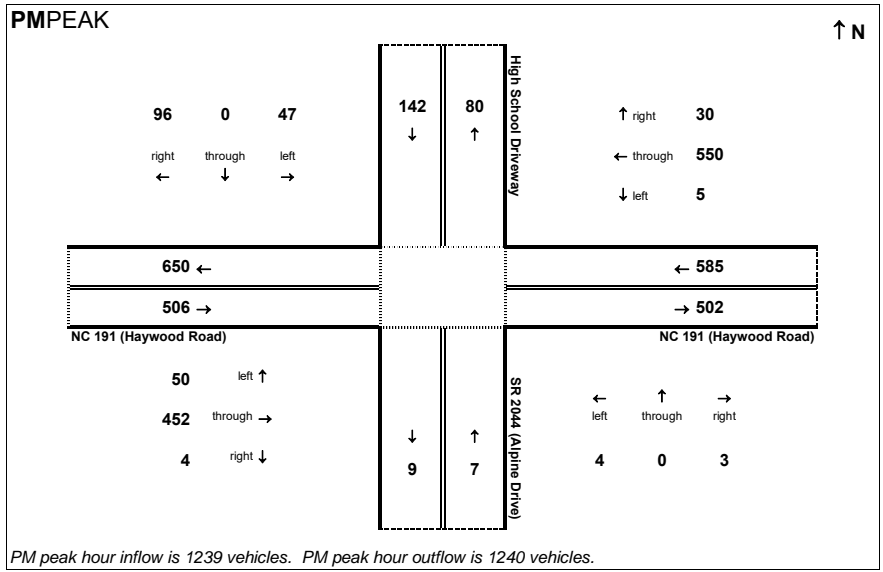
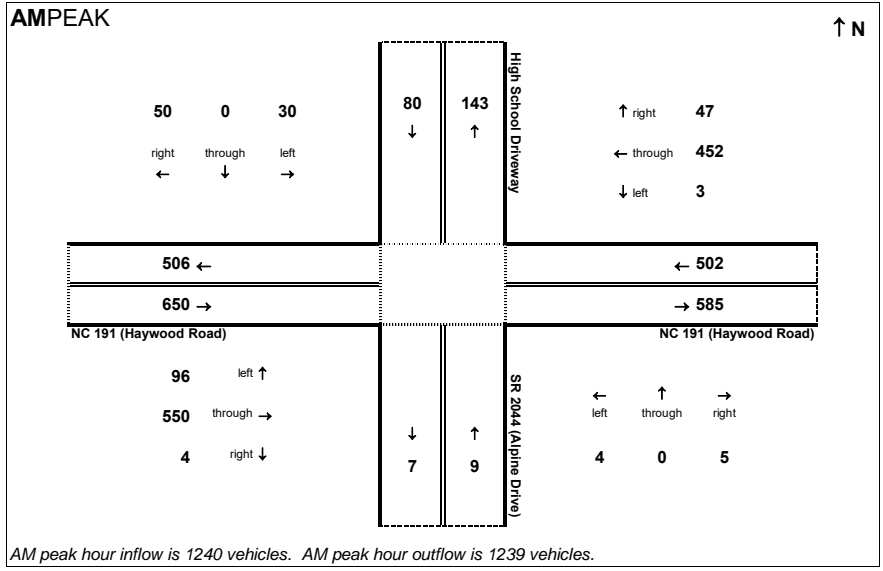


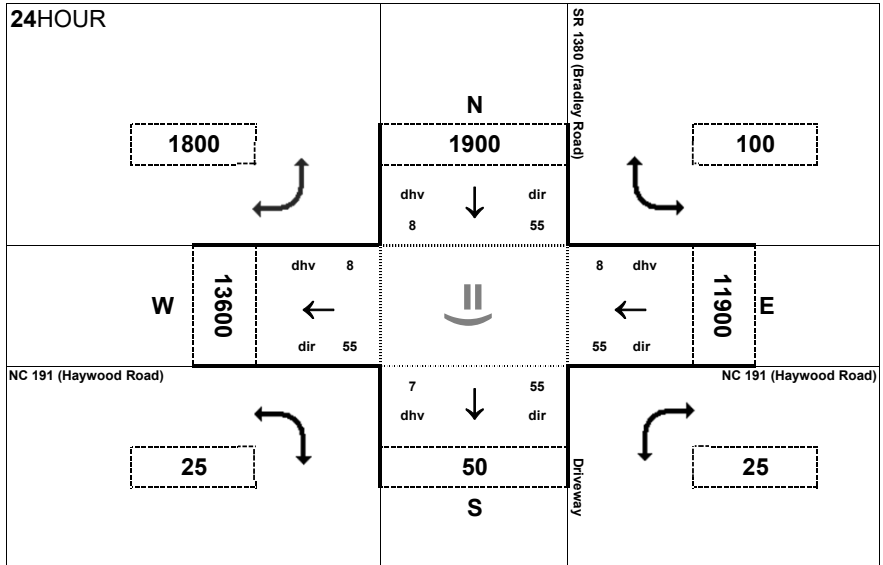
Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and SR 2044 (Alpine Drive)

Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2017 Existing

Project:
 R - 2588B



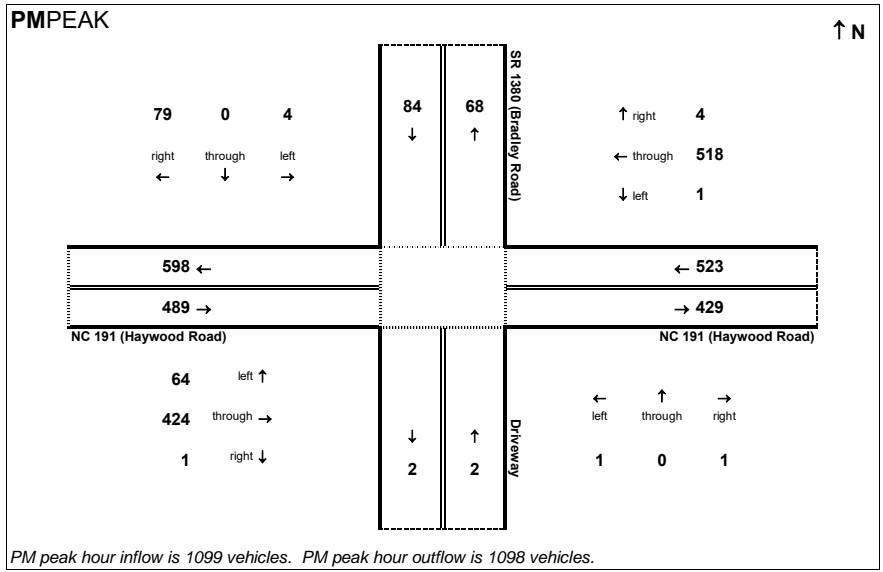
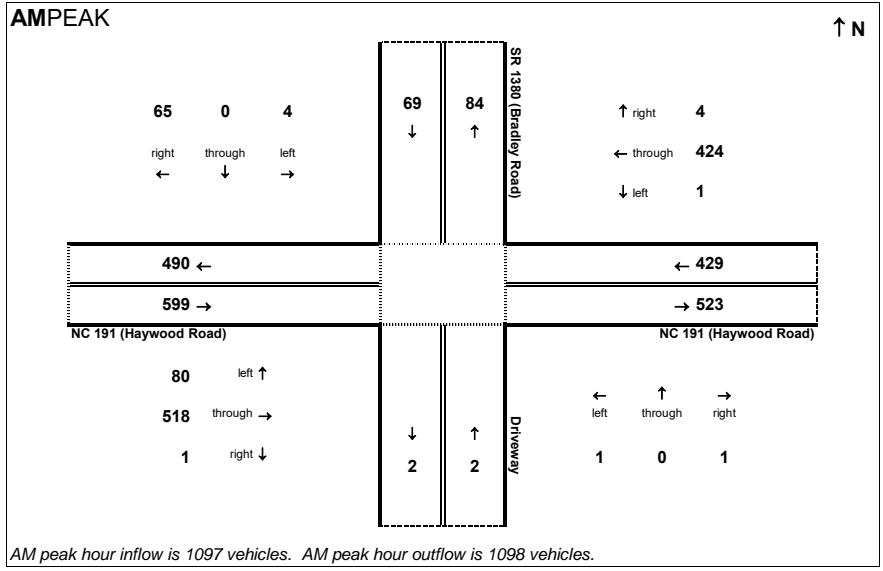


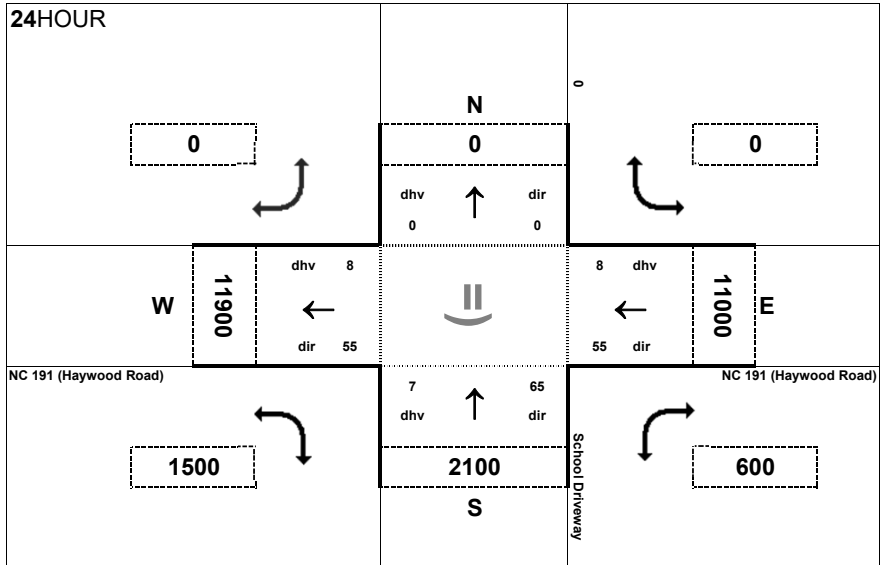
Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and SR 2044 (Alpine Drive)

Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2017 Existing

Project:
 R - 2588B



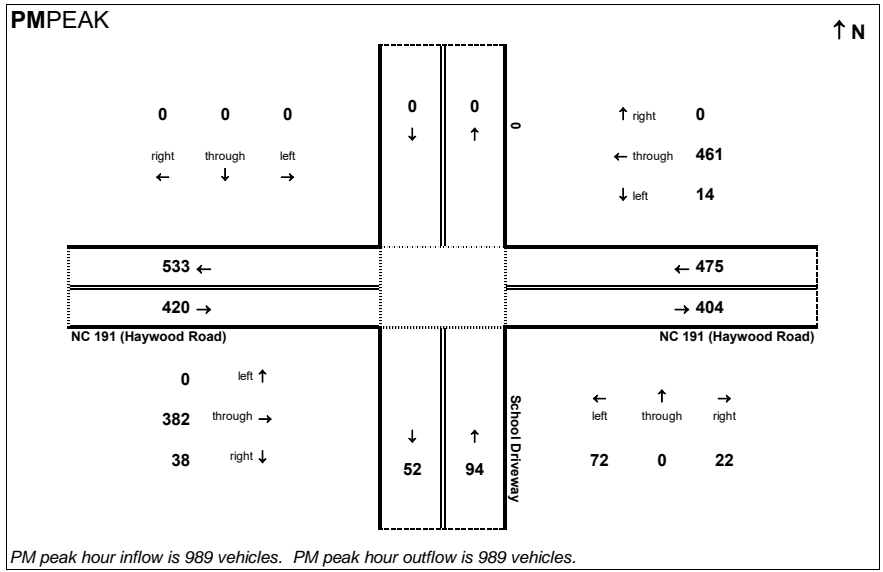
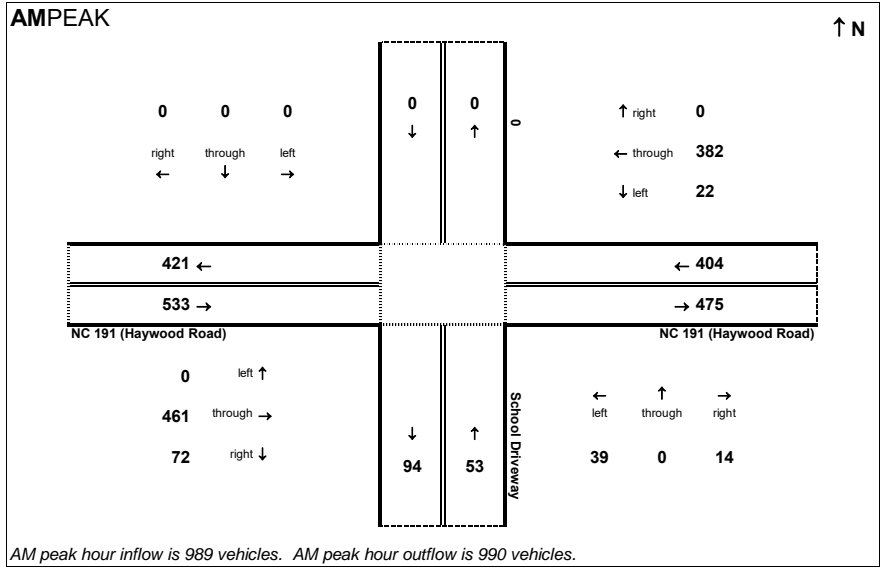


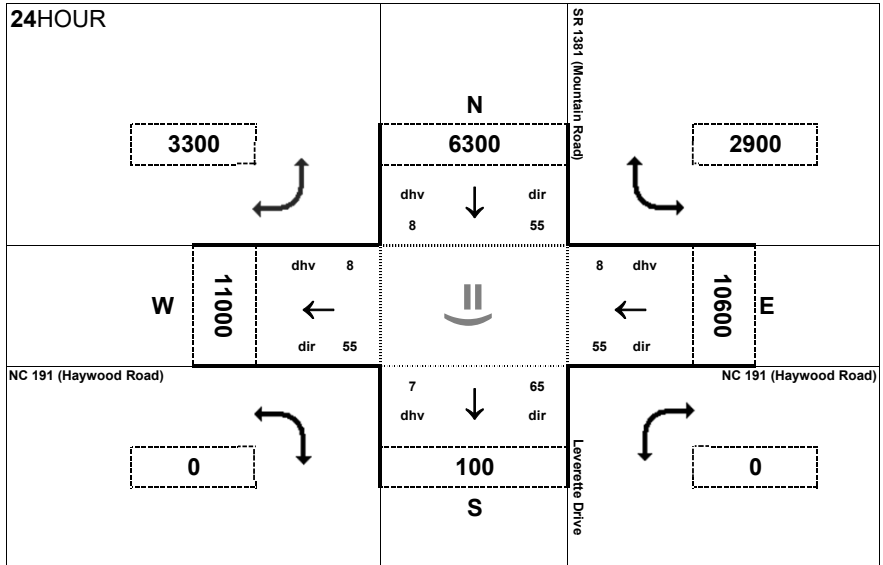
Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and School Driveway

Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2017 Existing

Project:
 R - 2588B



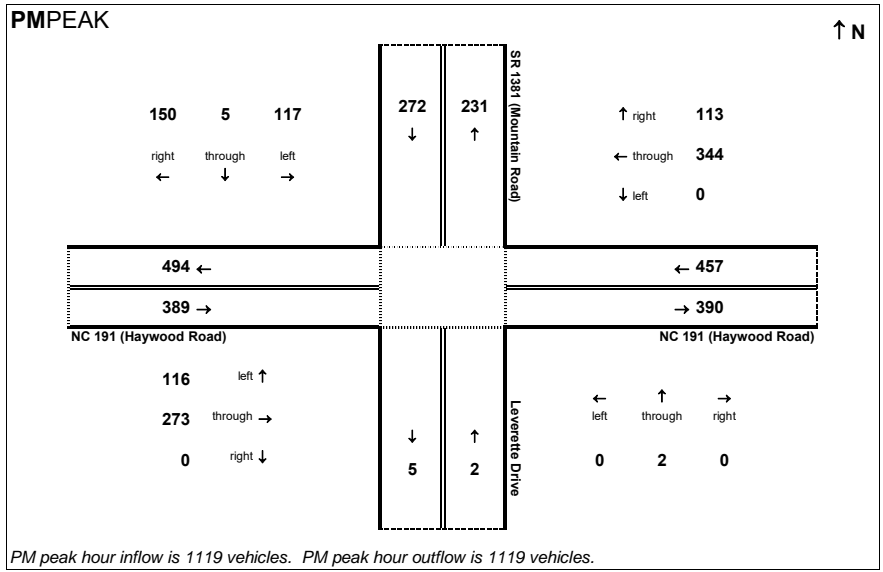
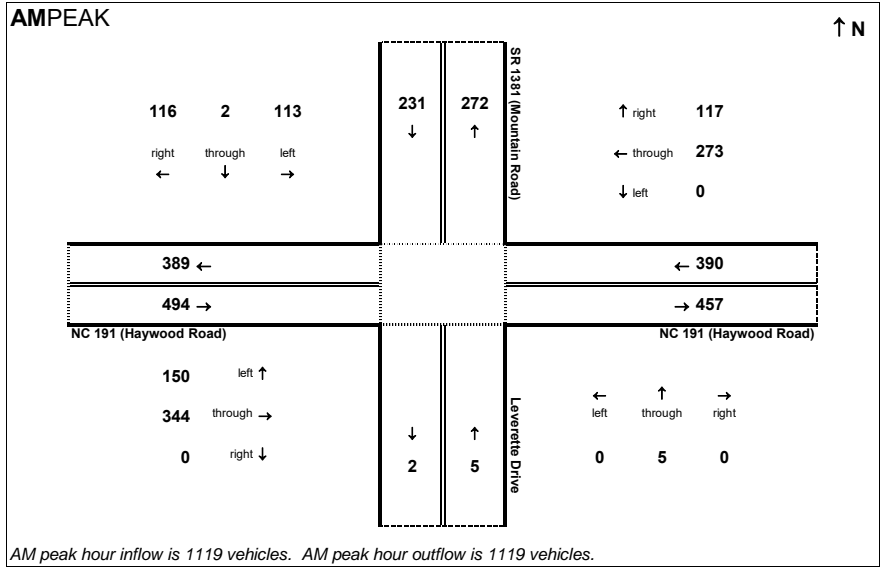


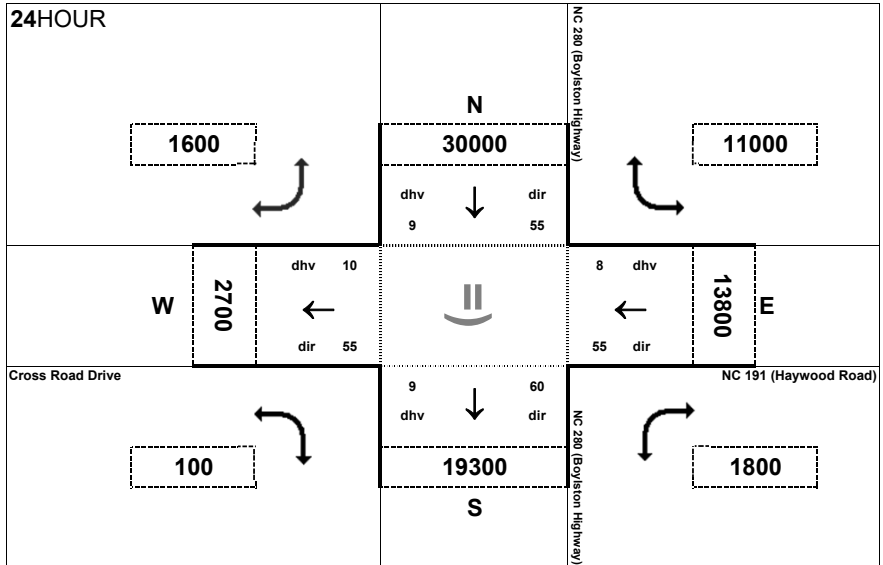
Peak Hour Volume Breakouts Report:
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Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2017 Existing

Project:
 R - 2588B



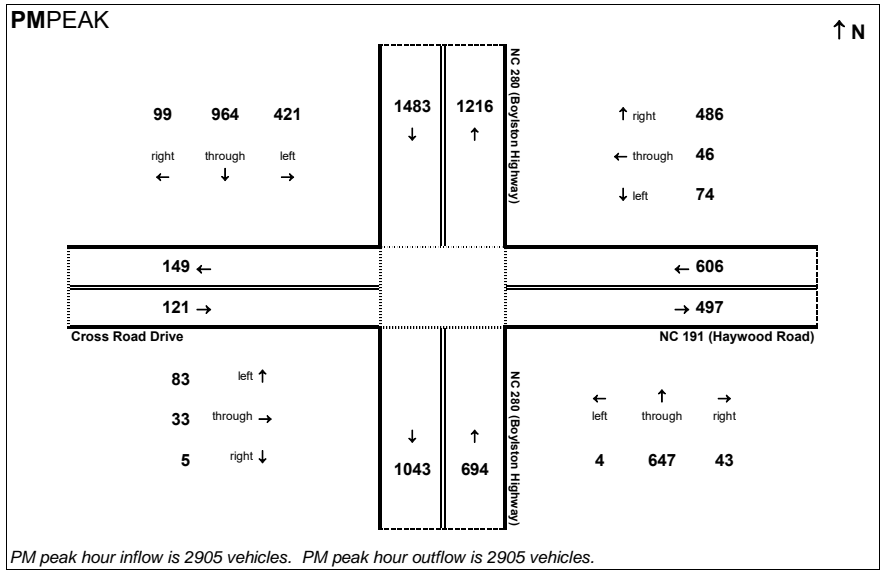
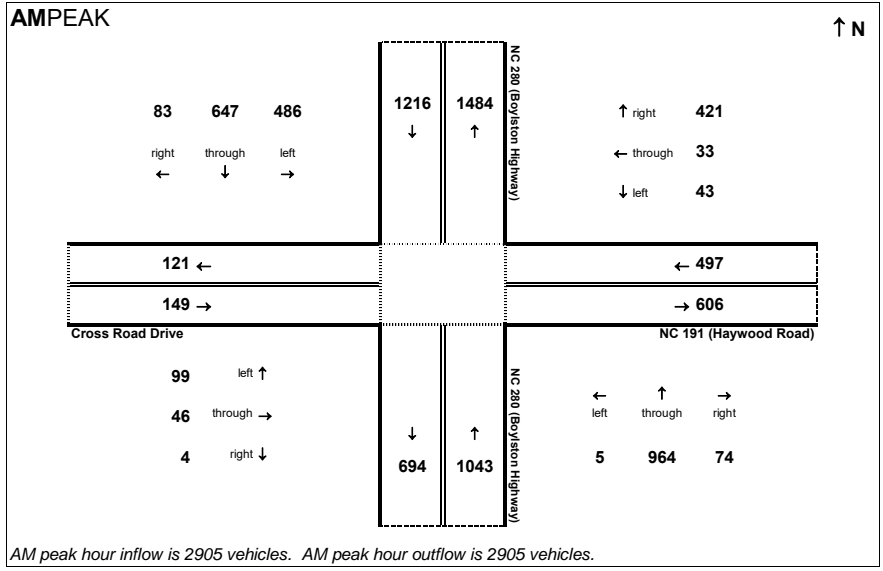


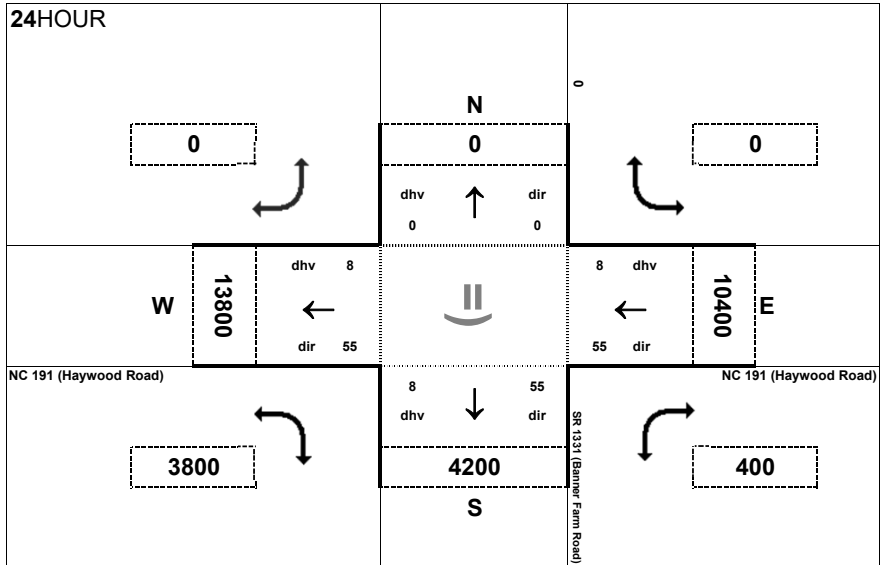
Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and NC 280 (Boylston Highway)

Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2017 Build

Project:
 R - 2588B



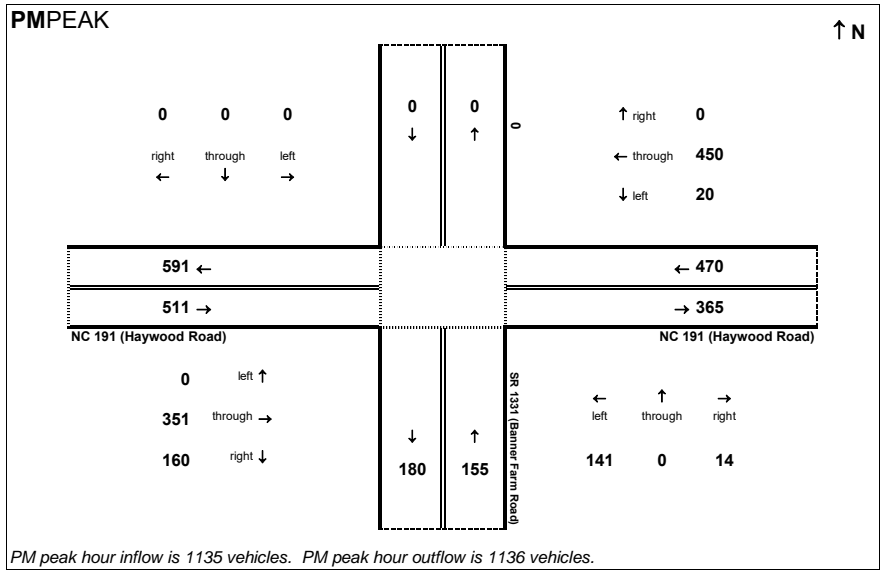
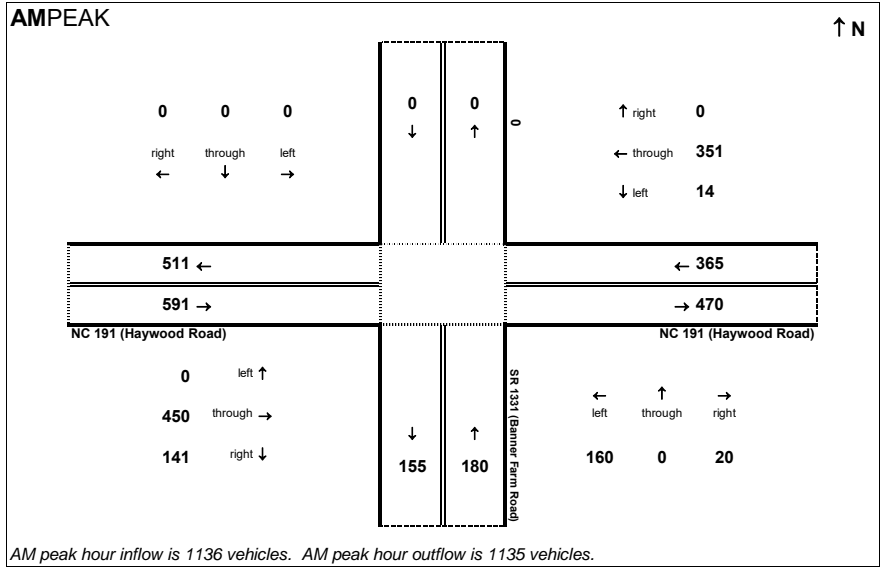


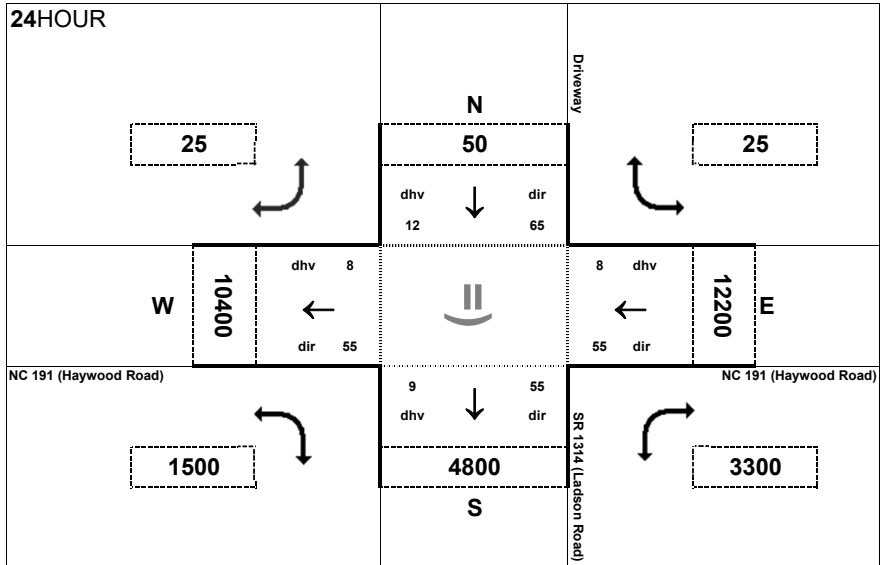
Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and SR 1331 (Banner Farm Road)

Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2017 Build

Project:
 R - 2588B



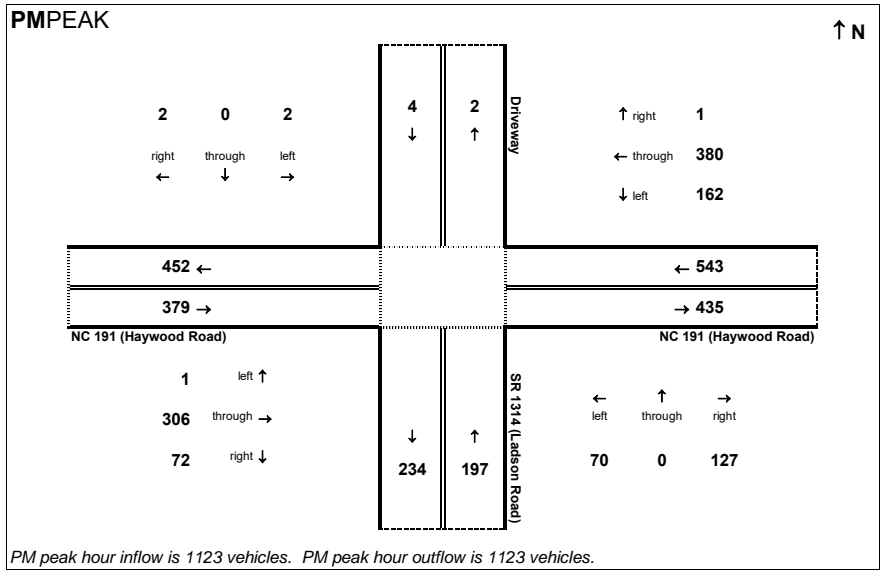
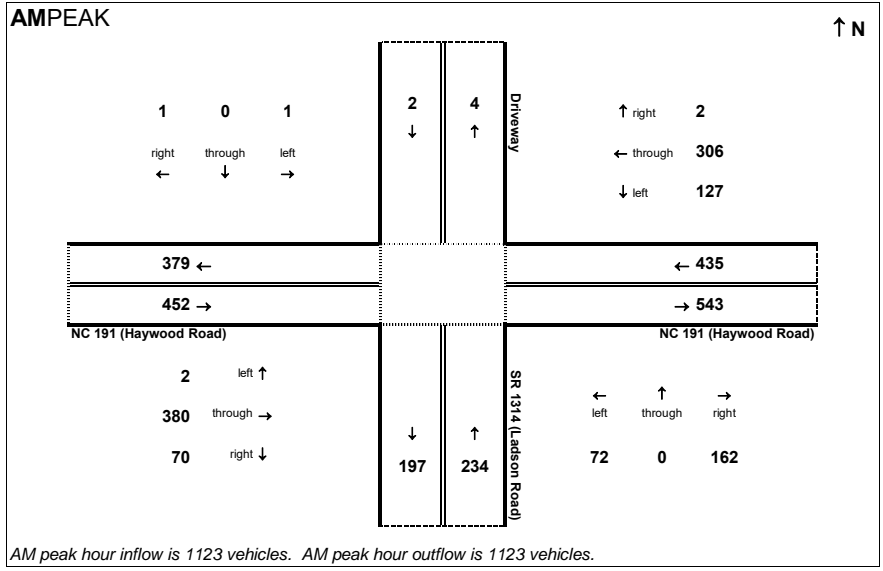


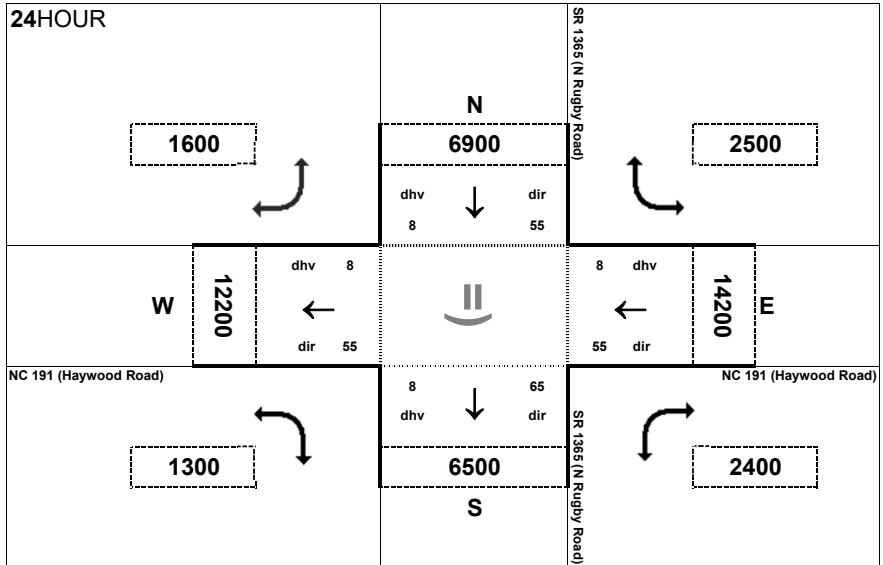
Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and SR 1314 (Ladson Road)

Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2017 Build

Project:
 R - 2588B



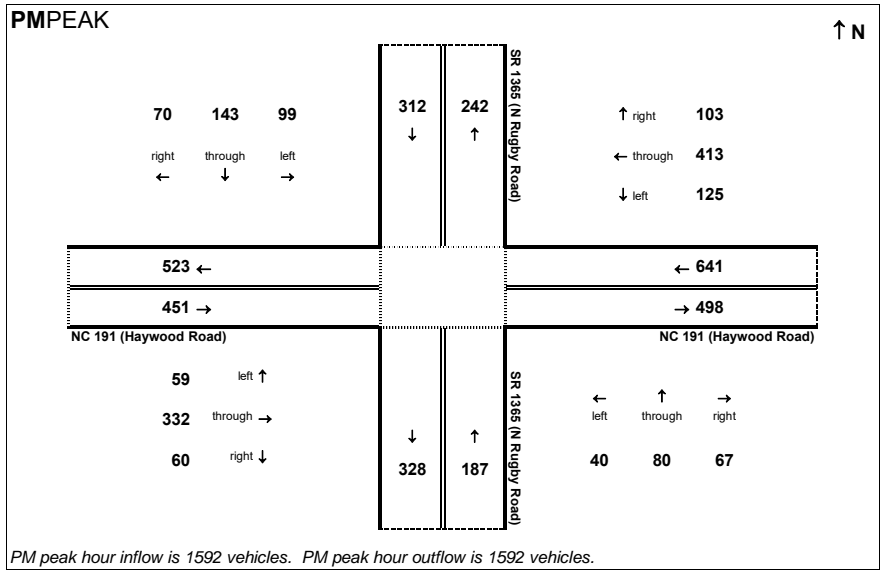
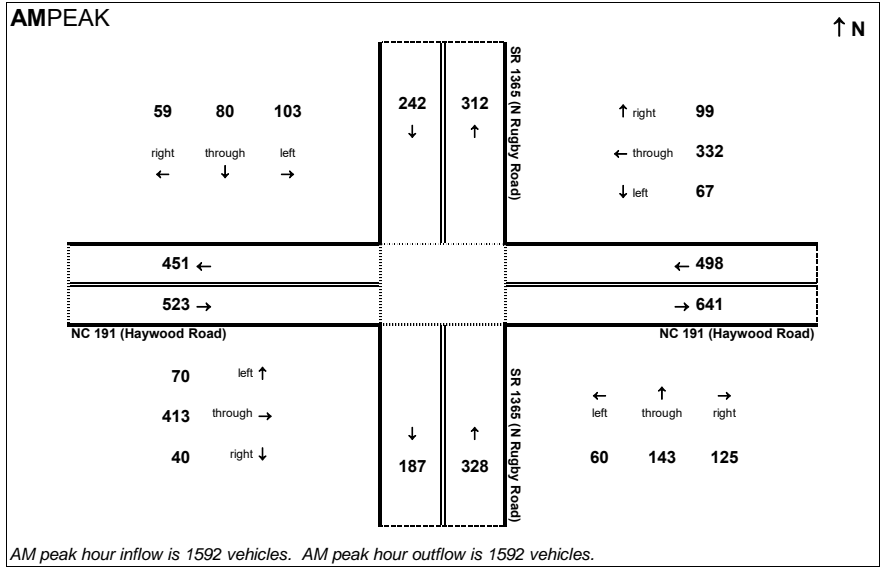


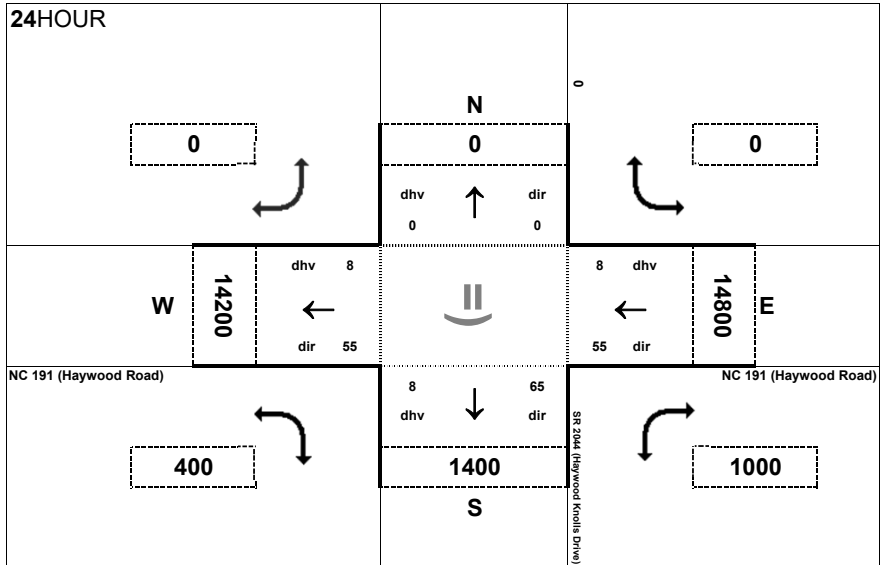
Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and SR 1365 (N Rugby Road)

Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2017 Build

Project:
 R - 2588B



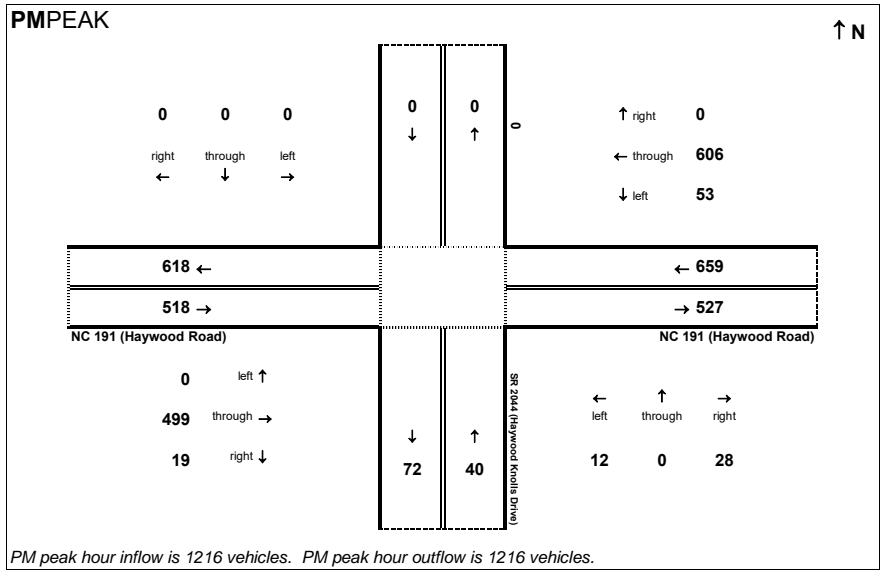
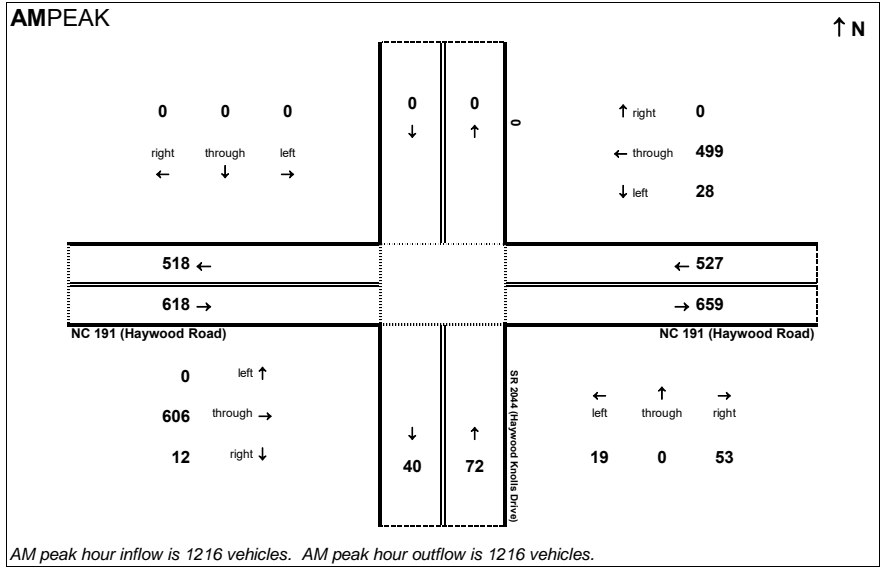


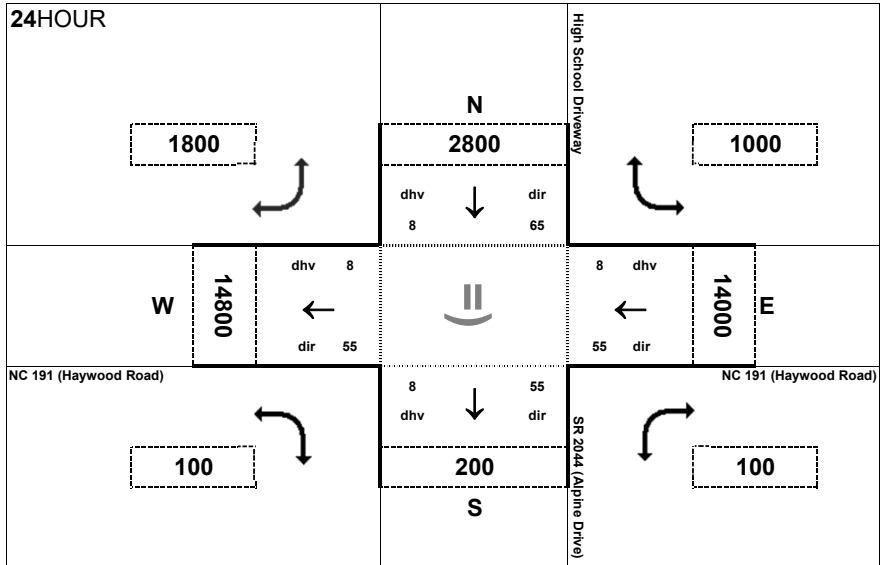
Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and SR 2044 (Haywood Knolls Drive)

Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2017 Build

Project:
 R - 2588B



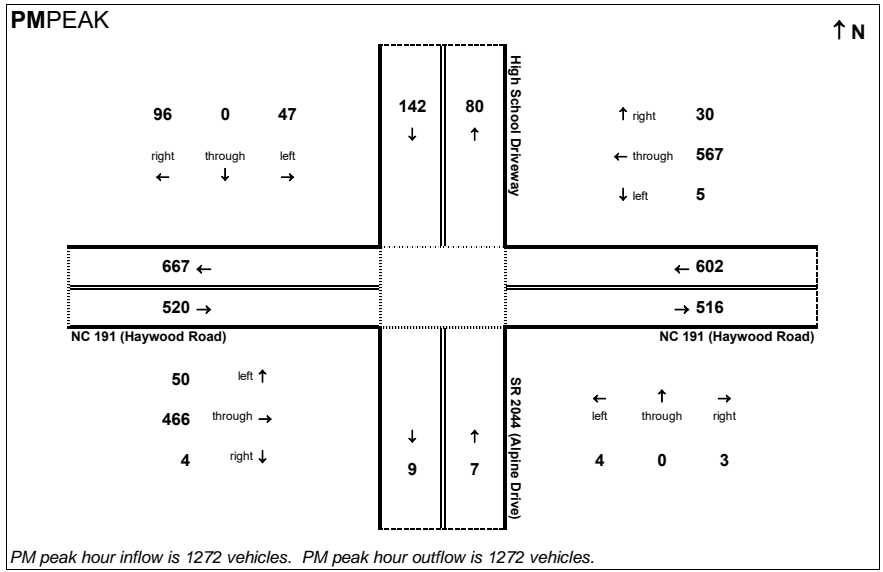
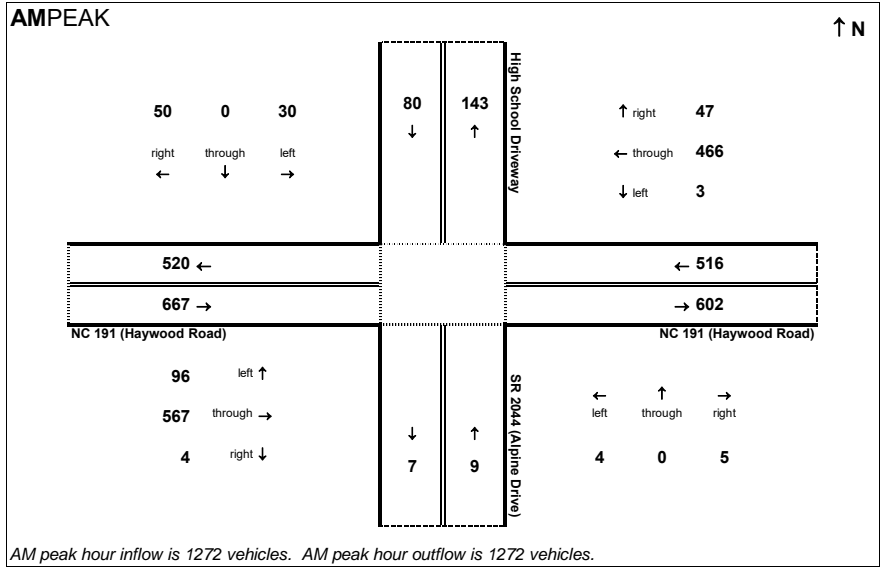


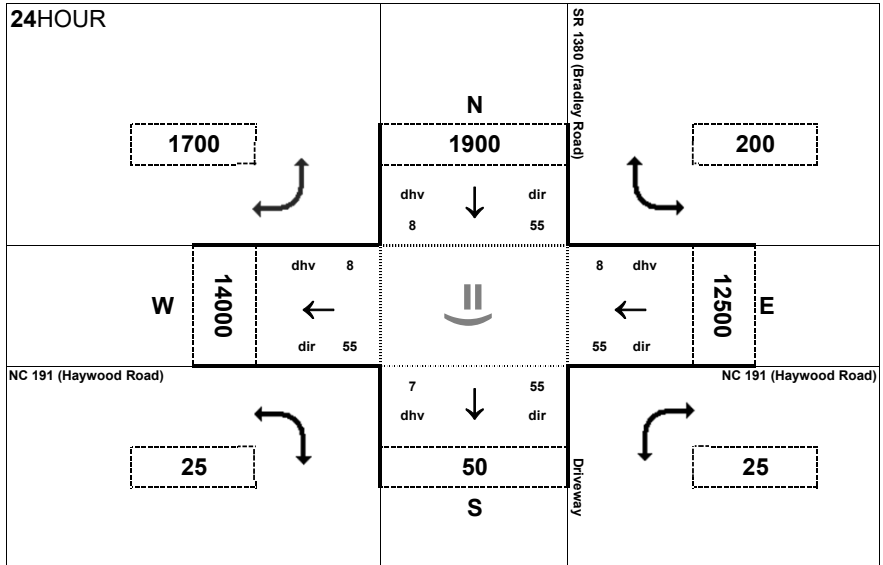
Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and SR 2044 (Alpine Drive)

Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2017 Build

Project:
 R - 2588B



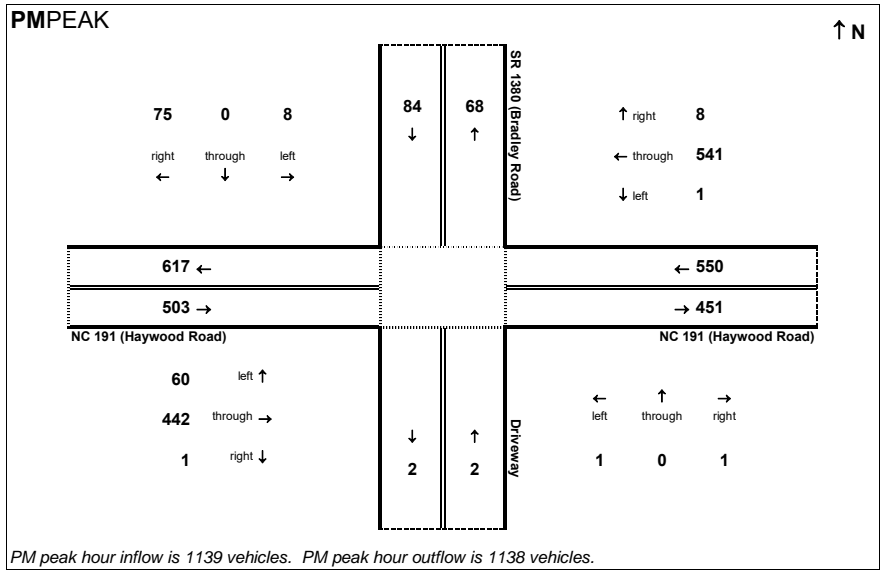
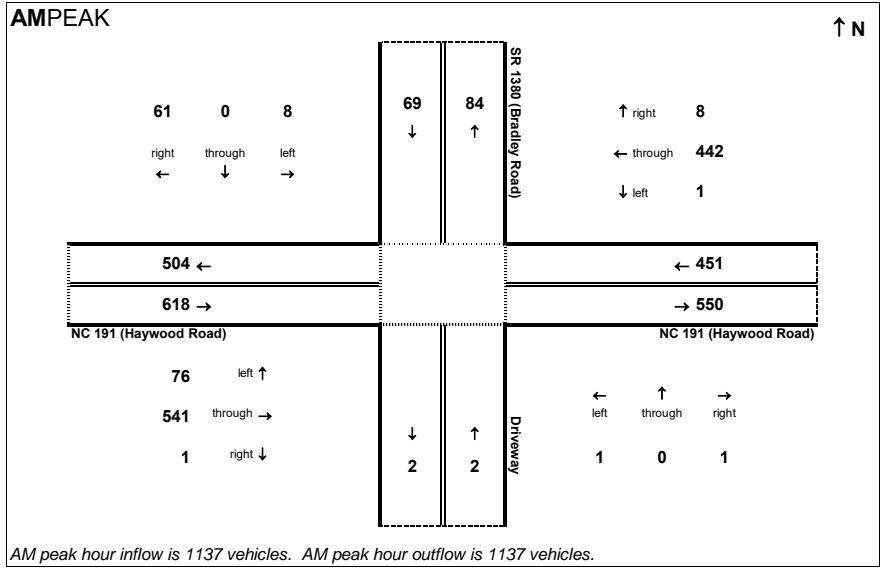


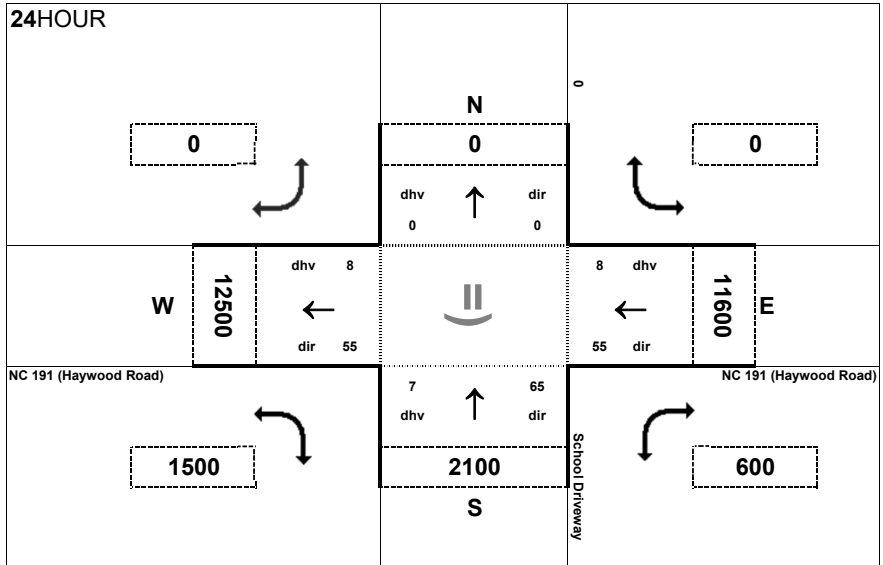
Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and SR 2044 (Alpine Drive)

Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2017 Build

Project:
 R - 2588B



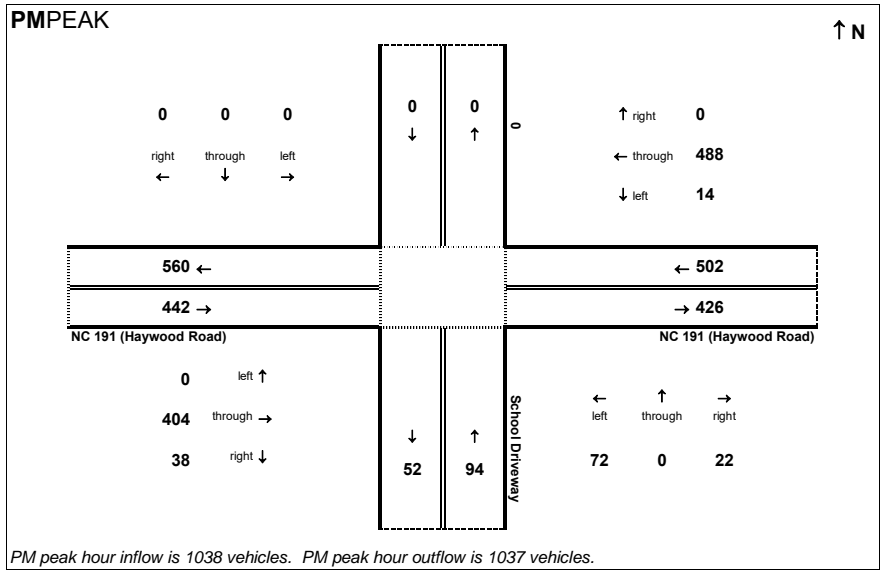
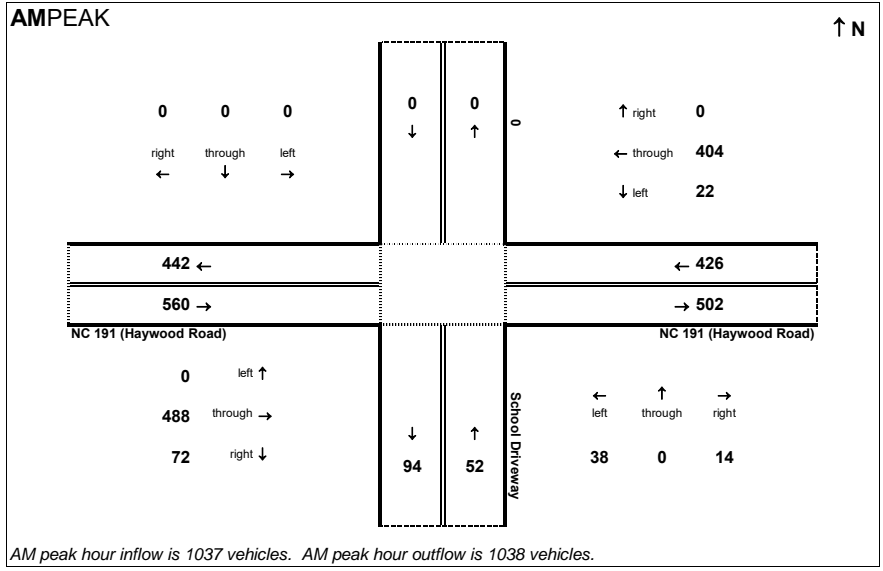


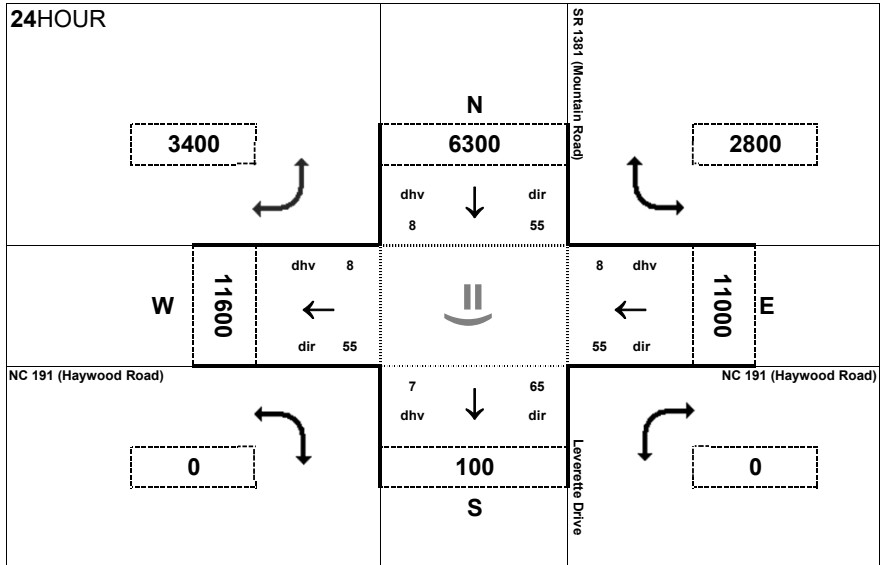
Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and School Driveway

Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2017 Build

Project:
 R - 2588B



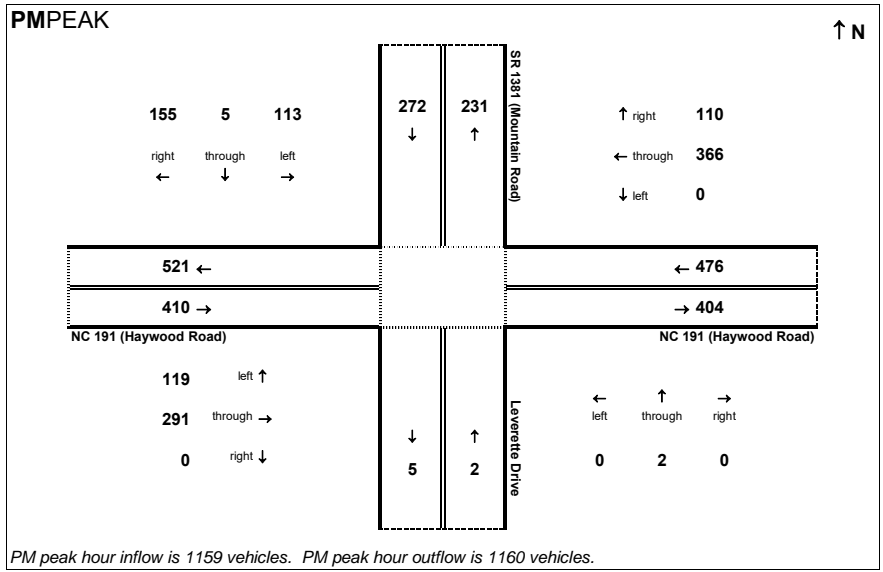
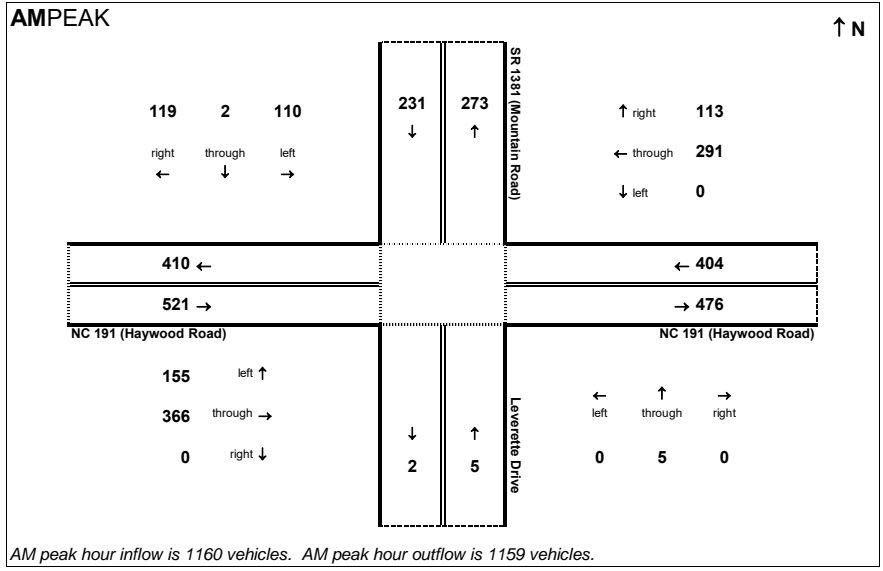


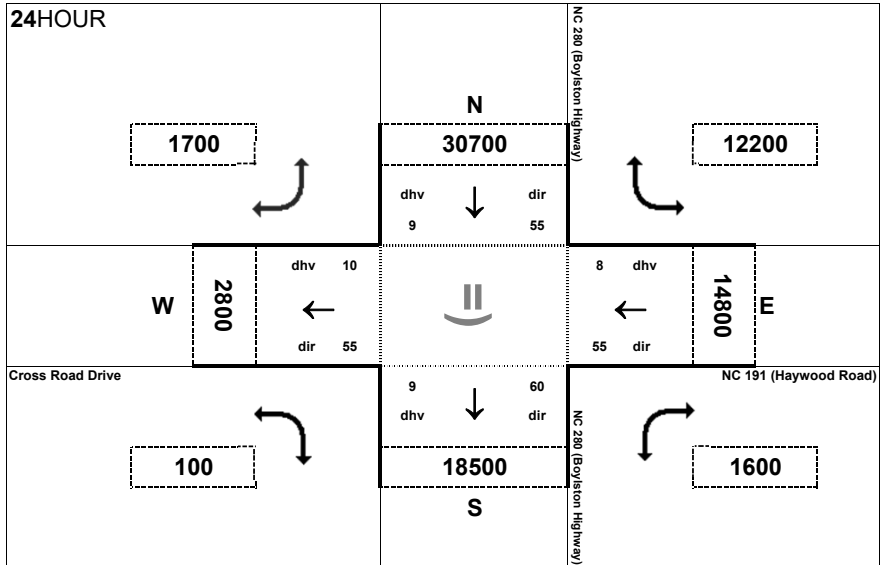
Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and SR 1381 (Mountain Road)

Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2017 Build

Project:
 R - 2588B



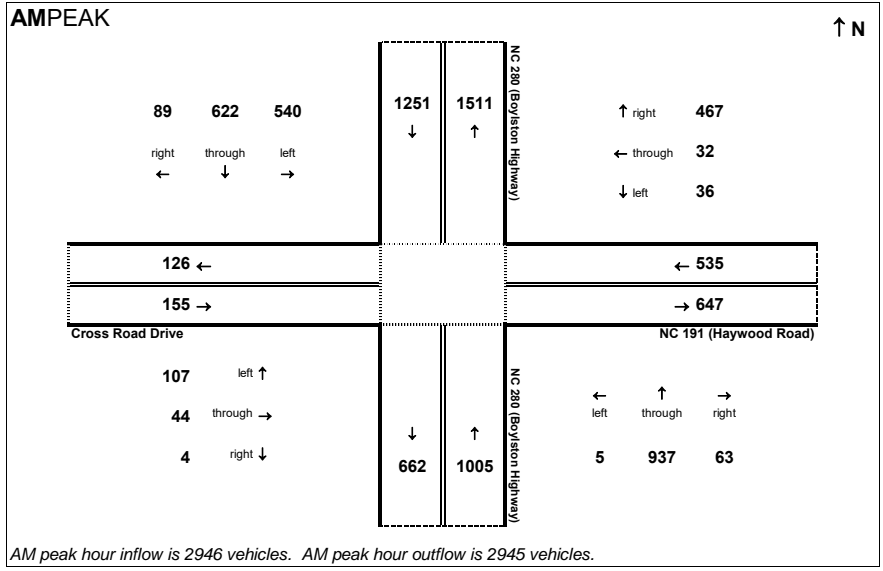


Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and NC 280 (Boylston Highway)

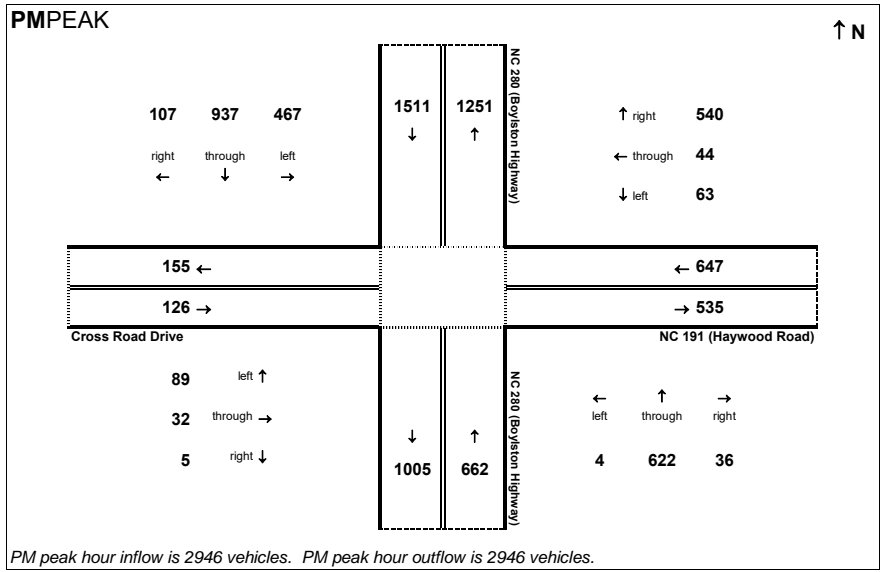
Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2030 No Build

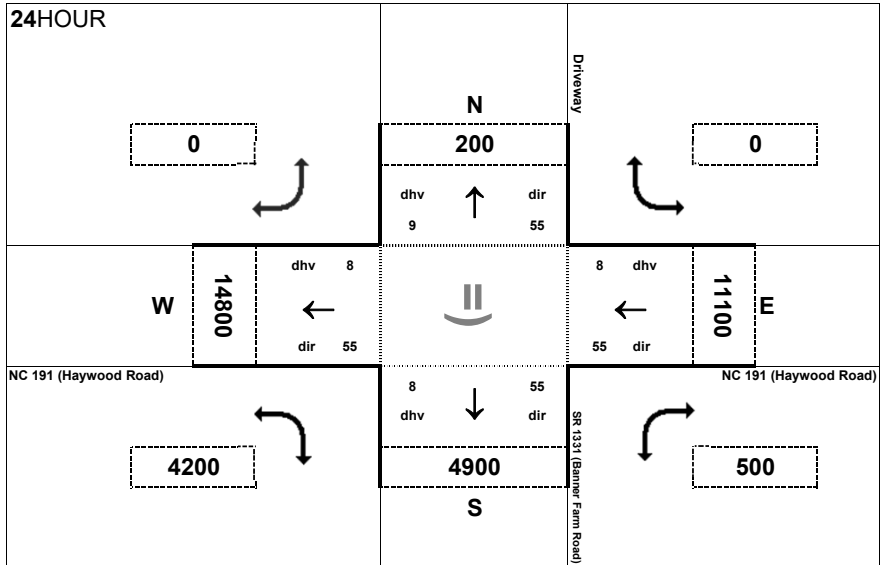
Project:
 R - 2588B



AM peak hour inflow is 2946 vehicles. AM peak hour outflow is 2945 vehicles.



PM peak hour inflow is 2946 vehicles. PM peak hour outflow is 2946 vehicles.

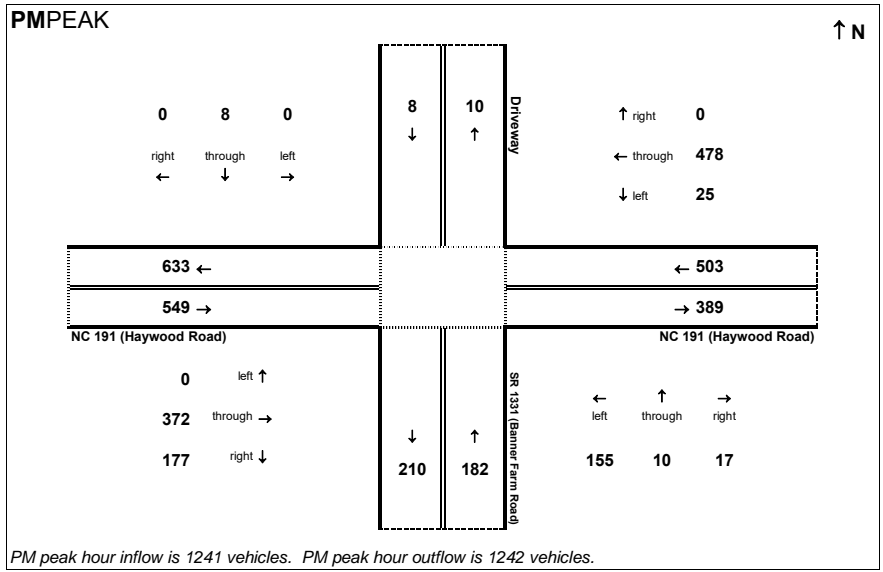
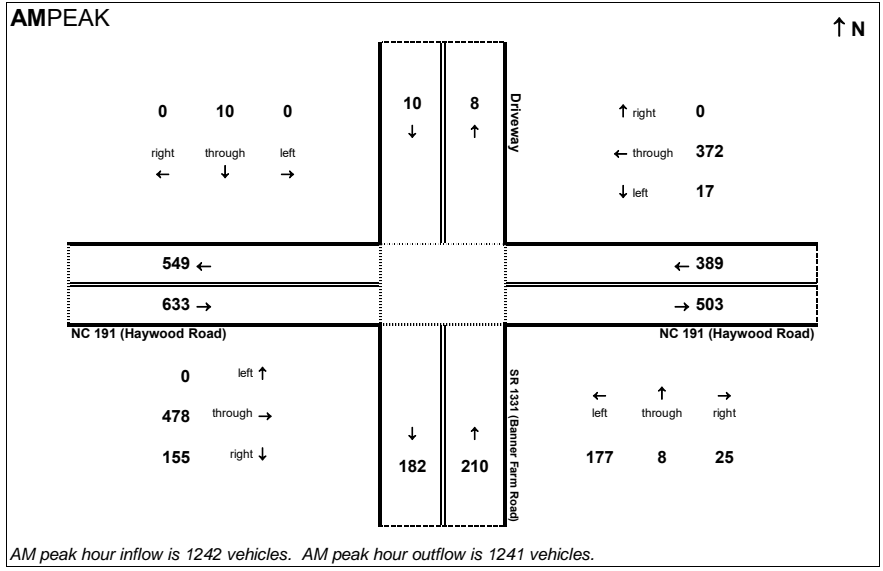


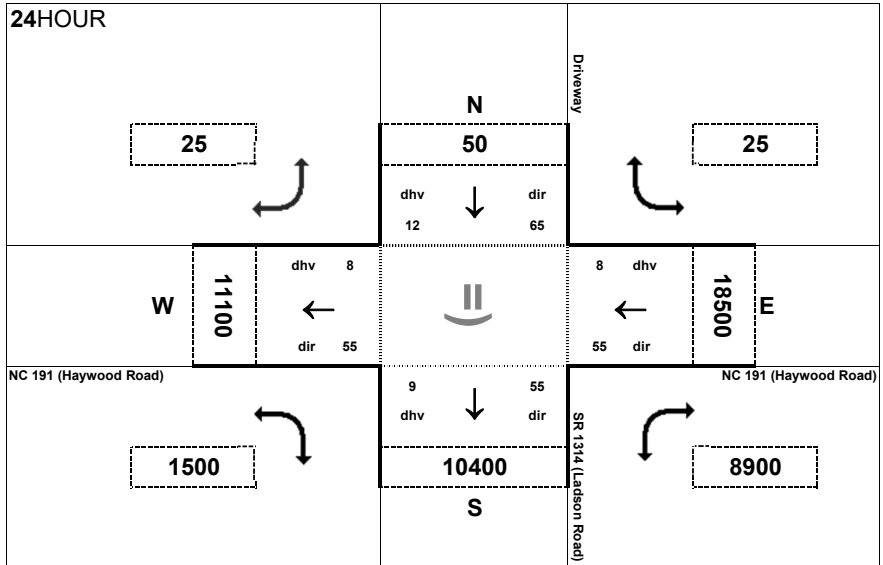
Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and SR 1331 (Banner Farm Road)

Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2030 No Build

Project:
 R - 2588B



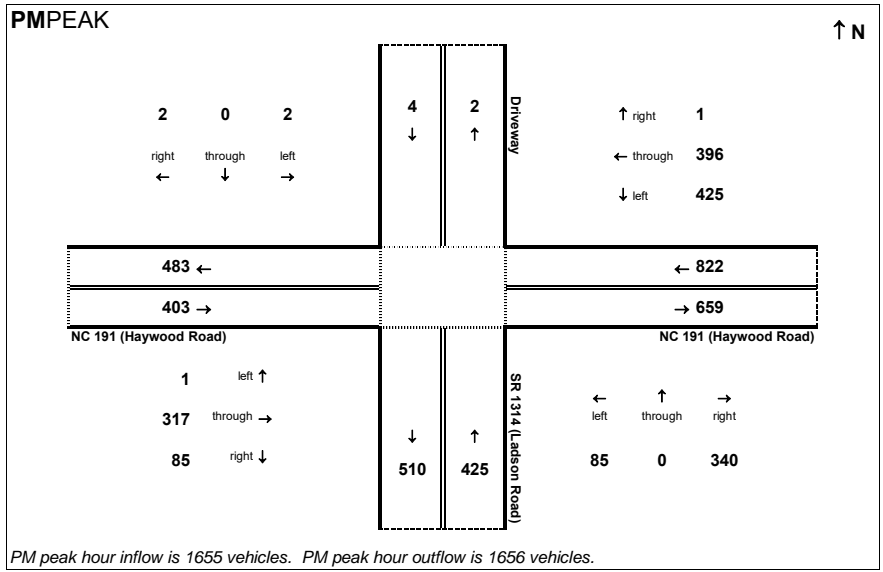
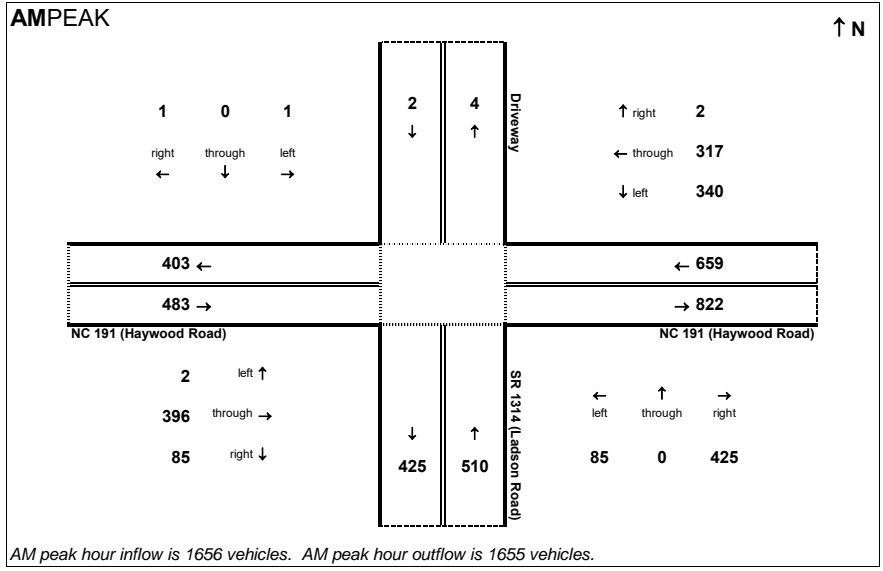


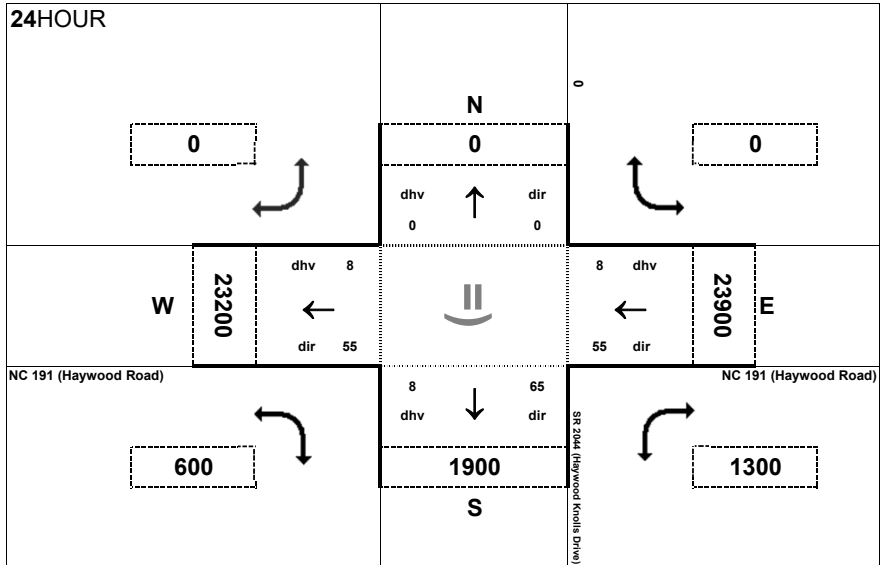
Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and SR 1314 (Ladson Road)

Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2030 No Build

Project:
 R - 2588B



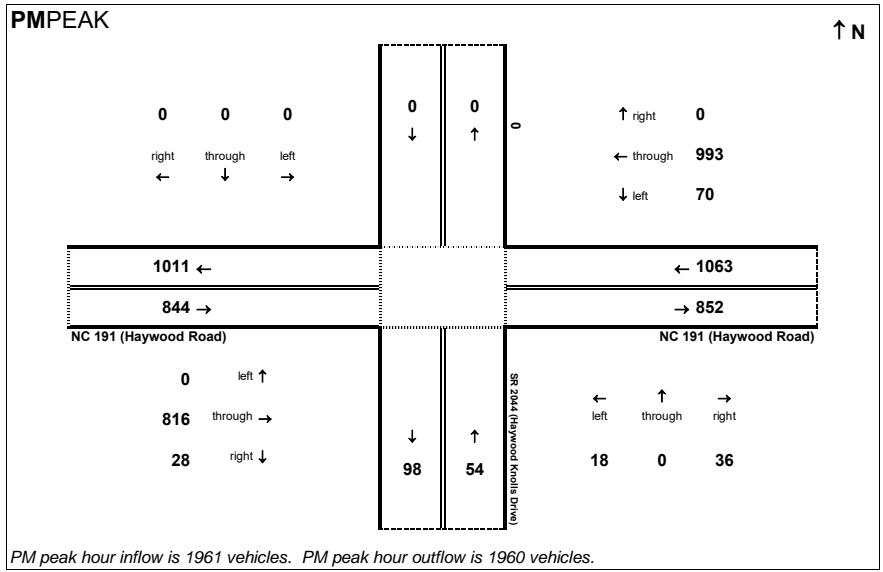
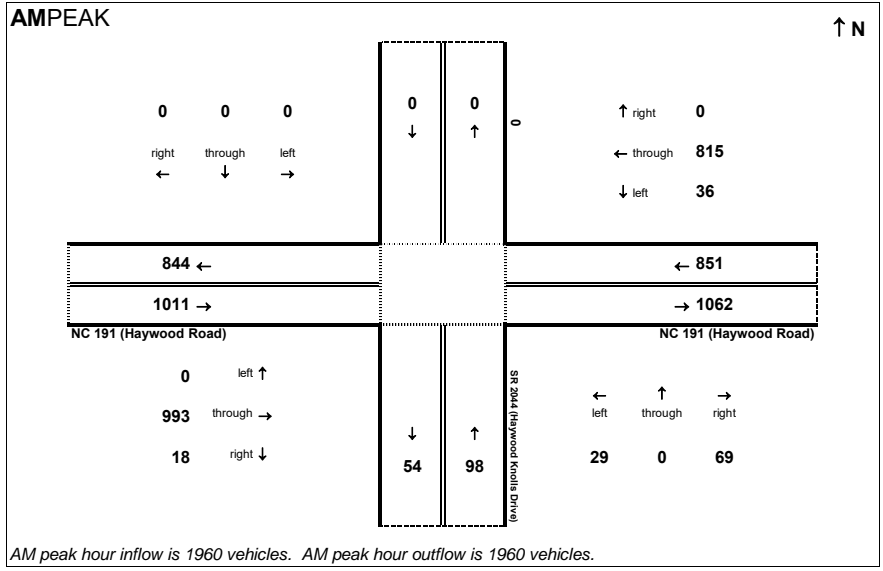


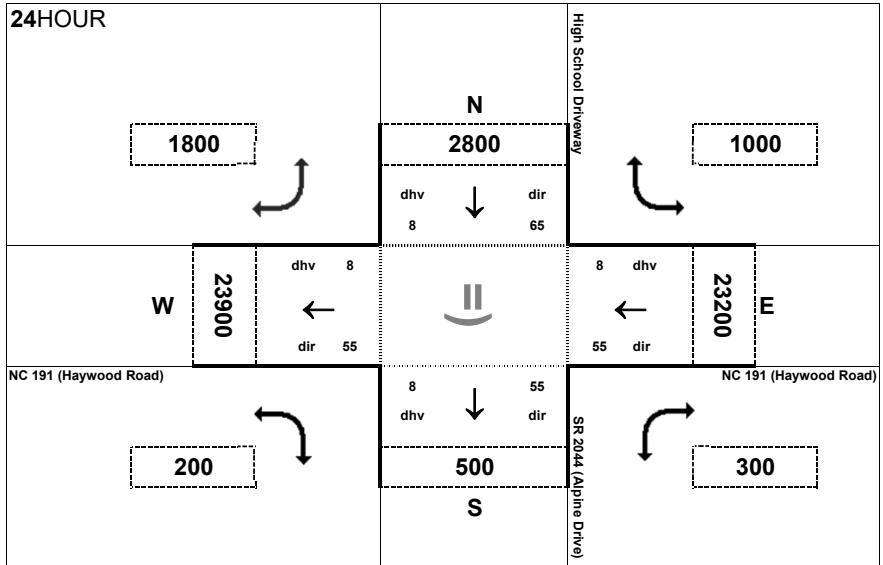
Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and SR 2044 (Haywood Knolls Drive)

Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2030 No Build

Project:
 R - 2588B



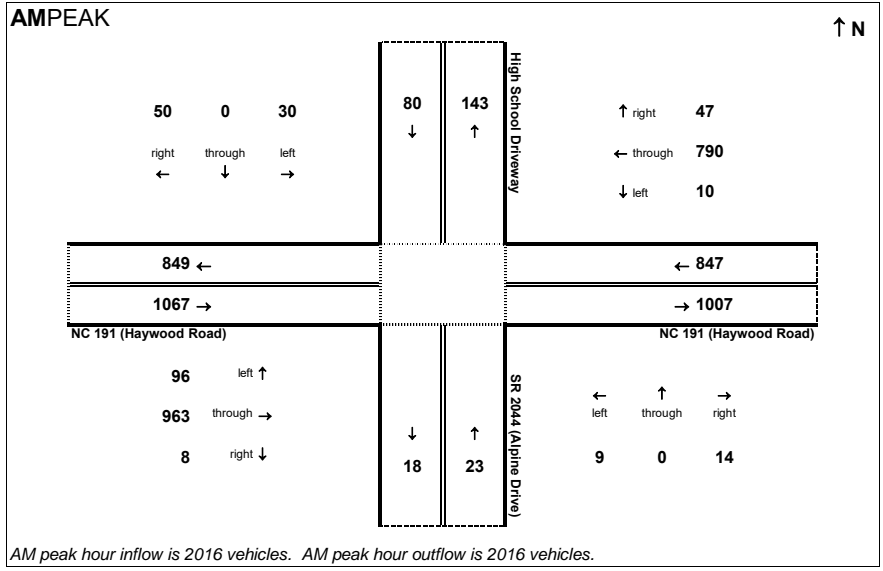


Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and SR 2044 (Alpine Drive)

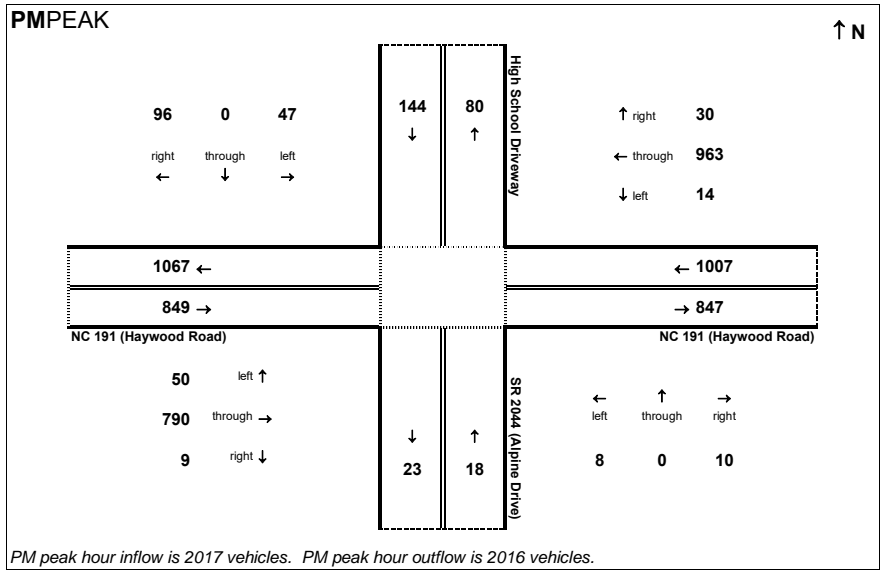
Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2030 No Build

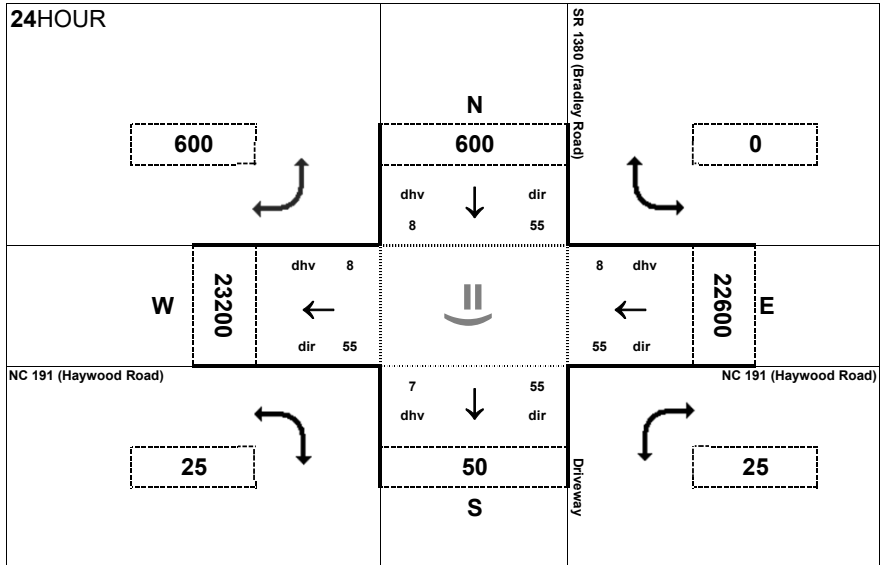
Project:
 R - 2588B



AM peak hour inflow is 2016 vehicles. AM peak hour outflow is 2016 vehicles.



PM peak hour inflow is 2017 vehicles. PM peak hour outflow is 2016 vehicles.

