

# Old Highway 5 –Final Recommendations Report

Keck & Wood Project No. 210187

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Prepared For:



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Prepared by:



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# 1. INTRODUCTION

A corridor study was requested by Cherokee County for the segment of Old Highway 5 between the Cobb County line and River Pointe Parkway in order to help identify locations with operational and/or safety concerns as well as to evaluate the existing pedestrian infrastructure along the route. Utilizing existing traffic count data, recent crash history, and plans for future developments and roadway projects, the corridor was analyzed and solutions were developed to mitigate any operational and/or safety deficiencies that were identified.

The study area consists of the approximately 14-mile-long segment of Old Highway 5 in Cherokee County, beginning at the Cobb County line and ending at River Pointe Parkway, just north of the I-575 interchange in Canton. Old Highway 5 traverses primarily north-south and contains segments within the city limits of Woodstock, Holly Springs, and Canton. The corridor was divided into five segments based on the primary stakeholder for each section of roadway as follows:

1. Cherokee County: Cobb County line to Stockwood Drive (0.49 miles)
2. City of Woodstock: Stockwood Drive to Little River Bridge (2.88 miles)
3. City of Holly Springs: Little River Bridge to Lakeside Drive (4.48 miles)
4. City of Canton: Lakeside Drive to Herndon Lane (2.19 miles)
5. GDOT District 6: Herndon Lane to River Pointe Parkway (4.04 miles)

An overview of the study area is shown in Figure 1.1 while Figure 1.2 depicts the segments as identified above.

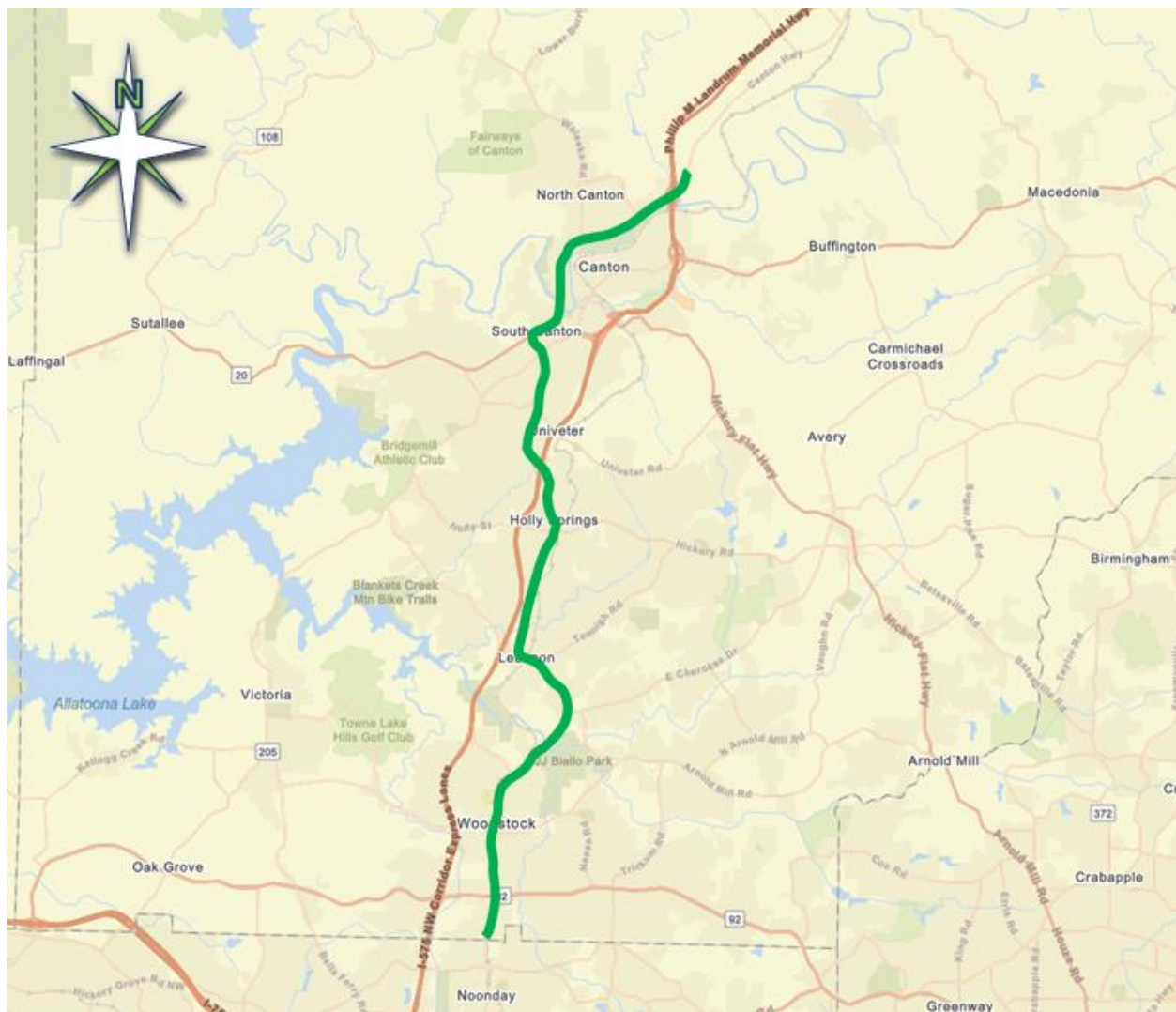


Figure 1.1 - Overview of Study Area



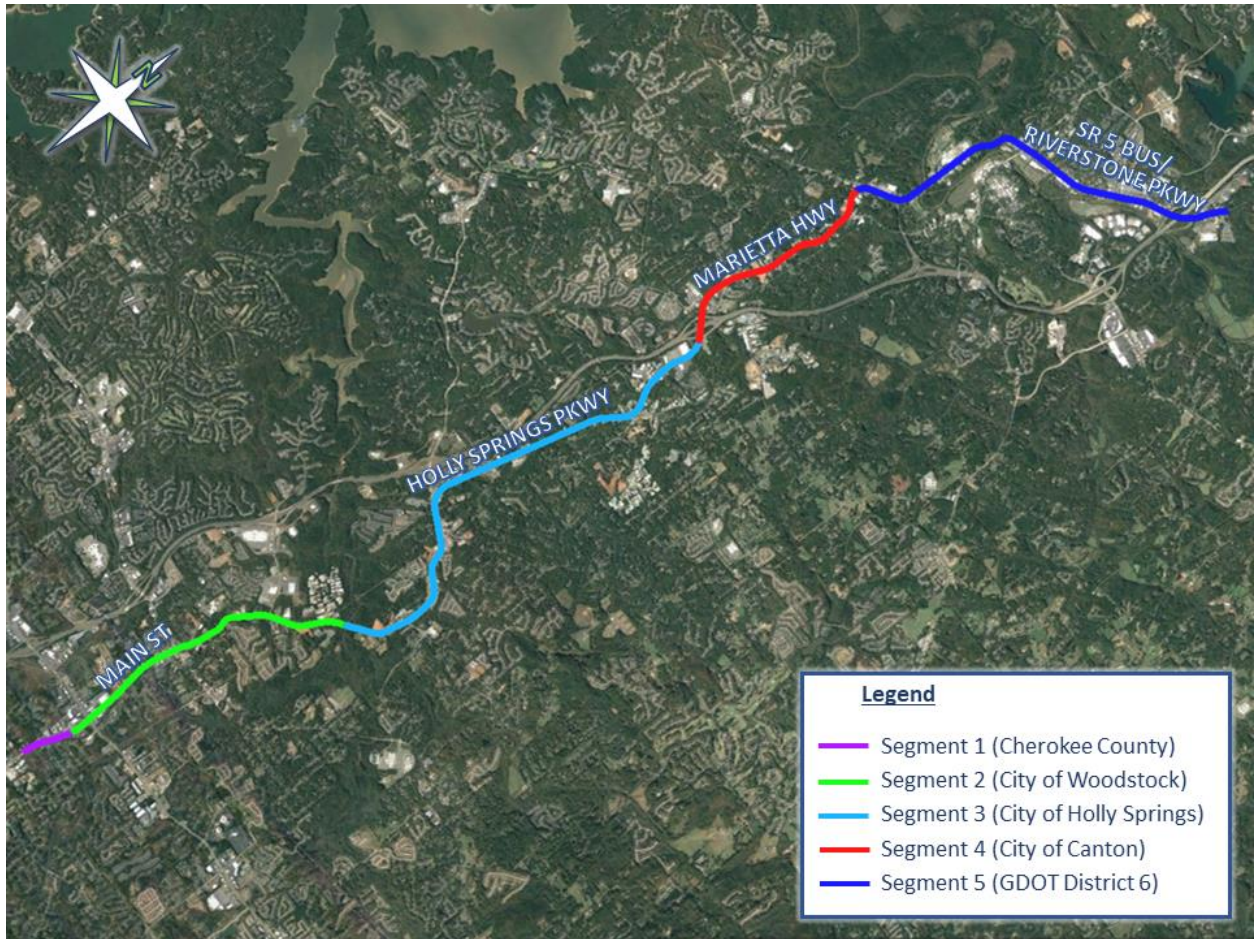


Figure 1.2 - Study Area Breakdown by Primary Stakeholder

## 2. EXISTING CONDITIONS

An Existing Conditions Report was previously submitted which provided a summary of the data collected for the corridor as well as the results of the operational and safety analyses. The report also included a summary of the existing pedestrian infrastructure along the study corridor. The sections below provide a brief overview of the findings from the Existing Conditions Report.