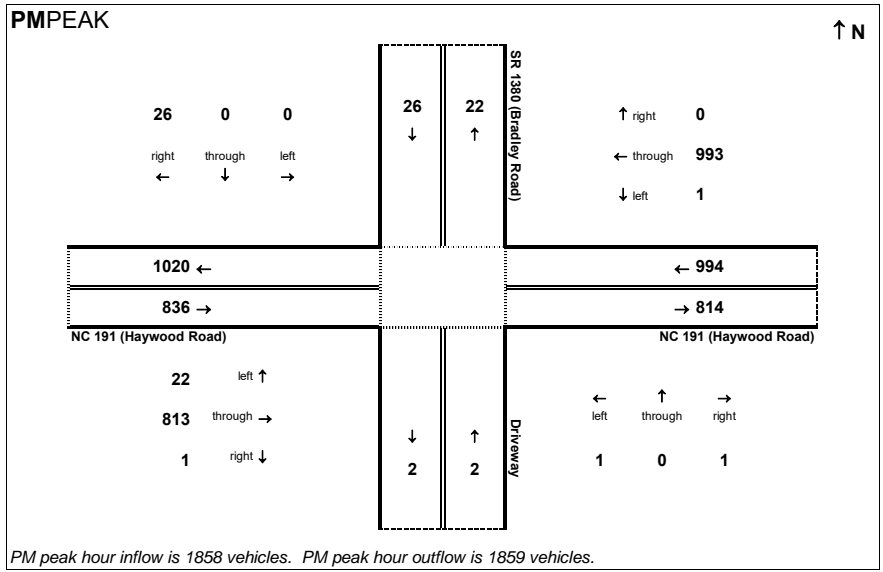
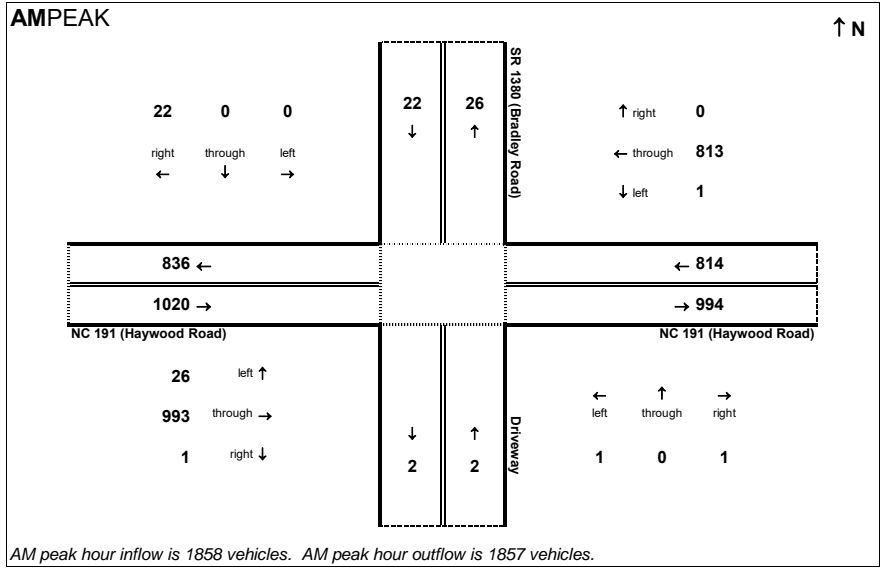


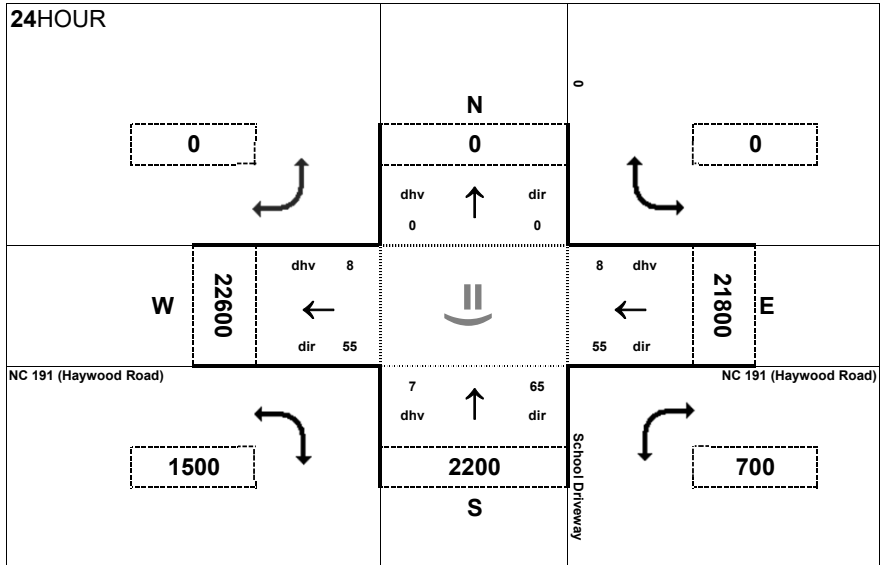
Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and SR 2044 (Alpine Drive)

Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2030 No Build

Project:
 R - 2588B



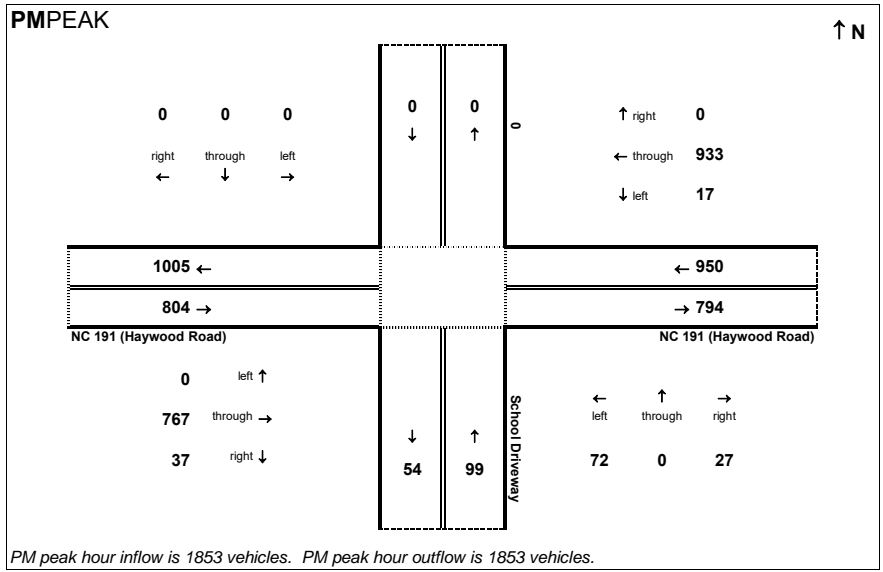
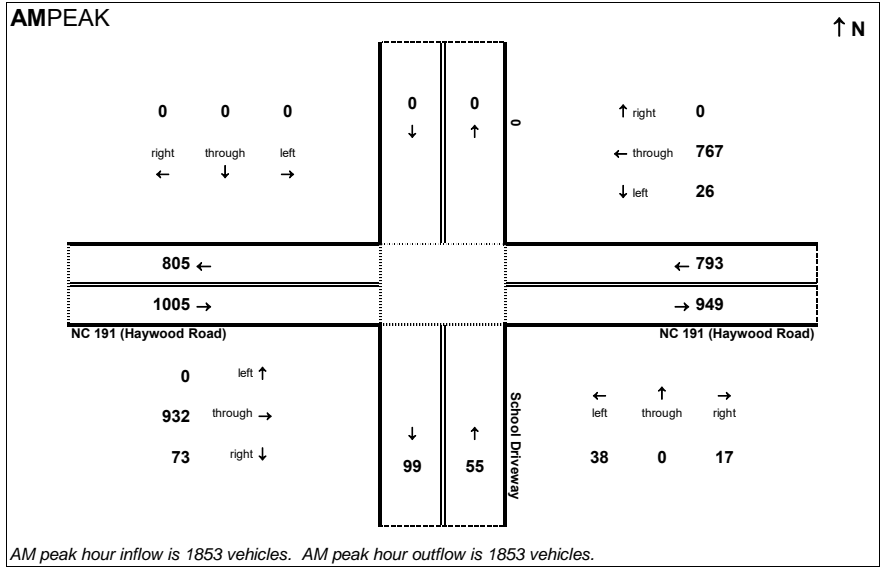


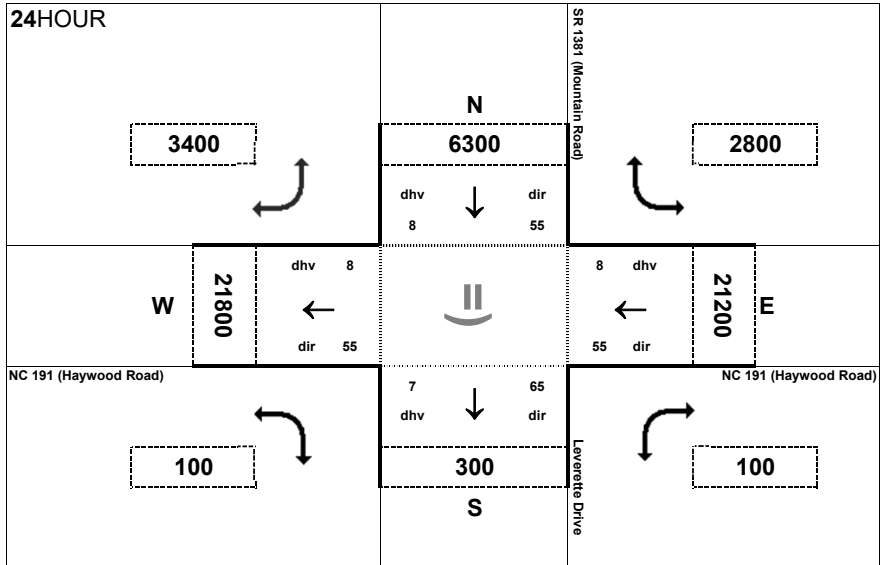
Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and School Driveway

Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2030 No Build

Project:
 R - 2588B



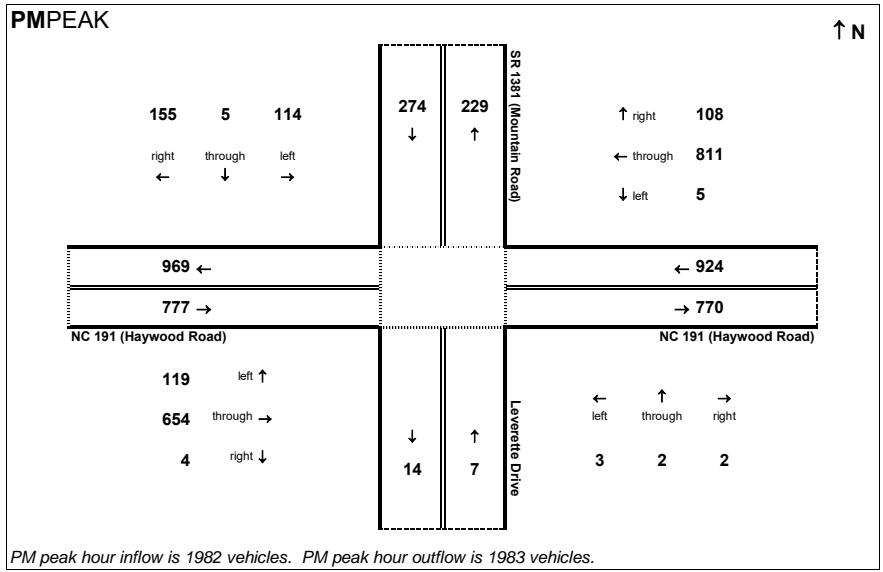
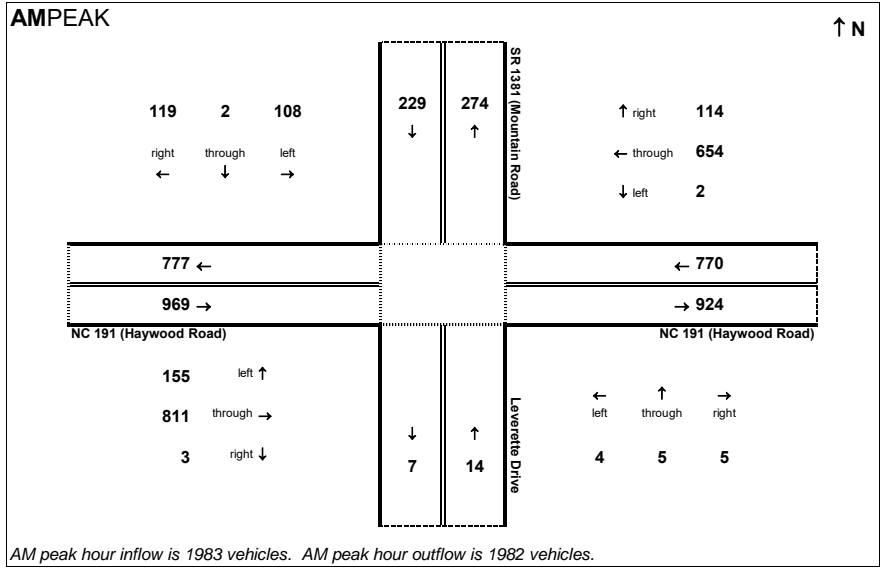


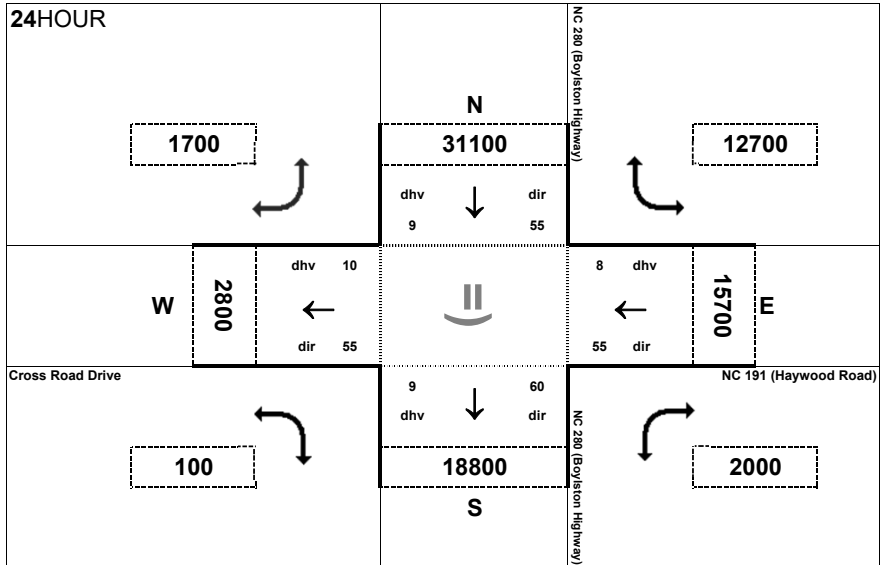
Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and SR 1381 (Mountain Road)

Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2030 No Build

Project:
 R - 2588B



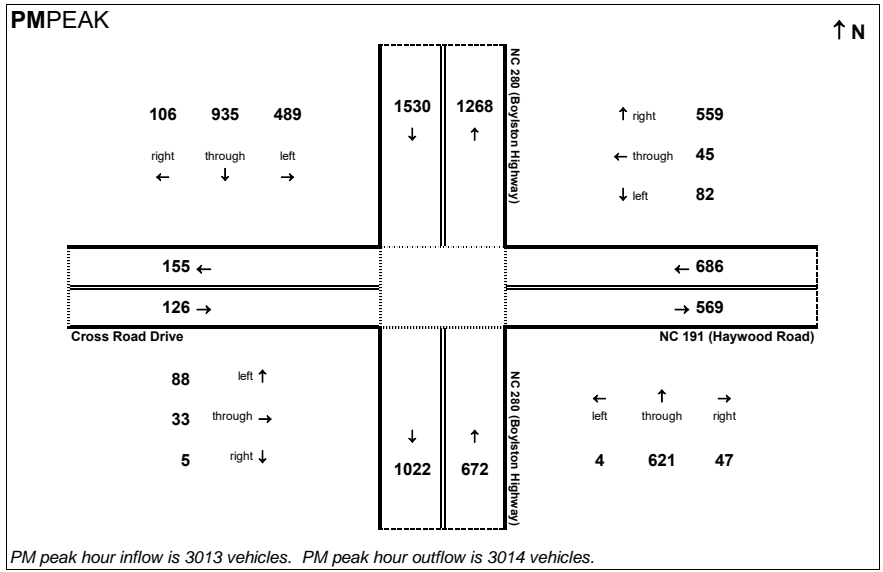
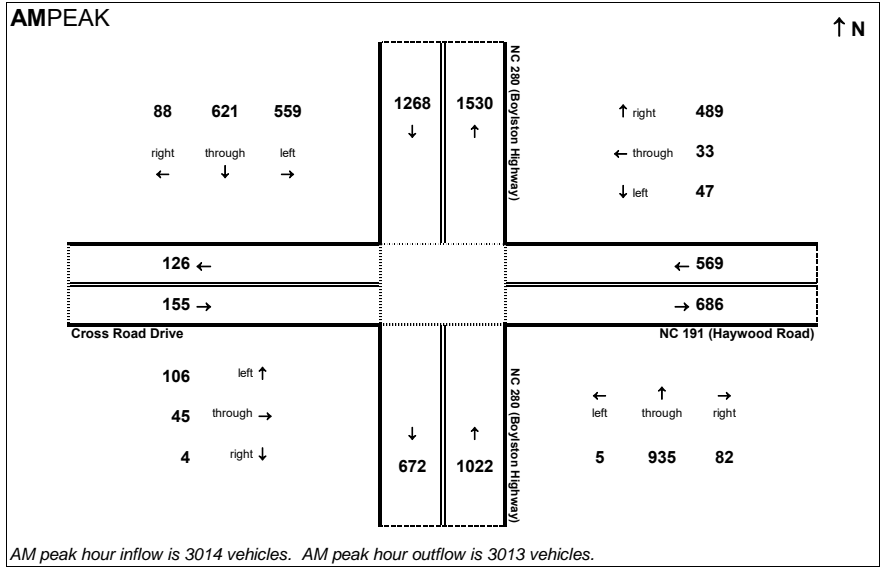


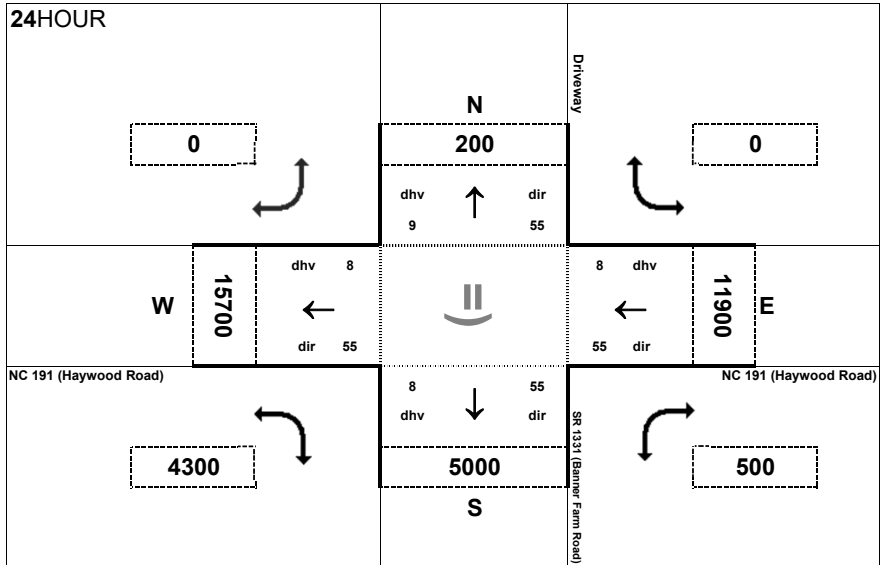
Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and NC 280 (Boylston Highway)

Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2030 Build

Project:
 R - 2588B



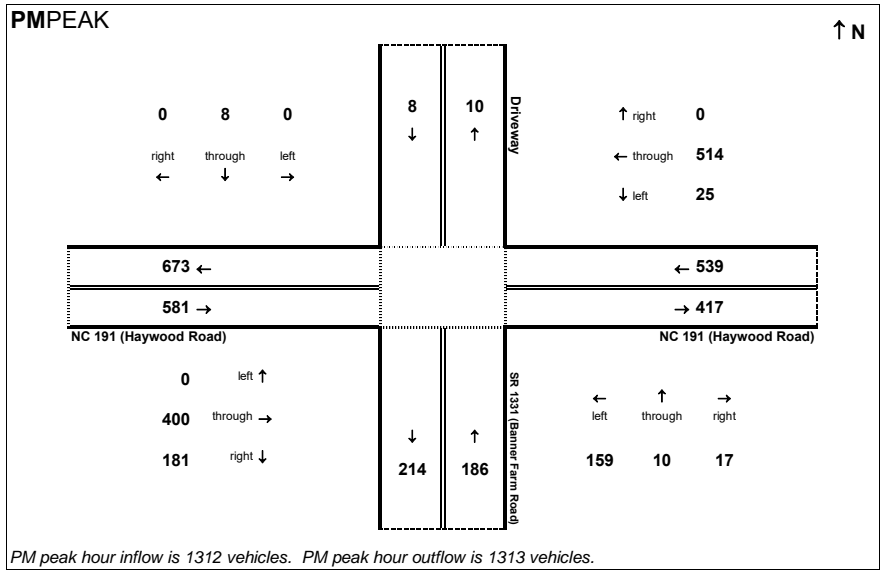
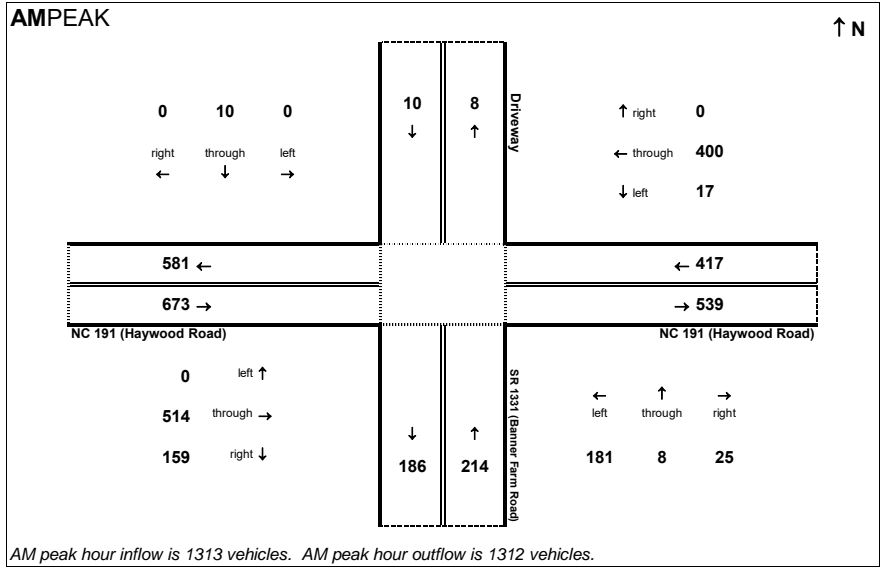


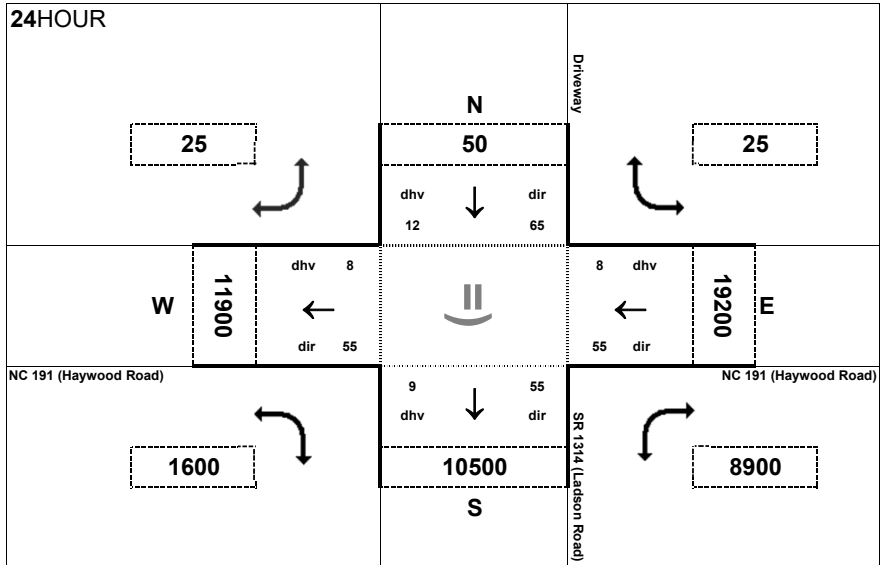
Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and SR 1331 (Banner Farm Road)

Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2030 Build

Project:
 R - 2588B



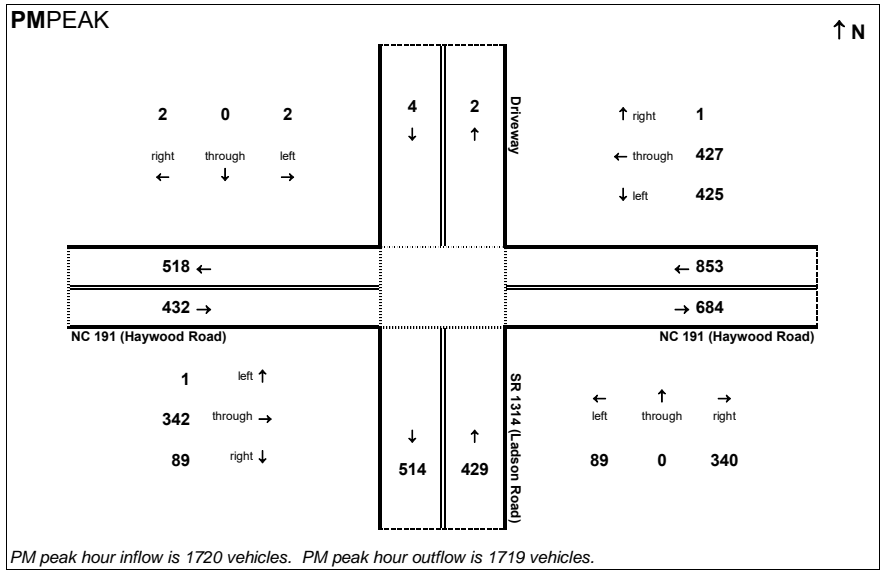
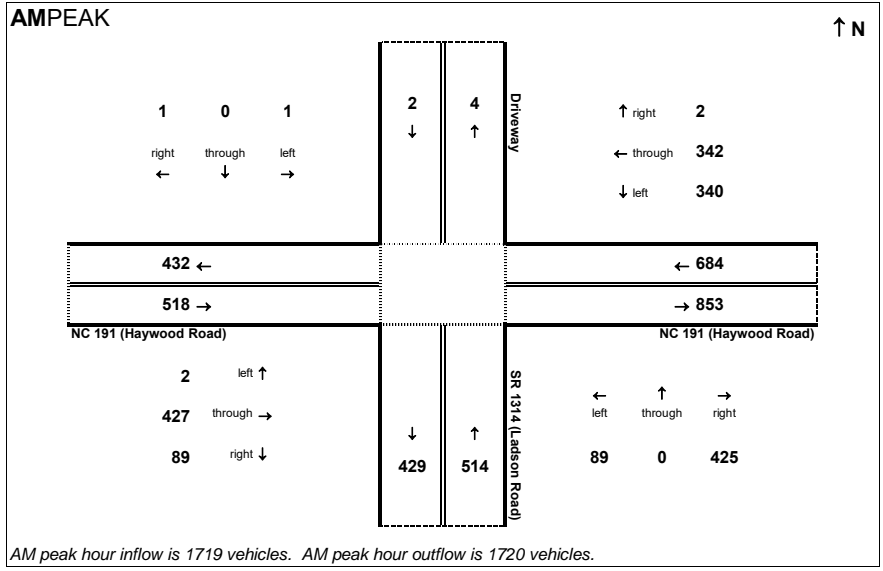


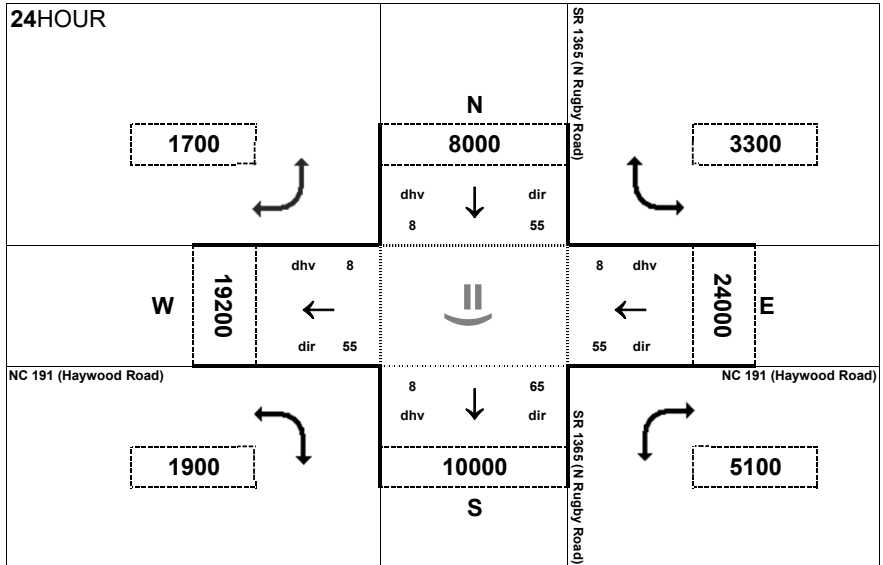
Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and SR 1314 (Ladson Road)

Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2030 Build

Project:
 R - 2588B



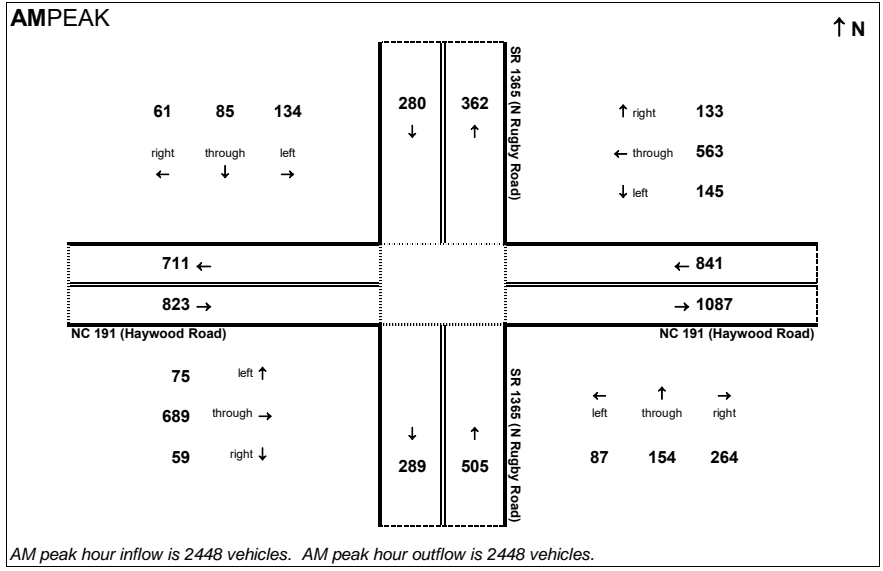


Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and SR 1365 (N Rugby Road)

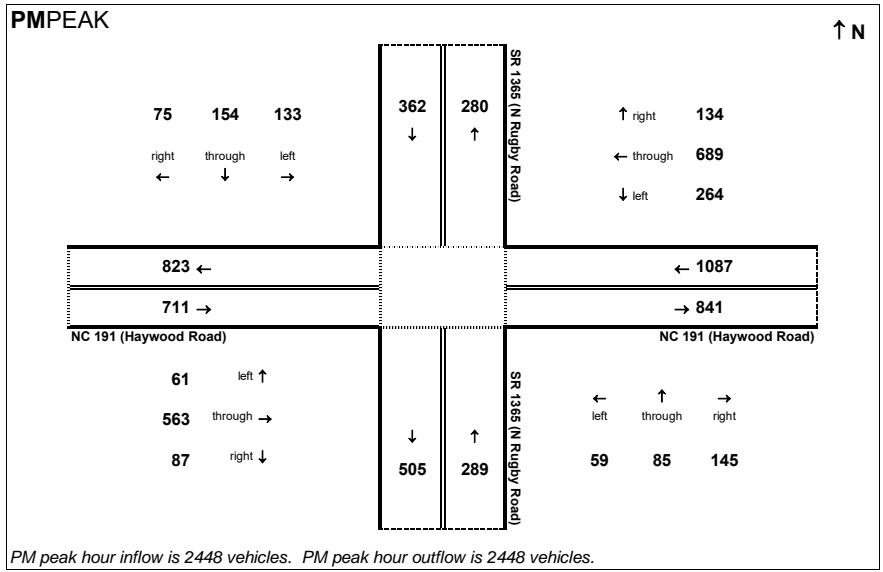
Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2030 Build

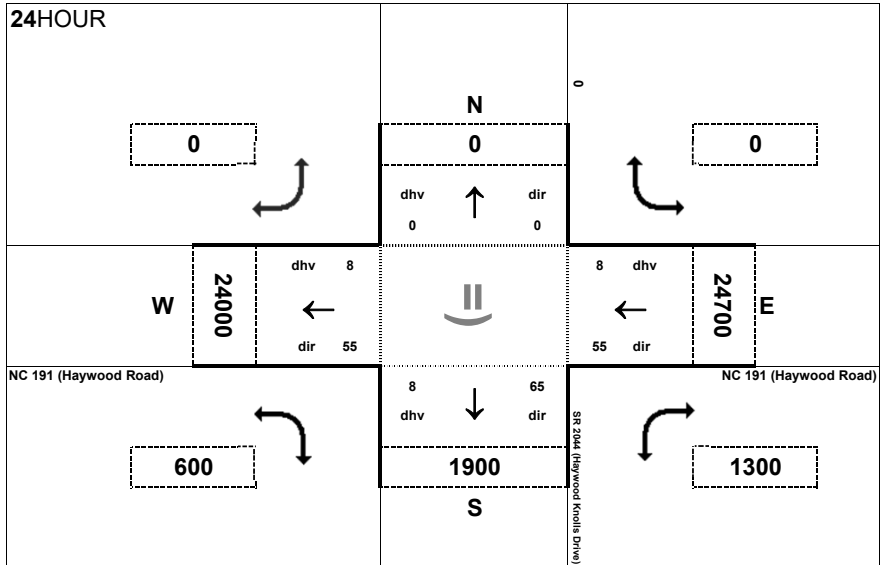
Project:
 R - 2588B



AM peak hour inflow is 2448 vehicles. AM peak hour outflow is 2448 vehicles.



PM peak hour inflow is 2448 vehicles. PM peak hour outflow is 2448 vehicles.

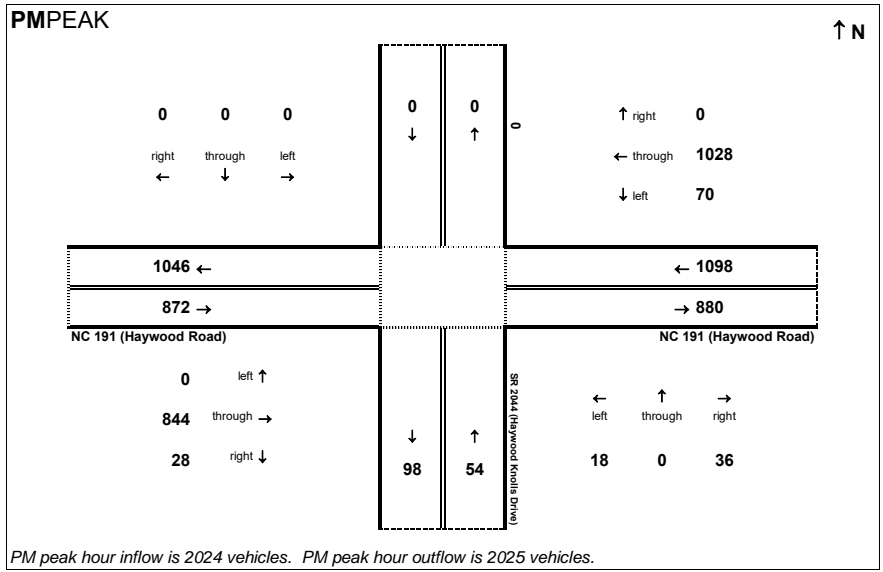
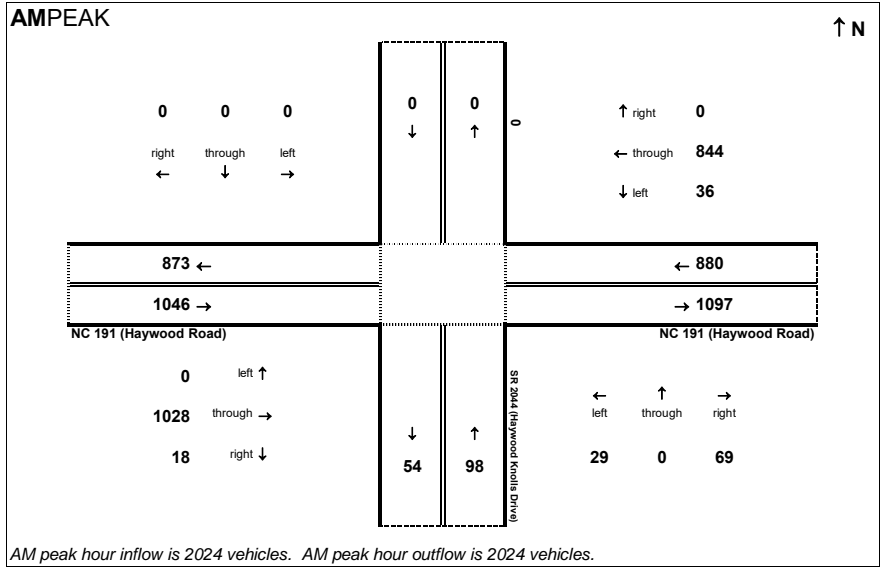


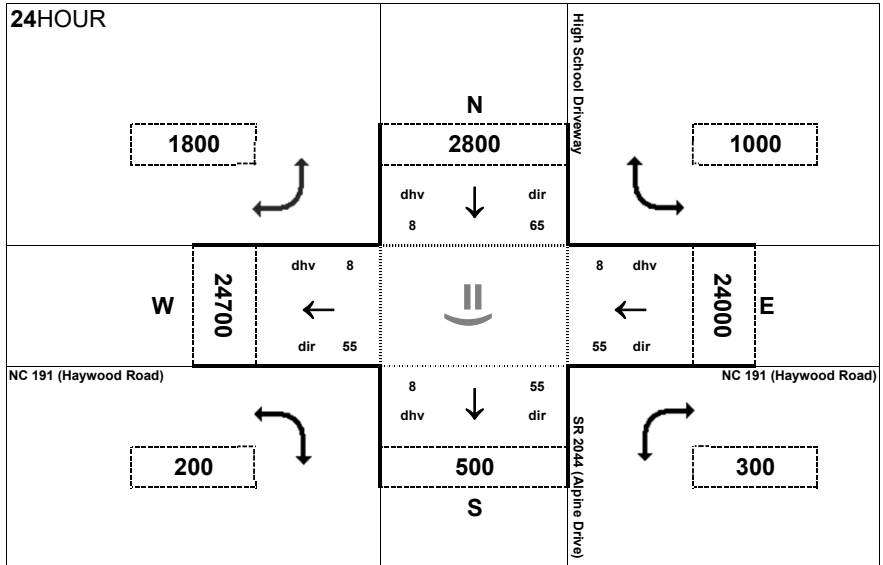
Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and SR 2044 (Haywood Knolls Drive)

Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2030 Build

Project:
 R - 2588B



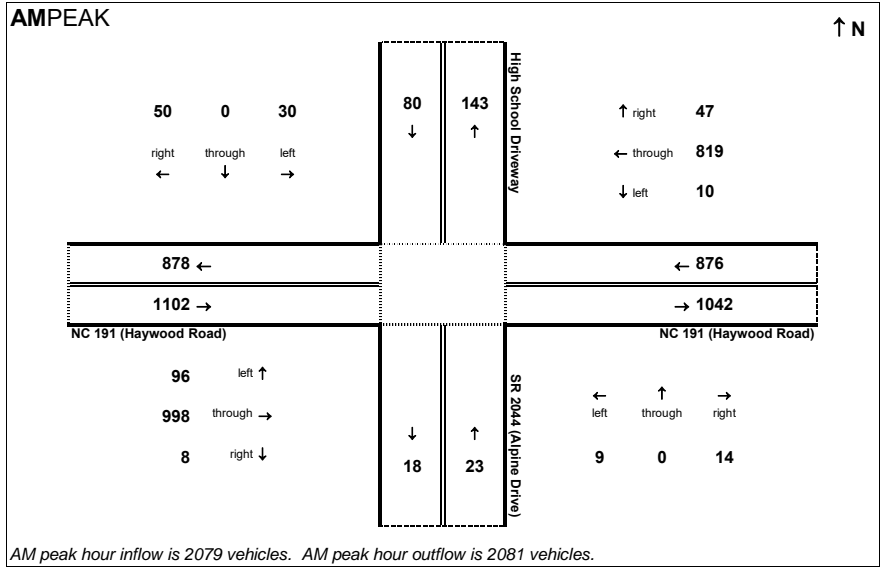


Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and SR 2044 (Alpine Drive)

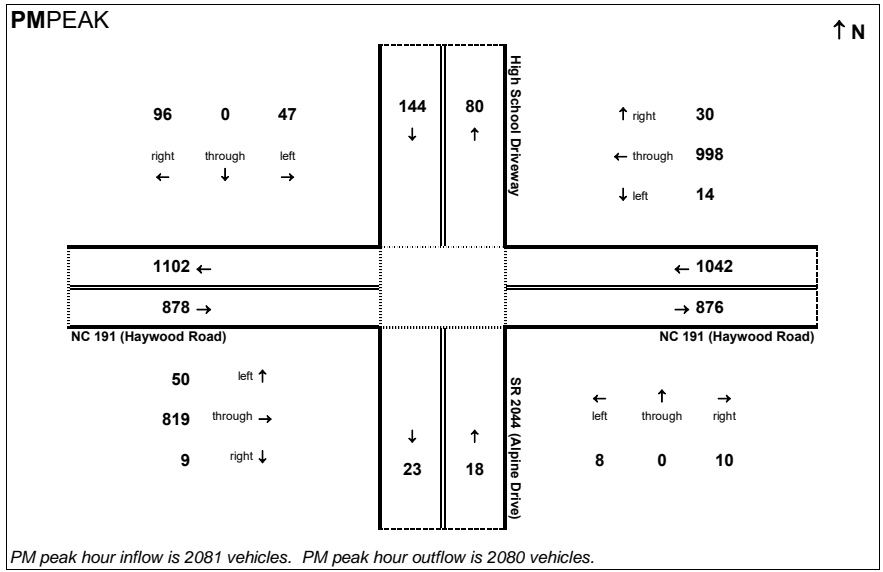
Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2030 Build

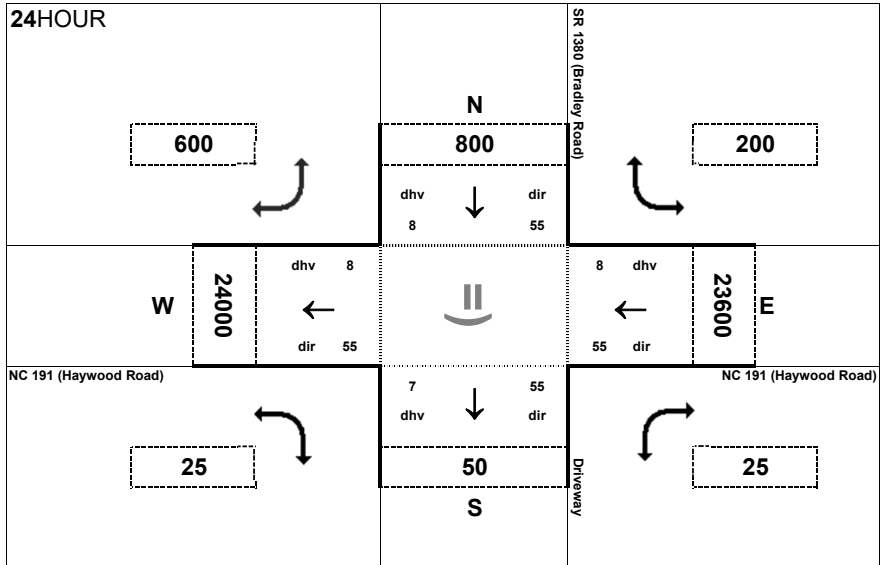
Project:
 R - 2588B



AM peak hour inflow is 2079 vehicles. AM peak hour outflow is 2081 vehicles.



PM peak hour inflow is 2081 vehicles. PM peak hour outflow is 2080 vehicles.

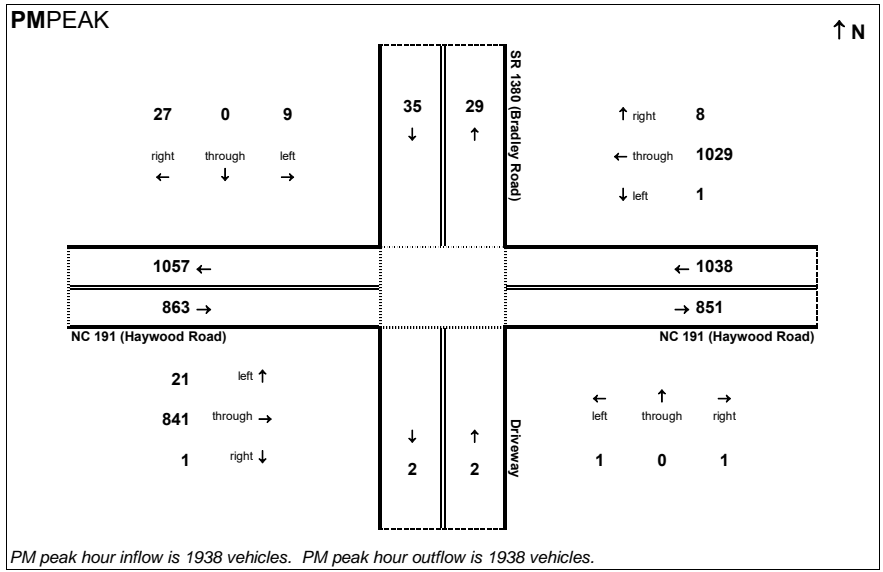
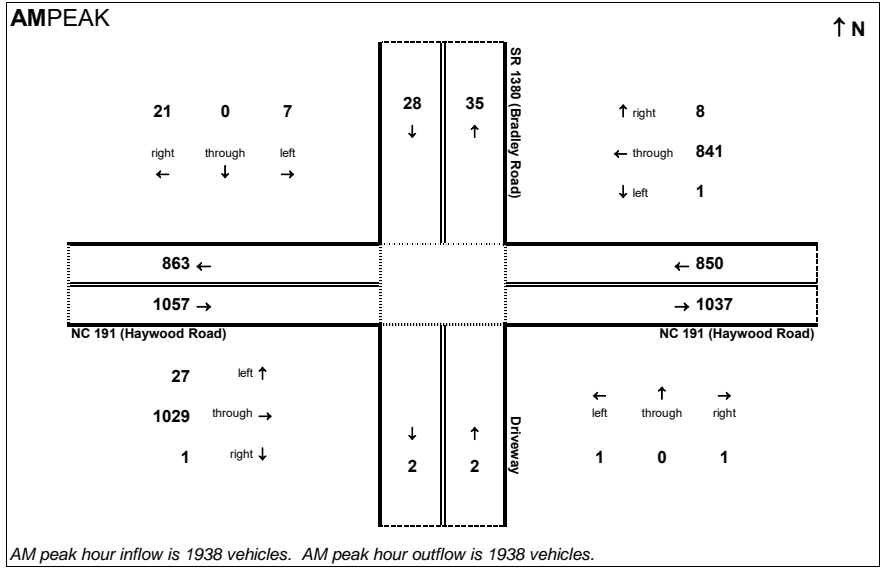


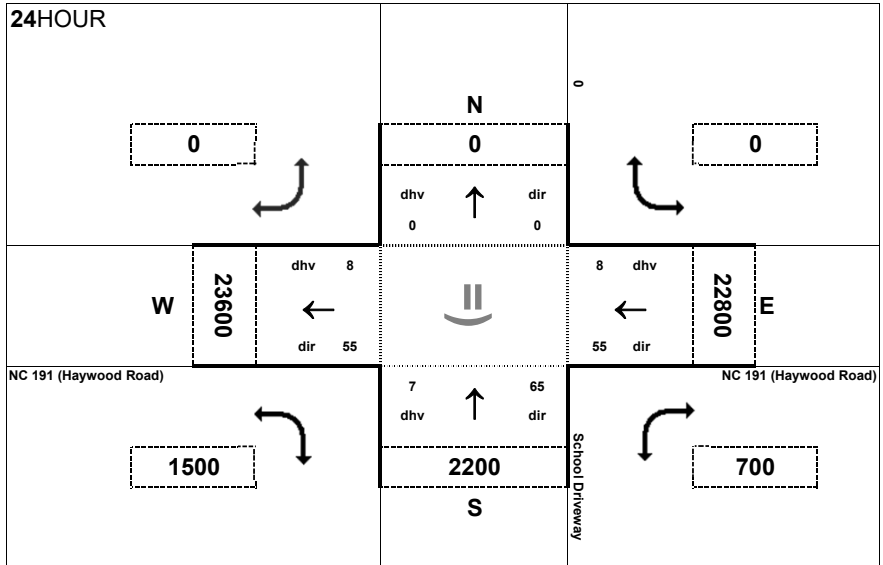
Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and SR 2044 (Alpine Drive)

Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2030 Build

Project:
 R - 2588B



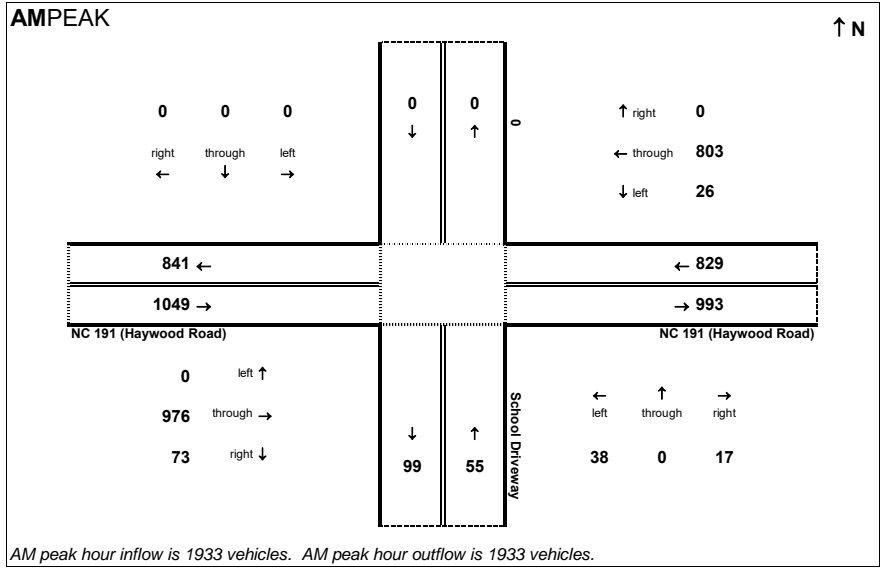


Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and School Driveway

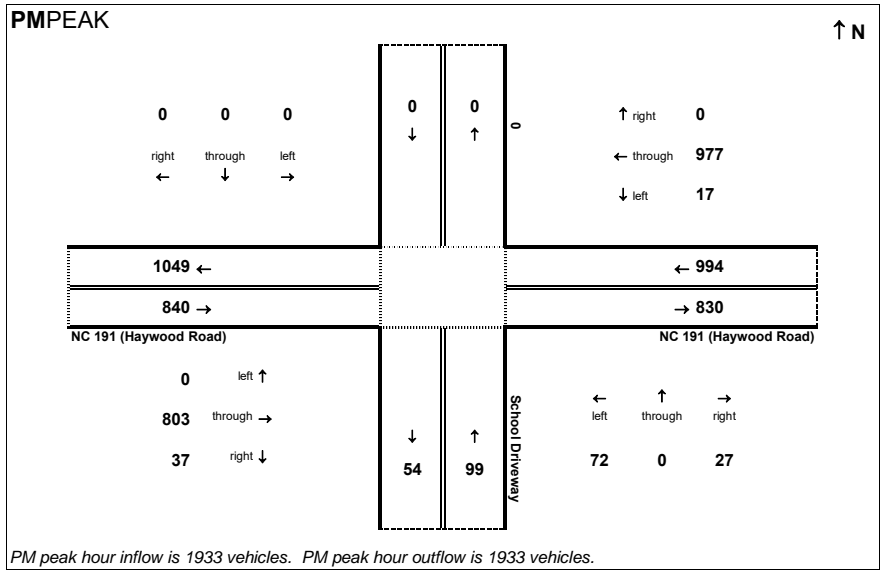
Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2030 Build

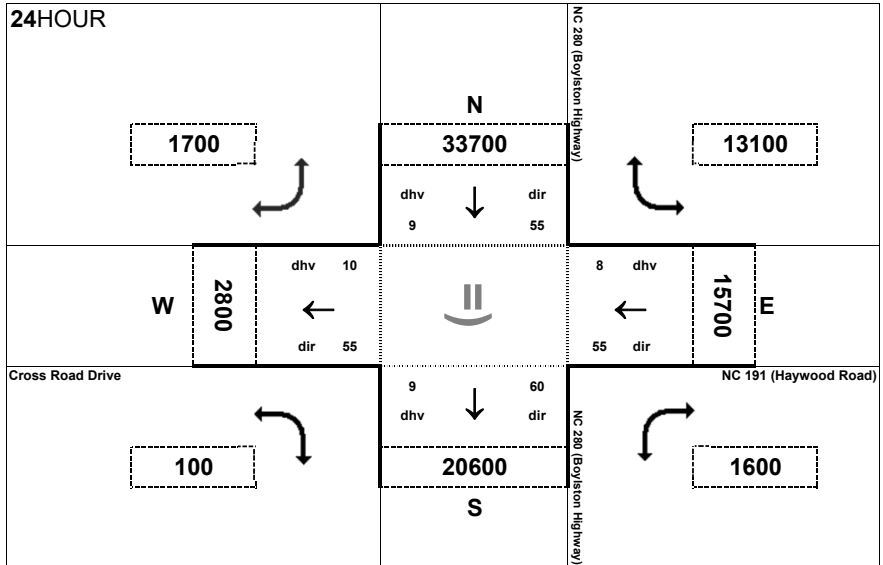
Project:
 R - 2588B



AM peak hour inflow is 1933 vehicles. AM peak hour outflow is 1933 vehicles.



PM peak hour inflow is 1933 vehicles. PM peak hour outflow is 1933 vehicles.

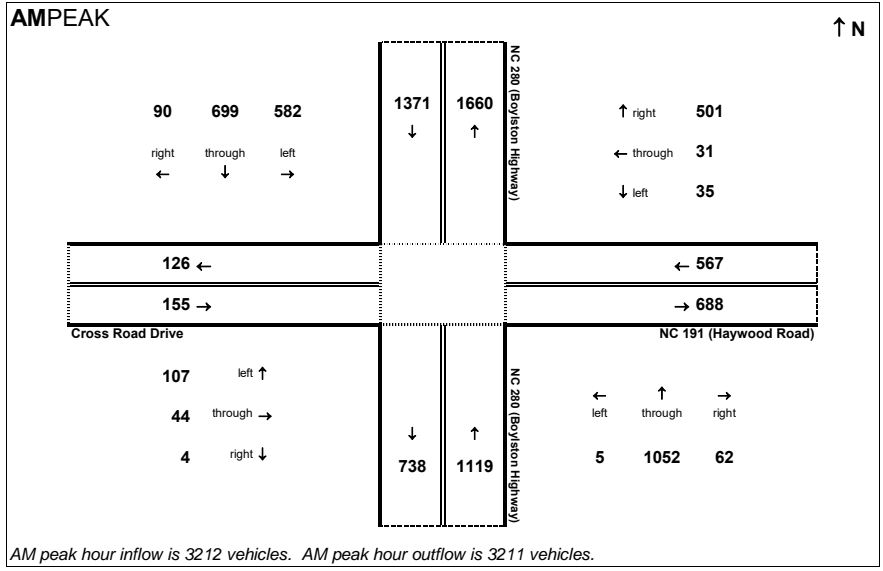


Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and NC 280 (Boylston Highway)

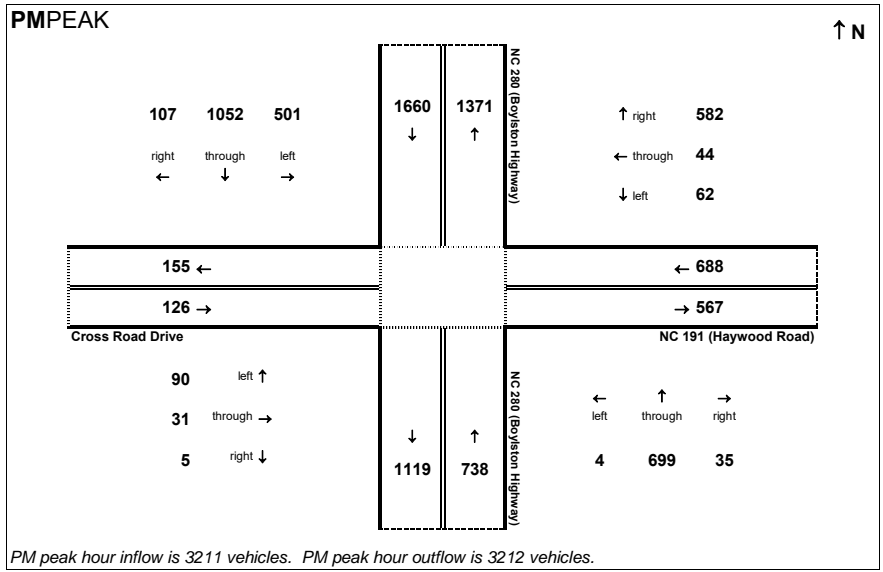
Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2040 No Build

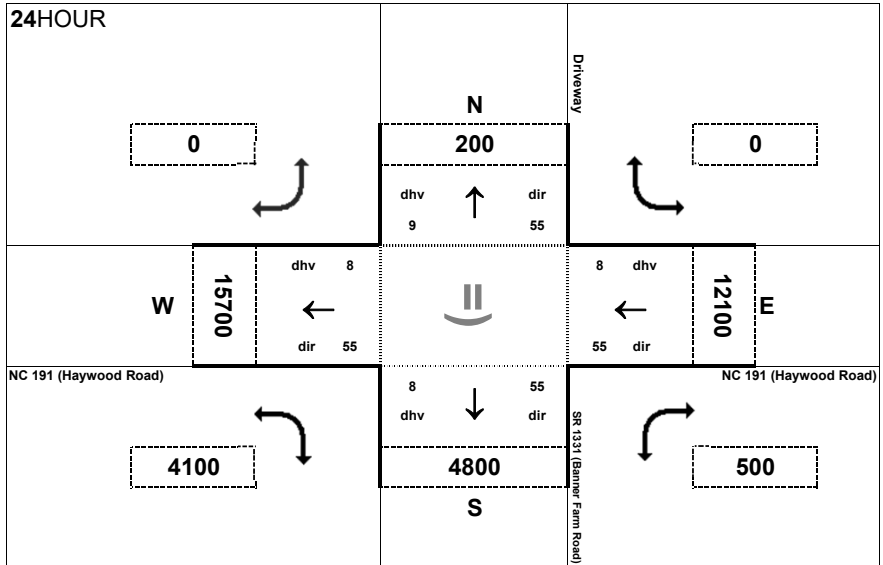
Project:
 R - 2588B



AM peak hour inflow is 3212 vehicles. AM peak hour outflow is 3211 vehicles.



PM peak hour inflow is 3211 vehicles. PM peak hour outflow is 3212 vehicles.

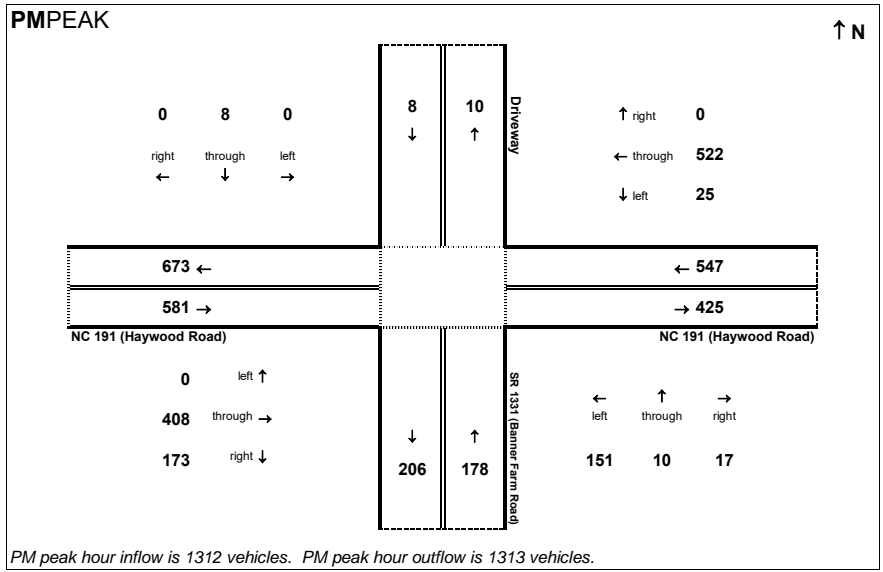
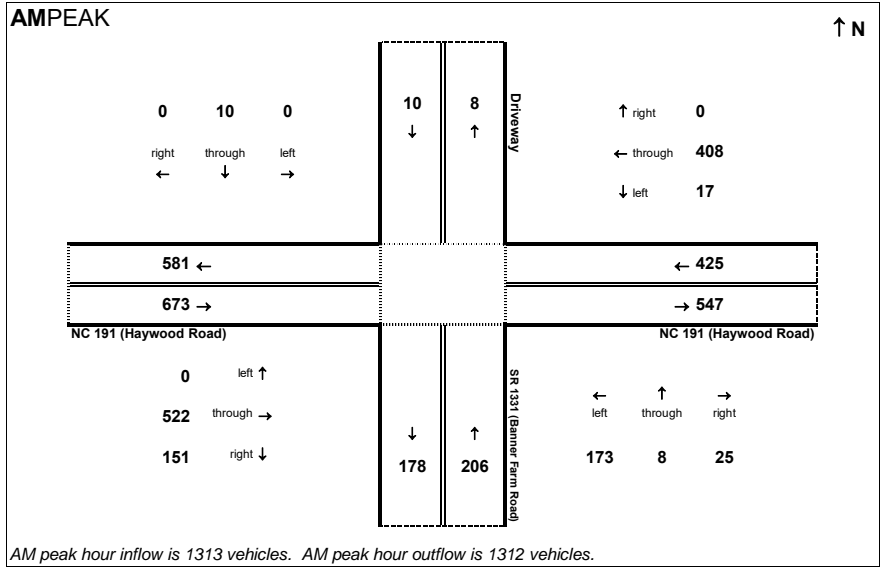


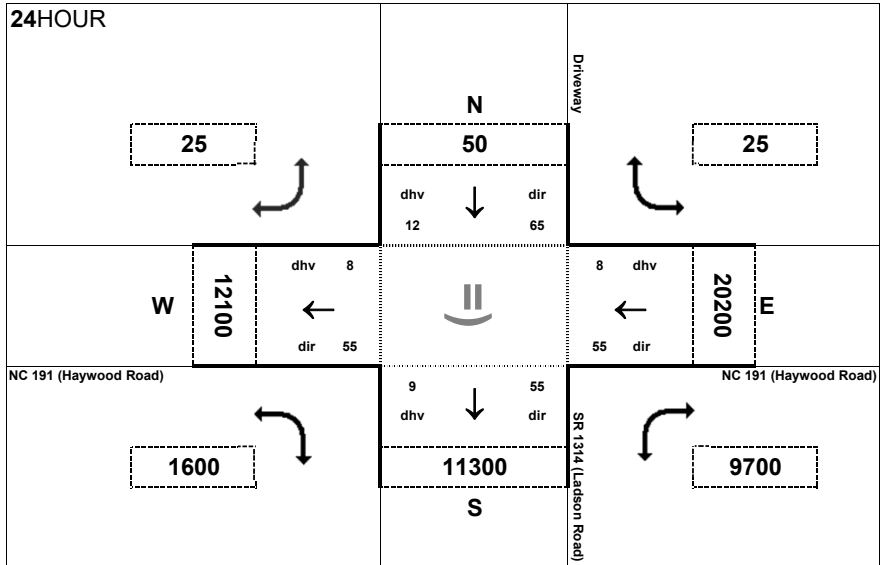
Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and SR 1331 (Banner Farm Road)

Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2040 No Build

Project:
 R - 2588B



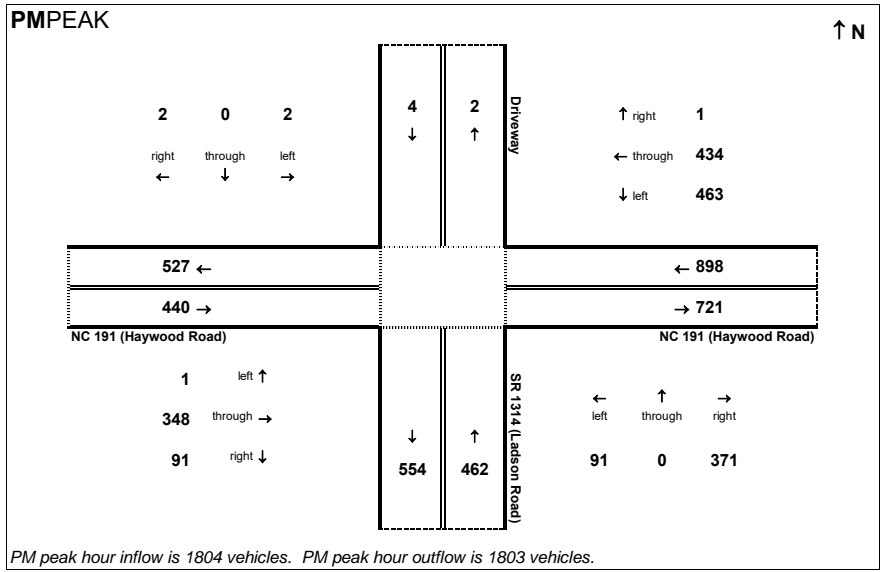
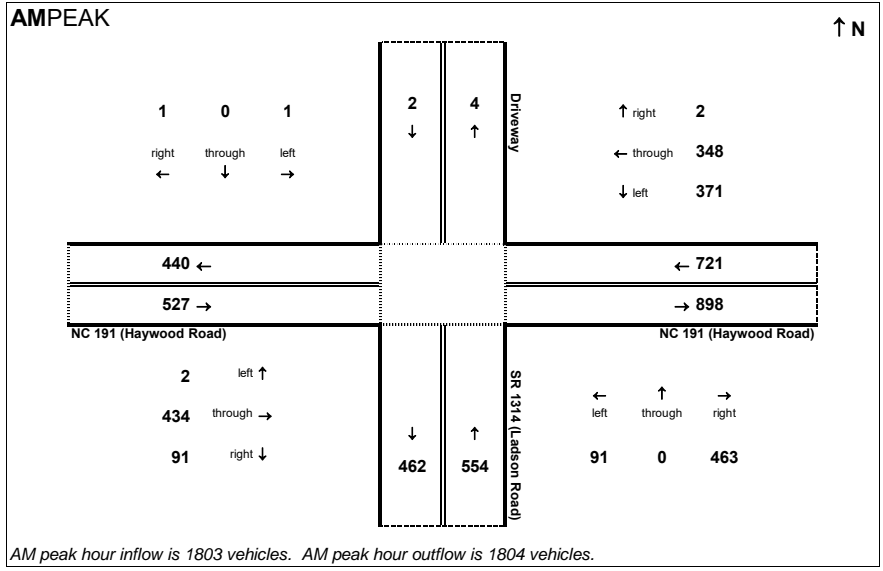


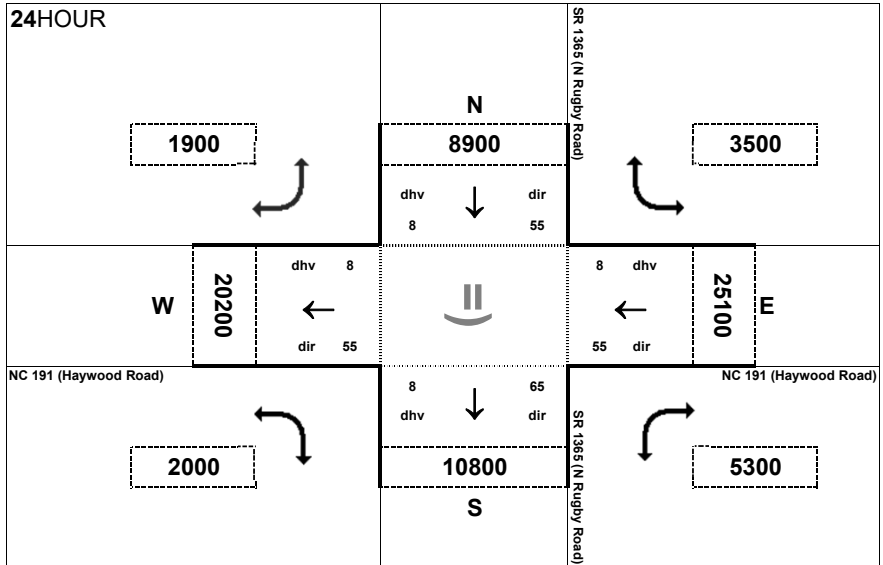
Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and SR 1314 (Ladson Road)

Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2040 No Build

Project:
 R - 2588B



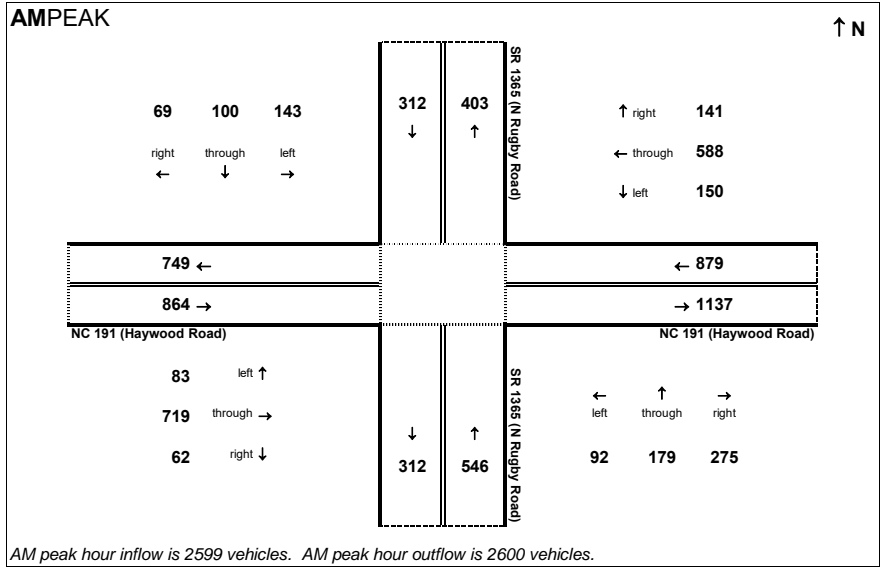


Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and SR 1365 (N Rugby Road)

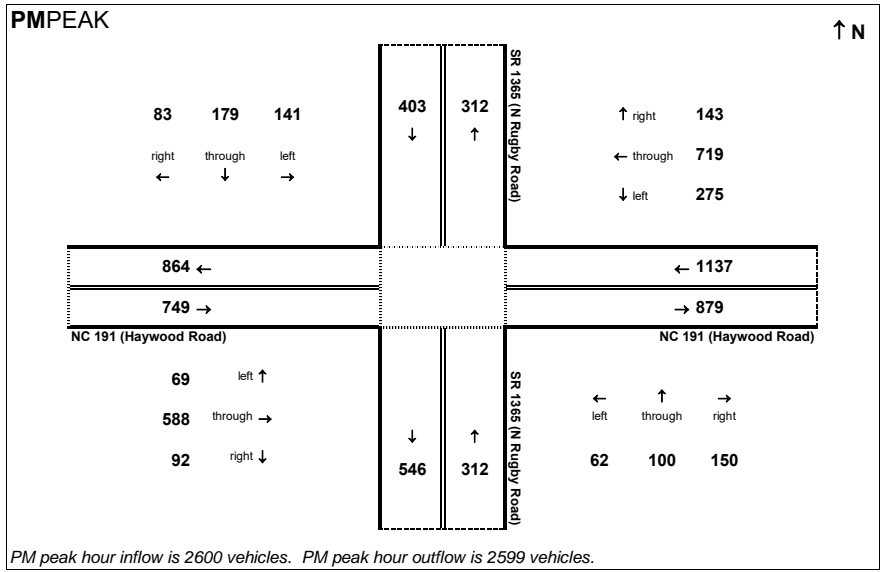
Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2040 No Build

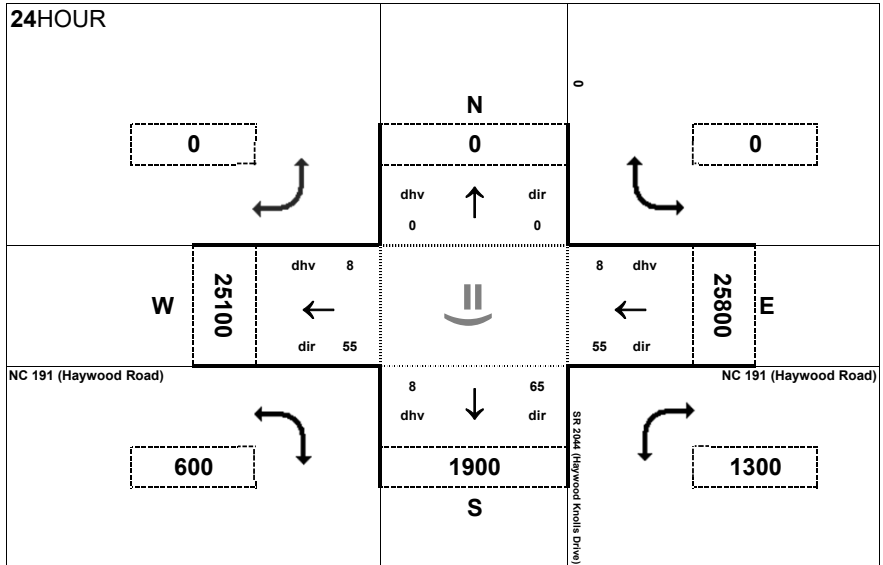
Project:
 R - 2588B



AM peak hour inflow is 2599 vehicles. AM peak hour outflow is 2600 vehicles.



PM peak hour inflow is 2600 vehicles. PM peak hour outflow is 2599 vehicles.

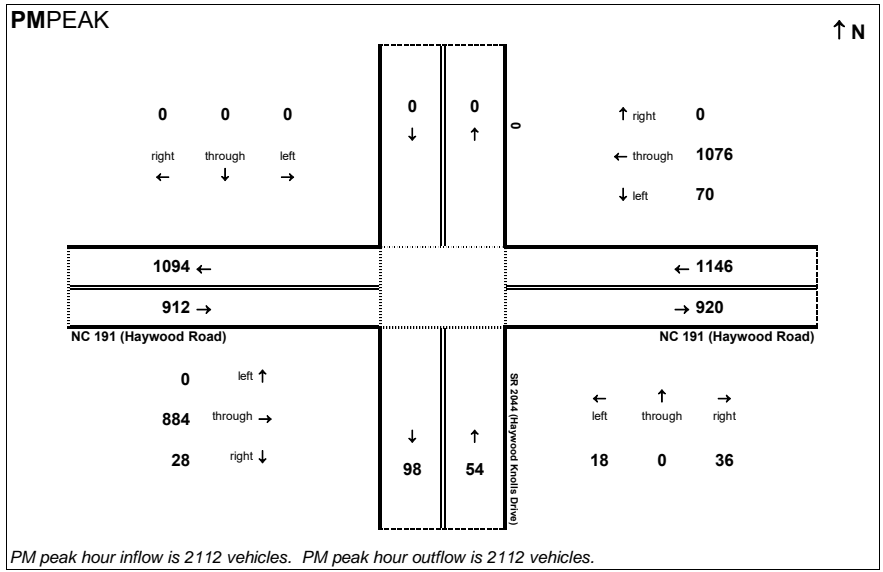
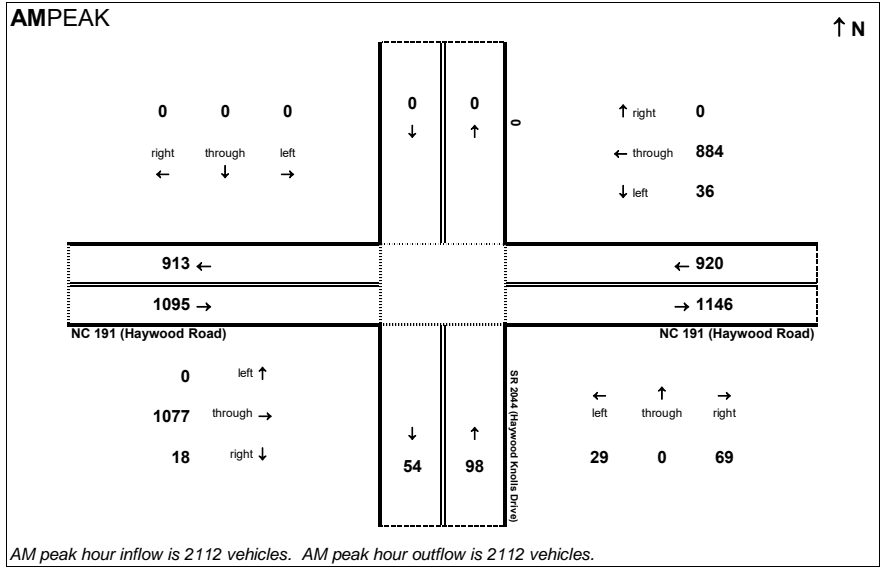


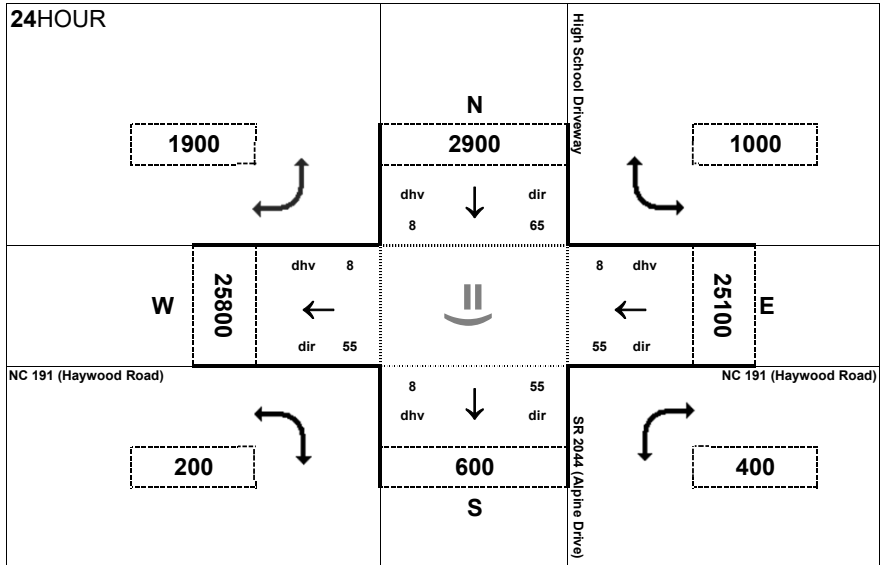
Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and SR 2044 (Haywood Knolls Drive)

Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2040 No Build

Project:
 R - 2588B



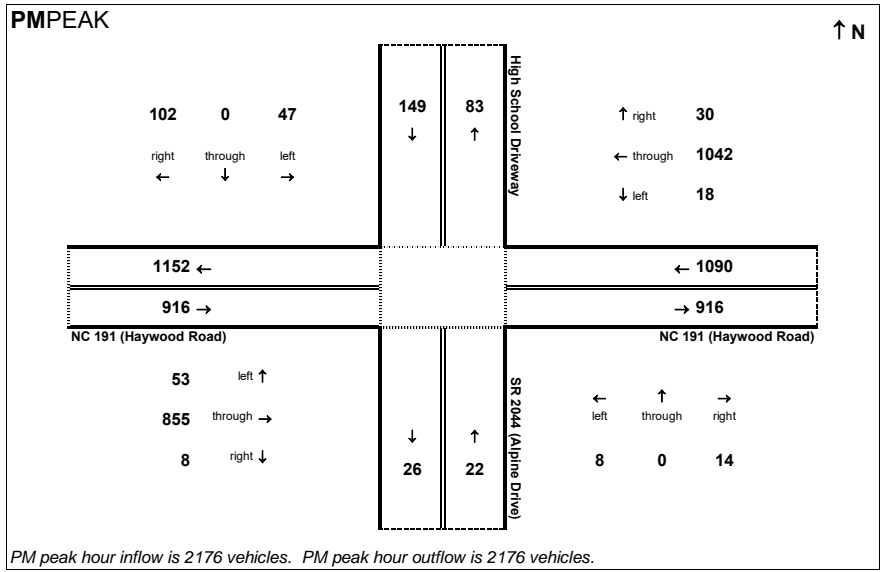
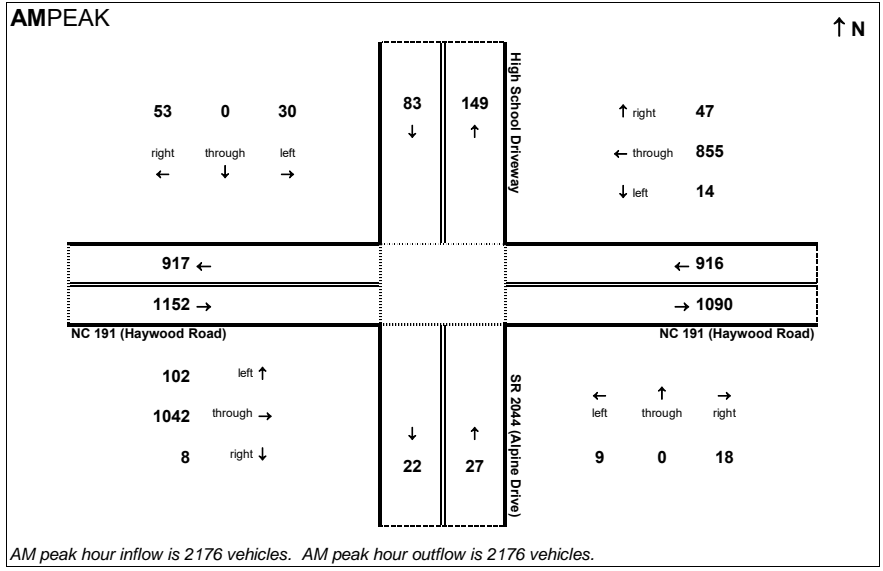


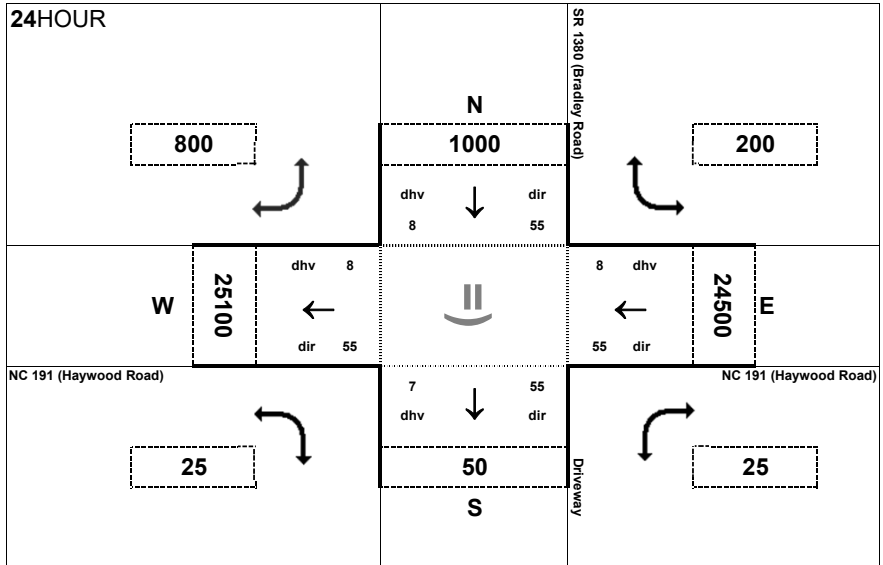
Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and SR 2044 (Alpine Drive)

Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2040 No Build

Project:
 R - 2588B



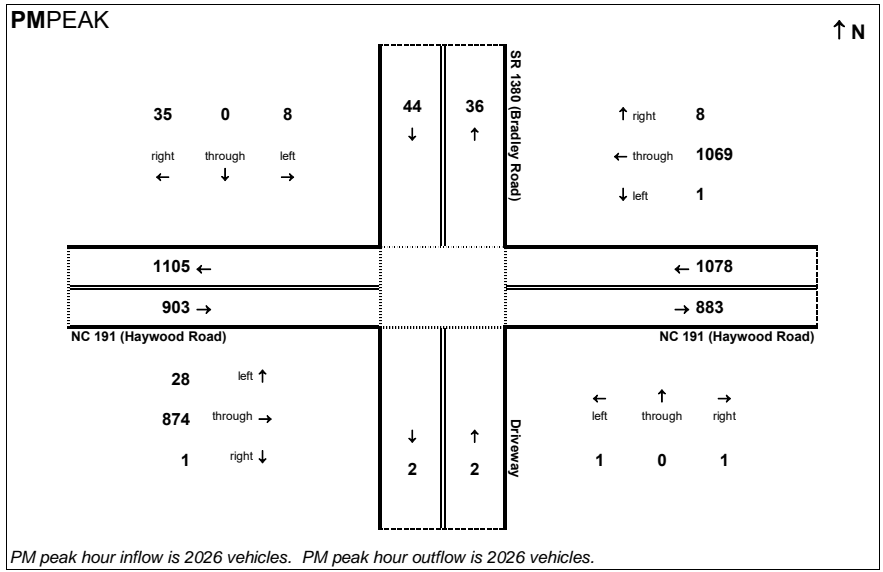
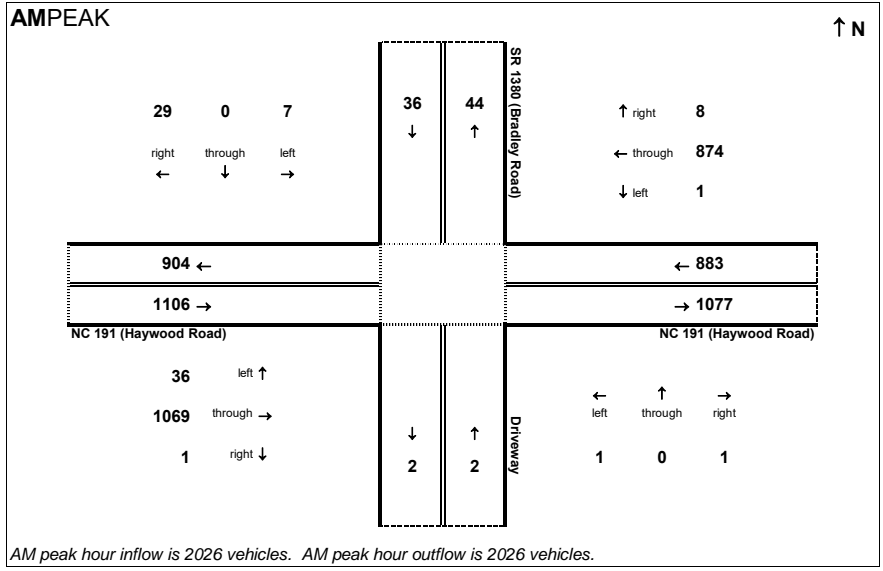


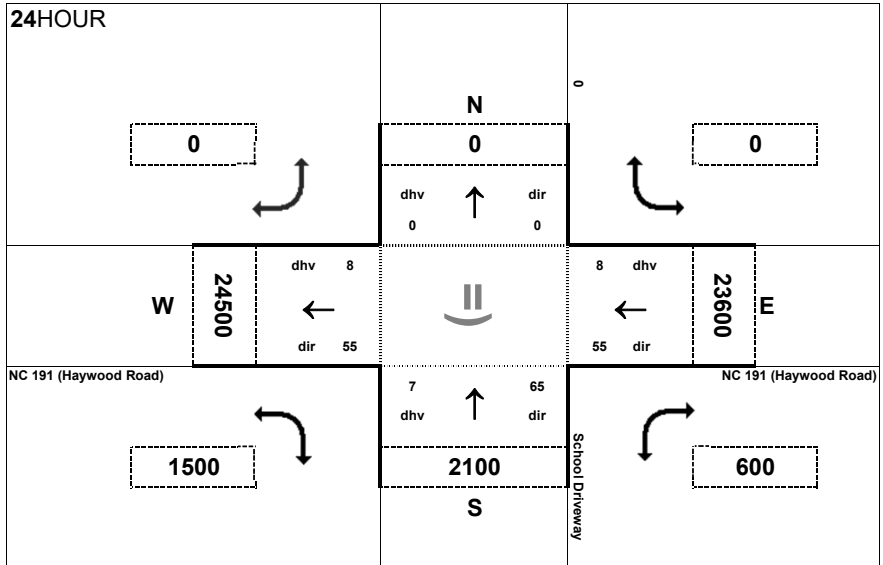
Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and SR 2044 (Alpine Drive)

Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2040 No Build

Project:
 R - 2588B



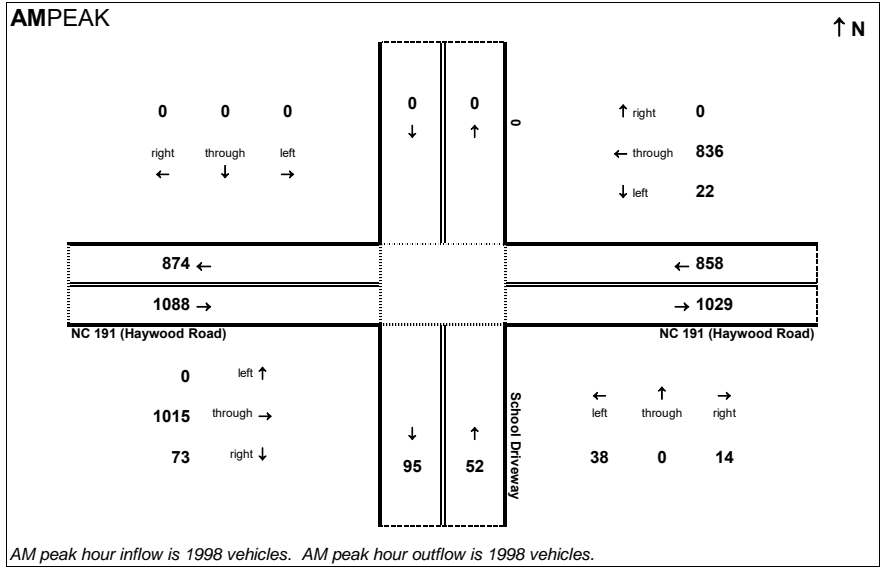


Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and School Driveway

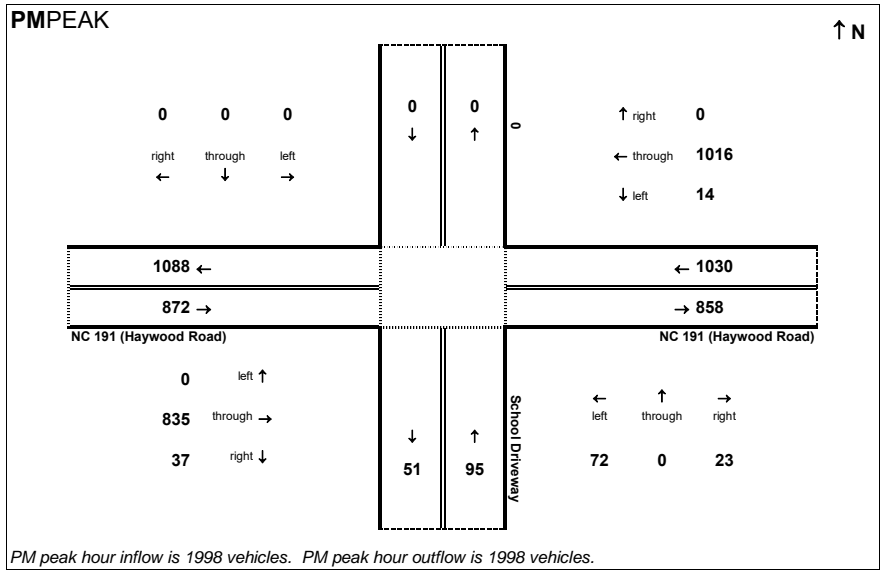
Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2040 No Build

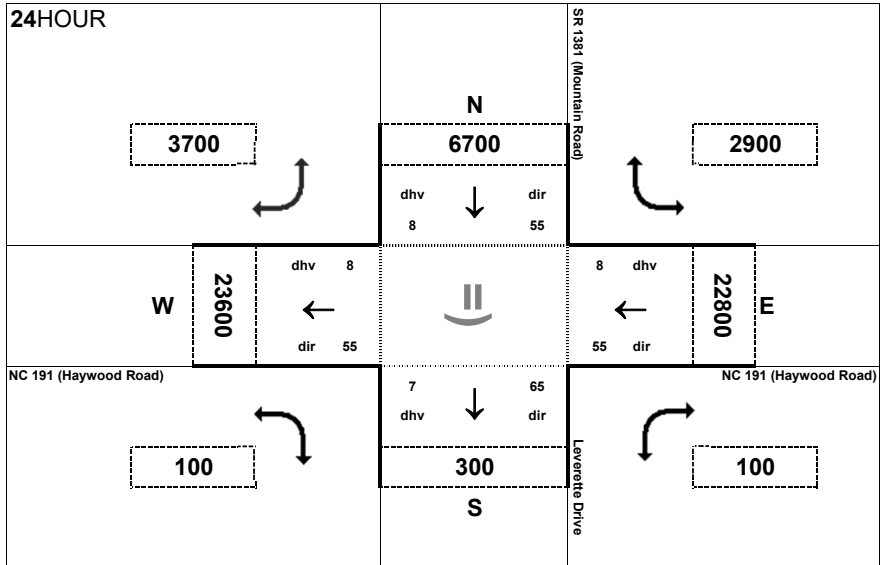
Project:
 R - 2588B



AM peak hour inflow is 1998 vehicles. AM peak hour outflow is 1998 vehicles.



PM peak hour inflow is 1998 vehicles. PM peak hour outflow is 1998 vehicles.