### 2.1. Operational Analysis

In order to determine the need for any roadway and/or operational improvements, a capacity analysis was performed for the Existing Conditions based on the methodology outlined in the Highway Capacity Manual (HCM). Synchro 11 was used to analyze all 38 signalized intersections.

The HCM defines level of service (LOS) in terms of the amount of control delay, including initial deceleration delay, queue move-up time, stopped delay, and final acceleration delay. The LOS categories range from A to F, with different thresholds specified according to the type of stop control at the intersection. The LOS criteria for signalized intersections are listed in Table 2.1.

Rural, sparsely developed areas have a minimum LOS requirement of C based on rural residents' expectation for relatively uncongested conditions in combination with design flexibility associated with lower right of way costs. The minimum LOS for urban areas is D, reflecting the greater acceptance of delay and congestion by urban residents. Additionally, the increased density of developments makes right of way costs much higher in urban areas. The study area is generally well-developed; therefore, an LOS D or higher was considered acceptable.

The analysis results indicated that 7 intersections were operating inadequately (LOS E or F) during the morning and/or evening peak hours while 1 was approaching inadequate LOS (the average delay was within 5 seconds of the LOS E threshold).

- Main Street at SR 92/Alabama Road (intersection #2)
  - LOS E (65.8 sec) during AM peak and LOS F (115.6 sec) during PM peak
- Holly Springs Parkway at East Cherokee Drive (intersection #9)
  - LOS E (55.9 sec) during PM peak
- Holly Springs Parkway at Sixes Road (intersection #13)
  - LOS E (58.7 sec) during PM peak
- Marietta Highway at Prominence Point Parkway/Driveway #3 (intersection #21)
  - LOS F (151.0 sec) during PM peak
- Marietta Highway at Butterworth Road/Univeter Road (intersection #23)
  - LOS F (152.2 sec) during PM peak
- SR 20/Marietta Highway at SR 140/Hickory Flat Highway (intersection #26)
  - LOS F (96.7 sec) during AM peak and LOS F (100.3 sec) during PM peak
- SR 5 Business/SR 140/Marietta Highway/Riverstone Parkway at SR 140/Waleska Road (intersection #28)
  - LOS E (55.7 sec) during AM peak
- Holly Springs Parkway at Holly Street/Hickory Road (intersection #16)
  - LOS D (53.1 sec) during AM peak

The Existing Year capacity analysis results for the morning and evening peak hours for all study intersections are shown in Table 2.2. The intersections showing inadequate operations are highlighted in red and the intersection nearing inadequate LOS is highlighted in yellow. The Synchro reports are included in Appendix A.

Table 2.1 – Level of Service Criteria

Level of Service (LOS)	Signalized Control Delay per Vehicle (sec)
A	≤ 10
B	> 10 and ≤ 20
C	> 20 and ≤ 35
D	> 35 and ≤ 55
E	> 55 and ≤ 80
F	> 80

Table 2.2 – Existing Year 2021 Capacity Analysis Results

No.	Intersection	Intersection Control	Existing 2021			
			AM Peak		PM Peak	
			LOS	sec/veh	LOS	sec/veh
1	Main St at Mauldin Dr	Signalized	A	8.9	A	7.3
<b>2</b>	<b>Main St at SR 92/Alabama Rd</b>	<b>Signalized</b>	<b>E</b>	<b>65.8</b>	<b>F</b>	<b>115.6</b>
3	Main St at Driveway #1 (Woodstock Place)	Signalized	A	4.4	A	9.5
4	Main St at Serenade Ln	Signalized	B	17.6	B	19.5
5	Main St at Dupree Rd	Signalized	C	27.2	C	23.7
6	Main St at Fowler St	Signalized	A	8.9	B	14.0
7	Main St at Arnold Mill Rd	Signalized	D	40.6	D	45.9
8	Main St at Ridgewalk Pkwy	Signalized	C	23.3	C	30.3
<b>9</b>	<b>Holly Springs Pkwy at E Cherokee Dr</b>	<b>Signalized</b>	<b>D</b>	<b>42.4</b>	<b>E</b>	<b>55.9</b>
10	Holly Springs Pkwy at Stoney Creek Pkwy	Signalized	B	12.3	B	10.3
11	Holly Springs Pkwy at Misty Hollow Way/Toonigh Rd	Signalized	C	22.7	B	17.9
12	Holly Springs Pkwy at River Park Blvd	Signalized	B	14.5	B	15.9
<b>13</b>	<b>Holly Springs Pkwy at Sixes Rd</b>	<b>Signalized</b>	<b>D</b>	<b>39.1</b>	<b>E</b>	<b>58.7</b>
14	Holly Springs Pkwy at Driveway #2 (The Home Depot)	Signalized	A	7.0	B	12.2
15	Holly Springs Pkwy at Rabbit Hill Rd	Signalized	A	9.2	A	5.8
<b>16</b>	<b>Holly Springs Pkwy at Holly St/Hickory Rd</b>	<b>Signalized</b>	<b>D</b>	<b>53.1</b>	<b>D</b>	<b>43.9</b>
17	Holly Springs Pkwy at Adam Jenkins Memorial Dr/Pinecrest Rd	Signalized	B	10.5	B	13.2
18	Holly Springs Pkwy at Harbor Creek Pkwy	Signalized	B	17.5	C	20.8
19	Holly Springs Pkwy at I-575 NB Ramps	Signalized	B	14.1	C	22.8
20	Holly Springs Pkwy/Marietta Hwy at I-575 SB Ramps	Signalized	B	18.9	B	18.1
<b>21</b>	<b>Marietta Hwy at Prominence Point Pkwy/Driveway #3 (Kroger)</b>	<b>Signalized</b>	<b>D</b>	<b>36.6</b>	<b>F</b>	<b>151.0</b>
22	Marietta Hwy at Ridge Rd	Signalized	C	27.3	C	26.3
<b>23</b>	<b>Marietta Hwy at Butterworth Rd/Univeter Rd</b>	<b>Signalized</b>	<b>C</b>	<b>29.5</b>	<b>F</b>	<b>152.2</b>
24	Marietta Hwy at Bells Ferry Rd/Marietta Rd	Signalized	B	17.8	B	17.4
25	Marietta Hwy at SR 20/Herndon Ln	Signalized	D	43.5	D	38.2
<b>26</b>	<b>SR 20/Marietta Hwy at SR 140/Hickory Flat Hwy</b>	<b>Signalized</b>	<b>F</b>	<b>96.7</b>	<b>F</b>	<b>100.3</b>
27	SR 5 BUS/SR 140/Marietta Hwy at Driveway #4 (Cherokee High School)	Signalized	B	12.9	A	6.5
<b>28</b>	<b>SR 5 BUS/SR 140/Marietta Hwy/Riverstone Pkwy at SR 140/Waleska Rd</b>	<b>Signalized</b>	<b>D</b>	<b>46.4</b>	<b>E</b>	<b>55.7</b>
29	SR 5 BUS/Riverstone Pkwy at Juniper St/Canton Mill Dr	Signalized	A	9.7	B	13.9
30	SR 5 BUS/Riverstone Pkwy at Old Ballground Hwy	Signalized	A	8.9	A	7.6
31	SR 5 BUS/Riverstone Pkwy at Reinhardt College Pkwy	Signalized	B	16.5	C	22.4
32	SR 5 BUS/Riverstone Pkwy at Driveway #5 (Riverstone Plaza)	Signalized	A	1.8	A	7.5
33	SR 5 BUS/Riverstone Pkwy at Riverstone Blvd	Signalized	D	35.6	B	17.5
34	SR 5 BUS/Riverstone Pkwy at Milton Dr/Old Ballground Hwy	Signalized	B	17.3	B	16.2
35	SR 5 BUS/Riverstone Pkwy at I-575 SB Ramps	Signalized	D	46.8	C	29.2
36	SR 5 BUS/Riverstone Pkwy at I-575 NB Ramps	Signalized	C	33.1	D	47.4
37	SR 5 BUS/Riverstone Pkwy/Ball Ground Hwy at Liberty Blvd/Keith Dr	Signalized	B	12.1	C	22.3
38	SR 5 BUS/Ball Ground Hwy at River Pointe Pkwy	Signalized	A	7.3	A	8.4

A back of queue (BOQ) analysis was performed to determine if any existing queues exceeded the available storage space at any of the study intersections. The 95<sup>th</sup> percentile BOQ length was calculated for specific movements at each intersection. The queue is expected to be the reported length or shorter 95 percent of the time. The results indicated that 18 of the intersections had 95<sup>th</sup> percentile BOQ lengths which exceeded the available lane storage or had an approach with queueing that exceeded 1,000 feet. The 95<sup>th</sup> percentile queue lengths for these intersections are shown in Table 2.3 along with the primary stakeholder for each location.

Table 2.3 – Existing Year 2021 Back of Queue Analysis Results

No.	Intersection	Movement	Existing Storage (feet)	95th Percentile Back of Queue (feet)	
				AM Peak	PM Peak
2	Main St at SR 92/Alabama Rd	Westbound Left	80	273	146
		Westbound Right	175	78	183
		Northbound Left	270	303	425
		Northbound Right	360	101	501
6	Main St at Fowler St	Westbound Right	25	19	49
9	Holly Springs Pkwy at E Cherokee Dr	Eastbound Left	25	26	144
		Westbound Right	265	89	283
10	Holly Springs Pkwy at Stoney Creek Pkwy	Southbound Thru	N/A	1076	215
		Westbound Left	70	81	68
12	Holly Springs Pkwy at River Park Blvd	SB Thru/Right	N/A	1082	534
13	Holly Springs Pkwy at Sixes Rd	Eastbound Left	240	168	374
		Westbound Left	50	74	103
		Northbound Left	295	414	495
16	Holly Springs Pkwy at Holly St/Hickory Rd	Westbound Left	60	304	222
		Southbound Left	330	364	297
18	Holly Springs Pkwy at Harbor Creek Pkwy	Eastbound Left	125	34	126
		Eastbound Right	60	3	74
21	Marietta Hwy at Prominence Point Pkwy/ Driveway #3 (Kroger)	Westbound Left	55	85	226
		Northbound Left	125	306	701
23	Marietta Hwy at Butterworth Rd/Univeter Rd	Eastbound Right	70	147	112
		Northbound Left	245	171	748
		Southbound Left	110	173	204
25	Marietta Hwy at SR 20/Herndon Ln	Eastbound Left	305	412	258
26	SR 20/Marietta Hwy at SR 140/Hickory Flat Hwy	Southbound Left	175	672	857
		Westbound Thru	N/A	953	1145
27	SR 5 BUS/SR 140/Marietta Hwy at Driveway #4 (Cherokee High School)	Northbound Left	160	170	14
28	SR 5 BUS/SR 140/Marietta Hwy/Riverstone Pkwy at SR 140/Waleska Rd	Northbound Left	190	543	711
		Eastbound Left	95	100	131
		Eastbound Right	70	526	349
30	SR 5 BUS/Riverstone Pkwy at Old Ballground Hwy	Westbound Left	60	21	64
31	SR 5 BUS/Riverstone Pkwy at Reinhardt College Pkwy	Northbound Left	185	205	273
34	SR 5 BUS/Riverstone Pkwy at Milton Dr/Old Ballground Hwy	Westbound Left	30	60	79
35	SR 5 BUS/Riverstone Pkwy at I-575 SB Ramps	Southbound Left	305	236	415

## 2.2. Safety and Crash Analysis

Crash data for the study area was obtained from Numetric for the five-year period between 2016 and 2020. A total of 4,330 crashes were reported along the corridor, including 9 fatal crashes, 37 serious injury crashes, 182 minor injury crashes, and 635 possible injury crashes. Using the historical data, the top ten crash locations were selected based on the number of crashes occurring at each intersection. Intersections with upcoming roadway projects within the next five years were excluded from the list. During the analysis process, an additional planned project was identified at the intersection of Main Street and Arnold Mill Road; therefore, the intersection was removed from the top ten list.



Table 2.4 provides a summary of the crashes by severity at the top locations and Table 2.5 summarizes the crashes by manner of collision. Crash diagrams for the top locations are presented in Appendix B.

Table 2.4 – Top Crash Locations by Severity

No.	Intersection	Crashes by Severity					Total	Primary Maintaining Agency
		Fatal Injury Crash (K)	Serious Injury Crash (A)	Minor Injury Crash (B)	Possible Injury Crash (C)	Property Damage Only Crash (O)		
9	Holly Springs Pkwy at E Cherokee Dr	0	0	3	21	119	143	Holly Springs
23	Marietta Hwy at Butterworth Rd/Univeter Rd	1	1	4	22	112	140	Canton
35	SR 5 BUS/Riverstone Pkwy at I-575 SB Ramps	0	4	15	24	89	132	GDOT
33	SR 5 BUS/Riverstone Pkwy at Riverstone Blvd	0	1	4	22	101	128	GDOT
13	Holly Springs Pkwy at Sixes Rd	0	0	0	16	103	119	Holly Springs
36	SR 5 BUS/Riverstone Pkwy at I-575 NB Ramps	1	1	5	18	88	113	GDOT
20	Holly Springs Pkwy/Marietta Hwy at I-575 SB Ramps	0	0	6	18	56	80	Canton
11	Holly Springs Pkwy at Misty Hollow Way/Toonigh Rd	0	1	4	13	57	75	Holly Springs
21	Marietta Hwy at Prominence Point Pkwy/Driveway #3	0	0	3	11	60	74	Canton

Table 2.5 – Top Crash Locations by Manner of Collision

No.	Intersection	Crashes by Manner of Collision						Total	Primary Maintaining Agency
		Angle	Head On	Not a Collision with Motor Vehicle	Rear End	Sideswipe - Opposite Direction	Sideswipe - Same Direction		
9	Holly Springs Pkwy at E Cherokee Dr	19	1	3	114	0	6	143	Holly Springs
23	Marietta Hwy at Butterworth Rd/Univeter Rd	26	0	6	105	0	3	140	Canton
35	SR 5 BUS/Riverstone Pkwy at I-575 SB Ramps	58	0	5	57	0	12	132	GDOT
33	SR 5 BUS/Riverstone Pkwy at Riverstone Blvd	68	0	4	33	0	23	128	GDOT
13	Holly Springs Pkwy at Sixes Rd	14	0	3	90	0	12	119	Holly Springs
36	SR 5 BUS/Riverstone Pkwy at I-575 NB Ramps	16	0	1	83	1	12	113	GDOT
20	Holly Springs Pkwy/Marietta Hwy at I-575 SB Ramps	24	0	2	51	0	3	80	Canton
11	Holly Springs Pkwy at Misty Hollow Way/Toonigh Rd	16	0	2	55	0	2	75	Holly Springs
21	Marietta Hwy at Prominence Point Pkwy/Driveway #3	15	0	3	46	1	9	74	Canton

### 2.3. Pedestrian Infrastructure

An evaluation of the existing pedestrian infrastructure was completed along the study corridor. The evaluation assessed various elements of the existing pedestrian facilities including connectivity, ADA compliance, and the presence of lighting. A summary of the findings broken down into the five previously-defined segments is presented in Table 2.6.