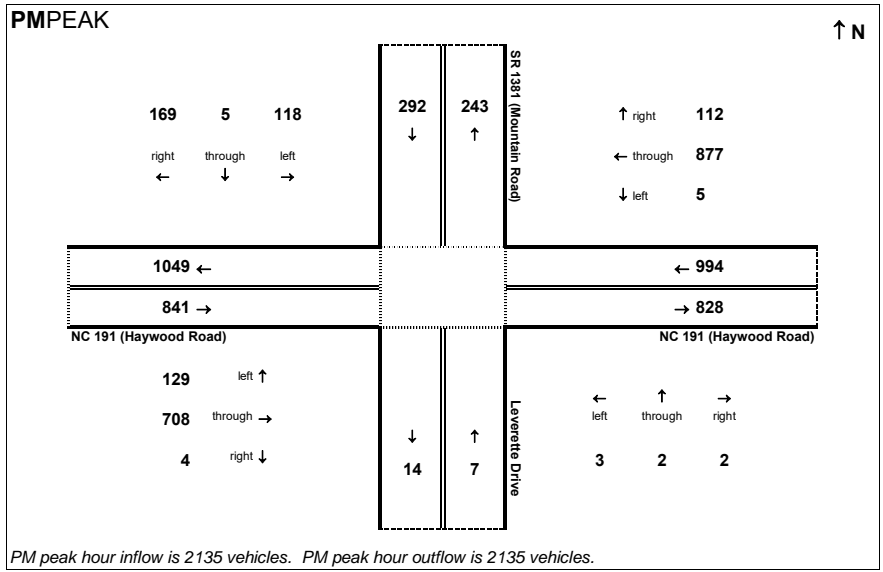
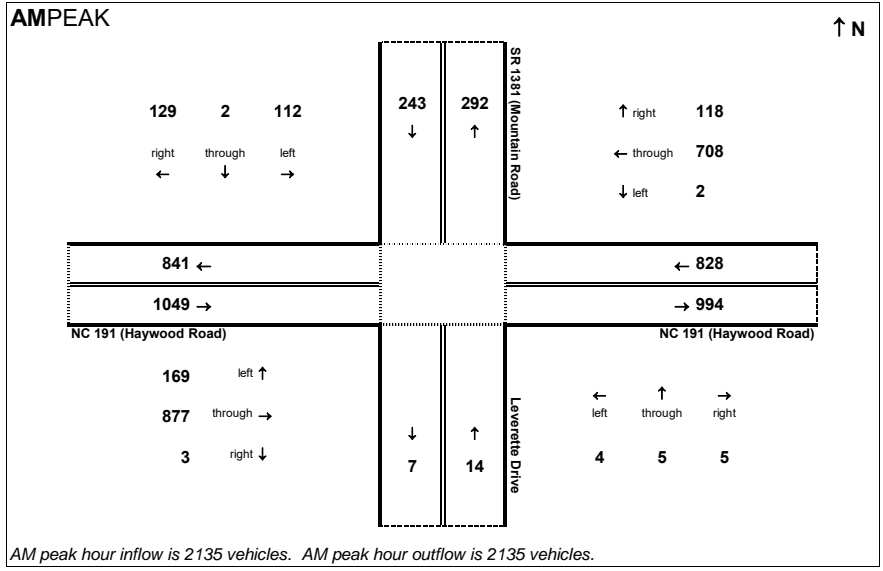


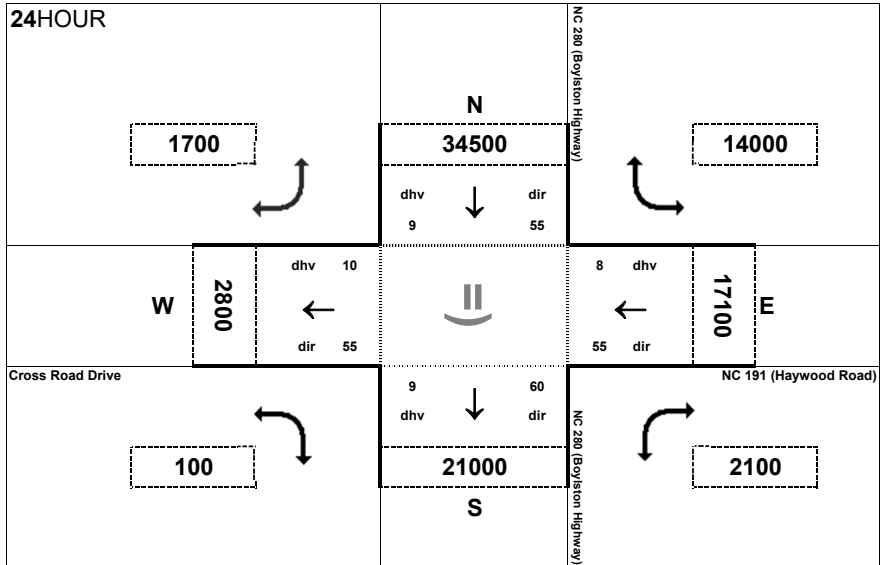
Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and SR 1381 (Mountain Road)

Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2040 No Build

Project:
 R - 2588B



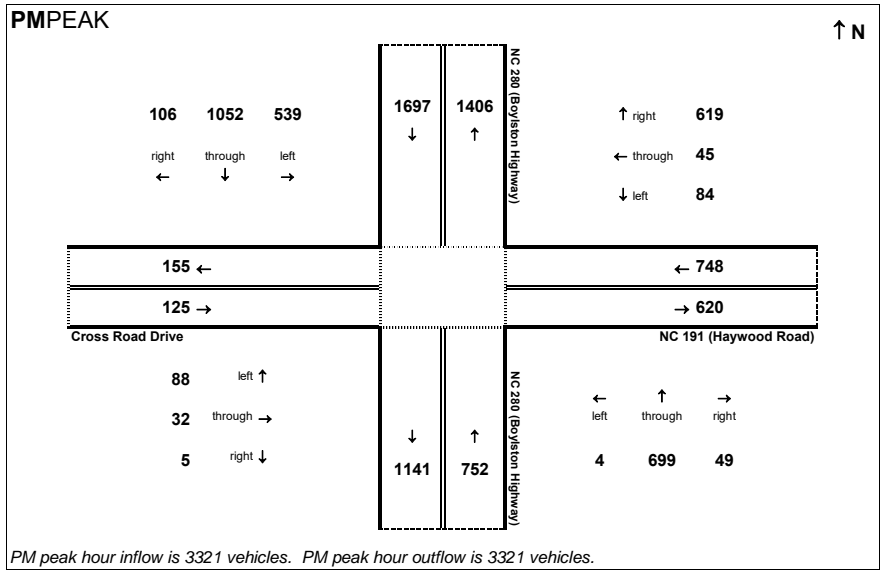
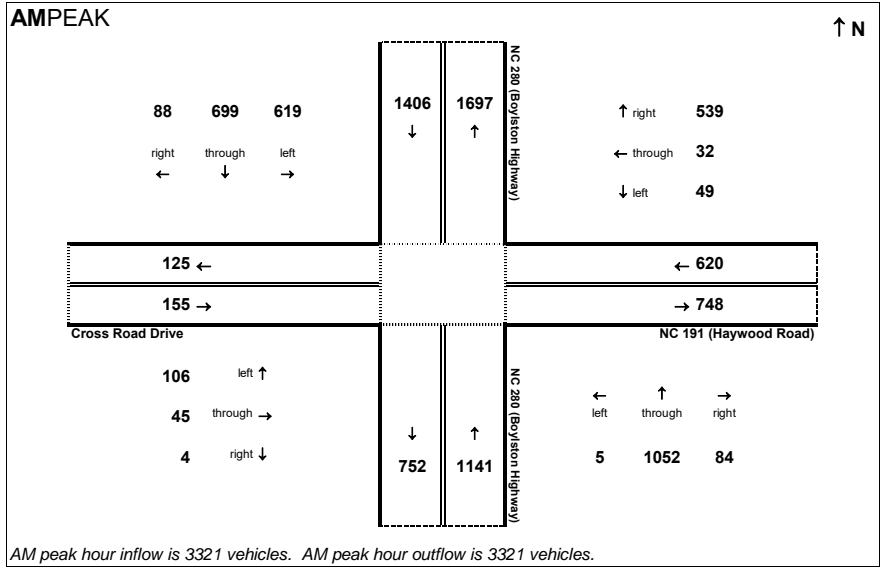


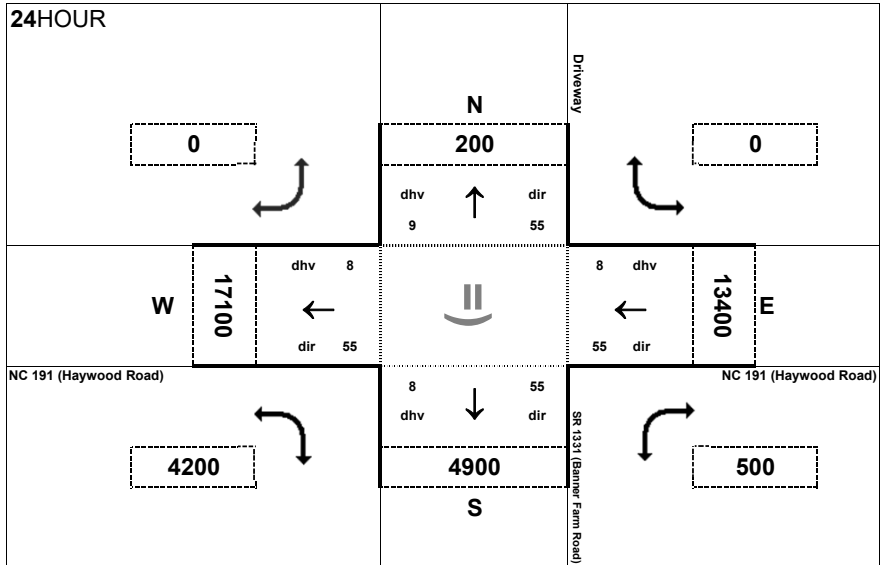
Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and NC 280 (Boylston Highway)

Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2040 Build

Project:
 R - 2588B



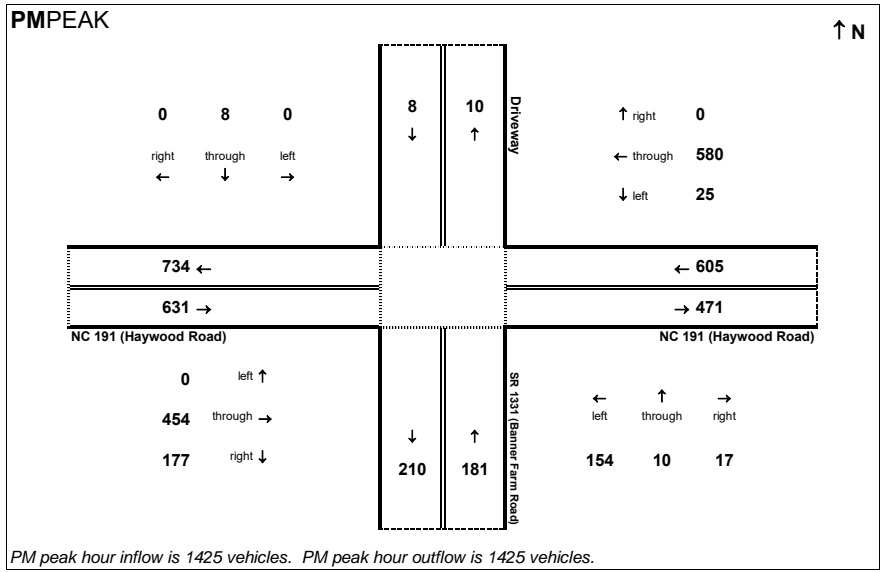
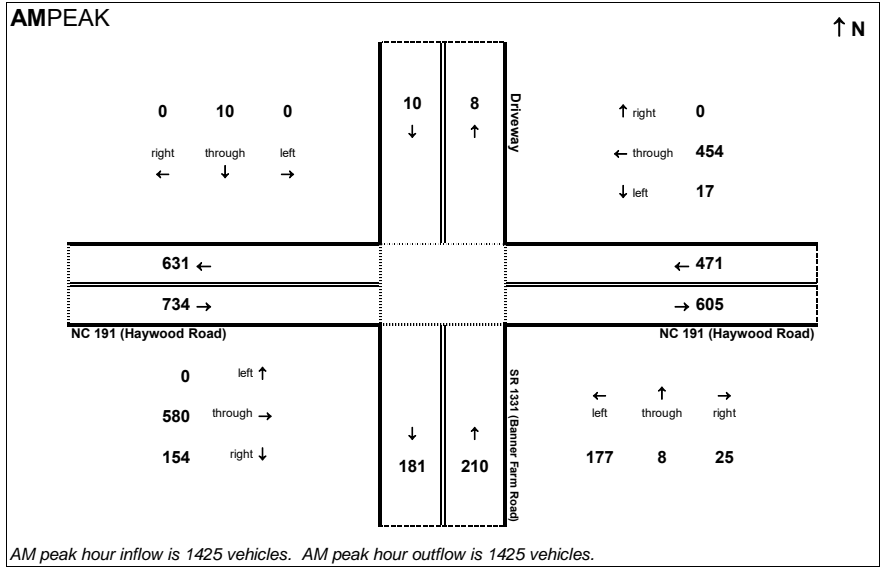


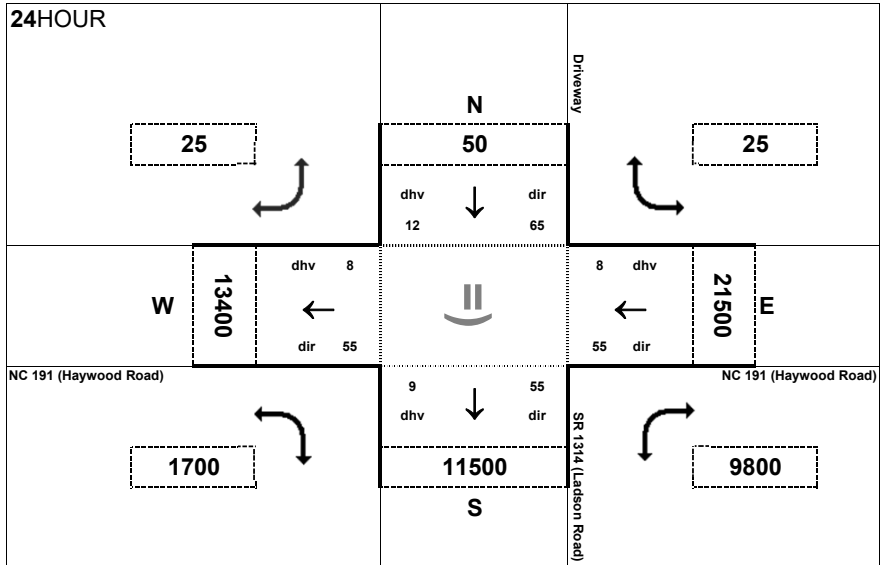
Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and SR 1331 (Banner Farm Road)

Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2040 Build

Project:
 R - 2588B



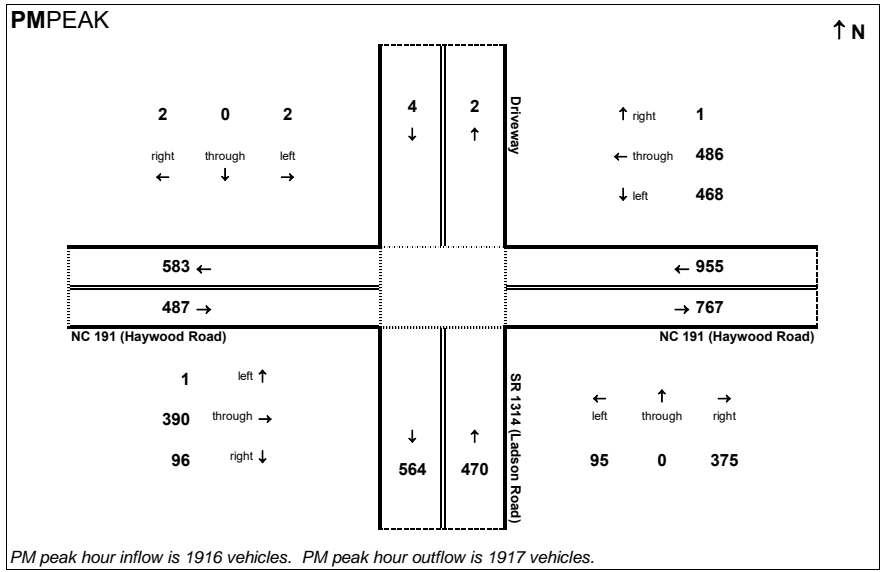
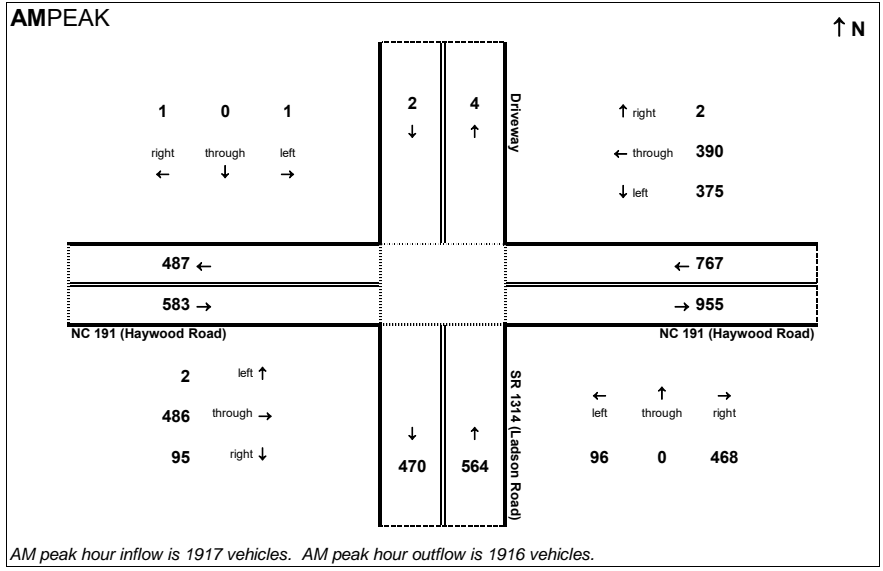


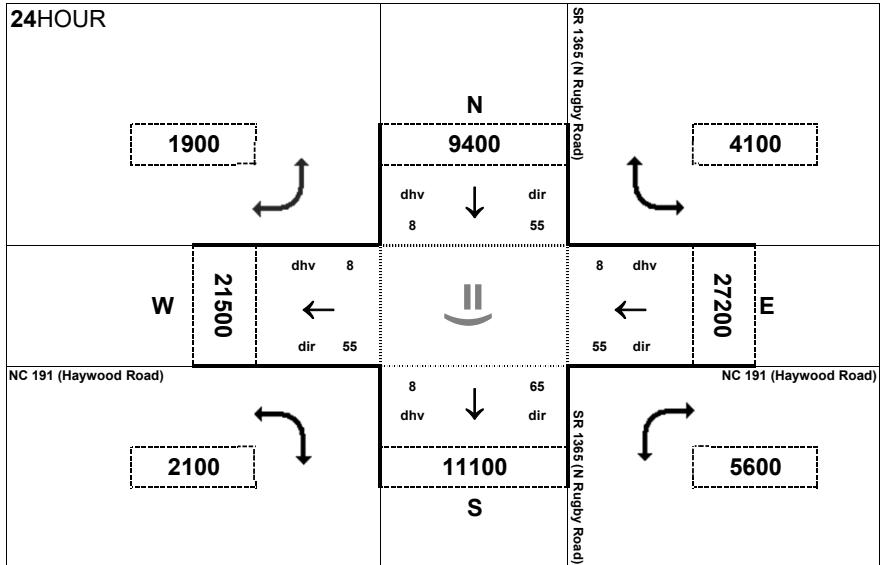
Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and SR 1314 (Ladson Road)

Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2040 Build

Project:
 R - 2588B



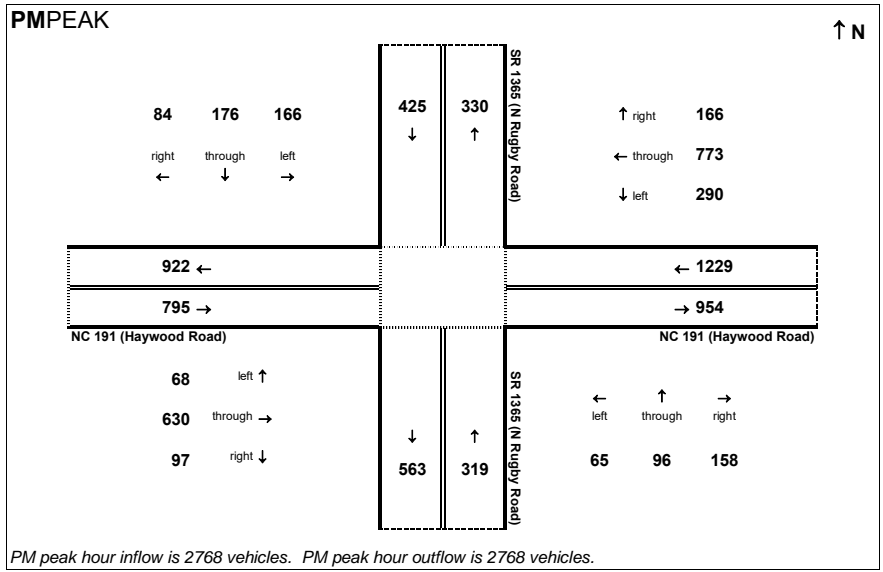
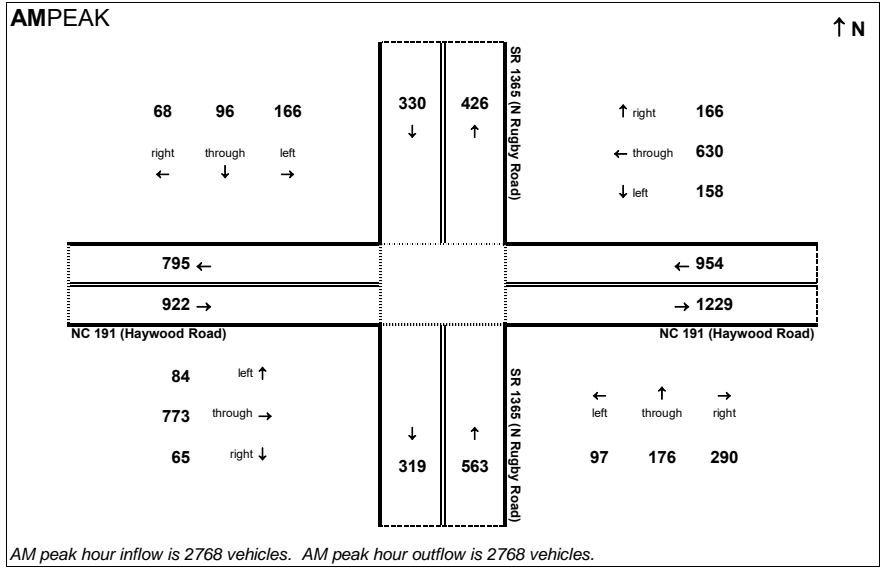


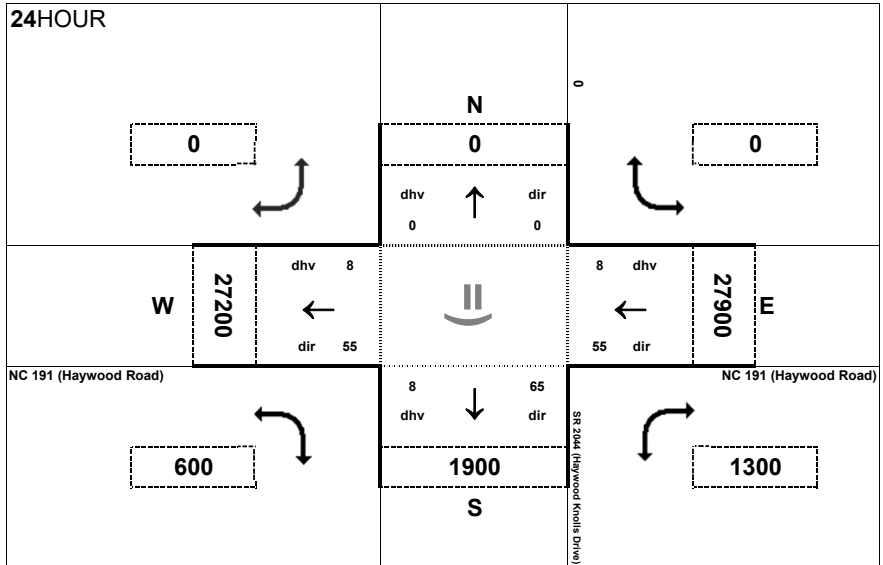
Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and SR 1365 (N Rugby Road)

Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2040 Build

Project:
 R - 2588B



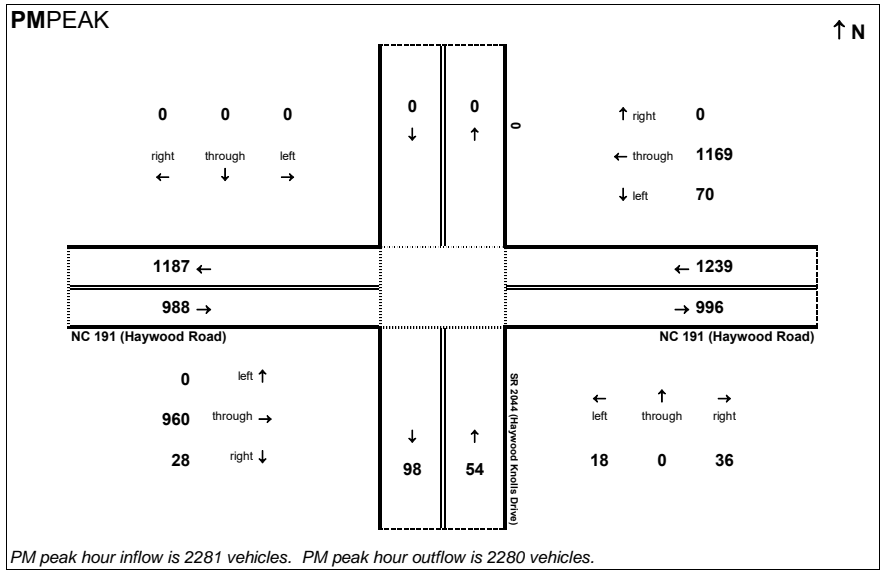
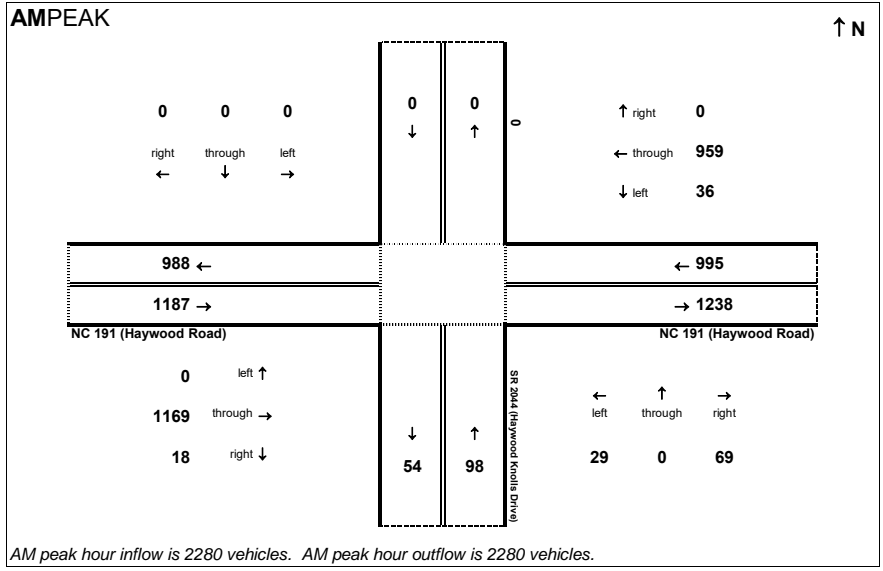


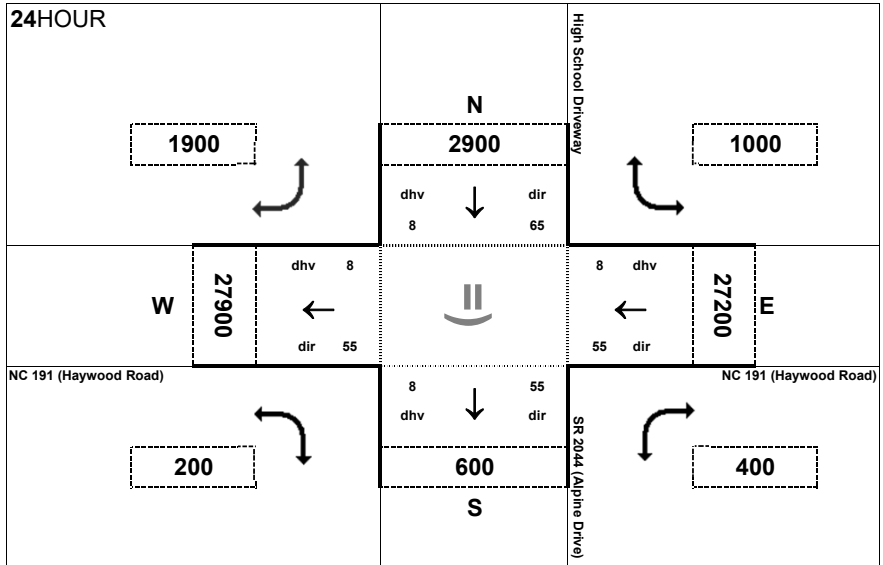
Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and SR 2044 (Haywood Knolls Drive)

Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2040 Build

Project:
 R - 2588B



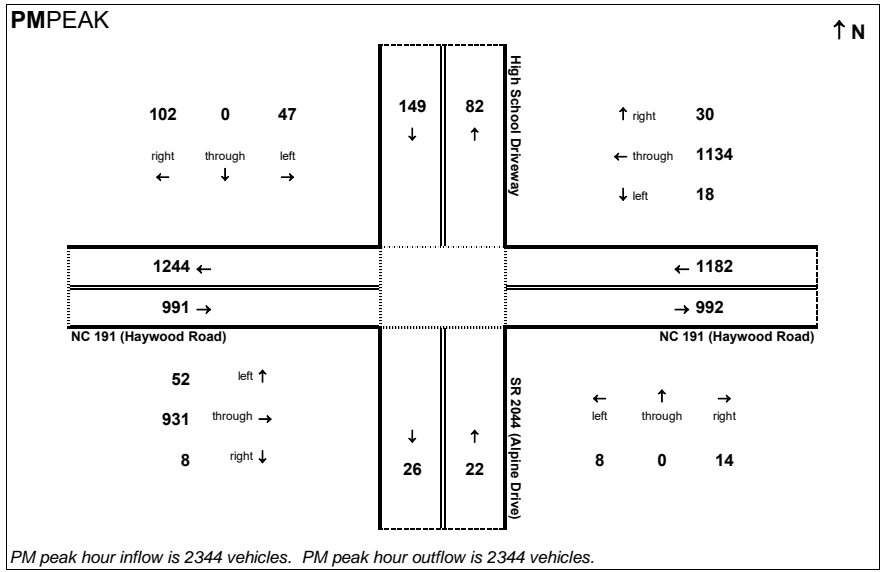
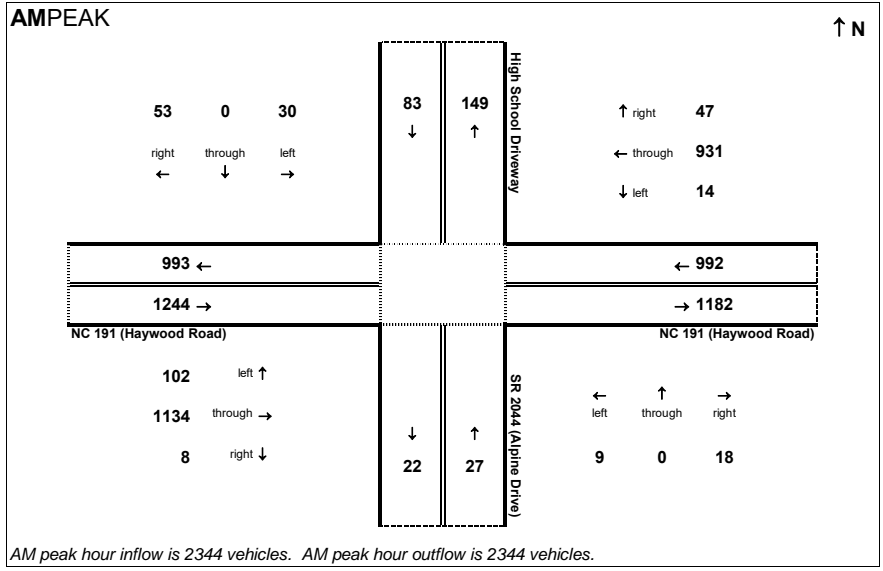


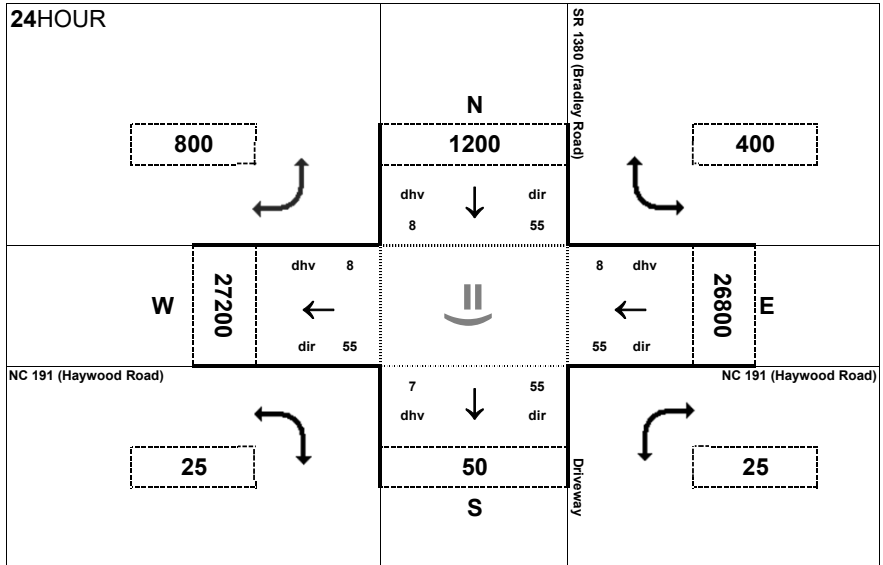
Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and SR 2044 (Alpine Drive)

Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2040 Build

Project:
 R - 2588B



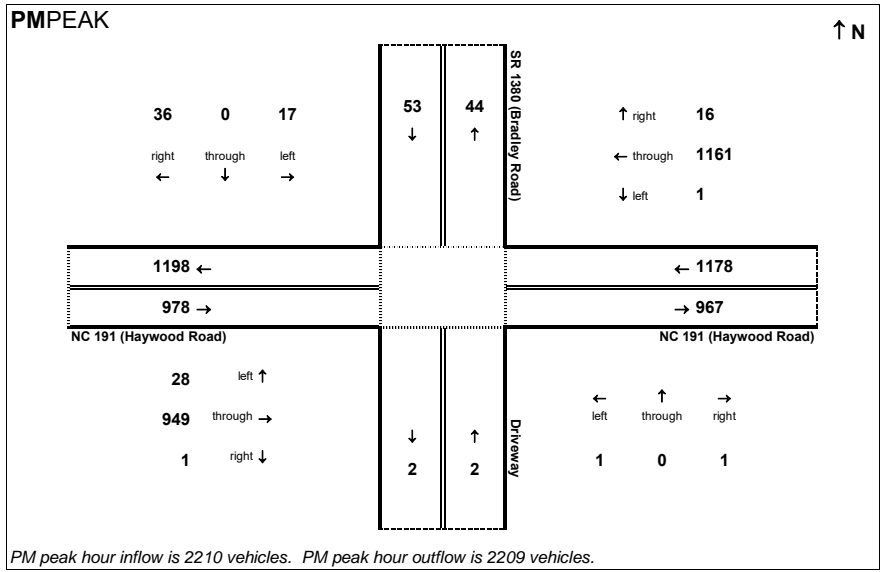
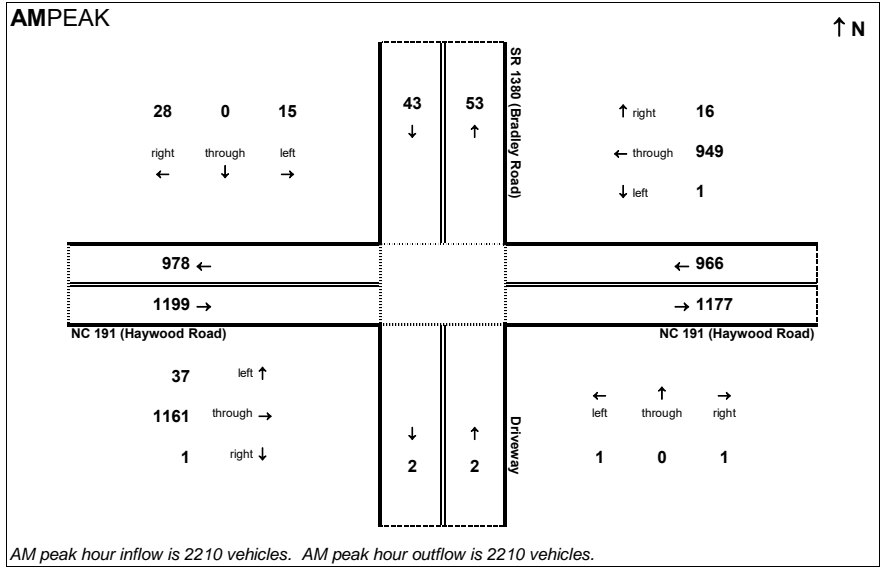


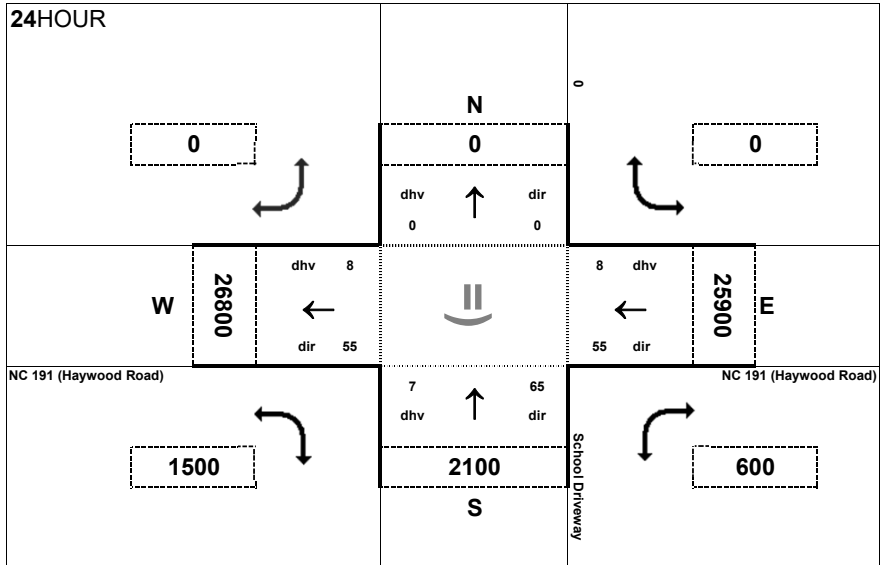
Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and SR 2044 (Alpine Drive)

Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2040 Build

Project:
 R - 2588B



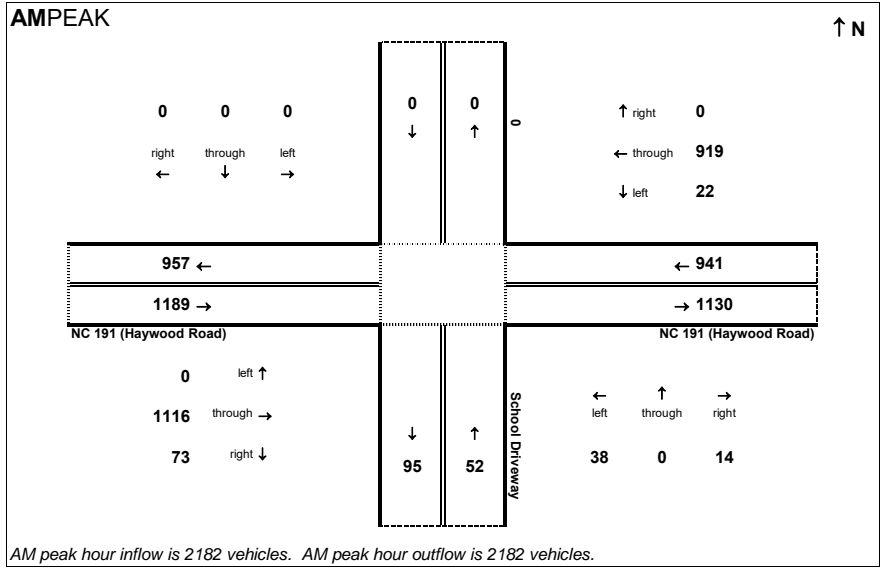


Peak Hour Volume Breakouts Report:
 Intersection of NC 191 (Haywood Road) and School Driveway

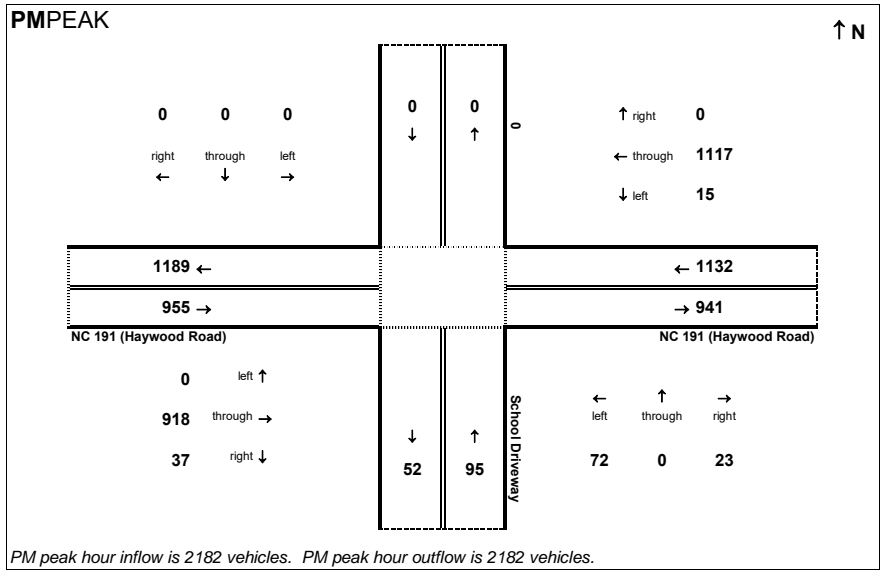
Traffic Forecast Release Date:
 July-17

Traffic Data Year:
 2040 Build

Project:
 R - 2588B



AM peak hour inflow is 2182 vehicles. AM peak hour outflow is 2182 vehicles.



PM peak hour inflow is 2182 vehicles. PM peak hour outflow is 2182 vehicles.

Appendix B
Crash Data

**North Carolina Department of Transportation
Traffic Engineering Accident Analysis System
Strip Analysis Report**

Acc No	Crash ID	Milepost	Date	Accident Type	Total Damage	Injuries				Condition			Road		Trfc Ctl	
						F	A	B	C	R	L	W	Ch	Ci	Dv	Op
9	104596300	2.775	12/18/2015 18:11	LEFT TURN, DIFFERENT ROADWAYS	\$ 13800	0	0	0	0	1	1	1	3	0	3	1
Unit	1 : 4	Alchl/Drgs:	0	Speed: 35 MPH Dir: S		Veh Mnvr/Ped Actn:				8	Obj Strk:					
Unit	2 : 1	Alchl/Drgs:	0	Speed: 35 MPH Dir: W		Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	3 : 4	Alchl/Drgs:	0	Speed: 35 MPH Dir: E		Veh Mnvr/Ped Actn:				1	Obj Strk:					
10	104980362	2.775	01/18/2017 19:41	SIDESWIPE, SAME DIRECTION	\$ 2400	0	0	0	0	1	5	1	3	0	3	1
Unit	1 : 1	Alchl/Drgs:	0	Speed: 5 MPH Dir: W		Veh Mnvr/Ped Actn:				7	Obj Strk:					
Unit	2 : 1	Alchl/Drgs:	0	Speed: 0 MPH Dir: W		Veh Mnvr/Ped Actn:				1	Obj Strk:					
11	104979126	2.788	01/16/2017 17:40	BACKING UP	\$ 525	0	0	0	0	2	2	2	7	0	3	1
Unit	1 : 1	Alchl/Drgs:	0	Speed: 10 MPH Dir: N		Veh Mnvr/Ped Actn:				10	Obj Strk:					
Unit	2 : 4	Alchl/Drgs:	0	Speed: 0 MPH Dir: S		Veh Mnvr/Ped Actn:				1	Obj Strk:					
12	103877681	2.837	10/18/2013 17:02	LEFT TURN, SAME ROADWAY	\$ 9000	0	0	0	1	1	1	1	1	0	13	1
Unit	1 : 4	Alchl/Drgs:	0	Speed: 45 MPH Dir: S		Veh Mnvr/Ped Actn:				8	Obj Strk:					
Unit	2 : 1	Alchl/Drgs:	0	Speed: 45 MPH Dir: N		Veh Mnvr/Ped Actn:				4	Obj Strk:					
13	104376170	2.875	05/12/2015 15:29	REAR END, SLOW OR STOP	\$ 3500	0	0	0	0	1	1	1	1	0	13	1
Unit	1 : 2	Alchl/Drgs:	0	Speed: 40 MPH Dir: S		Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 1	Alchl/Drgs:	0	Speed: 35 MPH Dir: S		Veh Mnvr/Ped Actn:				4	Obj Strk:					
14	104523058	2.875	10/17/2015 21:52	OTHER COLLISION WITH VEHICLE	\$ 2100	0	0	0	0	1	5	1	1	0	13	1
Unit	1 : 1	Alchl/Drgs:	0	Speed: 35 MPH Dir: N		Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 1	Alchl/Drgs:	0	Speed: 45 MPH Dir: N		Veh Mnvr/Ped Actn:				4	Obj Strk:					
15	104789675	2.929	07/13/2016 09:04	REAR END, SLOW OR STOP	\$ 1000	0	0	0	0	1	1	1	1	0	13	1
Unit	1 : 1	Alchl/Drgs:	0	Speed: 35 MPH Dir: NW		Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 2	Alchl/Drgs:	0	Speed: 35 MPH Dir: NW		Veh Mnvr/Ped Actn:				11	Obj Strk:					
16	104033148	2.938	04/13/2014 12:10	LEFT TURN, DIFFERENT ROADWAYS	\$ 3000	0	0	0	0	1	1	1	1	0	1	1
Unit	1 : 1	Alchl/Drgs:	0	Speed: 0 MPH Dir: W		Veh Mnvr/Ped Actn:				8	Obj Strk:					
Unit	2 : 1	Alchl/Drgs:	0	Speed: 40 MPH Dir: S		Veh Mnvr/Ped Actn:				4	Obj Strk:					
17	103950223	2.945	01/13/2014 08:35	FIXED OBJECT	\$ 2750	0	0	0	0	1	1	1	5	0	13	1
Unit	1 : 1	Alchl/Drgs:	0	Speed: 45 MPH Dir: S		Veh Mnvr/Ped Actn:				4	Obj Strk:		58			

**North Carolina Department of Transportation
Traffic Engineering Accident Analysis System
Strip Analysis Report**

Acc No	Crash ID	Milepost	Date	Accident Type	Total Damage	Injuries				Condition			Road		Trfc Ctl	
						F	A	B	C	R	L	W	Ch	Ci	Dv	Op
18	104248421	2.981	12/16/2014 17:50	OVERTURN/ROLLOVER	\$ 1200	0	0	1	0	1	2	1	1	0	13	1
Unit	1 : 20	Alchl/Drgs:	0	Speed:	55 MPH Dir: E	Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 5	Alchl/Drgs:	0	Speed:	45 MPH Dir: E	Veh Mnvr/Ped Actn:				1	Obj Strk:					
19	103505647	3.023	07/25/2012 16:47	REAR END, SLOW OR STOP	\$ 1200	0	0	0	0	1	1	1	1	0	0	
Unit	1 : 1	Alchl/Drgs:	0	Speed:	40 MPH Dir: W	Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 1	Alchl/Drgs:	0	Speed:	40 MPH Dir: W	Veh Mnvr/Ped Actn:				11	Obj Strk:					
20	103945042	3.062	01/06/2014 18:19	REAR END, SLOW OR STOP	\$ 18500	0	0	0	0	1	5	1	1	0	14	1
Unit	1 : 1	Alchl/Drgs:	0	Speed:	45 MPH Dir: W	Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 1	Alchl/Drgs:	0	Speed:	0 MPH Dir: W	Veh Mnvr/Ped Actn:				1	Obj Strk:					
21	104753087	3.075	06/01/2016 15:26	REAR END, SLOW OR STOP	\$ 1750	0	0	0	0	1	1	2	1	0	13	1
Unit	1 : 1	Alchl/Drgs:	0	Speed:	25 MPH Dir: SE	Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 1	Alchl/Drgs:	0	Speed:	0 MPH Dir: SE	Veh Mnvr/Ped Actn:				1	Obj Strk:					
22	105025200	3.075	03/01/2017 07:42	REAR END, SLOW OR STOP	\$ 9800	0	0	0	0	1	1	1	1	0	13	1
Unit	1 : 2	Alchl/Drgs:	0	Speed:	30 MPH Dir: S	Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 1	Alchl/Drgs:	0	Speed:	30 MPH Dir: S	Veh Mnvr/Ped Actn:				1	Obj Strk:					
Unit	3 : 1	Alchl/Drgs:	0	Speed:	30 MPH Dir: S	Veh Mnvr/Ped Actn:				1	Obj Strk:					
23	103735068	3.098	04/25/2013 18:56	REAR END, SLOW OR STOP	\$ 4500	0	0	0	0	1	1	1	1	0	13	1
Unit	1 : 2	Alchl/Drgs:	0	Speed:	45 MPH Dir: W	Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 4	Alchl/Drgs:	0	Speed:	0 MPH Dir: W	Veh Mnvr/Ped Actn:				1	Obj Strk:					
24	103765140	3.107	05/28/2013 21:50	BACKING UP	\$ 2700	0	0	0	0	1	5	1	1	0	0	
Unit	1 : 1	Alchl/Drgs:	0	Speed:	0 MPH Dir: W	Veh Mnvr/Ped Actn:				1	Obj Strk:					
Unit	2 : 1	Alchl/Drgs:	0	Speed:	0 MPH Dir: W	Veh Mnvr/Ped Actn:				1	Obj Strk:					
25	104532423	3.107	10/27/2015 07:28	FIXED OBJECT	\$ 12000	0	0	0	0	2	1	2	1	0	0	
Unit	1 : 4	Alchl/Drgs:	0	Speed:	45 MPH Dir: N	Veh Mnvr/Ped Actn:				4	Obj Strk:		64			
26	104768085	3.116	06/18/2016 12:34	REAR END, SLOW OR STOP	\$ 2500	0	0	0	0	1	1	1	1	0	13	1
Unit	1 : 2	Alchl/Drgs:	0	Speed:	45 MPH Dir: S	Veh Mnvr/Ped Actn:				4	Obj Strk:		61			
Unit	2 : 4	Alchl/Drgs:	0	Speed:	35 MPH Dir: S	Veh Mnvr/Ped Actn:				1	Obj Strk:					
Unit	3 : 1	Alchl/Drgs:	0	Speed:	45 MPH Dir: S	Veh Mnvr/Ped Actn:				1	Obj Strk:					

**North Carolina Department of Transportation
Traffic Engineering Accident Analysis System
Strip Analysis Report**

Acc No	Crash ID	Milepost	Date	Accident Type	Total Damage	Injuries				Condition			Road		Trfc Ctl	
						F	A	B	C	R	L	W	Ch	Ci	Dv	Op
27	103804889	3.138	07/21/2013 14:40	REAR END, SLOW OR STOP	\$ 3000	0	0	0	0	2	1	3	1	0	13	1
Unit	1 : 1	Alchl/Drgs:	0	Speed: 40 MPH Dir: S		Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 1	Alchl/Drgs:	0	Speed: 45 MPH Dir: S		Veh Mnvr/Ped Actn:				4	Obj Strk:					
28	103787422	3.223	06/28/2013 18:41	FIXED OBJECT	\$ 10000	0	0	1	0	2	1	3	1	0	13	1
Unit	1 : 5	Alchl/Drgs:	0	Speed: 45 MPH Dir: N		Veh Mnvr/Ped Actn:				4	Obj Strk:		34			
29	104362585	3.307	04/24/2015 15:08	ANIMAL	\$ 1500	0	0	0	0	1	1	1	1	0	13	1
Unit	1 : 5	Alchl/Drgs:	0	Speed: 45 MPH Dir: N		Veh Mnvr/Ped Actn:				4	Obj Strk:		17			
30	103990173	3.323	02/28/2014 07:25	REAR END, SLOW OR STOP	\$ 7000	0	0	0	0	1	1	1	1	0	13	1
Unit	1 : 4	Alchl/Drgs:	0	Speed: 0 MPH Dir: W		Veh Mnvr/Ped Actn:				1	Obj Strk:					
Unit	2 : 1	Alchl/Drgs:	0	Speed: 40 MPH Dir: W		Veh Mnvr/Ped Actn:				4	Obj Strk:					
31	103933809	3.407	12/20/2013 08:03	REAR END, SLOW OR STOP	\$ 1700	0	0	0	0	1	1	1	1	0	13	1
Unit	1 : 1	Alchl/Drgs:	0	Speed: 45 MPH Dir: E		Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 1	Alchl/Drgs:	0	Speed: 45 MPH Dir: E		Veh Mnvr/Ped Actn:				11	Obj Strk:					
32	103684414	3.470	02/21/2013 08:35	LEFT TURN, SAME ROADWAY	\$ 5600	0	0	0	3	1	1	1	1	0	3	1
Unit	1 : 5	Alchl/Drgs:	0	Speed: 40 MPH Dir: S		Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 4	Alchl/Drgs:	0	Speed: 5 MPH Dir: N		Veh Mnvr/Ped Actn:				8	Obj Strk:					
33	104058143	3.470	05/09/2014 15:09	HEAD ON	\$ 4500	0	0	0	0	1	1	1	1	0	3	1
Unit	1 : 1	Alchl/Drgs:	0	Speed: 45 MPH Dir: S		Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 5	Alchl/Drgs:	0	Speed: 45 MPH Dir: W		Veh Mnvr/Ped Actn:				8	Obj Strk:					
34	104230933	3.470	12/04/2014 06:28	FIXED OBJECT	\$ 6000	0	0	0	1	1	4	1	1	0	3	1
Unit	1 : 2	Alchl/Drgs:	0	Speed: 45 MPH Dir: N		Veh Mnvr/Ped Actn:				4	Obj Strk:		58			
35	104716448	3.470	04/27/2016 07:40	RIGHT TURN, DIFFERENT ROADWAYS	\$ 3000	0	0	0	0	1	1	1	1	0	1	1
Unit	1 : 1	Alchl/Drgs:	0	Speed: 10 MPH Dir: E		Veh Mnvr/Ped Actn:				7	Obj Strk:					
Unit	2 : 2	Alchl/Drgs:	0	Speed: 35 MPH Dir: S		Veh Mnvr/Ped Actn:				4	Obj Strk:					
36	104953989	3.470	12/12/2016 15:40	LEFT TURN, DIFFERENT ROADWAYS	\$ 3000	0	0	0	0	1	1	1	1	0	3	1
Unit	1 : 1	Alchl/Drgs:	0	Speed: 35 MPH Dir: S		Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 4	Alchl/Drgs:	0	Speed: 5 MPH Dir: NW		Veh Mnvr/Ped Actn:				8	Obj Strk:					

**North Carolina Department of Transportation
Traffic Engineering Accident Analysis System
Strip Analysis Report**

Acc No	Crash ID	Milepost	Date	Accident Type	Total Damage	Injuries				Condition			Road		Trfc Ctl	
						F	A	B	C	R	L	W	Ch	Ci	Dv	Op
37	104974337	3.470	01/12/2017 07:09	LEFT TURN, DIFFERENT ROADWAYS	\$ 23500	0	0	0	1	1	3	1	1	0	3	1
Unit	1 : 4	Alchl/Drgs:	0	Speed:	0 MPH Dir: NW	Veh Mnvr/Ped Actn:		8	Obj Strk:		61					
Unit	2 : 4	Alchl/Drgs:	0	Speed:	50 MPH Dir: S	Veh Mnvr/Ped Actn:		4	Obj Strk:							
38	104897955	3.523	10/31/2016 08:21	ANIMAL	\$ 3000	0	0	0	0	1	1	1	1	0	13	1
Unit	1 : 4	Alchl/Drgs:	0	Speed:	35 MPH Dir: N	Veh Mnvr/Ped Actn:		4	Obj Strk:		17					
39	104277720	3.561	01/22/2015 07:51	REAR END, SLOW OR STOP	\$ 2500	0	0	0	0	1	1	1	1	0	13	1
Unit	1 : 4	Alchl/Drgs:	0	Speed:	35 MPH Dir: N	Veh Mnvr/Ped Actn:		11	Obj Strk:							
Unit	2 : 1	Alchl/Drgs:	0	Speed:	35 MPH Dir: N	Veh Mnvr/Ped Actn:		1	Obj Strk:							
40	104166104	3.581	09/18/2014 07:44	REAR END, SLOW OR STOP	\$ 1200	0	0	0	0	1	1	1	1	0	13	1
Unit	1 : 4	Alchl/Drgs:	0	Speed:	20 MPH Dir: N	Veh Mnvr/Ped Actn:		11	Obj Strk:							
Unit	2 : 1	Alchl/Drgs:	0	Speed:	5 MPH Dir: N	Veh Mnvr/Ped Actn:		1	Obj Strk:							
41	103764393	3.610	05/31/2013 10:53	PARKED MOTOR VEHICLE	\$ 4500	0	0	0	0	1	1	1	1	0	13	1
Unit	1 : 1	Alchl/Drgs:	7	Speed:	0 MPH Dir: SE	Veh Mnvr/Ped Actn:		3	Obj Strk:		20					
Unit	2 : 5	Alchl/Drgs:	0	Speed:	40 MPH Dir: SE	Veh Mnvr/Ped Actn:		4	Obj Strk:		20					
42	103549853	3.619	09/18/2012 07:58	REAR END, SLOW OR STOP	\$ 3300	0	0	0	0	2	1	3	1	0	11	1
Unit	1 : 1	Alchl/Drgs:	0	Speed:	35 MPH Dir: NW	Veh Mnvr/Ped Actn:		4	Obj Strk:							
Unit	2 : 1	Alchl/Drgs:	0	Speed:	25 MPH Dir: NW	Veh Mnvr/Ped Actn:		11	Obj Strk:							
43	103856521	3.619	09/24/2013 16:23	REAR END, SLOW OR STOP	\$ 2500	0	0	0	1	1	1	2	1	0	13	1
Unit	1 : 10	Alchl/Drgs:	0	Speed:	45 MPH Dir: S	Veh Mnvr/Ped Actn:		4	Obj Strk:							
Unit	2 : 1	Alchl/Drgs:	0	Speed:	45 MPH Dir: S	Veh Mnvr/Ped Actn:		1	Obj Strk:							
44	104363573	3.632	04/28/2015 15:20	REAR END, SLOW OR STOP	\$ 2050	0	0	0	1	1	1	1	1	0	0	
Unit	1 : 1	Alchl/Drgs:	0	Speed:	10 MPH Dir: NW	Veh Mnvr/Ped Actn:		4	Obj Strk:							
Unit	2 : 4	Alchl/Drgs:	0	Speed:	0 MPH Dir: NW	Veh Mnvr/Ped Actn:		1	Obj Strk:							
45	103753834	3.647	05/19/2013 15:18	REAR END, SLOW OR STOP	\$ 2200	0	0	0	0	1	1	2	1	0	13	1
Unit	1 : 1	Alchl/Drgs:	0	Speed:	35 MPH Dir: E	Veh Mnvr/Ped Actn:		4	Obj Strk:							
Unit	2 : 1	Alchl/Drgs:	0	Speed:	30 MPH Dir: E	Veh Mnvr/Ped Actn:		1	Obj Strk:							
46	104648677	3.647	02/12/2016 15:15	MOVABLE OBJECT	\$ 2500	0	0	0	0	1	1	1	3	0	13	1
Unit	1 : 1	Alchl/Drgs:	0	Speed:	30 MPH Dir: N	Veh Mnvr/Ped Actn:		4	Obj Strk:							

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Acc No	Crash ID	Milepost	Date	Accident Type	Total Damage	Injuries				Condition			Road		Trfc Ctl	
						F	A	B	C	R	L	W	Ch	Ci	Dv	Op
47	104285334	3.662	02/02/2015 15:26	REAR END, SLOW OR STOP	\$ 15000	0	0	0	0	1	1	1	1	0	0	
Unit	1 : 2	Alchl/Drgs:	0	Speed:	35 MPH Dir: N	Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 2	Alchl/Drgs:	0	Speed:	35 MPH Dir: N	Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	3 : 4	Alchl/Drgs:	0	Speed:	35 MPH Dir: N	Veh Mnvr/Ped Actn:				4	Obj Strk:					
48	103554399	3.682	09/25/2012 07:25	REAR END, SLOW OR STOP	\$ 15500	0	0	1	1	1	1	1	1	0	0	
Unit	1 : 2	Alchl/Drgs:	0	Speed:	0 MPH Dir: W	Veh Mnvr/Ped Actn:				1	Obj Strk:					
Unit	2 : 2	Alchl/Drgs:	0	Speed:	0 MPH Dir: W	Veh Mnvr/Ped Actn:				1	Obj Strk:					
Unit	3 : 1	Alchl/Drgs:	0	Speed:	35 MPH Dir: W	Veh Mnvr/Ped Actn:				1	Obj Strk:					
Unit	4 : 4	Alchl/Drgs:	0	Speed:	30 MPH Dir: W	Veh Mnvr/Ped Actn:				4	Obj Strk:					
49	104067983	3.710	05/26/2014 19:41	REAR END, SLOW OR STOP	\$ 2800	0	0	0	0	1	1	1	1	0	0	
Unit	1 : 1	Alchl/Drgs:	0	Speed:	60 MPH Dir: S	Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 1	Alchl/Drgs:	0	Speed:	45 MPH Dir: S	Veh Mnvr/Ped Actn:				4	Obj Strk:					
50	103841588	3.738	08/27/2013 15:25	SIDESWIPE, SAME DIRECTION	\$ 4500	0	0	0	0	1	1	1	1	0	0	
Unit	1 : 1	Alchl/Drgs:	0	Speed:	3 MPH Dir: E	Veh Mnvr/Ped Actn:				5	Obj Strk:					
Unit	2 : 2	Alchl/Drgs:	0	Speed:	20 MPH Dir: E	Veh Mnvr/Ped Actn:				4	Obj Strk:					
51	103958531	3.738	01/21/2014 07:34	REAR END, SLOW OR STOP	\$ 11000	0	0	1	3	1	1	1	1	0	0	
Unit	1 : 1	Alchl/Drgs:	0	Speed:	0 MPH Dir: E	Veh Mnvr/Ped Actn:				1	Obj Strk:					
Unit	2 : 1	Alchl/Drgs:	0	Speed:	40 MPH Dir: E	Veh Mnvr/Ped Actn:				4	Obj Strk:					
52	104636057	3.738	02/04/2016 07:54	REAR END, SLOW OR STOP	\$ 9800	0	0	0	0	1	1	1	1	0	13 1	
Unit	1 : 1	Alchl/Drgs:	0	Speed:	30 MPH Dir: NW	Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 2	Alchl/Drgs:	0	Speed:	0 MPH Dir: NW	Veh Mnvr/Ped Actn:				1	Obj Strk:					
Unit	3 : 1	Alchl/Drgs:	0	Speed:	0 MPH Dir: NW	Veh Mnvr/Ped Actn:				1	Obj Strk:					
53	105088868	3.738	04/28/2017 08:40	FIXED OBJECT	\$ 10000	0	0	0	0	1	1	5	1	0	0	
Unit	1 : 1	Alchl/Drgs:	0	Speed:	45 MPH Dir: SE	Veh Mnvr/Ped Actn:				4	Obj Strk:		33			
54	105084089	3.838	05/01/2017 07:43	REAR END, SLOW OR STOP	\$ 27500	0	0	0	0	2	1	3	1	0	13 1	
Unit	1 : 2	Alchl/Drgs:	0	Speed:	40 MPH Dir: S	Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 4	Alchl/Drgs:	0	Speed:	20 MPH Dir: S	Veh Mnvr/Ped Actn:				11	Obj Strk:					
Unit	3 : 1	Alchl/Drgs:	0	Speed:	20 MPH Dir: S	Veh Mnvr/Ped Actn:				11	Obj Strk:					

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						F	A	B	C	R	L	W	Ch	Ci	Dv	Op
55	103560806	3.846	10/02/2012 15:21	REAR END, SLOW OR STOP	\$ 6000	0	0	0	1	1	1	1	1	0	13	1
Unit	1 : 1	Alchl/Drgs:	0	Speed:	35 MPH	Dir:	W	Veh Mnvr/Ped Actn:				4	Obj Strk:			
Unit	2 : 4	Alchl/Drgs:	0	Speed:	0 MPH	Dir:	W	Veh Mnvr/Ped Actn:				1	Obj Strk:			
56	103651841	3.901	01/15/2013 12:25	REAR END, SLOW OR STOP	\$ 4500	0	0	0	0	2	1	3	1	0	3	1
Unit	1 : 1	Alchl/Drgs:	0	Speed:	40 MPH	Dir:	N	Veh Mnvr/Ped Actn:				4	Obj Strk:			
Unit	2 : 2	Alchl/Drgs:	0	Speed:	40 MPH	Dir:	N	Veh Mnvr/Ped Actn:				11	Obj Strk:			
57	103741524	3.901	05/02/2013 15:13	REAR END, SLOW OR STOP	\$ 1200	0	0	0	0	2	1	2	1	0	3	1
Unit	1 : 5	Alchl/Drgs:	0	Speed:	15 MPH	Dir:	NW	Veh Mnvr/Ped Actn:				4	Obj Strk:			
Unit	2 : 2	Alchl/Drgs:	0	Speed:	0 MPH	Dir:	NW	Veh Mnvr/Ped Actn:				1	Obj Strk:			
58	103927929	3.901	12/14/2013 12:29	MOVABLE OBJECT	\$ 1350	0	0	0	0	2	1	3	1	0	13	1
Unit	1 : 1	Alchl/Drgs:	0	Speed:	25 MPH	Dir:	S	Veh Mnvr/Ped Actn:				8	Obj Strk: 61			
59	104323815	3.910	03/17/2015 07:32	LEFT TURN, SAME ROADWAY	\$ 4500	0	0	0	0	1	1	1	1	0	3	1
Unit	1 : 2	Alchl/Drgs:	0	Speed:	35 MPH	Dir:	N	Veh Mnvr/Ped Actn:				4	Obj Strk:			
Unit	2 : 4	Alchl/Drgs:	0	Speed:	35 MPH	Dir:	S	Veh Mnvr/Ped Actn:				8	Obj Strk:			
60	104937555	3.910	12/06/2016 12:22	LEFT TURN, DIFFERENT ROADWAYS	\$ 9000	0	0	0	0	2	1	3	1	0	3	1
Unit	1 : 4	Alchl/Drgs:	0	Speed:	15 MPH	Dir:	SE	Veh Mnvr/Ped Actn:				8	Obj Strk:			
Unit	2 : 1	Alchl/Drgs:	0	Speed:	45 MPH	Dir:	NW	Veh Mnvr/Ped Actn:				4	Obj Strk:			
61	103628951	3.919	12/13/2012 15:33	REAR END, SLOW OR STOP	\$ 3300	0	0	0	1	1	1	1	1	0	3	1
Unit	1 : 14	Alchl/Drgs:	0	Speed:	35 MPH	Dir:	E	Veh Mnvr/Ped Actn:				4	Obj Strk:			
Unit	2 : 1	Alchl/Drgs:	0	Speed:	0 MPH	Dir:	E	Veh Mnvr/Ped Actn:				1	Obj Strk:			
62	103908481	3.919	11/19/2013 15:14	REAR END, SLOW OR STOP	\$ 5950	0	0	0	0	1	1	1	1	0	13	1
Unit	1 : 4	Alchl/Drgs:	0	Speed:	30 MPH	Dir:	N	Veh Mnvr/Ped Actn:				4	Obj Strk:			
Unit	2 : 4	Alchl/Drgs:	0	Speed:	30 MPH	Dir:	N	Veh Mnvr/Ped Actn:				11	Obj Strk:			
Unit	3 : 1	Alchl/Drgs:	0	Speed:	30 MPH	Dir:	S	Veh Mnvr/Ped Actn:				1	Obj Strk:			
Unit	4 : 4	Alchl/Drgs:	0	Speed:	30 MPH	Dir:	N	Veh Mnvr/Ped Actn:				11	Obj Strk:			
63	104214792	3.919	11/17/2014 07:40	REAR END, SLOW OR STOP	\$ 1500	0	0	0	1	2	1	3	1	0	3	1
Unit	1 : 1	Alchl/Drgs:	0	Speed:	35 MPH	Dir:	S	Veh Mnvr/Ped Actn:				4	Obj Strk:			
Unit	2 : 1	Alchl/Drgs:	0	Speed:	35 MPH	Dir:	S	Veh Mnvr/Ped Actn:				11	Obj Strk:			

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Acc No	Crash ID	Milepost	Date	Accident Type	Total Damage	Injuries				Condition			Road		Trfc Ctl	
						F	A	B	C	R	L	W	Ch	Ci	Dv	Op
64	104546441	3.919	11/06/2015 15:10	REAR END, SLOW OR STOP	\$ 17000	0	0	0	0	1	1	1	1	0	3	1
Unit	1 : 1	Alchl/Drgs:	0	Speed:	35 MPH Dir: NW	Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 4	Alchl/Drgs:	0	Speed:	10 MPH Dir: NW	Veh Mnvr/Ped Actn:				1	Obj Strk:					
Unit	3 : 4	Alchl/Drgs:	0	Speed:	10 MPH Dir: NW	Veh Mnvr/Ped Actn:				1	Obj Strk:					
65	103592475	3.938	11/06/2012 13:38	REAR END, SLOW OR STOP	\$ 10400	0	0	0	0	2	1	2	1	0	3	1
Unit	1 : 2	Alchl/Drgs:	0	Speed:	25 MPH Dir: N	Veh Mnvr/Ped Actn:				1	Obj Strk:					
Unit	2 : 1	Alchl/Drgs:	0	Speed:	35 MPH Dir: N	Veh Mnvr/Ped Actn:				4	Obj Strk:					
66	104394645	3.938	06/02/2015 15:30	REAR END, SLOW OR STOP	\$ 3000	0	0	0	0	2	1	1	1	0	13	1
Unit	1 : 5	Alchl/Drgs:	0	Speed:	30 MPH Dir: N	Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 1	Alchl/Drgs:	0	Speed:	30 MPH Dir: N	Veh Mnvr/Ped Actn:				1	Obj Strk:					
67	104549203	3.938	11/10/2015 15:21	REAR END, SLOW OR STOP	\$ 3500	0	0	0	0	1	1	1	1	0	13	1
Unit	1 : 1	Alchl/Drgs:	0	Speed:	30 MPH Dir: N	Veh Mnvr/Ped Actn:				1	Obj Strk:					
Unit	2 : 2	Alchl/Drgs:	0	Speed:	30 MPH Dir: N	Veh Mnvr/Ped Actn:				1	Obj Strk:					
Unit	3 : 2	Alchl/Drgs:	0	Speed:	30 MPH Dir: N	Veh Mnvr/Ped Actn:				4	Obj Strk:					
68	104830520	3.938	08/26/2016 13:42	REAR END, SLOW OR STOP	\$ 4000	0	0	0	1	1	1	1	1	0	0	
Unit	1 : 1	Alchl/Drgs:	0	Speed:	45 MPH Dir: N	Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 4	Alchl/Drgs:	7	Speed:	45 MPH Dir: N	Veh Mnvr/Ped Actn:				1	Obj Strk:					
Unit	3 : 1	Alchl/Drgs:	7	Speed:	45 MPH Dir: N	Veh Mnvr/Ped Actn:				1	Obj Strk:					
69	103648979	3.946	01/03/2013 15:22	REAR END, SLOW OR STOP	\$ 2000	0	0	0	0	1	1	1	1	0	0	
Unit	1 : 1	Alchl/Drgs:	0	Speed:	25 MPH Dir: NW	Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 4	Alchl/Drgs:	0	Speed:	20 MPH Dir: NW	Veh Mnvr/Ped Actn:				4	Obj Strk:					
70	104731040	3.946	05/12/2016 15:36	REAR END, SLOW OR STOP	\$ 3000	0	0	0	0	2	1	2	1	0	13	1
Unit	1 : 2	Alchl/Drgs:	0	Speed:	35 MPH Dir: W	Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 3	Alchl/Drgs:	0	Speed:	35 MPH Dir: W	Veh Mnvr/Ped Actn:				11	Obj Strk:					
71	104491159	3.999	09/16/2015 16:01	REAR END, SLOW OR STOP	\$ 4000	0	0	0	2	1	1	1	1	0	13	1
Unit	1 : 1	Alchl/Drgs:	0	Speed:	35 MPH Dir: N	Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 2	Alchl/Drgs:	0	Speed:	10 MPH Dir: N	Veh Mnvr/Ped Actn:				11	Obj Strk:					
Unit	3 : 4	Alchl/Drgs:	0	Speed:	8 MPH Dir: N	Veh Mnvr/Ped Actn:				11	Obj Strk:					
72	104393834	4.037	05/28/2015 07:37	REAR END, SLOW OR STOP	\$ 2000	0	0	0	0	1	1	1	1	0	13	1
Unit	1 : 1	Alchl/Drgs:	0	Speed:	45 MPH Dir: SE	Veh Mnvr/Ped Actn:				4	Obj Strk:					

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Acc No	Crash ID	Milepost	Date	Accident Type	Total Damage	Injuries				Condition			Road		Trfc Ctl	
						F	A	B	C	R	L	W	Ch	Ci	Dv	Op
Unit	2 : 1	Alchl/Drgs:	0	Speed:	5 MPH Dir: SE	Veh Mnvr/Ped Actn:				11	Obj Strk:					
73	103666260	4.038	01/30/2013 15:15	OVERTURN/ROLLOVER	\$ 1100	0	0	0	0	2	1	3	1	0	0	
Unit	1 : 4	Alchl/Drgs:	0	Speed:	40 MPH Dir: W	Veh Mnvr/Ped Actn:				4	Obj Strk:					
74	104176798	4.038	10/03/2014 15:20	REAR END, SLOW OR STOP	\$ 5500	0	0	0	1	1	1	1	1	0	13	1
Unit	1 : 1	Alchl/Drgs:	1	Speed:	25 MPH Dir: W	Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 1	Alchl/Drgs:	0	Speed:	0 MPH Dir: W	Veh Mnvr/Ped Actn:				1	Obj Strk:					
75	103873109	4.046	10/14/2013 15:19	REAR END, SLOW OR STOP	\$ 4000	0	0	0	0	1	1	2	1	0	13	1
Unit	1 : 4	Alchl/Drgs:	0	Speed:	35 MPH Dir: N	Veh Mnvr/Ped Actn:				1	Obj Strk:					
Unit	2 : 1	Alchl/Drgs:	0	Speed:	35 MPH Dir: N	Veh Mnvr/Ped Actn:				4	Obj Strk:					
76	105033050	4.055	03/10/2017 07:23	REAR END, SLOW OR STOP	\$ 1000	0	0	0	0	2	1	2	1	0	0	
Unit	1 : 1	Alchl/Drgs:	0	Speed:	35 MPH Dir: SE	Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 5	Alchl/Drgs:	0	Speed:	10 MPH Dir: SE	Veh Mnvr/Ped Actn:				11	Obj Strk:					
77	104883570	4.060	10/17/2016 07:38	REAR END, SLOW OR STOP	\$ 2000	0	0	0	0	1	1	1	1	0	13	1
Unit	1 : 1	Alchl/Drgs:	0	Speed:	45 MPH Dir: E	Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 1	Alchl/Drgs:	0	Speed:	45 MPH Dir: E	Veh Mnvr/Ped Actn:				1	Obj Strk:					
78	103924073	4.061	12/09/2013 07:55	REAR END, SLOW OR STOP	\$ 300	0	0	0	0	2	1	2	1	0	13	1
Unit	1 : 4	Alchl/Drgs:	0	Speed:	45 MPH Dir: S	Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 4	Alchl/Drgs:	0	Speed:	45 MPH Dir: S	Veh Mnvr/Ped Actn:				1	Obj Strk:					
79	103913792	4.087	11/25/2013 15:32	REAR END, SLOW OR STOP	\$ 3500	0	0	0	0	1	1	1	1	0	13	1
Unit	1 : 1	Alchl/Drgs:	0	Speed:	40 MPH Dir: W	Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 1	Alchl/Drgs:	0	Speed:	40 MPH Dir: W	Veh Mnvr/Ped Actn:				1	Obj Strk:					
80	104711393	4.090	04/04/2016 15:18	REAR END, SLOW OR STOP	\$ 8300	0	0	0	0	1	1	1	1	0	13	1
Unit	1 : 1	Alchl/Drgs:	0	Speed:	35 MPH Dir: N	Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 1	Alchl/Drgs:	0	Speed:	30 MPH Dir: N	Veh Mnvr/Ped Actn:				11	Obj Strk:					
81	104711401	4.090	04/22/2016 09:57	REAR END, SLOW OR STOP	\$ 9000	0	0	0	1	2	1	3	1	0	0	
Unit	1 : 4	Alchl/Drgs:	0	Speed:	45 MPH Dir: S	Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 4	Alchl/Drgs:	0	Speed:	45 MPH Dir: S	Veh Mnvr/Ped Actn:				11	Obj Strk:					

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Acc No	Crash ID	Milepost	Date	Accident Type	Total Damage	Injuries				Condition			Road		Trfc Ctl	
						F	A	B	C	R	L	W	Ch	Ci	Dv	Op
82	103730589	4.146	04/18/2013 15:29	REAR END, SLOW OR STOP	\$ 3700	0	0	0	1	1	1	1	1	0	13	1
Unit	1 : 2	Alchl/Drugs:	0	Speed:	35 MPH Dir: N	Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 1	Alchl/Drugs:	0	Speed:	35 MPH Dir: N	Veh Mnvr/Ped Actn:				1	Obj Strk:					
Unit	3 : 1	Alchl/Drugs:	0	Speed:	35 MPH Dir: N	Veh Mnvr/Ped Actn:				1	Obj Strk:					
83	103730598	4.146	04/18/2013 15:29	REAR END, SLOW OR STOP	\$ 1300	0	0	0	0	1	1	1	1	0	13	1
Unit	1 : 1	Alchl/Drugs:	0	Speed:	35 MPH Dir: N	Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 1	Alchl/Drugs:	0	Speed:	35 MPH Dir: N	Veh Mnvr/Ped Actn:				4	Obj Strk:					
84	103746476	4.146	05/09/2013 16:20	REAR END, SLOW OR STOP	\$ 1000	0	0	1	0	1	1	1	1	0	13	1
Unit	1 : 21	Alchl/Drugs:	0	Speed:	0 MPH Dir:	Veh Mnvr/Ped Actn:					Obj Strk:					
Unit	2 : 4	Alchl/Drugs:	0	Speed:	40 MPH Dir: N	Veh Mnvr/Ped Actn:				11	Obj Strk:					
85	103933790	4.146	12/16/2013 15:20	REAR END, SLOW OR STOP	\$ 5100	0	0	0	0	1	1	1	1	0	13	1
Unit	1 : 1	Alchl/Drugs:	0	Speed:	45 MPH Dir: W	Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 4	Alchl/Drugs:	0	Speed:	40 MPH Dir: W	Veh Mnvr/Ped Actn:				11	Obj Strk:					
Unit	3 : 1	Alchl/Drugs:	0	Speed:	40 MPH Dir: W	Veh Mnvr/Ped Actn:				11	Obj Strk:					
Unit	4 : 1	Alchl/Drugs:	0	Speed:	45 MPH Dir: W	Veh Mnvr/Ped Actn:				1	Obj Strk:					
86	104577172	4.176	12/03/2015 15:22	REAR END, SLOW OR STOP	\$ 2500	0	0	0	14	1	1	1	1	0	13	1
Unit	1 : 7	Alchl/Drugs:	0	Speed:	20 MPH Dir: N	Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 7	Alchl/Drugs:	0	Speed:	20 MPH Dir: N	Veh Mnvr/Ped Actn:				11	Obj Strk:					
87	103683550	4.240	02/19/2013 15:16	REAR END, SLOW OR STOP	\$ 1800	0	0	0	0	1	1	1	1	0	13	1
Unit	1 : 1	Alchl/Drugs:	0	Speed:	30 MPH Dir: NW	Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 1	Alchl/Drugs:	0	Speed:	0 MPH Dir: NW	Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	3 : 2	Alchl/Drugs:	0	Speed:	0 MPH Dir: NW	Veh Mnvr/Ped Actn:				1	Obj Strk:					
88	103683552	4.240	02/19/2013 15:17	REAR END, SLOW OR STOP	\$ 1500	0	0	0	0	1	1	1	1	0	13	1
Unit	1 : 1	Alchl/Drugs:	0	Speed:	40 MPH Dir: NW	Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 1	Alchl/Drugs:	0	Speed:	0 MPH Dir: NW	Veh Mnvr/Ped Actn:				1	Obj Strk:					
89	104730996	4.246	05/12/2016 07:55	REAR END, SLOW OR STOP	\$ 1800	0	0	1	0	1	1	1	1	0	13	1
Unit	1 : 1	Alchl/Drugs:	0	Speed:	35 MPH Dir: S	Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 1	Alchl/Drugs:	0	Speed:	0 MPH Dir: S	Veh Mnvr/Ped Actn:				1	Obj Strk:					
90	103703557	4.290	03/14/2013 10:52	LEFT TURN, SAME ROADWAY	\$ 5500	0	0	0	0	1	1	1	1	0	0	
Unit	1 : 1	Alchl/Drugs:	0	Speed:	5 MPH Dir: S	Veh Mnvr/Ped Actn:				9	Obj Strk:					

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						F	A	B	C	R	L	W	Ch	Ci	Dv	Op
Unit	2 : 4	Alchl/Drgs:	0	Speed:	30 MPH Dir: S	Veh Mnvr/Ped Actn:				4	Obj Strk:					
91	103931055	4.346	12/16/2013 15:46	REAR END, SLOW OR STOP	\$ 4500	0	0	0	1	1	1	1	1	0	0	
Unit	1 : 4	Alchl/Drgs:	0	Speed:	25 MPH Dir: E	Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 4	Alchl/Drgs:	0	Speed:	20 MPH Dir: E	Veh Mnvr/Ped Actn:				1	Obj Strk:					
92	105044866	4.352	03/21/2017 07:13	ANIMAL	\$ 2000	0	0	0	0	1	3	1	1	0	13	1
Unit	1 : 1	Alchl/Drgs:	0	Speed:	30 MPH Dir: S	Veh Mnvr/Ped Actn:				4	Obj Strk: 17					
93	104946052	4.372	12/10/2016 15:28	REAR END, SLOW OR STOP	\$ 800	0	0	0	0	1	1	1	1	0	3	1
Unit	1 : 1	Alchl/Drgs:	0	Speed:	10 MPH Dir: NW	Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 4	Alchl/Drgs:	0	Speed:	0 MPH Dir: NW	Veh Mnvr/Ped Actn:				1	Obj Strk:					
94	103973520	4.381	02/10/2014 10:05	REAR END, SLOW OR STOP	\$ 4800	0	0	0	0	2	1	4	1	0	3	1
Unit	1 : 4	Alchl/Drgs:	0	Speed:	0 MPH Dir: W	Veh Mnvr/Ped Actn:				1	Obj Strk:					
Unit	2 : 1	Alchl/Drgs:	0	Speed:	45 MPH Dir: W	Veh Mnvr/Ped Actn:				4	Obj Strk:					
95	104683336	4.384	03/24/2016 09:43	REAR END, SLOW OR STOP	\$ 2500	0	0	0	0	1	1	1	1	0	0	
Unit	1 : 4	Alchl/Drgs:	0	Speed:	45 MPH Dir: NW	Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 2	Alchl/Drgs:	0	Speed:	20 MPH Dir: NW	Veh Mnvr/Ped Actn:				7	Obj Strk:					
96	105088777	4.386	04/26/2017 16:12	REAR END, SLOW OR STOP	\$ 5000	0	0	0	0	1	1	1	1	0	3	1
Unit	1 : 4	Alchl/Drgs:	0	Speed:	45 MPH Dir: W	Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 4	Alchl/Drgs:	0	Speed:	45 MPH Dir: W	Veh Mnvr/Ped Actn:				1	Obj Strk:					
97	103539470	4.390	09/06/2012 20:45	LEFT TURN, SAME ROADWAY	\$ 20000	0	0	0	0	1	5	1	1	0	3	1
Unit	1 : 1	Alchl/Drgs:	0	Speed:	0 MPH Dir: S	Veh Mnvr/Ped Actn:				8	Obj Strk:					
Unit	2 : 4	Alchl/Drgs:	0	Speed:	40 MPH Dir: N	Veh Mnvr/Ped Actn:				4	Obj Strk:					
98	103546724	4.390	09/15/2012 17:06	LEFT TURN, SAME ROADWAY	\$ 9000	1	0	2	0	1	1	2	1	0	3	1
Unit	1 : 1	Alchl/Drgs:	0	Speed:	25 MPH Dir: SE	Veh Mnvr/Ped Actn:				8	Obj Strk:					
Unit	2 : 2	Alchl/Drgs:	0	Speed:	45 MPH Dir: NW	Veh Mnvr/Ped Actn:				4	Obj Strk:					
99	103711745	4.390	03/27/2013 09:43	REAR END, TURN	\$ 2500	0	0	0	0	1	1	1	1	0	3	1
Unit	1 : 1	Alchl/Drgs:	0	Speed:	45 MPH Dir: S	Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 1	Alchl/Drgs:	0	Speed:	5 MPH Dir: S	Veh Mnvr/Ped Actn:				7	Obj Strk:					

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						F	A	B	C	R	L	W	Ch	Ci	Dv	Op
100	103861121	4.390	09/29/2013 20:30	LEFT TURN, SAME ROADWAY	\$ 1900	0	0	0	0	1	5	1	5	0	3	1
Unit	1 : 2	Alchl/Drgs:	0	Speed: 45 MPH Dir: W		Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 2	Alchl/Drgs:	0	Speed: 20 MPH Dir: E		Veh Mnvr/Ped Actn:				8	Obj Strk:					
101	103887030	4.390	10/30/2013 07:10	LEFT TURN, SAME ROADWAY	\$ 8000	0	0	0	2	1	5	1	1	0	3	1
Unit	1 : 4	Alchl/Drgs:	0	Speed: 45 MPH Dir: W		Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 1	Alchl/Drgs:	0	Speed: 25 MPH Dir: E		Veh Mnvr/Ped Actn:				8	Obj Strk:					
102	103921323	4.390	12/07/2013 20:56	LEFT TURN, SAME ROADWAY	\$ 6500	0	0	0	1	2	5	3	1	0	3	1
Unit	1 : 1	Alchl/Drgs:	0	Speed: 5 MPH Dir: E		Veh Mnvr/Ped Actn:				8	Obj Strk:					
Unit	2 : 1	Alchl/Drgs:	0	Speed: 30 MPH Dir: W		Veh Mnvr/Ped Actn:				4	Obj Strk:					
103	103983713	4.390	02/22/2014 08:42	LEFT TURN, DIFFERENT ROADWAYS	\$ 3000	0	0	0	0	1	1	1	1	0	3	1
Unit	1 : 2	Alchl/Drgs:	0	Speed: 40 MPH Dir: N		Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 1	Alchl/Drgs:	0	Speed: 10 MPH Dir: W		Veh Mnvr/Ped Actn:				8	Obj Strk:					
104	104011470	4.390	03/22/2014 18:42	ANGLE	\$ 8000	0	0	0	0	1	1	1	1	0	3	1
Unit	1 : 1	Alchl/Drgs:	0	Speed: 35 MPH Dir: E		Veh Mnvr/Ped Actn:				4	Obj Strk:		58			
Unit	2 : 1	Alchl/Drgs:	0	Speed: 30 MPH Dir: S		Veh Mnvr/Ped Actn:				4	Obj Strk:					
105	104277979	4.390	01/21/2015 16:30	LEFT TURN, DIFFERENT ROADWAYS	\$ 500	0	0	0	0	1	8	1	1	0	3	1
Unit	1 : 32	Alchl/Drgs:	7	Speed: 45 MPH Dir: S		Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 4	Alchl/Drgs:	0	Speed: 45 MPH Dir: S		Veh Mnvr/Ped Actn:				8	Obj Strk:					
106	104515720	4.390	10/10/2015 18:06	ANGLE	\$ 3000	0	0	0	0	2	1	3	1	0	3	1
Unit	1 : 4	Alchl/Drgs:	0	Speed: 45 MPH Dir: N		Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 4	Alchl/Drgs:	0	Speed: 45 MPH Dir: W		Veh Mnvr/Ped Actn:				1	Obj Strk:					
107	104934788	4.390	12/03/2016 08:39	ANGLE	\$ 6000	0	0	0	0	1	1	1	1	0	3	1
Unit	1 : 4	Alchl/Drgs:	0	Speed: 30 MPH Dir: S		Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 2	Alchl/Drgs:	0	Speed: 10 MPH Dir: S		Veh Mnvr/Ped Actn:				4	Obj Strk:					
108	104963186	4.390	12/31/2016 21:54	ANGLE	\$ 600	0	0	0	0	1	5	1	1	0	3	1
Unit	1 : 5	Alchl/Drgs:	0	Speed: 45 MPH Dir: W		Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 4	Alchl/Drgs:	0	Speed: 45 MPH Dir: N		Veh Mnvr/Ped Actn:				4	Obj Strk:					

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						F	A	B	C	R	L	W	Ch	Ci	Dv	Op
109	105066516	4.390	04/10/2017 11:49	LEFT TURN, SAME ROADWAY	\$ 8500	0	0	0	1	1	1	1	1	0	3	1
Unit	1 : 2	Alchl/Drgs:	0	Speed: 30 MPH Dir: S		Veh Mnvr/Ped Actn: 8				Obj Strk:						
Unit	2 : 1	Alchl/Drgs:	0	Speed: 45 MPH Dir: N		Veh Mnvr/Ped Actn: 4				Obj Strk:						
110	105084876	4.390	04/18/2017 23:54	ANGLE	\$ 5000	0	0	1	1	2	5	2	1	0	3	1
Unit	1 : 1	Alchl/Drgs:	1	Speed: 45 MPH Dir: S		Veh Mnvr/Ped Actn: 4				Obj Strk:						
Unit	2 : 1	Alchl/Drgs:	0	Speed: 45 MPH Dir: SE		Veh Mnvr/Ped Actn: 4				Obj Strk: 34						
111	104483692	4.393	09/09/2015 15:00	REAR END, SLOW OR STOP	\$ 2000	0	0	0	1	2	1	1	1	0	3	1
Unit	1 : 4	Alchl/Drgs:	0	Speed: 10 MPH Dir: S		Veh Mnvr/Ped Actn: 4				Obj Strk:						
Unit	2 : 2	Alchl/Drgs:	0	Speed: 0 MPH Dir: S		Veh Mnvr/Ped Actn: 1				Obj Strk:						
112	104577272	4.394	12/05/2015 14:40	REAR END, SLOW OR STOP	\$ 2500	0	0	0	0	1	1	1	1	0	3	1
Unit	1 : 4	Alchl/Drgs:	0	Speed: 20 MPH Dir: E		Veh Mnvr/Ped Actn: 4				Obj Strk:						
Unit	2 : 1	Alchl/Drgs:	0	Speed: 20 MPH Dir: E		Veh Mnvr/Ped Actn: 1				Obj Strk:						
113	103586027	4.398	10/29/2012 16:15	REAR END, SLOW OR STOP	\$ 1700	0	0	0	0	1	1	2	1	0	3	1
Unit	1 : 4	Alchl/Drgs:	0	Speed: 40 MPH Dir: S		Veh Mnvr/Ped Actn: 4				Obj Strk:						
Unit	2 : 2	Alchl/Drgs:	0	Speed: 40 MPH Dir: S		Veh Mnvr/Ped Actn: 1				Obj Strk:						
114	104586927	4.399	12/16/2015 07:49	REAR END, SLOW OR STOP	\$ 1000	0	0	0	0	1	1	1	1	0	3	1
Unit	1 : 4	Alchl/Drgs:	0	Speed: 5 MPH Dir: E		Veh Mnvr/Ped Actn: 4				Obj Strk:						
Unit	2 : 2	Alchl/Drgs:	0	Speed: 0 MPH Dir: E		Veh Mnvr/Ped Actn: 1				Obj Strk:						
115	103643742	4.490	01/05/2013 17:37	FIXED OBJECT	\$ 2000	0	0	0	0	1	2	1	1	0	13	1
Unit	1 : 1	Alchl/Drgs:	0	Speed: 35 MPH Dir: NW		Veh Mnvr/Ped Actn: 4				Obj Strk: 64						
116	103790309	4.490	07/02/2013 10:54	REAR END, SLOW OR STOP	\$ 175	0	0	0	0	1	1	1	1	0	13	1
Unit	1 : 1	Alchl/Drgs:	0	Speed: 45 MPH Dir: S		Veh Mnvr/Ped Actn: 4				Obj Strk:						
Unit	2 : 1	Alchl/Drgs:	0	Speed: 45 MPH Dir: S		Veh Mnvr/Ped Actn: 11				Obj Strk:						
117	104042544	4.490	04/17/2014 16:36	REAR END, SLOW OR STOP	\$ 2500	0	0	0	0	1	1	1	1	0	13	1
Unit	1 : 1	Alchl/Drgs:	0	Speed: 45 MPH Dir: S		Veh Mnvr/Ped Actn: 4				Obj Strk:						
Unit	2 : 4	Alchl/Drgs:	0	Speed: 30 MPH Dir: S		Veh Mnvr/Ped Actn: 11				Obj Strk:						
118	104098157	4.490	06/26/2014 17:45	REAR END, SLOW OR STOP	\$ 2400	0	0	0	0	1	1	1	1	0	13	1
Unit	1 : 4	Alchl/Drgs:	0	Speed: 30 MPH Dir: SE		Veh Mnvr/Ped Actn: 4				Obj Strk:						

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						F	A	B	C	R	L	W	Ch	Ci	Dv	Op	
Unit	2 : 2	Alchl/Drugs:	0	Speed:	0 MPH	Dir:	SE	Veh Mnvr/Ped Actn:				1	Obj Strk:				
119	104114821	4.490	07/30/2014 12:02	FIXED OBJECT	\$ 1200			0	0	1	0	1	1	1	1	0	13 1
Unit	1 : 20	Alchl/Drugs:	0	Speed:	55 MPH	Dir:	N	Veh Mnvr/Ped Actn:				4	Obj Strk: 64				
120	103666880	4.590	01/31/2013 09:35	REAR END, SLOW OR STOP	\$ 4100			0	0	0	0	1	1	1	1	0	0
Unit	1 : 4	Alchl/Drugs:	0	Speed:	0 MPH	Dir:	S	Veh Mnvr/Ped Actn:				1	Obj Strk:				
Unit	2 : 4	Alchl/Drugs:	0	Speed:	0 MPH	Dir:	S	Veh Mnvr/Ped Actn:				1	Obj Strk:				
Unit	3 : 2	Alchl/Drugs:	0	Speed:	45 MPH	Dir:	S	Veh Mnvr/Ped Actn:				4	Obj Strk:				
121	103738912	4.590	04/29/2013 07:42	REAR END, SLOW OR STOP	\$ 4000			0	0	0	0	1	1	1	1	0	13 1
Unit	1 : 4	Alchl/Drugs:	0	Speed:	45 MPH	Dir:	S	Veh Mnvr/Ped Actn:				4	Obj Strk:				
Unit	2 : 1	Alchl/Drugs:	0	Speed:	45 MPH	Dir:	S	Veh Mnvr/Ped Actn:				4	Obj Strk:				
122	103774956	4.590	06/13/2013 14:52	REAR END, SLOW OR STOP	\$ 7000			0	0	0	0	1	1	1	1	0	0
Unit	1 : 1	Alchl/Drugs:	0	Speed:	55 MPH	Dir:	N	Veh Mnvr/Ped Actn:				4	Obj Strk:				
Unit	2 : 4	Alchl/Drugs:	0	Speed:	0 MPH	Dir:	N	Veh Mnvr/Ped Actn:				1	Obj Strk:				
123	104204849	4.590	11/05/2014 17:23	REAR END, SLOW OR STOP	\$ 8700			0	0	0	1	1	2	1	1	0	13 1
Unit	1 : 1	Alchl/Drugs:	0	Speed:	45 MPH	Dir:	SE	Veh Mnvr/Ped Actn:				4	Obj Strk:				
Unit	2 : 1	Alchl/Drugs:	0	Speed:	0 MPH	Dir:	SE	Veh Mnvr/Ped Actn:				1	Obj Strk:				
Unit	3 : 4	Alchl/Drugs:	0	Speed:	0 MPH	Dir:	SE	Veh Mnvr/Ped Actn:				1	Obj Strk:				
124	103502483	4.682	07/21/2012 14:15	FIXED OBJECT	\$ 5900			0	1	1	0	2	1	2	1	0	0
Unit	1 : 2	Alchl/Drugs:	0	Speed:	50 MPH	Dir:	S	Veh Mnvr/Ped Actn:				4	Obj Strk: 33				
125	103533364	4.682	08/28/2012 07:39	REAR END, SLOW OR STOP	\$ 7000			0	0	0	1	1	1	1	1	0	0
Unit	1 : 2	Alchl/Drugs:	0	Speed:	40 MPH	Dir:	SE	Veh Mnvr/Ped Actn:				4	Obj Strk:				
Unit	2 : 4	Alchl/Drugs:	0	Speed:	10 MPH	Dir:	SE	Veh Mnvr/Ped Actn:				1	Obj Strk:				
126	105062936	4.690	04/07/2017 01:08	MOVABLE OBJECT	\$ 10000			0	0	0	0	1	5	1	1	0	0
Unit	1 : 1	Alchl/Drugs:	0	Speed:	50 MPH	Dir:	N	Veh Mnvr/Ped Actn:				4	Obj Strk: 33				
127	104729877	4.782	05/11/2016 03:50	ANIMAL	\$ 1500			0	0	0	0	1	5	1	1	0	0
Unit	1 : 5	Alchl/Drugs:	0	Speed:	45 MPH	Dir:	S	Veh Mnvr/Ped Actn:				4	Obj Strk: 17				

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						F	A	B	C	R	L	W	Ch	Ci	Dv	Op
128	105069640	4.782	04/15/2017 03:15	FIXED OBJECT	\$ 2000	0	0	0	0	1	5	1	1	0	13	1
Unit	1 : 1	Alchl/Drgs:	0	Speed:	45 MPH Dir: SE	Veh Mnvr/Ped Actn:				4	Obj Strk:		58			
129	104659166	4.790	02/05/2016 10:11	SIDESWIPE, OPPOSITE DIRECTION	\$ 14000	0	0	1	0	1	1	1	1	0	13	1
Unit	1 : 12	Alchl/Drgs:	0	Speed:	45 MPH Dir: E	Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 1	Alchl/Drgs:	0	Speed:	35 MPH Dir: W	Veh Mnvr/Ped Actn:				4	Obj Strk:		58			
130	104493650	4.836	09/15/2015 03:00	FIXED OBJECT	\$ 6000	1	0	0	0	1	1	1	1	0	13	1
Unit	1 : 1	Alchl/Drgs:	3	Speed:	75 MPH Dir: SE	Veh Mnvr/Ped Actn:				4	Obj Strk:		33			
131	104511138	4.873	10/06/2015 09:02	REAR END, TURN	\$ 7500	0	0	2	1	1	1	1	1	0	13	1
Unit	1 : 1	Alchl/Drgs:	0	Speed:	45 MPH Dir: N	Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 5	Alchl/Drgs:	0	Speed:	5 MPH Dir: N	Veh Mnvr/Ped Actn:				8	Obj Strk:					
132	103585180	4.982	10/29/2012 12:38	FIXED OBJECT	\$ 2500	0	0	0	0	1	1	2	1	0	13	1
Unit	1 : 5	Alchl/Drgs:	0	Speed:	50 MPH Dir: NW	Veh Mnvr/Ped Actn:				4	Obj Strk:					
133	103918566	5.032	12/04/2013 17:50	FIXED OBJECT	\$ 4000	0	0	0	0	1	5	1	1	0	0	
Unit	1 : 10	Alchl/Drgs:	0	Speed:	50 MPH Dir: S	Veh Mnvr/Ped Actn:				4	Obj Strk:		59			
134	103585172	5.082	10/29/2012 12:38	OTHER NON-COLLISION	\$ 2000	0	0	0	0	1	1	2	1	0	13	1
Unit	1 : 4	Alchl/Drgs:	0	Speed:	0 MPH Dir: SE	Veh Mnvr/Ped Actn:				1	Obj Strk:					
135	104716576	5.082	04/28/2016 16:55	REAR END, SLOW OR STOP	\$ 7000	0	0	0	0	1	1	1	1	0	13	1
Unit	1 : 1	Alchl/Drgs:	0	Speed:	45 MPH Dir: S	Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 4	Alchl/Drgs:	0	Speed:	45 MPH Dir: S	Veh Mnvr/Ped Actn:				4	Obj Strk:					
136	104279688	5.101	01/28/2015 05:15	ANIMAL	\$ 1000	0	0	0	0	1	5	1	1	0	0	
Unit	1 : 4	Alchl/Drgs:	0	Speed:	55 MPH Dir: N	Veh Mnvr/Ped Actn:				4	Obj Strk:		17			
137	104655242	5.112	02/01/2016 16:43	FIXED OBJECT	\$ 2000	0	0	1	0	1	1	1	1	0	3	1
Unit	1 : 1	Alchl/Drgs:	3	Speed:	35 MPH Dir: E	Veh Mnvr/Ped Actn:				4	Obj Strk:		58			
138	105105155	5.167	05/17/2017 17:11	HEAD ON	\$ 5500	0	0	2	0	1	1	1	1	0	13	1
Unit	1 : 1	Alchl/Drgs:	3	Speed:	45 MPH Dir: S	Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 4	Alchl/Drgs:	0	Speed:	45 MPH Dir: N	Veh Mnvr/Ped Actn:				4	Obj Strk:					

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						F	A	B	C	R	L	W	Ch	Ci	Dv	Op
139	105051412	5.176	03/20/2017 14:08	REAR END, SLOW OR STOP	\$ 8500	0	0	0	2	1	1	1	1	0	9	1
Unit	1 : 1	Alchl/Drgs:	0	Speed: 45 MPH Dir: NW		Veh Mnvr/Ped Actn: 4				Obj Strk:						
Unit	2 : 2	Alchl/Drgs:	0	Speed: 40 MPH Dir: NW		Veh Mnvr/Ped Actn: 4				Obj Strk:						
Unit	3 : 1	Alchl/Drgs:	0	Speed: 0 MPH Dir: NW		Veh Mnvr/Ped Actn: 1				Obj Strk:						
Unit	4 : 1	Alchl/Drgs:	0	Speed: 0 MPH Dir: NW		Veh Mnvr/Ped Actn: 1				Obj Strk:						
140	104224586	5.182	11/17/2014 12:09	FIXED OBJECT	\$ 7000	0	0	1	0	2	1	2	1	0	0	
Unit	1 : 2	Alchl/Drgs:	0	Speed: 55 MPH Dir: S		Veh Mnvr/Ped Actn: 4				Obj Strk: 59						
141	104969385	5.212	01/06/2017 17:03	FIXED OBJECT	\$ 6000	0	0	0	1	2	2	2	1	0	0	
Unit	1 : 1	Alchl/Drgs:	0	Speed: 45 MPH Dir: S		Veh Mnvr/Ped Actn: 4				Obj Strk: 59						
142	103999595	5.312	03/10/2014 15:44	LEFT TURN, SAME ROADWAY	\$ 3000	0	0	2	0	1	1	1	1	0	0	
Unit	1 : 20	Alchl/Drgs:	0	Speed: 55 MPH Dir: S		Veh Mnvr/Ped Actn: 4				Obj Strk:						
Unit	2 : 1	Alchl/Drgs:	0	Speed: 55 MPH Dir: S		Veh Mnvr/Ped Actn: 9				Obj Strk:						
143	104271086	5.384	01/17/2015 00:18	FIXED OBJECT	\$ 7000	0	0	0	1	1	5	1	1	0	13	1
Unit	1 : 4	Alchl/Drgs:	1	Speed: 45 MPH Dir: S		Veh Mnvr/Ped Actn: 4				Obj Strk: 49						
144	104679653	5.384	03/17/2016 21:30	FIXED OBJECT	\$ 5500	0	0	0	1	1	5	1	1	0	0	
Unit	1 : 4	Alchl/Drgs:	0	Speed: 45 MPH Dir: S		Veh Mnvr/Ped Actn: 4				Obj Strk: 50						
145	103481595	5.412	06/22/2012 08:30	SIDESWIPE, SAME DIRECTION	\$ 6500	0	0	0	1	1	1	1	1	0	0	
Unit	1 : 1	Alchl/Drgs:	0	Speed: 40 MPH Dir: S		Veh Mnvr/Ped Actn: 6				Obj Strk: 59						
Unit	2 : 19	Alchl/Drgs:	0	Speed: 0 MPH Dir:		Veh Mnvr/Ped Actn:				Obj Strk:						
146	104835757	5.612	08/10/2016 13:01	FIXED OBJECT	\$ 3400	1	0	1	0	2	1	1	1	0	0	
Unit	1 : 1	Alchl/Drgs:	0	Speed: 65 MPH Dir: S		Veh Mnvr/Ped Actn: 4				Obj Strk: 33						
147	103763196	5.632	05/30/2013 11:10	SIDESWIPE, SAME DIRECTION	\$ 23000	0	0	0	0	1	1	1	1	0	0	
Unit	1 : 19	Alchl/Drgs:	0	Speed: 0 MPH Dir:		Veh Mnvr/Ped Actn:				Obj Strk:						
Unit	2 : 2	Alchl/Drgs:	0	Speed: 40 MPH Dir: SE		Veh Mnvr/Ped Actn: 6				Obj Strk: 20						
Unit	3 : 1	Alchl/Drgs:	7	Speed: 0 MPH Dir: SW		Veh Mnvr/Ped Actn: 2				Obj Strk: 20						
148	104416549	5.712	06/25/2015 07:13	FIXED OBJECT	\$ 5000	0	0	0	0	1	1	1	1	0	13	1
Unit	1 : 1	Alchl/Drgs:	0	Speed: 50 MPH Dir: S		Veh Mnvr/Ped Actn: 4				Obj Strk: 56						