Table 2.6 – Summary of Existing Pedestrian Infrastructure Evaluation

Gaps in Connectivity			Insufficient Lighting			Concerns with ADA Compliance		
Location	Side	Segment	Location	Side	Segment	Location	Side	Segment
<b>Cherokee County</b>			<b>Cherokee County</b>			<b>Cherokee County</b>		
Main St	East	Cobb County line to south of Stockwood Dr	Main St	West	Cobb County line to Stockwood Dr	Main St	East	north of Meadow Ln to Mauldin Dr
<b>City of Woodstock</b>			<b>City of Woodstock</b>			<b>City of Woodstock</b>		
Main St	East	Serenade Ln to Fowler St	Main St	West	Stockwood Dr to Fowler St	Main St	West	Stockwood Dr to southern Sam's Club driveway
Main St	East	Arnold Mill Rd to Rope Mill Rd	Main St	West	Rope Mill Rd to Linton St	Main St	East	Mauldin Dr to S on Main Dr/Serenade Ln
Main St	West	Linton St to Haney Rd	Pedestrian crossing at E Main ST			Intersection of Main St and northern Sam's Club driveway		
Main St	West	Ridgewalk Pkwy to Little River Bridge	Intersection of Main St and Innovation Way			Main St	West	Rope Mill Rd to Linton St
Main St	East	Morgan's Ace Hardware to Little River Bridge	Intersection of Main St and Dobbs Rd			Pedestrian crossing at E Main St		
<b>City of Holly Springs</b>			<b>City of Holly Springs</b>			<b>City of Holly Springs</b>		
Holly Springs Pkwy	East	Little River Bridge to south of Edmondson Ln	Main St	East	north of Linton St to Haney Rd	Intersection of Main St and Innovation Way		
Holly Springs Pkwy	West	Little River Bridge to Braswell Ct	Main St	West	Haney Rd to Ridgewalk Pkwy	Intersection of Main St and Dobbs Rd		
Holly Springs Pkwy	East	Seth Ridge Dr to New Park Dr	Main St	East	Bellevue Dr to Ridgewalk Pkwy	Main St	East	Dobbs Rd to south of Linton St
Holly Springs Pkwy	West	Seth Ridge Dr to south of Riverside Pkwy	Main St	East	Johnston Farm Ln to northern Ace Hardware dwy	Main St	East	north of Linton St to Haney Rd
Holly Springs Pkwy	East	north of Stoney Creek Pkwy to Riverside Way	Main St	West	Bell Pkwy to Waste Management	Main St	East	Bellevue Dr to Cherokee Co Health Dept
Holly Springs Pkwy	West	north of Turner Ln to River Park Blvd	<b>City of Holly Springs</b>			<b>City of Holly Springs</b>		
Holly Springs Pkwy	East	Toonigh Rd to River Park Blvd	Holly Springs Pkwy	West	Edmondson Ln to E Cherokee Dr	Holly Springs Pkwy	East	New Park Dr to north of Animal Medical Center
Holly Springs Pkwy	Both	E Rope Mill Rd to south of Sixes Rd	Holly Springs Pkwy	East	Automotive Dynamics to E Cherokee Dr	Holly Springs Pkwy	West	Riverside Pkwy to Riverside Way
Holly Springs Pkwy	East	north of Sixes Rd to north of Home Depot	Holly Springs Pkwy	West	Riverside Pkwy to Riverside Way	Holly Springs Pkwy	East	south of Fox Creek Dr to Toonigh Rd
Holly Springs Pkwy	West	Rabbit Hill Rd to Childers Rd	Holly Springs Pkwy	East	Stoney Creek Pkwy to north of Animal Medical Center	<b>City of Canton</b>		
Holly Springs Pkwy	East	north of Rabbit Hill Rd to Fire Training Center	Holly Springs Pkwy	East	south of Fox Creek Dr to Toonigh Rd	Intersection of Marietta Hwy and Prominence Point Pkwy		
Holly Springs Pkwy	East	Overlook Cir to Childers Rd	Holly Springs Pkwy	West	River Park Blvd to north of railroad bridge	Intersection of Marietta Hwy and Ridge Rd/Canterbury Ridge Pkwy		
Holly Springs Pkwy	Both	Hembridge Dr to I-575 NB Ramps	Holly Springs Pkwy	East	River Park Blvd to E Rope Mill Rd	Marietta Hwy	East	Canterbury Ridge Pkwy to Ameris Bank driveway
<b>City of Canton</b>			Holly Springs Pkwy	East	southern QT dwy to north of Sherwin Williams dwy	Intersection of Marietta Hwy and Butterworth Rd/Univeter Rd		
Marietta Hwy	East	I-575 NB Ramps to south of Hill Creek Dr	Holly Springs Pkwy	East	Toonigh Creek to Holly Park Ln	Marietta Hwy	West	Pine Ridge Office Park to Ridge Pine Dr
Marietta Hwy	West	I-575 NB Ramps to north of Hill Creek Dr	Holly Springs Pkwy	East	in front of Cherokee Fire Training Center	<b>GDOT District 6</b>		
Marietta Hwy	East	Travis Tritt Ln to north of Ridge Rd	<b>City of Canton</b>			SR 20/Marietta Hwy	Both	south of Herndon Ln to Herndon Ln
Marietta Hwy	East	south of Goodwin Rd to Univeter Rd	Intersection of Marietta Hwy and Prominence Point Pkwy			Marietta Hwy	West	SR 140/SR 20 to Fields Cir
Marietta Hwy	West	Goodwin Rd to south of Inman Dr	Marietta Hwy	West	Ridge Rd/Canterbury Ridge Pkwy to Goodwin Rd	Marietta Hwy	West	Haynes Rd to Santia Rd
Marietta Hwy	West	north of Inman Dr to Univeter Rd	Marietta Hwy	West	Inman Dr to north of Inman Dr	Marietta Hwy	East	Canton Auto Retailer to Riverside Dr
Marietta Hwy	East	Univeter Rd to Heights Pl	Intersection of Marietta Hwy and Butterworth Rd/Univeter Rd			Intersection of Marietta Hwy and Marshal's Walk		
Marietta Hwy	West	Univeter Rd to north of Ivey Dr	Marietta Hwy	East	south of Funeral Home to Fowler Insurance dwy	Marietta Hwy	West	School Dr to Waleska St
Marietta Hwy	East	north of Heights Pl to south of SR 20	Marietta Hwy	West	Pine Ridge Office Park to Ridge Pine Dr	Marietta Hwy	East	N Etowah Dr/Anderson Ave to Waleska St
Marietta Hwy	West	Ridge Pine Dr to south of SR 20	<b>GDOT District 6</b>			Intersection of Riverstone Pkwy and Juniper St/Lakeview Dr		
<b>GDOT District 6</b>			SR 20/Marietta Hwy	Both	south of Herndon Ln to Herndon Ln	Intersection of Riverstone Pkwy and Tiffany Ln		
SR 20/Marietta Hwy	East	Herndon Ln to south of Riverside Dr	Marietta Hwy	West	SR 140/SR 20 to N Etowah Dr/Anderson Ave	Riverstone Pkwy	West	Milton Dr/Old Ball Ground Hwy to Transit Ave
Riverstone Pkwy	East	Old Ball Ground Hwy to Liberty Blvd	Marietta Hwy	East	N Etowah Dr/Anderson Ave to Waleska St	Riverstone Pkwy	East	Keith Dr to north of Keith Dr
Riverstone Pkwy	West	south of Reinhardt College Pkwy to Riverstone Blvd	Marietta Hwy	West	Unnamed road at Krystal to Waleska St	Riverstone Pkwy	East	south of River Pointe Pkwy to River Pointe Pkwy
Riverstone Pkwy	West	north of Riverstone Blvd to Milton Dr	Riverstone Pkwy	East	Lakeview Dr to Old Ball Ground Hwy			
Riverstone Pkwy	West	Transit Ave to I-575 NB Ramps	Riverstone Pkwy	West	Old Ball Ground Hwy to north of Tiffany Ln			
Riverstone Pkwy	Both	Liberty Blvd to River Pointe Pkwy	Riverstone Pkwy	West	Liberty Blvd to north of Liberty Blvd			
			Riverstone Pkwy	East	Keith Dr to north of Keith Dr			
			Riverstone Pkwy	East	south of River Pointe Pkwy to River Pointe Pkwy			

### 3. STAKEHOLDER INFORMATION

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Meetings with each stakeholder were held in order to obtain information regarding upcoming projects in the vicinity of the study area which could impact any of the study intersections. Included in the discussions were roadway projects, planned developments, and projects pertaining to pedestrian facilities. Information provided by the different stakeholders is included in Appendix C.

#### 3.1. Planned Transportation Improvement Projects

##### *City of Woodstock*

- GDOT PI 0018024 is an operational improvement project for the intersection of Main Street and SR 92/Alabama Road which is scheduled to be let in 2024. The project proposes to extend the westbound left turn lane and add a third northbound left turn lane by removing one southbound receiving lane.
- The intersection of Towne Lake Parkway and Mill Street is being converted to a roundabout as part of the “Hub Transformation Project,” which is intended to improve traffic flow throughout the entire downtown Woodstock area. The Hub Transformation Project will also convert Mill Street to a two-way roadway.
- The City of Woodstock has plans improve the intersection of Main Street and Dupree Road as Dupree Road will be extended beyond its existing intersection with Main Street. The improvements include adding a left turn lane on the southbound approach on Main Street as well as a right turn lane on the eastbound approach on Dupree Road. The new westbound approach on Dupree Road will also contain a right turn lane and a shared through-left turn lane.
- City of Woodstock has plans to improve the intersection of Main Street and Arnold Mill Road, which will include adding an eastbound left turn lane, modifying the northbound approach to provide a through lane and a shared through/right turn lane, and closing East Main Street south of Arnold Mill Road.
- The Grid Streets program is being implemented by the City of Woodstock as a way to distribute traffic flows throughout the city as opposed to forcing traffic onto major arterials which are often congested.
- The Greenprints Trail System plan was updated in 2021 to include plans to connect the trail system throughout the city. A map was provided which depicts all of the existing, funded, and proposed trails.

##### *City of Holly Springs*

- The East Cherokee Drive Project is a sidewalk project that runs from the Publix at the intersection of Holly Springs Parkway and East Cherokee Drive to Riverside Way/Fox Creek Drive. It is scheduled to be constructed in summer of 2022.
- The City has plans to install a traffic signal at the intersection of Holly Springs Parkway and Fox Creek Drive/Turner Lane. The project is expected to go to bid in summer 2022.
- The City of Holly Springs has plans to further expand their City Wide Trail System which would provide connectivity between the residential areas to the many commercial, greenspace, and recreational areas.

##### *City of Canton*

- City of Canton’s Transportation Master Plan is scheduled to be finished in November 2022.
- The intersection of Marietta Highway/SR 5 Business/Riverstone Parkway and SR 140/Waleska Road was evaluated as part of the TE Study completed for SR 140 in 2019. Proposed short-term improvements for the intersection include completing a signal upgrade, increasing the right turn lane storage on the SR 140/Waleska Road southbound approach, and converting the existing Walgreens driveway to right-in-right-out (RIRO). The long-term improvements include providing dual left turn lanes for the northbound, eastbound, and westbound approaches, installing a second receiving lane on SR 140/Waleska Road northbound, and installing medians to restrict left-turn movements along Marietta Highway/Riverstone Parkway. The interim improvements recommended involve the realignment of Shoal Creek Lane to align with Mary Lane, just north of the subject intersection, which will be completed under GDOT PI 0017789. The project also includes left and right turn lanes and improved medians. Construction funding has been programmed for 2024.
- The Reinhardt College Parkway at SR 140/Waleska Road intersection was also evaluated as part of the TE Study completed for SR 140. The interim improvements include converting the intersection to a continuous green-T as well as converting the intersections with Mill Street and Vandiver Road to RIRO.