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Acc No	Crash ID	Milepost	Date	Accident Type	Total Damage	Injuries				Condition			Road		Trfc Ctl	
						F	A	B	C	R	L	W	Ch	Ci	Dv	Op
149	105062521	5.712	04/03/2017 17:54	REAR END, SLOW OR STOP	\$ 10500	0	0	0	0	2	1	2	1	0	13	1
Unit	1 : 2	Alchl/Drgs:	0	Speed: 40 MPH Dir: N		Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 1	Alchl/Drgs:	0	Speed: 0 MPH Dir: N		Veh Mnvr/Ped Actn:				11	Obj Strk:					
150	104471140	5.784	08/25/2015 08:39	REAR END, SLOW OR STOP	\$ 2750	0	0	0	0	1	1	1	1	0	3	1
Unit	1 : 2	Alchl/Drgs:	0	Speed: 45 MPH Dir: N		Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 1	Alchl/Drgs:	0	Speed: 45 MPH Dir: N		Veh Mnvr/Ped Actn:				11	Obj Strk:					
151	103904860	5.792	11/13/2013 17:54	OVERTURN/ROLLOVER	\$ 20000	0	0	1	0	1	2	1	1	0	0	
Unit	1 : 1	Alchl/Drgs:	0	Speed: 50 MPH Dir: E		Veh Mnvr/Ped Actn:				6	Obj Strk:					
152	103931900	5.797	12/18/2013 10:01	REAR END, SLOW OR STOP	\$ 3500	0	0	0	0	1	1	1	1	0	13	1
Unit	1 : 4	Alchl/Drgs:	0	Speed: 35 MPH Dir: S		Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 1	Alchl/Drgs:	0	Speed: 35 MPH Dir: S		Veh Mnvr/Ped Actn:				8	Obj Strk:					
153	103704145	5.803	03/18/2013 07:26	REAR END, SLOW OR STOP	\$ 6500	0	0	0	1	2	1	2	1	0	3	1
Unit	1 : 1	Alchl/Drgs:	0	Speed: 445 MPH Dir: S		Veh Mnvr/Ped Actn:				1	Obj Strk:					
Unit	2 : 2	Alchl/Drgs:	0	Speed: 45 MPH Dir: S		Veh Mnvr/Ped Actn:				1	Obj Strk:					
Unit	3 : 4	Alchl/Drgs:	0	Speed: 45 MPH Dir: S		Veh Mnvr/Ped Actn:				4	Obj Strk:					
154	103763070	5.808	05/30/2013 15:08	REAR END, SLOW OR STOP	\$ 900	0	0	0	1	1	1	1	1	0	3	1
Unit	1 : 1	Alchl/Drgs:	0	Speed: 40 MPH Dir: N		Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 5	Alchl/Drgs:	0	Speed: 40 MPH Dir: N		Veh Mnvr/Ped Actn:				11	Obj Strk:					
155	104334003	5.812	03/27/2015 07:55	RIGHT TURN, DIFFERENT ROADWAYS	\$ 4000	0	0	0	0	2	1	2	1	0	3	1
Unit	1 : 4	Alchl/Drgs:	0	Speed: 0 MPH Dir: SE		Veh Mnvr/Ped Actn:				7	Obj Strk:					
Unit	2 : 1	Alchl/Drgs:	0	Speed: 45 MPH Dir: SE		Veh Mnvr/Ped Actn:				4	Obj Strk:					
156	104853678	5.821	09/19/2016 07:54	REAR END, SLOW OR STOP	\$ 2800	0	0	0	2	2	1	1	1	0	3	1
Unit	1 : 2	Alchl/Drgs:	0	Speed: 45 MPH Dir: S		Veh Mnvr/Ped Actn:				11	Obj Strk:					
Unit	2 : 2	Alchl/Drgs:	0	Speed: 45 MPH Dir: S		Veh Mnvr/Ped Actn:				1	Obj Strk:					
157	104616702	5.878	01/16/2016 06:08	FIXED OBJECT	\$ 2600	0	0	1	0	4	5	2	1	0	13	1
Unit	1 : 2	Alchl/Drgs:	0	Speed: 45 MPH Dir: N		Veh Mnvr/Ped Actn:				4	Obj Strk:		60			
158	103634092	5.912	12/21/2012 17:55	REAR END, SLOW OR STOP	\$ 600	0	0	0	0	1	5	1	1	0	13	1
Unit	1 : 1	Alchl/Drgs:	0	Speed: 5 MPH Dir: W		Veh Mnvr/Ped Actn:				4	Obj Strk:					

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Acc No	Crash ID	Milepost	Date	Accident Type	Total Damage	Injuries				Condition			Road		Trfc Ctl		
						F	A	B	C	R	L	W	Ch	Ci	Dv	Op	
Unit	2 : 1	Alchl/Drgs:	0	Speed:	0 MPH	Dir:	W	Veh Mnvr/Ped Actn:				1	Obj Strk:				
159	104436251	5.912	07/01/2015 10:48	REAR END, SLOW OR STOP	\$ 5000			0	0	1	0	1	1	1	1	0	13 1
Unit	1 : 20	Alchl/Drgs:	0	Speed:	40 MPH	Dir:	N	Veh Mnvr/Ped Actn:				4	Obj Strk:				
Unit	2 : 1	Alchl/Drgs:	0	Speed:	35 MPH	Dir:	N	Veh Mnvr/Ped Actn:				4	Obj Strk:				
Unit	3 : 5	Alchl/Drgs:	0	Speed:	40 MPH	Dir:	S	Veh Mnvr/Ped Actn:				4	Obj Strk:				
160	103658876	6.232	01/23/2013 09:02	REAR END, SLOW OR STOP	\$ 17000			0	0	0	0	1	1	1	1	0	9 1
Unit	1 : 4	Alchl/Drgs:	0	Speed:	45 MPH	Dir:	SE	Veh Mnvr/Ped Actn:				4	Obj Strk:				
Unit	2 : 4	Alchl/Drgs:	0	Speed:	0 MPH	Dir:	SE	Veh Mnvr/Ped Actn:				1	Obj Strk:				
161	103523612	6.309	08/16/2012 21:23	REAR END, SLOW OR STOP	\$ 4000			0	0	0	0	1	4	1	1	0	13 1
Unit	1 : 1	Alchl/Drgs:	0	Speed:	35 MPH	Dir:	N	Veh Mnvr/Ped Actn:				4	Obj Strk:				
Unit	2 : 1	Alchl/Drgs:	0	Speed:	35 MPH	Dir:	N	Veh Mnvr/Ped Actn:				11	Obj Strk:				
162	104352961	6.309	04/17/2015 17:51	REAR END, SLOW OR STOP	\$ 4000			0	0	0	0	3	1	2	1	0	13 1
Unit	1 : 4	Alchl/Drgs:	0	Speed:	35 MPH	Dir:	N	Veh Mnvr/Ped Actn:				1	Obj Strk:				
Unit	2 : 1	Alchl/Drgs:	0	Speed:	35 MPH	Dir:	N	Veh Mnvr/Ped Actn:				4	Obj Strk:				
163	103738086	6.437	04/29/2013 14:59	REAR END, SLOW OR STOP	\$ 6500			0	0	0	2	1	1	2	1	0	13 1
Unit	1 : 1	Alchl/Drgs:	0	Speed:	45 MPH	Dir:	N	Veh Mnvr/Ped Actn:				1	Obj Strk:				
Unit	2 : 1	Alchl/Drgs:	0	Speed:	45 MPH	Dir:	N	Veh Mnvr/Ped Actn:				4	Obj Strk:				
Unit	3 : 1	Alchl/Drgs:	0	Speed:	45 MPH	Dir:	N	Veh Mnvr/Ped Actn:				1	Obj Strk:				
Unit	4 : 1	Alchl/Drgs:	0	Speed:	45 MPH	Dir:	N	Veh Mnvr/Ped Actn:				4	Obj Strk: 20				
164	104938715	6.632	12/06/2016 17:50	REAR END, SLOW OR STOP	\$ 2000			0	0	0	1	1	5	1	1	0	13 1
Unit	1 : 1	Alchl/Drgs:	0	Speed:	45 MPH	Dir:	N	Veh Mnvr/Ped Actn:				4	Obj Strk:				
Unit	2 : 1	Alchl/Drgs:	0	Speed:	45 MPH	Dir:	N	Veh Mnvr/Ped Actn:				11	Obj Strk:				
165	104560671	6.742	11/19/2015 15:14	REAR END, SLOW OR STOP	\$ 1500			0	0	0	0	1	1	1	1	0	13 1
Unit	1 : 1	Alchl/Drgs:	0	Speed:	25 MPH	Dir:	NW	Veh Mnvr/Ped Actn:				4	Obj Strk:				
Unit	2 : 1	Alchl/Drgs:	0	Speed:	0 MPH	Dir:	NW	Veh Mnvr/Ped Actn:				1	Obj Strk:				
166	103829025	6.833	08/20/2013 08:06	REAR END, SLOW OR STOP	\$ 8000			0	0	0	0	1	1	2	1	0	13 1
Unit	1 : 1	Alchl/Drgs:	0	Speed:	40 MPH	Dir:	W	Veh Mnvr/Ped Actn:				4	Obj Strk:				
Unit	2 : 1	Alchl/Drgs:	0	Speed:	0 MPH	Dir:	W	Veh Mnvr/Ped Actn:				1	Obj Strk:				

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Acc No	Crash ID	Milepost	Date	Accident Type	Total Damage	Injuries				Condition			Road		Trfc Ctl	
						F	A	B	C	R	L	W	Ch	Ci	Dv	Op
167	103888124	6.833	10/31/2013 13:23	REAR END, SLOW OR STOP	\$ 12000	0	0	0	1	1	1	2	1	0	13	1
Unit	1 : 4	Alchl/Drgs:	0	Speed: 35 MPH Dir: W		Veh Mnvr/Ped Actn: 4				Obj Strk:						
Unit	2 : 4	Alchl/Drgs:	0	Speed: 0 MPH Dir: W		Veh Mnvr/Ped Actn: 1				Obj Strk:						
168	104951069	6.833	12/15/2016 17:53	REAR END, SLOW OR STOP	\$ 3800	0	0	0	0	1	3	1	1	0	13	1
Unit	1 : 4	Alchl/Drgs:	0	Speed: 45 MPH Dir: W		Veh Mnvr/Ped Actn: 4				Obj Strk:						
Unit	2 : 1	Alchl/Drgs:	0	Speed: 0 MPH Dir: W		Veh Mnvr/Ped Actn: 1				Obj Strk:						
169	103771021	6.842	06/09/2013 15:51	LEFT TURN, DIFFERENT ROADWAYS	\$ 20500	0	0	0	3	2	1	2	1	0	1	1
Unit	1 : 4	Alchl/Drgs:	0	Speed: 45 MPH Dir: S		Veh Mnvr/Ped Actn: 4				Obj Strk:						
Unit	2 : 4	Alchl/Drgs:	1	Speed: 65 MPH Dir: E		Veh Mnvr/Ped Actn: 8				Obj Strk:						
170	104363559	6.842	04/29/2015 12:12	LEFT TURN, SAME ROADWAY	\$ 4500	0	0	0	1	1	1	2	1	0	13	1
Unit	1 : 1	Alchl/Drgs:	0	Speed: 45 MPH Dir: N		Veh Mnvr/Ped Actn: 8				Obj Strk:						
Unit	2 : 1	Alchl/Drgs:	0	Speed: 45 MPH Dir: S		Veh Mnvr/Ped Actn: 4				Obj Strk:						
171	104538048	6.842	10/14/2015 06:30	FIXED OBJECT	\$ 3500	0	0	0	0	1	5	1	1	0	1	1
Unit	1 : 5	Alchl/Drgs:	0	Speed: 40 MPH Dir: N		Veh Mnvr/Ped Actn: 4				Obj Strk:		61				
172	104612127	6.842	01/09/2016 16:46	RIGHT TURN, DIFFERENT ROADWAYS	\$ 4000	0	0	0	0	2	2	2	1	0	1	1
Unit	1 : 12	Alchl/Drgs:	0	Speed: 10 MPH Dir: NW		Veh Mnvr/Ped Actn: 7				Obj Strk:						
Unit	2 : 4	Alchl/Drgs:	0	Speed: 45 MPH Dir: E		Veh Mnvr/Ped Actn: 4				Obj Strk:						
173	104966907	6.902	12/31/2016 12:34	REAR END, SLOW OR STOP	\$ 6000	0	0	0	0	1	1	1	1	0	13	1
Unit	1 : 1	Alchl/Drgs:	0	Speed: 45 MPH Dir: N		Veh Mnvr/Ped Actn: 4				Obj Strk:						
Unit	2 : 1	Alchl/Drgs:	0	Speed: 35 MPH Dir: N		Veh Mnvr/Ped Actn: 11				Obj Strk:						
174	103838526	6.978	09/02/2013 09:21	REAR END, SLOW OR STOP	\$ 4000	0	0	0	1	1	1	1	1	0	13	1
Unit	1 : 1	Alchl/Drgs:	0	Speed: 45 MPH Dir: N		Veh Mnvr/Ped Actn: 4				Obj Strk:						
Unit	2 : 2	Alchl/Drgs:	0	Speed: 45 MPH Dir: N		Veh Mnvr/Ped Actn: 1				Obj Strk:						
175	104030892	7.002	04/01/2014 15:00	REAR END, SLOW OR STOP	\$ 2900	0	0	0	0	1	1	1	1	0	13	1
Unit	1 : 5	Alchl/Drgs:	0	Speed: 35 MPH Dir: S		Veh Mnvr/Ped Actn: 4				Obj Strk:						
Unit	2 : 20	Alchl/Drgs:	0	Speed: 0 MPH Dir: S		Veh Mnvr/Ped Actn: 1				Obj Strk:						
176	104277722	7.002	01/22/2015 08:00	REAR END, SLOW OR STOP	\$ 11000	0	0	1	1	1	1	2	3	0	13	1
Unit	1 : 2	Alchl/Drgs:	0	Speed: 45 MPH Dir: NW		Veh Mnvr/Ped Actn: 4				Obj Strk:						

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Acc No	Crash ID	Milepost	Date	Accident Type	Total Damage	Injuries				Condition			Road		Trfc Ctl	
						F	A	B	C	R	L	W	Ch	Ci	Dv	Op
Unit	2 : 1	Alchl/Drugs:	0	Speed:	30 MPH	Dir:	NW	Veh Mnvr/Ped Actn:				1	Obj Strk:			
177	104986711	7.002	01/24/2017 14:00	RIGHT TURN, DIFFERENT ROADWAYS	\$ 750	0	0	0	0	1	1	1	1	0	13	1
Unit	1 : 4	Alchl/Drugs:	0	Speed:	10 MPH	Dir:	SE	Veh Mnvr/Ped Actn:				7	Obj Strk:			
Unit	2 : 2	Alchl/Drugs:	0	Speed:	45 MPH	Dir:	SE	Veh Mnvr/Ped Actn:				4	Obj Strk:			
178	104412217	7.042	06/19/2015 12:53	REAR END, SLOW OR STOP	\$ 16000	0	0	0	0	1	1	2	1	0	13	1
Unit	1 : 1	Alchl/Drugs:	0	Speed:	45 MPH	Dir:	E	Veh Mnvr/Ped Actn:				4	Obj Strk:			
Unit	2 : 4	Alchl/Drugs:	0	Speed:	45 MPH	Dir:	E	Veh Mnvr/Ped Actn:				11	Obj Strk:			
179	104123310	7.102	07/29/2014 07:20	SIDESWIPE, OPPOSITE DIRECTION	\$ 6000	0	0	0	0	1	1	1	1	0	13	1
Unit	1 : 12	Alchl/Drugs:	0	Speed:	45 MPH	Dir:	E	Veh Mnvr/Ped Actn:				4	Obj Strk:			
Unit	2 : 14	Alchl/Drugs:	0	Speed:	45 MPH	Dir:	W	Veh Mnvr/Ped Actn:				4	Obj Strk:			
180	104469162	7.102	08/24/2015 12:17	REAR END, SLOW OR STOP	\$ 3500	0	0	0	2	1	1	1	1	0	13	1
Unit	1 : 4	Alchl/Drugs:	0	Speed:	35 MPH	Dir:	SW	Veh Mnvr/Ped Actn:				11	Obj Strk:			
Unit	2 : 2	Alchl/Drugs:	0	Speed:	35 MPH	Dir:	SW	Veh Mnvr/Ped Actn:				4	Obj Strk:			
181	105001006	7.102	02/07/2017 07:29	REAR END, SLOW OR STOP	\$ 7200	0	0	0	0	1	1	1	1	0	13	1
Unit	1 : 5	Alchl/Drugs:	0	Speed:	35 MPH	Dir:	S	Veh Mnvr/Ped Actn:				4	Obj Strk:			
Unit	2 : 1	Alchl/Drugs:	0	Speed:	0 MPH	Dir:	S	Veh Mnvr/Ped Actn:				1	Obj Strk:			
Unit	3 : 1	Alchl/Drugs:	0	Speed:	0 MPH	Dir:	S	Veh Mnvr/Ped Actn:				1	Obj Strk:			
182	104711687	7.143	04/23/2016 14:19	LEFT TURN, DIFFERENT ROADWAYS	\$ 5500	0	0	0	0	1	1	1	1	0	13	1
Unit	1 : 1	Alchl/Drugs:	0	Speed:	5 MPH	Dir:	W	Veh Mnvr/Ped Actn:				8	Obj Strk:			
Unit	2 : 5	Alchl/Drugs:	0	Speed:	30 MPH	Dir:	N	Veh Mnvr/Ped Actn:				4	Obj Strk:			
183	103601660	7.164	11/16/2012 08:47	ANGLE	\$ 1500	0	0	0	1	1	1	1	7	0	13	1
Unit	1 : 1	Alchl/Drugs:	0	Speed:	5 MPH	Dir:	SW	Veh Mnvr/Ped Actn:				12	Obj Strk:			
Unit	2 : 4	Alchl/Drugs:	0	Speed:	25 MPH	Dir:	NW	Veh Mnvr/Ped Actn:				4	Obj Strk:			
184	104124505	7.164	08/07/2014 16:45	LEFT TURN, DIFFERENT ROADWAYS	\$ 3000	0	0	0	0	1	1	1	3	0	13	1
Unit	1 : 2	Alchl/Drugs:	0	Speed:	5 MPH	Dir:	S	Veh Mnvr/Ped Actn:				8	Obj Strk:			
Unit	2 : 1	Alchl/Drugs:	0	Speed:	35 MPH	Dir:	NW	Veh Mnvr/Ped Actn:				4	Obj Strk:			
185	104169157	7.164	09/29/2014 11:55	FIXED OBJECT	\$ 3500	0	0	0	0	2	1	2	1	0	13	1
Unit	1 : 2	Alchl/Drugs:	0	Speed:	45 MPH	Dir:	E	Veh Mnvr/Ped Actn:				4	Obj Strk: 42			

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						F	A	B	C	R	L	W	Ch	Ci	Dv	Op
186	104323808	7.164	03/16/2015 16:25	LEFT TURN, DIFFERENT ROADWAYS	\$ 3000	0	0	1	0	1	1	1	7	0	13	1
Unit	1 : 20	Alchl/Drgs:	0	Speed: 5 MPH Dir: S		Veh Mnvr/Ped Actn: 8				Obj Strk:						
Unit	2 : 1	Alchl/Drgs:	0	Speed: 35 MPH Dir: NW		Veh Mnvr/Ped Actn: 4				Obj Strk:						
187	104444131	7.164	07/27/2015 15:30	LEFT TURN, DIFFERENT ROADWAYS	\$ 3000	0	0	0	0	1	1	2	3	0	13	1
Unit	1 : 1	Alchl/Drgs:	0	Speed: 30 MPH Dir: S		Veh Mnvr/Ped Actn: 8				Obj Strk:						
Unit	2 : 2	Alchl/Drgs:	0	Speed: 10 MPH Dir: SW		Veh Mnvr/Ped Actn: 8				Obj Strk:						
188	104568509	7.164	11/19/2015 09:00	LEFT TURN, DIFFERENT ROADWAYS	\$ 9000	0	0	0	0	2	1	2	1	0	13	1
Unit	1 : 2	Alchl/Drgs:	0	Speed: 10 MPH Dir: S		Veh Mnvr/Ped Actn: 8				Obj Strk:						
Unit	2 : 1	Alchl/Drgs:	0	Speed: 20 MPH Dir: W		Veh Mnvr/Ped Actn: 4				Obj Strk:						
189	104562672	7.164	11/23/2015 12:52	LEFT TURN, SAME ROADWAY	\$ 1600	0	0	0	0	1	1	1	7	0	0	
Unit	1 : 1	Alchl/Drgs:	0	Speed: 45 MPH Dir: SE		Veh Mnvr/Ped Actn: 8				Obj Strk:						
Unit	2 : 4	Alchl/Drgs:	0	Speed: 45 MPH Dir: NW		Veh Mnvr/Ped Actn: 4				Obj Strk:						
190	104675213	7.164	03/15/2016 17:08	LEFT TURN, DIFFERENT ROADWAYS	\$ 8000	0	0	0	0	1	1	1	1	0	13	1
Unit	1 : 2	Alchl/Drgs:	0	Speed: 10 MPH Dir: W		Veh Mnvr/Ped Actn: 8				Obj Strk:						
Unit	2 : 2	Alchl/Drgs:	0	Speed: 45 MPH Dir: W		Veh Mnvr/Ped Actn: 4				Obj Strk:						
191	104947605	7.164	12/14/2016 17:44	LEFT TURN, DIFFERENT ROADWAYS	\$ 6000	0	0	0	0	1	5	1	5	0	13	1
Unit	1 : 4	Alchl/Drgs:	0	Speed: 10 MPH Dir: S		Veh Mnvr/Ped Actn: 8				Obj Strk:						
Unit	2 : 2	Alchl/Drgs:	0	Speed: 25 MPH Dir: W		Veh Mnvr/Ped Actn: 4				Obj Strk:						
192	103516612	7.174	08/08/2012 12:40	REAR END, SLOW OR STOP	\$ 400	0	0	0	0	1	1	1	1	0	3	1
Unit	1 : 1	Alchl/Drgs:	0	Speed: 45 MPH Dir: N		Veh Mnvr/Ped Actn: 11				Obj Strk:						
Unit	2 : 2	Alchl/Drgs:	0	Speed: 0 MPH Dir: N		Veh Mnvr/Ped Actn: 1				Obj Strk:						
193	104555050	7.188	11/12/2015 14:15	SIDESWIPE, SAME DIRECTION	\$ 3800	0	0	0	0	1	1	1	1	0	3	1
Unit	1 : 4	Alchl/Drgs:	0	Speed: 45 MPH Dir: S		Veh Mnvr/Ped Actn: 5				Obj Strk:						
Unit	2 : 4	Alchl/Drgs:	0	Speed: 35 MPH Dir: S		Veh Mnvr/Ped Actn: 4				Obj Strk:						
194	103887475	7.191	10/30/2013 17:27	REAR END, SLOW OR STOP	\$ 7200	0	0	0	0	1	1	1	7	0	13	1
Unit	1 : 1	Alchl/Drgs:	0	Speed: 0 MPH Dir: NW		Veh Mnvr/Ped Actn: 1				Obj Strk:						
Unit	2 : 1	Alchl/Drgs:	0	Speed: 40 MPH Dir: NW		Veh Mnvr/Ped Actn: 4				Obj Strk:						
Unit	3 : 2	Alchl/Drgs:	0	Speed: 0 MPH Dir: NW		Veh Mnvr/Ped Actn: 1				Obj Strk:						

**North Carolina Department of Transportation
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Acc No	Crash ID	Milepost	Date	Accident Type	Total Damage	Injuries				Condition			Road		Trfc Ctl	
						F	A	B	C	R	L	W	Ch	Ci	Dv	Op
195	103796578	7.193	07/10/2013 08:06	REAR END, SLOW OR STOP	\$ 200	0	0	0	0	1	1	1	1	0	3	1
Unit	1 : 1	Alchl/Drgs:	0	Speed: 45 MPH Dir: N		Veh Mnvr/Ped Actn:				12	Obj Strk:					
Unit	2 : 4	Alchl/Drgs:	0	Speed: 45 MPH Dir: N		Veh Mnvr/Ped Actn:				1	Obj Strk:					
196	103883420	7.193	10/26/2013 11:45	REAR END, SLOW OR STOP	\$ 3000	0	0	0	2	1	1	1	1	0	3	1
Unit	1 : 1	Alchl/Drgs:	0	Speed: 45 MPH Dir: N		Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 1	Alchl/Drgs:	0	Speed: 45 MPH Dir: N		Veh Mnvr/Ped Actn:				11	Obj Strk:					
197	104272332	7.193	01/18/2015 14:35	REAR END, SLOW OR STOP	\$ 700	0	0	0	0	1	1	1	3	0	3	1
Unit	1 : 1	Alchl/Drgs:	0	Speed: 45 MPH Dir: N		Veh Mnvr/Ped Actn:				11	Obj Strk:					
Unit	2 : 1	Alchl/Drgs:	0	Speed: 45 MPH Dir: N		Veh Mnvr/Ped Actn:				1	Obj Strk:					
198	104349852	7.193	04/12/2015 18:18	REAR END, TURN	\$ 1800	0	0	0	0	1	1	2	3	0	3	1
Unit	1 : 4	Alchl/Drgs:	0	Speed: 3 MPH Dir: N		Veh Mnvr/Ped Actn:				7	Obj Strk:					
Unit	2 : 1	Alchl/Drgs:	0	Speed: 10 MPH Dir: N		Veh Mnvr/Ped Actn:				4	Obj Strk:					
199	104362581	7.193	04/23/2015 21:10	REAR END, TURN	\$ 4500	0	0	0	0	1	1	1	3	0	3	1
Unit	1 : 1	Alchl/Drgs:	0	Speed: 10 MPH Dir: N		Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 1	Alchl/Drgs:	0	Speed: 5 MPH Dir: N		Veh Mnvr/Ped Actn:				4	Obj Strk:					
200	104491949	7.193	09/18/2015 13:08	REAR END, SLOW OR STOP	\$ 3000	0	0	0	0	1	1	1	7	0	3	1
Unit	1 : 4	Alchl/Drgs:	0	Speed: 45 MPH Dir: N		Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 4	Alchl/Drgs:	0	Speed: 45 MPH Dir: N		Veh Mnvr/Ped Actn:				1	Obj Strk:					
201	104716419	7.193	04/27/2016 09:06	REAR END, SLOW OR STOP	\$ 2500	0	0	0	0	1	1	1	3	0	3	1
Unit	1 : 1	Alchl/Drgs:	0	Speed: 3 MPH Dir: N		Veh Mnvr/Ped Actn:				12	Obj Strk:					
Unit	2 : 1	Alchl/Drgs:	0	Speed: 0 MPH Dir: N		Veh Mnvr/Ped Actn:				1	Obj Strk:					
202	104869896	7.193	10/04/2016 17:23	REAR END, SLOW OR STOP	\$ 4000	0	0	0	0	1	1	1	2	0	3	1
Unit	1 : 5	Alchl/Drgs:	0	Speed: 45 MPH Dir: N		Veh Mnvr/Ped Actn:				4	Obj Strk:					
Unit	2 : 1	Alchl/Drgs:	0	Speed: 45 MPH Dir: N		Veh Mnvr/Ped Actn:				1	Obj Strk:					
203	105018382	7.193	02/24/2017 07:49	SIDESWIPE, SAME DIRECTION	\$ 2000	0	0	0	0	1	1	1	1	0	3	1
Unit	1 : 32	Alchl/Drgs:	7	Speed: 10 MPH Dir: N		Veh Mnvr/Ped Actn:				7	Obj Strk:					
Unit	2 : 4	Alchl/Drgs:	0	Speed: 0 MPH Dir: N		Veh Mnvr/Ped Actn:				1	Obj Strk:					

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Acc No	Crash ID	Milepost	Date	Accident Type	Total Damage	Injuries				Condition			Road		Trfc Ctl	
						F	A	B	C	R	L	W	Ch	Ci	Dv	Op
204	104172218	7.196	10/02/2014 10:01	REAR END, SLOW OR STOP	\$ 200	0	0	0	0	1	1	1	7	0	3	1
Unit	1 : 2	Alchl/Drgs:	0	Speed:	0 MPH	Dir:	W	Veh Mnvr/Ped Actn:				1	Obj Strk:			
Unit	2 : 5	Alchl/Drgs:	0	Speed:	15 MPH	Dir:	W	Veh Mnvr/Ped Actn:				4	Obj Strk:			
205	103526799	7.197	08/21/2012 14:09	REAR END, SLOW OR STOP	\$ 3300	0	0	0	0	1	1	1	3	0	3	1
Unit	1 : 4	Alchl/Drgs:	0	Speed:	10 MPH	Dir:	N	Veh Mnvr/Ped Actn:				1	Obj Strk:			
Unit	2 : 1	Alchl/Drgs:	0	Speed:	35 MPH	Dir:	N	Veh Mnvr/Ped Actn:				4	Obj Strk:			
206	104453119	7.197	08/06/2015 15:36	REAR END, SLOW OR STOP	\$ 2300	0	0	0	1	1	1	1	6	0	3	1
Unit	1 : 1	Alchl/Drgs:	0	Speed:	45 MPH	Dir:	N	Veh Mnvr/Ped Actn:				4	Obj Strk:			
Unit	2 : 4	Alchl/Drgs:	0	Speed:	45 MPH	Dir:	N	Veh Mnvr/Ped Actn:				1	Obj Strk:			
207	104086894	7.198	06/12/2014 19:59	REAR END, SLOW OR STOP	\$ 700	0	0	0	0	1	1	1	1	0	3	1
Unit	1 : 3	Alchl/Drgs:	0	Speed:	0 MPH	Dir:	N	Veh Mnvr/Ped Actn:				12	Obj Strk:			
Unit	2 : 1	Alchl/Drgs:	0	Speed:	0 MPH	Dir:	N	Veh Mnvr/Ped Actn:				1	Obj Strk:			
208	104753521	7.198	06/04/2016 14:29	SIDESWIPE, SAME DIRECTION	\$ 1500	0	0	0	0	1	1	1	5	0	3	1
Unit	1 : 1	Alchl/Drgs:	0	Speed:	5 MPH	Dir:	W	Veh Mnvr/Ped Actn:				4	Obj Strk:			
Unit	2 : 4	Alchl/Drgs:	0	Speed:	0 MPH	Dir:	W	Veh Mnvr/Ped Actn:				7	Obj Strk:			
209	103526752	7.202	08/21/2012 15:59	LEFT TURN, SAME ROADWAY	\$ 5000	0	0	0	0	1	1	2	1	0	3	1
Unit	1 : 2	Alchl/Drgs:	0	Speed:	5 MPH	Dir:	N	Veh Mnvr/Ped Actn:				8	Obj Strk:			
Unit	2 : 4	Alchl/Drgs:	0	Speed:	40 MPH	Dir:	S	Veh Mnvr/Ped Actn:				4	Obj Strk:			
210	104099703	7.202	06/25/2014 10:06	LEFT TURN, DIFFERENT ROADWAYS	\$ 2300	0	0	0	0	1	1	1	1	0	3	1
Unit	1 : 1	Alchl/Drgs:	0	Speed:	45 MPH	Dir:	W	Veh Mnvr/Ped Actn:				4	Obj Strk:			
Unit	2 : 1	Alchl/Drgs:	0	Speed:	45 MPH	Dir:	N	Veh Mnvr/Ped Actn:				8	Obj Strk:			
211	104124424	7.202	08/07/2014 06:18	SIDESWIPE, OPPOSITE DIRECTION	\$ 1100	0	0	0	0	1	3	1	1	0	3	1
Unit	1 : 2	Alchl/Drgs:	0	Speed:	0 MPH	Dir:	N	Veh Mnvr/Ped Actn:				1	Obj Strk:			
Unit	2 : 32	Alchl/Drgs:	7	Speed:	30 MPH	Dir:	S	Veh Mnvr/Ped Actn:				6	Obj Strk:			
212	104187064	7.202	10/19/2014 15:50	ANGLE	\$ 4500	0	0	0	0	1	1	1	5	0	3	1
Unit	1 : 1	Alchl/Drgs:	0	Speed:	45 MPH	Dir:	W	Veh Mnvr/Ped Actn:				4	Obj Strk:			
Unit	2 : 2	Alchl/Drgs:	0	Speed:	45 MPH	Dir:	NW	Veh Mnvr/Ped Actn:				4	Obj Strk:			

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						F	A	B	C	R	L	W	Ch	Ci	Dv	Op
213	104195821	7.202	10/27/2014 09:51	REAR END, SLOW OR STOP	\$ 2200	0	0	0	1	1	1	1	5	0	3	1
Unit	1 : 4	Alchl/Drgs:	0	Speed: 10 MPH Dir: S		Veh Mnvr/Ped Actn: 1				Obj Strk:						
Unit	2 : 4	Alchl/Drgs:	0	Speed: 10 MPH Dir: S		Veh Mnvr/Ped Actn: 4				Obj Strk:						
214	104202322	7.202	11/03/2014 17:33	ANGLE	\$ 3800	0	0	0	0	1	2	1	1	0	13	1
Unit	1 : 2	Alchl/Drgs:	0	Speed: 45 MPH Dir: W		Veh Mnvr/Ped Actn: 4				Obj Strk:						
Unit	2 : 1	Alchl/Drgs:	0	Speed: 45 MPH Dir: N		Veh Mnvr/Ped Actn: 4				Obj Strk:						
215	104283843	7.202	01/30/2015 18:17	LEFT TURN, SAME ROADWAY	\$ 2000	0	0	0	0	1	4	1	1	0	3	1
Unit	1 : 1	Alchl/Drgs:	0	Speed: 5 MPH Dir: W		Veh Mnvr/Ped Actn: 8				Obj Strk:						
Unit	2 : 2	Alchl/Drgs:	0	Speed: 40 MPH Dir: S		Veh Mnvr/Ped Actn: 4				Obj Strk:						
216	104528087	7.202	10/22/2015 16:10	LEFT TURN, DIFFERENT ROADWAYS	\$ 14000	0	0	0	0	1	1	1	1	0	3	1
Unit	1 : 1	Alchl/Drgs:	1	Speed: 10 MPH Dir: S		Veh Mnvr/Ped Actn: 8				Obj Strk:						
Unit	2 : 4	Alchl/Drgs:	0	Speed: 45 MPH Dir: W		Veh Mnvr/Ped Actn: 4				Obj Strk:						
217	104596678	7.202	12/16/2015 19:30	LEFT TURN, SAME ROADWAY	\$ 12000	0	0	0	0	2	5	2	1	0	3	1
Unit	1 : 1	Alchl/Drgs:	7	Speed: 45 MPH Dir: E		Veh Mnvr/Ped Actn: 8				Obj Strk:						
Unit	2 : 4	Alchl/Drgs:	0	Speed: 45 MPH Dir: W		Veh Mnvr/Ped Actn: 4				Obj Strk:						
218	104866414	7.202	09/30/2016 18:35	RIGHT TURN, DIFFERENT ROADWAYS	\$ 9500	0	0	0	0	1	1	1	1	0	1	1
Unit	1 : 1	Alchl/Drgs:	0	Speed: 45 MPH Dir: N		Veh Mnvr/Ped Actn: 7				Obj Strk:						
Unit	2 : 4	Alchl/Drgs:	0	Speed: 45 MPH Dir: E		Veh Mnvr/Ped Actn: 4				Obj Strk:						
Unit	3 : 1	Alchl/Drgs:	0	Speed: 45 MPH Dir: W		Veh Mnvr/Ped Actn: 1				Obj Strk:						
Unit	4 : 4	Alchl/Drgs:	0	Speed: 45 MPH Dir: W		Veh Mnvr/Ped Actn: 1				Obj Strk:						
219	104963344	7.202	12/31/2016 19:17	ANGLE	\$ 5000	0	0	0	0	1	4	1	1	0	3	1
Unit	1 : 4	Alchl/Drgs:	0	Speed: 15 MPH Dir: N		Veh Mnvr/Ped Actn: 4				Obj Strk:						
Unit	2 : 1	Alchl/Drgs:	0	Speed: 45 MPH Dir: W		Veh Mnvr/Ped Actn: 4				Obj Strk:						
220	105098166	7.208	05/10/2017 14:37	SIDESWIPE, SAME DIRECTION	\$ 3200	0	0	0	0	1	1	1	5	0	0	
Unit	1 : 1	Alchl/Drgs:	0	Speed: 30 MPH Dir: E		Veh Mnvr/Ped Actn: 5				Obj Strk:						
Unit	2 : 5	Alchl/Drgs:	0	Speed: 40 MPH Dir: E		Veh Mnvr/Ped Actn: 4				Obj Strk:						
221	104908274	7.209	11/09/2016 09:23	REAR END, SLOW OR STOP	\$ 2500	0	0	0	0	1	1	2	1	0	0	
Unit	1 : 5	Alchl/Drgs:	0	Speed: 35 MPH Dir: W		Veh Mnvr/Ped Actn: 4				Obj Strk:						
Unit	2 : 1	Alchl/Drgs:	0	Speed: 0 MPH Dir: W		Veh Mnvr/Ped Actn: 1				Obj Strk:						

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Acc No	Crash ID	Milepost	Date	Accident Type	Total Damage	Injuries				Condition			Road		Trfc Ctl	
						F	A	B	C	R	L	W	Ch	Ci	Dv	Op
222	103505067	7.211	07/24/2012 16:06	FIXED OBJECT	\$ 7600	0	0	0	1	1	1	2	3	0	3	1
Unit	1 : 1	Alchl/Drgs:	0	Speed: 45 MPH	Dir: W	Veh Mnvr/Ped Actn: 4				Obj Strk: 38						
223	103594289	7.211	11/07/2012 19:00	RIGHT TURN, SAME ROADWAY	\$ 6000	0	0	0	1	1	4	1	5	0	3	1
Unit	1 : 4	Alchl/Drgs:	0	Speed: 45 MPH	Dir: W	Veh Mnvr/Ped Actn: 4				Obj Strk:						
Unit	2 : 4	Alchl/Drgs:	0	Speed: 25 MPH	Dir: W	Veh Mnvr/Ped Actn: 7				Obj Strk:						
224	104052352	7.211	05/08/2014 13:19	REAR END, SLOW OR STOP	\$ 1600	0	0	0	0	1	1	1	1	0	3	1
Unit	1 : 1	Alchl/Drgs:	0	Speed: 5 MPH	Dir: SW	Veh Mnvr/Ped Actn: 4				Obj Strk:						
Unit	2 : 4	Alchl/Drgs:	0	Speed: 0 MPH	Dir: SW	Veh Mnvr/Ped Actn: 1				Obj Strk:						
225	104255360	7.211	12/24/2014 16:19	REAR END, SLOW OR STOP	\$ 2500	0	0	0	0	2	1	2	1	0	3	1
Unit	1 : 2	Alchl/Drgs:	1	Speed: 45 MPH	Dir: SW	Veh Mnvr/Ped Actn: 11				Obj Strk:						
Unit	2 : 1	Alchl/Drgs:	0	Speed: 45 MPH	Dir: SW	Veh Mnvr/Ped Actn: 1				Obj Strk:						
226	104788963	7.211	07/05/2016 17:27	REAR END, SLOW OR STOP	\$ 6500	0	0	0	0	1	1	1	7	0	13	1
Unit	1 : 4	Alchl/Drgs:	0	Speed: 45 MPH	Dir: E	Veh Mnvr/Ped Actn: 4				Obj Strk:						
Unit	2 : 2	Alchl/Drgs:	7	Speed: 45 MPH	Dir: W	Veh Mnvr/Ped Actn: 11				Obj Strk:						
227	104968332	7.211	01/04/2017 18:38	LEFT TURN, DIFFERENT ROADWAYS	\$ 800	0	0	0	0	1	5	1	1	0	3	1
Unit	1 : 1	Alchl/Drgs:	7	Speed: 45 MPH	Dir: E	Veh Mnvr/Ped Actn: 8				Obj Strk:						
Unit	2 : 2	Alchl/Drgs:	0	Speed: 45 MPH	Dir: W	Veh Mnvr/Ped Actn: 1				Obj Strk:						
228	103865275	7.227	10/01/2013 17:06	REAR END, SLOW OR STOP	\$ 6100	0	0	0	2	1	1	1	1	0	3	1
Unit	1 : 2	Alchl/Drgs:	0	Speed: 0 MPH	Dir: S	Veh Mnvr/Ped Actn: 1				Obj Strk:						
Unit	2 : 4	Alchl/Drgs:	0	Speed: 0 MPH	Dir: S	Veh Mnvr/Ped Actn: 1				Obj Strk:						
Unit	3 : 1	Alchl/Drgs:	0	Speed: 0 MPH	Dir: S	Veh Mnvr/Ped Actn: 1				Obj Strk:						
Unit	4 : 1	Alchl/Drgs:	0	Speed: 35 MPH	Dir: S	Veh Mnvr/Ped Actn: 4				Obj Strk:						
229	103821312	7.245	08/10/2013 15:45	LEFT TURN, SAME ROADWAY	\$ 5000	0	0	0	0	2	1	3	7	0	0	
Unit	1 : 4	Alchl/Drgs:	0	Speed: 5 MPH	Dir: SE	Veh Mnvr/Ped Actn: 8				Obj Strk:						
Unit	2 : 4	Alchl/Drgs:	0	Speed: 45 MPH	Dir: N	Veh Mnvr/Ped Actn: 4				Obj Strk:						
230	104058151	7.245	05/14/2014 07:16	LEFT TURN, DIFFERENT ROADWAYS	\$ 8000	0	0	1	0	1	1	1	1	0	0	
Unit	1 : 1	Alchl/Drgs:	0	Speed: 0 MPH	Dir: W	Veh Mnvr/Ped Actn: 8				Obj Strk:						
Unit	2 : 1	Alchl/Drgs:	0	Speed: 35 MPH	Dir: N	Veh Mnvr/Ped Actn: 4				Obj Strk:						

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Acc No	Crash ID	Milepost	Date	Accident Type	Total Damage	Injuries				Condition			Road		Trfc Ctl		
						F	A	B	C	R	L	W	Ch	Ci	Dv	Op	
231	104315420	7.245	03/07/2015 16:06	LEFT TURN, DIFFERENT ROADWAYS	\$ 3500	0	0	0	1	1	1	1	1	0	0		
Unit	1 : 1	Alchl/Drgs:	0	Speed: 20 MPH	Dir: W	Veh Mnvr/Ped Actn:				8	Obj Strk:						
Unit	2 : 1	Alchl/Drgs:	0	Speed: 35 MPH	Dir: N	Veh Mnvr/Ped Actn:				4	Obj Strk:						

232	104380436	7.245	05/15/2015 16:45	LEFT TURN, DIFFERENT ROADWAYS	\$ 2300	0	0	0	0	1	1	1	1	0	13	1	
Unit	1 : 2	Alchl/Drgs:	0	Speed: 10 MPH	Dir: S	Veh Mnvr/Ped Actn:				8	Obj Strk:						
Unit	2 : 1	Alchl/Drgs:	0	Speed: 45 MPH	Dir: N	Veh Mnvr/Ped Actn:				4	Obj Strk:						

233	104670922	7.245	03/10/2016 10:03	LEFT TURN, DIFFERENT ROADWAYS	\$ 16700	0	0	0	1	1	1	1	5	0	13	1	
Unit	1 : 4	Alchl/Drgs:	0	Speed: 5 MPH	Dir: SW	Veh Mnvr/Ped Actn:				8	Obj Strk:						
Unit	2 : 4	Alchl/Drgs:	0	Speed: 40 MPH	Dir: N	Veh Mnvr/Ped Actn:				4	Obj Strk:		38				

Legend for Report Details:

- Acc No - Accident Number
- Injuries: F - Fatal, A - Class A, B - Class B, C - Class C
- Condition: R - Road Surface, L - Ambient Light, W - Weather
- Rd Ch - Road Character
- Rd Ci - Roadway Contributing Circumstances
- Trfc Ctl - Traffic Control: Dv - Device, Op - Operating
- Alchl/Drgs - Alcohol Drugs Suspected
- Veh Mnvr/Ped Actn - Vehicle Maneuver/Pedestrian Action
- Obj Strk - Object Struck

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Summary Statistics

High Level Crash Summary

Crash Type	Number of Crashes	Percent of Total
Total Crashes	233	100.00
Fatal Crashes	3	1.29
Non-Fatal Injury Crashes	69	29.61
Total Injury Crashes	72	30.90
Property Damage Only Crashes	161	69.10
Night Crashes	32	13.73
Wet Crashes	40	17.17
Alcohol/Drugs Involvement Crashes	6	2.58

Crash Severity Summary

Crash Type	Number of Crashes	Percent of Total
Total Crashes	233	100.00
Fatal Crashes	3	1.29
Class A Crashes	1	0.43
Class B Crashes	21	9.01
Class C Crashes	47	20.17
Property Damage Only Crashes	161	69.10

Vehicle Exposure Statistics

Annual ADT = 11000

Total Length = 4.521 (Miles) 7.276 (Kilometers)

Total Vehicle Exposure = 90.81 (MVMT) 146.14 (MVKMT)

Crash Rate	Crashes Per 100 Million Vehicle Miles	Crashes Per 100 Million Vehicle Kilometers
Total Crash Rate	256.58	159.43
Fatal Crash Rate	3.30	2.05
Non Fatal Crash Rate	75.98	47.21
Night Crash Rate	35.24	21.90
Wet Crash Rate	44.05	27.37
EPDO Rate	1144.60	711.22

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Miscellaneous Statistics

Severity Index =	4.46
EPDO Crash Index =	1039.40
Estimated Property Damage Total = \$	1177250.00

Accident Type Summary

Accident Type	Number of Crashes	Percent of Total
ANGLE	10	4.29
ANIMAL	5	2.15
BACKING UP	2	0.86
FIXED OBJECT	24	10.30
HEAD ON	2	0.86
LEFT TURN, DIFFERENT ROADWAYS	24	10.30
LEFT TURN, SAME ROADWAY	18	7.73
MOVABLE OBJECT	3	1.29
OTHER COLLISION WITH VEHICLE	1	0.43
OTHER NON-COLLISION	1	0.43
OVERTURN/ROLLOVER	3	1.29
PARKED MOTOR VEHICLE	1	0.43
REAR END, SLOW OR STOP	118	50.64
REAR END, TURN	4	1.72
RIGHT TURN, DIFFERENT ROADWAYS	5	2.15
RIGHT TURN, SAME ROADWAY	1	0.43
SIDESWIPE, OPPOSITE DIRECTION	3	1.29
SIDESWIPE, SAME DIRECTION	8	3.43

Injury Summary

Injury Type	Number of Injuries	Percent of Total
Fatal Injuries	3	2.68
Class A Injuries	1	0.89
Class B Injuries	28	25.00
Class C Injuries	80	71.43
Total Non-Fatal Injuries	109	97.32
Total Injuries	112	100.00

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Monthly Summary

Month	Number of Crashes	Percent of Total
Jan	24	10.30
Feb	15	6.44
Mar	18	7.73
Apr	28	12.02
May	20	8.58
Jun	13	5.58
Jul	12	5.15
Aug	16	6.87
Sep	16	6.87
Oct	25	10.73
Nov	17	7.30
Dec	29	12.45

Daily Summary

Day	Number of Crashes	Percent of Total
Mon	39	16.74
Tue	40	17.17
Wed	44	18.88
Thu	45	19.31
Fri	31	13.30
Sat	26	11.16
Sun	8	3.43

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Strip Analysis Report**

Hourly Summary

Hour	Number of Crashes	Percent of Total
0000-0059	1	0.43
0100-0159	1	0.43
0200-0259	0	0.00
0300-0359	3	1.29
0400-0459	0	0.00
0500-0559	1	0.43
0600-0659	4	1.72
0700-0759	32	13.73
0800-0859	13	5.58
0900-0959	12	5.15
1000-1059	10	4.29
1100-1159	5	2.15
1200-1259	15	6.44
1300-1359	6	2.58
1400-1459	14	6.01
1500-1559	45	19.31
1600-1659	18	7.73
1700-1759	23	9.87
1800-1859	11	4.72
1900-1959	7	3.00
2000-2059	4	1.72
2100-2159	6	2.58
2200-2259	1	0.43
2300-2359	1	0.43

**North Carolina Department of Transportation
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Light and Road Conditions Summary

Condition	Dry	Wet	Other	Total
Day	155	33	0	188
Dark	27	4	1	32
Other	10	3	0	13
Total	192	40	1	233

Object Struck Summary

Object Type	Times Struck	Percent of Total
ANIMAL	5	11.90
BRIDGE RAIL END	1	2.38
BRIDGE RAIL FACE	1	2.38
CATCH BASIN OR CULVERT ON SHOULDER	1	2.38
DITCH	6	14.29
EMBANKMENT	4	9.52
FENCE OR FENCE POST	4	9.52
GUARDRAIL FACE ON SHOULDER	1	2.38
MAILBOX	1	2.38
OFFICIAL HIGHWAY SIGN BREAKAWAY	2	4.76
OTHER FIXED OBJECT	3	7.14
PARKED MOTOR VEHICLE	5	11.90
TREE	5	11.90
UTILITY POLE	3	7.14

Vehicle Type Summary

Vehicle Type	Number Involved	Percent of Total
FARM TRACTOR	2	0.43
LIGHT TRUCK (MINI-VAN, PANEL)	2	0.43
MOPED	1	0.22
MOTORCYCLE	6	1.29
PASSENGER CAR	224	48.28
PICKUP	72	15.52
SCHOOL BUS	2	0.43
SINGLE UNIT TRUCK (2-AXLE, 6-TIRE)	3	0.65
SPORT UTILITY	120	25.86
TRACTOR/SEMI-TRAILER	2	0.43
TRUCK/TRAILER	3	0.65
UNKNOWN	4	0.86
VAN	23	4.96

North Carolina Department of Transportation
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<u>Vehicle Type</u>	<u>Number Involved</u>	<u>Percent of Total</u>
---------------------	----------------------------	-----------------------------

North Carolina Department of Transportation
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Yearly Totals Summary

Accident Totals

Year	Total Accidents	Fatal Accidents	Injury Accidents	Property Damage Only Accidents
2012	22	1	9	12
2013	56	0	18	38
2014	38	0	13	25
2015	52	1	13	38
2016	42	1	10	31
2017	23	0	6	17
Total	233	3	69	161

Injury Totals

Year	Fatal Injuries	Class A, B, or C Injuries
2012	1	13
2013	0	26
2014	0	18
2015	1	31
2016	1	12
2017	0	9
Total	3	109

Miscellaneous Totals

Year	Property Damage	EPDO Index
2012	\$ 122700	232.80
2013	\$ 288675	189.20
2014	\$ 167350	134.20
2015	\$ 249700	224.00
2016	\$ 195850	191.80
2017	\$ 152975	67.40
Total	\$ 1177250	1039.40

Type of Accident Totals

Year	Left Turn	Right Turn	Rear End	Run Off Road &			
				Fixed Object	Angle	Side Swipe	Other
2012	3	1	12	3	1	1	1
2013	9	0	37	3	0	2	5
2014	8	0	17	5	4	2	2

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	Run Off Road &						
Year	Left Turn	Right Turn	Rear End	Fixed Object	Angle	Side Swipe	Other
2015	13	1	27	6	1	1	3
2016	6	3	21	4	3	2	3
2017	3	1	8	3	1	3	4
Total	42	6	122	24	10	11	18

**North Carolina Department of Transportation
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Strip Analysis Report**

Strip Diagram

Features	Milepost	Crash IDs
	2.73	
	2.74	
	2.75	
	2.76	103859499 105089109
	2.77	
SR 1381 SR 1383 SR 1444 LEVERETTE MOUNTAIN	2.78	103824991 103981204 104015648 104193353 104291971 104596323 104596300 104980362
	2.79	104979126
	2.80	
	2.81	
	2.82	
	2.83	
	2.84	103877681
	2.85	
	2.86	
	2.87	
	2.88	104376170 104523058
	2.89	
	2.90	
	2.91	
	2.92	
	2.93	104789675
SR 1463 SHANNON	2.94	104033148 103950223
	2.95	
	2.96	
	2.97	
	2.98	104248421
	2.99	
	3.00	
	3.01	
SR 1463 SHANNON	3.02	103505647
	3.03	
	3.04	
	3.05	
	3.06	103945042
	3.07	
	3.08	104753087 105025200
	3.09	
	3.10	103735068
SR 1980 CIMARRON	3.11	103765140 104532423
	3.12	104768085
	3.13	
	3.14	103804889

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Features	Milepost	Crash IDs
	3.15	
	3.16	
	3.17	
	3.18	
	3.19	
	3.20	
	3.21	
	3.22	103787422
	3.23	
	3.24	
	3.25	
	3.26	
	3.27	
	3.28	
	3.29	
	3.30	
	3.31	104362585
	3.32	103990173
	3.33	
	3.34	
	3.35	
	3.36	
	3.37	
	3.38	
	3.39	
	3.40	
	3.41	103933809
	3.42	
	3.43	
	3.44	
	3.45	
	3.46	
	3.47	103684414 104058143 104230933 104716448 104953989 104974337
	3.48	
	3.49	
	3.50	
	3.51	
	3.52	104897955
	3.53	
	3.54	
	3.55	
	3.56	104277720
	3.57	
	3.58	104166104
	3.59	

**North Carolina Department of Transportation
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Features	Milepost	Crash IDs
	3.60	
	3.61	103764393
	3.62	103549853 103856521
	3.63	104363573
SR 1380 SR 1460 BRADLEY	3.64	
	3.65	103753834 104648677
	3.66	104285334
	3.67	
	3.68	103554399
	3.69	
	3.70	
	3.71	104067983
	3.72	
	3.73	
	3.74	103841588 103958531 104636057 105088868
	3.75	
	3.76	
	3.77	
	3.78	
	3.79	
	3.80	
	3.81	
	3.82	
	3.83	
	3.84	105084089
	3.85	103560806
	3.86	
	3.87	
	3.88	
	3.89	
	3.90	103651841 103741524 103927929
ALPINE HENDERSON WEST HENDERSON HIGH	3.91	104323815 104937555
	3.92	103628951 103908481 104214792 104546441
	3.93	
	3.94	103592475 104394645 104549203 104830520
	3.95	103648979 104731040
	3.96	
	3.97	
	3.98	
	3.99	
	4.00	104491159
	4.01	
	4.02	
	4.03	

**North Carolina Department of Transportation
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Features	Milepost	Crash IDs
SR 2044 HAYWOOD KNOLLS	4.04	104393834 103666260 104176798
	4.05	103873109 105033050
	4.06	104883570 103924073
	4.07	
	4.08	
	4.09	103913792 104711393 104711401
	4.10	
	4.11	
	4.12	
	4.13	
	4.14	
	4.15	103730589 103730598 103746476 103933790
	4.16	
	4.17	
	4.18	104577172
	4.19	
	4.20	
	4.21	
	4.22	
	4.23	
	4.24	103683550 103683552
	4.25	104730996
	SR 1309 SR 1310 SR 1312 GRANDVIEW RUGBY	4.26
4.27		
4.28		
4.29		103703557
4.30		
4.31		
4.32		
4.33		
4.34		
4.35		103931055 105044866
4.36		
4.37	104946052	
4.38	103973520 104683336	
SR 1365 RUGBY	4.39	105088777 103539470 103546724 103711745 103861121 103887030 103921323 103983713 104011470 104277979 104515720 104934788 104963186 105066516 105084876 104483692 104577272
	4.40	103586027 104586927
	4.41	
	4.42	

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Features	Milepost	Crash IDs
	4.43	
	4.44	
	4.45	
	4.46	
	4.47	
	4.48	
	4.49	103643742 103790309 104042544 104098157 104114821
	4.50	
	4.51	
	4.52	
	4.53	
	4.54	
	4.55	
	4.56	
	4.57	
	4.58	
	4.59	103666880 103738912 103774956 104204849
	4.60	
	4.61	
	4.62	
	4.63	
	4.64	
	4.65	
	4.66	
	4.67	
	4.68	103502483 103533364
	4.69	105062936
	4.70	
	4.71	
	4.72	
	4.73	
	4.74	
	4.75	
	4.76	
	4.77	
	4.78	104729877 105069640
	4.79	104659166
	4.80	
	4.81	
	4.82	
	4.83	
	4.84	104493650
	4.85	
	4.86	
	4.87	104511138

**North Carolina Department of Transportation
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Strip Analysis Report**

Features	Milepost	Crash IDs	
SR 1310	4.88		
	4.89		
	4.90		
		4.91	
		4.92	
		4.93	
		4.94	
		4.95	
		4.96	
		4.97	
		4.98	103585180
		4.99	
		5.00	
		5.01	
		5.02	
		5.03	103918566
		5.04	
		5.05	
		5.06	
		5.07	
		5.08	103585172 104716576
		5.09	
		5.10	104279688
		5.11	104655242
		5.12	
		5.13	
		5.14	
		5.15	
		5.16	
	Structure:440121	5.17	105105155
		5.18	105051412 104224586
		5.19	
		5.20	
5.21		104969385	
5.22			
5.23			
5.24			
5.25			
5.26			
5.27			
5.28			
5.29			
5.30			
5.31		103999595	
5.32			
5.33			

**North Carolina Department of Transportation
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Features	Milepost	Crash IDs
	5.34	
	5.35	
	5.36	
	5.37	
Structure:440129	5.38	104271086 104679653
	5.39	
	5.40	
	5.41	103481595
	5.42	
	5.43	
	5.44	
	5.45	
	5.46	
	5.47	
	5.48	
	5.49	
	5.50	
	5.51	
	5.52	
	5.53	
	5.54	
	5.55	
	5.56	
	5.57	
	5.58	
	5.59	
	5.60	
	5.61	104835757
	5.62	
	5.63	103763196
	5.64	
	5.65	
	5.66	
	5.67	
	5.68	
	5.69	
	5.70	
	5.71	104416549 105062521
	5.72	
	5.73	
	5.74	
	5.75	
	5.76	
	5.77	
	5.78	104471140
	5.79	103904860

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Features	Milepost	Crash IDs
	5.80	103931900 103704145
SR 1314 SR 1426 LADSON SCHOOL HOUSE	5.81	103763070 104334003
	5.82	104853678
	5.83	
	5.84	
	5.85	
	5.86	
	5.87	
	5.88	104616702
	5.89	
	5.90	
	5.91	103634092 104436251
	5.92	
	5.93	
	5.94	
	5.95	
	5.96	
	5.97	
	5.98	
	5.99	
	6.00	
	6.01	
	6.02	
SR 1353 HOOPER	6.03	
	6.04	
	6.05	
	6.06	
	6.07	
	6.08	
	6.09	
	6.10	
	6.11	
	6.12	
	6.13	
	6.14	
	6.15	
	6.16	
	6.17	
	6.18	
	6.19	
	6.20	
	6.21	
	6.22	
	6.23	103658876
	6.24	

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Features	Milepost	Crash IDs
	6.25	
	6.26	
	6.27	
	6.28	
	6.29	
	6.30	
	6.31	103523612 104352961
	6.32	
	6.33	
	6.34	
	6.35	
	6.36	
	6.37	
	6.38	
	6.39	
	6.40	
	6.41	
	6.42	
	6.43	
	6.44	103738086
	6.45	
	6.46	
	6.47	
	6.48	
	6.49	
	6.50	
	6.51	
	6.52	
	6.53	
	6.54	
	6.55	
	6.56	
	6.57	
	6.58	
	6.59	
	6.60	
	6.61	
	6.62	
	6.63	104938715
	6.64	
	6.65	
	6.66	
	6.67	
	6.68	
	6.69	
	6.70	

**North Carolina Department of Transportation
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Features	Milepost	Crash IDs
	6.71	
	6.72	
	6.73	
	6.74	104560671
	6.75	
	6.76	
	6.77	
	6.78	
	6.79	
	6.80	
	6.81	
	6.82	
	6.83	103829025 103888124 104951069
SR 1331 BANNER FARM	6.84	103771021 104363559 104538048 104612127
	6.85	
	6.86	
	6.87	
	6.88	
	6.89	
	6.90	104966907
	6.91	
	6.92	
	6.93	
	6.94	
CLEMENT	6.95	
	6.96	
	6.97	
	6.98	103838526
	6.99	
	7.00	104030892 104277722 104986711
	7.01	
	7.02	
	7.03	
	7.04	104412217
	7.05	
	7.06	
	7.07	
	7.08	
	7.09	
	7.10	104123310 104469162 105001006
	7.11	
	7.12	
	7.13	
	7.14	104711687
	7.15	
	7.16	103601660 104124505 104169157 104323808

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Features	Milepost	Crash IDs
		104444131 104568509 104562672 104675213
		104947605
	7.17	103516612
	7.18	
	7.19	104555050 103887475 103796578 103883420
		104272332 104349852 104362581 104491949
		104716419 104869896 105018382
NC 280	7.20	104172218 103526799 104453119 104086894
		104753521 103526752 104099703 104124424
		104187064 104195821 104202322 104283843
		104528087 104596678 104866414 104963344
	7.21	105098166 104908274 103505067 103594289
		104052352 104255360 104788963 104968332
	7.22	
	7.23	103865275
	7.24	103821312 104058151 104315420 104380436
		104670922
	7.25	

**North Carolina Department of Transportation
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Study Criteria

Study Name	Log No.	PH No.	TIP No.	K/A Cf.	B/C Cf.	ADT	ADT Route
41000047314				76.8	8.4	11000	30000191

Request Date	Courier Service	Phone No.	Ext.	Fax No.

County			Municipality			Name	Code	Div.	Name	Code	Y-Line Ft.	Begin Date	End Date	Years
HENDERSON			All and Rural				45	14			0	06/01/2012	05/31/2017	5.00

Location Text	Requestor
NC 191 (Haywood Rd) from 250 feet east of SR 1381 (Mountain Rd) / SR 1444 (Leverette Dr) to 250 feet west of NC 280 (Boylston Hwy)	

Included Accidents	Old MP	New MP	Type
103735068		3.098	I
104768085		3.116	I
103684414		3.47	I
103753834		3.647	I
103741524		3.901	I
103927929		3.901	I
103628951		3.919	I
103908481		3.919	I
104546441		3.919	I
104214792		3.919	I
103913792		4.087	I
103502483		4.682	I
103533364		4.682	I
104729877		4.782	I
105069640		4.782	I
103703557		4.29	I
104493650		4.836	I
103973520		4.381	I
104011470		4.39	I
104515720		4.39	I
104963186		4.39	I
103921323		4.39	I
104934788		4.39	I
103711745		4.39	I
104577272		4.394	I
103586027		4.398	I

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103790309	4.49	I
103643742	4.49	I
104042544	4.49	I
104204849	4.59	I
103774956	4.59	I
103738912	4.59	I
103666880	4.59	I
105062936	4.69	I
104659166	4.79	I
104511138	4.873	I
103585180	4.982	I
103585172	5.082	I
104279688	5.101	I
105105155	5.167	I
105051412	5.176	I
104224586	5.182	I
103918566	5.032	I
104679653	5.384	I
104271086	5.384	I
103704145	5.803	I
104853678	5.821	I
104616702	5.878	I
104352961	6.309	I
103523612	6.309	I
103738086	6.437	I
104951069	6.833	I
103888124	6.833	I
103829025	6.833	I
104711687	7.143	I
104323808	7.164	I
104562672	7.164	I
103601660	7.164	I
104568509	7.164	I
104675213	7.164	I
104947605	7.164	I
104444131	7.164	I
104869896	7.193	I
104716419	7.193	I
103883420	7.193	I
104968332	7.211	I
104052352	7.211	I

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103594289	7.211	I
103505067	7.211	I
104380436	7.245	I
103821312	7.245	I
104315420	7.245	I
104058151	7.245	I
104376170	2.875	I
104789675	2.929	I
104033148	2.938	I
103950223	2.945	I
104248421	2.981	I
103945042	3.062	I
104362585	3.307	I
104716448	3.47	I
104974337	3.47	I
104230933	3.47	I
104058143	3.47	I
104953989	3.47	I
104277720	3.561	I
104166104	3.581	I
104648677	3.647	I
103651841	3.901	I
104937555	3.91	I
104323815	3.91	I
104711401	4.09	I
104124505	7.164	I
103516612	7.174	I
104272332	7.193	I
104349852	7.193	I
104362581	7.193	I
103796578	7.193	I
104453119	7.197	I
104086894	7.198	I
104866414	7.202	I
103526752	7.202	I
105098166	7.208	I
104908274	7.209	I
104255360	7.211	I
104670922	7.245	I
103763196	5.632	I

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Excluded Accidents

104570443
 104301532
 104297886
 104742154
 104076420
 104152740
 104241549
 104384718
 104565396
 103547235
 104802706
 104915446
 105098752
 104961024
 103610609
 103538663
 103992979
 104189076
 105090433
 104525607
 104581072
 103552038

Fiche Roads

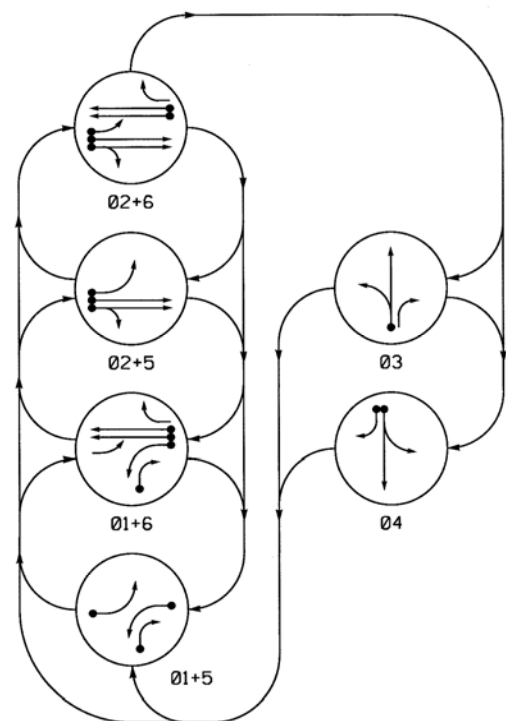
Name	Code
NC 191	30000191
NC 280	30000280
HAYWOOD	50013484
BOYLESTON	50003402
OLD HAYWOOD	50022224
BREVARD	50003633

Strip Road

Name	Code	Begin MP	End MP	Miles	Kilometers
NC 191	30000191	2.728	7.249	4.521	7.276

Appendix C
Traffic Signal Plans

PHASING DIAGRAM



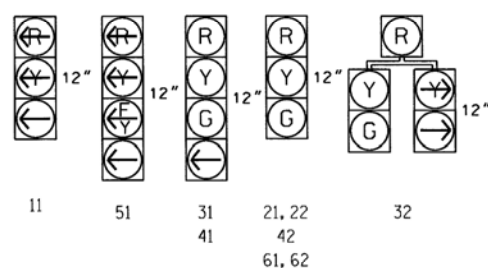
PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE	PHASE					
	01+5	01+6	02+5	02+6	03	04
11	—	—	—	—	—	—
21, 22	R	R	G	G	R	Y
31	R	R	R	R	G	R
32	R	R	R	R	G	R
41	R	R	R	R	G	R
42	R	R	R	R	G	R
51	—	—	—	—	—	—
61, 62	R	G	R	G	R	Y

SIGNAL FACE I.D.

All Heads L.E.D.

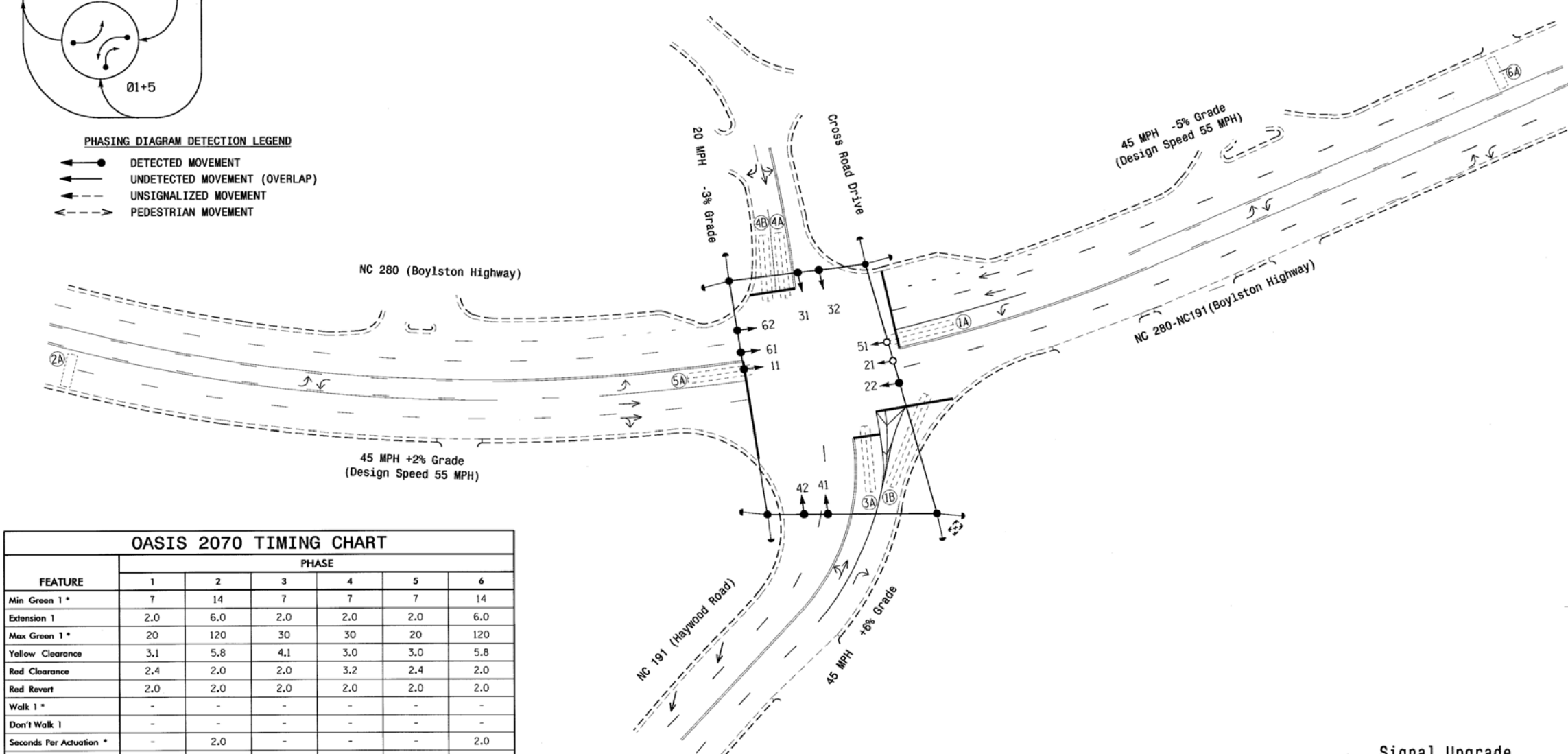


OASIS 2070 LOOP & DETECTOR INSTALLATION CHART											
LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING					SYSTEM LOOP	NEW CARD
					PHASE	CALLING EXTENSION	FULL TIME DELAY	STRETCH TIME	DELAY TIME		
1A	6X40	+5	2-4-2	-	1	Y	Y	-	-	3	-
1B	6X60	+5	2-4-2	-	1	Y	Y	-	-	15	-
2A	6X20	410	EXIST	-	2	Y	Y	-	-	-	-
3A	6X40	+5	2-4-2	-	3	Y	Y	-	-	3	-
4A	6X40	+5	2-4-2	-	4	Y	Y	-	-	3	-
4B	6X40	+5	2-4-2	-	4	Y	Y	-	-	15	-
5A	6X40	+5	2-4-2	-	5	Y	Y	-	-	30	-
6A	6X20	410	EXIST	-	6	Y	Y	-	-	3	-

6 Phase Fully Actuated Isolated

NOTES

1. Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
2. Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
3. Disable Backup Protection for phase 6.
4. Phase 1 and/or phase 5 may be lagged.
5. Reposition existing signal head numbered 22.
6. Set all detector units to presence mode.
7. Pavement markings are existing.



OASIS 2070 TIMING CHART

FEATURE	PHASE					
	1	2	3	4	5	6
Min Green 1*	7	14	7	7	7	14
Extension 1	2.0	6.0	2.0	2.0	2.0	6.0
Max Green 1*	20	120	30	30	20	120
Yellow Clearance	3.1	5.8	4.1	3.0	3.0	5.8
Red Clearance	2.4	2.0	2.0	3.2	2.4	2.0
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1*	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation*	-	2.0	-	-	-	2.0
Max Variable Initial*	-	45	-	-	-	45
Time Before Reduction*	-	15	-	-	-	15
Time To Reduce*	-	30	-	-	-	30
Minimum Gap	-	3.4	-	-	-	3.4
Recall Mode	-	MIN RECALL	-	-	-	MIN RECALL
Vehicle Call Memory	-	YELLOW	-	-	-	YELLOW
Dual Entry	-	-	-	-	-	-
Simultaneous Gap	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.

PROPOSED	LEGEND	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	⊥
⊥	Right of Way	⊥
→	Directional Arrow	→

Signal Upgrade

NC 280 (Boylston Highway) /
NC 280-191 (Boylston Highway)
at NC 191 (Haywood Road) /
Cross Road Drive

Division 14 Henderson county Hendersonville

PLAN DATE: February 2014 REVIEWED BY: T. Williams

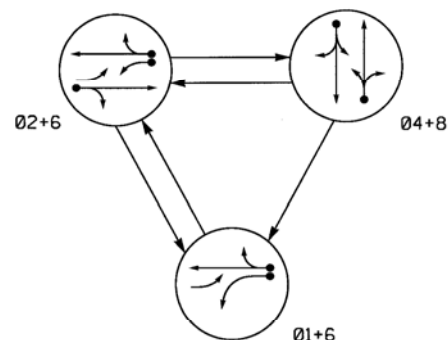
PREPARED BY: M. Mahbooba REVIEWED BY:

SEAL
TIMOTHY WILLIAMS
ENGINEER
4/16/14

SCALE: 1" = 40'

REVISIONS	INIT.	DATE

PHASING DIAGRAM



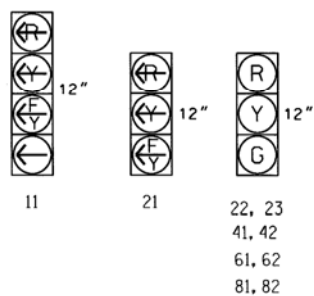
SIGNAL FACE	PHASE			
	01+6	02+6	04+8	F L HEADS
11	←	←	←	←
21	←	←	←	←
22, 23	R	G	R	Y
41, 42	R	R	G	R
61, 62	G	G	R	Y
81, 82	R	R	G	R

PHASING DIAGRAM DETECTION LEGEND

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

SIGNAL FACE I.D.

All Heads L.E.D.



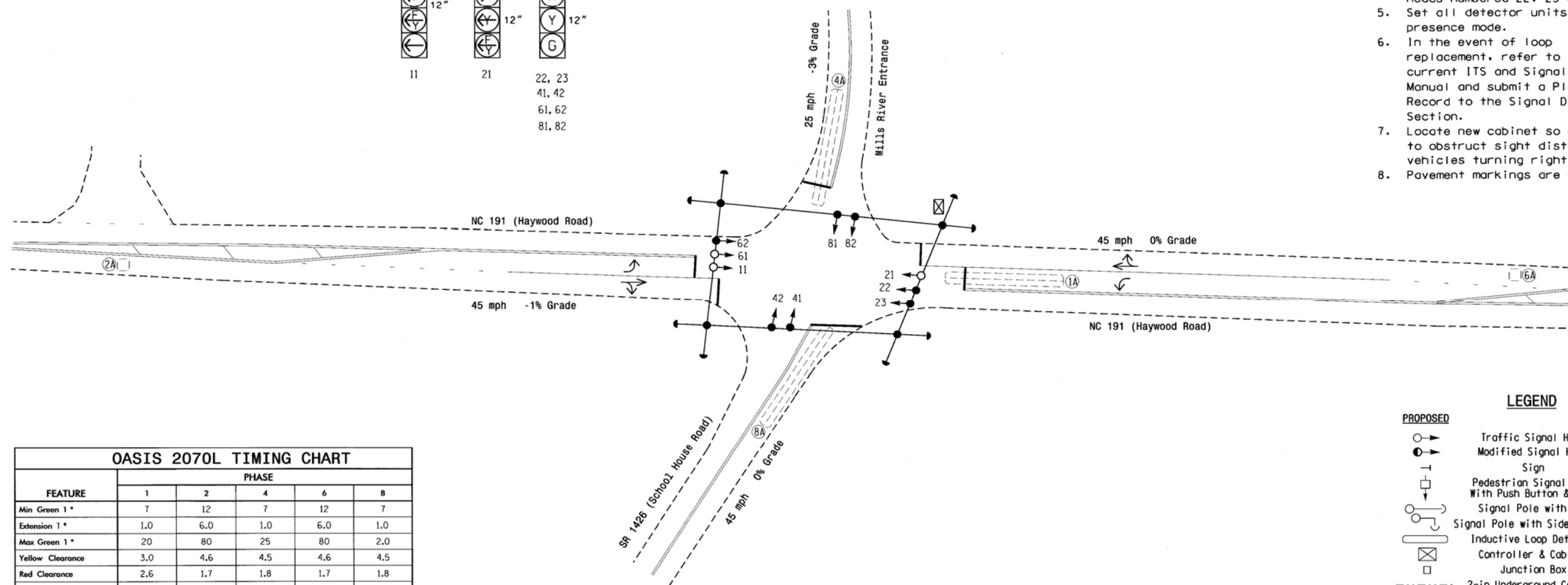
OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING				SYSTEM LOOP	NEW CARD	
					PHASE	CALLING	EXTENSION	FULL TIME DELAY			
1A	6X60	+10	2-4-2	-	1	Y	Y	-	15	-	Y
2A	6X6	300	5	-	2	Y	Y	-	-	-	Y
4A	6X60	+10	2-4-2	-	4	Y	Y	-	10	-	Y
6A	6X6	300	5	-	6	Y	Y	-	-	-	Y
8A	6X60	0	2-4-2	-	8	Y	Y	-	10	-	Y

3 Phase Fully Actuated Isolated

NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2012 and "Standard Specifications for Roads and Structures" dated January 2012.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 may be lagged.
- Reposition existing signal heads numbered 22, 23 & 62.
- Set all detector units to presence mode.
- In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Pavement markings are existing.



FEATURE	PHASE				
	1	2	4	6	8
Min Green 1 *	7	12	7	12	7
Extension 1 *	1.0	6.0	1.0	6.0	1.0
Max Green 1 *	20	80	25	80	2.0
Yellow Clearance	3.0	4.6	4.5	4.6	4.5
Red Clearance	2.6	1.7	1.8	1.7	1.8
Red Revert	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-	-
Don't Walk 1	-	-	-	-	-
Seconds Per Actuation *	-	2.0	-	2.0	-
Max Variable Initial *	-	34	-	34	-
Time Before Reduction *	-	15	-	15	-
Time To Reduce *	-	30	-	30	-
Minimum Gap	-	3.0	-	3.0	-
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.

LEGEND

- | PROPOSED | EXISTING |
|--|--|
| ○ → Traffic Signal Head | ● → Traffic Signal Head |
| ○ → Modified Signal Head | N/A |
| ⊥ Sign | ⊥ Sign |
| □ → Pedestrian Signal Head With Push Button & Sign | □ → Pedestrian Signal Head With Push Button & Sign |
| ○ → Signal Pole with Guy | ○ → Signal Pole with Guy |
| ○ → Signal Pole with Sidewalk Guy | ○ → Signal Pole with Sidewalk Guy |
| ▭ → Inductive Loop Detector | ▭ → Inductive Loop Detector |
| ⊠ → Controller & Cabinet | ⊠ → Controller & Cabinet |
| □ → Junction Box | □ → Junction Box |
| --- 2-in Underground Conduit | --- 2-in Underground Conduit |
| N/A Right of Way | --- Right of Way |
| → Directional Arrow | → Directional Arrow |

Signal Upgrade

	<p>NC 191 (Haywood Road) at SR 1426 (School House Road) / Mills River Entrance</p>		<p>SEAL NORTH CAROLINA PROFESSIONAL ENGINEER 24393 J. WILLIAMS</p>
	<p>Division 14 Henderson County Near Fletcher</p>	<p>PLANNED BY: March 2014</p>	
<p>750 N. Greenfield Pkwy, Garner, NC 27529</p>	<p>PREPARED BY: G. Pierce</p>	<p>REVIEWED BY: G. Pierce</p>	<p>DATE: 4/7/14</p>
<p>SCALE: 1" = 30'</p>	<p>REVISIONS</p>	<p>INIT.</p>	<p>DATE</p>

07-488-2014-14157 SS-TSS/SM/TSS-Signal/Signal/Region01/14141057/141057-sig.dwg, 2014.mdd, dgn

OASIS 2070 TIMING CHART

FEATURE	1	2	3	4
Min Green 1 *	7	12	7	12
Extension 1 *	1.0	6.0	2.0	1.0
Max Green 1 *	20	100	35	25
Yellow Clearance	4.5	5.0	4.0	5.0
Red Clearance	1.0	2.0	1.6	2.0
Red Revert	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-
Don't Walk 1	-	-	-	-
Seconds Per Actuation *	2.0	-	-	-
Max Variable Initial *	-	-	-	-
Time Before Reduction *	20	20	-	-
Time To Reduce *	30	30	-	-
Minimum Gap	-	-	-	-
Recall Mode	-	-	-	-
Vehicle Call Memory	-	-	-	-
Dual Entry	-	-	-	-
Simultaneous Gap	ON	ON	ON	ON

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

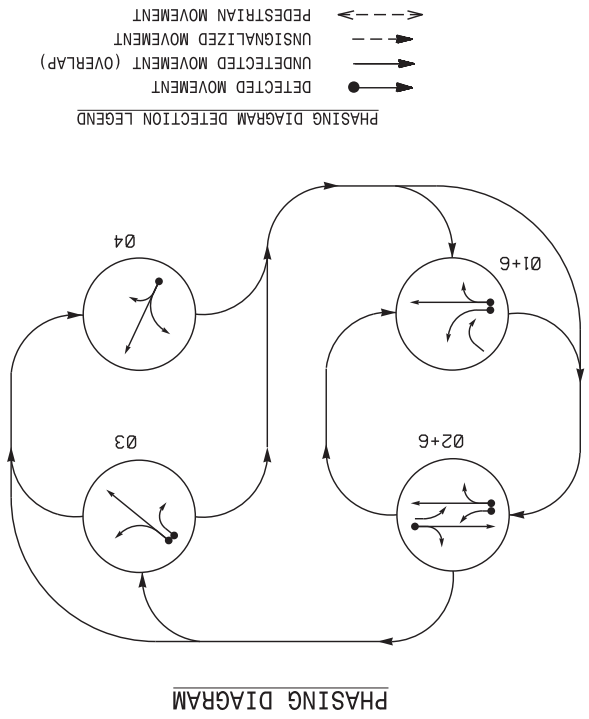
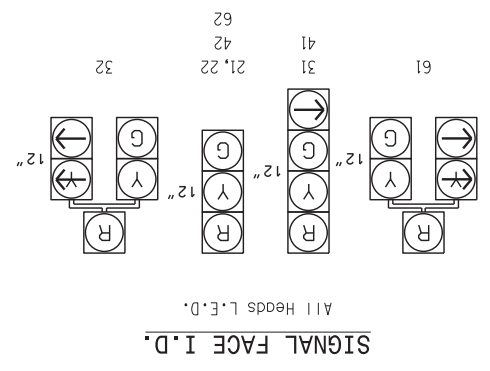


TABLE OF OPERATION

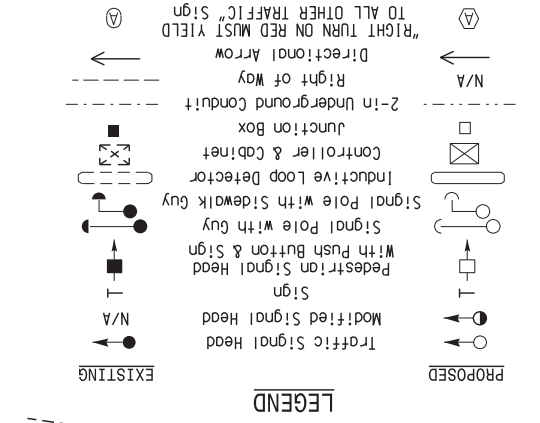
PHASE	SIGNAL			
	F	Y	R	G
0	1	0	0	6
1	0	2	0	6
2	0	3	0	6
3	0	4	0	6
4	0	0	4	6
5	0	0	0	6
6	0	0	0	6
7	0	0	0	6
8	0	0	0	6
9	0	0	0	6
10	0	0	0	6
11	0	0	0	6
12	0	0	0	6
13	0	0	0	6
14	0	0	0	6
15	0	0	0	6
16	0	0	0	6
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52	0	0	0	6
53	0	0	0	6
54	0	0	0	6
55	0	0	0	6
56	0	0	0	6
57	0	0	0	6
58	0	0	0	6
59	0	0	0	6
60	0	0	0	6
61	0	0	0	6
62	0	0	0	6



OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	INDUCTIVE LOOPS	DETECTOR PROGRAMMING	SYSTEM LOOP DELAY TIME	STRETCH TIME	FULL TIME DELAY	CALLING EXTENSION	PHASE	NEW LOOP
1A	6X60	0	2-4-2	-	-	-	-	6	Y	-
2A	6X6	300	4	-	-	-	-	Y	-	-
3A	6X60	0	2-4-2	-	-	-	-	3	Y	-
3B	6X60	0	2-4-2	-	-	-	-	3	Y	-
4A	6X60	+10	2-4-2	-	-	-	-	4	Y	-
6A	6X6	300	4	-	-	-	-	6	Y	-

- Refer to "Roadway Standard Drawings NCDOT" dated January 2012, "Standard Specifications for Roads and Structures" dated January 2012.
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Enable Backup Protect for phase 6 to allow the controller to clear from phase 2+6 to phase 1+6 by progressing through an all red display.
- Set all detector units to presence mode.
- In the event of loop replacement, refer to the current ITS and Signals Design Manual and submit a Plan of Record to the Signal Design Section.
- Pavement markings are existing.



Plan of Record

Prepared by: M. Mahooda DATE: October 2014
 Reviewed by: Z. Little DATE: October 2014
 Signature: *Z. Little* DATE: 12/5/2014

Upgraded equipment to 2070 and added back up protection for phase 6

This plan of record reflects existing field conditions as submitted by field personnel. This plan may have been modified from its original state.

Plan of Record

Prepared in the Office of:

NC 191 (Haywood Road) at SR 1381 (Mountain Road) / SR 1444 (Lavette Drive) / Balfour

Division 14 Henderson County

PLANNING AND DESIGN SECTION
 STATE OF NORTH CAROLINA
 TRANSPORTATION

Scale: 1" = 30'

0 30

NO.	DATE	REVISIONS
1	10/1/14	Initial

REVIEWED BY: S.T. FRANKLIN
 PREPARED BY: S.T. FRANKLIN
 PLAN DATE: Dec. 1997
 DIVISION 14 Henderson County

SR 1381 (Mountain Road) / SR 1444 (Lavette Drive) / Balfour

Not a certified document.
 This document originally issued and sealed by Kinith E. Wilton, PE 003007 on 1/1/1998
 This document shall not be considered a certified document.