The proposed long-term improvement involves converting the intersection to a roundabout. GDOT PI 0017982 is an intersection improvement project at this location, but it is unclear which improvement is being implemented due to a lack of a detailed project description on GeoPI. Construction funding has been programmed for 2023.

- A study is being completed by Atkins to evaluate the need for a mid-block pedestrian crossing with a pedestrian hybrid beacon (PHB) on SR 5 Business/Riverstone Parkway between SR 140/Waleska Road and Hospital Drive. At this time, the PHB warrant has not been met; however, installation of a PHB is being considered by the City although it has not yet been approved.

*GDOT District 6*

- GDOT PI 0007836 is a widening project for SR 20 between I-75 in Bartow County and I-575 in Cherokee County. Several intersections along the route will be impacted, including the intersections of SR 20 with Marietta Highway and with SR 140/Hickory Flat Highway. The project is scheduled to be let in 2027.

### 3.2. Planned Developments

Meetings with the stakeholders revealed plans for several developments in the vicinity of the study area. A list of the known developments is provided in Table 3.1.

*Table 3.1 – Planned Developments*

Development	Location	Type	Size
<b>City of Woodstock</b>			
Bentley Development	Arnold Mill Rd, east of Old Hwy 5	Mixed-Use	237 apartments, 42,000 sqft commercial
Brooks Family Property	SR 92, east of Old Hwy 5	Mixed-Use	79 townhomes, 21,000 sqft commercial
Flatiron Building	between Main St and Rope Mill Rd	Mixed-Use	20 apartments, 4,500 sqft commercial
<b>City of Holly Springs</b>			
Townhomes	east side of Old Hwy 5 near Fire Training Center	Residential	100 townhomes
Townhomes	west side of Old Hwy 5 south of Overlook Cir	Residential	50 townhomes
<b>City of Canton</b>			
Urgent Care and Starbucks	4125 Marietta Hwy (Old RaceTrac)	Mixed-Use	6,000 sqft
Apartments	300 Prominence Point Pkwy	Residential	168 apartments
My Georgia Plumber	3050 Marietta Hwy	Service	10,800 sqft
Office & Retail - 4 buildings	3174 Marietta Hwy	Retail/Office	22,000 sqft
Jackie Moore Ln Apartments	591 Jackie Moore Ln	Residential	252 apartments
Marietta Rd Project	1010 Marietta Rd	Residential	156 townhomes
<b>GDOT District 6*</b>			
The Bluffs	Bluffs Pkwy	Residential	145 townhomes
Hickory Bluffs	Bluffs Pkwy	Residential	433 townhomes
The Cottages at Riverstone	Reservoir Dr, north of Teasley Middle School	Residential	255 houses
Crystal Lagoons	Reinhardt College Pkwy, behind Publix	Residential	200 townhomes
Riverstone Dominion	Bluffs Pkwy, adjacent to school site	Senior Living	251 apartments
Great Sky - Pod 18	Great Sky Pkwy and Reservoir Dr	Residential	72 houses
Great Sky - Pod 15	Sunshower Ridge	Residential	62 houses
Great Sky - Pod 13	Great Sky Pkwy	Residential	92 houses
Great Sky - Pod 14	Great Sky Pkwy	Residential	164 houses
Great Sky - Pod 7	Great Sky Pkwy	Residential	38 houses
Senior Apartments	137 Reinhardt College Pkwy	Senior Living	120 apartments
Retail/Office	950 Old Ball Ground Hwy	Retail/Office	11,500 sqft
Kimberly Crossing	Reinhardt College Pkwy at Elmwood St	Residential	26 houses
Hospital Dr Project	old hospital site on Hospital Dr	Residential	260 apartments, 50 townhomes
Avanta Project	Reinhardt College Pkwy, across from high school site	Residential	270 townhomes
Etowah Mill Apartments	Reformation Pkwy	Residential	280 apartments
Academy & Main Apartments	Academy St and Main St	Residential	250 apartments

*\*The information pertaining to developments planned for the City of Canton and GDOT District 6 was provided by the City of Canton. The list was then divided based on the geographical location of each development.*

## 4. FUTURE CONDITIONS

An analysis was completed to evaluate the operations of the corridor in future years under Without Development and With Development conditions. An Opening Year of 2028 was established for the study area based on the anticipated time frame needed for the County to complete the improvements, including the pursuit of funding, completion of design work, as well as project letting and construction. A Design Year of 2048 was established based on the typical 20-year design life of most of the improvements. Growth rates were determined using historical traffic count data as well as population projection data. An additional growth rate was applied to estimate the With Development traffic volumes, which was based on information received from the stakeholders regarding planned developments.

### 4.1. Future Traffic Volume Development

An opening year of 2028 and a design year of 2048 were established for the study area and growth rates were calculated in order to obtain the projected traffic volumes for the Without Development conditions. Average annual growth rates were determined using adjusted counts from GDOT and Cherokee County population projections.

GDOT currently maintains fourteen count stations along Old Highway 5 within the vicinity of the study area. Raw counts gathered at the stations between 2012 and 2021 were available on the GDOT Traffic Analysis and Data Application (TADA). Counts collected in 2020 were assumed to be misrepresentative of typical volumes due to the impacts to traffic caused by the COVID-19 pandemic. These counts were excluded from the analysis in order to ensure that the calculated growth rates were not incorrectly skewed. The raw counts were adjusted using GDOT's annual, monthly, daily, and axle factors as appropriate. The raw counts are provided in Appendix D, while the applicable traffic factors and adjusted counts are provided in Appendix E and Appendix F, respectively. Using the adjusted TADA counts, linear regression analysis was performed to estimate the Opening Year 2028 and Design Year 2048 volumes at each of the GDOT count stations. The annual growth rate formula was then used to calculate the compounded growth rates per year. Two of the stations showed a rapid decline in volumes resulting in negative growth rates varying from -2.5% to -8.6% per year; these stations were considered outliers and were therefore excluded from the analysis. Another station was excluded because it only had data for two years, one being 2020.

Population projection data from the U.S. Census Bureau, the Governor's Office of Planning and Budget (OPB), and the Atlanta Regional Commission (ARC) was used to determine annual growth rates based on Cherokee County population data.

The growth rates for the study area were calculated by averaging the growth rates from the TADA counts and county population data. Table 4.1 provides a summary of the growth rates by source and the calculations are provided in Appendix G.

Table 4.1 – Compounded Growth Rates: No-Build/Build Without Development

Data Source	Existing Year to 2028	2028 to 2048
GDOT TADA <sup>1</sup>	1.6%	1.2%
U.S. Census Bureau's Annual Resident Population Estimates <sup>2</sup>	1.7%	1.5%
Governor's Office of Planning and Budget County Residential Projections <sup>3</sup>	0.9%	0.8%
Atlanta Regional Commission Forecast Data <sup>4</sup>	1.3%	1.3%
Overall Average Growth Rate	1.4%	1.2%
<b>Applied Annual Growth Rate</b>	<b>1.5%</b>	<b>1.0%</b>

1 - <https://gdottrafficdata.drakewell.com/publicmultinodemap.asp>

2 - <https://www.census.gov/programs-surveys/popest.html>

3 - <https://opb.georgia.gov/census-data/population-projections>

4 - <https://atlantaregional.org/atlanta-region/population-employment-forecasts>

An additional growth rate was applied to the existing volumes to determine the With Development traffic volumes. Using information on the various planned developments in each segment, the number of new trips expected to be generated by each development was estimated using the ITE Trip Generation Manual. Since a complete trip generation analysis was not performed as part of this study, pass-by and internal capture trips were not included as



a part of this preliminary analysis. The total number of expected new trips was compared to the Opening Year 2028 estimated average daily traffic along Old Highway 5 for each segment and the percent difference between the two was calculated. The growth anticipated for each segment varied widely, with the Woodstock segment falling near the mid-range. The City of Woodstock’s segment is expected to experience an increase in traffic of approximately 20 percent upon completion of all the planned developments. When expressed as an annual growth rate, the 20 percent increase is approximately equal to 3.0 percent per year, which is roughly two times the estimated Without Development growth rate for the study area. The increase calculated for the Woodstock segment was applied to the entire corridor to avoid an over-estimation of volumes resulting from the fact that only a partial trip generation analysis was done. This growth rate was applied to the Opening Year 2028 Without Development volumes in order to obtain the Opening Year 2028 With Development traffic. The Design Year 2048 With Development traffic was determined by applying the annual growth rate of 1 percent to the Opening Year 2028 With Development volumes.

## 4.2. Operational Analysis (No-Build Conditions)

The top ten intersections which exhibited the highest delay times in the existing conditions were selected for further evaluation. Intersections with upcoming roadway projects within the next five years were excluded from the top ten list. Intersection capacity analysis was performed for the morning and evening peak hours of the Opening Year 2028 and Design Year 2048 in the No-Build With Development and No-Build Without Development conditions. The results are presented in Table 4.2 and the Synchro reports are included in Appendix H.

Table 4.2 – No-Build Capacity Analysis Results

No.	Intersection**	Scenario	Opening Year 2028				Design Year 2048			
			AM Peak		PM Peak		AM Peak		PM Peak	
			LOS	sec/veh	LOS	sec/veh	LOS	sec/veh	LOS	sec/veh
21	Marietta Hwy at Prominence Point Pkwy/Driveway #3	No-Build: Without Development	D	43.5	F	174.3	E	65.4	F	229.4
		No-Build: With Development	E	63.0	F	222.0	F	101.6	F	307.5
23	Marietta Hwy at Butterworth Rd/Univeter Rd	No-Build: Without Development	C	34.9	F	205.7	F	80.3	F	326.2
		No-Build: With Development	E	74.1	F	312.8	F	150.6	F	470.3
9	Holly Springs Pkwy at E Cherokee Dr	No-Build: Without Development	D	44.5	E	63.8	D	52.3	F	119.0
		No-Build: With Development	D	51.2	F	112.8	E	79.3	F	210.4
13	Holly Springs Pkwy at Sixes Rd	No-Build: Without Development	D	42.8	E	73.4	F	106.1	F	161.6
		No-Build: With Development	F	96.5	F	152.6	F	254.0	F	284.0
16	Holly Springs Pkwy at Holly St/Hickory Rd	No-Build: Without Development	E	73.5	E	55.9	F	118.4	F	103.8
		No-Build: With Development	F	114.3	F	99.9	F	179.2	F	157.2
36*	SR 5 BUS/Riverstone Pkwy at I-575 NB Ramps*	No-Build: Without Development	D	43.3	E	69.9	F	80.2	F	164.8
		No-Build: With Development	E	76.2	F	154.7	F	146.1	F	294.1
35*	SR 5 BUS/Riverstone Pkwy at I-575 SB Ramps*	No-Build: Without Development	E	63.1	D	51.8	F	131.8	F	119.6
		No-Build: With Development	F	124.6	F	112.9	F	225.8	F	192.5
22*	Marietta Hwy at Ridge Rd*	No-Build: Without Development	D	36.9	D	37.3	E	71.2	F	95.6
		No-Build: With Development	E	66.5	F	89.0	F	131.1	F	192.5
8*	Main St at Ridgewalk Pkwy*	No-Build: Without Development	C	24.3	C	31.3	C	28.6	C	34.2
		No-Build: With Development	C	27.5	C	33.9	D	42.6	D	47.5
33*	SR 5 BUS/Riverstone Pkwy at Riverstone Blvd*	No-Build: Without Development	D	36.5	B	19.1	C	31.7	C	24.4
		No-Build: With Development	C	31.5	C	24.1	D	38.8	C	31.9

\*Although the indicated intersections were operating acceptably in the Existing Condition, they were selected for potential mitigation due to the exclusion of higher ranking intersections as a result of planned projects at those locations.

\*\*All intersections are currently signalized.

## 5. PROPOSED IMPROVEMENTS

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### 5.1. Operational Improvements

Potential alternatives for mitigation were explored for each of the top ten intersections identified as having the worst delay times in the Existing Year 2021 conditions, and a capacity analysis was performed at each location for the Build conditions in the Opening Year 2028 and Design Year 2048 using the Without Development and With Development volumes.

The criteria for determining LOS at an intersection were provided in Section 2.1 of this report; however, only the criteria for signalized intersections were listed. Since some of the proposed improvements involve converting the existing intersection to a single or multilane roundabout, it should be noted that the LOS thresholds vary depending on the type of control at an intersection. Based on guidance in the HCM, the LOS criteria for unsignalized intersections are also applicable to roundabouts. These criteria are presented in Table 5.1.

*Table 5.1 – LOS Criteria: Roundabouts*

Level of Service (LOS)	Roundabouts and Unsignalized Intersections Control Delay per Vehicle (sec)
A	$\leq 10$
B	$> 10$ and $\leq 15$
C	$> 15$ and $\leq 25$
D	$> 25$ and $\leq 35$
E	$> 35$ and $\leq 50$
F	$> 50$

The results of the Build condition capacity analysis for the Opening and Design Years in the Without Development scenario are provided in Table 5.2, along with a comparison to the No-Build analysis results. The results and comparison for the With Development scenarios are included in Table 5.3. The capacity analysis reports for the Build condition scenarios are included in Appendix I. The sections that follow provide details pertaining to the analysis results and to each proposed improvement. For the purposes of this study and to maintain consistency throughout the discussions, Old Highway 5 was assumed to be the north-south roadway at all study intersections.

Table 5.2 – Build: Without Development Capacity Analysis Results

No.	Intersection	Analysis Scenario	Opening 2028 Without Dev.				Design 2048 Without Dev.			
			AM Peak		PM Peak		AM Peak		PM Peak	
			LOS	sec/veh	LOS	sec/veh	LOS	sec/veh	LOS	sec/veh
21	Marietta Hwy at Prominence Point Pkwy/Driveway #3 (Kroger)	No Build without Development	D	43.5	F	174.3	E	65.4	F	229.4
		Build - Alt 1: Dual NB Left Turn Lanes	C	24.0	C	34.2	C	27.7	D	46.1
		% Improvement	45%		80%		58%		80%	
		Build - Alt 2: Multilane Roundabout	A	6.0	B	10.4	A	6.9	C	18.3
		% Improvement	86%		94%		89%		92%	
23	Marietta Hwy at Butterworth Rd/ Univeter Rd	No Build without Development	C	34.9	F	205.7	F	80.3	F	326.2
		Build - Alt 1: Single Lane Roundabout w/ Turn Lanes	A	8.8	C	16.6	B	11.1	F	57.0
		% Improvement	75%		92%		86%		83%	
		Build - Alt 2: Multilane Roundabout	A	9.6	B	12.6	B	11.4	C	19.4
		% Improvement	72%		94%		86%		94%	
9	Holly Springs Pkwy at E Cherokee Dr	No Build without Development	D	44.5	E	63.8	D	52.3	F	119.0
		Build - Alt 1: Dual NB and WB Right Turn Lanes	D	42.0	D	51.7	D	49.4	E	73.5
		% Improvement	6%		19%		6%		38%	
13	Holly Springs Pkwy at Sixes Rd	No Build without Development	D	42.8	E	73.4	F	106.1	F	161.6
		Build - Alt 1: Remove EBR, Dual EBL, Free-Flow SBR	C	28.9	D	43.0	C	33.8	D	54.0
		% Improvement	32%		41%		68%		67%	
16	Holly Springs Pkwy at Holly St/ Hickory Rd	No Build without Development	E	73.5	E	55.9	F	118.4	F	103.8
		Build - Alt 1: Add SB Right Turn Lane	D	42.7	D	41.4	E	57.2	E	61.7
		% Improvement	42%		26%		52%		41%	
		Build - Alt 2: Dual SB Left Turn Lanes	D	48.5	D	43.1	E	66.8	D	52.4
		% Improvement	34%		23%		44%		50%	
		Build - Alt 3: Add SBR, Dual SBL, Dual WBR	D	44.4	D	40.9	E	56.1	D	47.5
		% Improvement	40%		27%		53%		54%	
36	SR 5 BUS/ Riverstone Pkwy at I-575 NB Ramps	No Build without Development	D	43.3	E	69.9	F	80.2	F	164.8
		Build - Alt 1: Free-Flow Right Turn from Ramp	C	31.1	D	41.5	E	75.4	F	91.8
		% Improvement	28%		41%		6%		44%	
35	SR 5 BUS/ Riverstone Pkwy at I-575 SB Ramps	No Build without Development	E	63.1	D	51.8	F	131.8	F	119.6
		Build - Alt 1: Diverging Diamond Interchange (DDI)	F	81.4	E	78.2	F	134.0	F	152.1
		% Improvement	-29%		-51%		-2%		-27%	
		Build - Alt 2: Dual SB Left Turn Lanes	C	27.2	C	25.5	F	83.2	E	65.2
		% Improvement	57%		51%		37%		45%	
22	Marietta Hwy at Ridge Rd	No Build without Development	D	36.9	D	37.3	E	71.2	F	95.6
		Build - Alt 1: Add NBT Lane, EBL, and WBL	C	21.1	B	18.6	C	34.5	C	34.4
		% Improvement	43%		50%		52%		64%	
8	Main St at Ridgewalk Pkwy	No Build without Development	C	24.3	C	31.3	C	28.6	C	34.2
		Build - Alt 1: Multilane Roundabout	A	6.1	A	7.0	A	7.0	A	8.6
		% Improvement	75%		78%		76%		75%	
		Build - Alt 2: Dual SB Right Turn Lanes	C	20.9	C	24.3	C	24.9	C	26.2
		% Improvement	14%		22%		13%		23%	
33	SR 5 BUS/ Riverstone Pkwy at Riverstone Blvd	No Build without Development	D	36.5	B	19.1	C	31.7	C	24.4
		Build - Alt 1: Triple EB Left Turn Lanes	C	33.5	B	17.6	C	28.7	C	20.9
		% Improvement	8%		8%		9%		14%	