14-0893























4 Phase Fully Actuated Isolated

NOTES

Appendix D
Capacity Analysis Results

R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2017 AM
09/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	99	45	4	33	33	380	5	979	57	445	660	84
Future Volume (vph)	99	45	4	33	33	380	5	979	57	445	660	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	12	12	12	12	12	12
Storage Length (ft)	0		75	0		600	150		0	150		50
Storage Lanes	0		1	0		1	1		0	1		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt			0.850			0.850		0.992				0.850
Flt Protected		0.967			0.976		0.950			0.950		
Satd. Flow (prot)	0	1801	1583	0	1757	1531	1770	3511	0	1770	3539	1583
Flt Permitted		0.967			0.976		0.373			0.950		
Satd. Flow (perm)	0	1801	1583	0	1757	1531	695	3511	0	1770	3539	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		20			45			45			45	
Link Distance (ft)		280			1846			3351			3356	
Travel Time (s)		9.5			28.0			50.8			50.8	
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)	110	50	4	37	37	422	6	1088	63	494	733	93
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	160	4	0	74	422	6	1151	0	494	733	93
Turn Type	Split	NA	pm+ov	Split	NA	pm+ov	pm+pt	NA		Prot	NA	Perm
Protected Phases	3	3	5	4	4	1	5	2		1	6	
Permitted Phases			3			4	2					6
Detector Phase	3	3	5	4	4	1	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	14.0		7.0	14.0	14.0
Minimum Split (s)	24.1	24.1	12.4	24.2	24.2	12.5	12.4	25.8		12.5	25.8	25.8
Total Split (s)	24.1	24.1	12.4	24.2	24.2	47.0	12.4	54.7		47.0	89.3	89.3
Total Split (%)	16.1%	16.1%	8.3%	16.1%	16.1%	31.3%	8.3%	36.5%		31.3%	59.5%	59.5%
Maximum Green (s)	18.0	18.0	7.0	18.0	18.0	41.5	7.0	46.9		41.5	81.5	81.5
Yellow Time (s)	4.1	4.1	3.0	3.0	3.0	3.1	3.0	5.8		3.1	5.8	5.8
All-Red Time (s)	2.0	2.0	2.4	3.2	3.2	2.4	2.4	2.0		2.4	2.0	2.0
Lost Time Adjust (s)		-1.1	-0.4			-1.2	-1.2	-0.4	-2.8	0.0	-2.8	-2.8
Total Lost Time (s)		5.0	5.0			5.0	4.3	5.0	5.0	5.5	5.0	5.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	6.0		2.0	6.0	6.0
Minimum Gap (s)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	3.4		0.2	3.4	3.4
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0		0.0	15.0	15.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.0		0.0	30.0	30.0
Recall Mode	None	None	None	None	None	None	None	Min		None	Min	Min
Act Effect Green (s)		16.6	24.0			11.7	59.5	57.0	49.6		41.6	91.9
Actuated g/C Ratio		0.12	0.17			0.08	0.42	0.41	0.35		0.30	0.66
v/c Ratio		0.75	0.01			0.50	0.65	0.02	0.93		0.94	0.32
Control Delay		82.0	33.0			74.0	37.9	13.8	57.0		75.5	12.3
Queue Delay		0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay		82.0	33.0		74.0	37.9	13.8	57.0		75.5	12.3	11.3
LOS		F	C		E	D	B	E		E	B	B
Approach Delay		80.8			43.3			56.8			35.9	
Approach LOS		F			D			E			D	
Queue Length 50th (ft)		143	2		66	308	2	536		448	131	27
Queue Length 95th (ft)		#235	11		122	434	7	#722		#712	234	68
Internal Link Dist (ft)		200			1766			3271			3276	
Turn Bay Length (ft)			75			600	150			150		50
Base Capacity (vph)		246	271		241	650	339	1249		525	2323	1038
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		0.65	0.01		0.31	0.65	0.02	0.92		0.94	0.32	0.09










Intersection Summary

Area Type: Other
 Cycle Length: 150
 Actuated Cycle Length: 140
 Natural Cycle: 150
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.94
 Intersection Signal Delay: 47.1
 Intersection Capacity Utilization 80.5%
 Analysis Period (min) 15
 Intersection LOS: D
 ICU Level of Service D

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

Splits and Phases: 1: NC 280 (Boylston Highway) & NC 191 (Haywood Road)

47 s	54.7 s	24.1 s	24.2 s
12.4 s	89.3 s		

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	417	115	14	327	130	20
Future Volume (vph)	417	115	14	327	130	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	12	12	10	10
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.971				0.982	
Flt Protected				0.998	0.958	
Satd. Flow (prot)	1748	0	0	1859	1636	0
Flt Permitted				0.998	0.958	
Satd. Flow (perm)	1748	0	0	1859	1636	0
Link Speed (mph)	45			45	45	
Link Distance (ft)	1846			5456	1563	
Travel Time (s)	28.0			82.7	23.7	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	463	128	16	363	144	22
Shared Lane Traffic (%)						
Lane Group Flow (vph)	591	0	0	379	166	0
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 44.0% ICU Level of Service A
 Analysis Period (min) 15

Intersection

Int Delay, s/veh 4.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	417	115	14	327	130	20
Future Vol, veh/h	417	115	14	327	130	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
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	463	128	16	363	144	22

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	591
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.12
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.218
Pot Cap-1 Maneuver	-	-	985
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	985
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	28.9
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	313	-	-	985	-
HCM Lane V/C Ratio	0.532	-	-	0.016	-
HCM Control Delay (s)	28.9	-	-	8.7	0
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	2.9	-	-	0	-

R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2017 AM
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	353	66	130	284	2	68	0	167	1	0	1
Future Volume (vph)	2	353	66	130	284	2	68	0	167	1	0	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	12
Storage Length (ft)	150		0	250		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
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		0.976			0.999			0.904			0.932	
Flt Protected	0.950			0.950				0.986			0.976	
Satd. Flow (prot)	1711	1757	0	1711	1799	0	0	1660	0	0	1694	0
Flt Permitted	0.568			0.260				0.904			0.870	
Satd. Flow (perm)	1023	1757	0	468	1799	0	0	1522	0	0	1510	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			45			25	
Link Distance (ft)		5456			7476			1256			553	
Travel Time (s)		82.7			113.3			19.0			15.1	
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)	2	392	73	144	316	2	76	0	186	1	0	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	2	465	0	144	318	0	0	262	0	0	2	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	12.0	12.0		7.0	12.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	18.3	18.3		12.6	18.3		13.3	13.3		13.3	13.3	
Total Split (s)	45.0	45.0		13.0	58.0		32.0	32.0		32.0	32.0	
Total Split (%)	50.0%	50.0%		14.4%	64.4%		35.6%	35.6%		35.6%	35.6%	
Maximum Green (s)	38.7	38.7		7.4	51.7		25.7	25.7		25.7	25.7	
Yellow Time (s)	4.6	4.6		3.0	4.6		4.5	4.5		4.5	4.5	
All-Red Time (s)	1.7	1.7		2.6	1.7		1.8	1.8		1.8	1.8	
Lost Time Adjust (s)	-1.3	-1.3		-0.6	-1.3			-1.3			-1.3	
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	6.0	6.0		1.0	6.0		1.0	1.0		1.0	1.0	
Minimum Gap (s)	3.0	3.0		0.2	3.0		0.2	0.2		0.2	0.2	
Time Before Reduce (s)	15.0	15.0		0.0	15.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	30.0	30.0		0.0	30.0		0.0	0.0		0.0	0.0	
Recall Mode	Min	Min		None	Min		None	None		None	None	
Act Effect Green (s)	22.9	22.9		32.3	32.3			16.1			16.1	
Actuated g/C Ratio	0.38	0.38		0.54	0.54			0.27			0.27	
v/c Ratio	0.01	0.69		0.33	0.33			0.64			0.00	
Control Delay	14.0	23.3		9.3	8.8			29.5			19.5	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	14.0	23.3		9.3	8.8			29.5				19.5
LOS	B	C		A	A			C				B
Approach Delay		23.2			8.9			29.5				19.5
Approach LOS		C			A			C				B
Queue Length 50th (ft)	1	140		21	52			84				1
Queue Length 95th (ft)	5	294		60	130			195				6
Internal Link Dist (ft)		5376			7396			1176				473
Turn Bay Length (ft)	150			250								
Base Capacity (vph)	714	1226		439	1540			816				809
Starvation Cap Reductn	0	0		0	0			0				0
Spillback Cap Reductn	0	0		0	0			0				0
Storage Cap Reductn	0	0		0	0			0				0
Reduced v/c Ratio	0.00	0.38		0.33	0.21			0.32				0.00

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 59.6
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.69
 Intersection Signal Delay: 19.0
 Intersection Capacity Utilization 57.6%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 3: SR 1426 (School House Road)/Water Treatment & NC 191 (Haywood Road)



R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2017 AM
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	400	37	64	322	98	56	148	120	104	83	55
Future Volume (vph)	65	400	37	64	322	98	56	148	120	104	83	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	12
Storage Length (ft)	150		0	125		0	100		0	125		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	100			100			100			100		
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		0.987			0.965			0.933			0.940	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1711	1777	0	1711	1738	0	1770	1738	0	1770	1751	0
Flt Permitted	0.239			0.210			0.950			0.950		
Satd. Flow (perm)	430	1777	0	378	1738	0	1770	1738	0	1770	1751	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			35			45	
Link Distance (ft)		7476			1829			1358			1857	
Travel Time (s)		113.3			27.7			26.5			28.1	
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)	72	444	41	71	358	109	62	164	133	116	92	61
Shared Lane Traffic (%)												
Lane Group Flow (vph)	72	485	0	71	467	0	62	297	0	116	153	0
Turn Type	pm+pt	NA		pm+pt	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases	2			6								
Detector Phase	5	2		1	6		4	4		3	3	
Switch Phase												
Minimum Initial (s)	7.0	12.0		7.0	12.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	11.6	17.9		11.9	17.9		12.1	12.1		13.1	13.1	
Total Split (s)	11.6	51.1		11.9	51.4		35.0	35.0		22.0	22.0	
Total Split (%)	9.7%	42.6%		9.9%	42.8%		29.2%	29.2%		18.3%	18.3%	
Maximum Green (s)	7.0	45.2		7.0	45.5		29.9	29.9		15.9	15.9	
Yellow Time (s)	3.0	4.6		3.0	4.6		3.9	3.9		5.1	5.1	
All-Red Time (s)	1.6	1.3		1.9	1.3		1.2	1.2		1.0	1.0	
Lost Time Adjust (s)	0.4	-0.9		0.1	-0.9		-0.1	-0.1		-1.1	-1.1	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	1.0	6.0		1.0	6.0		1.0	1.0		1.0	1.0	
Minimum Gap (s)	3.0	3.0		0.2	0.2		0.2	0.2		0.2	0.2	
Time Before Reduce (s)	0.0	15.0		0.0	15.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	30.0		0.0	30.0		0.0	0.0		0.0	0.0	
Recall Mode	None	Min		None	Min		None	None		None	None	
Act Effect Green (s)	34.7	29.8		35.1	30.0		19.3	19.3		13.1	13.1	
Actuated g/C Ratio	0.40	0.34		0.40	0.34		0.22	0.22		0.15	0.15	
v/c Ratio	0.26	0.80		0.26	0.78		0.16	0.78		0.44	0.59	
Control Delay	17.7	39.3		17.8	38.0		33.1	50.2		46.6	51.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	

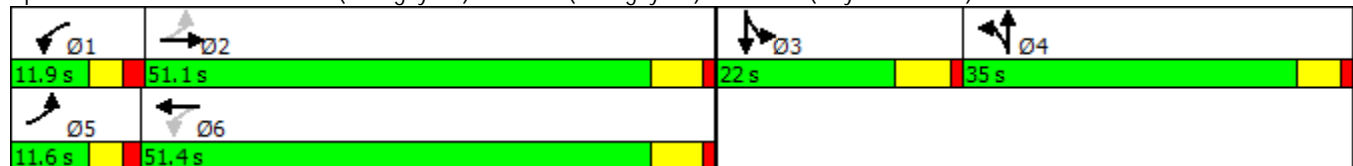
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	17.7	39.3		17.8	38.0		33.1	50.2		46.6	51.0	
LOS	B	D		B	D		C	D		D	D	
Approach Delay		36.5			35.4			47.3			49.1	
Approach LOS		D			D			D			D	
Queue Length 50th (ft)	22	248		21	236		29	160		61	83	
Queue Length 95th (ft)	56	444		56	426		75	310		145	186	
Internal Link Dist (ft)		7396			1749			1278			1777	
Turn Bay Length (ft)	150			125			100			125		
Base Capacity (vph)	277	1042		268	1025		675	663		382	378	
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	0.26	0.47		0.26	0.46		0.09	0.45		0.30	0.40	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 87.7
 Natural Cycle: 80
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.80
 Intersection Signal Delay: 40.4
 Intersection Capacity Utilization 66.8%
 Analysis Period (min) 15

Intersection LOS: D
 ICU Level of Service C

Splits and Phases: 4: SR 1309 (S Rugby Rd)/SR 1365 (N Rugby Rd) & NC 191 (Haywood Road)



	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗		↖	↗	↖	↗
Traffic Volume (vph)	588	12	28	484	19	53
Future Volume (vph)	588	12	28	484	19	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	10	10
Storage Length (ft)		0	225		0	100
Storage Lanes		0	1		1	1
Taper Length (ft)			25		100	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.997					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1795	0	1711	1801	1652	1478
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1795	0	1711	1801	1652	1478
Link Speed (mph)	45			45	25	
Link Distance (ft)	1829			653	1295	
Travel Time (s)	27.7			9.9	35.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	653	13	31	538	21	59
Shared Lane Traffic (%)						
Lane Group Flow (vph)	666	0	31	538	21	59
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 41.7% ICU Level of Service A
 Analysis Period (min) 15

Intersection

Int Delay, s/veh 1.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↻		↻	↻	↻	↻
Traffic Vol, veh/h	588	12	28	484	19	53
Future Vol, veh/h	588	12	28	484	19	53
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	225	-	0	100
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	653	13	31	538	21	59





















Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	667
Stage 1	-	-	660
Stage 2	-	-	600
Critical Hdwy	-	4.12	6.42
Critical Hdwy Stg 1	-	-	5.42
Critical Hdwy Stg 2	-	-	5.42
Follow-up Hdwy	-	2.218	3.518
Pot Cap-1 Maneuver	-	923	463
Stage 1	-	-	514
Stage 2	-	-	548
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	923	463
Mov Cap-2 Maneuver	-	-	182
Stage 1	-	-	514
Stage 2	-	-	530

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	17.5
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	182	463	-	-	923	-
HCM Lane V/C Ratio	0.116	0.127	-	-	0.034	-
HCM Control Delay (s)	27.4	13.9	-	-	9	-
HCM Lane LOS	D	B	-	-	A	-
HCM 95th %tile Q(veh)	0.4	0.4	-	-	0.1	-

R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2017 AM
09/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	96	550	4	3	452	47	4	0	5	30	0	50
Future Volume (vph)	96	550	4	3	452	47	4	0	5	30	0	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	12
Storage Length (ft)	350		0	225		225	0		0	0		300
Storage Lanes	1		0	1		1	0		0	0		1
Taper Length (ft)	25			100			100			100		
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		0.999				0.850		0.919				0.850
Flt Protected	0.950			0.950				0.980			0.950	
Satd. Flow (prot)	1711	1799	0	1711	1801	1531	0	1678	0	0	1770	1583
Flt Permitted	0.220			0.432				0.980			0.950	
Satd. Flow (perm)	396	1799	0	778	1801	1531	0	1678	0	0	1770	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		55			55			25			25	
Link Distance (ft)		653			1496			862			788	
Travel Time (s)		8.1			18.5			23.5			21.5	
Peak Hour Factor	0.50	0.90	0.90	0.90	0.90	0.50	0.90	0.50	0.90	0.50	0.50	0.50
Adj. Flow (vph)	192	611	4	3	502	94	4	0	6	60	0	100
Shared Lane Traffic (%)												
Lane Group Flow (vph)	192	615	0	3	502	94	0	10	0	0	60	100
Turn Type	pm+pt	NA		Perm	NA	pm+ov	Split	NA		Split	NA	pm+ov
Protected Phases	1	6			2	4	3	3		4	4	1
Permitted Phases	6			2		2						4
Detector Phase	1	6		2	2	4	3	3		4	4	1
Switch Phase												
Minimum Initial (s)	10.0	14.0		14.0	14.0	7.0	7.0	7.0		7.0	7.0	10.0
Minimum Split (s)	15.6	20.4		20.4	20.4	12.5	12.0	12.0		12.5	12.5	15.6
Total Split (s)	21.0	90.0		69.0	69.0	18.0	12.0	12.0		18.0	18.0	21.0
Total Split (%)	17.5%	75.0%		57.5%	57.5%	15.0%	10.0%	10.0%		15.0%	15.0%	17.5%
Maximum Green (s)	15.4	83.6		62.6	62.6	12.5	7.0	7.0		12.5	12.5	15.4
Yellow Time (s)	3.0	5.2		5.2	5.2	3.7	3.0	3.0		3.7	3.7	3.0
All-Red Time (s)	2.6	1.2		1.2	1.2	1.8	2.0	2.0		1.8	1.8	2.6
Lost Time Adjust (s)	-0.6	-1.4		-1.4	-1.4	-1.4		0.0			-0.5	-0.6
Total Lost Time (s)	5.0	5.0		5.0	5.0	4.1		5.0			5.0	5.0
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lead		Lag	Lag	Lead
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	2.0	6.0		6.0	6.0	2.0	2.0	2.0		2.0	2.0	2.0
Minimum Gap (s)	0.2	3.0		3.0	3.0	0.2	0.2	0.2		0.2	0.2	0.2
Time Before Reduce (s)	0.0	15.0		15.0	15.0	0.0	0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	30.0		30.0	30.0	0.0	0.0	0.0		0.0	0.0	0.0
Recall Mode	None	Min		Min	Min	None	None	None		None	None	None
Act Effect Green (s)	40.3	41.9		23.2	23.2	37.6		7.6			8.6	21.7
Actuated g/C Ratio	0.70	0.73		0.40	0.40	0.66		0.13			0.15	0.38
v/c Ratio	0.35	0.47		0.01	0.69	0.09		0.05			0.23	0.17
Control Delay	6.4	7.0		12.7	21.2	4.3		30.6			29.5	15.5
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0			0.0	0.0

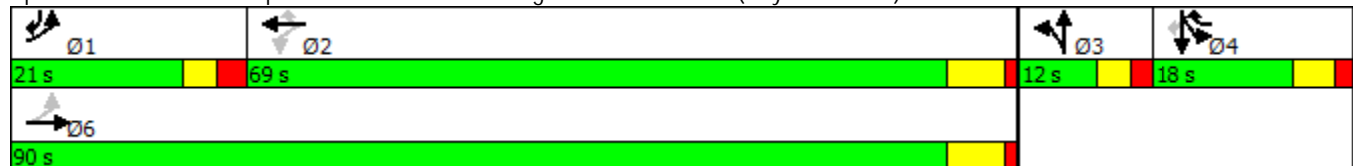
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	6.4	7.0		12.7	21.2	4.3		30.6			29.5	15.5
LOS	A	A		B	C	A		C			C	B
Approach Delay		6.8			18.5			30.6			20.7	
Approach LOS		A			B			C			C	
Queue Length 50th (ft)	17	75		1	131	10		3			18	19
Queue Length 95th (ft)	35	259		6	320	11		11			36	41
Internal Link Dist (ft)		573			1416			782			708	
Turn Bay Length (ft)	350			225		225						300
Base Capacity (vph)	675	1791		737	1706	1151		222			434	756
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	0.28	0.34		0.00	0.29	0.08		0.05			0.14	0.13

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 57.3
 Natural Cycle: 65
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.69
 Intersection Signal Delay: 12.8
 Intersection Capacity Utilization 59.2%
 Analysis Period (min) 15


















Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 6: Alpine Dr/West Henderson High School & NC 191 (Haywood Road)



R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2017 AM
09/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	518	1	1	424	4	1	0	1	4	0	65
Future Volume (vph)	80	518	1	1	424	4	1	0	1	4	0	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	10	10	10	10	10	10
Storage Length (ft)	225		0	0		0	0		0	0		0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
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					0.999			0.932			0.872	
Flt Protected	0.950							0.976			0.997	
Satd. Flow (prot)	1711	1801	0	0	1799	0	0	1581	0	0	1511	0
Flt Permitted	0.950							0.976			0.997	
Satd. Flow (perm)	1711	1801	0	0	1799	0	0	1581	0	0	1511	0
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		1496			911			590			1563	
Travel Time (s)		22.7			13.8			13.4			35.5	
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)	89	576	1	1	471	4	1	0	1	4	0	72
Shared Lane Traffic (%)												
Lane Group Flow (vph)	89	577	0	0	476	0	0	2	0	0	76	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 64.2%
 Analysis Period (min) 15
 ICU Level of Service C

Intersection

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Int Delay, s/veh	1.5											
Lane Configurations												
Traffic Vol, veh/h	80	518	1	1	424	4	1	0	1	4	0	65
Future Vol, veh/h	80	518	1	1	424	4	1	0	1	4	0	65
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	225	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	89	576	1	1	471	4	1	0	1	4	0	72

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	476	0	0	577	0	0	1266	1232	576	1230	1230	473
Stage 1	-	-	-	-	-	-	754	754	-	476	476	-
Stage 2	-	-	-	-	-	-	512	478	-	754	754	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1086	-	-	996	-	-	146	177	517	154	178	591
Stage 1	-	-	-	-	-	-	401	417	-	570	557	-
Stage 2	-	-	-	-	-	-	545	556	-	401	417	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1086	-	-	996	-	-	120	162	517	144	163	591
Mov Cap-2 Maneuver	-	-	-	-	-	-	120	162	-	144	163	-
Stage 1	-	-	-	-	-	-	368	383	-	523	556	-
Stage 2	-	-	-	-	-	-	478	555	-	367	383	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.1	0	23.7	13.5
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	195	1086	-	-	996	-	-	501
HCM Lane V/C Ratio	0.011	0.082	-	-	0.001	-	-	0.153
HCM Control Delay (s)	23.7	8.6	-	-	8.6	0	-	13.5
HCM Lane LOS	C	A	-	-	A	A	-	B
HCM 95th %tile Q(veh)	0	0.3	-	-	0	-	-	0.5

R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2017 AM
09/20/2017

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↙	↑	↖	↗
Traffic Volume (vph)	461	72	22	382	39	14
Future Volume (vph)	461	72	22	382	39	14
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	12	12
Storage Length (ft)		175	175		0	300
Storage Lanes		1	1		1	1
Taper Length (ft)			100		100	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1801	1531	1711	1801	1770	1583
Flt Permitted			0.143		0.950	
Satd. Flow (perm)	1801	1531	257	1801	1770	1583
Right Turn on Red		No				No
Satd. Flow (RTOR)						
Link Speed (mph)	45			45	30	
Link Distance (ft)	911			3670	692	
Travel Time (s)	13.8			55.6	15.7	
Peak Hour Factor	0.50	0.90	0.50	0.90	0.50	0.50
Adj. Flow (vph)	922	80	44	424	78	28
Shared Lane Traffic (%)						
Lane Group Flow (vph)	922	80	44	424	78	28
Turn Type	NA	pm+ov	pm+pt	NA	Prot	pm+ov
Protected Phases	6	4	5	2	4	5
Permitted Phases		6	2			4
Detector Phase	6	4	5	2	4	5
Switch Phase						
Minimum Initial (s)	12.0	7.0	7.0	12.0	7.0	7.0
Minimum Split (s)	18.0	13.0	13.0	18.0	13.0	13.0
Total Split (s)	64.0	13.0	13.0	77.0	13.0	13.0
Total Split (%)	71.1%	14.4%	14.4%	85.6%	14.4%	14.4%
Maximum Green (s)	58.0	7.0	7.0	71.0	7.0	7.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag		Lead			Lead
Lead-Lag Optimize?	Yes		Yes			Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	Min	None	None	Min	None	None
Act Effct Green (s)	45.3	56.2	49.8	51.7	9.1	18.8
Actuated g/C Ratio	0.70	0.86	0.76	0.79	0.14	0.29
v/c Ratio	0.74	0.06	0.11	0.30	0.32	0.06
Control Delay	15.0	2.0	2.7	3.3	37.5	23.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.0	2.0	2.7	3.3	37.5	23.8
LOS	B	A	A	A	D	C
Approach Delay	13.9			3.2	33.9	

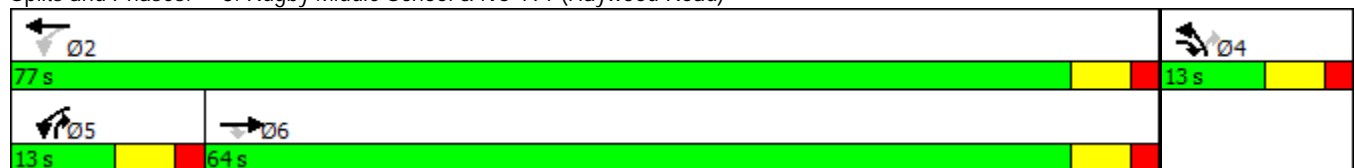
Lane Group	→ EBT	↘ EBR	↙ WBL	← WBT	↖ NBL	↗ NBR
Approach LOS	B			A	C	
Queue Length 50th (ft)	329	7	4	46	32	9
Queue Length 95th (ft)	164	15	5	70	47	19
Internal Link Dist (ft)	831			3590	612	
Turn Bay Length (ft)		175	175			300
Base Capacity (vph)	1524	1322	399	1694	247	456
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.60	0.06	0.11	0.25	0.32	0.06

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 65.1
 Natural Cycle: 70
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.74
 Intersection Signal Delay: 12.1
 Intersection Capacity Utilization 38.4%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 8: Rugby Middle School & NC 191 (Haywood Road)



R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2017 AM
09/20/2017

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	150	344	0	0	273	117	0	5	0	113	2	116
Future Volume (vph)	150	344	0	0	273	117	0	5	0	113	2	116
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	12
Storage Length (ft)	125		0	125		0	0		0	0		150
Storage Lanes	1		0	1		0	0		0	0		1
Taper Length (ft)	100			100			100			100		
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					0.955							0.850
Flt Protected	0.950										0.953	
Satd. Flow (prot)	1711	1801	0	1801	1720	0	0	1863	0	0	1775	1583
Flt Permitted	0.277										0.953	
Satd. Flow (perm)	499	1801	0	1801	1720	0	0	1863	0	0	1775	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			25			35	
Link Distance (ft)		3670			2566			1006			2428	
Travel Time (s)		55.6			38.9			27.4			47.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	167	382	0	0	303	130	0	6	0	126	2	129
Shared Lane Traffic (%)												
Lane Group Flow (vph)	167	382	0	0	433	0	0	6	0	0	128	129
Turn Type	pm+pt	NA		Perm	NA			NA		Split	NA	pm+ov
Protected Phases	1	6			2		4	4		3	3	1
Permitted Phases	6			2								3
Detector Phase	1	6		2	2		4	4		3	3	1
Switch Phase												
Minimum Initial (s)	7.0	12.0		12.0	12.0		7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	12.5	19.0		19.0	19.0		12.6	12.6		12.6	12.6	12.5
Total Split (s)	19.0	82.0		63.0	63.0		13.0	13.0		25.0	25.0	19.0
Total Split (%)	15.8%	68.3%		52.5%	52.5%		10.8%	10.8%		20.8%	20.8%	15.8%
Maximum Green (s)	13.5	75.0		56.0	56.0		7.4	7.4		19.4	19.4	13.5
Yellow Time (s)	4.5	5.0		5.0	5.0		4.0	4.0		4.0	4.0	4.5
All-Red Time (s)	1.0	2.0		2.0	2.0		1.6	1.6		1.6	1.6	1.0
Lost Time Adjust (s)	-0.5	-2.0		-2.0	-2.0			-0.6			-0.6	-0.6
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	4.9
Lead/Lag	Lead			Lag	Lag		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	1.0	6.0		6.0	6.0		2.0	2.0		2.0	2.0	1.0
Minimum Gap (s)	0.2	3.0		3.0	3.0		0.2	0.2		0.2	0.2	0.2
Time Before Reduce (s)	0.0	20.0		20.0	20.0		0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	30.0		30.0	30.0		0.0	0.0		0.0	0.0	0.0
Recall Mode	None	Min		Min	Min		None	None		None	None	None
Act Effect Green (s)	37.4	39.2			22.8			8.6			10.7	20.3
Actuated g/C Ratio	0.66	0.70			0.40			0.15			0.19	0.36
v/c Ratio	0.32	0.31			0.62			0.02			0.38	0.23
Control Delay	7.5	6.9			20.0			31.4			28.9	13.3
Queue Delay	0.0	0.0			0.0			0.0			0.0	0.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	7.5	6.9			20.0			31.4			28.9	13.3
LOS	A	A			C			C			C	B
Approach Delay		7.1			20.0			31.4			21.1	
Approach LOS		A			C			C			C	
Queue Length 50th (ft)	17	45			104			2			36	24
Queue Length 95th (ft)	72	168			298			16			123	74
Internal Link Dist (ft)		3590			2486			926			2348	
Turn Bay Length (ft)	125											150
Base Capacity (vph)	670	1741			1589			298			710	761
Starvation Cap Reductn	0	0			0			0			0	0
Spillback Cap Reductn	0	0			0			0			0	0
Storage Cap Reductn	0	0			0			0			0	0
Reduced v/c Ratio	0.25	0.22			0.27			0.02			0.18	0.17

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 56.4
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.62
 Intersection Signal Delay: 14.6
 Intersection Capacity Utilization 55.3%
 Analysis Period (min) 15






















Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 9: SR 1444 (Leverette Drive)/SR 1381 (Mountain Road) & NC 191 (Haywood Road)



R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2017 PM
09/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	33	5	57	45	445	4	660	33	380	979	99
Future Volume (vph)	84	33	5	57	45	445	4	660	33	380	979	99
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	12	12	12	12	12	12
Storage Length (ft)	0		75	0		600	150		0	150		50
Storage Lanes	0		1	0		1	1		0	1		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt			0.850			0.850		0.993				0.850
Flt Protected		0.965			0.973		0.950			0.950		
Satd. Flow (prot)	0	1798	1583	0	1752	1531	1770	3514	0	1770	3539	1583
Flt Permitted		0.965			0.973		0.263			0.950		
Satd. Flow (perm)	0	1798	1583	0	1752	1531	490	3514	0	1770	3539	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		20			45			45			45	
Link Distance (ft)		280			1846			3351			3356	
Travel Time (s)		9.5			28.0			50.8			50.8	
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)	93	37	6	63	50	494	4	733	37	422	1088	110
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	130	6	0	113	494	4	770	0	422	1088	110
Turn Type	Split	NA	pm+ov	Split	NA	pm+ov	pm+pt	NA		Prot	NA	Perm
Protected Phases	3	3	5	4	4	1	5	2		1	6	
Permitted Phases			3			4	2					6
Detector Phase	3	3	5	4	4	1	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	14.0		7.0	14.0	14.0
Minimum Split (s)	24.1	24.1	12.4	24.2	24.2	12.5	12.4	25.8		12.5	25.8	25.8
Total Split (s)	24.1	24.1	12.4	24.2	24.2	37.0	12.4	34.7		37.0	59.3	59.3
Total Split (%)	20.1%	20.1%	10.3%	20.2%	20.2%	30.8%	10.3%	28.9%		30.8%	49.4%	49.4%
Maximum Green (s)	18.0	18.0	7.0	18.0	18.0	31.5	7.0	26.9		31.5	51.5	51.5
Yellow Time (s)	4.1	4.1	3.0	3.0	3.0	3.1	3.0	5.8		3.1	5.8	5.8
All-Red Time (s)	2.0	2.0	2.4	3.2	3.2	2.4	2.4	2.0		2.4	2.0	2.0
Lost Time Adjust (s)		-1.1	-0.4			-1.2	-1.2	-0.4	-2.8	0.0	-2.8	-2.8
Total Lost Time (s)		5.0	5.0			5.0	4.3	5.0	5.0	5.5	5.0	5.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	6.0		2.0	6.0	6.0
Minimum Gap (s)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	3.4		0.2	3.4	3.4
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0		0.0	15.0	15.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.0		0.0	30.0	30.0
Recall Mode	None	None	None	None	None	None	None	Min		None	Min	Min
Act Effct Green (s)		13.1	20.7			12.6	47.1	35.1	27.5		28.2	59.2
Actuated g/C Ratio		0.13	0.20			0.12	0.46	0.34	0.27		0.28	0.58
v/c Ratio		0.57	0.02			0.53	0.70	0.02	0.82		0.87	0.53
Control Delay		54.1	21.4			53.9	29.2	14.5	44.6		55.7	16.1
Queue Delay		0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay		54.1	21.4		53.9	29.2	14.5	44.6		55.7	16.1	12.8
LOS		D	C		D	C	B	D		E	B	B
Approach Delay		52.7			33.8			44.4			26.2	
Approach LOS		D			C			D			C	
Queue Length 50th (ft)		86	2		75	260	1	258		269	199	29
Queue Length 95th (ft)		155	10		139	420	6	#404		#500	413	85
Internal Link Dist (ft)		200			1766			3271			3276	
Turn Bay Length (ft)			75			600	150			150		50
Base Capacity (vph)		342	319		336	764	262	1042		557	2116	946
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		0.38	0.02		0.34	0.65	0.02	0.74		0.76	0.51	0.12










Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 102.4
 Natural Cycle: 110
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.87
 Intersection Signal Delay: 33.3
 Intersection Capacity Utilization 66.3%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Intersection LOS: C
 ICU Level of Service C

Splits and Phases: 1: NC 280 (Boylston Highway) & NC 191 (Haywood Road)

Ø1	Ø2	Ø3	Ø4
37 s	34.7 s	24.1 s	24.2 s
Ø5	Ø6		
12.4 s	59.3 s		

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	327	130	20	417	115	14
Future Volume (vph)	327	130	20	417	115	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	12	12	10	10
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.962				0.985	
Flt Protected				0.998	0.957	
Satd. Flow (prot)	1732	0	0	1859	1639	0
Flt Permitted				0.998	0.957	
Satd. Flow (perm)	1732	0	0	1859	1639	0
Link Speed (mph)	45			45	45	
Link Distance (ft)	1846			5456	1563	
Travel Time (s)	28.0			82.7	23.7	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	363	144	22	463	128	16
Shared Lane Traffic (%)						
Lane Group Flow (vph)	507	0	0	485	144	0
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 52.1% ICU Level of Service A
 Analysis Period (min) 15

Intersection

Int Delay, s/veh 3.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	327	130	20	417	115	14
Future Vol, veh/h	327	130	20	417	115	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
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	363	144	22	463	128	16

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	944
Stage 1	-	-	436
Stage 2	-	-	508
Critical Hdwy	-	4.12	6.42
Critical Hdwy Stg 1	-	-	5.42
Critical Hdwy Stg 2	-	-	5.42
Follow-up Hdwy	-	2.218	3.518
Pot Cap-1 Maneuver	-	1057	291
Stage 1	-	-	652
Stage 2	-	-	604
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	1057	283
Mov Cap-2 Maneuver	-	-	283
Stage 1	-	-	652
Stage 2	-	-	587

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	27.4
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	301	-	-	1057	-
HCM Lane V/C Ratio	0.476	-	-	0.021	-
HCM Control Delay (s)	27.4	-	-	8.5	0
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	2.4	-	-	0.1	-

R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2017 PM
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	284	68	167	353	1	66	0	130	2	0	2
Future Volume (vph)	1	284	68	167	353	1	66	0	130	2	0	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	12
Storage Length (ft)	150		0	250		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
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		0.971						0.910			0.932	
Flt Protected	0.950			0.950				0.983			0.976	
Satd. Flow (prot)	1711	1748	0	1711	1801	0	0	1666	0	0	1694	0
Flt Permitted	0.530			0.307				0.886			0.853	
Satd. Flow (perm)	954	1748	0	553	1801	0	0	1502	0	0	1481	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			45			25	
Link Distance (ft)		5456			7476			1256			553	
Travel Time (s)		82.7			113.3			19.0			15.1	
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)	1	316	76	186	392	1	73	0	144	2	0	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	392	0	186	393	0	0	217	0	0	4	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	12.0	12.0		7.0	12.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	18.3	18.3		12.6	18.3		13.3	13.3		13.3	13.3	
Total Split (s)	44.0	44.0		16.0	60.0		30.0	30.0		30.0	30.0	
Total Split (%)	48.9%	48.9%		17.8%	66.7%		33.3%	33.3%		33.3%	33.3%	
Maximum Green (s)	37.7	37.7		10.4	53.7		23.7	23.7		23.7	23.7	
Yellow Time (s)	4.6	4.6		3.0	4.6		4.5	4.5		4.5	4.5	
All-Red Time (s)	1.7	1.7		2.6	1.7		1.8	1.8		1.8	1.8	
Lost Time Adjust (s)	-1.3	-1.3		-0.6	-1.3			-1.3			-1.3	
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	6.0	6.0		1.0	6.0		1.0	1.0		1.0	1.0	
Minimum Gap (s)	3.0	3.0		0.2	3.0		0.2	0.2		0.2	0.2	
Time Before Reduce (s)	15.0	15.0		0.0	15.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	30.0	30.0		0.0	30.0		0.0	0.0		0.0	0.0	
Recall Mode	Min	Min		None	Min		None	None		None	None	
Act Effect Green (s)	20.0	20.0		33.8	33.8			13.6			13.6	
Actuated g/C Ratio	0.35	0.35		0.58	0.58			0.24			0.24	
v/c Ratio	0.00	0.65		0.38	0.37			0.62			0.01	
Control Delay	14.0	22.3		8.5	8.1			29.4			19.2	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	14.0	22.3		8.5	8.1			29.4				19.2
LOS	B	C		A	A			C				B
Approach Delay		22.3			8.2			29.4				19.3
Approach LOS		C			A			C				B
Queue Length 50th (ft)	0	104		25	59			63				1
Queue Length 95th (ft)	3	236		67	144			157				8
Internal Link Dist (ft)		5376			7396			1176				473
Turn Bay Length (ft)	150			250								
Base Capacity (vph)	671	1230		553	1644			677				668
Starvation Cap Reductn	0	0		0	0			0				0
Spillback Cap Reductn	0	0		0	0			0				0
Storage Cap Reductn	0	0		0	0			0				0
Reduced v/c Ratio	0.00	0.32		0.34	0.24			0.32				0.01

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 57.8
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.65
 Intersection Signal Delay: 16.7
 Intersection Capacity Utilization 54.2%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 3: SR 1426 (School House Road)/Water Treatment & NC 191 (Haywood Road)



R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2017 PM
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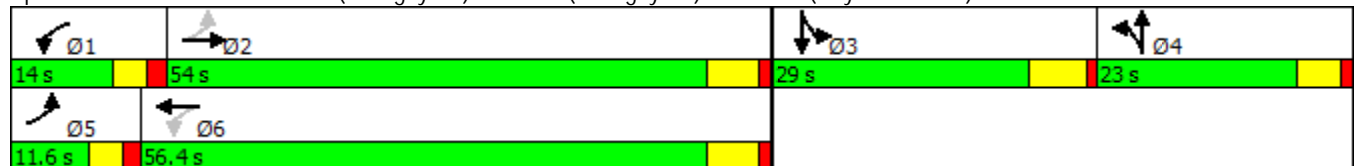
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	322	56	120	400	104	37	83	64	98	148	65
Future Volume (vph)	55	322	56	120	400	104	37	83	64	98	148	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	12
Storage Length (ft)	150		0	125		0	100		0	125		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	100			100			100			100		
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		0.978			0.969			0.935			0.954	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1711	1761	0	1711	1745	0	1770	1742	0	1770	1777	0
Flt Permitted	0.228			0.290			0.950			0.950		
Satd. Flow (perm)	411	1761	0	522	1745	0	1770	1742	0	1770	1777	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			35			45	
Link Distance (ft)		7476			1829			1358			1857	
Travel Time (s)		113.3			27.7			26.5			28.1	
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)	61	358	62	133	444	116	41	92	71	109	164	72
Shared Lane Traffic (%)												
Lane Group Flow (vph)	61	420	0	133	560	0	41	163	0	109	236	0
Turn Type	pm+pt	NA		pm+pt	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases	2			6								
Detector Phase	5	2		1	6		4	4		3	3	
Switch Phase												
Minimum Initial (s)	7.0	12.0		7.0	12.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	11.6	17.9		11.9	17.9		12.1	12.1		13.1	13.1	
Total Split (s)	11.6	54.0		14.0	56.4		23.0	23.0		29.0	29.0	
Total Split (%)	9.7%	45.0%		11.7%	47.0%		19.2%	19.2%		24.2%	24.2%	
Maximum Green (s)	7.0	48.1		9.1	50.5		17.9	17.9		22.9	22.9	
Yellow Time (s)	3.0	4.6		3.0	4.6		3.9	3.9		5.1	5.1	
All-Red Time (s)	1.6	1.3		1.9	1.3		1.2	1.2		1.0	1.0	
Lost Time Adjust (s)	0.4	-0.9		0.1	-0.9		-0.1	-0.1		-1.1	-1.1	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	1.0	6.0		1.0	6.0		1.0	1.0		1.0	1.0	
Minimum Gap (s)	3.0	3.0		0.2	0.2		0.2	0.2		0.2	0.2	
Time Before Reduce (s)	0.0	15.0		0.0	15.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	30.0		0.0	30.0		0.0	0.0		0.0	0.0	
Recall Mode	None	Min		None	Min		None	None		None	None	
Act Effect Green (s)	39.3	32.2		43.0	37.0		12.5	12.5		16.8	16.8	
Actuated g/C Ratio	0.43	0.35		0.47	0.41		0.14	0.14		0.18	0.18	
v/c Ratio	0.22	0.67		0.38	0.79		0.17	0.68		0.33	0.72	
Control Delay	15.2	31.4		16.5	35.1		42.2	57.1		39.5	51.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	15.2	31.4		16.5	35.1		42.2	57.1		39.5	51.4	
LOS	B	C		B	D		D	E		D	D	
Approach Delay		29.3			31.5			54.1			47.7	
Approach LOS		C			C			D			D	
Queue Length 50th (ft)	17	197		39	290		21	91		55	129	
Queue Length 95th (ft)	45	356		86	503		63	195		128	260	
Internal Link Dist (ft)		7396			1749			1278			1777	
Turn Bay Length (ft)	150			125			100			125		
Base Capacity (vph)	277	1013		376	1054		374	368		499	501	
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	0.22	0.41		0.35	0.53		0.11	0.44		0.22	0.47	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 91.1
 Natural Cycle: 80
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.79
 Intersection Signal Delay: 36.8
 Intersection Capacity Utilization 67.5%
 Analysis Period (min) 15
 Intersection LOS: D
 ICU Level of Service C

Splits and Phases: 4: SR 1309 (S Rugby Rd)/SR 1365 (N Rugby Rd) & NC 191 (Haywood Road)



	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗		↖	↗	↖	↗
Traffic Volume (vph)	484	19	53	588	12	28
Future Volume (vph)	484	19	53	588	12	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	10	10
Storage Length (ft)		0	225		0	100
Storage Lanes		0	1		1	1
Taper Length (ft)			25		100	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.995					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1792	0	1711	1801	1652	1478
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1792	0	1711	1801	1652	1478
Link Speed (mph)	45			45	25	
Link Distance (ft)	1829			653	1295	
Travel Time (s)	27.7			9.9	35.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	538	21	59	653	13	31
Shared Lane Traffic (%)						
Lane Group Flow (vph)	559	0	59	653	13	31
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 43.3% ICU Level of Service A
 Analysis Period (min) 15

Intersection

Int Delay, s/veh	1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	484	19	53	588	12	28
Future Vol, veh/h	484	19	53	588	12	28
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	225	-	0	100
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	538	21	59	653	13	31

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	559	0	1319	548
Stage 1	-	-	-	-	548	-
Stage 2	-	-	-	-	771	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1012	-	173	536
Stage 1	-	-	-	-	579	-
Stage 2	-	-	-	-	456	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1012	-	163	536
Mov Cap-2 Maneuver	-	-	-	-	163	-
Stage 1	-	-	-	-	579	-
Stage 2	-	-	-	-	429	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	17.2
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	163	536	-	-	1012	-
HCM Lane V/C Ratio	0.082	0.058	-	-	0.058	-
HCM Control Delay (s)	29	12.1	-	-	8.8	-
HCM Lane LOS	D	B	-	-	A	-
HCM 95th %tile Q(veh)	0.3	0.2	-	-	0.2	-

R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2017 PM
09/20/2017

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	452	4	5	550	30	4	0	3	47	0	96
Future Volume (vph)	50	452	4	5	550	30	4	0	3	47	0	96
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	12
Storage Length (ft)	350		0	225		225	0		0	0		300
Storage Lanes	1		0	1		1	0		0	0		1
Taper Length (ft)	25			100			100			100		
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		0.999				0.850		0.942				0.850
Flt Protected	0.950			0.950				0.972			0.950	
Satd. Flow (prot)	1711	1799	0	1711	1801	1531	0	1706	0	0	1770	1583
Flt Permitted	0.171			0.478				0.972			0.950	
Satd. Flow (perm)	308	1799	0	861	1801	1531	0	1706	0	0	1770	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		55			55			25			25	
Link Distance (ft)		653			1496			862			788	
Travel Time (s)		8.1			18.5			23.5			21.5	
Peak Hour Factor	0.50	0.90	0.90	0.90	0.90	0.50	0.90	0.50	0.90	0.50	0.50	0.50
Adj. Flow (vph)	100	502	4	6	611	60	4	0	3	94	0	192
Shared Lane Traffic (%)												
Lane Group Flow (vph)	100	506	0	6	611	60	0	7	0	0	94	192
Turn Type	pm+pt	NA		Perm	NA	pm+ov	Split	NA		Split	NA	pm+ov
Protected Phases	1	6			2	4	3	3		4	4	1
Permitted Phases	6			2		2						4
Detector Phase	1	6		2	2	4	3	3		4	4	1
Switch Phase												
Minimum Initial (s)	10.0	14.0		14.0	14.0	7.0	7.0	7.0		7.0	7.0	10.0
Minimum Split (s)	15.6	20.4		20.4	20.4	12.5	12.0	12.0		12.5	12.5	15.6
Total Split (s)	20.0	89.0		69.0	69.0	19.0	12.0	12.0		19.0	19.0	20.0
Total Split (%)	16.7%	74.2%		57.5%	57.5%	15.8%	10.0%	10.0%		15.8%	15.8%	16.7%
Maximum Green (s)	14.4	82.6		62.6	62.6	13.5	7.0	7.0		13.5	13.5	14.4
Yellow Time (s)	3.0	5.2		5.2	5.2	3.7	3.0	3.0		3.7	3.7	3.0
All-Red Time (s)	2.6	1.2		1.2	1.2	1.8	2.0	2.0		1.8	1.8	2.6
Lost Time Adjust (s)	-0.6	-1.4		-1.4	-1.4	-1.4		0.0			-0.5	-0.6
Total Lost Time (s)	5.0	5.0		5.0	5.0	4.1		5.0			5.0	5.0
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lead		Lag	Lag	Lead
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	2.0	6.0		6.0	6.0	2.0	2.0	2.0		2.0	2.0	2.0
Minimum Gap (s)	0.2	3.0		3.0	3.0	0.2	0.2	0.2		0.2	0.2	0.2
Time Before Reduce (s)	0.0	15.0		15.0	15.0	0.0	0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	30.0		30.0	30.0	0.0	0.0	0.0		0.0	0.0	0.0
Recall Mode	None	Min		Min	Min	None	None	None		None	None	None
Act Effect Green (s)	46.6	48.3		29.4	29.4	45.2		7.7			9.9	22.9
Actuated g/C Ratio	0.72	0.75		0.45	0.45	0.70		0.12			0.15	0.35
v/c Ratio	0.21	0.38		0.02	0.75	0.06		0.03			0.35	0.34
Control Delay	5.6	6.2		11.8	22.5	3.4		36.3			34.4	20.8
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0			0.0	0.0

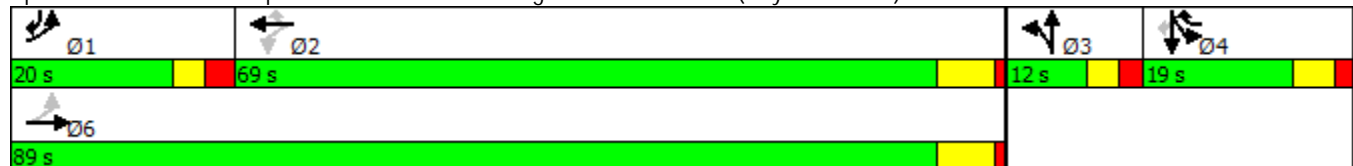
Lane Group												
Total Delay	5.6	6.2		11.8	22.5	3.4		36.3			34.4	20.8
LOS	A	A		B	C	A		D			C	C
Approach Delay		6.1			20.7			36.3			25.3	
Approach LOS		A			C			D			C	
Queue Length 50th (ft)	9	62		1	181	6		2			32	46
Queue Length 95th (ft)	22	214		9	424	7		11			57	84
Internal Link Dist (ft)		573			1416			782			708	
Turn Bay Length (ft)	350			225		225						300
Base Capacity (vph)	579	1736		789	1651	1200		203			421	676
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	0.17	0.29		0.01	0.37	0.05		0.03			0.22	0.28

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 64.8
 Natural Cycle: 75
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.75
 Intersection Signal Delay: 16.0
 Intersection Capacity Utilization 55.6%
 Analysis Period (min) 15


















Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 6: Alpine Dr/West Henderson High School & NC 191 (Haywood Road)



R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2017 PM
09/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	64	424	1	1	518	4	1	0	1	4	0	79
Future Volume (vph)	64	424	1	1	518	4	1	0	1	4	0	79
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	10	10	10	10	10	10
Storage Length (ft)	235		0	0		0	0		0	0		0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
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					0.999			0.932				0.871
Flt Protected	0.950							0.976				0.998
Satd. Flow (prot)	1711	1801	0	0	1799	0	0	1581	0	0	1511	0
Flt Permitted	0.950							0.976				0.998
Satd. Flow (perm)	1711	1801	0	0	1799	0	0	1581	0	0	1511	0
Link Speed (mph)		45			45			30				30
Link Distance (ft)		1496			911			590				1563
Travel Time (s)		22.7			13.8			13.4				35.5
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)	71	471	1	1	576	4	1	0	1	4	0	88
Shared Lane Traffic (%)												
Lane Group Flow (vph)	71	472	0	0	581	0	0	2	0	0	92	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 63.5%
 Analysis Period (min) 15
 ICU Level of Service B













Intersection







Int Delay, s/veh	1.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	64	424	1	1	518	4	1	0	1	4	0	79
Future Vol, veh/h	64	424	1	1	518	4	1	0	1	4	0	79
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	235	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	71	471	1	1	576	4	1	0	1	4	0	88

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	580	0	0	472	0	0	1238	1196	472	1194	1194	578
Stage 1	-	-	-	-	-	-	614	614	-	580	580	-
Stage 2	-	-	-	-	-	-	624	582	-	614	614	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	994	-	-	1090	-	-	152	186	592	163	187	516
Stage 1	-	-	-	-	-	-	479	483	-	500	500	-
Stage 2	-	-	-	-	-	-	473	499	-	479	483	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	994	-	-	1090	-	-	119	173	592	154	173	516
Mov Cap-2 Maneuver	-	-	-	-	-	-	119	173	-	154	173	-
Stage 1	-	-	-	-	-	-	445	449	-	464	500	-
Stage 2	-	-	-	-	-	-	392	499	-	444	449	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.2	0	23.4	14.7
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	198	994	-	-	1090	-	-	463
HCM Lane V/C Ratio	0.011	0.072	-	-	0.001	-	-	0.199
HCM Control Delay (s)	23.4	8.9	-	-	8.3	0	-	14.7
HCM Lane LOS	C	A	-	-	A	A	-	B
HCM 95th %tile Q(veh)	0	0.2	-	-	0	-	-	0.7

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	382	38	14	461	72	22
Future Volume (vph)	382	38	14	461	72	22
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	12	12
Storage Length (ft)		175	175		0	350
Storage Lanes		1	1		1	1
Taper Length (ft)			100		100	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1801	1531	1711	1801	1770	1583
Flt Permitted			0.345		0.950	
Satd. Flow (perm)	1801	1531	621	1801	1770	1583
Right Turn on Red		No				No
Satd. Flow (RTOR)						
Link Speed (mph)	45			45	30	
Link Distance (ft)	911			3670	692	
Travel Time (s)	13.8			55.6	15.7	
Peak Hour Factor	0.90	0.50	0.50	0.90	0.50	0.50
Adj. Flow (vph)	424	76	28	512	144	44
Shared Lane Traffic (%)						
Lane Group Flow (vph)	424	76	28	512	144	44
Turn Type	NA	pm+ov	pm+pt	NA	Prot	pm+ov
Protected Phases	6	4	5	2	4	5
Permitted Phases		6	2			4
Detector Phase	6	4	5	2	4	5
Switch Phase						
Minimum Initial (s)	12.0	7.0	7.0	12.0	7.0	7.0
Minimum Split (s)	18.0	13.0	13.0	18.0	13.0	13.0
Total Split (s)	50.0	25.0	15.0	65.0	25.0	15.0
Total Split (%)	55.6%	27.8%	16.7%	72.2%	27.8%	16.7%
Maximum Green (s)	44.0	19.0	9.0	59.0	19.0	9.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag		Lead			Lead
Lead-Lag Optimize?	Yes		Yes			Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	Min	None	None	Min	None	None
Act Effct Green (s)	22.5	36.0	27.8	29.1	10.3	20.7
Actuated g/C Ratio	0.50	0.80	0.62	0.64	0.23	0.46
v/c Ratio	0.47	0.06	0.05	0.44	0.36	0.06
Control Delay	14.7	3.0	4.7	7.3	20.6	8.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.7	3.0	4.7	7.3	20.6	8.8
LOS	B	A	A	A	C	A
Approach Delay	13.0			7.2	17.8	

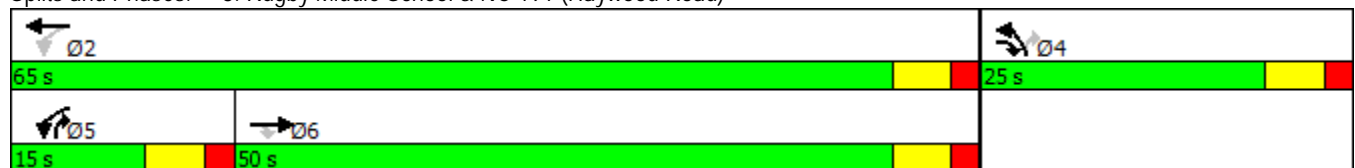
Lane Group						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Approach LOS	B			A	B	
Queue Length 50th (ft)	102	7	3	67	35	6
Queue Length 95th (ft)	201	8	6	149	47	13
Internal Link Dist (ft)	831			3590	612	
Turn Bay Length (ft)		175	175			350
Base Capacity (vph)	1632	1371	640	1792	840	798
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.06	0.04	0.29	0.17	0.06

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 45.2
 Natural Cycle: 45
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.47
 Intersection Signal Delay: 11.2
 Intersection Capacity Utilization 38.4%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 8: Rugby Middle School & NC 191 (Haywood Road)



R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2017 PM
09/20/2017

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	116	273	0	0	344	113	0	2	0	117	5	150
Future Volume (vph)	116	273	0	0	344	113	0	2	0	117	5	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	12
Storage Length (ft)	125		0	125		0	0		0	0		150
Storage Lanes	1		0	1		0	0		0	0		1
Taper Length (ft)	100			100			100			100		
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					0.963							0.850
Flt Protected	0.950										0.954	
Satd. Flow (prot)	1711	1801	0	1801	1734	0	0	1863	0	0	1777	1583
Flt Permitted	0.217										0.954	
Satd. Flow (perm)	391	1801	0	1801	1734	0	0	1863	0	0	1777	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			25				35
Link Distance (ft)		3670			2566			1006				2428
Travel Time (s)		55.6			38.9			27.4				47.3
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	129	303	0	0	382	126	0	2	0	130	6	167
Shared Lane Traffic (%)												
Lane Group Flow (vph)	129	303	0	0	508	0	0	2	0	0	136	167
Turn Type	pm+pt	NA		Perm	NA			NA		Split	NA	pm+ov
Protected Phases	1	6			2		4	4		3	3	1
Permitted Phases	6			2								3
Detector Phase	1	6		2	2		4	4		3	3	1
Switch Phase												
Minimum Initial (s)	7.0	12.0		12.0	12.0		7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	12.5	19.0		19.0	19.0		12.6	12.6		12.6	12.6	12.5
Total Split (s)	18.0	82.0		64.0	64.0		13.0	13.0		25.0	25.0	18.0
Total Split (%)	15.0%	68.3%		53.3%	53.3%		10.8%	10.8%		20.8%	20.8%	15.0%
Maximum Green (s)	12.5	75.0		57.0	57.0		7.4	7.4		19.4	19.4	12.5
Yellow Time (s)	4.5	5.0		5.0	5.0		4.0	4.0		4.0	4.0	4.5
All-Red Time (s)	1.0	2.0		2.0	2.0		1.6	1.6		1.6	1.6	1.0
Lost Time Adjust (s)	-0.5	-2.0		-2.0	-2.0			-0.6			-0.6	-0.6
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	4.9
Lead/Lag	Lead			Lag	Lag		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	1.0	6.0		6.0	6.0		1.0	1.0		2.0	2.0	1.0
Minimum Gap (s)	0.2	3.0		3.0	3.0		0.2	0.2		0.2	0.2	0.2
Time Before Reduce (s)	0.0	20.0		20.0	20.0		0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	30.0		30.0	30.0		0.0	0.0		0.0	0.0	0.0
Recall Mode	None	Min		Min	Min		None	None		None	None	None
Act Effect Green (s)	39.3	39.3			25.6			8.2			11.0	24.2
Actuated g/C Ratio	0.63	0.63			0.41			0.13			0.18	0.39
v/c Ratio	0.31	0.27			0.72			0.01			0.44	0.27
Control Delay	7.7	6.8			22.6			34.0			31.8	15.4
Queue Delay	0.0	0.0			0.0			0.0			0.0	0.0

Lane Group												
Total Delay	7.7	6.8			22.6			34.0			31.8	15.4
LOS	A	A			C			C			C	B
Approach Delay		7.1			22.6			34.0			22.8	
Approach LOS		A			C			C			C	
Queue Length 50th (ft)	13	35			132			1			41	36
Queue Length 95th (ft)	59	132			360			8			137	107
Internal Link Dist (ft)		3590			2486			926			2348	
Turn Bay Length (ft)	125											150
Base Capacity (vph)	540	1721			1577			256			610	753
Starvation Cap Reductn	0	0			0			0			0	0
Spillback Cap Reductn	0	0			0			0			0	0
Storage Cap Reductn	0	0			0			0			0	0
Reduced v/c Ratio	0.24	0.18			0.32			0.01			0.22	0.22

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 62.6
 Natural Cycle: 65
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.72
 Intersection Signal Delay: 17.3
 Intersection Capacity Utilization 57.3%
 Analysis Period (min) 15























Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 9: SR 1444 (Leverette Drive)/SR 1381 (Mountain Road) & NC 191 (Haywood Road)



R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2017 AM
09/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	99	45	4	33	33	380	5	979	57	445	660	84
Future Volume (vph)	99	45	4	33	33	380	5	979	57	445	660	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	12	12	12	12	12	12
Storage Length (ft)	0		75	0		600	150		0	150		50
Storage Lanes	0		1	0		1	1		0	1		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt			0.850			0.850		0.992				0.850
Flt Protected		0.967			0.976		0.950			0.950		
Satd. Flow (prot)	0	1801	1583	0	1757	1531	1770	3511	0	1770	3539	1583
Flt Permitted		0.967			0.976		0.373			0.950		
Satd. Flow (perm)	0	1801	1583	0	1757	1531	695	3511	0	1770	3539	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		20			45			45			45	
Link Distance (ft)		280			1846			3351			3356	
Travel Time (s)		9.5			28.0			50.8			50.8	
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)	110	50	4	37	37	422	6	1088	63	494	733	93
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	160	4	0	74	422	6	1151	0	494	733	93
Turn Type	Split	NA	pm+ov	Split	NA	pm+ov	pm+pt	NA		Prot	NA	Perm
Protected Phases	3	3	5	4	4	1	5	2		1	6	
Permitted Phases			3			4	2					6
Detector Phase	3	3	5	4	4	1	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	14.0		7.0	14.0	14.0
Minimum Split (s)	24.1	24.1	12.4	24.2	24.2	12.5	12.4	25.8		12.5	25.8	25.8
Total Split (s)	24.1	24.1	12.4	24.2	24.2	47.0	12.4	54.7		47.0	89.3	89.3
Total Split (%)	16.1%	16.1%	8.3%	16.1%	16.1%	31.3%	8.3%	36.5%		31.3%	59.5%	59.5%
Maximum Green (s)	18.0	18.0	7.0	18.0	18.0	41.5	7.0	46.9		41.5	81.5	81.5
Yellow Time (s)	4.1	4.1	3.0	3.0	3.0	3.1	3.0	5.8		3.1	5.8	5.8
All-Red Time (s)	2.0	2.0	2.4	3.2	3.2	2.4	2.4	2.0		2.4	2.0	2.0
Lost Time Adjust (s)		-1.1	-0.4			-1.2	-1.2	-0.4	-2.8	0.0	-2.8	-2.8
Total Lost Time (s)		5.0	5.0			5.0	4.3	5.0	5.0	5.5	5.0	5.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	6.0		2.0	6.0	6.0
Minimum Gap (s)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	3.4		0.2	3.4	3.4
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0		0.0	15.0	15.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.0		0.0	30.0	30.0
Recall Mode	None	None	None	None	None	None	None	Min		None	Min	Min
Act Effect Green (s)		16.6	24.0			11.7	59.5	57.0	49.6		41.6	91.9
Actuated g/C Ratio		0.12	0.17			0.08	0.42	0.41	0.35		0.30	0.66
v/c Ratio		0.75	0.01			0.50	0.65	0.02	0.93		0.94	0.32
Control Delay		82.0	33.0			74.0	37.9	13.8	57.0		75.5	12.3
Queue Delay		0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay		82.0	33.0		74.0	37.9	13.8	57.0		75.5	12.3	11.3
LOS		F	C		E	D	B	E		E	B	B
Approach Delay		80.8			43.3			56.8			35.9	
Approach LOS		F			D			E			D	
Queue Length 50th (ft)		143	2		66	308	2	536		448	131	27
Queue Length 95th (ft)		#235	11		122	434	7	#722		#712	234	68
Internal Link Dist (ft)		200			1766			3271			3276	
Turn Bay Length (ft)			75			600	150			150		50
Base Capacity (vph)		246	271		241	650	339	1249		525	2323	1038
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		0.65	0.01		0.31	0.65	0.02	0.92		0.94	0.32	0.09










Intersection Summary

Area Type: Other
 Cycle Length: 150
 Actuated Cycle Length: 140
 Natural Cycle: 150
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.94
 Intersection Signal Delay: 47.1
 Intersection Capacity Utilization 80.5%
 Analysis Period (min) 15
 Intersection LOS: D
 ICU Level of Service D

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

Splits and Phases: 1: NC 280 (Boylston Highway) & NC 191 (Haywood Road)

47 s	54.7 s	24.1 s	24.2 s
12.4 s	89.3 s		

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	417	115	14	327	130	20
Future Volume (vph)	417	115	14	327	130	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	12	12	10	10
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.971				0.982	
Flt Protected				0.998	0.958	
Satd. Flow (prot)	1748	0	0	1859	1636	0
Flt Permitted				0.998	0.958	
Satd. Flow (perm)	1748	0	0	1859	1636	0
Link Speed (mph)	45			45	45	
Link Distance (ft)	1846			5456	1563	
Travel Time (s)	28.0			82.7	23.7	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	463	128	16	363	144	22
Shared Lane Traffic (%)						
Lane Group Flow (vph)	591	0	0	379	166	0
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 44.0% ICU Level of Service A
 Analysis Period (min) 15

Intersection

Int Delay, s/veh 4.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	417	115	14	327	130	20
Future Vol, veh/h	417	115	14	327	130	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
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	463	128	16	363	144	22

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	591
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	4.12
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	2.218
Pot Cap-1 Maneuver	-	-	985
Stage 1	-	-	-
Stage 2	-	-	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	985
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	28.9
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	313	-	-	985	-
HCM Lane V/C Ratio	0.532	-	-	0.016	-
HCM Control Delay (s)	28.9	-	-	8.7	0
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	2.9	-	-	0	-

R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2017 AM
09/20/2017

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	353	66	130	284	2	68	0	167	1	0	1
Future Volume (vph)	2	353	66	130	284	2	68	0	167	1	0	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	12
Storage Length (ft)	150		0	250		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
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		0.976			0.999			0.904			0.932	
Flt Protected	0.950			0.950				0.986			0.976	
Satd. Flow (prot)	1711	1757	0	1711	1799	0	0	1660	0	0	1694	0
Flt Permitted	0.568			0.260				0.904			0.870	
Satd. Flow (perm)	1023	1757	0	468	1799	0	0	1522	0	0	1510	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			45			25	
Link Distance (ft)		5456			7476			1256			553	
Travel Time (s)		82.7			113.3			19.0			15.1	
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)	2	392	73	144	316	2	76	0	186	1	0	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	2	465	0	144	318	0	0	262	0	0	2	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	12.0	12.0		7.0	12.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	18.3	18.3		12.6	18.3		13.3	13.3		13.3	13.3	
Total Split (s)	45.0	45.0		13.0	58.0		32.0	32.0		32.0	32.0	
Total Split (%)	50.0%	50.0%		14.4%	64.4%		35.6%	35.6%		35.6%	35.6%	
Maximum Green (s)	38.7	38.7		7.4	51.7		25.7	25.7		25.7	25.7	
Yellow Time (s)	4.6	4.6		3.0	4.6		4.5	4.5		4.5	4.5	
All-Red Time (s)	1.7	1.7		2.6	1.7		1.8	1.8		1.8	1.8	
Lost Time Adjust (s)	-1.3	-1.3		-0.6	-1.3			-1.3			-1.3	
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	6.0	6.0		1.0	6.0		1.0	1.0		1.0	1.0	
Minimum Gap (s)	3.0	3.0		0.2	3.0		0.2	0.2		0.2	0.2	
Time Before Reduce (s)	15.0	15.0		0.0	15.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	30.0	30.0		0.0	30.0		0.0	0.0		0.0	0.0	
Recall Mode	Min	Min		None	Min		None	None		None	None	
Act Effect Green (s)	22.9	22.9		32.3	32.3			16.1			16.1	
Actuated g/C Ratio	0.38	0.38		0.54	0.54			0.27			0.27	
v/c Ratio	0.01	0.69		0.33	0.33			0.64			0.00	
Control Delay	14.0	23.3		9.3	8.8			29.5			19.5	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	14.0	23.3		9.3	8.8			29.5				19.5
LOS	B	C		A	A			C				B
Approach Delay		23.2			8.9			29.5				19.5
Approach LOS		C			A			C				B
Queue Length 50th (ft)	1	140		21	52			84				1
Queue Length 95th (ft)	5	294		60	130			195				6
Internal Link Dist (ft)		5376			7396			1176				473
Turn Bay Length (ft)	150			250								
Base Capacity (vph)	714	1226		439	1540			816				809
Starvation Cap Reductn	0	0		0	0			0				0
Spillback Cap Reductn	0	0		0	0			0				0
Storage Cap Reductn	0	0		0	0			0				0
Reduced v/c Ratio	0.00	0.38		0.33	0.21			0.32				0.00

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 59.6
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.69
 Intersection Signal Delay: 19.0
 Intersection Capacity Utilization 57.6%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 3: SR 1426 (School House Road)/Water Treatment & NC 191 (Haywood Road)



R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2017 AM
09/20/2017

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	400	37	64	322	98	56	148	120	104	83	55
Future Volume (vph)	65	400	37	64	322	98	56	148	120	104	83	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	12
Storage Length (ft)	150		0	125		0	100		0	125		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	100			100			100			100		
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		0.987			0.965			0.933			0.940	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1711	1777	0	1711	1738	0	1770	1738	0	1770	1751	0
Flt Permitted	0.239			0.210			0.950			0.950		
Satd. Flow (perm)	430	1777	0	378	1738	0	1770	1738	0	1770	1751	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			35			45	
Link Distance (ft)		7476			1829			1358			1857	
Travel Time (s)		113.3			27.7			26.5			28.1	
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)	72	444	41	71	358	109	62	164	133	116	92	61
Shared Lane Traffic (%)												
Lane Group Flow (vph)	72	485	0	71	467	0	62	297	0	116	153	0
Turn Type	pm+pt	NA		pm+pt	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases	2			6								
Detector Phase	5	2		1	6		4	4		3	3	
Switch Phase												
Minimum Initial (s)	7.0	12.0		7.0	12.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	11.6	17.9		11.9	17.9		12.1	12.1		13.1	13.1	
Total Split (s)	11.6	51.1		11.9	51.4		35.0	35.0		22.0	22.0	
Total Split (%)	9.7%	42.6%		9.9%	42.8%		29.2%	29.2%		18.3%	18.3%	
Maximum Green (s)	7.0	45.2		7.0	45.5		29.9	29.9		15.9	15.9	
Yellow Time (s)	3.0	4.6		3.0	4.6		3.9	3.9		5.1	5.1	
All-Red Time (s)	1.6	1.3		1.9	1.3		1.2	1.2		1.0	1.0	
Lost Time Adjust (s)	0.4	-0.9		0.1	-0.9		-0.1	-0.1		-1.1	-1.1	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	1.0	6.0		1.0	6.0		1.0	1.0		1.0	1.0	
Minimum Gap (s)	3.0	3.0		0.2	0.2		0.2	0.2		0.2	0.2	
Time Before Reduce (s)	0.0	15.0		0.0	15.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	30.0		0.0	30.0		0.0	0.0		0.0	0.0	
Recall Mode	None	Min		None	Min		None	None		None	None	
Act Effect Green (s)	34.7	29.8		35.1	30.0		19.3	19.3		13.1	13.1	
Actuated g/C Ratio	0.40	0.34		0.40	0.34		0.22	0.22		0.15	0.15	
v/c Ratio	0.26	0.80		0.26	0.78		0.16	0.78		0.44	0.59	
Control Delay	17.7	39.3		17.8	38.0		33.1	50.2		46.6	51.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	

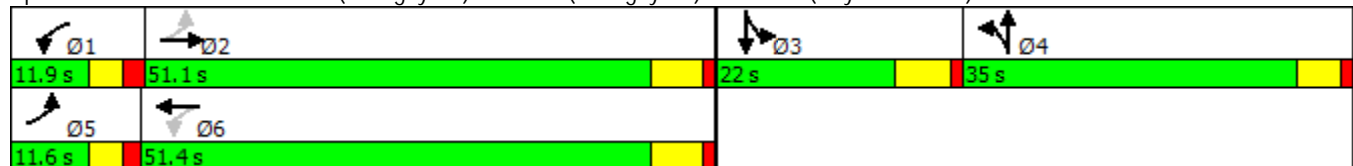
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	17.7	39.3		17.8	38.0		33.1	50.2		46.6	51.0	
LOS	B	D		B	D		C	D		D	D	
Approach Delay		36.5			35.4			47.3			49.1	
Approach LOS		D			D			D			D	
Queue Length 50th (ft)	22	248		21	236		29	160		61	83	
Queue Length 95th (ft)	56	444		56	426		75	310		145	186	
Internal Link Dist (ft)		7396			1749			1278			1777	
Turn Bay Length (ft)	150			125			100			125		
Base Capacity (vph)	277	1042		268	1025		675	663		382	378	
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	0.26	0.47		0.26	0.46		0.09	0.45		0.30	0.40	












Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 87.7
 Natural Cycle: 80
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.80
 Intersection Signal Delay: 40.4
 Intersection Capacity Utilization 66.8%
 Analysis Period (min) 15

Intersection LOS: D
 ICU Level of Service C

Splits and Phases: 4: SR 1309 (S Rugby Rd)/SR 1365 (N Rugby Rd) & NC 191 (Haywood Road)



						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	588	12	28	484	19	53
Future Volume (vph)	588	12	28	484	19	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	10	10
Storage Length (ft)		0	225		0	100
Storage Lanes		0	1		1	1
Taper Length (ft)			25		100	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.997					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1795	0	1711	1801	1652	1478
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1795	0	1711	1801	1652	1478
Link Speed (mph)	45			45	25	
Link Distance (ft)	1829			653	1295	
Travel Time (s)	27.7			9.9	35.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	653	13	31	538	21	59
Shared Lane Traffic (%)						
Lane Group Flow (vph)	666	0	31	538	21	59
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 41.7% ICU Level of Service A
 Analysis Period (min) 15

Intersection

Int Delay, s/veh 1.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↻		↻	↻	↻	↻
Traffic Vol, veh/h	588	12	28	484	19	53
Future Vol, veh/h	588	12	28	484	19	53
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	225	-	0	100
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	653	13	31	538	21	59

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	667
Stage 1	-	-	660
Stage 2	-	-	600
Critical Hdwy	-	4.12	6.42
Critical Hdwy Stg 1	-	-	5.42
Critical Hdwy Stg 2	-	-	5.42
Follow-up Hdwy	-	2.218	3.518
Pot Cap-1 Maneuver	-	923	463
Stage 1	-	-	514
Stage 2	-	-	548
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	923	463
Mov Cap-2 Maneuver	-	-	182
Stage 1	-	-	514
Stage 2	-	-	530

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	17.5
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	182	463	-	-	923	-
HCM Lane V/C Ratio	0.116	0.127	-	-	0.034	-
HCM Control Delay (s)	27.4	13.9	-	-	9	-
HCM Lane LOS	D	B	-	-	A	-
HCM 95th %tile Q(veh)	0.4	0.4	-	-	0.1	-

R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2017 AM
09/20/2017

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	96	550	4	3	452	47	4	0	5	30	0	50
Future Volume (vph)	96	550	4	3	452	47	4	0	5	30	0	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	12
Storage Length (ft)	350		0	225		225	0		0	0		300
Storage Lanes	1		0	1		1	0		0	0		1
Taper Length (ft)	25			100			100			100		
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		0.999				0.850		0.919				0.850
Flt Protected	0.950			0.950				0.980			0.950	
Satd. Flow (prot)	1711	1799	0	1711	1801	1531	0	1678	0	0	1770	1583
Flt Permitted	0.220			0.432				0.980			0.950	
Satd. Flow (perm)	396	1799	0	778	1801	1531	0	1678	0	0	1770	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		55			55			25			25	
Link Distance (ft)		653			1496			862			788	
Travel Time (s)		8.1			18.5			23.5			21.5	
Peak Hour Factor	0.50	0.90	0.90	0.90	0.90	0.50	0.90	0.50	0.90	0.50	0.50	0.50
Adj. Flow (vph)	192	611	4	3	502	94	4	0	6	60	0	100
Shared Lane Traffic (%)												
Lane Group Flow (vph)	192	615	0	3	502	94	0	10	0	0	60	100
Turn Type	pm+pt	NA		Perm	NA	pm+ov	Split	NA		Split	NA	pm+ov
Protected Phases	1	6			2	4	3	3		4	4	1
Permitted Phases	6			2		2						4
Detector Phase	1	6		2	2	4	3	3		4	4	1
Switch Phase												
Minimum Initial (s)	10.0	14.0		14.0	14.0	7.0	7.0	7.0		7.0	7.0	10.0
Minimum Split (s)	15.6	20.4		20.4	20.4	12.5	12.0	12.0		12.5	12.5	15.6
Total Split (s)	21.0	90.0		69.0	69.0	18.0	12.0	12.0		18.0	18.0	21.0
Total Split (%)	17.5%	75.0%		57.5%	57.5%	15.0%	10.0%	10.0%		15.0%	15.0%	17.5%
Maximum Green (s)	15.4	83.6		62.6	62.6	12.5	7.0	7.0		12.5	12.5	15.4
Yellow Time (s)	3.0	5.2		5.2	5.2	3.7	3.0	3.0		3.7	3.7	3.0
All-Red Time (s)	2.6	1.2		1.2	1.2	1.8	2.0	2.0		1.8	1.8	2.6
Lost Time Adjust (s)	-0.6	-1.4		-1.4	-1.4	-1.4		0.0			-0.5	-0.6
Total Lost Time (s)	5.0	5.0		5.0	5.0	4.1		5.0			5.0	5.0
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lead		Lag	Lag	Lead
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	2.0	6.0		6.0	6.0	2.0	2.0	2.0		2.0	2.0	2.0
Minimum Gap (s)	0.2	3.0		3.0	3.0	0.2	0.2	0.2		0.2	0.2	0.2
Time Before Reduce (s)	0.0	15.0		15.0	15.0	0.0	0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	30.0		30.0	30.0	0.0	0.0	0.0		0.0	0.0	0.0
Recall Mode	None	Min		Min	Min	None	None	None		None	None	None
Act Effect Green (s)	40.3	41.9		23.2	23.2	37.6		7.6			8.6	21.7
Actuated g/C Ratio	0.70	0.73		0.40	0.40	0.66		0.13			0.15	0.38
v/c Ratio	0.35	0.47		0.01	0.69	0.09		0.05			0.23	0.17
Control Delay	6.4	7.0		12.7	21.2	4.3		30.6			29.5	15.5
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0			0.0	0.0

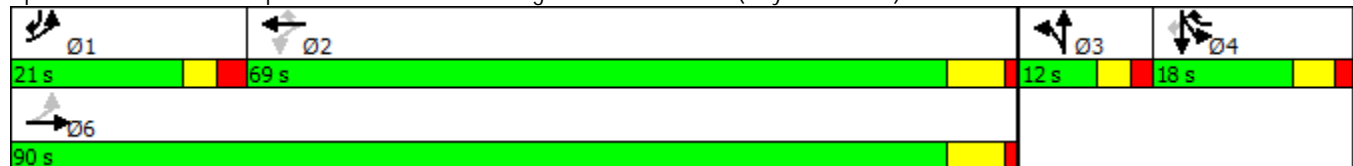
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	6.4	7.0		12.7	21.2	4.3		30.6			29.5	15.5
LOS	A	A		B	C	A		C			C	B
Approach Delay		6.8			18.5			30.6			20.7	
Approach LOS		A			B			C			C	
Queue Length 50th (ft)	17	75		1	131	10		3			18	19
Queue Length 95th (ft)	35	259		6	320	11		11			36	41
Internal Link Dist (ft)		573			1416			782			708	
Turn Bay Length (ft)	350			225		225						300
Base Capacity (vph)	675	1791		737	1706	1151		222			434	756
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	0.28	0.34		0.00	0.29	0.08		0.05			0.14	0.13

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 57.3
 Natural Cycle: 65
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.69
 Intersection Signal Delay: 12.8
 Intersection Capacity Utilization 59.2%
 Analysis Period (min) 15


















Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 6: Alpine Dr/West Henderson High School & NC 191 (Haywood Road)



R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2017 AM
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	80	518	1	1	424	4	1	0	1	4	0	65
Future Volume (vph)	80	518	1	1	424	4	1	0	1	4	0	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	10	10	10	10	10	10
Storage Length (ft)	225		0	0		0	0		0	0		0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
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					0.999			0.932			0.872	
Flt Protected	0.950							0.976			0.997	
Satd. Flow (prot)	1711	1801	0	0	1799	0	0	1581	0	0	1511	0
Flt Permitted	0.950							0.976			0.997	
Satd. Flow (perm)	1711	1801	0	0	1799	0	0	1581	0	0	1511	0
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		1496			911			590			1563	
Travel Time (s)		22.7			13.8			13.4			35.5	
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)	89	576	1	1	471	4	1	0	1	4	0	72
Shared Lane Traffic (%)												
Lane Group Flow (vph)	89	577	0	0	476	0	0	2	0	0	76	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 64.2%
 Analysis Period (min) 15
 ICU Level of Service C

Intersection

Int Delay, s/veh	1.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	80	518	1	1	424	4	1	0	1	4	0	65
Future Vol, veh/h	80	518	1	1	424	4	1	0	1	4	0	65
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	225	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	89	576	1	1	471	4	1	0	1	4	0	72

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	476	0	0	577	0	0	1266	1232	576	1230	1230	473
Stage 1	-	-	-	-	-	-	754	754	-	476	476	-
Stage 2	-	-	-	-	-	-	512	478	-	754	754	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1086	-	-	996	-	-	146	177	517	154	178	591
Stage 1	-	-	-	-	-	-	401	417	-	570	557	-
Stage 2	-	-	-	-	-	-	545	556	-	401	417	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1086	-	-	996	-	-	120	162	517	144	163	591
Mov Cap-2 Maneuver	-	-	-	-	-	-	120	162	-	144	163	-
Stage 1	-	-	-	-	-	-	368	383	-	523	556	-
Stage 2	-	-	-	-	-	-	478	555	-	367	383	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.1	0	23.7	13.5
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	195	1086	-	-	996	-	-	501
HCM Lane V/C Ratio	0.011	0.082	-	-	0.001	-	-	0.153
HCM Control Delay (s)	23.7	8.6	-	-	8.6	0	-	13.5
HCM Lane LOS	C	A	-	-	A	A	-	B
HCM 95th %tile Q(veh)	0	0.3	-	-	0	-	-	0.5

R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2017 AM
09/20/2017

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↙	↑	↖	↗
Traffic Volume (vph)	461	72	22	382	39	14
Future Volume (vph)	461	72	22	382	39	14
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	12	12
Storage Length (ft)		175	175		0	300
Storage Lanes		1	1		1	1
Taper Length (ft)			100		100	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1801	1531	1711	1801	1770	1583
Flt Permitted			0.143		0.950	
Satd. Flow (perm)	1801	1531	257	1801	1770	1583
Right Turn on Red		No				No
Satd. Flow (RTOR)						
Link Speed (mph)	45			45	30	
Link Distance (ft)	911			3670	692	
Travel Time (s)	13.8			55.6	15.7	
Peak Hour Factor	0.50	0.90	0.50	0.90	0.50	0.50
Adj. Flow (vph)	922	80	44	424	78	28
Shared Lane Traffic (%)						
Lane Group Flow (vph)	922	80	44	424	78	28
Turn Type	NA	pm+ov	pm+pt	NA	Prot	pm+ov
Protected Phases	6	4	5	2	4	5
Permitted Phases		6	2			4
Detector Phase	6	4	5	2	4	5
Switch Phase						
Minimum Initial (s)	12.0	7.0	7.0	12.0	7.0	7.0
Minimum Split (s)	18.0	13.0	13.0	18.0	13.0	13.0
Total Split (s)	64.0	13.0	13.0	77.0	13.0	13.0
Total Split (%)	71.1%	14.4%	14.4%	85.6%	14.4%	14.4%
Maximum Green (s)	58.0	7.0	7.0	71.0	7.0	7.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag		Lead			Lead
Lead-Lag Optimize?	Yes		Yes			Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	Min	None	None	Min	None	None
Act Effct Green (s)	45.3	56.2	49.8	51.7	9.1	18.8
Actuated g/C Ratio	0.70	0.86	0.76	0.79	0.14	0.29
v/c Ratio	0.74	0.06	0.11	0.30	0.32	0.06
Control Delay	15.0	2.0	2.7	3.3	37.5	23.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.0	2.0	2.7	3.3	37.5	23.8
LOS	B	A	A	A	D	C
Approach Delay	13.9			3.2	33.9	

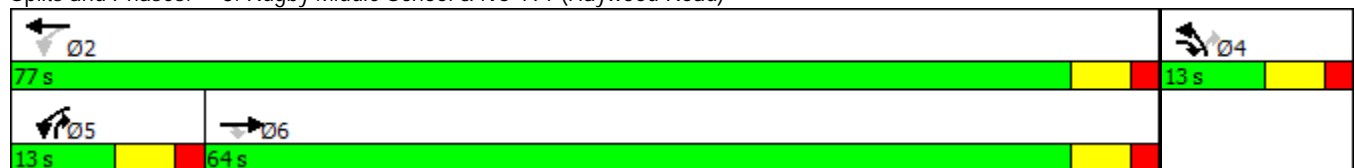
Lane Group	→ EBT	↘ EBR	↙ WBL	← WBT	↖ NBL	↗ NBR
Approach LOS	B			A	C	
Queue Length 50th (ft)	329	7	4	46	32	9
Queue Length 95th (ft)	164	15	5	70	47	19
Internal Link Dist (ft)	831			3590	612	
Turn Bay Length (ft)		175	175			300
Base Capacity (vph)	1524	1322	399	1694	247	456
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.60	0.06	0.11	0.25	0.32	0.06

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 65.1
 Natural Cycle: 70
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.74
 Intersection Signal Delay: 12.1
 Intersection Capacity Utilization 38.4%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 8: Rugby Middle School & NC 191 (Haywood Road)



R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2017 AM
09/20/2017

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	150	344	0	0	273	117	0	5	0	113	2	116
Future Volume (vph)	150	344	0	0	273	117	0	5	0	113	2	116
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	12
Storage Length (ft)	125		0	125		0	0		0	0		150
Storage Lanes	1		0	1		0	0		0	0		1
Taper Length (ft)	100			100			100			100		
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					0.955							0.850
Flt Protected	0.950										0.953	
Satd. Flow (prot)	1711	1801	0	1801	1720	0	0	1863	0	0	1775	1583
Flt Permitted	0.277										0.953	
Satd. Flow (perm)	499	1801	0	1801	1720	0	0	1863	0	0	1775	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			25				35
Link Distance (ft)		3670			2566			1006				2428
Travel Time (s)		55.6			38.9			27.4				47.3
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	167	382	0	0	303	130	0	6	0	126	2	129
Shared Lane Traffic (%)												
Lane Group Flow (vph)	167	382	0	0	433	0	0	6	0	0	128	129
Turn Type	pm+pt	NA		Perm	NA			NA		Split	NA	pm+ov
Protected Phases	1	6			2		4	4		3	3	1
Permitted Phases	6			2								3
Detector Phase	1	6		2	2		4	4		3	3	1
Switch Phase												
Minimum Initial (s)	7.0	12.0		12.0	12.0		7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	12.5	19.0		19.0	19.0		12.6	12.6		12.6	12.6	12.5
Total Split (s)	19.0	82.0		63.0	63.0		13.0	13.0		25.0	25.0	19.0
Total Split (%)	15.8%	68.3%		52.5%	52.5%		10.8%	10.8%		20.8%	20.8%	15.8%
Maximum Green (s)	13.5	75.0		56.0	56.0		7.4	7.4		19.4	19.4	13.5
Yellow Time (s)	4.5	5.0		5.0	5.0		4.0	4.0		4.0	4.0	4.5
All-Red Time (s)	1.0	2.0		2.0	2.0		1.6	1.6		1.6	1.6	1.0
Lost Time Adjust (s)	-0.5	-2.0		-2.0	-2.0			-0.6			-0.6	-0.6
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	4.9
Lead/Lag	Lead			Lag	Lag		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	1.0	6.0		6.0	6.0		2.0	2.0		2.0	2.0	1.0
Minimum Gap (s)	0.2	3.0		3.0	3.0		0.2	0.2		0.2	0.2	0.2
Time Before Reduce (s)	0.0	20.0		20.0	20.0		0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	30.0		30.0	30.0		0.0	0.0		0.0	0.0	0.0
Recall Mode	None	Min		Min	Min		None	None		None	None	None
Act Effect Green (s)	37.4	39.2			22.8			8.6			10.7	20.3
Actuated g/C Ratio	0.66	0.70			0.40			0.15			0.19	0.36
v/c Ratio	0.32	0.31			0.62			0.02			0.38	0.23
Control Delay	7.5	6.9			20.0			31.4			28.9	13.3
Queue Delay	0.0	0.0			0.0			0.0			0.0	0.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	7.5	6.9			20.0			31.4			28.9	13.3
LOS	A	A			C			C			C	B
Approach Delay		7.1			20.0			31.4			21.1	
Approach LOS		A			C			C			C	
Queue Length 50th (ft)	17	45			104			2			36	24
Queue Length 95th (ft)	72	168			298			16			123	74
Internal Link Dist (ft)		3590			2486			926			2348	
Turn Bay Length (ft)	125											150
Base Capacity (vph)	670	1741			1589			298			710	761
Starvation Cap Reductn	0	0			0			0			0	0
Spillback Cap Reductn	0	0			0			0			0	0
Storage Cap Reductn	0	0			0			0			0	0
Reduced v/c Ratio	0.25	0.22			0.27			0.02			0.18	0.17

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 56.4
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.62
 Intersection Signal Delay: 14.6
 Intersection Capacity Utilization 55.3%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service B













Splits and Phases: 9: SR 1444 (Leverette Drive)/SR 1381 (Mountain Road) & NC 191 (Haywood Road)



R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2017 PM
09/20/2017

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	33	5	57	45	445	4	660	33	380	979	99
Future Volume (vph)	84	33	5	57	45	445	4	660	33	380	979	99
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	12	12	12	12	12	12
Storage Length (ft)	0		75	0		600	150		0	150		50
Storage Lanes	0		1	0		1	1		0	1		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt			0.850			0.850		0.993				0.850
Flt Protected		0.965			0.973		0.950			0.950		
Satd. Flow (prot)	0	1798	1583	0	1752	1531	1770	3514	0	1770	3539	1583
Flt Permitted		0.965			0.973		0.263			0.950		
Satd. Flow (perm)	0	1798	1583	0	1752	1531	490	3514	0	1770	3539	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		20			45			45			45	
Link Distance (ft)		280			1846			3351			3356	
Travel Time (s)		9.5			28.0			50.8			50.8	
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)	93	37	6	63	50	494	4	733	37	422	1088	110
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	130	6	0	113	494	4	770	0	422	1088	110
Turn Type	Split	NA	pm+ov	Split	NA	pm+ov	pm+pt	NA		Prot	NA	Perm
Protected Phases	3	3	5	4	4	1	5	2		1	6	
Permitted Phases			3			4	2					6
Detector Phase	3	3	5	4	4	1	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	14.0		7.0	14.0	14.0
Minimum Split (s)	24.1	24.1	12.4	24.2	24.2	12.5	12.4	25.8		12.5	25.8	25.8
Total Split (s)	24.1	24.1	12.4	24.2	24.2	37.0	12.4	34.7		37.0	59.3	59.3
Total Split (%)	20.1%	20.1%	10.3%	20.2%	20.2%	30.8%	10.3%	28.9%		30.8%	49.4%	49.4%
Maximum Green (s)	18.0	18.0	7.0	18.0	18.0	31.5	7.0	26.9		31.5	51.5	51.5
Yellow Time (s)	4.1	4.1	3.0	3.0	3.0	3.1	3.0	5.8		3.1	5.8	5.8
All-Red Time (s)	2.0	2.0	2.4	3.2	3.2	2.4	2.4	2.0		2.4	2.0	2.0
Lost Time Adjust (s)		-1.1	-0.4			-1.2	-1.2	-0.4	-2.8	0.0	-2.8	-2.8
Total Lost Time (s)		5.0	5.0			5.0	4.3	5.0	5.0	5.5	5.0	5.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	6.0		2.0	6.0	6.0
Minimum Gap (s)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	3.4		0.2	3.4	3.4
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0		0.0	15.0	15.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.0		0.0	30.0	30.0
Recall Mode	None	None	None	None	None	None	None	Min		None	Min	Min
Act Effct Green (s)		13.1	20.7			12.6	47.1	35.1	27.5		28.2	59.2
Actuated g/C Ratio		0.13	0.20			0.12	0.46	0.34	0.27		0.28	0.58
v/c Ratio		0.57	0.02			0.53	0.70	0.02	0.82		0.87	0.53
Control Delay		54.1	21.4			53.9	29.2	14.5	44.6		55.7	16.1
Queue Delay		0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0







												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay		54.1	21.4		53.9	29.2	14.5	44.6		55.7	16.1	12.8
LOS		D	C		D	C	B	D		E	B	B
Approach Delay		52.7			33.8			44.4			26.2	
Approach LOS		D			C			D			C	
Queue Length 50th (ft)		86	2		75	260	1	258		269	199	29
Queue Length 95th (ft)		155	10		139	420	6	#404		#500	413	85
Internal Link Dist (ft)		200			1766			3271			3276	
Turn Bay Length (ft)			75			600	150			150		50
Base Capacity (vph)		342	319		336	764	262	1042		557	2116	946
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		0.38	0.02		0.34	0.65	0.02	0.74		0.76	0.51	0.12










Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 102.4
 Natural Cycle: 110
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.87
 Intersection Signal Delay: 33.3
 Intersection Capacity Utilization 66.3%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Intersection LOS: C
 ICU Level of Service C

Splits and Phases: 1: NC 280 (Boylston Highway) & NC 191 (Haywood Road)

 Ø1	 Ø2	 Ø3	 Ø4
37 s	34.7 s	24.1 s	24.2 s
 Ø5	 Ø6		
12.4 s	59.3 s		

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	327	130	20	417	115	14
Future Volume (vph)	327	130	20	417	115	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	12	12	10	10
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.962				0.985	
Flt Protected				0.998	0.957	
Satd. Flow (prot)	1732	0	0	1859	1639	0
Flt Permitted				0.998	0.957	
Satd. Flow (perm)	1732	0	0	1859	1639	0
Link Speed (mph)	45			45	45	
Link Distance (ft)	1846			5456	1563	
Travel Time (s)	28.0			82.7	23.7	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	363	144	22	463	128	16
Shared Lane Traffic (%)						
Lane Group Flow (vph)	507	0	0	485	144	0
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 52.1% ICU Level of Service A
 Analysis Period (min) 15

Intersection

Int Delay, s/veh 3.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	327	130	20	417	115	14
Future Vol, veh/h	327	130	20	417	115	14
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
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	363	144	22	463	128	16

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	944
Stage 1	-	-	436
Stage 2	-	-	508
Critical Hdwy	-	4.12	6.42
Critical Hdwy Stg 1	-	-	5.42
Critical Hdwy Stg 2	-	-	5.42
Follow-up Hdwy	-	2.218	3.518
Pot Cap-1 Maneuver	-	1057	291
Stage 1	-	-	652
Stage 2	-	-	604
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	1057	283
Mov Cap-2 Maneuver	-	-	283
Stage 1	-	-	652
Stage 2	-	-	587

Approach	EB	WB	NB
HCM Control Delay, s	0	0.4	27.4
HCM LOS			D

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	301	-	-	1057	-
HCM Lane V/C Ratio	0.476	-	-	0.021	-
HCM Control Delay (s)	27.4	-	-	8.5	0
HCM Lane LOS	D	-	-	A	A
HCM 95th %tile Q(veh)	2.4	-	-	0.1	-

R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2017 PM
09/20/2017

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	284	68	167	353	1	66	0	130	2	0	2
Future Volume (vph)	1	284	68	167	353	1	66	0	130	2	0	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	12
Storage Length (ft)	150		0	250		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
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		0.971						0.910			0.932	
Flt Protected	0.950			0.950				0.983			0.976	
Satd. Flow (prot)	1711	1748	0	1711	1801	0	0	1666	0	0	1694	0
Flt Permitted	0.530			0.307				0.886			0.853	
Satd. Flow (perm)	954	1748	0	553	1801	0	0	1502	0	0	1481	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			45			25	
Link Distance (ft)		5456			7476			1256			553	
Travel Time (s)		82.7			113.3			19.0			15.1	
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)	1	316	76	186	392	1	73	0	144	2	0	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	392	0	186	393	0	0	217	0	0	4	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	12.0	12.0		7.0	12.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	18.3	18.3		12.6	18.3		13.3	13.3		13.3	13.3	
Total Split (s)	44.0	44.0		16.0	60.0		30.0	30.0		30.0	30.0	
Total Split (%)	48.9%	48.9%		17.8%	66.7%		33.3%	33.3%		33.3%	33.3%	
Maximum Green (s)	37.7	37.7		10.4	53.7		23.7	23.7		23.7	23.7	
Yellow Time (s)	4.6	4.6		3.0	4.6		4.5	4.5		4.5	4.5	
All-Red Time (s)	1.7	1.7		2.6	1.7		1.8	1.8		1.8	1.8	
Lost Time Adjust (s)	-1.3	-1.3		-0.6	-1.3			-1.3			-1.3	
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	6.0	6.0		1.0	6.0		1.0	1.0		1.0	1.0	
Minimum Gap (s)	3.0	3.0		0.2	3.0		0.2	0.2		0.2	0.2	
Time Before Reduce (s)	15.0	15.0		0.0	15.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	30.0	30.0		0.0	30.0		0.0	0.0		0.0	0.0	
Recall Mode	Min	Min		None	Min		None	None		None	None	
Act Effect Green (s)	20.0	20.0		33.8	33.8			13.6			13.6	
Actuated g/C Ratio	0.35	0.35		0.58	0.58			0.24			0.24	
v/c Ratio	0.00	0.65		0.38	0.37			0.62			0.01	
Control Delay	14.0	22.3		8.5	8.1			29.4			19.2	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	14.0	22.3		8.5	8.1			29.4				19.2
LOS	B	C		A	A			C				B
Approach Delay		22.3			8.2			29.4				19.3
Approach LOS		C			A			C				B
Queue Length 50th (ft)	0	104		25	59			63				1
Queue Length 95th (ft)	3	236		67	144			157				8
Internal Link Dist (ft)		5376			7396			1176				473
Turn Bay Length (ft)	150			250								
Base Capacity (vph)	671	1230		553	1644			677				668
Starvation Cap Reductn	0	0		0	0			0				0
Spillback Cap Reductn	0	0		0	0			0				0
Storage Cap Reductn	0	0		0	0			0				0
Reduced v/c Ratio	0.00	0.32		0.34	0.24			0.32				0.01

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 57.8
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.65
 Intersection Signal Delay: 16.7
 Intersection Capacity Utilization 54.2%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 3: SR 1426 (School House Road)/Water Treatment & NC 191 (Haywood Road)



R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2017 PM
09/20/2017

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	322	56	120	400	104	37	83	64	98	148	65
Future Volume (vph)	55	322	56	120	400	104	37	83	64	98	148	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	12
Storage Length (ft)	150		0	125		0	100		0	125		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	100			100			100			100		
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		0.978			0.969			0.935			0.954	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1711	1761	0	1711	1745	0	1770	1742	0	1770	1777	0
Flt Permitted	0.228			0.290			0.950			0.950		
Satd. Flow (perm)	411	1761	0	522	1745	0	1770	1742	0	1770	1777	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			35			45	
Link Distance (ft)		7476			1829			1358			1857	
Travel Time (s)		113.3			27.7			26.5			28.1	
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)	61	358	62	133	444	116	41	92	71	109	164	72
Shared Lane Traffic (%)												
Lane Group Flow (vph)	61	420	0	133	560	0	41	163	0	109	236	0
Turn Type	pm+pt	NA		pm+pt	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases	2			6								
Detector Phase	5	2		1	6		4	4		3	3	
Switch Phase												
Minimum Initial (s)	7.0	12.0		7.0	12.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	11.6	17.9		11.9	17.9		12.1	12.1		13.1	13.1	
Total Split (s)	11.6	54.0		14.0	56.4		23.0	23.0		29.0	29.0	
Total Split (%)	9.7%	45.0%		11.7%	47.0%		19.2%	19.2%		24.2%	24.2%	
Maximum Green (s)	7.0	48.1		9.1	50.5		17.9	17.9		22.9	22.9	
Yellow Time (s)	3.0	4.6		3.0	4.6		3.9	3.9		5.1	5.1	
All-Red Time (s)	1.6	1.3		1.9	1.3		1.2	1.2		1.0	1.0	
Lost Time Adjust (s)	0.4	-0.9		0.1	-0.9		-0.1	-0.1		-1.1	-1.1	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	1.0	6.0		1.0	6.0		1.0	1.0		1.0	1.0	
Minimum Gap (s)	3.0	3.0		0.2	0.2		0.2	0.2		0.2	0.2	
Time Before Reduce (s)	0.0	15.0		0.0	15.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	30.0		0.0	30.0		0.0	0.0		0.0	0.0	
Recall Mode	None	Min		None	Min		None	None		None	None	
Act Effect Green (s)	39.3	32.2		43.0	37.0		12.5	12.5		16.8	16.8	
Actuated g/C Ratio	0.43	0.35		0.47	0.41		0.14	0.14		0.18	0.18	
v/c Ratio	0.22	0.67		0.38	0.79		0.17	0.68		0.33	0.72	
Control Delay	15.2	31.4		16.5	35.1		42.2	57.1		39.5	51.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	

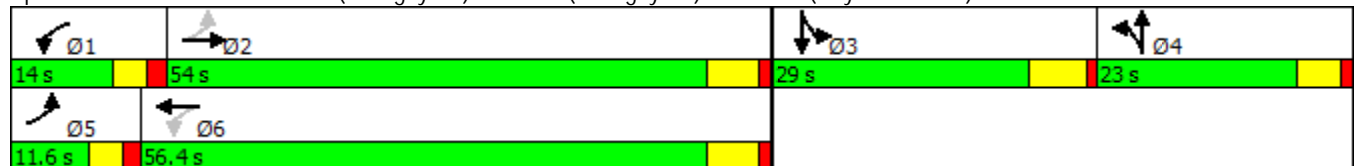
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	15.2	31.4		16.5	35.1		42.2	57.1		39.5	51.4	
LOS	B	C		B	D		D	E		D	D	
Approach Delay		29.3			31.5			54.1			47.7	
Approach LOS		C			C			D			D	
Queue Length 50th (ft)	17	197		39	290		21	91		55	129	
Queue Length 95th (ft)	45	356		86	503		63	195		128	260	
Internal Link Dist (ft)		7396			1749			1278			1777	
Turn Bay Length (ft)	150			125			100			125		
Base Capacity (vph)	277	1013		376	1054		374	368		499	501	
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	0.22	0.41		0.35	0.53		0.11	0.44		0.22	0.47	












Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 91.1
 Natural Cycle: 80
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.79
 Intersection Signal Delay: 36.8
 Intersection Capacity Utilization 67.5%
 Analysis Period (min) 15

Intersection LOS: D
 ICU Level of Service C

Splits and Phases: 4: SR 1309 (S Rugby Rd)/SR 1365 (N Rugby Rd) & NC 191 (Haywood Road)



						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	484	19	53	588	12	28
Future Volume (vph)	484	19	53	588	12	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	10	10
Storage Length (ft)		0	225		0	100
Storage Lanes		0	1		1	1
Taper Length (ft)			25		100	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.995					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1792	0	1711	1801	1652	1478
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1792	0	1711	1801	1652	1478
Link Speed (mph)	45			45	25	
Link Distance (ft)	1829			653	1295	
Travel Time (s)	27.7			9.9	35.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	538	21	59	653	13	31
Shared Lane Traffic (%)						
Lane Group Flow (vph)	559	0	59	653	13	31
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 43.3% ICU Level of Service A
 Analysis Period (min) 15

Intersection

Int Delay, s/veh	1					
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	484	19	53	588	12	28
Future Vol, veh/h	484	19	53	588	12	28
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	225	-	0	100
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	538	21	59	653	13	31

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	559	0	1319	548
Stage 1	-	-	-	-	548	-
Stage 2	-	-	-	-	771	-
Critical Hdwy	-	-	4.12	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	-	-	2.218	-	3.518	3.318
Pot Cap-1 Maneuver	-	-	1012	-	173	536
Stage 1	-	-	-	-	579	-
Stage 2	-	-	-	-	456	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1012	-	163	536
Mov Cap-2 Maneuver	-	-	-	-	163	-
Stage 1	-	-	-	-	579	-
Stage 2	-	-	-	-	429	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	17.2
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	163	536	-	-	1012	-
HCM Lane V/C Ratio	0.082	0.058	-	-	0.058	-
HCM Control Delay (s)	29	12.1	-	-	8.8	-
HCM Lane LOS	D	B	-	-	A	-
HCM 95th %tile Q(veh)	0.3	0.2	-	-	0.2	-

R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2017 PM
09/20/2017

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	452	4	5	550	30	4	0	3	47	0	96
Future Volume (vph)	50	452	4	5	550	30	4	0	3	47	0	96
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	12
Storage Length (ft)	350		0	225		225	0		0	0		300
Storage Lanes	1		0	1		1	0		0	0		1
Taper Length (ft)	25			100			100			100		
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		0.999				0.850		0.942				0.850
Flt Protected	0.950			0.950				0.972			0.950	
Satd. Flow (prot)	1711	1799	0	1711	1801	1531	0	1706	0	0	1770	1583
Flt Permitted	0.171			0.478				0.972			0.950	
Satd. Flow (perm)	308	1799	0	861	1801	1531	0	1706	0	0	1770	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		55			55			25			25	
Link Distance (ft)		653			1496			862			788	
Travel Time (s)		8.1			18.5			23.5			21.5	
Peak Hour Factor	0.50	0.90	0.90	0.90	0.90	0.50	0.90	0.50	0.90	0.50	0.50	0.50
Adj. Flow (vph)	100	502	4	6	611	60	4	0	3	94	0	192
Shared Lane Traffic (%)												
Lane Group Flow (vph)	100	506	0	6	611	60	0	7	0	0	94	192
Turn Type	pm+pt	NA		Perm	NA	pm+ov	Split	NA		Split	NA	pm+ov
Protected Phases	1	6			2	4	3	3		4	4	1
Permitted Phases	6			2		2						4
Detector Phase	1	6		2	2	4	3	3		4	4	1
Switch Phase												
Minimum Initial (s)	10.0	14.0		14.0	14.0	7.0	7.0	7.0		7.0	7.0	10.0
Minimum Split (s)	15.6	20.4		20.4	20.4	12.5	12.0	12.0		12.5	12.5	15.6
Total Split (s)	20.0	89.0		69.0	69.0	19.0	12.0	12.0		19.0	19.0	20.0
Total Split (%)	16.7%	74.2%		57.5%	57.5%	15.8%	10.0%	10.0%		15.8%	15.8%	16.7%
Maximum Green (s)	14.4	82.6		62.6	62.6	13.5	7.0	7.0		13.5	13.5	14.4
Yellow Time (s)	3.0	5.2		5.2	5.2	3.7	3.0	3.0		3.7	3.7	3.0
All-Red Time (s)	2.6	1.2		1.2	1.2	1.8	2.0	2.0		1.8	1.8	2.6
Lost Time Adjust (s)	-0.6	-1.4		-1.4	-1.4	-1.4		0.0			-0.5	-0.6
Total Lost Time (s)	5.0	5.0		5.0	5.0	4.1		5.0			5.0	5.0
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lead		Lag	Lag	Lead
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	2.0	6.0		6.0	6.0	2.0	2.0	2.0		2.0	2.0	2.0
Minimum Gap (s)	0.2	3.0		3.0	3.0	0.2	0.2	0.2		0.2	0.2	0.2
Time Before Reduce (s)	0.0	15.0		15.0	15.0	0.0	0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	30.0		30.0	30.0	0.0	0.0	0.0		0.0	0.0	0.0
Recall Mode	None	Min		Min	Min	None	None	None		None	None	None
Act Effect Green (s)	46.6	48.3		29.4	29.4	45.2		7.7			9.9	22.9
Actuated g/C Ratio	0.72	0.75		0.45	0.45	0.70		0.12			0.15	0.35
v/c Ratio	0.21	0.38		0.02	0.75	0.06		0.03			0.35	0.34
Control Delay	5.6	6.2		11.8	22.5	3.4		36.3			34.4	20.8
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0			0.0	0.0

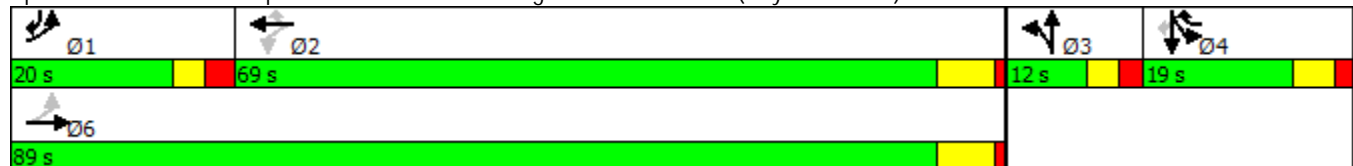
Lane Group												
Total Delay	5.6	6.2		11.8	22.5	3.4		36.3			34.4	20.8
LOS	A	A		B	C	A		D			C	C
Approach Delay		6.1			20.7			36.3			25.3	
Approach LOS		A			C			D			C	
Queue Length 50th (ft)	9	62		1	181	6		2			32	46
Queue Length 95th (ft)	22	214		9	424	7		11			57	84
Internal Link Dist (ft)		573			1416			782			708	
Turn Bay Length (ft)	350			225		225						300
Base Capacity (vph)	579	1736		789	1651	1200		203			421	676
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	0.17	0.29		0.01	0.37	0.05		0.03			0.22	0.28

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 64.8
 Natural Cycle: 75
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.75
 Intersection Signal Delay: 16.0
 Intersection Capacity Utilization 55.6%
 Analysis Period (min) 15


















Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 6: Alpine Dr/West Henderson High School & NC 191 (Haywood Road)



R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2017 PM
09/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	64	424	1	1	518	4	1	0	1	4	0	79
Future Volume (vph)	64	424	1	1	518	4	1	0	1	4	0	79
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	10	10	10	10	10	10
Storage Length (ft)	235		0	0		0	0		0	0		0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
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					0.999			0.932				0.871
Flt Protected	0.950							0.976				0.998
Satd. Flow (prot)	1711	1801	0	0	1799	0	0	1581	0	0	1511	0
Flt Permitted	0.950							0.976				0.998
Satd. Flow (perm)	1711	1801	0	0	1799	0	0	1581	0	0	1511	0
Link Speed (mph)		45			45			30				30
Link Distance (ft)		1496			911			590				1563
Travel Time (s)		22.7			13.8			13.4				35.5
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)	71	471	1	1	576	4	1	0	1	4	0	88
Shared Lane Traffic (%)												
Lane Group Flow (vph)	71	472	0	0	581	0	0	2	0	0	92	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 63.5%
 Analysis Period (min) 15
 ICU Level of Service B













Intersection







Int Delay, s/veh	1.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	64	424	1	1	518	4	1	0	1	4	0	79
Future Vol, veh/h	64	424	1	1	518	4	1	0	1	4	0	79
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	235	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	71	471	1	1	576	4	1	0	1	4	0	88

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	580	0	0	472	0	0	1238	1196	472	1194	1194	578
Stage 1	-	-	-	-	-	-	614	614	-	580	580	-
Stage 2	-	-	-	-	-	-	624	582	-	614	614	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	994	-	-	1090	-	-	152	186	592	163	187	516
Stage 1	-	-	-	-	-	-	479	483	-	500	500	-
Stage 2	-	-	-	-	-	-	473	499	-	479	483	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	994	-	-	1090	-	-	119	173	592	154	173	516
Mov Cap-2 Maneuver	-	-	-	-	-	-	119	173	-	154	173	-
Stage 1	-	-	-	-	-	-	445	449	-	464	500	-
Stage 2	-	-	-	-	-	-	392	499	-	444	449	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.2	0	23.4	14.7
HCM LOS			C	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	198	994	-	-	1090	-	-	463
HCM Lane V/C Ratio	0.011	0.072	-	-	0.001	-	-	0.199
HCM Control Delay (s)	23.4	8.9	-	-	8.3	0	-	14.7
HCM Lane LOS	C	A	-	-	A	A	-	B
HCM 95th %tile Q(veh)	0	0.2	-	-	0	-	-	0.7

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	382	38	14	461	72	22
Future Volume (vph)	382	38	14	461	72	22
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	12	12
Storage Length (ft)		175	175		0	350
Storage Lanes		1	1		1	1
Taper Length (ft)			100		100	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1801	1531	1711	1801	1770	1583
Flt Permitted			0.345		0.950	
Satd. Flow (perm)	1801	1531	621	1801	1770	1583
Right Turn on Red		No				No
Satd. Flow (RTOR)						
Link Speed (mph)	45			45	30	
Link Distance (ft)	911			3670	692	
Travel Time (s)	13.8			55.6	15.7	
Peak Hour Factor	0.90	0.50	0.50	0.90	0.50	0.50
Adj. Flow (vph)	424	76	28	512	144	44
Shared Lane Traffic (%)						
Lane Group Flow (vph)	424	76	28	512	144	44
Turn Type	NA	pm+ov	pm+pt	NA	Prot	pm+ov
Protected Phases	6	4	5	2	4	5
Permitted Phases		6	2			4
Detector Phase	6	4	5	2	4	5
Switch Phase						
Minimum Initial (s)	12.0	7.0	7.0	12.0	7.0	7.0
Minimum Split (s)	18.0	13.0	13.0	18.0	13.0	13.0
Total Split (s)	50.0	25.0	15.0	65.0	25.0	15.0
Total Split (%)	55.6%	27.8%	16.7%	72.2%	27.8%	16.7%
Maximum Green (s)	44.0	19.0	9.0	59.0	19.0	9.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag		Lead			Lead
Lead-Lag Optimize?	Yes		Yes			Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	Min	None	None	Min	None	None
Act Effect Green (s)	22.5	36.0	27.8	29.1	10.3	20.7
Actuated g/C Ratio	0.50	0.80	0.62	0.64	0.23	0.46
v/c Ratio	0.47	0.06	0.05	0.44	0.36	0.06
Control Delay	14.7	3.0	4.7	7.3	20.6	8.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.7	3.0	4.7	7.3	20.6	8.8
LOS	B	A	A	A	C	A
Approach Delay	13.0			7.2	17.8	

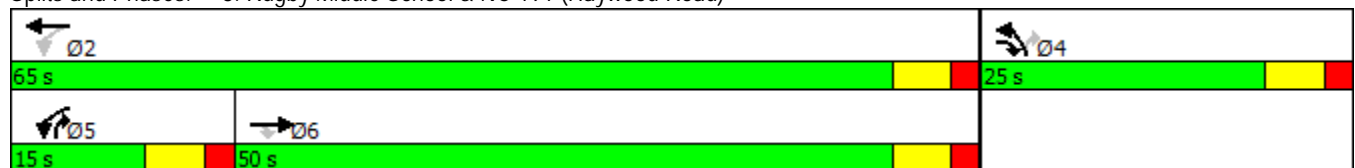
Lane Group						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Approach LOS	B			A	B	
Queue Length 50th (ft)	102	7	3	67	35	6
Queue Length 95th (ft)	201	8	6	149	47	13
Internal Link Dist (ft)	831			3590	612	
Turn Bay Length (ft)		175	175			350
Base Capacity (vph)	1632	1371	640	1792	840	798
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.26	0.06	0.04	0.29	0.17	0.06

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 45.2
 Natural Cycle: 45
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.47
 Intersection Signal Delay: 11.2
 Intersection Capacity Utilization 38.4%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 8: Rugby Middle School & NC 191 (Haywood Road)



R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2017 PM
09/20/2017

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	116	273	0	0	344	113	0	2	0	117	5	150
Future Volume (vph)	116	273	0	0	344	113	0	2	0	117	5	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	12
Storage Length (ft)	125		0	125		0	0		0	0		150
Storage Lanes	1		0	1		0	0		0	0		1
Taper Length (ft)	100			100			100			100		
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					0.963							0.850
Flt Protected	0.950										0.954	
Satd. Flow (prot)	1711	1801	0	1801	1734	0	0	1863	0	0	1777	1583
Flt Permitted	0.217										0.954	
Satd. Flow (perm)	391	1801	0	1801	1734	0	0	1863	0	0	1777	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			25				35
Link Distance (ft)		3670			2566			1006				2428
Travel Time (s)		55.6			38.9			27.4				47.3
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	129	303	0	0	382	126	0	2	0	130	6	167
Shared Lane Traffic (%)												
Lane Group Flow (vph)	129	303	0	0	508	0	0	2	0	0	136	167
Turn Type	pm+pt	NA		Perm	NA			NA		Split	NA	pm+ov
Protected Phases	1	6			2		4	4		3	3	1
Permitted Phases	6			2								3
Detector Phase	1	6		2	2		4	4		3	3	1
Switch Phase												
Minimum Initial (s)	7.0	12.0		12.0	12.0		7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	12.5	19.0		19.0	19.0		12.6	12.6		12.6	12.6	12.5
Total Split (s)	18.0	82.0		64.0	64.0		13.0	13.0		25.0	25.0	18.0
Total Split (%)	15.0%	68.3%		53.3%	53.3%		10.8%	10.8%		20.8%	20.8%	15.0%
Maximum Green (s)	12.5	75.0		57.0	57.0		7.4	7.4		19.4	19.4	12.5
Yellow Time (s)	4.5	5.0		5.0	5.0		4.0	4.0		4.0	4.0	4.5
All-Red Time (s)	1.0	2.0		2.0	2.0		1.6	1.6		1.6	1.6	1.0
Lost Time Adjust (s)	-0.5	-2.0		-2.0	-2.0			-0.6			-0.6	-0.6
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	4.9
Lead/Lag	Lead			Lag	Lag		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	1.0	6.0		6.0	6.0		1.0	1.0		2.0	2.0	1.0
Minimum Gap (s)	0.2	3.0		3.0	3.0		0.2	0.2		0.2	0.2	0.2
Time Before Reduce (s)	0.0	20.0		20.0	20.0		0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	30.0		30.0	30.0		0.0	0.0		0.0	0.0	0.0
Recall Mode	None	Min		Min	Min		None	None		None	None	None
Act Effect Green (s)	39.3	39.3			25.6			8.2			11.0	24.2
Actuated g/C Ratio	0.63	0.63			0.41			0.13			0.18	0.39
v/c Ratio	0.31	0.27			0.72			0.01			0.44	0.27
Control Delay	7.7	6.8			22.6			34.0			31.8	15.4
Queue Delay	0.0	0.0			0.0			0.0			0.0	0.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	7.7	6.8			22.6			34.0			31.8	15.4
LOS	A	A			C			C			C	B
Approach Delay		7.1			22.6			34.0			22.8	
Approach LOS		A			C			C			C	
Queue Length 50th (ft)	13	35			132			1			41	36
Queue Length 95th (ft)	59	132			360			8			137	107
Internal Link Dist (ft)		3590			2486			926			2348	
Turn Bay Length (ft)	125											150
Base Capacity (vph)	540	1721			1577			256			610	753
Starvation Cap Reductn	0	0			0			0			0	0
Spillback Cap Reductn	0	0			0			0			0	0
Storage Cap Reductn	0	0			0			0			0	0
Reduced v/c Ratio	0.24	0.18			0.32			0.01			0.22	0.22

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 62.6
 Natural Cycle: 65
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.72
 Intersection Signal Delay: 17.3
 Intersection Capacity Utilization 57.3%
 Analysis Period (min) 15























Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 9: SR 1444 (Leverette Drive)/SR 1381 (Mountain Road) & NC 191 (Haywood Road)



R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2030 AM
09/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	107	44	4	36	32	467	5	937	63	540	622	89
Future Volume (vph)	107	44	4	36	32	467	5	937	63	540	622	89
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	12	12	12	12	12	12
Storage Length (ft)	0		75	0		600	150		0	150		50
Storage Lanes	0		1	0		1	1		0	1		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Flt			0.850			0.850		0.991				0.850
Flt Protected		0.966			0.974		0.950			0.950		
Satd. Flow (prot)	0	1799	1583	0	1754	1531	1770	3507	0	1770	3539	1583
Flt Permitted		0.966			0.974		0.389			0.950		
Satd. Flow (perm)	0	1799	1583	0	1754	1531	725	3507	0	1770	3539	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		20			45			45			45	
Link Distance (ft)		280			1846			3351			3356	
Travel Time (s)		9.5			28.0			50.8			50.8	
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)	119	49	4	40	36	519	6	1041	70	600	691	99
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	168	4	0	76	519	6	1111	0	600	691	99
Turn Type	Split	NA	pm+ov	Split	NA	pm+ov	pm+pt	NA		Prot	NA	Perm
Protected Phases	3	3	5	4	4	1	5	2		1	6	
Permitted Phases			3			4	2					6
Detector Phase	3	3	5	4	4	1	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	14.0		7.0	14.0	14.0
Minimum Split (s)	24.1	24.1	14.4	24.2	24.2	14.4	14.4	25.8		14.4	25.8	25.8
Total Split (s)	24.1	24.1	14.4	24.2	24.2	62.0	14.4	59.7		62.0	107.3	107.3
Total Split (%)	14.2%	14.2%	8.5%	14.2%	14.2%	36.5%	8.5%	35.1%		36.5%	63.1%	63.1%
Maximum Green (s)	17.1	17.1	7.4	17.2	17.2	55.0	7.4	52.7		55.0	100.3	100.3
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		-2.0	-2.0		-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	-2.0
Total Lost Time (s)		5.0	5.0		5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	6.0		2.0	6.0	6.0
Minimum Gap (s)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	3.4		0.2	3.4	3.4
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0		0.0	15.0	15.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.0		0.0	30.0	30.0
Recall Mode	None	None	None	None	None	None	None	Min		None	Min	Min
Act Effct Green (s)		18.4	27.4		13.5	75.6	63.1	54.1		57.1	110.7	110.7
Actuated g/C Ratio		0.11	0.17		0.08	0.46	0.39	0.33		0.35	0.68	0.68
v/c Ratio		0.83	0.02		0.52	0.73	0.02	0.96		0.97	0.29	0.09
Control Delay		101.9	40.5		85.0	43.0	16.4	70.9		81.2	12.0	11.0
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	0.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay		101.9	40.5		85.0	43.0	16.4	70.9		81.2	12.0	11.0
LOS		F	D		F	D	B	E		F	B	B
Approach Delay		100.5			48.4			70.6			41.8	
Approach LOS		F			D			E			D	
Queue Length 50th (ft)		179	3		80	452	2	615		639	130	31
Queue Length 95th (ft)		#316	13		139	605	8	#800		#940	229	74
Internal Link Dist (ft)		200			1766			3271			3276	
Turn Bay Length (ft)			75			600	150			150		50
Base Capacity (vph)		210	269		206	709	342	1177		619	2402	1074
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		0.80	0.01		0.37	0.73	0.02	0.94		0.97	0.29	0.09

Intersection Summary

Area Type: Other
 Cycle Length: 170
 Actuated Cycle Length: 163.1
 Natural Cycle: 170
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.97
 Intersection Signal Delay: 55.9
 Intersection Capacity Utilization 85.2%
 Analysis Period (min) 15
 Intersection LOS: E
 ICU Level of Service E



















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

Splits and Phases: 1: NC 280 (Boylston Highway) & NC 191 (Haywood Road)

62 s	59.7 s	24.1 s	24.2 s
14.4 s	107.3 s		

R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2030 AM
09/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	478	155	17	372	4	177	8	25	4	10	4
Future Volume (vph)	4	478	155	17	372	4	177	8	25	4	10	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	12	12	12	10	10	10	12	12	12
Storage Length (ft)	0		100	0		0	100		0	0		0
Storage Lanes	0		1	0		0	1		0	0		0
Taper Length (ft)	100			100			100			100		
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		0.999			0.886			0.972	
Flt Protected					0.998		0.950				0.990	
Satd. Flow (prot)	0	1801	1531	0	1857	0	1652	1540	0	0	1792	0
Flt Permitted					0.998		0.950				0.990	
Satd. Flow (perm)	0	1801	1531	0	1857	0	1652	1540	0	0	1792	0
Link Speed (mph)		45			45			45			30	
Link Distance (ft)		1846			5456			1563			408	
Travel Time (s)		28.0			82.7			23.7			9.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	4	531	172	19	413	4	197	9	28	4	11	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	535	172	0	436	0	197	37	0	0	19	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 56.8%
 Analysis Period (min) 15
 ICU Level of Service B

Intersection

Int Delay, s/veh	14.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↕		↖	↗			↕	
Traffic Vol, veh/h	4	478	155	17	372	4	177	8	25	4	10	4
Future Vol, veh/h	4	478	155	17	372	4	177	8	25	4	10	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	100	-	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	531	172	19	413	4	197	9	28	4	11	4



















Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	418	0	0	531	0	0	1001	996	531	1011	993	416
Stage 1	-	-	-	-	-	-	540	540	-	453	453	-
Stage 2	-	-	-	-	-	-	461	456	-	558	540	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1141	-	-	1036	-	-	222	244	548	218	245	637
Stage 1	-	-	-	-	-	-	526	521	-	586	570	-
Stage 2	-	-	-	-	-	-	581	568	-	514	521	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1141	-	-	1036	-	-	208	237	548	196	238	637
Mov Cap-2 Maneuver	-	-	-	-	-	-	208	237	-	196	238	-
Stage 1	-	-	-	-	-	-	523	518	-	582	556	-
Stage 2	-	-	-	-	-	-	552	554	-	477	518	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.4	83.8	19.9
HCM LOS			F	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	208	416	1141	-	-	1036	-	-	262
HCM Lane V/C Ratio	0.946	0.088	0.004	-	-	0.018	-	-	0.076
HCM Control Delay (s)	96.7	14.5	8.2	0	-	8.5	0	-	19.9
HCM Lane LOS	F	B	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	7.9	0.3	0	-	-	0.1	-	-	0.2

R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2030 AM
09/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	396	85	340	317	2	85	0	425	1	0	1
Future Volume (vph)	2	396	85	340	317	2	85	0	425	1	0	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	12
Storage Length (ft)	150		0	250		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
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		0.974			0.999			0.887			0.932	
Flt Protected	0.950			0.950				0.992			0.976	
Satd. Flow (prot)	1711	1754	0	1711	1799	0	0	1639	0	0	1694	0
Flt Permitted	0.549			0.123				0.944			0.876	
Satd. Flow (perm)	989	1754	0	221	1799	0	0	1560	0	0	1521	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			45			25	
Link Distance (ft)		5456			7476			1256			553	
Travel Time (s)		82.7			113.3			19.0			15.1	
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)	2	440	94	378	352	2	94	0	472	1	0	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	2	534	0	378	354	0	0	566	0	0	2	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	12.0	12.0		7.0	12.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	19.0	19.0		14.6	19.0		14.0	14.0		14.0	14.0	
Total Split (s)	32.6	32.6		20.4	53.0		37.0	37.0		37.0	37.0	
Total Split (%)	36.2%	36.2%		22.7%	58.9%		41.1%	41.1%		41.1%	41.1%	
Maximum Green (s)	25.6	25.6		13.4	46.0		30.0	30.0		30.0	30.0	
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0			-2.0			-2.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	6.0	6.0		1.0	6.0		1.0	1.0		1.0	1.0	
Minimum Gap (s)	3.0	3.0		0.2	3.0		0.2	0.2		0.2	0.2	
Time Before Reduce (s)	15.0	15.0		0.0	15.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	30.0	30.0		0.0	30.0		0.0	0.0		0.0	0.0	
Recall Mode	Min	Min		None	Min		None	None		None	None	
Act Effect Green (s)	27.6	27.6		48.0	48.0			32.0			32.0	
Actuated g/C Ratio	0.31	0.31		0.53	0.53			0.36			0.36	
v/c Ratio	0.01	0.99		1.02	0.37			1.02			0.00	
Control Delay	22.0	70.5		76.2	13.6			74.6			19.0	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	

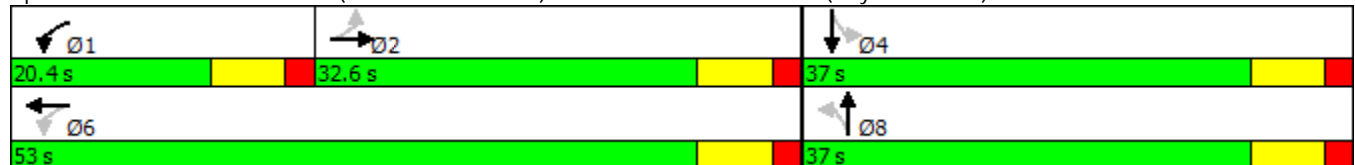
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	22.0	70.5		76.2	13.6			74.6			19.0	
LOS	C	E		E	B			E			B	
Approach Delay		70.4			45.9			74.6			19.0	
Approach LOS		E			D			E			B	
Queue Length 50th (ft)	1	301		~171	110			~331			1	
Queue Length 95th (ft)	6	#512		#355	171			#545			5	
Internal Link Dist (ft)		5376			7396			1176			473	
Turn Bay Length (ft)	150			250								
Base Capacity (vph)	303	537		372	959			554			540	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.01	0.99		1.02	0.37			1.02			0.00	

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Natural Cycle: 90
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 1.02
 Intersection Signal Delay: 61.9
 Intersection Capacity Utilization 89.1%
 Analysis Period (min) 15
 Intersection LOS: E
 ICU Level of Service E

~ 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: SR 1426 (School House Road)/Water Treatment & NC 191 (Haywood Road)



R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2030 AM
09/20/2017

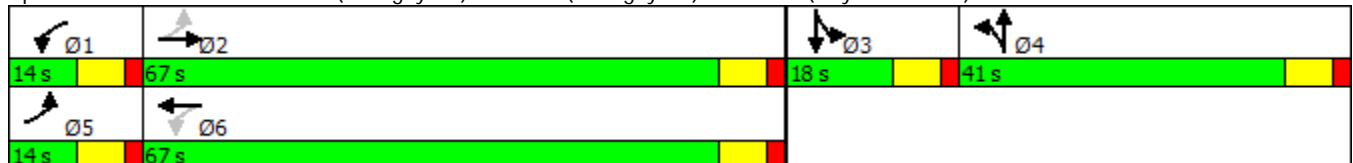
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	70	666	55	139	545	129	83	154	254	130	85	58
Future Volume (vph)	70	666	55	139	545	129	83	154	254	130	85	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	12
Storage Length (ft)	150		0	125		0	100		0	125		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	100			100			100			100		
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		0.989			0.971			0.907			0.939	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1711	1781	0	1711	1748	0	1770	1690	0	1770	1749	0
Flt Permitted	0.070			0.065			0.950			0.950		
Satd. Flow (perm)	126	1781	0	117	1748	0	1770	1690	0	1770	1749	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			35			45	
Link Distance (ft)		7476			1829			1358			1857	
Travel Time (s)		113.3			27.7			26.5			28.1	
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)	78	740	61	154	606	143	92	171	282	144	94	64
Shared Lane Traffic (%)												
Lane Group Flow (vph)	78	801	0	154	749	0	92	453	0	144	158	0
Turn Type	pm+pt	NA		pm+pt	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases	2			6								
Detector Phase	5	2		1	6		4	4		3	3	
Switch Phase												
Minimum Initial (s)	7.0	12.0		7.0	12.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	14.0	19.0		14.0	19.0		14.0	14.0		14.0	14.0	
Total Split (s)	14.0	67.0		14.0	67.0		41.0	41.0		18.0	18.0	
Total Split (%)	10.0%	47.9%		10.0%	47.9%		29.3%	29.3%		12.9%	12.9%	
Maximum Green (s)	7.0	60.0		7.0	60.0		34.0	34.0		11.0	11.0	
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	1.0	6.0		1.0	6.0		1.0	1.0		1.0	1.0	
Minimum Gap (s)	3.0	3.0		0.2	0.2		0.2	0.2		0.2	0.2	
Time Before Reduce (s)	0.0	15.0		0.0	15.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	30.0		0.0	30.0		0.0	0.0		0.0	0.0	
Recall Mode	None	Min		None	Min		None	None		None	None	
Act Effect Green (s)	71.0	62.0		71.0	62.0		36.0	36.0		13.0	13.0	
Actuated g/C Ratio	0.51	0.44		0.51	0.44		0.26	0.26		0.09	0.09	
v/c Ratio	0.47	1.02		0.96	0.97		0.20	1.04		0.88	0.98	
Control Delay	27.8	74.8		93.3	63.6		42.2	104.9		106.2	126.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	












Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	27.8	74.8		93.3	63.6		42.2	104.9		106.2	126.9	
LOS	C	E		F	E		D	F		F	F	
Approach Delay		70.7			68.7			94.3				117.0
Approach LOS		E			E			F				F
Queue Length 50th (ft)	33	-768		92	655		66	-445		132	146	
Queue Length 95th (ft)	70	#1018		#237	#930		116	#663		#260	#294	
Internal Link Dist (ft)		7396			1749			1278			1777	
Turn Bay Length (ft)	150			125			100			125		
Base Capacity (vph)	165	788		161	774		455	434		164	162	
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	0.47	1.02		0.96	0.97		0.20	1.04		0.88	0.98	

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Natural Cycle: 140
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 1.04
 Intersection Signal Delay: 80.2
 Intersection Capacity Utilization 93.6%
 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: 4: SR 1309 (S Rugby Rd)/SR 1365 (N Rugby Rd) & NC 191 (Haywood Road)



						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	993	18	36	815	29	69
Future Volume (vph)	993	18	36	815	29	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	10	10
Storage Length (ft)		0	225		0	100
Storage Lanes		0	1		1	1
Taper Length (ft)			25		100	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.998					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1797	0	1711	1801	1652	1478
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1797	0	1711	1801	1652	1478
Link Speed (mph)	45			45	25	
Link Distance (ft)	1829			653	1295	
Travel Time (s)	27.7			9.9	35.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	1103	20	40	906	32	77
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1123	0	40	906	32	77
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 64.3% ICU Level of Service C
 Analysis Period (min) 15

Intersection

Int Delay, s/veh 3.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↻		↻	↻	↻	↻
Traffic Vol, veh/h	993	18	36	815	29	69
Future Vol, veh/h	993	18	36	815	29	69
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	225	-	0	100
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	1103	20	40	906	32	77

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	1123
Stage 1	-	-	1113
Stage 2	-	-	986
Critical Hdwy	-	4.12	6.42
Critical Hdwy Stg 1	-	-	5.42
Critical Hdwy Stg 2	-	-	5.42
Follow-up Hdwy	-	2.218	3.518
Pot Cap-1 Maneuver	-	622	57
Stage 1	-	-	314
Stage 2	-	-	361
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	622	53
Mov Cap-2 Maneuver	-	-	53
Stage 1	-	-	314
Stage 2	-	-	338

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	61.3
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	53	254	-	-	622	-
HCM Lane V/C Ratio	0.608	0.302	-	-	0.064	-
HCM Control Delay (s)	147.1	25.2	-	-	11.2	-
HCM Lane LOS	F	D	-	-	B	-
HCM 95th %tile Q(veh)	2.4	1.2	-	-	0.2	-

R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2030 AM
09/20/2017

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	96	963	8	10	790	47	9	0	14	30	0	50
Future Volume (vph)	96	963	8	10	790	47	9	0	14	30	0	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	12
Storage Length (ft)	350		0	225		225	0		0	0		300
Storage Lanes	1		0	1		1	0		0	0		1
Taper Length (ft)	25			100			100			100		
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		0.999				0.850		0.917				0.850
Flt Protected	0.950			0.950				0.981			0.950	
Satd. Flow (prot)	1711	1799	0	1711	1801	1531	0	1676	0	0	1770	1583
Flt Permitted	0.089			0.186				0.981			0.950	
Satd. Flow (perm)	160	1799	0	335	1801	1531	0	1676	0	0	1770	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		55			55			25			25	
Link Distance (ft)		653			1496			862			788	
Travel Time (s)		8.1			18.5			23.5			21.5	
Peak Hour Factor	0.50	0.90	0.90	0.90	0.90	0.50	0.90	0.50	0.90	0.50	0.50	0.50
Adj. Flow (vph)	192	1070	9	11	878	94	10	0	16	60	0	100
Shared Lane Traffic (%)												
Lane Group Flow (vph)	192	1079	0	11	878	94	0	26	0	0	60	100
Turn Type	pm+pt	NA		Perm	NA	pm+ov	Split	NA		Split	NA	pm+ov
Protected Phases	1	6			2	4	3	3		4	4	1
Permitted Phases	6			2		2						4
Detector Phase	1	6		2	2	4	3	3		4	4	1
Switch Phase												
Minimum Initial (s)	10.0	14.0		14.0	14.0	7.0	7.0	7.0		7.0	7.0	10.0
Minimum Split (s)	17.6	21.0		21.0	21.0	14.0	14.0	14.0		14.0	14.0	17.6
Total Split (s)	18.0	92.0		74.0	74.0	14.0	14.0	14.0		14.0	14.0	18.0
Total Split (%)	15.0%	76.7%		61.7%	61.7%	11.7%	11.7%	11.7%		11.7%	11.7%	15.0%
Maximum Green (s)	11.0	85.0		67.0	67.0	7.0	7.0	7.0		7.0	7.0	11.0
Yellow Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0	-2.0		-2.0			-2.0	-2.0
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0		5.0			5.0	5.0
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lead		Lag	Lag	Lead
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	2.0	6.0		6.0	6.0	2.0	2.0	2.0		2.0	2.0	2.0
Minimum Gap (s)	0.2	3.0		3.0	3.0	0.2	0.2	0.2		0.2	0.2	0.2
Time Before Reduce (s)	0.0	15.0		15.0	15.0	0.0	0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	30.0		30.0	30.0	0.0	0.0	0.0		0.0	0.0	0.0
Recall Mode	None	Min		Min	Min	None	None	None		None	None	None
Act Effect Green (s)	73.0	74.8		53.9	53.9	67.0		10.0			10.0	24.0
Actuated g/C Ratio	0.76	0.78		0.56	0.56	0.70		0.10			0.10	0.25
v/c Ratio	0.56	0.77		0.06	0.87	0.09		0.15			0.33	0.25
Control Delay	23.6	14.6		12.4	30.2	4.1		52.3			55.1	37.1
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0			0.0	0.0

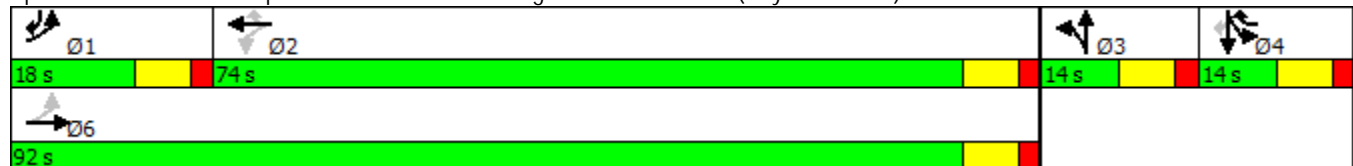
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	23.6	14.6		12.4	30.2	4.1		52.3			55.1	37.1
LOS	C	B		B	C	A		D			E	D
Approach Delay		16.0			27.5			52.3			43.9	
Approach LOS		B			C			D			D	
Queue Length 50th (ft)	57	506		4	524	11		18			41	58
Queue Length 95th (ft)	33	746		13	754	11		27			49	61
Internal Link Dist (ft)		573			1416			782			708	
Turn Bay Length (ft)	350			225		225						300
Base Capacity (vph)	354	1525		246	1326	1068		173			183	409
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	0.54	0.71		0.04	0.66	0.09		0.15			0.33	0.24

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 95.9
 Natural Cycle: 90
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.87
 Intersection Signal Delay: 22.8
 Intersection Capacity Utilization 83.4%
 Analysis Period (min) 15


















Intersection LOS: C
 ICU Level of Service E

Splits and Phases: 6: Alpine Dr/West Henderson High School & NC 191 (Haywood Road)



R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2030 AM
09/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	993	1	1	813	4	1	0	1	4	0	22
Future Volume (vph)	26	993	1	1	813	4	1	0	1	4	0	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	10	10	10	10	10	10
Storage Length (ft)	235		0	0		0	0		0	0		0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (ft)	225			100			100			100		
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					0.999			0.932			0.884	
Flt Protected	0.950							0.976			0.993	
Satd. Flow (prot)	1711	1801	0	0	1799	0	0	1581	0	0	1526	0
Flt Permitted	0.950							0.976			0.993	
Satd. Flow (perm)	1711	1801	0	0	1799	0	0	1581	0	0	1526	0
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		1496			911			590			1563	
Travel Time (s)		22.7			13.8			13.4			35.5	
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)	29	1103	1	1	903	4	1	0	1	4	0	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	29	1104	0	0	908	0	0	2	0	0	28	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 62.3%
 Analysis Period (min) 15
 ICU Level of Service B

Intersection

Int Delay, s/veh	0.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	26	993	1	1	813	4	1	0	1	4	0	22
Future Vol, veh/h	26	993	1	1	813	4	1	0	1	4	0	22
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	235	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	29	1103	1	1	903	4	1	0	1	4	0	24













Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	908	0	0	1104	0	0	2082	2072	1104	2070	2070	906
Stage 1	-	-	-	-	-	-	1162	1162	-	908	908	-
Stage 2	-	-	-	-	-	-	920	910	-	1162	1162	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	750	-	-	632	-	-	39	54	257	40	54	334
Stage 1	-	-	-	-	-	-	237	269	-	330	354	-
Stage 2	-	-	-	-	-	-	325	353	-	237	269	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	750	-	-	632	-	-	35	52	257	39	52	334
Mov Cap-2 Maneuver	-	-	-	-	-	-	35	52	-	39	52	-
Stage 1	-	-	-	-	-	-	228	259	-	317	353	-
Stage 2	-	-	-	-	-	-	300	352	-	227	259	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0	65.2	33.7
HCM LOS			F	D

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	62	750	-	-	632	-	-	154
HCM Lane V/C Ratio	0.036	0.039	-	-	0.002	-	-	0.188
HCM Control Delay (s)	65.2	10	-	-	10.7	0	-	33.7
HCM Lane LOS	F	A	-	-	B	A	-	D
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	0.7

R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2030 AM
09/20/2017

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	932	73	26	767	38	17
Future Volume (vph)	932	73	26	767	38	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	12	12
Storage Length (ft)		175	175		0	350
Storage Lanes		1	1		1	1
Taper Length (ft)			100		100	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1801	1531	1711	1801	1770	1583
Flt Permitted			0.076		0.950	
Satd. Flow (perm)	1801	1531	137	1801	1770	1583
Right Turn on Red		No				No
Satd. Flow (RTOR)						
Link Speed (mph)	45			45	30	
Link Distance (ft)	911			3670	692	
Travel Time (s)	13.8			55.6	15.7	
Peak Hour Factor	0.90	0.50	0.50	0.90	0.50	0.50
Adj. Flow (vph)	1036	146	52	852	76	34
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1036	146	52	852	76	34
Turn Type	NA	pm+ov	pm+pt	NA	Prot	pm+ov
Protected Phases	6	4	5	2	4	5
Permitted Phases		6	2			4
Detector Phase	6	4	5	2	4	5
Switch Phase						
Minimum Initial (s)	12.0	7.0	7.0	12.0	7.0	7.0
Minimum Split (s)	19.0	14.0	14.0	19.0	14.0	14.0
Total Split (s)	62.0	14.0	14.0	76.0	14.0	14.0
Total Split (%)	68.9%	15.6%	15.6%	84.4%	15.6%	15.6%
Maximum Green (s)	55.0	7.0	7.0	69.0	7.0	7.0
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag		Lead			Lead
Lead-Lag Optimize?	Yes		Yes			Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	Min	None	None	Min	None	None
Act Effct Green (s)	52.7	68.4	63.3	63.3	9.2	23.5
Actuated g/C Ratio	0.64	0.83	0.77	0.77	0.11	0.28
v/c Ratio	0.90	0.12	0.19	0.62	0.39	0.08
Control Delay	26.7	2.4	3.6	6.4	44.0	25.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.7	2.4	3.6	6.4	44.0	25.9
LOS	C	A	A	A	D	C
Approach Delay	23.7			6.2	38.4	

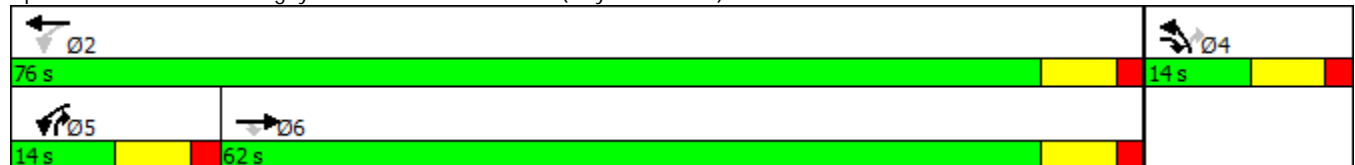
Lane Group	→ EBT	↘ EBR	↙ WBL	← WBT	↖ NBL	↗ NBR
Approach LOS	C			A	D	
Queue Length 50th (ft)	458	15	5	146	41	15
Queue Length 95th (ft)	#793	13	6	223	46	21
Internal Link Dist (ft)	831			3590	612	
Turn Bay Length (ft)		175	175			350
Base Capacity (vph)	1269	1266	280	1521	197	450
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.82	0.12	0.19	0.56	0.39	0.08

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 82.7
 Natural Cycle: 90
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.90
 Intersection Signal Delay: 17.2
 Intersection Capacity Utilization 63.2%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 8: Rugby Middle School & NC 191 (Haywood Road)



R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2030 AM
09/20/2017

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	155	811	3	2	654	114	4	5	5	108	2	119
Future Volume (vph)	155	811	3	2	654	114	4	5	5	108	2	119
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	12
Storage Length (ft)	125		0	125		0	0		0	0		150
Storage Lanes	1		0	1		0	0		0	0		1
Taper Length (ft)	100			100			100			100		
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					0.978			0.949				0.850
Flt Protected	0.950			0.950				0.988			0.953	
Satd. Flow (prot)	1711	1801	0	1711	1761	0	0	1747	0	0	1775	1583
Flt Permitted	0.093			0.258				0.988			0.953	
Satd. Flow (perm)	167	1801	0	465	1761	0	0	1747	0	0	1775	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			25			35	
Link Distance (ft)		3670			2566			1006			2428	
Travel Time (s)		55.6			38.9			27.4			47.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	172	901	3	2	727	127	4	6	6	120	2	132
Shared Lane Traffic (%)												
Lane Group Flow (vph)	172	904	0	2	854	0	0	16	0	0	122	132
Turn Type	pm+pt	NA		Perm	NA		Split	NA		Split	NA	pm+ov
Protected Phases	1	6			2		4	4		3	3	1
Permitted Phases	6			2								3
Detector Phase	1	6		2	2		4	4		3	3	1
Switch Phase												
Minimum Initial (s)	7.0	12.0		12.0	12.0		7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	14.0	19.0		19.0	19.0		14.0	14.0		14.0	14.0	14.0
Total Split (s)	14.0	90.0		76.0	76.0		14.0	14.0		16.0	16.0	14.0
Total Split (%)	11.7%	75.0%		63.3%	63.3%		11.7%	11.7%		13.3%	13.3%	11.7%
Maximum Green (s)	7.0	83.0		69.0	69.0		7.0	7.0		9.0	9.0	7.0
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0			-2.0			-2.0	-2.0
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	5.0
Lead/Lag	Lead			Lag	Lag		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	1.0	6.0		6.0	6.0		1.0	1.0		2.0	2.0	1.0
Minimum Gap (s)	0.2	3.0		3.0	3.0		0.2	0.2		0.2	0.2	0.2
Time Before Reduce (s)	0.0	20.0		20.0	20.0		0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	30.0		30.0	30.0		0.0	0.0		0.0	0.0	0.0
Recall Mode	None	Min		Min	Min		None	None		None	None	None
Act Effect Green (s)	64.7	64.7		49.8	49.8			9.6			11.2	24.6
Actuated g/C Ratio	0.71	0.71		0.55	0.55			0.11			0.12	0.27
v/c Ratio	0.61	0.71		0.01	0.89			0.09			0.56	0.31
Control Delay	23.1	11.9		10.0	30.5			49.1			55.1	29.6
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	0.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	23.1	11.9		10.0	30.5			49.1			55.1	29.6
LOS	C	B		A	C			D			E	C
Approach Delay		13.7			30.5			49.1			41.8	
Approach LOS		B			C			D			D	
Queue Length 50th (ft)	22	189		0	334			7			58	49
Queue Length 95th (ft)	#145	518		4	700			35			#191	128
Internal Link Dist (ft)		3590			2486			926			2348	
Turn Bay Length (ft)	125			125								150
Base Capacity (vph)	282	1595		375	1423			185			229	429
Starvation Cap Reductn	0	0		0	0			0			0	0
Spillback Cap Reductn	0	0		0	0			0			0	0
Storage Cap Reductn	0	0		0	0			0			0	0
Reduced v/c Ratio	0.61	0.57		0.01	0.60			0.09			0.53	0.31

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 90.9
 Natural Cycle: 90
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.89
 Intersection Signal Delay: 23.7
 Intersection Capacity Utilization 78.1%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Intersection LOS: C
 ICU Level of Service D

Splits and Phases: 9: SR 1444 (Leverette Drive)/SR 1381 (Mountain Road) & NC 191 (Haywood Road)



R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2030 PM

09/20/2017

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	89	32	5	63	44	540	4	622	36	467	937	107
Future Volume (vph)	89	32	5	63	44	540	4	622	36	467	937	107
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	12	12	12	12	12	12
Storage Length (ft)	0		75	0		600	150		0	150		50
Storage Lanes	0		1	0		1	1		0	1		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Frt			0.850			0.850		0.992				0.850
Flt Protected		0.965			0.971		0.950			0.950		
Satd. Flow (prot)	0	1798	1583	0	1748	1531	1770	3511	0	1770	3539	1583
Flt Permitted		0.965			0.971		0.275			0.950		
Satd. Flow (perm)	0	1798	1583	0	1748	1531	512	3511	0	1770	3539	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		20			45			45			45	
Link Distance (ft)		280			1846			3351			3356	
Travel Time (s)		9.5			28.0			50.8			50.8	
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)	99	36	6	70	49	600	4	691	40	519	1041	119
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	135	6	0	119	600	4	731	0	519	1041	119
Turn Type	Split	NA	pm+ov	Split	NA	pm+ov	pm+pt	NA		Prot	NA	Perm
Protected Phases	3	3	5	4	4	1	5	2		1	6	
Permitted Phases			3			4	2					6
Detector Phase	3	3	5	4	4	1	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	14.0		7.0	14.0	14.0
Minimum Split (s)	24.1	24.1	14.4	24.2	24.2	14.4	14.4	25.8		14.4	25.8	25.8
Total Split (s)	24.1	24.1	14.4	24.2	24.2	40.0	14.4	31.7		40.0	57.3	57.3
Total Split (%)	20.1%	20.1%	12.0%	20.2%	20.2%	33.3%	12.0%	26.4%		33.3%	47.8%	47.8%
Maximum Green (s)	17.1	17.1	7.4	17.2	17.2	33.0	7.4	24.7		33.0	50.3	50.3
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		-2.0	-2.0		-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	-2.0
Total Lost Time (s)		5.0	5.0		5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	6.0		2.0	6.0	6.0
Minimum Gap (s)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	3.4		0.2	3.4	3.4
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0		0.0	15.0	15.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.0		0.0	30.0	30.0
Recall Mode	None	None	None	None	None	None	None	Min		None	Min	Min
Act Effct Green (s)		14.3	23.4		13.8	54.0	34.7	25.7		35.2	60.7	60.7
Actuated g/C Ratio		0.13	0.21		0.13	0.49	0.32	0.24		0.32	0.56	0.56
v/c Ratio		0.57	0.02		0.54	0.79	0.01	0.88		0.91	0.53	0.14
Control Delay		55.5	20.4		55.0	32.9	15.2	54.8		58.5	19.0	15.7
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	0.0

Lane Group												
Total Delay		55.5	20.4		55.0	32.9	15.2	54.8		58.5	19.0	15.7
LOS		E	C		D	C	B	D		E	B	B
Approach Delay		54.0			36.5			54.6			31.0	
Approach LOS		D			D			D			C	
Queue Length 50th (ft)		91	2		80	345	1	261		352	201	33
Queue Length 95th (ft)		162	10		145	544	7	#413		#635	406	95
Internal Link Dist (ft)		200			1766			3271			3276	
Turn Bay Length (ft)			75			600	150			150		50
Base Capacity (vph)		316	344		309	758	273	864		571	1969	881
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		0.43	0.02		0.39	0.79	0.01	0.85		0.91	0.53	0.14



















Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 109.1
 Natural Cycle: 120
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.91
 Intersection Signal Delay: 38.5
 Intersection Capacity Utilization 70.9%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Intersection LOS: D
 ICU Level of Service C

Splits and Phases: 1: NC 280 (Boylston Highway) & NC 191 (Haywood Road)

40 s	31.7 s	24.1 s	24.2 s
14.4 s	57.3 s		

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	372	177	25	478	4	155	10	17	4	8	4
Future Volume (vph)	4	372	177	25	478	4	155	10	17	4	8	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	12	12	12	10	10	10	12	12	12
Storage Length (ft)	0		100	0		0	100		0	0		0
Storage Lanes	0		1	0		0	1		0	0		0
Taper Length (ft)	100			100			100			100		
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		0.999			0.905			0.968	
Flt Protected					0.998		0.950				0.988	
Satd. Flow (prot)	0	1801	1531	0	1857	0	1652	1573	0	0	1781	0
Flt Permitted					0.998		0.950				0.988	
Satd. Flow (perm)	0	1801	1531	0	1857	0	1652	1573	0	0	1781	0
Link Speed (mph)		45			45			45			30	
Link Distance (ft)		1846			5456			1563			408	
Travel Time (s)		28.0			82.7			23.7			9.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	4	413	197	28	531	4	172	11	19	4	9	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	417	197	0	563	0	172	30	0	0	17	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 67.7%
 Analysis Period (min) 15
 ICU Level of Service C

Intersection

Int Delay, s/veh	10.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔		↔		↔	↔			↔	
Traffic Vol, veh/h	4	372	177	25	478	4	155	10	17	4	8	4
Future Vol, veh/h	4	372	177	25	478	4	155	10	17	4	8	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	100	-	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	413	197	28	531	4	172	11	19	4	9	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	536	0	0	413	0	0	1018	1013	413	1026	1011	533
Stage 1	-	-	-	-	-	-	422	422	-	589	589	-
Stage 2	-	-	-	-	-	-	596	591	-	437	422	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1032	-	-	1146	-	-	216	239	639	213	240	547
Stage 1	-	-	-	-	-	-	609	588	-	494	495	-
Stage 2	-	-	-	-	-	-	490	494	-	598	588	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1032	-	-	1146	-	-	201	229	639	193	230	547
Mov Cap-2 Maneuver	-	-	-	-	-	-	201	229	-	193	230	-
Stage 1	-	-	-	-	-	-	605	584	-	491	478	-
Stage 2	-	-	-	-	-	-	460	477	-	566	584	-



















Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.4	70.2	20.2
HCM LOS			F	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	201	384	1032	-	-	1146	-	-	255
HCM Lane V/C Ratio	0.857	0.078	0.004	-	-	0.024	-	-	0.07
HCM Control Delay (s)	79.8	15.2	8.5	0	-	8.2	0	-	20.2
HCM Lane LOS	F	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	6.4	0.3	0	-	-	0.1	-	-	0.2

R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2030 PM

09/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	317	85	425	396	1	85	0	340	2	0	2
Future Volume (vph)	1	317	85	425	396	1	85	0	340	2	0	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	12
Storage Length (ft)	150		0	250		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
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		0.968						0.892			0.932	
Flt Protected	0.950			0.950				0.990			0.976	
Satd. Flow (prot)	1711	1743	0	1711	1801	0	0	1645	0	0	1694	0
Flt Permitted	0.507			0.154				0.932			0.863	
Satd. Flow (perm)	913	1743	0	277	1801	0	0	1549	0	0	1498	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			45			25	
Link Distance (ft)		5456			7476			1256			553	
Travel Time (s)		82.7			113.3			19.0			15.1	
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)	1	352	94	472	440	1	94	0	378	2	0	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	446	0	472	441	0	0	472	0	0	4	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	12.0	12.0		7.0	12.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	19.0	19.0		14.6	19.0		14.0	14.0		14.0	14.0	
Total Split (s)	31.0	31.0		25.0	56.0		34.0	34.0		34.0	34.0	
Total Split (%)	34.4%	34.4%		27.8%	62.2%		37.8%	37.8%		37.8%	37.8%	
Maximum Green (s)	24.0	24.0		18.0	49.0		27.0	27.0		27.0	27.0	
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	6.0	6.0		1.0	6.0		1.0	1.0		1.0	1.0	
Minimum Gap (s)	3.0	3.0		0.2	3.0		0.2	0.2		0.2	0.2	
Time Before Reduce (s)	15.0	15.0		0.0	15.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	30.0	30.0		0.0	30.0		0.0	0.0		0.0	0.0	
Recall Mode	Min	Min		None	Min		None	None		None	None	
Act Effect Green (s)	25.0	25.0		50.0	50.0			28.4			28.4	
Actuated g/C Ratio	0.28	0.28		0.57	0.57			0.32			0.32	
v/c Ratio	0.00	0.91		0.98	0.43			0.95			0.01	
Control Delay	23.0	55.2		60.3	12.8			61.2			21.0	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	

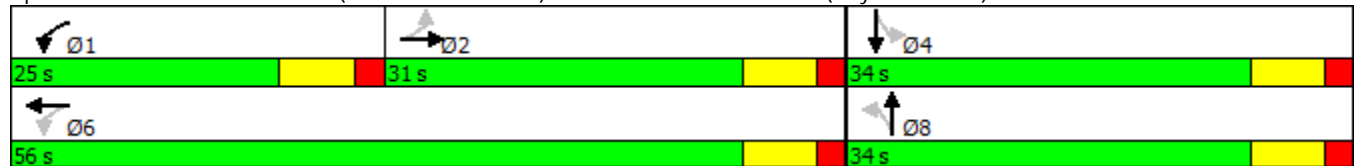
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	23.0	55.2		60.3	12.8			61.2			21.0	
LOS	C	E		E	B			E			C	
Approach Delay		55.1			37.4			61.2			21.0	
Approach LOS		E			D			E			C	
Queue Length 50th (ft)	0	242		208	134			259			2	
Queue Length 95th (ft)	4	#415		#411	203			#452			9	
Internal Link Dist (ft)		5376			7396			1176			473	
Turn Bay Length (ft)	150			250								
Base Capacity (vph)	268	513		481	1040			509			492	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.00	0.87		0.98	0.42			0.93			0.01	

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 88.4
 Natural Cycle: 90
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.98
 Intersection Signal Delay: 47.8
 Intersection Capacity Utilization 84.6%
 Analysis Period (min) 15
 Intersection LOS: D
 ICU Level of Service E

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

Splits and Phases: 3: SR 1426 (School House Road)/Water Treatment & NC 191 (Haywood Road)



R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2030 PM

09/20/2017

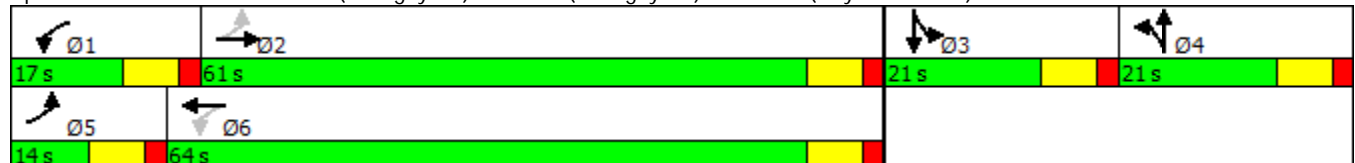
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	58	545	83	254	666	130	55	85	139	129	154	70
Future Volume (vph)	58	545	83	254	666	130	55	85	139	129	154	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	12
Storage Length (ft)	150		0	125		0	100		0	125		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	100			100			100			100		
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		0.980			0.976			0.907			0.953	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1711	1765	0	1711	1757	0	1770	1690	0	1770	1775	0
Flt Permitted	0.073			0.129			0.950			0.950		
Satd. Flow (perm)	131	1765	0	232	1757	0	1770	1690	0	1770	1775	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			35			45	
Link Distance (ft)		7476			1829			1358			1857	
Travel Time (s)		113.3			27.7			26.5			28.1	
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)	64	606	92	282	740	144	61	94	154	143	171	78
Shared Lane Traffic (%)												
Lane Group Flow (vph)	64	698	0	282	884	0	61	248	0	143	249	0
Turn Type	pm+pt	NA		pm+pt	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases	2			6								
Detector Phase	5	2		1	6		4	4		3	3	
Switch Phase												
Minimum Initial (s)	7.0	12.0		7.0	12.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	14.0	19.0		14.0	19.0		14.0	14.0		14.0	14.0	
Total Split (s)	14.0	61.0		17.0	64.0		21.0	21.0		21.0	21.0	
Total Split (%)	11.7%	50.8%		14.2%	53.3%		17.5%	17.5%		17.5%	17.5%	
Maximum Green (s)	7.0	54.0		10.0	57.0		14.0	14.0		14.0	14.0	
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	1.0	6.0		1.0	6.0		1.0	1.0		1.0	1.0	
Minimum Gap (s)	3.0	3.0		0.2	0.2		0.2	0.2		0.2	0.2	
Time Before Reduce (s)	0.0	15.0		0.0	15.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	30.0		0.0	30.0		0.0	0.0		0.0	0.0	
Recall Mode	None	Min		None	Min		None	None		None	None	
Act Effect Green (s)	62.1	53.0		68.5	59.1		16.0	16.0		16.0	16.0	
Actuated g/C Ratio	0.53	0.45		0.58	0.50		0.14	0.14		0.14	0.14	
v/c Ratio	0.34	0.87		0.98	1.00		0.25	1.07		0.59	1.03	
Control Delay	16.3	42.4		71.6	60.2		49.7	128.7		59.4	115.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	












Lane Group												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	16.3	42.4		71.6	60.2		49.7	128.7		59.4	115.8	
LOS	B	D		E	E		D	F		E	F	
Approach Delay		40.2			62.9			113.1			95.2	
Approach LOS		D			E			F			F	
Queue Length 50th (ft)	19	465		125	-729		43	-218		106	-211	
Queue Length 95th (ft)	41	#693		#307	#975		86	#384		176	#377	
Internal Link Dist (ft)		7396			1749			1278			1777	
Turn Bay Length (ft)	150			125			100			125		
Base Capacity (vph)	191	845		287	886		242	231		242	242	
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	0.34	0.83		0.98	1.00		0.25	1.07		0.59	1.03	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 117.2
 Natural Cycle: 120
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 1.07
 Intersection Signal Delay: 67.1
 Intersection Capacity Utilization 85.6%
 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: 4: SR 1309 (S Rugby Rd)/SR 1365 (N Rugby Rd) & NC 191 (Haywood Road)



						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	816	28	70	993	18	36
Future Volume (vph)	816	28	70	993	18	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	10	10
Storage Length (ft)		0	225		0	100
Storage Lanes		0	1		1	1
Taper Length (ft)			25		100	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.996					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1793	0	1711	1801	1652	1478
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1793	0	1711	1801	1652	1478
Link Speed (mph)	45			45	25	
Link Distance (ft)	1829			653	1295	
Travel Time (s)	27.7			9.9	35.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	907	31	78	1103	20	40
Shared Lane Traffic (%)						
Lane Group Flow (vph)	938	0	78	1103	20	40
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 62.3% ICU Level of Service B
Analysis Period (min) 15

Intersection

Int Delay, s/veh 1.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↻		↻	↻	↻	↻
Traffic Vol, veh/h	816	28	70	993	18	36
Future Vol, veh/h	816	28	70	993	18	36
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	225	-	0	100
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	907	31	78	1103	20	40

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	2181
Stage 1	-	-	922
Stage 2	-	-	1259
Critical Hdwy	-	4.12	6.42
Critical Hdwy Stg 1	-	-	5.42
Critical Hdwy Stg 2	-	-	5.42
Follow-up Hdwy	-	2.218	3.518
Pot Cap-1 Maneuver	-	730	51
Stage 1	-	-	387
Stage 2	-	-	267
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	730	46
Mov Cap-2 Maneuver	-	-	46
Stage 1	-	-	387
Stage 2	-	-	238

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	56.2
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	46	327	-	-	730	-
HCM Lane V/C Ratio	0.435	0.122	-	-	0.107	-
HCM Control Delay (s)	133.5	17.5	-	-	10.5	-
HCM Lane LOS	F	C	-	-	B	-
HCM 95th %tile Q(veh)	1.6	0.4	-	-	0.4	-

R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2030 PM
09/20/2017

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	790	9	14	963	30	8	0	10	47	0	96
Future Volume (vph)	50	790	9	14	963	30	8	0	10	47	0	96
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	12
Storage Length (ft)	350		0	225		225	0		0	0		300
Storage Lanes	1		0	1		1	0		0	0		1
Taper Length (ft)	25			100			100			100		
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		0.998						0.926				0.850
Flt Protected	0.950			0.950				0.978			0.950	
Satd. Flow (prot)	1711	1797	0	1711	1801	1531	0	1687	0	0	1770	1583
Flt Permitted	0.054			0.308				0.978			0.950	
Satd. Flow (perm)	97	1797	0	555	1801	1531	0	1687	0	0	1770	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		55			55			25			25	
Link Distance (ft)		653			1496			862			788	
Travel Time (s)		8.1			18.5			23.5			21.5	
Peak Hour Factor	0.50	0.90	0.90	0.90	0.90	0.50	0.90	0.50	0.90	0.50	0.50	0.50
Adj. Flow (vph)	100	878	10	16	1070	60	9	0	11	94	0	192
Shared Lane Traffic (%)												
Lane Group Flow (vph)	100	888	0	16	1070	60	0	20	0	0	94	192
Turn Type	pm+pt	NA		Perm	NA	pm+ov	Split	NA		Split	NA	pm+ov
Protected Phases	1	6			2	4	3	3		4	4	1
Permitted Phases	6			2		2						4
Detector Phase	1	6		2	2	4	3	3		4	4	1
Switch Phase												
Minimum Initial (s)	10.0	14.0		14.0	14.0	7.0	7.0	7.0		7.0	7.0	10.0
Minimum Split (s)	17.6	21.0		21.0	21.0	14.0	14.0	14.0		14.0	14.0	17.6
Total Split (s)	17.6	92.0		74.4	74.4	14.0	14.0	14.0		14.0	14.0	17.6
Total Split (%)	14.7%	76.7%		62.0%	62.0%	11.7%	11.7%	11.7%		11.7%	11.7%	14.7%
Maximum Green (s)	10.6	85.0		67.4	67.4	7.0	7.0	7.0		7.0	7.0	10.6
Yellow Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0	-2.0		-2.0			-2.0	-2.0
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0		5.0			5.0	5.0
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lead		Lag	Lag	Lead
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	2.0	6.0		6.0	6.0	2.0	2.0	2.0		2.0	2.0	2.0
Minimum Gap (s)	0.2	3.0		3.0	3.0	0.2	0.2	0.2		0.2	0.2	0.2
Time Before Reduce (s)	0.0	15.0		15.0	15.0	0.0	0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	30.0		30.0	30.0	0.0	0.0	0.0		0.0	0.0	0.0
Recall Mode	None	Min		Min	Min	None	None	None		None	None	None
Act Effect Green (s)	86.9	86.9		69.7	69.7	81.9		9.0			9.0	26.3
Actuated g/C Ratio	0.78	0.78		0.63	0.63	0.74		0.08			0.08	0.24
v/c Ratio	0.40	0.63		0.05	0.95	0.05		0.15			0.66	0.51
Control Delay	18.4	8.9		10.6	38.5	3.5		53.0			73.0	43.9
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0			0.0	0.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	18.4	8.9		10.6	38.5	3.5		53.0			73.0	43.9
LOS	B	A		B	D	A		D			E	D
Approach Delay		9.9			36.2			53.0			53.5	
Approach LOS		A			D			D			D	
Queue Length 50th (ft)	11	159		3	550	7		13			62	111
Queue Length 95th (ft)	19	464		16	#1142	8		22			70	107
Internal Link Dist (ft)		573			1416			782			708	
Turn Bay Length (ft)	350			225		225						300
Base Capacity (vph)	259	1411		347	1127	1127		137			143	379
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	0.39	0.63		0.05	0.95	0.05		0.15			0.66	0.51

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 111.2
 Natural Cycle: 120
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.95
 Intersection Signal Delay: 27.7
 Intersection Capacity Utilization 77.4%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service D


















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

Splits and Phases: 6: Alpine Dr/West Henderson High School & NC 191 (Haywood Road)

17.6 s	74.4 s	14 s	14 s
92 s			

R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2030 PM
09/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	813	1	1	993	4	1	0	1	4	0	26
Future Volume (vph)	22	813	1	1	993	4	1	0	1	4	0	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	10	10	10	10	10	10
Storage Length (ft)	225		0	0		0	0		0	0		0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
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								0.932			0.881	
Flt Protected	0.950							0.976			0.994	
Satd. Flow (prot)	1711	1801	0	0	1801	0	0	1581	0	0	1522	0
Flt Permitted	0.950							0.976			0.994	
Satd. Flow (perm)	1711	1801	0	0	1801	0	0	1581	0	0	1522	0
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		1496			911			590			1563	
Travel Time (s)		22.7			13.8			13.4			35.5	
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)	24	903	1	1	1103	4	1	0	1	4	0	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	24	904	0	0	1108	0	0	2	0	0	33	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 63.3%
 Analysis Period (min) 15
 ICU Level of Service B

Intersection

Int Delay, s/veh	0.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	22	813	1	1	993	4	1	0	1	4	0	26
Future Vol, veh/h	22	813	1	1	993	4	1	0	1	4	0	26
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	225	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	24	903	1	1	1103	4	1	0	1	4	0	29

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1108	0	0	904	0	0	2075	2063	904	2061	2061	1106
Stage 1	-	-	-	-	-	-	953	953	-	1108	1108	-
Stage 2	-	-	-	-	-	-	1122	1110	-	953	953	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	630	-	-	752	-	-	39	55	335	40	55	256
Stage 1	-	-	-	-	-	-	311	338	-	255	286	-
Stage 2	-	-	-	-	-	-	250	285	-	311	338	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	630	-	-	752	-	-	34	53	335	39	53	256
Mov Cap-2 Maneuver	-	-	-	-	-	-	34	53	-	39	53	-
Stage 1	-	-	-	-	-	-	299	325	-	245	285	-
Stage 2	-	-	-	-	-	-	221	284	-	298	325	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0	65.2	36.5
HCM LOS			F	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	62	630	-	-	752	-	-	147
HCM Lane V/C Ratio	0.036	0.039	-	-	0.001	-	-	0.227
HCM Control Delay (s)	65.2	10.9	-	-	9.8	0	-	36.5
HCM Lane LOS	F	B	-	-	A	A	-	E
HCM 95th %tile Q(veh)	0.1	0.1	-	-	0	-	-	0.8

R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2030 PM
09/20/2017

	→	↘	↙	←	↖	↗
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↙	↑	↖	↗
Traffic Volume (vph)	767	37	17	933	72	27
Future Volume (vph)	767	37	17	933	72	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	12	12
Storage Length (ft)		200	175		0	350
Storage Lanes		1	1		1	1
Taper Length (ft)			100		100	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1801	1531	1711	1801	1770	1583
Flt Permitted			0.130		0.950	
Satd. Flow (perm)	1801	1531	234	1801	1770	1583
Right Turn on Red		No				No
Satd. Flow (RTOR)						
Link Speed (mph)	45			45	30	
Link Distance (ft)	911			3670	692	
Travel Time (s)	13.8			55.6	15.7	
Peak Hour Factor	0.90	0.50	0.50	0.90	0.50	0.50
Adj. Flow (vph)	852	74	34	1037	144	54
Shared Lane Traffic (%)						
Lane Group Flow (vph)	852	74	34	1037	144	54
Turn Type	NA	pm+ov	pm+pt	NA	Prot	pm+ov
Protected Phases	6	4	5	2	4	5
Permitted Phases		6	2			4
Detector Phase	6	4	5	2	4	5
Switch Phase						
Minimum Initial (s)	12.0	7.0	7.0	12.0	7.0	7.0
Minimum Split (s)	19.0	14.0	14.0	19.0	14.0	14.0
Total Split (s)	59.0	17.0	14.0	73.0	17.0	14.0
Total Split (%)	65.6%	18.9%	15.6%	81.1%	18.9%	15.6%
Maximum Green (s)	52.0	10.0	7.0	66.0	10.0	7.0
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag		Lead			Lead
Lead-Lag Optimize?	Yes		Yes			Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	Min	None	None	Min	None	None
Act Effct Green (s)	43.2	60.9	53.8	53.8	11.2	25.6
Actuated g/C Ratio	0.57	0.81	0.71	0.71	0.15	0.34
v/c Ratio	0.83	0.06	0.10	0.81	0.55	0.10
Control Delay	22.4	2.4	3.5	13.0	41.8	21.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.4	2.4	3.5	13.0	41.8	21.7
LOS	C	A	A	B	D	C
Approach Delay	20.8			12.7	36.4	

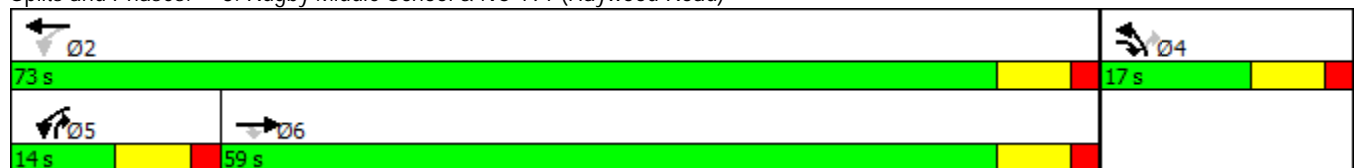
Lane Group	→ EBT	↘ EBR	↙ WBL	← WBT	↖ NBL	↗ NBR
Approach LOS	C			B	D	
Queue Length 50th (ft)	338	7	4	273	64	17
Queue Length 95th (ft)	513	8	6	438	73	27
Internal Link Dist (ft)	831			3590	612	
Turn Bay Length (ft)		200	175			350
Base Capacity (vph)	1328	1233	348	1597	290	538
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.64	0.06	0.10	0.65	0.50	0.10

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 75.3
 Natural Cycle: 70
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.83
 Intersection Signal Delay: 18.3
 Intersection Capacity Utilization 63.3%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 8: Rugby Middle School & NC 191 (Haywood Road)



R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2030 PM
09/20/2017

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	119	654	4	5	811	108	3	2	2	114	5	155
Future Volume (vph)	119	654	4	5	811	108	3	2	2	114	5	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	12
Storage Length (ft)	125		0	125		0	0		0	0		150
Storage Lanes	1		0	1		0	0		0	0		1
Taper Length (ft)	100			100			100			100		
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		0.999			0.982			0.961				0.850
Flt Protected	0.950			0.950				0.979			0.954	
Satd. Flow (prot)	1711	1799	0	1711	1768	0	0	1753	0	0	1777	1583
Flt Permitted	0.065			0.386				0.979			0.954	
Satd. Flow (perm)	117	1799	0	695	1768	0	0	1753	0	0	1777	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			25			35	
Link Distance (ft)		3670			2566			1006			2428	
Travel Time (s)		55.6			38.9			27.4			47.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	132	727	4	6	901	120	3	2	2	127	6	172
Shared Lane Traffic (%)												
Lane Group Flow (vph)	132	731	0	6	1021	0	0	7	0	0	133	172
Turn Type	pm+pt	NA		Perm	NA		Split	NA		Split	NA	pm+ov
Protected Phases	1	6			2		4	4		3	3	1
Permitted Phases	6			2								3
Detector Phase	1	6		2	2		4	4		3	3	1
Switch Phase												
Minimum Initial (s)	7.0	12.0		12.0	12.0		7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	14.0	19.0		19.0	19.0		14.0	14.0		14.0	14.0	14.0
Total Split (s)	14.0	91.0		77.0	77.0		14.0	14.0		15.0	15.0	14.0
Total Split (%)	11.7%	75.8%		64.2%	64.2%		11.7%	11.7%		12.5%	12.5%	11.7%
Maximum Green (s)	7.0	84.0		70.0	70.0		7.0	7.0		8.0	8.0	7.0
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0			-2.0			-2.0	-2.0
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	5.0
Lead/Lag	Lead			Lag	Lag		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	1.0	6.0		6.0	6.0		1.0	1.0		2.0	2.0	1.0
Minimum Gap (s)	0.2	3.0		3.0	3.0		0.2	0.2		0.2	0.2	0.2
Time Before Reduce (s)	0.0	20.0		20.0	20.0		0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	30.0		30.0	30.0		0.0	0.0		0.0	0.0	0.0
Recall Mode	None	Min		Min	Min		None	None		None	None	None
Act Effect Green (s)	80.4	80.4		66.3	66.3			9.1			10.1	23.4
Actuated g/C Ratio	0.78	0.78		0.64	0.64			0.09			0.10	0.23
v/c Ratio	0.57	0.52		0.01	0.90			0.05			0.76	0.48
Control Delay	25.2	6.3		8.0	28.4			49.2			75.7	40.5
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	0.0

Lane Group												
Total Delay	25.2	6.3		8.0	28.4			49.2			75.7	40.5
LOS	C	A		A	C			D			E	D
Approach Delay		9.2			28.3			49.2			55.8	
Approach LOS		A			C			D			E	
Queue Length 50th (ft)	23	120		1	470			4			90	102
Queue Length 95th (ft)	#116	334		8	#1044			21			#224	#175
Internal Link Dist (ft)		3590			2486			926			2348	
Turn Bay Length (ft)	125			125								150
Base Capacity (vph)	232	1516		491	1249			154			174	359
Starvation Cap Reductn	0	0		0	0			0			0	0
Spillback Cap Reductn	0	0		0	0			0			0	0
Storage Cap Reductn	0	0		0	0			0			0	0
Reduced v/c Ratio	0.57	0.48		0.01	0.82			0.05			0.76	0.48

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 103.1
 Natural Cycle: 100
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.90
 Intersection Signal Delay: 24.7
 Intersection Capacity Utilization 81.3%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Intersection LOS: C
 ICU Level of Service D

Splits and Phases: 9: SR 1444 (Leverette Drive)/SR 1381 (Mountain Road) & NC 191 (Haywood Road)



R-2588B: NC 191 Widening
Lanes, Volumes, Timings

Build 2030 AM
09/20/2017

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	106	45	4	47	33	489	5	935	82	559	621	88
Future Volume (vph)	106	45	4	47	33	489	5	935	82	559	621	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		75	0		350	150		0	350		0
Storage Lanes	0		1	0		1	1		0	2		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	0.88	1.00	0.95	0.95	0.97	0.95	0.95
Frt			0.850			0.850		0.988			0.981	
Flt Protected		0.966			0.972		0.950			0.950		
Satd. Flow (prot)	0	1799	1583	0	1811	2787	1770	3497	0	3433	3472	0
Flt Permitted		0.966			0.972		0.354			0.950		
Satd. Flow (perm)	0	1799	1583	0	1811	2787	659	3497	0	3433	3472	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		20			45			45			45	
Link Distance (ft)		319			1846			3351			3356	
Travel Time (s)		10.9			28.0			50.8			50.8	
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	50	4	52	37	543	6	1039	91	621	690	98
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	168	4	0	89	543	6	1130	0	621	788	0
Turn Type	Split	NA	Perm	Split	NA	pm+ov	pm+pt	NA		Prot	NA	
Protected Phases	8	8		4	4	1	5	2		1	6	
Permitted Phases			8			4	2					
Detector Phase	8	8	8	4	4	1	5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	14.0		7.0	14.0	
Minimum Split (s)	24.1	24.1	24.1	24.2	24.2	14.4	14.4	25.8		14.4	25.8	
Total Split (s)	24.1	24.1	24.1	24.2	24.2	27.0	14.4	44.7		27.0	57.3	
Total Split (%)	20.1%	20.1%	20.1%	20.2%	20.2%	22.5%	12.0%	37.3%		22.5%	47.8%	
Maximum Green (s)	17.1	17.1	17.1	17.2	17.2	20.0	7.4	37.7		20.0	50.3	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-2.0	-2.0			-2.0	-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)		5.0	5.0			5.0	5.0	5.0		5.0	5.0	
Lead/Lag						Lead	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?						Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	6.0		2.0	6.0	
Minimum Gap (s)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	3.4		0.2	3.4	
Time Before Reduce (s)	0.0	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	0.0	30.0		0.0	30.0	
Recall Mode	None	None	None	None	None	None	None	Min		None	Min	
Act Effect Green (s)		15.6	15.6			12.1	32.2	47.1	37.9	22.5	63.0	
Actuated g/C Ratio		0.15	0.15			0.12	0.31	0.45	0.36	0.21	0.60	
v/c Ratio		0.63	0.02			0.43	0.64	0.02	0.89	0.84	0.38	
Control Delay		54.9	41.0			52.8	22.7	11.8	43.4	53.5	14.1	
Queue Delay		0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		54.9	41.0			52.8	22.7	11.8	43.4	53.5	14.1	

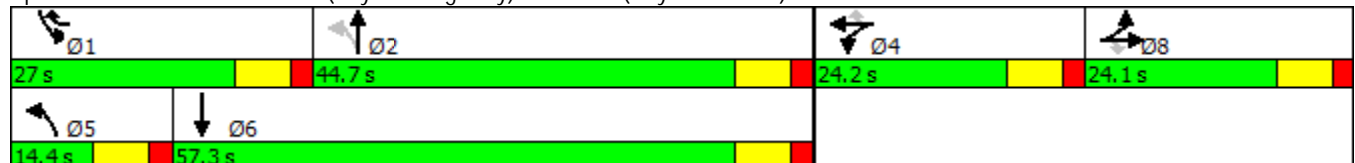
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		D	D		D	C	B	D		D		B
Approach Delay		54.6			26.9			43.2				31.5
Approach LOS		D			C			D				C
Queue Length 50th (ft)		113	2		60	116	2	393		222		139
Queue Length 95th (ft)		192	13		114	155	8	#578		#356		275
Internal Link Dist (ft)		239			1766			3271				3276
Turn Bay Length (ft)			75			350	150			350		
Base Capacity (vph)		336	295		339	855	400	1356		737		2087
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		0.50	0.01		0.26	0.64	0.01	0.83		0.84		0.38

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 104.8
 Natural Cycle: 120
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.89
 Intersection Signal Delay: 35.8
 Intersection Capacity Utilization 71.8%
 Analysis Period (min) 15
 Intersection LOS: D
 ICU Level of Service C
























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

Splits and Phases: 1: NC 280 (Boylston Highway) & NC 191 (Haywood Road)



R-2588B: NC 191 Widening
Lanes, Volumes, Timings

Build 2030 AM
09/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 						 	
Traffic Volume (vph)	4	514	159	17	400	4	181	8	25	4	10	4
Future Volume (vph)	4	514	159	17	400	4	181	8	25	4	10	4
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		175	150		0	150		0	0		0
Storage Lanes	1		1	1		0	1		0	0		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.999			0.886				0.972
Flt Protected	0.950			0.950			0.950				0.990	
Satd. Flow (prot)	1770	3539	1583	1770	3536	0	1770	1650	0	0	1792	0
Flt Permitted	0.493			0.395			0.745				0.952	
Satd. Flow (perm)	918	3539	1583	736	3536	0	1388	1650	0	0	1724	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			45				30
Link Distance (ft)		1846			5456			1563				408
Travel Time (s)		28.0			82.7			23.7				9.3
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	4	571	177	19	444	4	201	9	28	4	11	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	4	571	177	19	448	0	201	37	0	0	19	0
Turn Type	Perm	NA	Perm	D,P+P	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			4				8
Permitted Phases	2		2	2			4			8		
Detector Phase	2	2	2	1	6		4	4		8		8
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0		7.0
Minimum Split (s)	25.0	25.0	25.0	14.0	25.0		25.0	25.0		25.0		25.0
Total Split (s)	37.0	37.0	37.0	16.0	53.0		37.0	37.0		37.0		37.0
Total Split (%)	41.1%	41.1%	41.1%	17.8%	58.9%		41.1%	41.1%		41.1%		41.1%
Maximum Green (s)	30.0	30.0	30.0	9.0	46.0		30.0	30.0		30.0		30.0
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0		5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0		2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0				-2.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0				5.0
Lead/Lag	Lag	Lag	Lag	Lead								
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0		3.0
Recall Mode	Min	Min	Min	None	Min		Min	Min		Min		Min
Walk Time (s)	7.0	7.0	7.0		7.0		7.0	7.0		7.0		7.0
Flash Dont Walk (s)	11.0	11.0	11.0		11.0		11.0	11.0		11.0		11.0
Pedestrian Calls (#/hr)	0	0	0		0		0	0		0		0
Act Effect Green (s)	17.4	17.4	17.4	18.5	19.1		15.5	15.5				15.5
Actuated g/C Ratio	0.38	0.38	0.38	0.41	0.42		0.34	0.34				0.34
v/c Ratio	0.01	0.42	0.29	0.04	0.30		0.43	0.07				0.03
Control Delay	12.5	12.9	13.5	8.3	9.3		17.2	13.5				13.6
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0				0.0
Total Delay	12.5	12.9	13.5	8.3	9.3		17.2	13.5				13.6

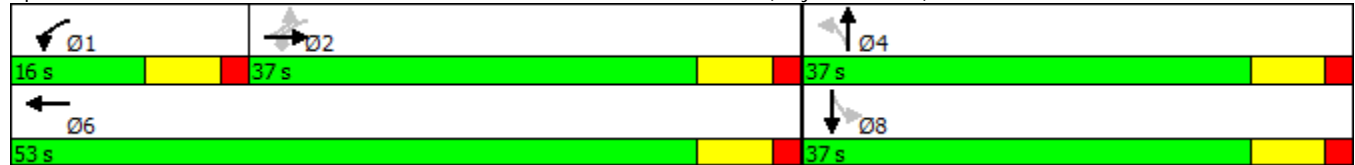
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	B	B	B	A	A		B	B				B
Approach Delay		13.0			9.2			16.6				13.6
Approach LOS		B			A			B				B
Queue Length 50th (ft)	1	43	24	2	32		32	5				3
Queue Length 95th (ft)	7	150	107	13	77		132	31				20
Internal Link Dist (ft)		1766			5376			1483				328
Turn Bay Length (ft)	150		175	150			150					
Base Capacity (vph)	699	2697	1206	579	3262		1058	1257				1314
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	0.21	0.15	0.03	0.14		0.19	0.03				0.01

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 45.6
 Natural Cycle: 65
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.43
 Intersection Signal Delay: 12.4
 Intersection Capacity Utilization 39.2%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A





















Splits and Phases: 2: Banner Farm Road/Water Treatment Plant & NC 191 (Haywood Road)



R-2588B: NC 191 Widening
Lanes, Volumes, Timings

Build 2030 AM

09/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	427	89	340	342	2	89	0	425	1	0	1
Future Volume (vph)	2	427	89	340	342	2	89	0	425	1	0	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	375		0	0		250	0		0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.974			0.999				0.850		0.932	
Flt Protected	0.950			0.950				0.950			0.976	
Satd. Flow (prot)	1770	3447	0	1770	3536	0	0	1770	1583	0	1694	0
Flt Permitted	0.525			0.950				0.757			0.823	
Satd. Flow (perm)	978	3447	0	1770	3536	0	0	1410	1583	0	1429	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			45			25	
Link Distance (ft)		5456			7476			1256			553	
Travel Time (s)		82.7			113.3			19.0			15.1	
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)	2	474	99	378	380	2	99	0	472	1	0	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	2	573	0	378	382	0	0	99	472	0	2	0
Turn Type	Perm	NA		Prot	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases		2		1	6			8	1		4	
Permitted Phases	2						8		8	4		
Detector Phase	2	2		1	6		8	8	1	4	4	
Switch Phase												
Minimum Initial (s)	12.0	12.0		7.0	12.0		7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	19.0	19.0		14.6	19.0		14.0	14.0	14.6	14.0	14.0	
Total Split (s)	32.0	32.0		39.0	71.0		19.0	19.0	39.0	19.0	19.0	
Total Split (%)	35.6%	35.6%		43.3%	78.9%		21.1%	21.1%	43.3%	21.1%	21.1%	
Maximum Green (s)	25.0	25.0		32.0	64.0		12.0	12.0	32.0	12.0	12.0	
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0			-2.0	-2.0		-2.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0	5.0		5.0	
Lead/Lag	Lag	Lag		Lead					Lead			
Lead-Lag Optimize?	Yes	Yes		Yes					Yes			
Vehicle Extension (s)	6.0	6.0		1.0	6.0		1.0	1.0	1.0	1.0	1.0	
Minimum Gap (s)	3.0	3.0		0.2	3.0		0.2	0.2	0.2	0.2	0.2	
Time Before Reduce (s)	15.0	15.0		0.0	15.0		0.0	0.0	0.0	0.0	0.0	
Time To Reduce (s)	30.0	30.0		0.0	30.0		0.0	0.0	0.0	0.0	0.0	
Recall Mode	Min	Min		None	Min		None	None	None	None	None	
Act Effect Green (s)	20.1	20.1		20.7	48.0			11.4	32.7		11.4	
Actuated g/C Ratio	0.32	0.32		0.32	0.75			0.18	0.51		0.18	
v/c Ratio	0.01	0.53		0.66	0.14			0.39	0.58		0.01	
Control Delay	20.0	22.2		26.7	3.6			33.9	13.7		29.0	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay	20.0	22.2		26.7	3.6			33.9	13.7		29.0	

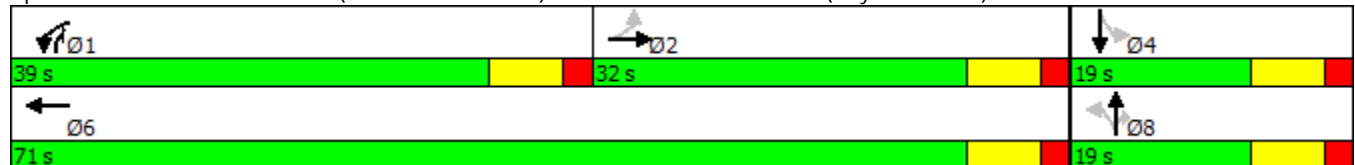
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	B	C		C	A			C	B		C	
Approach Delay		22.2			15.1			17.2			29.0	
Approach LOS		C			B			B			C	
Queue Length 50th (ft)	1	97		128	22			35	108		1	
Queue Length 95th (ft)	6	188		259	41			99	226		7	
Internal Link Dist (ft)		5376			7396			1176			473	
Turn Bay Length (ft)	150			375					250			
Base Capacity (vph)	453	1599		1034	3273			339	1223		343	
Starvation Cap Reductn	0	0		0	0			0	0		0	
Spillback Cap Reductn	0	0		0	0			0	0		0	
Storage Cap Reductn	0	0		0	0			0	0		0	
Reduced v/c Ratio	0.00	0.36		0.37	0.12			0.29	0.39		0.01	

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 63.7
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.66
 Intersection Signal Delay: 17.9
 Intersection Capacity Utilization 59.3%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 3: SR 1426 (School House Road)/Water Treatment & NC 191 (Haywood Road)



R-2588B: NC 191 Widening
Lanes, Volumes, Timings

Build 2030 AM
09/20/2017

Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	75	689	59	18	163	563	133	101	154	264	134	85
Future Volume (vph)	75	689	59	18	163	563	133	101	154	264	134	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250		0		450		0	175		200	225	
Storage Lanes	1		0		1		0	1		1	1	
Taper Length (ft)	100				100			100			100	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00
Frt		0.988				0.971				0.850		0.937
Flt Protected	0.950				0.950			0.950			0.950	
Satd. Flow (prot)	1770	3497	0	0	1770	3437	0	1770	1863	1583	1770	1745
Flt Permitted	0.950				0.950			0.950			0.950	
Satd. Flow (perm)	1770	3497	0	0	1770	3437	0	1770	1863	1583	1770	1745
Right Turn on Red			No				No			No		
Satd. Flow (RTOR)												
Link Speed (mph)		45				45			35			45
Link Distance (ft)		7476				1829			1358			1857
Travel Time (s)		113.3				27.7			26.5			28.1
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)	83	766	66	20	181	626	148	112	171	293	149	94
Shared Lane Traffic (%)												
Lane Group Flow (vph)	83	832	0	0	201	774	0	112	171	293	149	162
Turn Type	Prot	NA		Prot	Prot	NA		Split	NA	pm+ov	Split	NA
Protected Phases	5	2		1!	1	6		4	4	1!	8	8
Permitted Phases										4		
Detector Phase	5	2		1	1	6		4	4	1	8	8
Switch Phase												
Minimum Initial (s)	7.0	12.0		7.0	7.0	12.0		7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	14.0	19.0		14.0	14.0	19.0		14.0	14.0	14.0	14.0	14.0
Total Split (s)	17.0	44.0		28.0	28.0	55.0		24.0	24.0	28.0	24.0	24.0
Total Split (%)	14.2%	36.7%		23.3%	23.3%	45.8%		20.0%	20.0%	23.3%	20.0%	20.0%
Maximum Green (s)	10.0	37.0		21.0	21.0	48.0		17.0	17.0	21.0	17.0	17.0
Yellow Time (s)	5.0	5.0		5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0			-2.0	-2.0		-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	5.0	5.0			5.0	5.0		5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lead	Lag				Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes				Yes		
Vehicle Extension (s)	1.0	6.0		1.0	1.0	6.0		1.0	1.0	1.0	1.0	1.0
Minimum Gap (s)	3.0	3.0		0.2	0.2	0.2		0.2	0.2	0.2	0.2	0.2
Time Before Reduce (s)	0.0	15.0		0.0	0.0	15.0		0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	30.0		0.0	0.0	30.0		0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Min		None	None	Min		None	None	None	None	None
Act Effect Green (s)	10.7	30.2			16.6	40.0		14.4	14.4	31.0	14.5	14.5
Actuated g/C Ratio	0.11	0.31			0.17	0.41		0.15	0.15	0.32	0.15	0.15
v/c Ratio	0.43	0.76			0.66	0.54		0.42	0.62	0.58	0.56	0.62
Control Delay	53.4	36.3			51.3	24.9		46.5	52.0	20.0	50.4	52.9
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	53.4	36.3			51.3	24.9		46.5	52.0	20.0	50.4	52.9

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	61
Future Volume (vph)	61
Ideal Flow (vphpl)	1900
Storage Length (ft)	0
Storage Lanes	0
Taper Length (ft)	
Lane Util. Factor	1.00
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	No
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	0.90
Adj. Flow (vph)	68
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 (%)	
Maximum Green (s)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	
Minimum Gap (s)	
Time Before Reduce (s)	
Time To Reduce (s)	
Recall Mode	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	

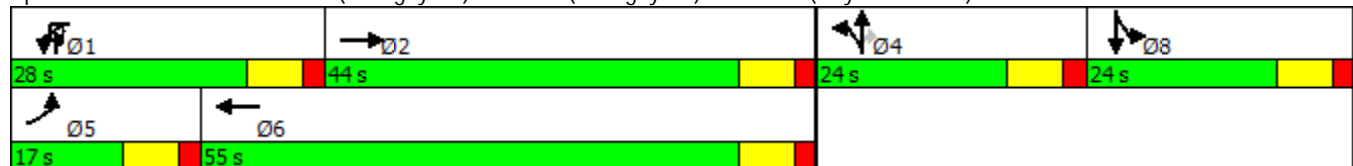
Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
LOS	D	D			D	C		D	D	B	D	D
Approach Delay		37.9				30.3			34.7			51.7
Approach LOS		D				C			C			D
Queue Length 50th (ft)	49	242			117	197		63	100	86	86	95
Queue Length 95th (ft)	115	374			225	295		137	199	161	177	192
Internal Link Dist (ft)		7396				1749			1278			1777
Turn Bay Length (ft)	250				450			175		200	225	
Base Capacity (vph)	230	1477			441	1862		364	383	630	364	359
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	0.56			0.46	0.42		0.31	0.45	0.47	0.41	0.45

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 96.5
 Natural Cycle: 65
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.76
 Intersection Signal Delay: 36.1
 Intersection Capacity Utilization 71.4%
 Analysis Period (min) 15
 ! Phase conflict between lane groups.

Intersection LOS: D
 ICU Level of Service C

Splits and Phases: 4: SR 1309 (S Rugby Rd)/SR 1365 (N Rugby Rd) & NC 191 (Haywood Road)














Lane Group SBR

LOS
Approach Delay
Approach LOS
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	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1028	36	0	895	0	84
Future Volume (vph)	1028	36	0	895	0	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	10	10
Storage Length (ft)		0	200		0	0
Storage Lanes		0	0		0	1
Taper Length (ft)			100		100	
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Frt	0.995					0.865
Flt Protected						
Satd. Flow (prot)	3522	0	0	3539	0	1504
Flt Permitted						
Satd. Flow (perm)	3522	0	0	3539	0	1504
Link Speed (mph)	45			45	25	
Link Distance (ft)	1829			653	1295	
Travel Time (s)	27.7			9.9	35.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	1142	40	0	994	0	93
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1182	0	0	994	0	93
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 41.4% ICU Level of Service A
 Analysis Period (min) 15

Intersection

Int Delay, s/veh 0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		↑
Traffic Vol, veh/h	1028	36	0	895	0	84
Future Vol, veh/h	1028	36	0	895	0	84
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Yield
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	1142	40	0	994	0	93

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	591
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	6.94
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	3.32
Pot Cap-1 Maneuver	-	0	450
Stage 1	-	0	-
Stage 2	-	0	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	450
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	15.1
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	450	-	-	-
HCM Lane V/C Ratio	0.207	-	-	-
HCM Control Delay (s)	15.1	-	-	-
HCM Lane LOS	C	-	-	-
HCM 95th %tile Q(veh)	0.8	-	-	-

R-2588B: NC 191 Widening
Lanes, Volumes, Timings

Build 2030 AM
09/20/2017

Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	15	96	998	8	8	10	819	47	9	0	14	30
Future Volume (vph)	15	96	998	8	8	10	819	47	9	0	14	30
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		375		0		150		225	0		0	0
Storage Lanes		1		0		1		1	0		0	0
Taper Length (ft)		100				100			100			100
Lane Util. Factor	0.95	1.00	0.95	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00
Frt			0.999					0.850		0.917		
Flt Protected		0.950				0.950				0.981		
Satd. Flow (prot)	0	1770	3536	0	0	1770	3539	1583	0	1676	0	0
Flt Permitted		0.185				0.255				0.981		
Satd. Flow (perm)	0	345	3536	0	0	475	3539	1583	0	1676	0	0
Right Turn on Red				No				No			No	
Satd. Flow (RTOR)												
Link Speed (mph)			55				55			25		
Link Distance (ft)			653				1496			862		
Travel Time (s)			8.1				18.5			23.5		
Peak Hour Factor	0.90	0.50	0.90	0.90	0.90	0.90	0.90	0.50	0.90	0.50	0.90	0.50
Adj. Flow (vph)	17	192	1109	9	9	11	910	94	10	0	16	60
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	209	1118	0	0	20	910	94	0	26	0	0
Turn Type	D.P+P	D.P+P	NA		Perm	Perm	NA	pm+ov	Split	NA		Split
Protected Phases	1!	1	6				2	4	3	3		4
Permitted Phases	2	2			2	2		2				
Detector Phase	1	1	6		2	2	2	4	3	3		4
Switch Phase												
Minimum Initial (s)	10.0	10.0	14.0		14.0	14.0	14.0	7.0	7.0	7.0		7.0
Minimum Split (s)	17.6	17.6	21.0		21.0	21.0	21.0	14.0	14.0	14.0		14.0
Total Split (s)	26.0	26.0	86.0		60.0	60.0	60.0	18.0	16.0	16.0		18.0
Total Split (%)	21.7%	21.7%	71.7%		50.0%	50.0%	50.0%	15.0%	13.3%	13.3%		15.0%
Maximum Green (s)	19.0	19.0	79.0		53.0	53.0	53.0	11.0	9.0	9.0		11.0
Yellow Time (s)	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0		5.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0		2.0
Lost Time Adjust (s)		-2.0	-2.0				-2.0	-2.0	-2.0	-2.0		
Total Lost Time (s)		5.0	5.0				5.0	5.0	5.0	5.0		
Lead/Lag	Lead	Lead			Lag	Lag	Lag	Lag	Lead	Lead		Lag
Lead-Lag Optimize?	Yes	Yes			Yes	Yes	Yes	Yes	Yes	Yes		Yes
Vehicle Extension (s)	2.0	2.0	6.0		6.0	6.0	6.0	2.0	2.0	2.0		2.0
Minimum Gap (s)	0.2	0.2	3.0		3.0	3.0	3.0	0.2	0.2	0.2		0.2
Time Before Reduce (s)	0.0	0.0	15.0		15.0	15.0	15.0	0.0	0.0	0.0		0.0
Time To Reduce (s)	0.0	0.0	30.0		30.0	30.0	30.0	0.0	0.0	0.0		0.0
Recall Mode	None	None	Min		Min	Min	Min	None	None	None		None
Act Effect Green (s)		41.4	48.5			27.9	27.9	42.4		9.9		
Actuated g/C Ratio		0.61	0.71			0.41	0.41	0.62		0.15		
v/c Ratio		0.42	0.44			0.10	0.63	0.10		0.11		
Control Delay		10.4	7.8			18.3	20.3	5.5		34.9		
Queue Delay		0.0	0.0			0.0	0.0	0.0		0.0		
Total Delay		10.4	7.8			18.3	20.3	5.5		34.9		

	↓	↙
Lane Group	SBT	SBR
Lane Configurations	↕	↕
Traffic Volume (vph)	0	50
Future Volume (vph)	0	50
Ideal Flow (vphpl)	1900	1900
Storage Length (ft)		300
Storage Lanes		1
Taper Length (ft)		
Lane Util. Factor	1.00	1.00
Frt		0.850
Flt Protected	0.950	
Satd. Flow (prot)	1770	1583
Flt Permitted	0.950	
Satd. Flow (perm)	1770	1583
Right Turn on Red		No
Satd. Flow (RTOR)		
Link Speed (mph)	25	
Link Distance (ft)	788	
Travel Time (s)	21.5	
Peak Hour Factor	0.50	0.50
Adj. Flow (vph)	0	100
Shared Lane Traffic (%)		
Lane Group Flow (vph)	60	100
Turn Type	NA	pm+ov
Protected Phases	4	1!
Permitted Phases		4
Detector Phase	4	1
Switch Phase		
Minimum Initial (s)	7.0	10.0
Minimum Split (s)	14.0	17.6
Total Split (s)	18.0	26.0
Total Split (%)	15.0%	21.7%
Maximum Green (s)	11.0	19.0
Yellow Time (s)	5.0	5.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0
Total Lost Time (s)	5.0	5.0
Lead/Lag	Lag	Lead
Lead-Lag Optimize?	Yes	Yes
Vehicle Extension (s)	2.0	2.0
Minimum Gap (s)	0.2	0.2
Time Before Reduce (s)	0.0	0.0
Time To Reduce (s)	0.0	0.0
Recall Mode	None	None
Act Effct Green (s)	10.6	24.9
Actuated g/C Ratio	0.16	0.37
v/c Ratio	0.22	0.17
Control Delay	34.0	18.7
Queue Delay	0.0	0.0
Total Delay	34.0	18.7

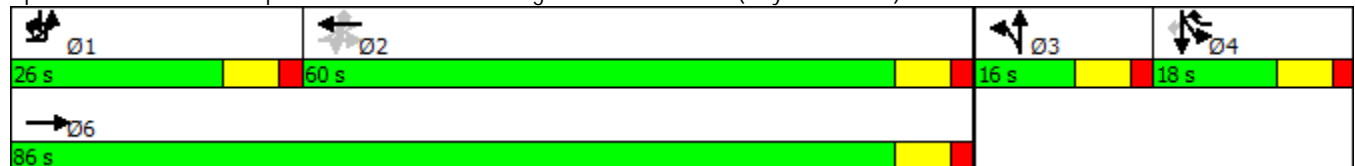
Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
LOS		B	A			B	C	A		C		
Approach Delay			8.2				18.9			34.9		
Approach LOS			A				B			C		
Queue Length 50th (ft)		22	78			4	134	11		9		
Queue Length 95th (ft)		44	241			24	297	13		22		
Internal Link Dist (ft)			573				1416			782		
Turn Bay Length (ft)		375				150		225				
Base Capacity (vph)		715	3421			384	2864	1067		294		
Starvation Cap Reductn		0	0			0	0	0		0		
Spillback Cap Reductn		0	0			0	0	0		0		
Storage Cap Reductn		0	0			0	0	0		0		
Reduced v/c Ratio		0.29	0.33			0.05	0.32	0.09		0.09		

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 68.1
 Natural Cycle: 70
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.63
 Intersection Signal Delay: 13.8
 Intersection Capacity Utilization 61.8%
 Analysis Period (min) 15
 ! Phase conflict between lane groups.