Table 5.3 – Build: With Development Capacity Analysis Results

No.	Intersection	Analysis Scenario	Opening 2028 With Development				Design 2048 With Development			
			AM Peak		PM Peak		AM Peak		PM Peak	
			LOS	sec/veh	LOS	sec/veh	LOS	sec/veh	LOS	sec/veh
21	Marietta Hwy at Prominence Point Pkwy/Driveway #3 (Kroger)	No Build with Development	E	63.0	F	222.0	F	101.6	F	307.5
		Build - Alt 1: Dual NB Left Turn Lanes	C	27.3	D	42.3	D	36.2	E	67.6
		% Improvement	57%		81%		64%		78%	
		Build - Alt 2: Multilane Roundabout	A	7.4	C	20.3	A	9.3	F	59.2
		% Improvement	88%		91%		91%		81%	
23	Marietta Hwy at Butterworth Rd/Univeter Rd	No Build with Development	E	74.1	F	312.8	F	150.6	F	470.3
		Build - Alt 1: Single Lane Roundabout w/ Turn Lanes	B	12.2	F	60.7	C	19.4	F	124.0
		% Improvement	84%		81%		87%		74%	
		Build - Alt 2: Multilane Roundabout	B	12.1	C	21.9	C	16.9	F	56.9
		% Improvement	84%		93%		89%		88%	
9	Holly Springs Pkwy at E Cherokee Dr	No Build with Development	D	51.2	F	112.8	E	79.3	F	210.4
		Build - Alt 1: Dual NB and WB Right Turn Lanes	D	48.8	E	71.0	F	82.5	F	108.8
		% Improvement	5%		37%		-4%		48%	
13	Holly Springs Pkwy at Sixes Rd	No Build with Development	F	96.5	F	152.6	F	254.0	F	284.0
		Build - Alt 1: Remove EBR, Dual EBL, Free-Flow SBR	D	35.6	D	53.7	F	86.7	F	93.1
		% Improvement	63%		65%		66%		67%	
16	Holly Springs Pkwy at Holly St/Hickory Rd	No Build with Development	F	114.3	F	99.9	F	179.2	F	157.2
		Build - Alt 1: Add SB Right Turn Lane	D	54.2	D	52.6	F	89.8	F	98.6
		% Improvement	53%		47%		50%		37%	
		Build - Alt 2: Dual SB Left Turn Lanes	E	65.1	D	51.4	F	103.2	F	80.0
		% Improvement	43%		49%		42%		49%	
		Build - Alt 3: Add SBR, Dual SBL, Dual WBR	D	54.1	D	46.3	F	81.3	E	60.4
		% Improvement	53%		54%		55%		62%	
36	SR 5 BUS/ Riverstone Pkwy at I-575 NB Ramps	No Build with Development	E	76.2	F	154.7	F	146.1	F	294.1
		Build - Alt 1: Free-Flow Right Turn from Ramp	E	56.5	F	92.5	F	139.1	F	154.3
		% Improvement	26%		40%		5%		48%	
35	SR 5 BUS/ Riverstone Pkwy at I-575 SB Ramps	No Build with Development	F	124.6	F	112.9	F	225.8	F	192.5
		Build - Alt 1: Diverging Diamond Interchange (DDI)	F	111.2	F	118.1	F	232.3	F	251.3
		% Improvement	11%		-5%		-3%		-31%	
		Build - Alt 2: Dual SB Left Turn Lanes	F	63.2	E	59.4	F	147.8	F	120.5
		% Improvement	49%		47%		35%		37%	
22	Marietta Hwy at Ridge Rd	No Build with Development	E	66.5	F	89.0	F	131.1	F	192.5
		Build - Alt 1: Add NBT Lane, EBL, and WBL	C	32.7	C	29.9	E	71.6	E	70.3
		% Improvement	51%		66%		45%		63%	
8	Main St at Ridgewalk Pkwy	No Build with Development	C	27.5	C	33.9	D	42.6	D	47.5
		Build - Alt 1: Multilane Roundabout	A	7.4	A	9.2	A	8.9	B	14.1
		% Improvement	73%		73%		79%		70%	
		Build - Alt 2: Dual SB Right Turn Lanes	C	23.9	C	25.9	D	37.9	D	35.1
		% Improvement	13%		24%		11%		26%	
33	SR 5 BUS/ Riverstone Pkwy at Riverstone Blvd	No Build with Development	C	31.5	C	24.1	D	38.8	C	31.9
		Build - Alt 1: Triple EB Left Turn Lanes	C	28.1	C	20.9	C	33.8	C	23.6
		% Improvement	11%		13%		13%		26%	

*Marietta Highway at Prominence Point Parkway/Driveway #3 (Intersection #21)*

Marietta Highway at Prominence Point Parkway is a four-legged, signalized intersection with dedicated left turn lanes on all approaches and dedicated right turn lanes on the northbound, southbound, and eastbound approaches. The northbound and southbound approaches on the mainline each consist of two travel lanes. The side streets are both single-lane approaches, but the westbound approach on Prominence Point Parkway contains two departure lanes. The intersection is expected to operate acceptably at LOS D during the morning peak hour of the Opening Year 2028 in the Without Development condition; however, the intersection would be expected to exhibit inadequate operations in all other No-Build scenarios, with the northbound left turn movement experiencing the highest delay times. Potential solutions for mitigation considered for this location include installing an additional northbound left turn lane to provide dual left turns and converting the intersection to a multilane roundabout.

**Dual northbound left turn lanes** would be provided by restriping the existing inside southbound receiving lane to function as a northbound left turn lane. The excess pavement on the west side of the roadway would be utilized to

shift the southbound traffic over in order to maintain two travel lanes; at the end of the new left turn lane, the southbound lanes would transition back to their existing alignment. The estimated cost of this improvement is \$750,000.

**The multilane roundabout** would consist of two-lane approaches on all four legs as well as right turn bypass lanes. The westbound approach, which is the Kroger driveway, would contain only one departure lane while the remaining approaches would have two. There is guardrail present on all but the northwest corner of the intersection. The vertical grade difference on the southeast corner is significant, which could impact the constructability of a roundabout. The estimated cost of the multilane roundabout is \$3,000,000.

Both alternatives would reduce delay and result in acceptable operations in all scenarios except for the evening peak hour in the Design Year under the With Development condition. The multilane roundabout would be expected to provide a greater reduction in delay times and provide an overall higher LOS than the dual northbound left turns.

#### *Marietta Highway at Butterworth Road/Univeter Road (Intersection #23)*

Marietta Highway at Butterworth Road/Univeter Road is a four-legged, signalized intersection with dedicated left and right turn lanes on three of the approaches; the southbound approach on Marietta Highway contains a left turn lane and a shared through-right turn lane. The intersection is severely skewed and has channelized right turns on the northbound and southbound approaches. It is expected to operate acceptably in the Opening Year during the morning peak hour in the Without Development condition; however, all other scenarios are expected to exhibit an LOS of E or below. Alternatives for mitigation include a single lane roundabout and a multilane roundabout.

**The single lane roundabout** would be elliptical in order to better fit within the constraints of the existing intersection. All four approaches would include two entry lanes and a single departure lane. The inner lane on the northbound and southbound approaches on Marietta Highway would be a dedicated left turn lane while the outer lane on the eastbound and westbound approaches would be a dedicated right turn lane. The estimated cost of the single lane roundabout is \$1,800,000.

**The multilane roundabout** would also be elliptical, but would contain two departure lanes on each approach that would transition down to a single lane at a merge point beyond the roundabout. The northbound and southbound approaches would consist of two entry lanes and a right turn bypass lane while the eastbound and westbound approaches would each contain a single approach lane as well as a right turn bypass lane. The estimated cost of the multilane roundabout is \$3,000,000.

Both roundabouts would be expected to result in a significant reduction of delay for all scenarios, with the multilane roundabout performing slightly better. It should be noted, however, that there are two fueling stations located at the intersection on the northeast and northwest corners. These properties would be impacted by the conversion to a roundabout and additional environmental documentation would be required to ensure there is no soil contamination on these two sites.

#### *Holly Springs Parkway at East Cherokee Drive (Intersection #9)*

Holly Springs Parkway at East Cherokee Drive is a four-legged, signalized intersection. The northbound approach on Holly Springs Parkway contains a single through lane, a left turn lane, a right turn lane, and two receiving lanes. The southbound approach consists of dual left turn lanes, a shared through-right turn lane, and a single departure lane. The westbound approach on East Cherokee Drive contains a left turn lane, a shared through-left turn lane, a right turn lane, and two departure lanes. The eastbound approach is the driveway to the Village Shoppes of East Cherokee shopping center and contain a left turn lane and a shared through-right turn lane. A project was completed at the end of 2017 to increase intersection capacity. This project included widening the westbound approach from two lanes to its current configuration, extending the northbound left turn lane, and converting the southbound right turn lane to a shared through-right turn in order to provide dual left turns. The intersection experiences high volumes on the northbound and westbound right turn movements as well as the southbound and westbound left turn movement during both peak hours. In the Without Development scenario, the intersection is expected to exhibit inadequate operations during the evening peak of the Opening and Design years. In the With Development scenario, it is expected to operate at LOS E or lower during the evening peak hour of the Opening year and both peak hours of the Design year.

The proposed improvement for this location involves **providing dual right turn lanes on the northbound and westbound approaches**. The existing right turn lanes to the Woodstock KinderCare driveways on Holly Springs



Parkway would be extended to create a second northbound receiving lane beyond the intersection. The new lane would then become a drop lane at the northernmost driveway to the KinderCare facility. The estimated cost of providing northbound and westbound dual right turn lanes is \$900,000.