Intersection LOS: B
 ICU Level of Service B


















Splits and Phases: 6: Alpine Dr/West Henderson High School & NC 191 (Haywood Road)



	↓	↙
Lane Group	SBT	SBR
LOS	C	B
Approach Delay	24.4	
Approach LOS	C	
Queue Length 50th (ft)	21	23
Queue Length 95th (ft)	38	42
Internal Link Dist (ft)	708	
Turn Bay Length (ft)		300
Base Capacity (vph)	367	795
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.16	0.13
Intersection Summary		

R-2588B: NC 191 Widening
Lanes, Volumes, Timings

Build 2030 AM
09/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	1036	2	0	843	8	0	0	2	0	0	28
Future Volume (vph)	27	1036	2	0	843	8	0	0	2	0	0	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	10	10	10	10	10	10
Storage Length (ft)	150		0	0		0	0		0	0		0
Storage Lanes	1		0	0		0	0		1	0		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.999				0.865			0.865
Flt Protected	0.950											
Satd. Flow (prot)	1770	3539	0	0	3536	0	0	0	1504	0	0	1504
Flt Permitted	0.950											
Satd. Flow (perm)	1770	3539	0	0	3536	0	0	0	1504	0	0	1504
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		1496			911			590			1563	
Travel Time (s)		22.7			13.8			13.4			35.5	
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)	30	1151	2	0	937	9	0	0	2	0	0	31
Shared Lane Traffic (%)												
Lane Group Flow (vph)	30	1153	0	0	946	0	0	0	2	0	0	31
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 38.7%
 Analysis Period (min) 15
 ICU Level of Service A

Intersection















Int Delay, s/veh 0.4








Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↔			↕↔				↔			↔
Traffic Vol, veh/h	27	1036	2	0	843	8	0	0	2	0	0	28
Future Vol, veh/h	27	1036	2	0	843	8	0	0	2	0	0	28
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	Yield
Storage Length	150	-	-	-	-	-	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	30	1151	2	0	937	9	0	0	2	0	0	31

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	946	0	0	-	-	0	-	-	577	-	-	473
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	4.14	-	-	-	-	-	-	-	6.94	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	2.22	-	-	-	-	-	-	-	3.32	-	-	3.32
Pot Cap-1 Maneuver	721	-	-	0	-	-	0	0	460	0	0	538
Stage 1	-	-	-	0	-	-	0	0	-	0	0	-
Stage 2	-	-	-	0	-	-	0	0	-	0	0	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	721	-	-	-	-	-	-	-	460	-	-	538
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0	12.9	12.1
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBT	WBR	SBLn1
Capacity (veh/h)	460	721	-	-	-	-	538
HCM Lane V/C Ratio	0.005	0.042	-	-	-	-	0.058
HCM Control Delay (s)	12.9	10.2	-	-	-	-	12.1
HCM Lane LOS	B	B	-	-	-	-	B
HCM 95th %tile Q(veh)	0	0.1	-	-	-	-	0.2

							
Lane Group	EBU	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Volume (vph)	1	976	73	26	803	38	17
Future Volume (vph)	1	976	73	26	803	38	17
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		175	175		0	350
Storage Lanes	1		1	1		1	1
Taper Length (ft)	100			100		100	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Frt			0.850				0.850
Flt Protected	0.950			0.950		0.950	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1770	1583
Flt Permitted	0.319			0.182		0.950	
Satd. Flow (perm)	594	3539	1583	339	3539	1770	1583
Right Turn on Red			No				No
Satd. Flow (RTOR)							
Link Speed (mph)		45			45	30	
Link Distance (ft)		911			3670	692	
Travel Time (s)		13.8			55.6	15.7	
Peak Hour Factor	0.50	0.90	0.50	0.50	0.90	0.50	0.50
Adj. Flow (vph)	2	1084	146	52	892	76	34
Shared Lane Traffic (%)							
Lane Group Flow (vph)	2	1084	146	52	892	76	34
Turn Type	Perm	NA	pm+ov	D,P+P	NA	Prot	pm+ov
Protected Phases		6	4	5	2	4	5
Permitted Phases	6		6	6			4
Detector Phase	6	6	4	5	2	4	5
Switch Phase							
Minimum Initial (s)	12.0	12.0	7.0	7.0	12.0	7.0	7.0
Minimum Split (s)	19.0	19.0	14.0	14.0	19.0	14.0	14.0
Total Split (s)	56.0	56.0	18.0	16.0	72.0	18.0	16.0
Total Split (%)	62.2%	62.2%	20.0%	17.8%	80.0%	20.0%	17.8%
Maximum Green (s)	49.0	49.0	11.0	9.0	65.0	11.0	9.0
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag		Lead			Lead
Lead-Lag Optimize?	Yes	Yes		Yes			Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	Min	Min	None	None	Min	None	None
Act Effct Green (s)	28.3	28.3	41.1	31.4	35.4	10.3	21.1
Actuated g/C Ratio	0.56	0.56	0.81	0.62	0.70	0.20	0.42
v/c Ratio	0.01	0.55	0.11	0.11	0.36	0.21	0.05
Control Delay	10.0	12.7	3.1	4.4	4.9	23.2	11.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.0	12.7	3.1	4.4	4.9	23.2	11.8
LOS	A	B	A	A	A	C	B
Approach Delay		11.5			4.9	19.7	
Approach LOS		B			A	B	

							
Lane Group	EBU	EBT	EBR	WBL	WBT	NBL	NBR
Queue Length 50th (ft)	0	154	15	5	56	22	6
Queue Length 95th (ft)	2	233	15	8	96	33	13
Internal Link Dist (ft)		831			3590	612	
Turn Bay Length (ft)	100		175	175			350
Base Capacity (vph)	539	3211	1319	549	3539	486	725
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.34	0.11	0.09	0.25	0.16	0.05

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 50.7
 Natural Cycle: 55
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.55
 Intersection Signal Delay: 9.2
 Intersection Capacity Utilization 41.1%
 Analysis Period (min) 15




















Intersection LOS: A
 ICU Level of Service A

Splits and Phases: 8: Rugby Middle School & NC 191 (Haywood Road)



R-2588B: NC 191 Widening
Lanes, Volumes, Timings

Build 2030 AM
09/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	160	850	3	2	687	114	4	5	5	108	2	122
Future Volume (vph)	160	850	3	2	687	114	4	5	5	108	2	122
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	100		0	0		0	0		150
Storage Lanes	1		0	1		0	0		0	0		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.979			0.949				0.850
Flt Protected	0.950			0.950				0.988			0.953	
Satd. Flow (prot)	1770	3539	0	1770	3465	0	0	1747	0	0	1775	1583
Flt Permitted	0.950			0.302				0.988			0.953	
Satd. Flow (perm)	1770	3539	0	563	3465	0	0	1747	0	0	1775	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			25			35	
Link Distance (ft)		3670			2566			1006			2428	
Travel Time (s)		55.6			38.9			27.4			47.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	178	944	3	2	763	127	4	6	6	120	2	136
Shared Lane Traffic (%)												
Lane Group Flow (vph)	178	947	0	2	890	0	0	16	0	0	122	136
Turn Type	Prot	NA		Perm	NA		Split	NA		Split	NA	pm+ov
Protected Phases	1	6			2		4	4		3	3	1
Permitted Phases				2								3
Detector Phase	1	6		2	2		4	4		3	3	1
Switch Phase												
Minimum Initial (s)	7.0	12.0		12.0	12.0		7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	14.0	19.0		19.0	19.0		14.0	14.0		14.0	14.0	14.0
Total Split (s)	29.0	84.0		55.0	55.0		14.0	14.0		22.0	22.0	29.0
Total Split (%)	24.2%	70.0%		45.8%	45.8%		11.7%	11.7%		18.3%	18.3%	24.2%
Maximum Green (s)	22.0	77.0		48.0	48.0		7.0	7.0		15.0	15.0	22.0
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0			-2.0			-2.0	-2.0
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	5.0
Lead/Lag	Lead			Lag	Lag		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	1.0	6.0		6.0	6.0		1.0	1.0		2.0	2.0	1.0
Minimum Gap (s)	0.2	3.0		3.0	3.0		0.2	0.2		0.2	0.2	0.2
Time Before Reduce (s)	0.0	20.0		20.0	20.0		0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	30.0		30.0	30.0		0.0	0.0		0.0	0.0	0.0
Recall Mode	None	Min		Min	Min		None	None		None	None	None
Act Effect Green (s)	14.8	54.2		31.6	31.6			10.4			13.2	26.7
Actuated g/C Ratio	0.20	0.72		0.42	0.42			0.14			0.18	0.35
v/c Ratio	0.51	0.37		0.01	0.61			0.07			0.39	0.24
Control Delay	38.8	7.6		20.0	22.5			42.5			39.5	15.2
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Delay	38.8	7.6		20.0	22.5			42.5			39.5	15.2

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	A		B	C			D			D	B
Approach Delay		12.5			22.5			42.5			26.7	
Approach LOS		B			C			D			C	
Queue Length 50th (ft)	69	73		0	147			6			47	35
Queue Length 95th (ft)	186	207		6	344			33			140	84
Internal Link Dist (ft)		3590			2486			926			2348	
Turn Bay Length (ft)	225			100								150
Base Capacity (vph)	648	3199		394	2428			240			461	830
Starvation Cap Reductn	0	0		0	0			0			0	0
Spillback Cap Reductn	0	0		0	0			0			0	0
Storage Cap Reductn	0	0		0	0			0			0	0
Reduced v/c Ratio	0.27	0.30		0.01	0.37			0.07			0.26	0.16

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 75.4
 Natural Cycle: 65
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.61
 Intersection Signal Delay: 18.2
 Intersection Capacity Utilization 58.8%
 Analysis Period (min) 15





















Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 9: SR 1444 (Leverette Drive)/SR 1381 (Mountain Road) & NC 191 (Haywood Road)



R-2588B: NC 191 Widening
Lanes, Volumes, Timings

Build 2030 PM
09/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	88	33	5	82	45	559	4	621	47	489	935	106
Future Volume (vph)	88	33	5	82	45	559	4	621	47	489	935	106
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		75	0		350	150		0	350		0
Storage Lanes	0		1	0		1	1		0	2		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	0.88	1.00	0.95	0.95	0.97	0.95	0.95
Frt			0.850			0.850		0.989			0.985	
Flt Protected		0.965			0.969		0.950			0.950		
Satd. Flow (prot)	0	1798	1583	0	1805	2787	1770	3500	0	3433	3486	0
Flt Permitted		0.965			0.969		0.229			0.950		
Satd. Flow (perm)	0	1798	1583	0	1805	2787	427	3500	0	3433	3486	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		20			45			45			45	
Link Distance (ft)		319			1846			3351			3356	
Travel Time (s)		10.9			28.0			50.8			50.8	
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)	98	37	6	91	50	621	4	690	52	543	1039	118
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	135	6	0	141	621	4	742	0	543	1157	0
Turn Type	Split	NA	Perm	Split	NA	pm+ov	pm+pt	NA		Prot	NA	
Protected Phases	8	8		4	4	1	5	2		1	6	
Permitted Phases			8			4	2					
Detector Phase	8	8	8	4	4	1	5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	14.0		7.0	14.0	
Minimum Split (s)	24.1	24.1	24.1	24.2	24.2	14.4	14.4	25.8		14.4	25.8	
Total Split (s)	24.1	24.1	24.1	24.2	24.2	32.0	14.4	39.7		32.0	57.3	
Total Split (%)	20.1%	20.1%	20.1%	20.2%	20.2%	26.7%	12.0%	33.1%		26.7%	47.8%	
Maximum Green (s)	17.1	17.1	17.1	17.2	17.2	25.0	7.4	32.7		25.0	50.3	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-2.0	-2.0			-2.0	-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)		5.0	5.0			5.0	5.0	5.0		5.0	5.0	
Lead/Lag						Lead	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?						Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	6.0		2.0	6.0	
Minimum Gap (s)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	3.4		0.2	3.4	
Time Before Reduce (s)	0.0	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	0.0	30.0		0.0	30.0	
Recall Mode	None	None	None	None	None	None	None	Min		None	Min	
Act Effect Green (s)		14.0	14.0			14.2	36.4	36.2	26.9		22.2	52.0
Actuated g/C Ratio		0.14	0.14			0.14	0.37	0.37	0.27		0.23	0.53
v/c Ratio		0.53	0.03			0.54	0.60	0.01	0.77		0.70	0.63
Control Delay		50.1	41.8			50.2	16.1	13.8	40.2		41.8	19.7
Queue Delay		0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0
Total Delay		50.1	41.8			50.2	16.1	13.8	40.2		41.8	19.7

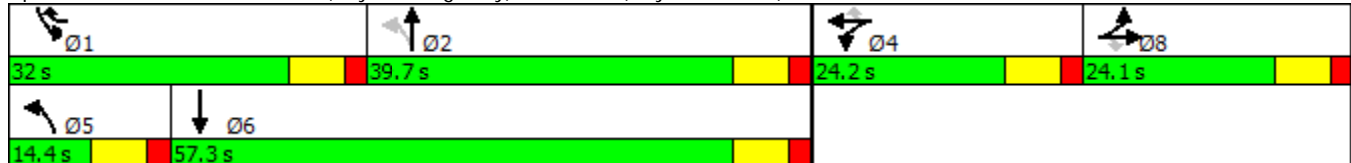
Lane Group												
LOS		D	D		D	B	B	D		D	B	
Approach Delay		49.7			22.4			40.1			26.7	
Approach LOS		D			C			D			C	
Queue Length 50th (ft)		80	3		84	98	1	227		161	238	
Queue Length 95th (ft)		162	17		168	159	7	344		262	474	
Internal Link Dist (ft)		239			1766			3271			3276	
Turn Bay Length (ft)			75			350	150			350		
Base Capacity (vph)		363	320		366	1200	293	1285		981	2024	
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		0.37	0.02		0.39	0.52	0.01	0.58		0.55	0.57	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 98
 Natural Cycle: 100
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.77
 Intersection Signal Delay: 29.7
 Intersection Capacity Utilization 61.1%
 Analysis Period (min) 15





















Intersection LOS: C
 ICU Level of Service B

Splits and Phases: 1: NC 280 (Boylston Highway) & NC 191 (Haywood Road)



R-2588B: NC 191 Widening
Lanes, Volumes, Timings

Build 2030 PM
09/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	400	181	25	514	4	159	10	17	4	8	4
Future Volume (vph)	4	400	181	25	514	4	159	10	17	4	8	4
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		175	150		0	150		0	0		0
Storage Lanes	1		1	1		0	1		0	0		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.999			0.905				0.968
Flt Protected	0.950			0.950			0.950				0.988	
Satd. Flow (prot)	1770	3539	1583	1770	3536	0	1770	1686	0	0	1781	0
Flt Permitted	0.436			0.495			0.746				0.945	
Satd. Flow (perm)	812	3539	1583	922	3536	0	1390	1686	0	0	1704	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			45				30
Link Distance (ft)		1846			5456			1563				408
Travel Time (s)		28.0			82.7			23.7				9.3
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	4	444	201	28	571	4	177	11	19	4	9	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	4	444	201	28	575	0	177	30	0	0	17	0
Turn Type	Perm	NA	Perm	D,P+P	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			4				8
Permitted Phases	2		2	2			4			8		
Detector Phase	2	2	2	1	6		4	4		8		8
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0		7.0
Minimum Split (s)	25.0	25.0	25.0	14.0	25.0		25.0	25.0		25.0		25.0
Total Split (s)	38.0	38.0	38.0	16.0	54.0		36.0	36.0		36.0		36.0
Total Split (%)	42.2%	42.2%	42.2%	17.8%	60.0%		40.0%	40.0%		40.0%		40.0%
Maximum Green (s)	31.0	31.0	31.0	9.0	47.0		29.0	29.0		29.0		29.0
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0		5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0		2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0				-2.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0				5.0
Lead/Lag	Lag	Lag	Lag	Lead								
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0		3.0
Recall Mode	Min	Min	Min	None	Min		Min	Min		Min		Min
Walk Time (s)	7.0	7.0	7.0		7.0		7.0	7.0		7.0		7.0
Flash Dont Walk (s)	11.0	11.0	11.0		11.0		11.0	11.0		11.0		11.0
Pedestrian Calls (#/hr)	0	0	0		0		0	0		0		0
Act Effect Green (s)	16.1	16.1	16.1	18.7	20.1		14.1	14.1				14.1
Actuated g/C Ratio	0.35	0.35	0.35	0.41	0.44		0.31	0.31				0.31
v/c Ratio	0.01	0.35	0.36	0.05	0.37		0.41	0.06				0.03
Control Delay	14.2	13.6	15.7	7.3	8.7		18.6	15.1				15.1
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0				0.0
Total Delay	14.2	13.6	15.7	7.3	8.7		18.6	15.1				15.1

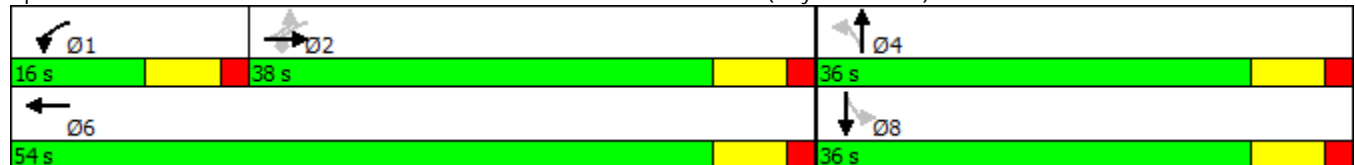
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	B	B	B	A	A		B	B				B
Approach Delay		14.3			8.6			18.1				15.1
Approach LOS		B			A			B				B
Queue Length 50th (ft)	0	30	26	3	40		26	4				2
Queue Length 95th (ft)	7	109	115	15	92		111	26				18
Internal Link Dist (ft)		1766			5376			1483				328
Turn Bay Length (ft)	150		175	150			150					
Base Capacity (vph)	639	2786	1246	623	3209		1047	1270				1284
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	0.16	0.16	0.04	0.18		0.17	0.02				0.01

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 45.4
 Natural Cycle: 65
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.41
 Intersection Signal Delay: 12.5
 Intersection Capacity Utilization 44.6%
 Analysis Period (min) 15




















Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 2: Banner Farm Road/Water Treatment Plant & NC 191 (Haywood Road)



R-2588B: NC 191 Widening
Lanes, Volumes, Timings

Build 2030 PM
09/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	342	89	425	427	1	89	0	340	2	0	2
Future Volume (vph)	1	342	89	425	427	1	89	0	340	2	0	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	375		0	0		250	0		0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.969							0.850		0.932	
Flt Protected	0.950			0.950				0.950			0.976	
Satd. Flow (prot)	1770	3429	0	1770	3539	0	0	1770	1583	0	1694	0
Flt Permitted	0.480			0.950				0.755			0.810	
Satd. Flow (perm)	894	3429	0	1770	3539	0	0	1406	1583	0	1406	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			45			25	
Link Distance (ft)		5456			7476			1256			553	
Travel Time (s)		82.7			113.3			19.0			15.1	
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)	1	380	99	472	474	1	99	0	378	2	0	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	479	0	472	475	0	0	99	378	0	4	0
Turn Type	Perm	NA		Prot	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases		2		1	6			8	1		4	
Permitted Phases	2						8		8	4		
Detector Phase	2	2		1	6		8	8	1	4	4	
Switch Phase												
Minimum Initial (s)	12.0	12.0		7.0	12.0		7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	19.0	19.0		14.6	19.0		14.0	14.0	14.6	14.0	14.0	
Total Split (s)	28.0	28.0		45.0	73.0		17.0	17.0	45.0	17.0	17.0	
Total Split (%)	31.1%	31.1%		50.0%	81.1%		18.9%	18.9%	50.0%	18.9%	18.9%	
Maximum Green (s)	21.0	21.0		38.0	66.0		10.0	10.0	38.0	10.0	10.0	
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0			-2.0	-2.0		-2.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0	5.0		5.0	
Lead/Lag	Lag	Lag		Lead					Lead			
Lead-Lag Optimize?	Yes	Yes		Yes					Yes			
Vehicle Extension (s)	6.0	6.0		1.0	6.0		1.0	1.0	1.0	1.0	1.0	
Minimum Gap (s)	3.0	3.0		0.2	3.0		0.2	0.2	0.2	0.2	0.2	
Time Before Reduce (s)	15.0	15.0		0.0	15.0		0.0	0.0	0.0	0.0	0.0	
Time To Reduce (s)	30.0	30.0		0.0	30.0		0.0	0.0	0.0	0.0	0.0	
Recall Mode	Min	Min		None	Min		None	None	None	None	None	
Act Effect Green (s)	18.4	18.4		23.4	49.1			11.1	34.9		11.1	
Actuated g/C Ratio	0.29	0.29		0.36	0.76			0.17	0.54		0.17	
v/c Ratio	0.00	0.49		0.73	0.18			0.41	0.44		0.02	
Control Delay	22.0	24.2		26.3	3.4			35.6	9.8		30.2	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay	22.0	24.2		26.3	3.4			35.6	9.8		30.2	

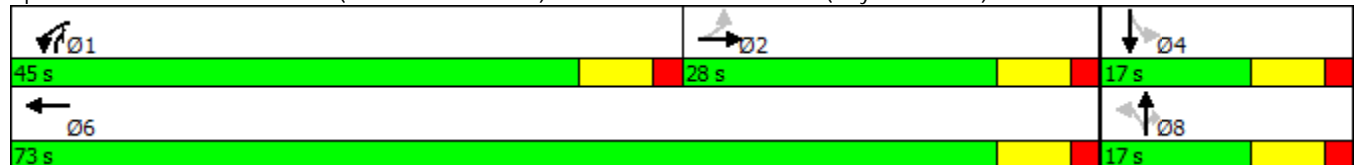
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	C	C		C	A			D	A			C
Approach Delay		24.2			14.8			15.1				30.3
Approach LOS		C			B			B				C
Queue Length 50th (ft)	0	87		161	28			37	71			1
Queue Length 95th (ft)	5	166		300	45			101	148			11
Internal Link Dist (ft)		5376			7396			1176				473
Turn Bay Length (ft)	150			375					250			
Base Capacity (vph)	352	1352		1165	3306			289	1326			289
Starvation Cap Reductn	0	0		0	0			0	0			0
Spillback Cap Reductn	0	0		0	0			0	0			0
Storage Cap Reductn	0	0		0	0			0	0			0
Reduced v/c Ratio	0.00	0.35		0.41	0.14			0.34	0.29			0.01

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 64.3
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.73
 Intersection Signal Delay: 17.3
 Intersection Capacity Utilization 57.0%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 3: SR 1426 (School House Road)/Water Treatment & NC 191 (Haywood Road)



R-2588B: NC 191 Widening
Lanes, Volumes, Timings

Build 2030 PM
09/20/2017

Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	61	563	87	35	299	689	134	68	85	145	133	154
Future Volume (vph)	61	563	87	35	299	689	134	68	85	145	133	154
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250		0		450		0	175		200	225	
Storage Lanes	1		0		1		0	1		1	1	
Taper Length (ft)	100				100			100			100	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00
Frt		0.980				0.976				0.850		0.951
Flt Protected	0.950				0.950			0.950			0.950	
Satd. Flow (prot)	1770	3468	0	0	1770	3454	0	1770	1863	1583	1770	1771
Flt Permitted	0.950				0.950			0.950			0.950	
Satd. Flow (perm)	1770	3468	0	0	1770	3454	0	1770	1863	1583	1770	1771
Right Turn on Red			No				No			No		
Satd. Flow (RTOR)												
Link Speed (mph)		45				45			35			45
Link Distance (ft)		7476				1829			1358			1857
Travel Time (s)		113.3				27.7			26.5			28.1
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	68	626	97	39	332	766	149	76	94	161	148	171
Shared Lane Traffic (%)												
Lane Group Flow (vph)	68	723	0	0	371	915	0	76	94	161	148	254
Turn Type	Prot	NA		Prot	Prot	NA		Split	NA	pm+ov	Split	NA
Protected Phases	5	2		1!	1	6		4	4	1!	8	8
Permitted Phases										4		
Detector Phase	5	2		1	1	6		4	4	1	8	8
Switch Phase												
Minimum Initial (s)	7.0	12.0		7.0	7.0	12.0		7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	14.0	19.0		14.0	14.0	19.0		14.0	14.0	14.0	14.0	14.0
Total Split (s)	15.0	39.0		38.0	38.0	62.0		15.0	15.0	38.0	28.0	28.0
Total Split (%)	12.5%	32.5%		31.7%	31.7%	51.7%		12.5%	12.5%	31.7%	23.3%	23.3%
Maximum Green (s)	8.0	32.0		31.0	31.0	55.0		8.0	8.0	31.0	21.0	21.0
Yellow Time (s)	5.0	5.0		5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0			-2.0	-2.0		-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	5.0	5.0			5.0	5.0		5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lead	Lag				Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes				Yes		
Vehicle Extension (s)	1.0	6.0		1.0	1.0	6.0		1.0	1.0	1.0	1.0	1.0
Minimum Gap (s)	3.0	3.0		0.2	0.2	0.2		0.2	0.2	0.2	0.2	0.2
Time Before Reduce (s)	0.0	15.0		0.0	0.0	15.0		0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	30.0		0.0	0.0	30.0		0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Min		None	None	Min		None	None	None	None	None
Act Effect Green (s)	9.7	27.9			26.7	48.7		9.8	9.8	36.5	19.4	19.4
Actuated g/C Ratio	0.09	0.27			0.26	0.47		0.09	0.09	0.35	0.19	0.19
v/c Ratio	0.41	0.78			0.82	0.57		0.46	0.54	0.29	0.45	0.77
Control Delay	58.1	43.0			53.5	22.9		59.6	61.9	14.7	44.9	59.0
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	58.1	43.0			53.5	22.9		59.6	61.9	14.7	44.9	59.0

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	75
Future Volume (vph)	75
Ideal Flow (vphpl)	1900
Storage Length (ft)	0
Storage Lanes	0
Taper Length (ft)	
Lane Util. Factor	1.00
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	No
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	0.90
Adj. Flow (vph)	83
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 (%)	
Maximum Green (s)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	
Minimum Gap (s)	
Time Before Reduce (s)	
Time To Reduce (s)	
Recall Mode	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	

Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
LOS	E	D			D	C		E	E	B	D	E
Approach Delay		44.3				31.7			38.4			53.8
Approach LOS		D				C			D			D
Queue Length 50th (ft)	46	249			244	252		52	65	41	92	169
Queue Length 95th (ft)	100	338			#387	322		110	#138	78	169	#304
Internal Link Dist (ft)		7396				1749			1278			1777
Turn Bay Length (ft)	250				450			175		200	225	
Base Capacity (vph)	174	1159			574	1937		174	183	662	400	400
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	0.62			0.65	0.47		0.44	0.51	0.24	0.37	0.64

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 104.4
 Natural Cycle: 80
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.82
 Intersection Signal Delay: 39.2
 Intersection Capacity Utilization 72.0%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 ! Phase conflict between lane groups.

Intersection LOS: D
 ICU Level of Service C

Splits and Phases: 4: SR 1309 (S Rugby Rd)/SR 1365 (N Rugby Rd) & NC 191 (Haywood Road)














Lane Group SBR

LOS
Approach Delay
Approach LOS
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	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	844	63	0	1107	0	45
Future Volume (vph)	844	63	0	1107	0	45
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	10	10
Storage Length (ft)		0	200		0	0
Storage Lanes		0	0		0	1
Taper Length (ft)			100		100	
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Frt	0.990					0.865
Flt Protected						
Satd. Flow (prot)	3504	0	0	3539	0	1504
Flt Permitted						
Satd. Flow (perm)	3504	0	0	3539	0	1504
Link Speed (mph)	45			45	25	
Link Distance (ft)	1829			653	1295	
Travel Time (s)	27.7			9.9	35.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	938	70	0	1230	0	50
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1008	0	0	1230	0	50
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 35.3% ICU Level of Service A
 Analysis Period (min) 15

Intersection

Int Delay, s/veh 0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		↑
Traffic Vol, veh/h	844	63	0	1107	0	45
Future Vol, veh/h	844	63	0	1107	0	45
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Yield
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	938	70	0	1230	0	50

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	504
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	6.94
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	3.32
Pot Cap-1 Maneuver	-	0	513
Stage 1	-	0	-
Stage 2	-	0	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	513
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	12.8
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	513	-	-	-
HCM Lane V/C Ratio	0.097	-	-	-
HCM Control Delay (s)	12.8	-	-	-
HCM Lane LOS	B	-	-	-
HCM 95th %tile Q(veh)	0.3	-	-	-

R-2588B: NC 191 Widening
Lanes, Volumes, Timings

Build 2030 PM
09/20/2017

Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	9	50	819	9	10	14	998	30	8	0	10	47
Future Volume (vph)	9	50	819	9	10	14	998	30	8	0	10	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		375		0		150		225	0		0	0
Storage Lanes		1		0		1		1	0		0	0
Taper Length (ft)		100				100			100			100
Lane Util. Factor	0.95	1.00	0.95	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00
Frt			0.998					0.850		0.926		
Flt Protected		0.950				0.950				0.978		
Satd. Flow (prot)	0	1770	3532	0	0	1770	3539	1583	0	1687	0	0
Flt Permitted		0.128				0.310				0.978		
Satd. Flow (perm)	0	238	3532	0	0	577	3539	1583	0	1687	0	0
Right Turn on Red				No				No			No	
Satd. Flow (RTOR)												
Link Speed (mph)			55				55			25		
Link Distance (ft)			653				1496			862		
Travel Time (s)			8.1				18.5			23.5		
Peak Hour Factor	0.90	0.50	0.90	0.90	0.90	0.90	0.90	0.50	0.90	0.50	0.90	0.50
Adj. Flow (vph)	10	100	910	10	11	16	1109	60	9	0	11	94
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	110	920	0	0	27	1109	60	0	20	0	0
Turn Type	D.P+P	D.P+P	NA		Perm	Perm	NA	pm+ov	Split	NA		Split
Protected Phases	1!	1	6				2	4	3	3		4
Permitted Phases	2	2			2	2		2				
Detector Phase	1	1	6		2	2	2	4	3	3		4
Switch Phase												
Minimum Initial (s)	10.0	10.0	14.0		14.0	14.0	14.0	7.0	7.0	7.0		7.0
Minimum Split (s)	17.6	17.6	21.0		21.0	21.0	21.0	14.0	14.0	14.0		14.0
Total Split (s)	22.0	22.0	87.0		65.0	65.0	65.0	19.0	14.0	14.0		19.0
Total Split (%)	18.3%	18.3%	72.5%		54.2%	54.2%	54.2%	15.8%	11.7%	11.7%		15.8%
Maximum Green (s)	15.0	15.0	80.0		58.0	58.0	58.0	12.0	7.0	7.0		12.0
Yellow Time (s)	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0		5.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0		2.0
Lost Time Adjust (s)		-2.0	-2.0				-2.0	-2.0	-2.0	-2.0		
Total Lost Time (s)		5.0	5.0				5.0	5.0	5.0	5.0		
Lead/Lag	Lead	Lead			Lag	Lag	Lag	Lag	Lead	Lead		Lag
Lead-Lag Optimize?	Yes	Yes			Yes	Yes	Yes	Yes	Yes	Yes		Yes
Vehicle Extension (s)	2.0	2.0	6.0		6.0	6.0	6.0	2.0	2.0	2.0		2.0
Minimum Gap (s)	0.2	0.2	3.0		3.0	3.0	3.0	0.2	0.2	0.2		0.2
Time Before Reduce (s)	0.0	0.0	15.0		15.0	15.0	15.0	0.0	0.0	0.0		0.0
Time To Reduce (s)	0.0	0.0	30.0		30.0	30.0	30.0	0.0	0.0	0.0		0.0
Recall Mode	None	None	Min		Min	Min	Min	None	None	None		None
Act Effect Green (s)		46.6	53.6			33.6	33.6	48.8		9.8		
Actuated g/C Ratio		0.63	0.72			0.45	0.45	0.66		0.13		
v/c Ratio		0.26	0.36			0.10	0.69	0.06		0.09		
Control Delay		8.3	7.0			16.3	20.6	4.5		39.0		
Queue Delay		0.0	0.0			0.0	0.0	0.0		0.0		
Total Delay		8.3	7.0			16.3	20.6	4.5		39.0		

	↓	↙
Lane Group	SBT	SBR
Lane Configurations	↕	↕
Traffic Volume (vph)	0	96
Future Volume (vph)	0	96
Ideal Flow (vphpl)	1900	1900
Storage Length (ft)		300
Storage Lanes		1
Taper Length (ft)		
Lane Util. Factor	1.00	1.00
Frt		0.850
Flt Protected	0.950	
Satd. Flow (prot)	1770	1583
Flt Permitted	0.950	
Satd. Flow (perm)	1770	1583
Right Turn on Red		No
Satd. Flow (RTOR)		
Link Speed (mph)	25	
Link Distance (ft)	788	
Travel Time (s)	21.5	
Peak Hour Factor	0.50	0.50
Adj. Flow (vph)	0	192
Shared Lane Traffic (%)		
Lane Group Flow (vph)	94	192
Turn Type	NA	pm+ov
Protected Phases	4	1!
Permitted Phases		4
Detector Phase	4	1
Switch Phase		
Minimum Initial (s)	7.0	10.0
Minimum Split (s)	14.0	17.6
Total Split (s)	19.0	22.0
Total Split (%)	15.8%	18.3%
Maximum Green (s)	12.0	15.0
Yellow Time (s)	5.0	5.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0
Total Lost Time (s)	5.0	5.0
Lead/Lag	Lag	Lead
Lead-Lag Optimize?	Yes	Yes
Vehicle Extension (s)	2.0	2.0
Minimum Gap (s)	0.2	0.2
Time Before Reduce (s)	0.0	0.0
Time To Reduce (s)	0.0	0.0
Recall Mode	None	None
Act Effct Green (s)	11.4	25.3
Actuated g/C Ratio	0.15	0.34
v/c Ratio	0.35	0.35
Control Delay	37.9	23.5
Queue Delay	0.0	0.0
Total Delay	37.9	23.5

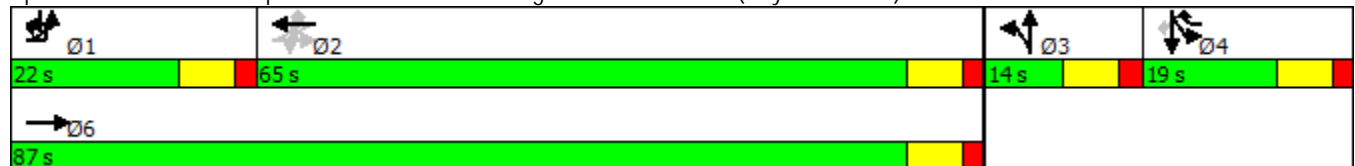
Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
LOS		A	A			B	C	A		D		
Approach Delay			7.1				19.7			39.0		
Approach LOS			A				B			D		
Queue Length 50th (ft)		12	65			6	185	7		7		
Queue Length 95th (ft)		25	185			27	364	8		20		
Internal Link Dist (ft)			573				1416			782		
Turn Bay Length (ft)		375				150		225				
Base Capacity (vph)		548	3312			472	2898	1125		222		
Starvation Cap Reductn		0	0			0	0	0		0		
Spillback Cap Reductn		0	0			0	0	0		0		
Storage Cap Reductn		0	0			0	0	0		0		
Reduced v/c Ratio		0.20	0.28			0.06	0.38	0.05		0.09		

Intersection Summary


















Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 74
 Natural Cycle: 75
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.69
 Intersection Signal Delay: 15.7
 Intersection Capacity Utilization 66.8%
 Analysis Period (min) 15
 ! Phase conflict between lane groups.

Intersection LOS: B
 ICU Level of Service C

Splits and Phases: 6: Alpine Dr/West Henderson High School & NC 191 (Haywood Road)



	↓	↙
Lane Group	SBT	SBR
LOS	D	C
Approach Delay	28.2	
Approach LOS	C	
Queue Length 50th (ft)	34	49
Queue Length 95th (ft)	57	81
Internal Link Dist (ft)	708	
Turn Bay Length (ft)		300
Base Capacity (vph)	363	658
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.26	0.29
Intersection Summary		

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	850	2	0	1031	8	0	0	2	0	0	36
Future Volume (vph)	21	850	2	0	1031	8	0	0	2	0	0	36
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	10	10	10	10	10	10
Storage Length (ft)	150		0	0		0	0		0	0		0
Storage Lanes	1		0	0		0	0		1	0		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.999				0.865			0.865
Flt Protected	0.950											
Satd. Flow (prot)	1770	3539	0	0	3536	0	0	0	1504	0	0	1504
Flt Permitted	0.950											
Satd. Flow (perm)	1770	3539	0	0	3536	0	0	0	1504	0	0	1504
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		1496			911			590			1563	
Travel Time (s)		22.7			13.8			13.4			35.5	
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)	23	944	2	0	1146	9	0	0	2	0	0	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	23	946	0	0	1155	0	0	0	2	0	0	40
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 38.8%
 Analysis Period (min) 15
 ICU Level of Service A















Intersection








Int Delay, s/veh	0.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↔			↕↔				↕			↕
Traffic Vol, veh/h	21	850	2	0	1031	8	0	0	2	0	0	36
Future Vol, veh/h	21	850	2	0	1031	8	0	0	2	0	0	36
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	Yield
Storage Length	150	-	-	-	-	-	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	23	944	2	0	1146	9	0	0	2	0	0	40

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1154	0	0	-	-	0	-	-	473	-	-	577
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	4.14	-	-	-	-	-	-	-	6.94	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	2.22	-	-	-	-	-	-	-	3.32	-	-	3.32
Pot Cap-1 Maneuver	601	-	-	0	-	-	0	0	538	0	0	460
Stage 1	-	-	-	0	-	-	0	0	-	0	0	-
Stage 2	-	-	-	0	-	-	0	0	-	0	0	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	601	-	-	-	-	-	-	-	538	-	-	460
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0	11.7	13.6
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBT	WBR	SBLn1
Capacity (veh/h)	538	601	-	-	-	-	460
HCM Lane V/C Ratio	0.004	0.039	-	-	-	-	0.087
HCM Control Delay (s)	11.7	11.2	-	-	-	-	13.6
HCM Lane LOS	B	B	-	-	-	-	B
HCM 95th %tile Q(veh)	0	0.1	-	-	-	-	0.3

							
Lane Group	EBU	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Volume (vph)	1	803	37	17	977	72	27
Future Volume (vph)	1	803	37	17	977	72	27
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		175	175		0	350
Storage Lanes	1		1	1		1	1
Taper Length (ft)	100			100		100	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Frt			0.850				0.850
Flt Protected	0.950			0.950		0.950	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1770	1583
Flt Permitted	0.263			0.244		0.950	
Satd. Flow (perm)	490	3539	1583	455	3539	1770	1583
Right Turn on Red			No				No
Satd. Flow (RTOR)							
Link Speed (mph)		45			45	30	
Link Distance (ft)		911			3670	692	
Travel Time (s)		13.8			55.6	15.7	
Peak Hour Factor	0.90	0.90	0.50	0.50	0.90	0.50	0.50
Adj. Flow (vph)	1	892	74	34	1086	144	54
Shared Lane Traffic (%)							
Lane Group Flow (vph)	1	892	74	34	1086	144	54
Turn Type	Perm	NA	pm+ov	D,P+P	NA	Prot	pm+ov
Protected Phases		6	4	5	2	4	5
Permitted Phases	6		6	6			4
Detector Phase	6	6	4	5	2	4	5
Switch Phase							
Minimum Initial (s)	12.0	12.0	7.0	7.0	12.0	7.0	7.0
Minimum Split (s)	19.0	19.0	14.0	14.0	19.0	14.0	14.0
Total Split (s)	49.0	49.0	25.0	16.0	65.0	25.0	16.0
Total Split (%)	54.4%	54.4%	27.8%	17.8%	72.2%	27.8%	17.8%
Maximum Green (s)	42.0	42.0	18.0	9.0	58.0	18.0	9.0
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag		Lead			Lead
Lead-Lag Optimize?	Yes	Yes		Yes			Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	Min	Min	None	None	Min	None	None
Act Effct Green (s)	25.4	25.4	39.8	28.5	32.5	11.7	22.7
Actuated g/C Ratio	0.51	0.51	0.81	0.58	0.66	0.24	0.46
v/c Ratio	0.00	0.49	0.06	0.07	0.47	0.34	0.07
Control Delay	12.0	13.7	3.1	5.2	6.8	21.8	9.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.0	13.7	3.1	5.2	6.8	21.8	9.5
LOS	B	B	A	A	A	C	A
Approach Delay		12.9			6.7	18.4	
Approach LOS		B			A	B	

							
Lane Group	EBU	EBT	EBR	WBL	WBT	NBL	NBR
Queue Length 50th (ft)	0	125	7	4	85	40	9
Queue Length 95th (ft)	3	202	9	7	153	50	16
Internal Link Dist (ft)		831			3590	612	
Turn Bay Length (ft)	100		175	175			350
Base Capacity (vph)	416	3005	1392	586	3466	770	796
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.30	0.05	0.06	0.31	0.19	0.07

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 49.4
 Natural Cycle: 50
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.49
 Intersection Signal Delay: 10.3
 Intersection Capacity Utilization 41.2%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 8: Rugby Middle School & NC 191 (Haywood Road)



R-2588B: NC 191 Widening
Lanes, Volumes, Timings

Build 2030 PM
09/20/2017

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	122	687	4	5	850	108	3	2	2	114	5	160
Future Volume (vph)	122	687	4	5	850	108	3	2	2	114	5	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	100		0	0		0	0		150
Storage Lanes	1		0	1		0	0		0	0		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.999			0.983			0.961				0.850
Flt Protected	0.950			0.950				0.979			0.954	
Satd. Flow (prot)	1770	3536	0	1770	3479	0	0	1753	0	0	1777	1583
Flt Permitted	0.950			0.361				0.979			0.954	
Satd. Flow (perm)	1770	3536	0	672	3479	0	0	1753	0	0	1777	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			25			35	
Link Distance (ft)		3670			2566			1006			2428	
Travel Time (s)		55.6			38.9			27.4			47.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	136	763	4	6	944	120	3	2	2	127	6	178
Shared Lane Traffic (%)												
Lane Group Flow (vph)	136	767	0	6	1064	0	0	7	0	0	133	178
Turn Type	Prot	NA		Perm	NA		Split	NA		Split	NA	pm+ov
Protected Phases	1	6			2		4	4		3	3	1
Permitted Phases				2								3
Detector Phase	1	6		2	2		4	4		3	3	1
Switch Phase												
Minimum Initial (s)	7.0	12.0		12.0	12.0		7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	14.0	19.0		19.0	19.0		14.0	14.0		14.0	14.0	14.0
Total Split (s)	24.0	83.0		59.0	59.0		14.0	14.0		23.0	23.0	24.0
Total Split (%)	20.0%	69.2%		49.2%	49.2%		11.7%	11.7%		19.2%	19.2%	20.0%
Maximum Green (s)	17.0	76.0		52.0	52.0		7.0	7.0		16.0	16.0	17.0
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0			-2.0			-2.0	-2.0
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	5.0
Lead/Lag	Lead			Lag	Lag		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	1.0	6.0		6.0	6.0		1.0	1.0		2.0	2.0	1.0
Minimum Gap (s)	0.2	3.0		3.0	3.0		0.2	0.2		0.2	0.2	0.2
Time Before Reduce (s)	0.0	20.0		20.0	20.0		0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	30.0		30.0	30.0		0.0	0.0		0.0	0.0	0.0
Recall Mode	None	Min		Min	Min		None	None		None	None	None
Act Effect Green (s)	12.6	52.3		34.5	34.5			9.6			13.0	30.2
Actuated g/C Ratio	0.16	0.67		0.44	0.44			0.12			0.17	0.39
v/c Ratio	0.48	0.32		0.02	0.69			0.03			0.45	0.29
Control Delay	39.7	6.3		15.8	21.2			41.3			38.8	17.5
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Delay	39.7	6.3		15.8	21.2			41.3			38.8	17.5

Lane Group												
LOS	D	A		B	C			D			D	B
Approach Delay		11.3			21.2			41.3			26.6	
Approach LOS		B			C			D			C	
Queue Length 50th (ft)	55	58		1	184			3			53	50
Queue Length 95th (ft)	159	163		11	414			20			157	125
Internal Link Dist (ft)		3590			2486			926			2348	
Turn Bay Length (ft)	225			100								150
Base Capacity (vph)	458	3291		495	2563			215			436	768
Starvation Cap Reductn	0	0		0	0			0			0	0
Spillback Cap Reductn	0	0		0	0			0			0	0
Storage Cap Reductn	0	0		0	0			0			0	0
Reduced v/c Ratio	0.30	0.23		0.01	0.42			0.03			0.31	0.23

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 77.8
 Natural Cycle: 70
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.69
 Intersection Signal Delay: 18.1
 Intersection Capacity Utilization 59.1%
 Analysis Period (min) 15






















Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 9: SR 1444 (Leverette Drive)/SR 1381 (Mountain Road) & NC 191 (Haywood Road)



R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2040 AM
09/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	107	44	4	35	31	501	5	1052	62	582	699	90
Future Volume (vph)	107	44	4	35	31	501	5	1052	62	582	699	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	12	12	12	12	12	12
Storage Length (ft)	0		75	0		600	150		0	150		50
Storage Lanes	0		1	0		1	1		0	1		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Fr			0.850			0.850		0.992				0.850
Flt Protected		0.966			0.974		0.950			0.950		
Satd. Flow (prot)	0	1799	1583	0	1754	1531	1770	3511	0	1770	3539	1583
Flt Permitted		0.966			0.974		0.357			0.950		
Satd. Flow (perm)	0	1799	1583	0	1754	1531	665	3511	0	1770	3539	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		20			45			45			45	
Link Distance (ft)		280			1846			3351			3356	
Travel Time (s)		9.5			28.0			50.8			50.8	
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)	119	49	4	39	34	557	6	1169	69	647	777	100
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	168	4	0	73	557	6	1238	0	647	777	100
Turn Type	Split	NA	Perm	Split	NA	pm+ov	pm+pt	NA		Prot	NA	Perm
Protected Phases	3	3		4	4	1	5	2		1	6	
Permitted Phases			3			4	2					6
Detector Phase	3	3	3	4	4	1	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	14.0		7.0	14.0	14.0
Minimum Split (s)	24.1	24.1	24.1	24.2	24.2	14.4	14.4	25.8		14.4	25.8	25.8
Total Split (s)	24.1	24.1	24.1	24.2	24.2	66.0	14.4	65.7		66.0	117.3	117.3
Total Split (%)	13.4%	13.4%	13.4%	13.4%	13.4%	36.7%	8.0%	36.5%		36.7%	65.2%	65.2%
Maximum Green (s)	17.1	17.1	17.1	17.2	17.2	59.0	7.4	58.7		59.0	110.3	110.3
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		-2.0	-2.0		-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	-2.0
Total Lost Time (s)		5.0	5.0		5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	6.0		2.0	6.0	6.0
Minimum Gap (s)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	3.4		0.2	3.4	3.4
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0		0.0	15.0	15.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.0		0.0	30.0	30.0
Recall Mode	None	None	None	None	None	None	None	Min		None	Min	Min
Act Effct Green (s)		18.7	18.7		13.7	79.7	69.7	60.7		61.0	124.0	124.0
Actuated g/C Ratio		0.11	0.11		0.08	0.46	0.40	0.35		0.35	0.71	0.71
v/c Ratio		0.87	0.02		0.53	0.80	0.02	1.01		1.04	0.31	0.09
Control Delay		113.8	71.5		91.2	50.2	16.8	83.7		101.4	10.4	9.2
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	0.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay		113.8	71.5		91.2	50.2	16.8	83.7		101.4	10.4	9.2
LOS		F	E		F	D	B	F		F	B	A
Approach Delay		112.8			54.9			83.3			49.0	
Approach LOS		F			D			F			D	
Queue Length 50th (ft)		192	4		82	540	2	-781		-799	151	31
Queue Length 95th (ft)		#345	18		141	712	8	#967		#1099	262	74
Internal Link Dist (ft)		200			1766			3271			3276	
Turn Bay Length (ft)			75			600	150			150		50
Base Capacity (vph)		197	173		193	700	327	1224		620	2521	1127
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		0.85	0.02		0.38	0.80	0.02	1.01		1.04	0.31	0.09

Intersection Summary

Area Type: Other
 Cycle Length: 180
 Actuated Cycle Length: 174.1
 Natural Cycle: 180
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 1.04
 Intersection Signal Delay: 65.1
 Intersection Capacity Utilization 90.7%
 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: 1: NC 280 (Boylston Highway) & NC 191 (Haywood Road)

Ø1	Ø2	Ø3	Ø4	Ø5	Ø6			
66 s	65.7 s	24.1 s	24.2 s	14.4 s	117.3 s			

R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2040 AM

09/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	522	151	17	408	4	173	8	25	4	10	4
Future Volume (vph)	4	522	151	17	408	4	173	8	25	4	10	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	12	12	12	10	10	10	12	12	12
Storage Length (ft)	0		100	0		0	100		0	0		0
Storage Lanes	0		1	0		0	1		0	0		0
Taper Length (ft)	100			100			100			100		
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		0.999			0.886			0.972	
Flt Protected					0.998		0.950				0.990	
Satd. Flow (prot)	0	1801	1531	0	1857	0	1652	1540	0	0	1792	0
Flt Permitted					0.998		0.950				0.990	
Satd. Flow (perm)	0	1801	1531	0	1857	0	1652	1540	0	0	1792	0
Link Speed (mph)		45			45			45			30	
Link Distance (ft)		1846			5456			1563			408	
Travel Time (s)		28.0			82.7			23.7			9.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	4	580	168	19	453	4	192	9	28	4	11	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	584	168	0	476	0	192	37	0	0	19	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 58.4%
 Analysis Period (min) 15
 ICU Level of Service B

Intersection

Int Delay, s/veh 19.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↔		↖	↗			↔	
Traffic Vol, veh/h	4	522	151	17	408	4	173	8	25	4	10	4
Future Vol, veh/h	4	522	151	17	408	4	173	8	25	4	10	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	100	-	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	580	168	19	453	4	192	9	28	4	11	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	458	0	0	580	0	0	1090	1085	580	1100	1082	456
Stage 1	-	-	-	-	-	-	589	589	-	493	493	-
Stage 2	-	-	-	-	-	-	501	496	-	607	589	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1103	-	-	994	-	-	193	217	514	190	217	604
Stage 1	-	-	-	-	-	-	494	495	-	558	547	-
Stage 2	-	-	-	-	-	-	552	545	-	483	495	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1103	-	-	994	-	-	~ 179	210	514	170	210	604
Mov Cap-2 Maneuver	-	-	-	-	-	-	~ 179	210	-	170	210	-
Stage 1	-	-	-	-	-	-	491	492	-	555	533	-
Stage 2	-	-	-	-	-	-	523	531	-	446	492	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0	0.3	121.5	22.1
HCM LOS			F	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	179	380	1103	-	-	994	-	-	231
HCM Lane V/C Ratio	1.074	0.096	0.004	-	-	0.019	-	-	0.087
HCM Control Delay (s)	141.7	15.5	8.3	0	-	8.7	0	-	22.1
HCM Lane LOS	F	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	9.4	0.3	0	-	-	0.1	-	-	0.3

Notes

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

R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2040 AM
09/20/2017

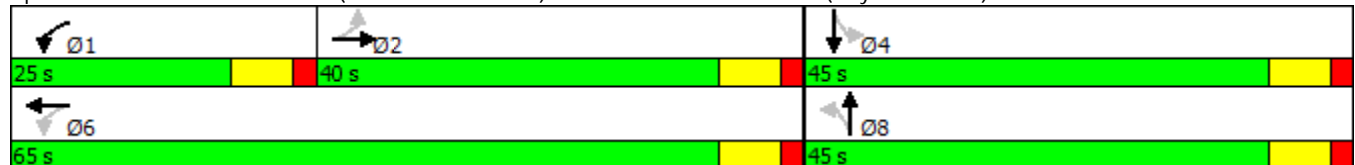
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	434	91	371	348	2	91	0	463	1	0	1
Future Volume (vph)	2	434	91	371	348	2	91	0	463	1	0	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	12
Storage Length (ft)	150		0	250		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
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		0.974			0.999			0.887			0.932	
Flt Protected	0.950			0.950				0.992			0.976	
Satd. Flow (prot)	1711	1754	0	1711	1799	0	0	1639	0	0	1694	0
Flt Permitted	0.532			0.100				0.944			0.885	
Satd. Flow (perm)	958	1754	0	180	1799	0	0	1560	0	0	1536	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			45			25	
Link Distance (ft)		5456			7476			1256			553	
Travel Time (s)		82.7			113.3			19.0			15.1	
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)	2	482	101	412	387	2	101	0	514	1	0	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	2	583	0	412	389	0	0	615	0	0	2	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	12.0	12.0		7.0	12.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	19.0	19.0		14.6	19.0		14.0	14.0		14.0	14.0	
Total Split (s)	40.0	40.0		25.0	65.0		45.0	45.0		45.0	45.0	
Total Split (%)	36.4%	36.4%		22.7%	59.1%		40.9%	40.9%		40.9%	40.9%	
Maximum Green (s)	33.0	33.0		18.0	58.0		38.0	38.0		38.0	38.0	
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	6.0	6.0		1.0	6.0		1.0	1.0		1.0	1.0	
Minimum Gap (s)	3.0	3.0		0.2	3.0		0.2	0.2		0.2	0.2	
Time Before Reduce (s)	15.0	15.0		0.0	15.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	30.0	30.0		0.0	30.0		0.0	0.0		0.0	0.0	
Recall Mode	Min	Min		None	Min		None	None		None	None	
Act Effect Green (s)	35.0	35.0		60.0	60.0			40.0			40.0	
Actuated g/C Ratio	0.32	0.32		0.55	0.55			0.36			0.36	
v/c Ratio	0.01	1.04		1.10	0.40			1.08			0.00	
Control Delay	26.0	87.8		105.9	16.0			97.3			22.5	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	26.0	87.8		105.9	16.0			97.3			22.5	
LOS	C	F		F	B			F			C	
Approach Delay		87.6			62.2			97.3			22.5	
Approach LOS		F			E			F			C	
Queue Length 50th (ft)	1	-448		-281	152			-488			1	
Queue Length 95th (ft)	7	#663		#477	223			#706			6	
Internal Link Dist (ft)		5376			7396			1176			473	
Turn Bay Length (ft)	150			250								
Base Capacity (vph)	304	558		376	981			567			558	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.01	1.04		1.10	0.40			1.08			0.00	

Intersection Summary

Area Type: Other
 Cycle Length: 110
 Actuated Cycle Length: 110
 Natural Cycle: 110
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 1.10
 Intersection Signal Delay: 80.4
 Intersection Capacity Utilization 95.9%
 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: SR 1426 (School House Road)/Water Treatment & NC 191 (Haywood Road)



R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2040 AM
09/20/2017

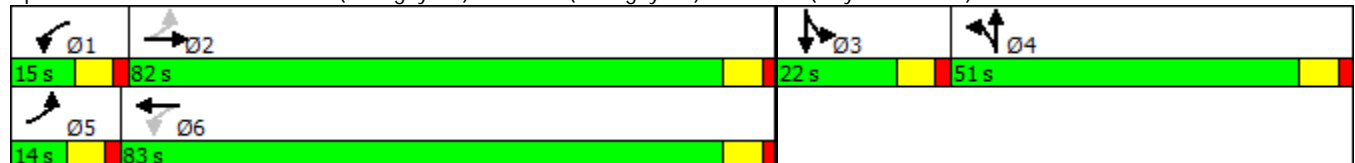
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	83	719	62	150	588	141	92	179	275	143	100	69
Future Volume (vph)	83	719	62	150	588	141	92	179	275	143	100	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	12
Storage Length (ft)	150		0	125		0	100		0	125		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	100			100			100			100		
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		0.988			0.971			0.909			0.939	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1711	1779	0	1711	1748	0	1770	1693	0	1770	1749	0
Flt Permitted	0.052			0.051			0.950			0.950		
Satd. Flow (perm)	94	1779	0	92	1748	0	1770	1693	0	1770	1749	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			35			45	
Link Distance (ft)		7476			1829			1358			1857	
Travel Time (s)		113.3			27.7			26.5			28.1	
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)	92	799	69	167	653	157	102	199	306	159	111	77
Shared Lane Traffic (%)												
Lane Group Flow (vph)	92	868	0	167	810	0	102	505	0	159	188	0
Turn Type	pm+pt	NA		pm+pt	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases	2			6								
Detector Phase	5	2		1	6		4	4		3	3	
Switch Phase												
Minimum Initial (s)	7.0	12.0		7.0	12.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	14.0	19.0		14.0	19.0		14.0	14.0		14.0	14.0	
Total Split (s)	14.0	82.0		15.0	83.0		51.0	51.0		22.0	22.0	
Total Split (%)	8.2%	48.2%		8.8%	48.8%		30.0%	30.0%		12.9%	12.9%	
Maximum Green (s)	7.0	75.0		8.0	76.0		44.0	44.0		15.0	15.0	
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	1.0	6.0		1.0	6.0		1.0	1.0		1.0	1.0	
Minimum Gap (s)	3.0	3.0		0.2	0.2		0.2	0.2		0.2	0.2	
Time Before Reduce (s)	0.0	15.0		0.0	15.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	30.0		0.0	30.0		0.0	0.0		0.0	0.0	
Recall Mode	None	Min		None	Min		None	None		None	None	
Act Effect Green (s)	86.0	77.0		88.0	78.0		46.0	46.0		17.0	17.0	
Actuated g/C Ratio	0.51	0.45		0.52	0.46		0.27	0.27		0.10	0.10	
v/c Ratio	0.69	1.08		1.18	1.01		0.21	1.10		0.90	1.08	
Control Delay	57.5	98.5		168.5	79.1		49.5	128.3		119.3	159.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	












Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	57.5	98.5		168.5	79.1		49.5	128.3		119.3	159.1	
LOS	E	F		F	E		D	F		F	F	
Approach Delay		94.6			94.4			115.1			140.8	
Approach LOS		F			F			F			F	
Queue Length 50th (ft)	51	~1073		~171	~919		89	~636		178	~232	
Queue Length 95th (ft)	#140	#1336		#339	#1204		144	#874		#324	#405	
Internal Link Dist (ft)		7396			1749			1278			1777	
Turn Bay Length (ft)	150			125			100			125		
Base Capacity (vph)	133	805		142	802		478	458		177	174	
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	0.69	1.08		1.18	1.01		0.21	1.10		0.90	1.08	

Intersection Summary

Area Type: Other
 Cycle Length: 170
 Actuated Cycle Length: 170
 Natural Cycle: 170
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 1.18
 Intersection Signal Delay: 104.4
 Intersection Capacity Utilization 100.8%
 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: 4: SR 1309 (S Rugby Rd)/SR 1365 (N Rugby Rd) & NC 191 (Haywood Road)



						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1077	18	36	884	29	69
Future Volume (vph)	1077	18	36	884	29	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	10	10
Storage Length (ft)		0	225		0	100
Storage Lanes		0	1		1	1
Taper Length (ft)			25		100	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.998					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1797	0	1711	1801	1652	1478
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1797	0	1711	1801	1652	1478
Link Speed (mph)	45			45	25	
Link Distance (ft)	1829			653	1295	
Travel Time (s)	27.7			9.9	35.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	1197	20	40	982	32	77
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1217	0	40	982	32	77
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 68.7% ICU Level of Service C
 Analysis Period (min) 15

Intersection

Int Delay, s/veh 4.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	1077	18	36	884	29	69
Future Vol, veh/h	1077	18	36	884	29	69
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	225	-	0	100
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	1197	20	40	982	32	77

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	1217
Stage 1	-	-	1207
Stage 2	-	-	1062
Critical Hdwy	-	4.12	6.42
Critical Hdwy Stg 1	-	-	5.42
Critical Hdwy Stg 2	-	-	5.42
Follow-up Hdwy	-	2.218	3.518
Pot Cap-1 Maneuver	-	573	45
Stage 1	-	-	283
Stage 2	-	-	332
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	573	42
Mov Cap-2 Maneuver	-	-	42
Stage 1	-	-	283
Stage 2	-	-	309

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	85.3
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	42	223	-	-	573	-
HCM Lane V/C Ratio	0.767	0.344	-	-	0.07	-
HCM Control Delay (s)	218.2	29.4	-	-	11.8	-
HCM Lane LOS	F	D	-	-	B	-
HCM 95th %tile Q(veh)	2.9	1.5	-	-	0.2	-

R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2040 AM
09/20/2017

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	102	1042	8	14	855	47	9	0	18	30	0	53
Future Volume (vph)	102	1042	8	14	855	47	9	0	18	30	0	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	12
Storage Length (ft)	350		0	225		225	0		0	0		300
Storage Lanes	1		0	1		1	0		0	0		1
Taper Length (ft)	25			100			100			100		
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		0.999				0.850		0.910				0.850
Flt Protected	0.950			0.950				0.984			0.950	
Satd. Flow (prot)	1711	1799	0	1711	1801	1531	0	1668	0	0	1770	1583
Flt Permitted	0.062			0.116				0.984			0.950	
Satd. Flow (perm)	112	1799	0	209	1801	1531	0	1668	0	0	1770	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		55			55			25			25	
Link Distance (ft)		653			1496			862			788	
Travel Time (s)		8.1			18.5			23.5			21.5	
Peak Hour Factor	0.50	0.90	0.90	0.90	0.90	0.50	0.90	0.50	0.90	0.50	0.50	0.50
Adj. Flow (vph)	204	1158	9	16	950	94	10	0	20	60	0	106
Shared Lane Traffic (%)												
Lane Group Flow (vph)	204	1167	0	16	950	94	0	30	0	0	60	106
Turn Type	pm+pt	NA		Perm	NA	pm+ov	Split	NA		Split	NA	pm+ov
Protected Phases	1	6			2	4	3	3		4	4	1
Permitted Phases	6			2		2						4
Detector Phase	1	6		2	2	4	3	3		4	4	1
Switch Phase												
Minimum Initial (s)	10.0	14.0		14.0	14.0	7.0	7.0	7.0		7.0	7.0	10.0
Minimum Split (s)	17.6	21.0		21.0	21.0	14.0	14.0	14.0		14.0	14.0	17.6
Total Split (s)	17.6	92.0		74.4	74.4	14.0	14.0	14.0		14.0	14.0	17.6
Total Split (%)	14.7%	76.7%		62.0%	62.0%	11.7%	11.7%	11.7%		11.7%	11.7%	14.7%
Maximum Green (s)	10.6	85.0		67.4	67.4	7.0	7.0	7.0		7.0	7.0	10.6
Yellow Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0	-2.0		-2.0			-2.0	-2.0
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0		5.0			5.0	5.0
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lead		Lag	Lag	Lead
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	2.0	6.0		6.0	6.0	2.0	2.0	2.0		2.0	2.0	2.0
Minimum Gap (s)	0.2	3.0		3.0	3.0	0.2	0.2	0.2		0.2	0.2	0.2
Time Before Reduce (s)	0.0	15.0		15.0	15.0	0.0	0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	30.0		30.0	30.0	0.0	0.0	0.0		0.0	0.0	0.0
Recall Mode	None	Min		Min	Min	None	None	None		None	None	None
Act Effect Green (s)	77.0	77.0		59.0	59.0	71.0		9.4			9.4	27.4
Actuated g/C Ratio	0.74	0.74		0.57	0.57	0.68		0.09			0.09	0.26
v/c Ratio	0.73	0.88		0.14	0.93	0.09		0.20			0.38	0.25
Control Delay	42.4	20.8		15.1	37.8	4.0		54.7			58.6	38.2
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0			0.0	0.0

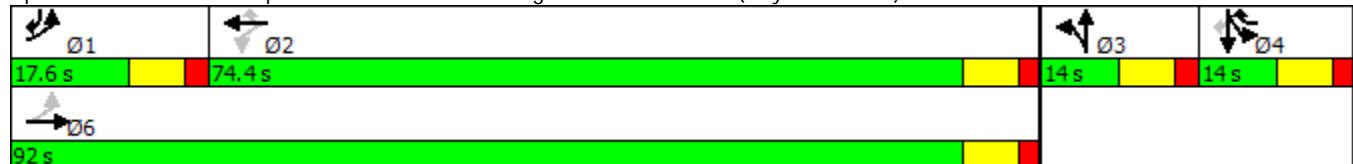
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	42.4	20.8		15.1	37.8	4.0		54.7			58.6	38.2
LOS	D	C		B	D	A		D			E	D
Approach Delay		24.0			34.4			54.7			45.6	
Approach LOS		C			C			D			D	
Queue Length 50th (ft)	98	624		5	622	12		22			45	69
Queue Length 95th (ft)	66	#1089		19	#942	11		30			49	65
Internal Link Dist (ft)		573			1416			782			708	
Turn Bay Length (ft)	350			225		225						300
Base Capacity (vph)	284	1502		144	1250	1044		150			159	421
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	0.72	0.78		0.11	0.76	0.09		0.20			0.38	0.25

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 104.1
 Natural Cycle: 100
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.93
 Intersection Signal Delay: 29.9
 Intersection Capacity Utilization 87.8%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service E


















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

Splits and Phases: 6: Alpine Dr/West Henderson High School & NC 191 (Haywood Road)



R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2040 AM
09/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	1069	1	1	874	8	1	0	1	7	0	29
Future Volume (vph)	36	1069	1	1	874	8	1	0	1	7	0	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	10	10	10	10	10	10
Storage Length (ft)	225		0	0		0	0		0	0		0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
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					0.999			0.932			0.892	
Flt Protected	0.950							0.976			0.990	
Satd. Flow (prot)	1711	1801	0	0	1799	0	0	1581	0	0	1535	0
Flt Permitted	0.950							0.976			0.990	
Satd. Flow (perm)	1711	1801	0	0	1799	0	0	1581	0	0	1535	0
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		1496			911			590			1563	
Travel Time (s)		22.7			13.8			13.4			35.5	
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)	40	1188	1	1	971	9	1	0	1	8	0	32
Shared Lane Traffic (%)												
Lane Group Flow (vph)	40	1189	0	0	981	0	0	2	0	0	40	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 66.3%
 Analysis Period (min) 15
 ICU Level of Service C













Intersection

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Int Delay, s/veh	1.3											
Lane Configurations												
Traffic Vol, veh/h	36	1069	1	1	874	8	1	0	1	7	0	29
Future Vol, veh/h	36	1069	1	1	874	8	1	0	1	7	0	29
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	225	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	40	1188	1	1	971	9	1	0	1	8	0	32

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	980	0	0	1189	0	0	2262	2250	1188	2247	2247	976
Stage 1	-	-	-	-	-	-	1268	1268	-	978	978	-
Stage 2	-	-	-	-	-	-	994	982	-	1269	1269	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	704	-	-	587	-	-	29	42	229	30	42	305
Stage 1	-	-	-	-	-	-	207	240	-	301	329	-
Stage 2	-	-	-	-	-	-	295	327	-	206	239	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	704	-	-	587	-	-	25	39	229	28	39	305
Mov Cap-2 Maneuver	-	-	-	-	-	-	25	39	-	28	39	-
Stage 1	-	-	-	-	-	-	195	226	-	284	328	-
Stage 2	-	-	-	-	-	-	263	326	-	193	225	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0	89.1	59.8
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	45	704	-	-	587	-	-	104
HCM Lane V/C Ratio	0.049	0.057	-	-	0.002	-	-	0.385
HCM Control Delay (s)	89.1	10.4	-	-	11.1	0	-	59.8
HCM Lane LOS	F	B	-	-	B	A	-	F
HCM 95th %tile Q(veh)	0.2	0.2	-	-	0	-	-	1.6

						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1015	73	22	836	38	14
Future Volume (vph)	1015	73	22	836	38	14
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	12	12
Storage Length (ft)		175	175		0	350
Storage Lanes		1	1		1	1
Taper Length (ft)			100		100	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1801	1531	1711	1801	1770	1583
Flt Permitted			0.063		0.950	
Satd. Flow (perm)	1801	1531	113	1801	1770	1583
Right Turn on Red		No				No
Satd. Flow (RTOR)						
Link Speed (mph)	45			45	30	
Link Distance (ft)	911			3670	692	
Travel Time (s)	13.8			55.6	15.7	
Peak Hour Factor	0.90	0.50	0.50	0.90	0.50	0.50
Adj. Flow (vph)	1128	146	44	929	76	28
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1128	146	44	929	76	28
Turn Type	NA	pm+ov	pm+pt	NA	Prot	pm+ov
Protected Phases	6	4	5	2	4	5
Permitted Phases		6	2			4
Detector Phase	6	4	5	2	4	5
Switch Phase						
Minimum Initial (s)	12.0	7.0	7.0	12.0	7.0	7.0
Minimum Split (s)	19.0	14.0	14.0	19.0	14.0	14.0
Total Split (s)	62.0	14.0	14.0	76.0	14.0	14.0
Total Split (%)	68.9%	15.6%	15.6%	84.4%	15.6%	15.6%
Maximum Green (s)	55.0	7.0	7.0	69.0	7.0	7.0
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag		Lead			Lead
Lead-Lag Optimize?	Yes		Yes			Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	Min	None	None	Min	None	None
Act Effct Green (s)	58.2	73.3	69.2	69.2	9.0	23.0
Actuated g/C Ratio	0.66	0.83	0.78	0.78	0.10	0.26
v/c Ratio	0.95	0.11	0.18	0.66	0.42	0.07
Control Delay	33.5	2.3	3.6	6.9	45.8	26.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.5	2.3	3.6	6.9	45.8	26.1
LOS	C	A	A	A	D	C
Approach Delay	29.9			6.8	40.5	

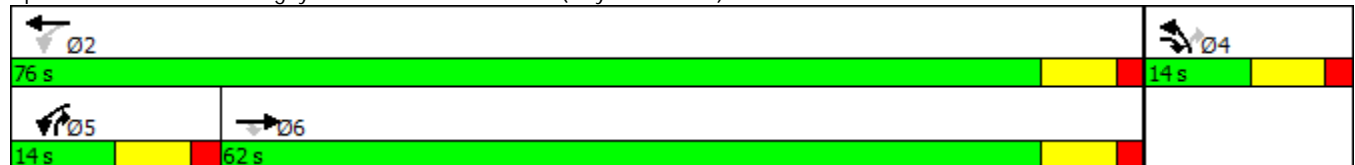
Lane Group	→ EBT	↘ EBR	↙ WBL	← WBT	↖ NBL	↗ NBR
Approach LOS	C			A		D
Queue Length 50th (ft)	568	15	4	174	41	12
Queue Length 95th (ft)	#907	13	5	269	46	18
Internal Link Dist (ft)	831			3590		612
Turn Bay Length (ft)	175		175		350	
Base Capacity (vph)	1188	1272	251	1452	181	413
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.95	0.11	0.18	0.64	0.42	0.07

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 88.2
 Natural Cycle: 90
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.95
 Intersection Signal Delay: 20.8
 Intersection Capacity Utilization 67.6%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Intersection LOS: C
 ICU Level of Service C

Splits and Phases: 8: Rugby Middle School & NC 191 (Haywood Road)



R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2040 AM
09/20/2017

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	169	877	3	2	708	118	4	5	5	112	2	129
Future Volume (vph)	169	877	3	2	708	118	4	5	5	112	2	129
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	12
Storage Length (ft)	125		0	125		0	0		0	0		150
Storage Lanes	1		0	1		0	0		0	0		1
Taper Length (ft)	100			100			100			100		
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					0.979			0.949				0.850
Flt Protected	0.950			0.950				0.988			0.953	
Satd. Flow (prot)	1711	1801	0	1711	1763	0	0	1747	0	0	1775	1583
Flt Permitted	0.073			0.212				0.988			0.953	
Satd. Flow (perm)	131	1801	0	382	1763	0	0	1747	0	0	1775	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			25			35	
Link Distance (ft)		3670			2566			1006			2428	
Travel Time (s)		55.6			38.9			27.4			47.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	188	974	3	2	787	131	4	6	6	124	2	143
Shared Lane Traffic (%)												
Lane Group Flow (vph)	188	977	0	2	918	0	0	16	0	0	126	143
Turn Type	pm+pt	NA		Perm	NA		Split	NA		Split	NA	pm+ov
Protected Phases	1	6			2		4	4		3	3	1
Permitted Phases	6			2								3
Detector Phase	1	6		2	2		4	4		3	3	1
Switch Phase												
Minimum Initial (s)	7.0	12.0		12.0	12.0		7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	14.0	19.0		19.0	19.0		14.0	14.0		14.0	14.0	14.0
Total Split (s)	14.0	89.0		75.0	75.0		14.0	14.0		17.0	17.0	14.0
Total Split (%)	11.7%	74.2%		62.5%	62.5%		11.7%	11.7%		14.2%	14.2%	11.7%
Maximum Green (s)	7.0	82.0		68.0	68.0		7.0	7.0		10.0	10.0	7.0
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0			-2.0			-2.0	-2.0
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	5.0
Lead/Lag	Lead			Lag	Lag		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	1.0	6.0		6.0	6.0		1.0	1.0		2.0	2.0	1.0
Minimum Gap (s)	0.2	3.0		3.0	3.0		0.2	0.2		0.2	0.2	0.2
Time Before Reduce (s)	0.0	20.0		20.0	20.0		0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	30.0		30.0	30.0		0.0	0.0		0.0	0.0	0.0
Recall Mode	None	Min		Min	Min		None	None		None	None	None
Act Effect Green (s)	69.9	69.9		55.3	55.3			9.4			11.7	24.7
Actuated g/C Ratio	0.72	0.72		0.57	0.57			0.10			0.12	0.26
v/c Ratio	0.76	0.75		0.01	0.91			0.09			0.59	0.35
Control Delay	40.9	13.7		10.5	33.4			50.4			57.6	31.4
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	0.0

R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2040 AM
09/20/2017

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	40.9	13.7		10.5	33.4			50.4			57.6	31.4
LOS	D	B		B	C			D			E	C
Approach Delay		18.1			33.3			50.4			43.6	
Approach LOS		B			C			D			D	
Queue Length 50th (ft)	50	238		0	399			9			69	65
Queue Length 95th (ft)	#217	638		4	#899			35			#186	136
Internal Link Dist (ft)		3590			2486			926			2348	
Turn Bay Length (ft)	125			125								150
Base Capacity (vph)	248	1556		288	1332			170			230	405
Starvation Cap Reductn	0	0		0	0			0			0	0
Spillback Cap Reductn	0	0		0	0			0			0	0
Storage Cap Reductn	0	0		0	0			0			0	0
Reduced v/c Ratio	0.76	0.63		0.01	0.69			0.09			0.55	0.35

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 96.6
 Natural Cycle: 90
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.91
 Intersection Signal Delay: 27.1
 Intersection Capacity Utilization 81.8%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Intersection LOS: C
 ICU Level of Service D

Splits and Phases: 9: SR 1444 (Leverette Drive)/SR 1381 (Mountain Road) & NC 191 (Haywood Road)



R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2040 PM
09/20/2017

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	31	5	62	44	582	4	699	35	501	1052	107
Future Volume (vph)	90	31	5	62	44	582	4	699	35	501	1052	107
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	11	11	11	12	12	12	12	12	12
Storage Length (ft)	0		75	0		600	150		0	150		50
Storage Lanes	0		1	0		1	1		0	1		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00
Fr			0.850			0.850		0.993				0.850
Flt Protected		0.964			0.972		0.950			0.950		
Satd. Flow (prot)	0	1796	1583	0	1750	1531	1770	3514	0	1770	3539	1583
Flt Permitted		0.964			0.972		0.242			0.950		
Satd. Flow (perm)	0	1796	1583	0	1750	1531	451	3514	0	1770	3539	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		20			45			45			45	
Link Distance (ft)		280			1846			3351			3356	
Travel Time (s)		9.5			28.0			50.8			50.8	
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)	100	34	6	69	49	647	4	777	39	557	1169	119
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	134	6	0	118	647	4	816	0	557	1169	119
Turn Type	Split	NA	pm+ov	Split	NA	pm+ov	pm+pt	NA		Prot	NA	Perm
Protected Phases	3	3	5	4	4	1	5	2		1	6	
Permitted Phases			3			4	2					6
Detector Phase	3	3	5	4	4	1	5	2		1	6	6
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	14.0		7.0	14.0	14.0
Minimum Split (s)	24.1	24.1	14.4	24.2	24.2	14.4	14.4	25.8		14.4	25.8	25.8
Total Split (s)	24.1	24.1	14.4	24.2	24.2	46.0	14.4	35.7		46.0	67.3	67.3
Total Split (%)	18.5%	18.5%	11.1%	18.6%	18.6%	35.4%	11.1%	27.5%		35.4%	51.8%	51.8%
Maximum Green (s)	17.1	17.1	7.4	17.2	17.2	39.0	7.4	28.7		39.0	60.3	60.3
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)		-2.0	-2.0		-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	-2.0
Total Lost Time (s)		5.0	5.0		5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lead	Lag		Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	6.0		2.0	6.0	6.0
Minimum Gap (s)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	3.4		0.2	3.4	3.4
Time Before Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.0		0.0	15.0	15.0
Time To Reduce (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.0		0.0	30.0	30.0
Recall Mode	None	None	None	None	None	None	None	Min		None	Min	Min
Act Effct Green (s)		14.9	24.0		14.3	60.5	39.5	30.5		41.1	71.3	71.3
Actuated g/C Ratio		0.12	0.20		0.12	0.50	0.33	0.25		0.34	0.59	0.59
v/c Ratio		0.61	0.02		0.57	0.85	0.02	0.92		0.93	0.56	0.13
Control Delay		62.8	24.0		62.3	38.8	16.0	61.4		62.3	18.9	14.6
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	0.0

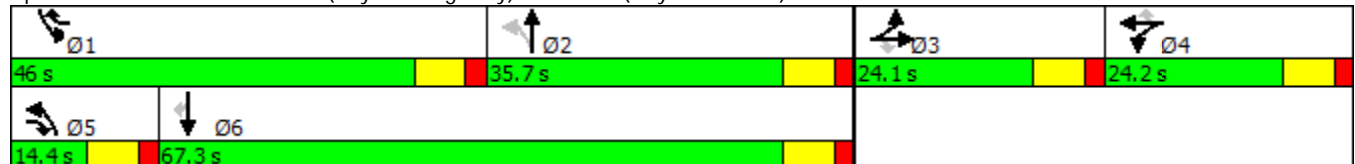
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay		62.8	24.0		62.3	38.8	16.0	61.4		62.3	18.9	14.6
LOS		E	C		E	D	B	E		E	B	B
Approach Delay		61.2			42.4			61.2			31.7	
Approach LOS		E			D			E			C	
Queue Length 50th (ft)		101	3		89	429	1	329		421	248	35
Queue Length 95th (ft)		174	11		156	#671	6	#499		#711	471	93
Internal Link Dist (ft)		200			1766			3271			3276	
Turn Bay Length (ft)			75			600	150			150		50
Base Capacity (vph)		284	319		279	765	251	895		602	2088	934
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		0.47	0.02		0.42	0.85	0.02	0.91		0.93	0.56	0.13

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 120.9
 Natural Cycle: 130
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.93
 Intersection Signal Delay: 41.9
 Intersection Capacity Utilization 75.6%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.



















Intersection LOS: D
 ICU Level of Service D

Splits and Phases: 1: NC 280 (Boylston Highway) & NC 191 (Haywood Road)



R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2040 PM
09/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	408	173	25	522	4	151	10	17	4	8	4
Future Volume (vph)	4	408	173	25	522	4	151	10	17	4	8	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	12	12	12	10	10	10	12	12	12
Storage Length (ft)	0		100	0		0	100		0	0		0
Storage Lanes	0		1	0		0	1		0	0		0
Taper Length (ft)	100			100			100			100		
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		0.999			0.905			0.968	
Flt Protected					0.998		0.950				0.988	
Satd. Flow (prot)	0	1801	1531	0	1857	0	1652	1573	0	0	1781	0
Flt Permitted					0.998		0.950				0.988	
Satd. Flow (perm)	0	1801	1531	0	1857	0	1652	1573	0	0	1781	0
Link Speed (mph)		45			45			45			30	
Link Distance (ft)		1846			5456			1563			408	
Travel Time (s)		28.0			82.7			23.7			9.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	4	453	192	28	580	4	168	11	19	4	9	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	457	192	0	612	0	168	30	0	0	17	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 69.8%
 Analysis Period (min) 15
 ICU Level of Service C

Intersection

Int Delay, s/veh	13.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↕		↖	↗			↕	
Traffic Vol, veh/h	4	408	173	25	522	4	151	10	17	4	8	4
Future Vol, veh/h	4	408	173	25	522	4	151	10	17	4	8	4
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	100	-	-	-	100	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	453	192	28	580	4	168	11	19	4	9	4

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	584	0	0	453	0	0	1106	1102	453	1115	1100	582
Stage 1	-	-	-	-	-	-	462	462	-	638	638	-
Stage 2	-	-	-	-	-	-	644	640	-	477	462	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	991	-	-	1108	-	-	188	212	607	185	212	513
Stage 1	-	-	-	-	-	-	580	565	-	465	471	-
Stage 2	-	-	-	-	-	-	461	470	-	569	565	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	991	-	-	1108	-	-	174	203	607	166	203	513
Mov Cap-2 Maneuver	-	-	-	-	-	-	174	203	-	166	203	-
Stage 1	-	-	-	-	-	-	576	561	-	462	454	-
Stage 2	-	-	-	-	-	-	431	453	-	537	561	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.1	0.4	98.1	22.5
HCM LOS			F	C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	174	349	991	-	-	1108	-	-	224
HCM Lane V/C Ratio	0.964	0.086	0.004	-	-	0.025	-	-	0.079
HCM Control Delay (s)	112.7	16.3	8.6	0	-	8.3	0	-	22.5
HCM Lane LOS	F	C	A	A	-	A	A	-	C
HCM 95th %tile Q(veh)	7.6	0.3	0	-	-	0.1	-	-	0.3

R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2040 PM
09/20/2017

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	348	91	463	434	1	91	0	371	2	0	2
Future Volume (vph)	1	348	91	463	434	1	91	0	371	2	0	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	12
Storage Length (ft)	150		0	250		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
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
Fr		0.969						0.892			0.932	
Flt Protected	0.950			0.950				0.990			0.976	
Satd. Flow (prot)	1711	1745	0	1711	1801	0	0	1645	0	0	1694	0
Flt Permitted	0.488			0.112				0.932			0.868	
Satd. Flow (perm)	879	1745	0	202	1801	0	0	1549	0	0	1507	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			45				25
Link Distance (ft)		5456			7476			1256				553
Travel Time (s)		82.7			113.3			19.0				15.1
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)	1	387	101	514	482	1	101	0	412	2	0	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	488	0	514	483	0	0	513	0	0	4	0
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			8			4	
Permitted Phases	2			6			8			4		
Detector Phase	2	2		1	6		8	8		4	4	
Switch Phase												
Minimum Initial (s)	12.0	12.0		7.0	12.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	19.0	19.0		14.6	19.0		14.0	14.0		14.0	14.0	
Total Split (s)	37.8	37.8		32.2	70.0		40.0	40.0		40.0	40.0	
Total Split (%)	34.4%	34.4%		29.3%	63.6%		36.4%	36.4%		36.4%	36.4%	
Maximum Green (s)	30.8	30.8		25.2	63.0		33.0	33.0		33.0	33.0	
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0			-2.0			-2.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	6.0	6.0		1.0	6.0		1.0	1.0		1.0	1.0	
Minimum Gap (s)	3.0	3.0		0.2	3.0		0.2	0.2		0.2	0.2	
Time Before Reduce (s)	15.0	15.0		0.0	15.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	30.0	30.0		0.0	30.0		0.0	0.0		0.0	0.0	
Recall Mode	Min	Min		None	Min		None	None		None	None	
Act Effect Green (s)	32.3	32.3		64.5	64.5			35.0			35.0	
Actuated g/C Ratio	0.29	0.29		0.59	0.59			0.32			0.32	
v/c Ratio	0.00	0.95		1.04	0.46			1.04			0.01	
Control Delay	27.0	67.6		82.9	14.3			88.1			25.8	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	27.0	67.6		82.9	14.3			88.1			25.8	
LOS	C	E		F	B			F			C	
Approach Delay		67.5			49.7			88.1			25.8	
Approach LOS		E			D			F			C	
Queue Length 50th (ft)	1	335		~342	179			~393			2	
Queue Length 95th (ft)	5	#539		#552	257			#599			10	
Internal Link Dist (ft)		5376			7396			1176			473	
Turn Bay Length (ft)	150			250								
Base Capacity (vph)	263	522		493	1069			494			481	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.00	0.93		1.04	0.45			1.04			0.01	

Intersection Summary

Area Type: Other
 Cycle Length: 110
 Actuated Cycle Length: 109.5
 Natural Cycle: 110
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 1.04
 Intersection Signal Delay: 63.8
 Intersection Capacity Utilization 91.0%
 Analysis Period (min) 15
 Intersection LOS: E
 ICU Level of Service E

~ 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: SR 1426 (School House Road)/Water Treatment & NC 191 (Haywood Road)



R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2040 PM
09/20/2017

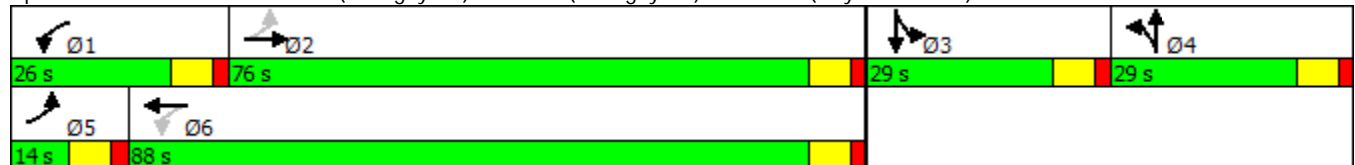
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	69	588	92	275	719	143	62	100	150	141	179	83
Future Volume (vph)	69	588	92	275	719	143	62	100	150	141	179	83
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	12
Storage Length (ft)	150		0	125		0	100		0	125		0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	100			100			100			100		
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		0.980			0.975			0.910			0.953	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1711	1765	0	1711	1756	0	1770	1695	0	1770	1775	0
Flt Permitted	0.056			0.058			0.950			0.950		
Satd. Flow (perm)	101	1765	0	104	1756	0	1770	1695	0	1770	1775	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			35			45	
Link Distance (ft)		7476			1829			1358			1857	
Travel Time (s)		113.3			27.7			26.5			28.1	
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)	77	653	102	306	799	159	69	111	167	157	199	92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	77	755	0	306	958	0	69	278	0	157	291	0
Turn Type	pm+pt	NA		pm+pt	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases	2			6								
Detector Phase	5	2		1	6		4	4		3	3	
Switch Phase												
Minimum Initial (s)	7.0	12.0		7.0	12.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	14.0	19.0		14.0	19.0		14.0	14.0		14.0	14.0	
Total Split (s)	14.0	76.0		26.0	88.0		29.0	29.0		29.0	29.0	
Total Split (%)	8.8%	47.5%		16.3%	55.0%		18.1%	18.1%		18.1%	18.1%	
Maximum Green (s)	7.0	69.0		19.0	81.0		22.0	22.0		22.0	22.0	
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0		-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lag	Lag		Lead	Lead	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	1.0	6.0		1.0	6.0		1.0	1.0		1.0	1.0	
Minimum Gap (s)	3.0	3.0		0.2	0.2		0.2	0.2		0.2	0.2	
Time Before Reduce (s)	0.0	15.0		0.0	15.0		0.0	0.0		0.0	0.0	
Time To Reduce (s)	0.0	30.0		0.0	30.0		0.0	0.0		0.0	0.0	
Recall Mode	None	Min		None	Min		None	None		None	None	
Act Effect Green (s)	80.0	71.0		97.0	83.0		24.0	24.0		24.0	24.0	
Actuated g/C Ratio	0.50	0.44		0.61	0.52		0.15	0.15		0.15	0.15	
v/c Ratio	0.55	0.96		1.12	1.05		0.26	1.09		0.59	1.09	
Control Delay	41.2	67.6		135.1	81.9		63.1	144.5		73.5	143.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	












Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	41.2	67.6		135.1	81.9		63.1	144.5		73.5	143.1	
LOS	D	E		F	F		E	F		E	F	
Approach Delay		65.2			94.8			128.3				118.7
Approach LOS		E			F			F				F
Queue Length 50th (ft)	32	761		~312	~1089		65	~327		156	~342	
Queue Length 95th (ft)	89	#1041		#514	#1354		117	#520		239	#539	
Internal Link Dist (ft)		7396			1749			1278			1777	
Turn Bay Length (ft)	150			125			100			125		
Base Capacity (vph)	141	783		273	910		265	254		265	266	
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	0.55	0.96		1.12	1.05		0.26	1.09		0.59	1.09	

Intersection Summary

Area Type: Other
 Cycle Length: 160
 Actuated Cycle Length: 160
 Natural Cycle: 160
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 1.12
 Intersection Signal Delay: 94.0
 Intersection Capacity Utilization 91.3%
 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: 4: SR 1309 (S Rugby Rd)/SR 1365 (N Rugby Rd) & NC 191 (Haywood Road)



						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	884	28	70	1076	18	36
Future Volume (vph)	884	28	70	1076	18	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	10	10
Storage Length (ft)		0	225		0	100
Storage Lanes		0	1		1	1
Taper Length (ft)			25		100	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.996					0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1793	0	1711	1801	1652	1478
Flt Permitted			0.950		0.950	
Satd. Flow (perm)	1793	0	1711	1801	1652	1478
Link Speed (mph)	45			45	25	
Link Distance (ft)	1829			653	1295	
Travel Time (s)	27.7			9.9	35.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	982	31	78	1196	20	40
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1013	0	78	1196	20	40
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other
Control Type: Unsignalized
Intersection Capacity Utilization 66.6% ICU Level of Service C
Analysis Period (min) 15

Intersection

Int Delay, s/veh 2.4

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	884	28	70	1076	18	36
Future Vol, veh/h	884	28	70	1076	18	36
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Stop
Storage Length	-	-	225	-	0	100
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	982	31	78	1196	20	40





















Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	998
Stage 1	-	-	998
Stage 2	-	-	1351
Critical Hdwy	-	4.12	6.22
Critical Hdwy Stg 1	-	-	5.42
Critical Hdwy Stg 2	-	-	5.42
Follow-up Hdwy	-	2.218	3.318
Pot Cap-1 Maneuver	-	684	296
Stage 1	-	-	357
Stage 2	-	-	241
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	684	296
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	357
Stage 2	-	-	214

Approach	EB	WB	NB
HCM Control Delay, s	0	0.7	79.6
HCM LOS			F

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	35	296	-	-	684	-
HCM Lane V/C Ratio	0.571	0.135	-	-	0.114	-
HCM Control Delay (s)	200.5	19.1	-	-	10.9	-
HCM Lane LOS	F	C	-	-	B	-
HCM 95th %tile Q(veh)	2	0.5	-	-	0.4	-

R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2040 PM
09/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	53	855	8	18	1042	30	8	0	14	47	0	102
Future Volume (vph)	53	855	8	18	1042	30	8	0	14	47	0	102
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	12
Storage Length (ft)	350		0	225		225	0		0	0		300
Storage Lanes	1		0	1		1	0		0	0		1
Taper Length (ft)	25			100			100			100		
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		0.999				0.850		0.914				0.850
Flt Protected	0.950			0.950				0.982			0.950	
Satd. Flow (prot)	1711	1799	0	1711	1801	1531	0	1672	0	0	1770	1583
Flt Permitted	0.042			0.272				0.982			0.950	
Satd. Flow (perm)	76	1799	0	490	1801	1531	0	1672	0	0	1770	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		55			55			25			25	
Link Distance (ft)		653			1496			862			788	
Travel Time (s)		8.1			18.5			23.5			21.5	
Peak Hour Factor	0.50	0.90	0.90	0.90	0.90	0.50	0.90	0.50	0.90	0.50	0.50	0.50
Adj. Flow (vph)	106	950	9	20	1158	60	9	0	16	94	0	204
Shared Lane Traffic (%)												
Lane Group Flow (vph)	106	959	0	20	1158	60	0	25	0	0	94	204
Turn Type	pm+pt	NA		Perm	NA	pm+ov	Split	NA		Split	NA	pm+ov
Protected Phases	1	6			2	4	3	3		4	4	1
Permitted Phases	6			2		2						4
Detector Phase	1	6		2	2	4	3	3		4	4	1
Switch Phase												
Minimum Initial (s)	10.0	14.0		14.0	14.0	7.0	7.0	7.0		7.0	7.0	10.0
Minimum Split (s)	17.6	21.0		21.0	21.0	14.0	14.0	14.0		14.0	14.0	17.6
Total Split (s)	17.6	112.0		94.4	94.4	14.0	14.0	14.0		14.0	14.0	17.6
Total Split (%)	12.6%	80.0%		67.4%	67.4%	10.0%	10.0%	10.0%		10.0%	10.0%	12.6%
Maximum Green (s)	10.6	105.0		87.4	87.4	7.0	7.0	7.0		7.0	7.0	10.6
Yellow Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0	-2.0		-2.0			-2.0	-2.0
Total Lost Time (s)	5.0	5.0		5.0	5.0	5.0		5.0			5.0	5.0
Lead/Lag	Lead			Lag	Lag	Lag	Lead	Lead		Lag	Lag	Lead
Lead-Lag Optimize?	Yes			Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	2.0	6.0		6.0	6.0	2.0	2.0	2.0		2.0	2.0	2.0
Minimum Gap (s)	0.2	3.0		3.0	3.0	0.2	0.2	0.2		0.2	0.2	0.2
Time Before Reduce (s)	0.0	15.0		15.0	15.0	0.0	0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	30.0		30.0	30.0	0.0	0.0	0.0		0.0	0.0	0.0
Recall Mode	None	Min		Min	Min	None	None	None		None	None	None
Act Effect Green (s)	107.1	107.1		89.7	89.7	100.9		9.0			9.0	26.4
Actuated g/C Ratio	0.80	0.80		0.67	0.67	0.75		0.07			0.07	0.20
v/c Ratio	0.50	0.67		0.06	0.96	0.05		0.22			0.79	0.66
Control Delay	32.3	9.7		9.9	41.0	3.2		66.8			103.2	62.0
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0			0.0	0.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	32.3	9.7		9.9	41.0	3.2		66.8			103.2	62.0
LOS	C	A		A	D	A		E			F	E
Approach Delay		12.0			38.7			66.8			75.0	
Approach LOS		B			D			E			E	
Queue Length 50th (ft)	42	385		6	~1026	7		22			86	175
Queue Length 95th (ft)	33	526		18	#1366	8		30			80	135
Internal Link Dist (ft)		573			1416			782			708	
Turn Bay Length (ft)	350			225		225						300
Base Capacity (vph)	214	1438		327	1203	1150		112			119	314
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	0.50	0.67		0.06	0.96	0.05		0.22			0.79	0.65

Intersection Summary


















Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 134.2
 Natural Cycle: 140
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.96
 Intersection Signal Delay: 32.2
 Intersection Capacity Utilization 81.5%
 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: 6: Alpine Dr/West Henderson High School & NC 191 (Haywood Road)

17.6 s	94.4 s	14 s	14 s
112 s			

R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2040 PM
09/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	874	1	1	1069	8	1	0	1	8	0	35
Future Volume (vph)	28	874	1	1	1069	8	1	0	1	8	0	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	10	10	10	10	10	10
Storage Length (ft)	225		0	0		0	0		0	0		0
Storage Lanes	1		0	0		0	0		0	0		0
Taper Length (ft)	100			100			100			100		
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					0.999			0.932			0.890	
Flt Protected	0.950							0.976			0.991	
Satd. Flow (prot)	1711	1801	0	0	1799	0	0	1581	0	0	1533	0
Flt Permitted	0.950							0.976			0.991	
Satd. Flow (perm)	1711	1801	0	0	1799	0	0	1581	0	0	1533	0
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		1496			911			590			1563	
Travel Time (s)		22.7			13.8			13.4			35.5	
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)	31	971	1	1	1188	9	1	0	1	9	0	39
Shared Lane Traffic (%)												
Lane Group Flow (vph)	31	972	0	0	1198	0	0	2	0	0	48	0
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 67.5% ICU Level of Service C
 Analysis Period (min) 15













Intersection

Int Delay, s/veh	1.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	28	874	1	1	1069	8	1	0	1	8	0	35
Future Vol, veh/h	28	874	1	1	1069	8	1	0	1	8	0	35
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	225	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	31	971	1	1	1188	9	1	0	1	9	0	39

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1197	0	0	972	0	0	2248	2233	972	2228	2228	1192
Stage 1	-	-	-	-	-	-	1034	1034	-	1194	1194	-
Stage 2	-	-	-	-	-	-	1214	1199	-	1034	1034	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	583	-	-	709	-	-	30	43	306	31	43	228
Stage 1	-	-	-	-	-	-	280	309	-	228	260	-
Stage 2	-	-	-	-	-	-	222	259	-	280	309	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	583	-	-	709	-	-	24	41	306	30	41	228
Mov Cap-2 Maneuver	-	-	-	-	-	-	24	41	-	30	41	-
Stage 1	-	-	-	-	-	-	265	293	-	216	259	-
Stage 2	-	-	-	-	-	-	183	258	-	264	293	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.4	0	89.1	68.2
HCM LOS			F	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	45	583	-	-	709	-	-	102
HCM Lane V/C Ratio	0.049	0.053	-	-	0.002	-	-	0.468
HCM Control Delay (s)	89.1	11.5	-	-	10.1	0	-	68.2
HCM Lane LOS	F	B	-	-	B	A	-	F
HCM 95th %tile Q(veh)	0.2	0.2	-	-	0	-	-	2

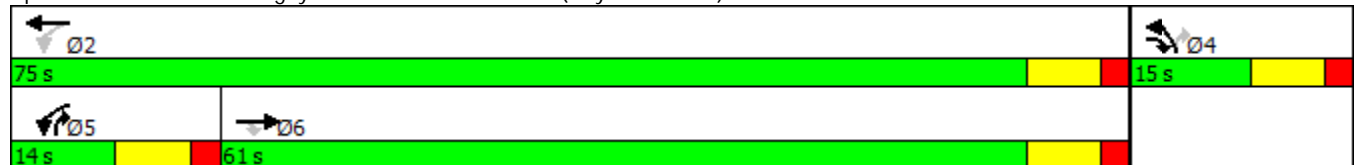
						
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	835	37	14	1016	72	23
Future Volume (vph)	835	37	14	1016	72	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	12	12
Storage Length (ft)		175	175		0	350
Storage Lanes		1	1		1	1
Taper Length (ft)			100		100	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Fr _t		0.850				0.850
Flt Protected			0.950		0.950	
Satd. Flow (prot)	1801	1531	1711	1801	1770	1583
Flt Permitted			0.123		0.950	
Satd. Flow (perm)	1801	1531	221	1801	1770	1583
Right Turn on Red		No				No
Satd. Flow (RTOR)						
Link Speed (mph)	45			45	30	
Link Distance (ft)	911			3670	692	
Travel Time (s)	13.8			55.6	15.7	
Peak Hour Factor	0.90	0.50	0.50	0.90	0.50	0.50
Adj. Flow (vph)	928	74	28	1129	144	46
Shared Lane Traffic (%)						
Lane Group Flow (vph)	928	74	28	1129	144	46
Turn Type	NA	pm+ov	pm+pt	NA	Prot	pm+ov
Protected Phases	6	4	5	2	4	5
Permitted Phases		6	2			4
Detector Phase	6	4	5	2	4	5
Switch Phase						
Minimum Initial (s)	12.0	7.0	7.0	12.0	7.0	7.0
Minimum Split (s)	19.0	14.0	14.0	19.0	14.0	14.0
Total Split (s)	61.0	15.0	14.0	75.0	15.0	14.0
Total Split (%)	67.8%	16.7%	15.6%	83.3%	16.7%	15.6%
Maximum Green (s)	54.0	8.0	7.0	68.0	8.0	7.0
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag		Lead			Lead
Lead-Lag Optimize?	Yes		Yes			Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	Min	None	None	Min	None	None
Act Effct Green (s)	48.0	65.8	55.3	55.3	10.1	24.6
Actuated g/C Ratio	0.63	0.87	0.73	0.73	0.13	0.32
v/c Ratio	0.81	0.06	0.08	0.86	0.61	0.09
Control Delay	19.4	2.1	2.9	15.1	47.9	23.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.4	2.1	2.9	15.1	47.9	23.7
LOS	B	A	A	B	D	C
Approach Delay	18.2			14.8	42.1	

Lane Group	→ EBT	↘ EBR	↙ WBL	← WBT	↖ NBL	↗ NBR
Approach LOS	B			B	D	
Queue Length 50th (ft)	373	7	3	295	70	17
Queue Length 95th (ft)	#579	8	4	497	75	26
Internal Link Dist (ft)	831			3590	612	
Turn Bay Length (ft)		175	175			350
Base Capacity (vph)	1380	1309	344	1593	242	514
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.06	0.08	0.71	0.60	0.09

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 75.8
 Natural Cycle: 75
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.86
 Intersection Signal Delay: 18.4
 Intersection Capacity Utilization 67.6%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 8: Rugby Middle School & NC 191 (Haywood Road)



R-2588B: NC 191 Widening
Lanes, Volumes, Timings

No-Build 2040 PM
09/20/2017

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	129	708	4	5	877	112	3	2	2	118	5	169
Future Volume (vph)	129	708	4	5	877	112	3	2	2	118	5	169
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	11	11	11	11	12	12	12	12	12	12
Storage Length (ft)	125		0	125		0	0		0	0		150
Storage Lanes	1		0	1		0	0		0	0		1
Taper Length (ft)	100			100			100			100		
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		0.999			0.983			0.961				0.850
Flt Protected	0.950			0.950				0.979			0.954	
Satd. Flow (prot)	1711	1799	0	1711	1770	0	0	1753	0	0	1777	1583
Flt Permitted	0.051			0.354				0.979			0.954	
Satd. Flow (perm)	92	1799	0	637	1770	0	0	1753	0	0	1777	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			25			35	
Link Distance (ft)		3670			2566			1006			2428	
Travel Time (s)		55.6			38.9			27.4			47.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	143	787	4	6	974	124	3	2	2	131	6	188
Shared Lane Traffic (%)												
Lane Group Flow (vph)	143	791	0	6	1098	0	0	7	0	0	137	188
Turn Type	pm+pt	NA		Perm	NA		Split	NA		Split	NA	pm+ov
Protected Phases	1	6			2		4	4		3	3	1
Permitted Phases	6			2								3
Detector Phase	1	6		2	2		4	4		3	3	1
Switch Phase												
Minimum Initial (s)	7.0	12.0		12.0	12.0		7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	14.0	19.0		19.0	19.0		14.0	14.0		14.0	14.0	14.0
Total Split (s)	14.0	92.0		78.0	78.0		14.0	14.0		14.0	14.0	14.0
Total Split (%)	11.7%	76.7%		65.0%	65.0%		11.7%	11.7%		11.7%	11.7%	11.7%
Maximum Green (s)	7.0	85.0		71.0	71.0		7.0	7.0		7.0	7.0	7.0
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0			-2.0			-2.0	-2.0
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	5.0
Lead/Lag	Lead			Lag	Lag		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	1.0	6.0		6.0	6.0		1.0	1.0		2.0	2.0	1.0
Minimum Gap (s)	0.2	3.0		3.0	3.0		0.2	0.2		0.2	0.2	0.2
Time Before Reduce (s)	0.0	20.0		20.0	20.0		0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	30.0		30.0	30.0		0.0	0.0		0.0	0.0	0.0
Recall Mode	None	Min		Min	Min		None	None		None	None	None
Act Effect Green (s)	87.2	87.2		73.2	73.2			9.0			9.0	22.2
Actuated g/C Ratio	0.80	0.80		0.67	0.67			0.08			0.08	0.20
v/c Ratio	0.69	0.55		0.01	0.92			0.05			0.93	0.58
Control Delay	39.8	6.2		7.6	30.4			49.3			109.8	46.6
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	0.0

Lane Group												
Total Delay	39.8	6.2		7.6	30.4			49.3			109.8	46.6
LOS	D	A		A	C			D			F	D
Approach Delay		11.4			30.3			49.3			73.3	
Approach LOS		B			C			D			E	
Queue Length 50th (ft)	44	128		1	543			4			94	114
Queue Length 95th (ft)	#164	370		7	#1158			21			#244	#224
Internal Link Dist (ft)		3590			2486			926			2348	
Turn Bay Length (ft)	125			125								150
Base Capacity (vph)	207	1442		428	1190			145			147	322
Starvation Cap Reductn	0	0		0	0			0			0	0
Spillback Cap Reductn	0	0		0	0			0			0	0
Storage Cap Reductn	0	0		0	0			0			0	0
Reduced v/c Ratio	0.69	0.55		0.01	0.92			0.05			0.93	0.58

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 108.8
 Natural Cycle: 120
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.93
 Intersection Signal Delay: 28.8
 Intersection Capacity Utilization 86.0%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.






















Intersection LOS: C
 ICU Level of Service E

Splits and Phases: 9: SR 1444 (Leverette Drive)/SR 1381 (Mountain Road) & NC 191 (Haywood Road)



R-2588B: NC 191 Widening
Lanes, Volumes, Timings

Build 2040 AM
09/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	106	45	4	49	32	539	5	1052	84	619	699	88
Future Volume (vph)	106	45	4	49	32	539	5	1052	84	619	699	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		75	0		350	150		0	350		0
Storage Lanes	0		1	0		1	1		0	2		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	0.88	1.00	0.95	0.95	0.97	0.95	0.95
Frt			0.850			0.850		0.989			0.983	
Flt Protected		0.966			0.971		0.950			0.950		
Satd. Flow (prot)	0	1799	1583	0	1809	2787	1770	3500	0	3433	3479	0
Flt Permitted		0.966			0.971		0.324			0.950		
Satd. Flow (perm)	0	1799	1583	0	1809	2787	604	3500	0	3433	3479	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		20			45			45			45	
Link Distance (ft)		572			1846			3351			3356	
Travel Time (s)		19.5			28.0			50.8			50.8	
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	50	4	54	36	599	6	1169	93	688	777	98
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	168	4	0	90	599	6	1262	0	688	875	0
Turn Type	Split	NA	Perm	Split	NA	pm+ov	pm+pt	NA		Prot	NA	
Protected Phases	3	3		4	4	1	5	2		1	6	
Permitted Phases			3			4	2					
Detector Phase	3	3	3	4	4	1	5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	14.0		7.0	14.0	
Minimum Split (s)	24.1	24.1	24.1	24.2	24.2	14.4	14.4	25.8		14.4	25.8	
Total Split (s)	24.1	24.1	24.1	24.2	24.2	30.8	14.4	50.9		30.8	67.3	
Total Split (%)	18.5%	18.5%	18.5%	18.6%	18.6%	23.7%	11.1%	39.2%		23.7%	51.8%	
Maximum Green (s)	17.1	17.1	17.1	17.2	17.2	23.8	7.4	43.9		23.8	60.3	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-2.0	-2.0			-2.0	-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)		5.0	5.0			5.0	5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	6.0		2.0	6.0	
Minimum Gap (s)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	3.4		0.2	3.4	
Time Before Reduce (s)	0.0	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	0.0	30.0		0.0	30.0	
Recall Mode	None	None	None	None	None	None	None	Min		None	Min	
Act Effect Green (s)		16.3	16.3			12.6	43.5	55.0		25.8	74.2	
Actuated g/C Ratio		0.13	0.13			0.10	0.36	0.46		0.21	0.61	
v/c Ratio		0.69	0.02			0.48	0.60	0.02		0.94	0.41	
Control Delay		65.8	46.2			60.1	34.7	11.8		68.5	14.3	
Queue Delay		0.0	0.0			0.0	0.0	0.0		0.0	0.0	
Total Delay		65.8	46.2			60.1	34.7	11.8		68.5	14.3	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		E	D		E	C	B	D		E	B	
Approach Delay		65.3			38.0			51.9			38.1	
Approach LOS		E			D			D			D	
Queue Length 50th (ft)		126	3		68	218	2	503		276	166	
Queue Length 95th (ft)		210	14		124	289	8	#714		#425	312	
Internal Link Dist (ft)		492			1766			3271			3276	
Turn Bay Length (ft)			75			350	150			350		
Base Capacity (vph)		285	250		288	1003	367	1332		734	2137	
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		0.59	0.02		0.31	0.60	0.02	0.95		0.94	0.41	

Intersection Summary

Area Type: Other
 Cycle Length: 130
 Actuated Cycle Length: 120.8
 Natural Cycle: 130
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.95
 Intersection Signal Delay: 44.1
 Intersection Capacity Utilization 76.8%
 Analysis Period (min) 15
 Intersection LOS: D
 ICU Level of Service D
























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

Splits and Phases: 1: NC 280 (Boylston Highway) & NC 191 (Haywood Road)

Ø1	Ø2	Ø3	Ø4
30.8 s	50.9 s	24.1 s	24.2 s
Ø5	Ø6		
14.4 s	67.3 s		

R-2588B: NC 191 Widening
Lanes, Volumes, Timings

Build 2040 AM
09/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 						 	
Traffic Volume (vph)	4	580	154	17	454	4	177	8	25	4	10	4
Future Volume (vph)	4	580	154	17	454	4	177	8	25	4	10	4
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		175	150		0	150		0	0		0
Storage Lanes	1		1	1		0	1		0	0		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.999			0.886			0.972	
Flt Protected	0.950			0.950			0.950				0.990	
Satd. Flow (prot)	1770	3539	1583	1770	3536	0	1770	1650	0	0	1792	0
Flt Permitted	0.465			0.348			0.745				0.953	
Satd. Flow (perm)	866	3539	1583	648	3536	0	1388	1650	0	0	1725	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			45			30	
Link Distance (ft)		1846			5456			1563			408	
Travel Time (s)		28.0			82.7			23.7			9.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	4	644	171	19	504	4	197	9	28	4	11	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	4	644	171	19	508	0	197	37	0	0	19	0
Turn Type	Perm	NA	Perm	D,P+P	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			4			8	
Permitted Phases	2		2	2			4			8		
Detector Phase	2	2	2	1	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	25.0	25.0	25.0	14.0	25.0		25.0	25.0		25.0	25.0	
Total Split (s)	40.0	40.0	40.0	15.0	55.0		35.0	35.0		35.0	35.0	
Total Split (%)	44.4%	44.4%	44.4%	16.7%	61.1%		38.9%	38.9%		38.9%	38.9%	
Maximum Green (s)	33.0	33.0	33.0	8.0	48.0		28.0	28.0		28.0	28.0	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0			-2.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0			5.0	
Lead/Lag	Lag	Lag	Lag	Lead								
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min	Min	None	Min		Min	Min		None	None	
Walk Time (s)	7.0	7.0	7.0		7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0	11.0		11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0	0		0		0	0		0	0	
Act Effect Green (s)	18.8	18.8	18.8	19.9	20.5		15.6	15.6			15.6	
Actuated g/C Ratio	0.40	0.40	0.40	0.42	0.43		0.33	0.33			0.33	
v/c Ratio	0.01	0.46	0.27	0.04	0.33		0.43	0.07			0.03	
Control Delay	12.2	12.9	13.0	8.1	9.2		18.2	14.5			14.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0	
Total Delay	12.2	12.9	13.0	8.1	9.2		18.2	14.5			14.5	

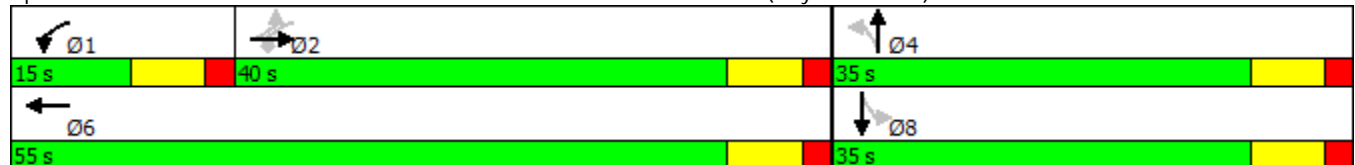
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	B	B	B	A	A		B	B				B
Approach Delay		12.9			9.2			17.6				14.5
Approach LOS		B			A			B				B
Queue Length 50th (ft)	1	50	23	2	37		33	5				3
Queue Length 95th (ft)	7	170	103	13	88		135	33				21
Internal Link Dist (ft)		1766			5376			1483				328
Turn Bay Length (ft)	150		175	150			150					
Base Capacity (vph)	688	2810	1257	538	3255		980	1164				1217
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	0.23	0.14	0.04	0.16		0.20	0.03				0.02

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 47.2
 Natural Cycle: 65
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.46
 Intersection Signal Delay: 12.4
 Intersection Capacity Utilization 40.8%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 2: Banner Farm Road/Water Treatment Plant & NC 191 (Haywood Road)



R-2588B: NC 191 Widening
Lanes, Volumes, Timings

Build 2040 AM
09/20/2017

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	2	486	95	375	390	2	96	0	468	1	0	1
Future Volume (vph)	2	486	95	375	390	2	96	0	468	1	0	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	375		0	0		250	0		0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.975			0.999				0.850		0.932	
Flt Protected	0.950			0.950				0.950			0.976	
Satd. Flow (prot)	1770	3451	0	1770	3536	0	0	1770	1583	0	1694	0
Flt Permitted	0.499			0.950				0.757			0.819	
Satd. Flow (perm)	930	3451	0	1770	3536	0	0	1410	1583	0	1422	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			45			25	
Link Distance (ft)		5456			7476			1256			553	
Travel Time (s)		82.7			113.3			19.0			15.1	
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)	2	540	106	417	433	2	107	0	520	1	0	1
Shared Lane Traffic (%)												
Lane Group Flow (vph)	2	646	0	417	435	0	0	107	520	0	2	0
Turn Type	Perm	NA		Prot	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases		2		1	6			8	1		4	
Permitted Phases	2						8		8	4		
Detector Phase	2	2		1	6		8	8	1	4	4	
Switch Phase												
Minimum Initial (s)	12.0	12.0		7.0	12.0		7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	19.0	19.0		14.6	19.0		14.0	14.0	14.6	14.0	14.0	
Total Split (s)	32.0	32.0		40.0	72.0		18.0	18.0	40.0	18.0	18.0	
Total Split (%)	35.6%	35.6%		44.4%	80.0%		20.0%	20.0%	44.4%	20.0%	20.0%	
Maximum Green (s)	25.0	25.0		33.0	65.0		11.0	11.0	33.0	11.0	11.0	
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0			-2.0	-2.0		-2.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0	5.0		5.0	
Lead/Lag	Lag	Lag		Lead					Lead			
Lead-Lag Optimize?	Yes	Yes		Yes					Yes			
Vehicle Extension (s)	6.0	6.0		1.0	6.0		1.0	1.0	1.0	1.0	1.0	
Minimum Gap (s)	3.0	3.0		0.2	3.0		0.2	0.2	0.2	0.2	0.2	
Time Before Reduce (s)	15.0	15.0		0.0	15.0		0.0	0.0	0.0	0.0	0.0	
Time To Reduce (s)	30.0	30.0		0.0	30.0		0.0	0.0	0.0	0.0	0.0	
Recall Mode	Min	Min		None	Min		None	None	None	None	None	
Act Effect Green (s)	21.8	21.8		23.3	52.3			11.5	35.3		11.5	
Actuated g/C Ratio	0.32	0.32		0.34	0.77			0.17	0.52		0.17	
v/c Ratio	0.01	0.59		0.69	0.16			0.45	0.63		0.01	
Control Delay	21.0	24.2		27.8	3.4			38.1	15.3		31.0	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay	21.0	24.2		27.8	3.4			38.1	15.3		31.0	

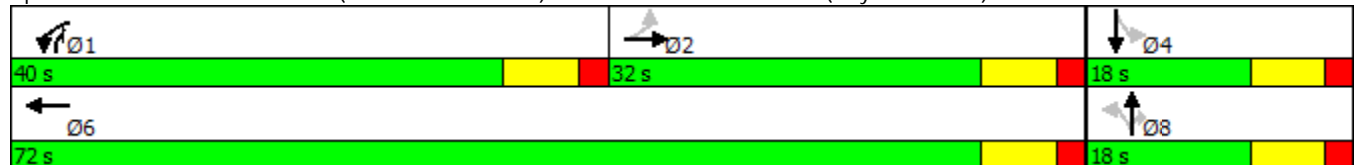
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	C	C		C	A			D	B		C	
Approach Delay		24.1			15.3			19.2			31.0	
Approach LOS		C			B			B			C	
Queue Length 50th (ft)	1	123		160	27			43	141		1	
Queue Length 95th (ft)	6	222		284	43			111	258		7	
Internal Link Dist (ft)		5376			7396			1176			473	
Turn Bay Length (ft)	150			375					250			
Base Capacity (vph)	404	1500		997	3193			294	1170		297	
Starvation Cap Reductn	0	0		0	0			0	0		0	
Spillback Cap Reductn	0	0		0	0			0	0		0	
Storage Cap Reductn	0	0		0	0			0	0		0	
Reduced v/c Ratio	0.00	0.43		0.42	0.14			0.36	0.44		0.01	

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 68
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.69
 Intersection Signal Delay: 19.2
 Intersection Capacity Utilization 63.8%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 3: SR 1426 (School House Road)/Water Treatment & NC 191 (Haywood Road)



R-2588B: NC 191 Widening
Lanes, Volumes, Timings

Build 2040 AM
09/20/2017

Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	84	773	65	18	176	630	166	111	176	290	166	96
Future Volume (vph)	84	773	65	18	176	630	166	111	176	290	166	96
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250		0		450		0	175		200	225	
Storage Lanes	1		0		1		0	1		1	1	
Taper Length (ft)	100				100			100			100	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00
Frt		0.988				0.969				0.850		0.938
Flt Protected	0.950				0.950			0.950			0.950	
Satd. Flow (prot)	1770	3497	0	0	1770	3429	0	1770	1863	1583	1770	1747
Flt Permitted	0.950				0.950			0.950			0.950	
Satd. Flow (perm)	1770	3497	0	0	1770	3429	0	1770	1863	1583	1770	1747
Right Turn on Red			No				No			No		
Satd. Flow (RTOR)												
Link Speed (mph)		45				45			35			45
Link Distance (ft)		7476				1829			1358			1857
Travel Time (s)		113.3				27.7			26.5			28.1
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)	93	859	72	20	196	700	184	123	196	322	184	107
Shared Lane Traffic (%)												
Lane Group Flow (vph)	93	931	0	0	216	884	0	123	196	322	184	183
Turn Type	Prot	NA		Prot	Prot	NA		Split	NA	pm+ov	Split	NA
Protected Phases	5	2		1!	1	6		4	4	1!	8	8
Permitted Phases										4		
Detector Phase	5	2		1	1	6		4	4	1	8	8
Switch Phase												
Minimum Initial (s)	7.0	12.0		7.0	7.0	12.0		7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	14.0	19.0		14.0	14.0	19.0		14.0	14.0	14.0	14.0	14.0
Total Split (s)	17.0	46.0		26.0	26.0	55.0		24.0	24.0	26.0	24.0	24.0
Total Split (%)	14.2%	38.3%		21.7%	21.7%	45.8%		20.0%	20.0%	21.7%	20.0%	20.0%
Maximum Green (s)	10.0	39.0		19.0	19.0	48.0		17.0	17.0	19.0	17.0	17.0
Yellow Time (s)	5.0	5.0		5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0			-2.0	-2.0		-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	5.0	5.0			5.0	5.0		5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lead	Lag				Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes				Yes		
Vehicle Extension (s)	1.0	6.0		1.0	1.0	6.0		1.0	1.0	1.0	1.0	1.0
Minimum Gap (s)	3.0	3.0		0.2	0.2	0.2		0.2	0.2	0.2	0.2	0.2
Time Before Reduce (s)	0.0	15.0		0.0	0.0	15.0		0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	30.0		0.0	0.0	30.0		0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Min		None	None	Min		None	None	None	None	None
Act Effect Green (s)	10.8	34.0			17.2	44.4		15.5	15.5	32.8	15.5	15.5
Actuated g/C Ratio	0.10	0.33			0.17	0.43		0.15	0.15	0.32	0.15	0.15
v/c Ratio	0.50	0.81			0.73	0.60		0.46	0.70	0.64	0.69	0.70
Control Delay	58.6	38.7			58.5	26.4		49.3	58.3	23.4	58.8	59.3
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	58.6	38.7			58.5	26.4		49.3	58.3	23.4	58.8	59.3

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	68
Future Volume (vph)	68
Ideal Flow (vphpl)	1900
Storage Length (ft)	0
Storage Lanes	0
Taper Length (ft)	
Lane Util. Factor	1.00
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	No
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	0.90
Adj. Flow (vph)	76
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 (%)	
Maximum Green (s)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	
Minimum Gap (s)	
Time Before Reduce (s)	
Time To Reduce (s)	
Recall Mode	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	

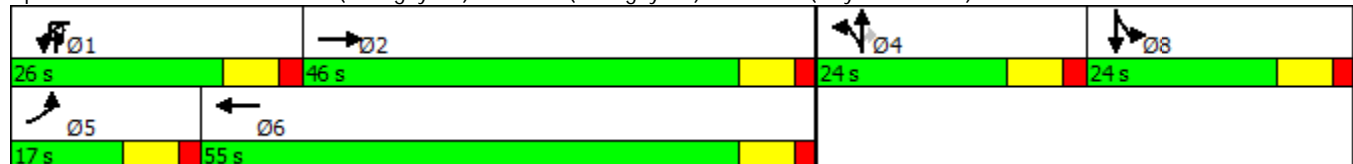
Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
LOS	E	D			E	C		D	E	C	E	E
Approach Delay		40.5				32.7			39.0			59.0
Approach LOS		D				C			D			E
Queue Length 50th (ft)	63	313			144	258		79	131	112	123	122
Queue Length 95th (ft)	126	420			#249	347		150	227	188	215	215
Internal Link Dist (ft)		7396				1749			1278			1777
Turn Bay Length (ft)	250				450			175		200	225	
Base Capacity (vph)	214	1442			373	1725		338	355	573	338	334
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	0.43	0.65			0.58	0.51		0.36	0.55	0.56	0.54	0.55

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 103
 Natural Cycle: 70
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.81
 Intersection Signal Delay: 39.7
 Intersection Capacity Utilization 78.0%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 ! Phase conflict between lane groups.

Intersection LOS: D
 ICU Level of Service D

Splits and Phases: 4: SR 1309 (S Rugby Rd)/SR 1365 (N Rugby Rd) & NC 191 (Haywood Road)





Lane Group SBR

LOS

Approach Delay

Approach LOS

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	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	1169	36	0	1010	0	84
Future Volume (vph)	1169	36	0	1010	0	84
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	10	10
Storage Length (ft)		0	200		0	0
Storage Lanes		0	0		0	1
Taper Length (ft)			100		100	
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Frt	0.996					0.865
Flt Protected						
Satd. Flow (prot)	3525	0	0	3539	0	1504
Flt Permitted						
Satd. Flow (perm)	3525	0	0	3539	0	1504
Link Speed (mph)	45			45	25	
Link Distance (ft)	1829			653	1295	
Travel Time (s)	27.7			9.9	35.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	1299	40	0	1122	0	93
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1339	0	0	1122	0	93
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 45.3% ICU Level of Service A
 Analysis Period (min) 15

Intersection

Int Delay, s/veh 0.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		↑
Traffic Vol, veh/h	1169	36	0	1010	0	84
Future Vol, veh/h	1169	36	0	1010	0	84
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Yield
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	1299	40	0	1122	0	93

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	669
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	6.94
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	3.32
Pot Cap-1 Maneuver	-	0	400
Stage 1	-	0	-
Stage 2	-	0	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	400
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	16.7
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	400	-	-	-
HCM Lane V/C Ratio	0.233	-	-	-
HCM Control Delay (s)	16.7	-	-	-
HCM Lane LOS	C	-	-	-
HCM 95th %tile Q(veh)	0.9	-	-	-

R-2588B: NC 191 Widening
Lanes, Volumes, Timings

Build 2040 AM
09/20/2017

Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	15	102	1134	8	16	14	931	47	9	0	18	30
Future Volume (vph)	15	102	1134	8	16	14	931	47	9	0	18	30
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		375		0		150		225	0		0	0
Storage Lanes		1		0		1		1	0		0	0
Taper Length (ft)		100				100			100			100
Lane Util. Factor	0.95	1.00	0.95	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00
Frt			0.999					0.850		0.910		
Flt Protected		0.950				0.950				0.984		
Satd. Flow (prot)	0	1770	3536	0	0	1770	3539	1583	0	1668	0	0
Flt Permitted		0.150				0.219				0.984		
Satd. Flow (perm)	0	279	3536	0	0	408	3539	1583	0	1668	0	0
Right Turn on Red				No				No			No	
Satd. Flow (RTOR)												
Link Speed (mph)			55				55			25		
Link Distance (ft)			653				1496			862		
Travel Time (s)			8.1				18.5			23.5		
Peak Hour Factor	0.90	0.50	0.90	0.90	0.90	0.90	0.90	0.50	0.90	0.50	0.90	0.50
Adj. Flow (vph)	17	204	1260	9	18	16	1034	94	10	0	20	60
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	221	1269	0	0	34	1034	94	0	30	0	0
Turn Type	D.P+P	D.P+P	NA		Perm	Perm	NA	pm+ov	Split	NA		Split
Protected Phases	1!	1	6				2	4	3	3		4
Permitted Phases	2	2			2	2		2				
Detector Phase	1	1	6		2	2	2	4	3	3		4
Switch Phase												
Minimum Initial (s)	10.0	10.0	14.0		14.0	14.0	14.0	7.0	7.0	7.0		7.0
Minimum Split (s)	17.6	17.6	21.0		21.0	21.0	21.0	14.0	14.0	14.0		14.0
Total Split (s)	26.0	26.0	88.0		62.0	62.0	62.0	16.0	16.0	16.0		16.0
Total Split (%)	21.7%	21.7%	73.3%		51.7%	51.7%	51.7%	13.3%	13.3%	13.3%		13.3%
Maximum Green (s)	19.0	19.0	81.0		55.0	55.0	55.0	9.0	9.0	9.0		9.0
Yellow Time (s)	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0		5.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0		2.0
Lost Time Adjust (s)		-2.0	-2.0				-2.0	-2.0	-2.0	-2.0		
Total Lost Time (s)		5.0	5.0				5.0	5.0	5.0	5.0		
Lead/Lag	Lead	Lead			Lag	Lag	Lag	Lag	Lead	Lead		Lag
Lead-Lag Optimize?	Yes	Yes			Yes	Yes	Yes	Yes	Yes	Yes		Yes
Vehicle Extension (s)	2.0	2.0	6.0		6.0	6.0	6.0	2.0	2.0	2.0		2.0
Minimum Gap (s)	0.2	0.2	3.0		3.0	3.0	3.0	0.2	0.2	0.2		0.2
Time Before Reduce (s)	0.0	0.0	15.0		15.0	15.0	15.0	0.0	0.0	0.0		0.0
Time To Reduce (s)	0.0	0.0	30.0		30.0	30.0	30.0	0.0	0.0	0.0		0.0
Recall Mode	None	None	Min		Min	Min	Min	None	None	None		None
Act Effect Green (s)		46.1	53.2			32.2	32.2	46.5		10.0		
Actuated g/C Ratio		0.63	0.73			0.44	0.44	0.64		0.14		
v/c Ratio		0.48	0.49			0.19	0.66	0.09		0.13		
Control Delay		13.7	7.7			19.8	20.5	5.5		37.9		
Queue Delay		0.0	0.0			0.0	0.0	0.0		0.0		
Total Delay		13.7	7.7			19.8	20.5	5.5		37.9		

	↓	↙
Lane Group	SBT	SBR
Lane Configurations	↕	↕
Traffic Volume (vph)	0	53
Future Volume (vph)	0	53
Ideal Flow (vphpl)	1900	1900
Storage Length (ft)		300
Storage Lanes		1
Taper Length (ft)		
Lane Util. Factor	1.00	1.00
Frt		0.850
Flt Protected	0.950	
Satd. Flow (prot)	1770	1583
Flt Permitted	0.950	
Satd. Flow (perm)	1770	1583
Right Turn on Red		No
Satd. Flow (RTOR)		
Link Speed (mph)	25	
Link Distance (ft)	788	
Travel Time (s)	21.5	
Peak Hour Factor	0.50	0.50
Adj. Flow (vph)	0	106
Shared Lane Traffic (%)		
Lane Group Flow (vph)	60	106
Turn Type	NA	pm+ov
Protected Phases	4	1!
Permitted Phases		4
Detector Phase	4	1
Switch Phase		
Minimum Initial (s)	7.0	10.0
Minimum Split (s)	14.0	17.6
Total Split (s)	16.0	26.0
Total Split (%)	13.3%	21.7%
Maximum Green (s)	9.0	19.0
Yellow Time (s)	5.0	5.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0
Total Lost Time (s)	5.0	5.0
Lead/Lag	Lag	Lead
Lead-Lag Optimize?	Yes	Yes
Vehicle Extension (s)	2.0	2.0
Minimum Gap (s)	0.2	0.2
Time Before Reduce (s)	0.0	0.0
Time To Reduce (s)	0.0	0.0
Recall Mode	None	None
Act Effct Green (s)	10.4	25.2
Actuated g/C Ratio	0.14	0.35
v/c Ratio	0.24	0.19
Control Delay	37.9	21.2
Queue Delay	0.0	0.0
Total Delay	37.9	21.2

Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
LOS		B	A			B	C	A		D		
Approach Delay			8.6				19.2			37.9		
Approach LOS			A				B			D		
Queue Length 50th (ft)		23	96			8	162	11		11		
Queue Length 95th (ft)		44	277			38	356	15		26		
Internal Link Dist (ft)			573				1416			782		
Turn Bay Length (ft)		375				150		225				
Base Capacity (vph)		663	3361			324	2816	1044		273		
Starvation Cap Reductn		0	0			0	0	0		0		
Spillback Cap Reductn		0	0			0	0	0		0		
Storage Cap Reductn		0	0			0	0	0		0		
Reduced v/c Ratio		0.33	0.38			0.10	0.37	0.09		0.11		

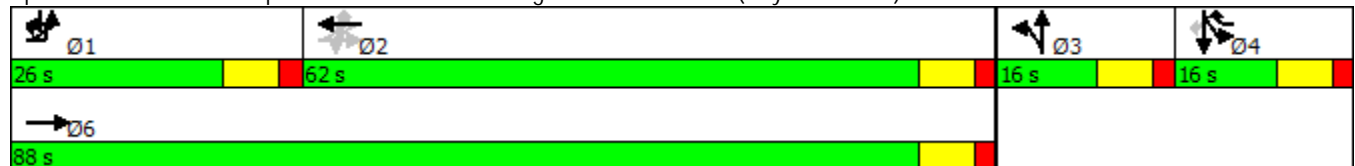
Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 72.8
 Natural Cycle: 75
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.66
 Intersection Signal Delay: 14.3
 Intersection Capacity Utilization 64.9%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service C

! Phase conflict between lane groups.

Splits and Phases: 6: Alpine Dr/West Henderson High School & NC 191 (Haywood Road)




















	↓	↙
Lane Group	SBT	SBR
LOS	D	C
Approach Delay	27.2	
Approach LOS	C	
Queue Length 50th (ft)	22	28
Queue Length 95th (ft)	42	49
Internal Link Dist (ft)	708	
Turn Bay Length (ft)		300
Base Capacity (vph)	290	740
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.21	0.14

Intersection Summary

R-2588B: NC 191 Widening
Lanes, Volumes, Timings

Build 2040 AM
09/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	1176	2	0	951	16	0	0	2	0	0	43
Future Volume (vph)	37	1176	2	0	951	16	0	0	2	0	0	43
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	10	10	10	10	10	10
Storage Length (ft)	150		0	0		0	0		0	0		0
Storage Lanes	1		0	0		0	0		1	0		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.997				0.865			0.865
Flt Protected	0.950											
Satd. Flow (prot)	1770	3539	0	0	3529	0	0	0	1504	0	0	1504
Flt Permitted	0.950											
Satd. Flow (perm)	1770	3539	0	0	3529	0	0	0	1504	0	0	1504
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		1496			911			590			1563	
Travel Time (s)		22.7			13.8			13.4			35.5	
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)	41	1307	2	0	1057	18	0	0	2	0	0	48
Shared Lane Traffic (%)												
Lane Group Flow (vph)	41	1309	0	0	1075	0	0	0	2	0	0	48
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 42.6%
 Analysis Period (min) 15
 ICU Level of Service A

Intersection

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Int Delay, s/veh	0.4											
Lane Configurations	↔	↕↔			↕↔				↕			↕
Traffic Vol, veh/h	37	1176	2	0	951	16	0	0	2	0	0	43
Future Vol, veh/h	37	1176	2	0	951	16	0	0	2	0	0	43
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	Yield
Storage Length	150	-	-	-	-	-	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	41	1307	2	0	1057	18	0	0	2	0	0	48















Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1074	0	0	-	-	0	-	-	654	-	-	537
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	4.14	-	-	-	-	-	-	-	6.94	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	2.22	-	-	-	-	-	-	-	3.32	-	-	3.32
Pot Cap-1 Maneuver	645	-	-	0	-	-	0	0	409	0	0	488
Stage 1	-	-	-	0	-	-	0	0	-	0	0	-
Stage 2	-	-	-	0	-	-	0	0	-	0	0	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	645	-	-	-	-	-	-	-	409	-	-	488
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0	13.9	13.2
HCM LOS			B	B

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBT	WBR	SBLn1
Capacity (veh/h)	409	645	-	-	-	-	488
HCM Lane V/C Ratio	0.005	0.064	-	-	-	-	0.098
HCM Control Delay (s)	13.9	11	-	-	-	-	13.2
HCM Lane LOS	B	B	-	-	-	-	B
HCM 95th %tile Q(veh)	0	0.2	-	-	-	-	0.3

R-2588B: NC 191 Widening
Lanes, Volumes, Timings

Build 2040 AM
09/20/2017

							
Lane Group	EBU	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Volume (vph)	1	1116	73	22	919	38	14
Future Volume (vph)	1	1116	73	22	919	38	14
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		175	175		0	350
Storage Lanes	1		1	1		1	1
Taper Length (ft)	100			100		100	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Frt			0.850				0.850
Flt Protected	0.950			0.950		0.950	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1770	1583
Flt Permitted	0.281			0.138		0.950	
Satd. Flow (perm)	523	3539	1583	257	3539	1770	1583
Right Turn on Red			No				No
Satd. Flow (RTOR)							
Link Speed (mph)		45			45	30	
Link Distance (ft)		911			3670	692	
Travel Time (s)		13.8			55.6	15.7	
Peak Hour Factor	0.90	0.90	0.50	0.50	0.90	0.50	0.50
Adj. Flow (vph)	1	1240	146	44	1021	76	28
Shared Lane Traffic (%)							
Lane Group Flow (vph)	1	1240	146	44	1021	76	28
Turn Type	Perm	NA	pm+ov	D,P+P	NA	Prot	pm+ov
Protected Phases		6	4	5	2	4	5
Permitted Phases	6		6	6			4
Detector Phase	6	6	4	5	2	4	5
Switch Phase							
Minimum Initial (s)	12.0	12.0	7.0	7.0	12.0	7.0	7.0
Minimum Split (s)	19.0	19.0	14.0	14.0	19.0	14.0	14.0
Total Split (s)	59.0	59.0	16.0	15.0	74.0	16.0	15.0
Total Split (%)	65.6%	65.6%	17.8%	16.7%	82.2%	17.8%	16.7%
Maximum Green (s)	52.0	52.0	9.0	8.0	67.0	9.0	8.0
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag		Lead			Lead
Lead-Lag Optimize?	Yes	Yes		Yes			Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	Min	Min	None	None	Min	None	None
Act Effct Green (s)	29.0	29.0	46.6	33.8	36.5	9.9	24.4
Actuated g/C Ratio	0.51	0.51	0.82	0.60	0.64	0.17	0.43
v/c Ratio	0.00	0.68	0.11	0.11	0.45	0.25	0.04
Control Delay	9.0	14.1	2.9	4.1	5.5	26.0	13.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.0	14.1	2.9	4.1	5.5	26.0	13.8
LOS	A	B	A	A	A	C	B
Approach Delay		12.9			5.4	22.7	
Approach LOS		B			A	C	

Lane Group	EBU	EBT	EBR	WBL	WBT	NBL	NBR
Queue Length 50th (ft)	0	188	15	4	68	24	6
Queue Length 95th (ft)	2	273	14	7	106	35	13
Internal Link Dist (ft)		831			3590	612	
Turn Bay Length (ft)	100		175	175			350
Base Capacity (vph)	473	3201	1274	432	3526	355	709
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.39	0.11	0.10	0.29	0.21	0.04

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 56.7
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.68
 Intersection Signal Delay: 10.2
 Intersection Capacity Utilization 45.0%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 8: Rugby Middle School & NC 191 (Haywood Road)



R-2588B: NC 191 Widening
Lanes, Volumes, Timings

Build 2040 AM
09/20/2017

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	173	974	3	2	787	118	4	5	5	112	2	133
Future Volume (vph)	173	974	3	2	787	118	4	5	5	112	2	133
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	100		0	0		0	0		150
Storage Lanes	1		0	1		0	0		0	0		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.980			0.949				0.850
Flt Protected	0.950			0.950				0.988			0.953	
Satd. Flow (prot)	1770	3539	0	1770	3468	0	0	1747	0	0	1775	1583
Flt Permitted	0.950			0.263				0.988			0.953	
Satd. Flow (perm)	1770	3539	0	490	3468	0	0	1747	0	0	1775	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			25			35	
Link Distance (ft)		3670			2566			1006			2428	
Travel Time (s)		55.6			38.9			27.4			47.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	192	1082	3	2	874	131	4	6	6	124	2	148
Shared Lane Traffic (%)												
Lane Group Flow (vph)	192	1085	0	2	1005	0	0	16	0	0	126	148
Turn Type	Prot	NA		Perm	NA		Split	NA		Split	NA	pm+ov
Protected Phases	1	6			2		4	4		8	8	1
Permitted Phases				2								8
Detector Phase	1	6		2	2		4	4		8	8	1
Switch Phase												
Minimum Initial (s)	7.0	12.0		12.0	12.0		7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	14.0	19.0		19.0	19.0		14.0	14.0		14.0	14.0	14.0
Total Split (s)	28.0	84.0		56.0	56.0		14.0	14.0		22.0	22.0	28.0
Total Split (%)	23.3%	70.0%		46.7%	46.7%		11.7%	11.7%		18.3%	18.3%	23.3%
Maximum Green (s)	21.0	77.0		49.0	49.0		7.0	7.0		15.0	15.0	21.0
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0			-2.0			-2.0	-2.0
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	5.0
Lead/Lag	Lead			Lag	Lag							Lead
Lead-Lag Optimize?	Yes			Yes	Yes							Yes
Vehicle Extension (s)	1.0	6.0		6.0	6.0		1.0	1.0		2.0	2.0	1.0
Minimum Gap (s)	0.2	3.0		3.0	3.0		0.2	0.2		0.2	0.2	0.2
Time Before Reduce (s)	0.0	20.0		20.0	20.0		0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	30.0		30.0	30.0		0.0	0.0		0.0	0.0	0.0
Recall Mode	None	Min		Min	Min		Max	Max		None	None	None
Act Effect Green (s)	15.9	57.3		36.3	36.3			9.3			13.1	34.1
Actuated g/C Ratio	0.17	0.60		0.38	0.38			0.10			0.14	0.36
v/c Ratio	0.65	0.51		0.01	0.76			0.09			0.51	0.26
Control Delay	49.9	11.6		20.0	30.3			48.1			49.1	24.0
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Delay	49.9	11.6		20.0	30.3			48.1			49.1	24.0

Lane Group												
LOS	D	B		B	C			D			D	C
Approach Delay		17.3			30.3			48.1			35.5	
Approach LOS		B			C			D			D	
Queue Length 50th (ft)	107	178		1	270			9			70	61
Queue Length 95th (ft)	213	245		6	403			35			154	128
Internal Link Dist (ft)		3590			2486			926			2348	
Turn Bay Length (ft)	225			100								150
Base Capacity (vph)	440	2975		270	1913			170			326	698
Starvation Cap Reductn	0	0		0	0			0			0	0
Spillback Cap Reductn	0	0		0	0			0			0	0
Storage Cap Reductn	0	0		0	0			0			0	0
Reduced v/c Ratio	0.44	0.36		0.01	0.53			0.09			0.39	0.21

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 95.1
 Natural Cycle: 70
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.76
 Intersection Signal Delay: 24.5
 Intersection Capacity Utilization 62.5%
 Analysis Period (min) 15






















Intersection LOS: C
 ICU Level of Service B

Splits and Phases: 9: SR 1444 (Leverette Drive)/SR 1381 (Mountain Road) & NC 191 (Haywood Road)















R-2588B Widening of NC 191
Lanes, Volumes, Timings

2040 Build PM
09/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	88	32	5	84	45	619	4	699	49	539	1052	106
Future Volume (vph)	88	32	5	84	45	619	4	699	49	539	1052	106
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		75	150		350	150		0	350		0
Storage Lanes	0		1	0		1	1		0	2		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	0.88	1.00	0.95	0.95	0.97	0.95	0.95
Frt			0.850			0.850		0.990			0.986	
Flt Protected		0.965			0.969		0.950			0.950		
Satd. Flow (prot)	0	1798	1583	0	1805	2787	1770	3504	0	3433	3490	0
Flt Permitted		0.965			0.969		0.180			0.950		
Satd. Flow (perm)	0	1798	1583	0	1805	2787	335	3504	0	3433	3490	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		20			45			45			45	
Link Distance (ft)		342			1846			3351			3356	
Travel Time (s)		11.7			28.0			50.8			50.8	
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)	98	36	6	93	50	688	4	777	54	599	1169	118
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	134	6	0	143	688	4	831	0	599	1287	0
Turn Type	Split	NA	Perm	Split	NA	pm+ov	pm+pt	NA		Prot	NA	
Protected Phases	3	3		4	4	1	5	2		1	6	
Permitted Phases			3			4	2					
Detector Phase	3	3	3	4	4	1	5	2		1	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	14.0		7.0	14.0	
Minimum Split (s)	24.1	24.1	24.1	24.2	24.2	14.4	14.4	25.8		14.4	25.8	
Total Split (s)	24.1	24.1	24.1	24.2	24.2	31.0	14.4	40.7		31.0	57.3	
Total Split (%)	20.1%	20.1%	20.1%	20.2%	20.2%	25.8%	12.0%	33.9%		25.8%	47.8%	
Maximum Green (s)	17.1	17.1	17.1	17.2	17.2	24.0	7.4	33.7		24.0	50.3	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-2.0	-2.0		-2.0	-2.0	-2.0	-2.0		-2.0	-2.0	
Total Lost Time (s)		5.0	5.0		5.0	5.0	5.0	5.0		5.0	5.0	
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	6.0		2.0	6.0	
Minimum Gap (s)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	3.4		0.2	3.4	
Time Before Reduce (s)	0.0	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	0.0	30.0		0.0	30.0	
Recall Mode	None	None	None	None	None	None	None	Min		None	Min	
Act Effect Green (s)		14.1	14.1		14.5	43.2	38.8	29.5		23.6	55.9	
Actuated g/C Ratio		0.14	0.14		0.14	0.42	0.38	0.29		0.23	0.55	
v/c Ratio		0.54	0.03		0.56	0.58	0.02	0.82		0.76	0.67	
Control Delay		52.4	42.6		52.6	26.0	13.5	42.6		45.3	20.8	
Queue Delay		0.0	0.0		0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay		52.4	42.6		52.6	26.0	13.5	42.6		45.3	20.8	

R-2588B Widening of NC 191
Lanes, Volumes, Timings

2040 Build PM
09/20/2017

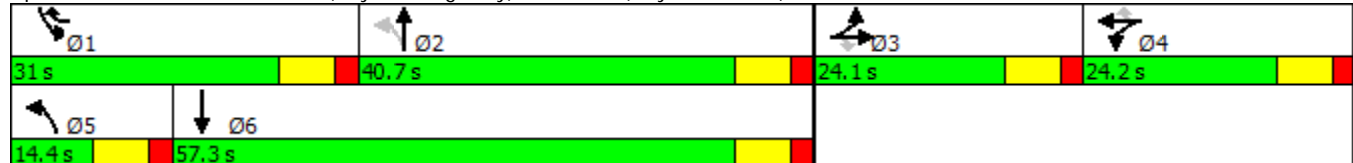
Lane Group												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS		D	D		D	C	B	D		D	C	
Approach Delay		52.0			30.6			42.4			28.6	
Approach LOS		D			C			D			C	
Queue Length 50th (ft)		86	4		92	194	1	276		191	285	
Queue Length 95th (ft)		160	17		170	298	7	390		296	555	
Internal Link Dist (ft)		262			1766			3271			3276	
Turn Bay Length (ft)			75			350	150			350		
Base Capacity (vph)		345	303		348	1262	263	1256		896	1989	
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		0.39	0.02		0.41	0.55	0.02	0.66		0.67	0.65	

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 102.3
 Natural Cycle: 100
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.82
 Intersection Signal Delay: 33.0
 Intersection Capacity Utilization 64.5%
 Analysis Period (min) 15

Intersection LOS: C
 ICU Level of Service C

Splits and Phases: 1: NC 280 (Boylston Highway) & NC 191 (Haywood Road)



R-2588B Widening of NC 191
Lanes, Volumes, Timings

2040 Build PM
09/20/2017

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	454	177	25	580	4	155	10	17	4	8	4
Future Volume (vph)	4	454	177	25	580	4	155	10	17	4	8	4
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		175	150		0	150		0	0		0
Storage Lanes	1		1	1		0	1		0	0		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.999			0.905			0.968	
Flt Protected	0.950			0.950			0.950				0.988	
Satd. Flow (prot)	1770	3539	1583	1770	3536	0	1770	1686	0	0	1781	0
Flt Permitted	0.406			0.448			0.746				0.944	
Satd. Flow (perm)	756	3539	1583	835	3536	0	1390	1686	0	0	1702	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			45				30
Link Distance (ft)		1846			5456			1563			408	
Travel Time (s)		28.0			82.7			23.7			9.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	4	504	197	28	644	4	172	11	19	4	9	4
Shared Lane Traffic (%)												
Lane Group Flow (vph)	4	504	197	28	648	0	172	30	0	0	17	0
Turn Type	Perm	NA	Perm	D,P+P	NA		Perm	NA		Perm	NA	
Protected Phases		2		1	6			4			8	
Permitted Phases	2		2	2			4			8		
Detector Phase	2	2	2	1	6		4	4		8	8	
Switch Phase												
Minimum Initial (s)	7.0	7.0	7.0	7.0	7.0		7.0	7.0		7.0	7.0	
Minimum Split (s)	25.0	25.0	25.0	14.0	25.0		25.0	25.0		25.0	25.0	
Total Split (s)	38.0	38.0	38.0	16.0	54.0		36.0	36.0		36.0	36.0	
Total Split (%)	42.2%	42.2%	42.2%	17.8%	60.0%		40.0%	40.0%		40.0%	40.0%	
Maximum Green (s)	31.0	31.0	31.0	9.0	47.0		29.0	29.0		29.0	29.0	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0	-2.0			-2.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0			5.0	
Lead/Lag	Lag	Lag	Lag	Lead								
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min	Min	None	Min		Min	Min		Min	Min	
Walk Time (s)	7.0	7.0	7.0		7.0		7.0	7.0		7.0	7.0	
Flash Dont Walk (s)	11.0	11.0	11.0		11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0	0		0		0	0		0	0	
Act Effect Green (s)	16.8	16.8	16.8	19.4	20.9		14.0	14.0			14.0	
Actuated g/C Ratio	0.37	0.37	0.37	0.42	0.46		0.31	0.31			0.31	
v/c Ratio	0.01	0.39	0.34	0.05	0.40		0.41	0.06			0.03	
Control Delay	14.0	13.7	15.3	7.2	8.8		18.9	15.3			15.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0			0.0	
Total Delay	14.0	13.7	15.3	7.2	8.8		18.9	15.3			15.3	

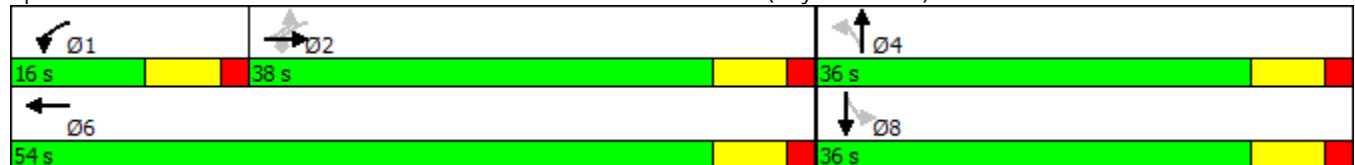
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	B	B	B	A	A		B	B				B
Approach Delay		14.2			8.7			18.4				15.3
Approach LOS		B			A			B				B
Queue Length 50th (ft)	0	34	25	3	46		26	4				2
Queue Length 95th (ft)	7	123	113	15	103		108	26				17
Internal Link Dist (ft)		1766			5376			1483				328
Turn Bay Length (ft)	150		175	150			150					
Base Capacity (vph)	586	2743	1227	612	3213		1029	1248				1260
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	0.18	0.16	0.05	0.20		0.17	0.02				0.01

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 45.9
 Natural Cycle: 65
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.41
 Intersection Signal Delay: 12.4
 Intersection Capacity Utilization 44.4%
 Analysis Period (min) 15




















Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 2: Banner Farm Road/Water Treatment Plant & NC 191 (Haywood Road)



R-2588B Widening of NC 191
Lanes, Volumes, Timings

2040 Build PM
09/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	390	96	468	486	1	95	0	375	2	0	2
Future Volume (vph)	1	390	96	468	486	1	95	0	375	2	0	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	375		0	0		250	0		0
Storage Lanes	1		0	1		0	0		1	0		0
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.970							0.850		0.932	
Flt Protected	0.950			0.950				0.950			0.976	
Satd. Flow (prot)	1770	3433	0	1770	3539	0	0	1770	1583	0	1694	0
Flt Permitted	0.450			0.950				0.755			0.814	
Satd. Flow (perm)	838	3433	0	1770	3539	0	0	1406	1583	0	1413	0
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			45			25	
Link Distance (ft)		5456			7476			1256			553	
Travel Time (s)		82.7			113.3			19.0			15.1	
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)	1	433	107	520	540	1	106	0	417	2	0	2
Shared Lane Traffic (%)												
Lane Group Flow (vph)	1	540	0	520	541	0	0	106	417	0	4	0
Turn Type	Perm	NA		Prot	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases		2		1	6			8	1		4	
Permitted Phases	2						8		8	4		
Detector Phase	2	2		1	6		8	8	1	4	4	
Switch Phase												
Minimum Initial (s)	12.0	12.0		7.0	12.0		7.0	7.0	7.0	7.0	7.0	
Minimum Split (s)	19.0	19.0		14.6	19.0		14.0	14.0	14.6	14.0	14.0	
Total Split (s)	27.0	27.0		45.0	72.0		18.0	18.0	45.0	18.0	18.0	
Total Split (%)	30.0%	30.0%		50.0%	80.0%		20.0%	20.0%	50.0%	20.0%	20.0%	
Maximum Green (s)	20.0	20.0		38.0	65.0		11.0	11.0	38.0	11.0	11.0	
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0			-2.0	-2.0		-2.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0	5.0		5.0	
Lead/Lag	Lag	Lag		Lead					Lead			
Lead-Lag Optimize?	Yes	Yes		Yes					Yes			
Vehicle Extension (s)	6.0	6.0		1.0	6.0		1.0	1.0	1.0	1.0	1.0	
Minimum Gap (s)	3.0	3.0		0.2	3.0		0.2	0.2	0.2	0.2	0.2	
Time Before Reduce (s)	15.0	15.0		0.0	15.0		0.0	0.0	0.0	0.0	0.0	
Time To Reduce (s)	30.0	30.0		0.0	30.0		0.0	0.0	0.0	0.0	0.0	
Recall Mode	Min	Min		None	Min		None	None	None	None	None	
Act Effect Green (s)	19.5	19.5		26.3	53.3			11.7	38.2		11.7	
Actuated g/C Ratio	0.28	0.28		0.38	0.77			0.17	0.56		0.17	
v/c Ratio	0.00	0.55		0.77	0.20			0.45	0.47		0.02	
Control Delay	25.0	27.0		28.2	3.4			38.6	10.2		31.5	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay	25.0	27.0		28.2	3.4			38.6	10.2		31.5	

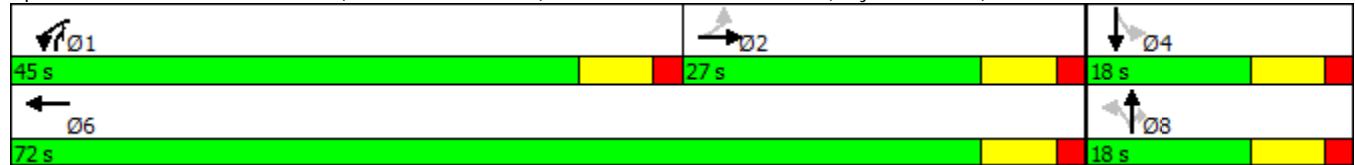
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	C	C		C	A			D	B		C	
Approach Delay		26.9			15.6			16.0			31.5	
Approach LOS		C			B			B			C	
Queue Length 50th (ft)	0	112		203	35			45	93		2	
Queue Length 95th (ft)	4	201		338	54			110	159		12	
Internal Link Dist (ft)		5376			7396			1176			473	
Turn Bay Length (ft)	150			375					250			
Base Capacity (vph)	297	1217		1105	3159			294	1262		296	
Starvation Cap Reductn	0	0		0	0			0	0		0	
Spillback Cap Reductn	0	0		0	0			0	0		0	
Storage Cap Reductn	0	0		0	0			0	0		0	
Reduced v/c Ratio	0.00	0.44		0.47	0.17			0.36	0.33		0.01	

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 68.8
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.77
 Intersection Signal Delay: 18.6
 Intersection Capacity Utilization 61.6%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service B

Splits and Phases: 3: SR 1426 (School House Road)/Water Treatment & NC 191 (Haywood Road)



R-2588B Widening of NC 191
Lanes, Volumes, Timings

2040 Build PM
09/20/2017

Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	68	630	97	35	325	773	166	74	96	158	166	176
Future Volume (vph)	68	630	97	35	325	773	166	74	96	158	166	176
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250		0		450		0	175		200	225	
Storage Lanes	1		0		1		0	1		1	1	
Taper Length (ft)	100				100			100			100	
Lane Util. Factor	1.00	0.95	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00
Frt		0.980				0.974				0.850		0.952
Flt Protected	0.950				0.950			0.950			0.950	
Satd. Flow (prot)	1770	3468	0	0	1770	3447	0	1770	1863	1583	1770	1773
Flt Permitted	0.950				0.950			0.950			0.950	
Satd. Flow (perm)	1770	3468	0	0	1770	3447	0	1770	1863	1583	1770	1773
Right Turn on Red			No				No			No		
Satd. Flow (RTOR)												
Link Speed (mph)		45				45			35			45
Link Distance (ft)		7476				1829			1358			1857
Travel Time (s)		113.3				27.7			26.5			28.1
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)	76	700	108	39	361	859	184	82	107	176	184	196
Shared Lane Traffic (%)												
Lane Group Flow (vph)	76	808	0	0	400	1043	0	82	107	176	184	289
Turn Type	Prot	NA		Prot	Prot	NA		Split	NA	pm+ov	Split	NA
Protected Phases	5	2		1!	1	6		4	4	1!	8	8
Permitted Phases										4		
Detector Phase	5	2		1	1	6		4	4	1	8	8
Switch Phase												
Minimum Initial (s)	7.0	12.0		7.0	7.0	12.0		7.0	7.0	7.0	7.0	7.0
Minimum Split (s)	14.0	19.0		14.0	14.0	19.0		14.0	14.0	14.0	14.0	14.0
Total Split (s)	16.0	39.0		37.0	37.0	60.0		15.0	15.0	37.0	29.0	29.0
Total Split (%)	13.3%	32.5%		30.8%	30.8%	50.0%		12.5%	12.5%	30.8%	24.2%	24.2%
Maximum Green (s)	9.0	32.0		30.0	30.0	53.0		8.0	8.0	30.0	22.0	22.0
Yellow Time (s)	5.0	5.0		5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0			-2.0	-2.0		-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	5.0	5.0			5.0	5.0		5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lag		Lead	Lead	Lag				Lead		
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes				Yes		
Vehicle Extension (s)	1.0	6.0		1.0	1.0	6.0		1.0	1.0	1.0	1.0	1.0
Minimum Gap (s)	3.0	3.0		0.2	0.2	0.2		0.2	0.2	0.2	0.2	0.2
Time Before Reduce (s)	0.0	15.0		0.0	0.0	15.0		0.0	0.0	0.0	0.0	0.0
Time To Reduce (s)	0.0	30.0		0.0	0.0	30.0		0.0	0.0	0.0	0.0	0.0
Recall Mode	None	Min		None	None	Min		None	None	None	None	None
Act Effect Green (s)	10.2	30.7			28.6	52.6		9.9	9.9	38.5	21.5	21.5
Actuated g/C Ratio	0.09	0.28			0.26	0.47		0.09	0.09	0.35	0.19	0.19
v/c Ratio	0.47	0.84			0.88	0.64		0.52	0.64	0.32	0.54	0.84
Control Delay	61.3	47.9			61.7	25.5		64.3	70.4	15.8	48.1	66.3
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0	0.0	0.0	0.0
Total Delay	61.3	47.9			61.7	25.5		64.3	70.4	15.8	48.1	66.3

Lane Group	SBR
Lane Configurations	
Traffic Volume (vph)	84
Future Volume (vph)	84
Ideal Flow (vphpl)	1900
Storage Length (ft)	0
Storage Lanes	0
Taper Length (ft)	
Lane Util. Factor	1.00
Frt	
Flt Protected	
Satd. Flow (prot)	0
Flt Permitted	
Satd. Flow (perm)	0
Right Turn on Red	No
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	0.90
Adj. Flow (vph)	93
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 (%)	
Maximum Green (s)	
Yellow Time (s)	
All-Red Time (s)	
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	
Minimum Gap (s)	
Time Before Reduce (s)	
Time To Reduce (s)	
Recall Mode	
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	

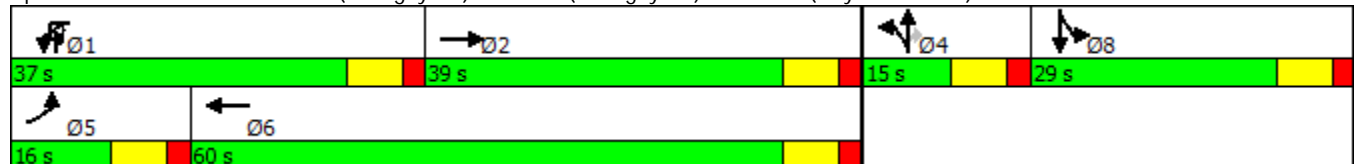
Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
LOS	E	D			E	C		E	E	B	D	E
Approach Delay		49.1				35.5			42.7			59.2
Approach LOS		D				D			D			E
Queue Length 50th (ft)	57	308			294	320		62	82	52	128	216
Queue Length 95th (ft)	109	386			#461	397		#117	#165	84	204	#356
Internal Link Dist (ft)		7396				1749			1278			1777
Turn Bay Length (ft)	250				450			175		200	225	
Base Capacity (vph)	178	1079			518	1737		161	170	605	389	389
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	0.43	0.75			0.77	0.60		0.51	0.63	0.29	0.47	0.74

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 111
 Natural Cycle: 90
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.88
 Intersection Signal Delay: 43.7
 Intersection Capacity Utilization 77.3%
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 ! Phase conflict between lane groups.

Intersection LOS: D
 ICU Level of Service D

Splits and Phases: 4: SR 1309 (S Rugby Rd)/SR 1365 (N Rugby Rd) & NC 191 (Haywood Road)














Lane Group SBR

LOS
Approach Delay
Approach LOS
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	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	960	63	0	1248	0	45
Future Volume (vph)	960	63	0	1248	0	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	10	10
Storage Length (ft)		0	200		0	0
Storage Lanes		0	0		0	1
Taper Length (ft)			100		100	
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00
Frt	0.991					0.865
Flt Protected						
Satd. Flow (prot)	3507	0	0	3539	0	1504
Flt Permitted						
Satd. Flow (perm)	3507	0	0	3539	0	1504
Link Speed (mph)	45			45	25	
Link Distance (ft)	1829			653	1295	
Travel Time (s)	27.7			9.9	35.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	1067	70	0	1387	0	50
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1137	0	0	1387	0	50
Sign Control	Free			Free	Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 38.5%
 Analysis Period (min) 15
 ICU Level of Service A

Intersection

Int Delay, s/veh 0.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		↑
Traffic Vol, veh/h	960	63	0	1248	0	45
Future Vol, veh/h	960	63	0	1248	0	45
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	Yield
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	1067	70	0	1387	0	50

Major/Minor	Major1	Major2	Minor1
Conflicting Flow All	0	0	568
Stage 1	-	-	-
Stage 2	-	-	-
Critical Hdwy	-	-	6.94
Critical Hdwy Stg 1	-	-	-
Critical Hdwy Stg 2	-	-	-
Follow-up Hdwy	-	-	3.32
Pot Cap-1 Maneuver	-	0	466
Stage 1	-	0	-
Stage 2	-	0	-
Platoon blocked, %	-	-	-
Mov Cap-1 Maneuver	-	-	466
Mov Cap-2 Maneuver	-	-	-
Stage 1	-	-	-
Stage 2	-	-	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	13.7
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBT
Capacity (veh/h)	466	-	-	-
HCM Lane V/C Ratio	0.107	-	-	-
HCM Control Delay (s)	13.7	-	-	-
HCM Lane LOS	B	-	-	-
HCM 95th %tile Q(veh)	0.4	-	-	-

R-2588B Widening of NC 191
Lanes, Volumes, Timings

2040 Build PM
09/20/2017

Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
Lane Configurations												
Traffic Volume (vph)	9	52	931	8	18	18	1134	30	8	0	14	47
Future Volume (vph)	9	52	931	8	18	18	1134	30	8	0	14	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		375		0		150		225	0		0	0
Storage Lanes		1		0		1		1	0		0	0
Taper Length (ft)		100				100			100			100
Lane Util. Factor	0.95	1.00	0.95	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00
Frt			0.999					0.850		0.914		
Flt Protected		0.950				0.950				0.982		
Satd. Flow (prot)	0	1770	3536	0	0	1770	3539	1583	0	1672	0	0
Flt Permitted		0.101				0.275				0.982		
Satd. Flow (perm)	0	188	3536	0	0	512	3539	1583	0	1672	0	0
Right Turn on Red				No				No			No	
Satd. Flow (RTOR)												
Link Speed (mph)			55				55			25		
Link Distance (ft)			653				1496			862		
Travel Time (s)			8.1				18.5			23.5		
Peak Hour Factor	0.90	0.50	0.90	0.90	0.90	0.90	0.90	0.50	0.90	0.50	0.90	0.50
Adj. Flow (vph)	10	104	1034	9	20	20	1260	60	9	0	16	94
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	114	1043	0	0	40	1260	60	0	25	0	0
Turn Type	D.P+P	D.P+P	NA		Perm	Perm	NA	Perm	Split	NA		Split
Protected Phases	1!	1	6				2		3	3		4
Permitted Phases	2	2			2	2		2				
Detector Phase	1	1	6		2	2	2	2	3	3		4
Switch Phase												
Minimum Initial (s)	10.0	10.0	14.0		14.0	14.0	14.0	14.0	7.0	7.0		7.0
Minimum Split (s)	17.6	17.6	21.0		21.0	21.0	21.0	21.0	14.0	14.0		14.0
Total Split (s)	21.0	21.0	88.0		67.0	67.0	67.0	67.0	14.0	14.0		18.0
Total Split (%)	17.5%	17.5%	73.3%		55.8%	55.8%	55.8%	55.8%	11.7%	11.7%		15.0%
Maximum Green (s)	14.0	14.0	81.0		60.0	60.0	60.0	60.0	7.0	7.0		11.0
Yellow Time (s)	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0		5.0
All-Red Time (s)	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0		2.0
Lost Time Adjust (s)		-2.0	-2.0				-2.0	-2.0	-2.0	-2.0		
Total Lost Time (s)		5.0	5.0				5.0	5.0	5.0	5.0		
Lead/Lag	Lead	Lead			Lag	Lag	Lag	Lag	Lead	Lead		Lag
Lead-Lag Optimize?	Yes	Yes			Yes	Yes	Yes	Yes	Yes	Yes		Yes
Vehicle Extension (s)	2.0	2.0	6.0		6.0	6.0	6.0	6.0	2.0	2.0		2.0
Minimum Gap (s)	0.2	0.2	3.0		3.0	3.0	3.0	3.0	0.2	0.2		0.2
Time Before Reduce (s)	0.0	0.0	15.0		15.0	15.0	15.0	15.0	0.0	0.0		0.0
Time To Reduce (s)	0.0	0.0	30.0		30.0	30.0	30.0	30.0	0.0	0.0		0.0
Recall Mode	None	None	Min		Min	Min	Min	Min	None	None		None
Act Effect Green (s)		54.1	61.2			40.5	40.5	40.5		9.8		
Actuated g/C Ratio		0.66	0.75			0.50	0.50	0.50		0.12		
v/c Ratio		0.29	0.39			0.16	0.72	0.08		0.12		
Control Delay		9.7	6.6			16.3	20.5	13.8		44.5		
Queue Delay		0.0	0.0			0.0	0.0	0.0		0.0		
Total Delay		9.7	6.6			16.3	20.5	13.8		44.5		

R-2588B Widening of NC 191
Lanes, Volumes, Timings

2040 Build PM
09/20/2017

	↓	↙
Lane Group	SBT	SBR
Lane Configurations	↕	↕
Traffic Volume (vph)	0	102
Future Volume (vph)	0	102
Ideal Flow (vphpl)	1900	1900
Storage Length (ft)		300
Storage Lanes		1
Taper Length (ft)		
Lane Util. Factor	1.00	1.00
Frt		0.850
Flt Protected	0.950	
Satd. Flow (prot)	1770	1583
Flt Permitted	0.950	
Satd. Flow (perm)	1770	1583
Right Turn on Red		No
Satd. Flow (RTOR)		
Link Speed (mph)	25	
Link Distance (ft)	788	
Travel Time (s)	21.5	
Peak Hour Factor	0.50	0.50
Adj. Flow (vph)	0	204
Shared Lane Traffic (%)		
Lane Group Flow (vph)	94	204
Turn Type	NA	pm+ov
Protected Phases	4	1!
Permitted Phases		4
Detector Phase	4	1
Switch Phase		
Minimum Initial (s)	7.0	10.0
Minimum Split (s)	14.0	17.6
Total Split (s)	18.0	21.0
Total Split (%)	15.0%	17.5%
Maximum Green (s)	11.0	14.0
Yellow Time (s)	5.0	5.0
All-Red Time (s)	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0
Total Lost Time (s)	5.0	5.0
Lead/Lag	Lag	Lead
Lead-Lag Optimize?	Yes	Yes
Vehicle Extension (s)	2.0	2.0
Minimum Gap (s)	0.2	0.2
Time Before Reduce (s)	0.0	0.0
Time To Reduce (s)	0.0	0.0
Recall Mode	None	None
Act Effct Green (s)	11.6	26.0
Actuated g/C Ratio	0.14	0.32
v/c Ratio	0.37	0.41
Control Delay	44.1	28.3
Queue Delay	0.0	0.0
Total Delay	44.1	28.3

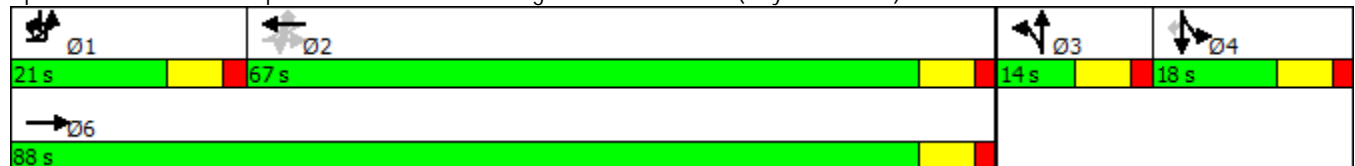
Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL
LOS		A	A			B	C	B		D		
Approach Delay			6.9				20.1			44.5		
Approach LOS			A				C			D		
Queue Length 50th (ft)		13	83			10	232	14		11		
Queue Length 95th (ft)		25	207			38	447	24		25		
Internal Link Dist (ft)			573				1416			782		
Turn Bay Length (ft)		375				150		225				
Base Capacity (vph)		472	3220			397	2750	1230		201		
Starvation Cap Reductn		0	0			0	0	0		0		
Spillback Cap Reductn		0	0			0	0	0		0		
Storage Cap Reductn		0	0			0	0	0		0		
Reduced v/c Ratio		0.24	0.32			0.10	0.46	0.05		0.12		

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 81.7
 Natural Cycle: 80
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.72
 Intersection Signal Delay: 16.3
 Intersection Capacity Utilization 70.5%
 Analysis Period (min) 15
 ! Phase conflict between lane groups.

Intersection LOS: B
 ICU Level of Service C


















Splits and Phases: 6: Alpine Dr/West Henderson High School & NC 191 (Haywood Road)



	↓	↙
Lane Group	SBT	SBR
LOS	D	C
Approach Delay	33.3	
Approach LOS	C	
Queue Length 50th (ft)	43	73
Queue Length 95th (ft)	64	98
Internal Link Dist (ft)	708	
Turn Bay Length (ft)		300
Base Capacity (vph)	308	579
Starvation Cap Reductn	0	0
Spillback Cap Reductn	0	0
Storage Cap Reductn	0	0
Reduced v/c Ratio	0.31	0.35
Intersection Summary		

R-2588B Widening of NC 191
Lanes, Volumes, Timings

2040 Build PM
09/20/2017

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	967	2	0	1163	17	0	0	2	0	0	53
Future Volume (vph)	28	967	2	0	1163	17	0	0	2	0	0	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	10	10	10	10	10	10
Storage Length (ft)	150		0	0		0	0		0	0		0
Storage Lanes	1		0	0		0	0		1	0		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.998				0.865			0.865
Flt Protected	0.950											
Satd. Flow (prot)	1770	3539	0	0	3532	0	0	0	1504	0	0	1504
Flt Permitted	0.950											
Satd. Flow (perm)	1770	3539	0	0	3532	0	0	0	1504	0	0	1504
Link Speed (mph)		45			45			30			30	
Link Distance (ft)		1496			911			590			1563	
Travel Time (s)		22.7			13.8			13.4			35.5	
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)	31	1074	2	0	1292	19	0	0	2	0	0	59
Shared Lane Traffic (%)												
Lane Group Flow (vph)	31	1076	0	0	1311	0	0	0	2	0	0	59
Sign Control		Free			Free			Stop			Stop	

Intersection Summary

Area Type: Other
 Control Type: Unsignalized
 Intersection Capacity Utilization 42.7%
 Analysis Period (min) 15
 ICU Level of Service A

Intersection

Int Delay, s/veh	0.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕↔			↕↔				↕			↕
Traffic Vol, veh/h	28	967	2	0	1163	17	0	0	2	0	0	53
Future Vol, veh/h	28	967	2	0	1163	17	0	0	2	0	0	53
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	Yield
Storage Length	150	-	-	-	-	-	-	-	0	-	-	0
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	90	90	90	90	90	90	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	31	1074	2	0	1292	19	0	0	2	0	0	59















Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	1311	0	0	-	-	0	-	-	538	-	-	656
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy	4.14	-	-	-	-	-	-	-	6.94	-	-	6.94
Critical Hdwy Stg 1	-	-	-	-	-	-	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-	-	-	-	-	-	-
Follow-up Hdwy	2.22	-	-	-	-	-	-	-	3.32	-	-	3.32
Pot Cap-1 Maneuver	524	-	-	0	-	-	0	0	488	0	0	408
Stage 1	-	-	-	0	-	-	0	0	-	0	0	-
Stage 2	-	-	-	0	-	-	0	0	-	0	0	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	524	-	-	-	-	-	-	-	488	-	-	408
Mov Cap-2 Maneuver	-	-	-	-	-	-	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	0.3	0	12.4	15.3
HCM LOS			B	C

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBT	WBR	SBLn1
Capacity (veh/h)	488	524	-	-	-	-	408
HCM Lane V/C Ratio	0.005	0.059	-	-	-	-	0.144
HCM Control Delay (s)	12.4	12.3	-	-	-	-	15.3
HCM Lane LOS	B	B	-	-	-	-	C
HCM 95th %tile Q(veh)	0	0.2	-	-	-	-	0.5

R-2588B Widening of NC 191
Lanes, Volumes, Timings

2040 Build PM
09/20/2017

							
Lane Group	EBU	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations							
Traffic Volume (vph)	1	918	37	15	1117	72	23
Future Volume (vph)	1	918	37	15	1117	72	23
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		175	175		0	350
Storage Lanes	1		1	1		1	1
Taper Length (ft)	100			100		100	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Frt			0.850				0.850
Flt Protected	0.950			0.950		0.950	
Satd. Flow (prot)	1770	3539	1583	1770	3539	1770	1583
Flt Permitted	0.225			0.199		0.950	
Satd. Flow (perm)	419	3539	1583	371	3539	1770	1583
Right Turn on Red			No				No
Satd. Flow (RTOR)							
Link Speed (mph)		45			45	30	
Link Distance (ft)		911			3670	692	
Travel Time (s)		13.8			55.6	15.7	
Peak Hour Factor	0.90	0.90	0.50	0.50	0.90	0.50	0.50
Adj. Flow (vph)	1	1020	74	30	1241	144	46
Shared Lane Traffic (%)							
Lane Group Flow (vph)	1	1020	74	30	1241	144	46
Turn Type	Perm	NA	pm+ov	D,P+P	NA	Prot	pm+ov
Protected Phases		6	4	5	2	4	5
Permitted Phases	6		6	6			4
Detector Phase	6	6	4	5	2	4	5
Switch Phase							
Minimum Initial (s)	12.0	12.0	7.0	7.0	12.0	7.0	7.0
Minimum Split (s)	19.0	19.0	14.0	14.0	19.0	14.0	14.0
Total Split (s)	53.0	53.0	23.0	14.0	67.0	23.0	14.0
Total Split (%)	58.9%	58.9%	25.6%	15.6%	74.4%	25.6%	15.6%
Maximum Green (s)	46.0	46.0	16.0	7.0	60.0	16.0	7.0
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag		Lead			Lead
Lead-Lag Optimize?	Yes	Yes		Yes			Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Recall Mode	Min	Min	None	None	Min	None	None
Act Effct Green (s)	28.4	28.4	42.9	31.4	35.4	11.9	22.8
Actuated g/C Ratio	0.54	0.54	0.82	0.60	0.68	0.23	0.44
v/c Ratio	0.00	0.53	0.06	0.06	0.52	0.36	0.07
Control Delay	11.0	13.7	2.8	5.0	7.0	23.9	11.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	11.0	13.7	2.8	5.0	7.0	23.9	11.2
LOS	B	B	A	A	A	C	B
Approach Delay		13.0			7.0	20.8	
Approach LOS		B			A	C	

Lane Group	EBU	EBT	EBR	WBL	WBT	NBL	NBR
Queue Length 50th (ft)	0	152	7	3	105	43	8
Queue Length 95th (ft)	3	241	8	7	186	53	16
Internal Link Dist (ft)		831			3590	612	
Turn Bay Length (ft)	100		175	175			350
Base Capacity (vph)	359	3036	1370	483	3436	660	690
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.00	0.34	0.05	0.06	0.36	0.22	0.07

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 52.4
 Natural Cycle: 50
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.53
 Intersection Signal Delay: 10.6
 Intersection Capacity Utilization 45.0%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 8: Rugby Middle School & NC 191 (Haywood Road)



R-2588B Widening of NC 191
Lanes, Volumes, Timings

2040 Build PM
09/20/2017

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	133	787	4	5	974	112	3	2	2	118	5	173
Future Volume (vph)	133	787	4	5	974	112	3	2	2	118	5	173
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		0	100		0	0		0	0		150
Storage Lanes	1		0	1		0	0		0	0		1
Taper Length (ft)	100			100			100			100		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.999			0.985			0.961				0.850
Flt Protected	0.950			0.950				0.979			0.954	
Satd. Flow (prot)	1770	3536	0	1770	3486	0	0	1753	0	0	1777	1583
Flt Permitted	0.950			0.323				0.979			0.954	
Satd. Flow (perm)	1770	3536	0	602	3486	0	0	1753	0	0	1777	1583
Right Turn on Red			No			No			No			No
Satd. Flow (RTOR)												
Link Speed (mph)		45			45			25			35	
Link Distance (ft)		3670			2566			1006			2428	
Travel Time (s)		55.6			38.9			27.4			47.3	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	148	874	4	6	1082	124	3	2	2	131	6	192
Shared Lane Traffic (%)												
Lane Group Flow (vph)	148	878	0	6	1206	0	0	7	0	0	137	192
Turn Type	Prot	NA		Perm	NA		Split	NA		Split	NA	pm+ov
Protected Phases	1	6			2		4	4		3	3	1
Permitted Phases				2								3
Detector Phase	1	6		2	2		4	4		3	3	1
Switch Phase												
Minimum Initial (s)	7.0	12.0		12.0	12.0		7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	14.0	19.0		19.0	19.0		14.0	14.0		14.0	14.0	14.0
Total Split (s)	23.0	84.0		61.0	61.0		14.0	14.0		22.0	22.0	23.0
Total Split (%)	19.2%	70.0%		50.8%	50.8%		11.7%	11.7%		18.3%	18.3%	19.2%
Maximum Green (s)	16.0	77.0		54.0	54.0		7.0	7.0		15.0	15.0	16.0
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
All-Red Time (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lost Time Adjust (s)	-2.0	-2.0		-2.0	-2.0			-2.0			-2.0	-2.0
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	5.0
Lead/Lag	Lead			Lag	Lag		Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	1.0	6.0		6.0	6.0		1.0	1.0		2.0	2.0	1.0
Minimum Gap (s)	0.2	3.0		3.0	3.0		0.2	0.2		0.2	0.2	0.2
Time Before Reduce (s)	0.0	20.0		20.0	20.0		0.0	0.0		0.0	0.0	0.0
Time To Reduce (s)	0.0	30.0		30.0	30.0		0.0	0.0		0.0	0.0	0.0
Recall Mode	None	Min		Min	Min		Max	Max		None	None	None
Act Effect Green (s)	13.7	61.7		42.9	42.9			9.2			13.7	27.4
Actuated g/C Ratio	0.14	0.62		0.43	0.43			0.09			0.14	0.27
v/c Ratio	0.61	0.40		0.02	0.81			0.04			0.57	0.44
Control Delay	54.6	10.2		17.8	30.1			50.0			52.9	23.1
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	0.0
Total Delay	54.6	10.2		17.8	30.1			50.0			52.9	23.1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
LOS	D	B		B	C			D			D	C
Approach Delay		16.6			30.1			50.0			35.5	
Approach LOS		B			C			D			D	
Queue Length 50th (ft)	91	137		2	346			4			83	72
Queue Length 95th (ft)	178	186		11	476			21			168	145
Internal Link Dist (ft)		3590			2486			926			2348	
Turn Bay Length (ft)	225			100								150
Base Capacity (vph)	326	2853		345	2002			161			309	508
Starvation Cap Reductn	0	0		0	0			0			0	0
Spillback Cap Reductn	0	0		0	0			0			0	0
Storage Cap Reductn	0	0		0	0			0			0	0
Reduced v/c Ratio	0.45	0.31		0.02	0.60			0.04			0.44	0.38

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 100
 Natural Cycle: 75
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.81
 Intersection Signal Delay: 25.5
 Intersection Capacity Utilization 63.7%
 Analysis Period (min) 15

Intersection LOS: C
 ICU Level of Service B

Splits and Phases: 9: SR 1444 (Leverette Drive)/SR 1381 (Mountain Road) & NC 191 (Haywood Road)



Queuing and Blocking Report

Intersection: 1: NC 280 (Boylston Highway) & NC 191 (Haywood Road)

Movement	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LT	R	R	L	T	TR	L	L	T	TR
Maximum Queue (ft)	194	23	147	168	208	95	540	562	286	327	270	287
Average Queue (ft)	101	3	66	66	100	6	346	366	166	194	84	116
95th Queue (ft)	170	14	122	141	176	54	505	524	268	297	213	214
Link Distance (ft)	511	511	1764	1764			3306	3306			3313	3313
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)					700	150			350	350		
Storage Blk Time (%)							47		1	1	0	
Queuing Penalty (veh)							2		2	3	0	

Intersection: 2: Banner Farm Road/Water Treatment Plant & NC 191 (Haywood Road)

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	SB
Directions Served	L	T	T	R	L	T	TR	L	TR	LTR
Maximum Queue (ft)	24	157	173	118	32	93	144	132	56	40
Average Queue (ft)	2	53	66	39	9	32	58	67	13	11
95th Queue (ft)	14	121	138	98	28	71	113	115	37	37
Link Distance (ft)		1764	1764			5365	5365	1500	1500	356
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	300			350	300					
Storage Blk Time (%)										
Queuing Penalty (veh)										

Intersection: 3: SR 1426 (School House Road)/Water Treatment & NC 191 (Haywood Road)

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB
Directions Served	L	T	TR	L	T	TR	LT	R	LTR
Maximum Queue (ft)	10	199	192	271	88	90	111	139	22
Average Queue (ft)	1	96	98	149	16	32	40	29	2
95th Queue (ft)	6	172	170	248	55	73	86	99	14
Link Distance (ft)		5365	5365		7410	7410	1183	1183	498
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	300			750					
Storage Blk Time (%)									
Queuing Penalty (veh)									

Queuing and Blocking Report

Intersection: 4: SR 1309 (S Rugby Rd)/SR 1365 (N Rugby Rd) & NC 191 (Haywood Road)

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	UL	T	TR	L	T	R	L	TR
Maximum Queue (ft)	198	377	373	267	292	320	155	204	155	204	220
Average Queue (ft)	65	215	217	123	158	190	66	107	24	100	107
95th Queue (ft)	134	332	336	214	268	304	123	177	109	174	182
Link Distance (ft)		7410	7410		1757	1757	1302	1302	1302	1806	1806
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	300			900							
Storage Blk Time (%)		2									
Queuing Penalty (veh)		2									

Intersection: 5: SR 2044 (Haywood Knolls) & NC 191 (Haywood Road)

Movement	EB	EB	NB
Directions Served	T	TR	R
Maximum Queue (ft)	3	4	46
Average Queue (ft)	0	0	3
95th Queue (ft)	3	4	24
Link Distance (ft)	1757	1757	1242
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: Alpine Dr/West Henderson High School & NC 191 (Haywood Road)

Movement	EB	EB	EB	WB	WB	WB	WB	NB	SB	SB
Directions Served	UL	T	TR	UL	T	T	R	LTR	LT	R
Maximum Queue (ft)	112	184	206	57	234	243	52	71	64	87
Average Queue (ft)	41	52	64	20	93	97	12	23	25	29
95th Queue (ft)	84	136	153	49	192	199	37	56	56	66
Link Distance (ft)		606	606		1373	1373		808	720	720
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	375			300			450			
Storage Blk Time (%)					0					
Queuing Penalty (veh)					0					

Queuing and Blocking Report

Intersection: 7: Bradley Rd & NC 191 (Haywood Road)

Movement	EB	WB	WB	NB
Directions Served	L	T	TR	R
Maximum Queue (ft)	31	2	2	6
Average Queue (ft)	3	0	0	0
95th Queue (ft)	18	2	2	4
Link Distance (ft)		833	833	486
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	300			
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 8: Rugby Middle School & NC 191 (Haywood Road)

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB
Directions Served	U	T	T	R	L	T	T	L	R
Maximum Queue (ft)	10	158	173	59	43	134	137	53	26
Average Queue (ft)	0	68	75	12	14	33	44	20	5
95th Queue (ft)	6	137	148	41	38	97	111	43	19
Link Distance (ft)		833	833			3546	3546	614	614
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	200			350	325				
Storage Blk Time (%)		0							
Queuing Penalty (veh)		0							

Intersection: 9: SR 1444 (Leverette Drive)/SR 1381 (Mountain Road) & NC 191 (Haywood Road)

Movement	EB	EB	EB	WB	WB	WB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	LTR	LT	R
Maximum Queue (ft)	182	187	212	50	316	327	28	140	136
Average Queue (ft)	84	79	93	2	183	192	5	50	61
95th Queue (ft)	156	165	180	32	274	285	18	104	116
Link Distance (ft)		3546	3546		2550	2550	917	2314	2314
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	450			200					
Storage Blk Time (%)						6			
Queuing Penalty (veh)						0			

Network Summary

Network wide Queuing Penalty: 9

Intersection: 1: NC 280 (Boylston Highway) & NC 191 (Haywood Road)

Movement	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LT	R	LT	R	R	L	T	TR	L	L	T	TR
Maximum Queue (ft)	155	25	168	121	149	78	307	324	224	256	558	281
Average Queue (ft)	78	4	81	48	75	5	179	198	115	146	142	160
95th Queue (ft)	136	18	143	104	134	42	278	297	194	219	459	245
Link Distance (ft)	284		1764	1764			3305	3305			3317	3317
Upstream Blk Time (%)											0	
Queuing Penalty (veh)											0	
Storage Bay Dist (ft)		75			350	150			350	350		
Storage Blk Time (%)	17						16					
Queuing Penalty (veh)	1						1					

Intersection: 2: Banner Farm Road/Water Treatment Plant & NC 191 (Haywood Road)

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	SB
Directions Served	L	T	T	R	L	T	TR	L	TR	LTR
Maximum Queue (ft)	20	146	146	146	49	104	156	128	42	37
Average Queue (ft)	1	49	58	52	13	38	66	62	12	11
95th Queue (ft)	10	111	119	115	38	81	127	109	33	35
Link Distance (ft)		1764	1764			5365	5365		1500	356
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	150			175	150			150		
Storage Blk Time (%)		0	0	0				0		
Queuing Penalty (veh)		0	0	0				0		

Intersection: 3: SR 1426 (School House Road)/Water Treatment & NC 191 (Haywood Road)

Movement	EB	EB	EB	WB	WB	WB	NB	NB	SB
Directions Served	L	T	TR	L	T	TR	LT	R	LTR
Maximum Queue (ft)	1	187	203	350	84	91	102	89	28
Average Queue (ft)	0	89	98	183	18	39	40	12	3
95th Queue (ft)	1	155	167	304	58	82	83	53	18
Link Distance (ft)		5365	5365		7410	7410	1183		498
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	150			375				250	
Storage Blk Time (%)		1		0					
Queuing Penalty (veh)		0		0					

Intersection: 4: SR 1309 (S Rugby Rd)/SR 1365 (N Rugby Rd) & NC 191 (Haywood Road)

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB
Directions Served	L	T	TR	UL	T	TR	L	T	R	L	TR
Maximum Queue (ft)	234	394	409	416	342	349	118	152	61	232	318
Average Queue (ft)	78	235	250	227	187	214	55	74	3	106	169
95th Queue (ft)	195	363	376	357	303	323	102	139	37	188	271
Link Distance (ft)		7410	7410		1757	1757		1302			1806
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)	150			450			175		200	225	
Storage Blk Time (%)	0	34		0	0		0	1		0	5
Queuing Penalty (veh)	1	23		1	0		0	1		0	8

Intersection: 5: SR 2044 (Haywood Knolls) & NC 191 (Haywood Road)

Movement	NB
Directions Served	R
Maximum Queue (ft)	5
Average Queue (ft)	0
95th Queue (ft)	5
Link Distance (ft)	1242
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 6: Alpine Dr/West Henderson High School & NC 191 (Haywood Road)

Movement	EB	EB	EB	WB	WB	WB	WB	NB	SB	SB
Directions Served	UL	T	TR	UL	T	T	R	LTR	LT	R
Maximum Queue (ft)	73	159	164	62	262	264	76	65	84	125
Average Queue (ft)	26	44	53	21	111	105	10	21	33	53
95th Queue (ft)	58	117	127	51	216	212	49	54	68	100
Link Distance (ft)		606	606		1373	1373		808	720	
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)	375			150			225			300
Storage Blk Time (%)					3	1				
Queuing Penalty (veh)					1	0				

Intersection: 7: Bradley Rd & NC 191 (Haywood Road)

Movement	EB	WB	NB
Directions Served	L	TR	R
Maximum Queue (ft)	21	2	3
Average Queue (ft)	2	0	0
95th Queue (ft)	12	2	2
Link Distance (ft)		833	486
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	150		
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 8: Rugby Middle School & NC 191 (Haywood Road)

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB
Directions Served	U	T	T	R	L	T	T	L	R
Maximum Queue (ft)	8	158	159	40	40	174	190	76	28
Average Queue (ft)	0	64	70	6	10	61	72	30	9
95th Queue (ft)	5	127	133	27	34	146	160	61	24
Link Distance (ft)		833	833			3546	3546	614	
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	100			175	175				350
Storage Blk Time (%)		2	0			0			
Queuing Penalty (veh)		0	0			0			

Intersection: 9: SR 1444 (Leverette Drive)/SR 1381 (Mountain Road) & NC 191 (Haywood Road)

Movement	EB	EB	EB	WB	WB	WB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	LTR	LT	R
Maximum Queue (ft)	152	177	176	98	357	365	16	154	151
Average Queue (ft)	70	65	75	6	220	229	2	62	70
95th Queue (ft)	135	141	146	50	323	338	9	123	130
Link Distance (ft)		3546	3546		2550	2550	917	2314	
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (ft)	225			100					150
Storage Blk Time (%)					38			0	0
Queuing Penalty (veh)					2			1	0

Network Summary

Network wide Queuing Penalty: 41