The analysis results indicate that this improvement would be expected to reduce delay for all scenarios except the With Development Design Year morning peak hour, which would suffer a slight (3-second) increase in delay.

#### *Holly Springs Parkway at Sixes Road (Intersection #13)*

Holly Springs Parkway at Sixes Road is a four-legged, signalized intersection. The southbound approach on Holly Springs Parkway and the eastbound approach on Sixes Road both contain a single through lane with a left turn lane and a right turn lane. The northbound approach contains dual left turn lanes and a shared through-right turn lane. The westbound approach consists of a left turn lane and a shared through-right turn lane. The intersection is expected to exhibit inadequate LOS in all conditions except for the Without Development Opening Year morning peak hour.

The proposed improvement for this intersection is to **provide dual left turn lanes on the eastbound approach** along Sixes Road and to convert the southbound right turn movement to a free-flow condition. The existing through lane would be restriped to serve as the additional left turn lane and the existing right turn lane would then accommodate a shared through-right turn movement. To alleviate congestion resulting from combining the through and right turn movements, East Rope Mill Lane would be utilized as a slip right turn lane. In order to accomplish this, East Rope Mill Lane would need to be realigned so that it intersects Sixes Road east of the existing intersection with North Rope Mill Road. The estimated cost of this improvement is \$1,200,000.

The intersection would be expected to operate acceptably with these improvements during both peak hours in the Without Development Opening and Design Year scenarios as well as the With Development Opening Year scenario. The analysis results indicate an LOS F for the With Development Design Year scenario; however, the intersection would still experience a reduction in delay times of over 50 percent.

#### *Holly Springs Parkway at Holly Street/Hickory Road (Intersection #16)*

Holly Springs Parkway at Holly Street/Hickory Road is a four-legged, signalized intersection. The northbound, eastbound, and westbound approaches all contain a single through lane with a left turn lane and a right turn lane. The southbound approach contains a left turn lane and a shared through-right turn lane. An at-grade rail crossing is located approximately 125 feet east of the intersection on Hickory Road. The intersection is expected to exhibit LOS E or lower in all scenarios with the southbound approach on Holly Springs Parkway experiencing the highest delay times. Potential solutions for mitigation include providing a right turn lane on the southbound approach, providing dual left turn lanes on the southbound approach, providing both a right turn lane and dual left turns on the southbound approach, and providing both of these as well as dual westbound right turn lanes.

**The addition of a southbound right turn lane** would involve widening the existing roadway along Holly Springs Parkway to provide the exclusive turn lane. The storage length would be restricted to approximately 75 feet in order to avoid widening beyond the local road just north of the intersection. The estimated cost of the southbound right turn lane is \$300,000. Another option to improve the southbound right turn movement would be to connect the unnamed local road north of the intersection to the paved turnout located just west of the intersection on Holly Steet so that it could be utilized as a right turn slip lane. According to the Cherokee County online GIS map, the city currently owns the land that would be required to complete this option.

**Installing an additional southbound left turn lane** would require widening the southbound approach as well as the westbound approach. In addition to acquiring right-of-way, coordination with the railway would likely be required. The estimated total cost of this improvement is \$1,000,000.

The third alternative considered for this location included **installing a southbound right turn lane, an additional southbound left turn lane, and an additional westbound right turn lane**. This alternative would require the most right-of-way and the railway coordination would still be required. The estimated cost of this alternative is \$1,500,000.

The final alternative considered was a combination of the first two alternatives, which included the **installation of a right turn lane and an additional left turn lane on the southbound approach**. As previously mentioned, right-of-way acquisition would be required along the southbound and westbound approaches. Additionally, impacts to the

westbound approach would likely result in the need for railway coordination. The estimated cost of these improvements is \$1,250,000.

All of the alternatives would result in a reduction in delay times in all scenarios. The third alternative, which involves the right turn lane and dual left turn lanes on the southbound approach and the dual right turn lanes on the westbound approach, would yield the biggest reduction in delay, but also has the highest estimated cost and impacts to adjacent properties. The first alternative, the southbound right turn lane, has the highest benefit-to-cost ratio.

#### *SR 5 Business/Riverstone Parkway at I-575 NB Ramps (Intersection #36)*

SR 5 Business/Riverstone Parkway at the I-575 Northbound Ramps is a signalized intersection with two lanes along SR 5 Business/Riverstone Parkway and three approach lanes on the I-575 northbound exit ramp. A single left turn lane is provided on the northbound approach on SR 5 Business/Riverstone Parkway; dual left turn lanes and a right turn lane are provided on the exit ramp. The intersection is expected to exhibit an LOS of E or lower in all scenarios except during the morning peak hour in the Without Development Opening Year condition, and the I-575 exit ramp is expected to operate at LOS E or worse in all scenarios.

The proposed improvement involves **converting the right turn from the I-575 exit ramp to a free-flow condition** by extending the northbound right turn lane at the adjacent intersection with Keith Drive back to the ramp intersection. Additional fill would likely be required to complete this extension due to the vertical grade along the side slopes on the northeast corner. The new outer lane would then become a drop lane at Keith Drive. The estimated cost of this improvement is \$400,000.

This improvement would result in a reduction of delay for all scenarios, but the intersection is only expected to exhibit an LOS of D or higher in the Without Development Opening Year conditions.

#### *SR 5 Business/Riverstone Parkway at I-575 SB Ramps (Intersection #35)*

SR 5 Business/Riverstone Parkway at the I-575 Southbound Ramps is a signalized intersection with two lanes along SR 5 Business/Riverstone Parkway and two approach lanes on the I-575 southbound exit ramp. A right turn lane is provided on the northbound approach along SR 5 Business/Riverstone Parkway; the exit ramp contains a left turn lane and a right turn lane. The analysis results indicate that the intersection will operate acceptably during the evening peak hour of the Opening Year in the Without Development scenario; all other scenarios exhibit LOS E or worse. The southbound left turn movement along SR 5 Business/Riverstone Parkway experiences long queues during the evening peak hour in the Existing Year. Potential improvements for this location include converting to a diverging diamond interchange (DDI) and providing dual southbound left turn lanes.

**Converting the interchange to a diverging diamond interchange (DDI)** would be expected to result in an increase in delay times for all scenarios. Assuming the existing bridge deck would be retained, the estimated cost of the diverging diamond interchange is \$5,000,000.

**Dual southbound left turn lanes** along SR 5 Business/Riverstone Parkway would be provided by widening the southbound approach. In order to avoid impacts to the bridge deck spanning I-575, the turn lane would need to be no longer than approximately 270 feet. The estimated cost of this improvement is \$750,000.

The intersection would be expected to operate acceptably at LOS C with dual southbound left turn lanes during both peak hours in the Opening Year Without Development condition. The results indicate that operations would fall to LOS E or below for all other scenarios; however, the improvement would result in decreased delay times with reductions ranging from 35 percent to 49 percent.

#### *Marietta Highway at Ridge Road/Canterbury Ridge Parkway (Intersection #22)*

Marietta Highway at Ridge Road/Canterbury Ridge Parkway is a signalized, four-legged intersection with single-lane approaches and dedicated turn lanes along the mainline. The intersection is expected to exhibit inadequate operations in all scenarios except the Without Development Opening Year conditions.

The proposed improvement involves **modifying the northbound approach to provide an additional through lane** by converting the existing right turn lane to a shared through-right turn lane. A merge point would be provided north of the intersection just past the Ameris Bank driveway. In addition, dedicated left turn lanes would be installed on both side street approaches. The estimated cost of these improvements is \$600,000.

The intersection improvements are expected to result in a significant reduction in delay time and improve operations for all scenarios. Operations in the With Development condition are expected to fall to LOS E in the Design Year, but the reduction in delay times would be 45 percent for the morning peak and 63 percent for the evening peak.

#### *Main Street at Ridgewalk Parkway (Intersection #8)*

The intersection of Main Street and Ridgewalk Parkway is signalized with three approaches. The northbound approach along Main Street contains dual left turn lanes and a single through lane. The southbound approach has a through lane and a right turn lane. The eastbound approach on Ridgewalk Parkway consists of dual left turn lanes and a single right turn lane. An intersection improvement project was completed at this location in 2020 which involved providing dual left turn lanes on the eastbound and northbound approaches. This intersection is expected to operate acceptably through all scenarios in the No-Build condition; however, it was selected for improvement as a result of higher ranked locations being removed from the list due to upcoming projects. Potential improvement alternatives include a multilane roundabout and installing an additional southbound right turn lane.

**The multilane roundabout** would consist of two entry lanes and two departure lanes on each approach. The southbound and eastbound approaches would each have a right turn bypass lane. The estimated cost of the multilane roundabout is \$2,000,000.

In order to **provide dual southbound right turn lanes**, the southbound approach along Main Street would need to be widened. Due to the proximity of the train tracks running along the west side of Main Street, the length of the new lane would be restricted to a maximum of approximately 200 feet in order to avoid impacts to the rail bed. The traffic signal phasing would be converted to allow the southbound right turn to operate during an overlap phase to increase the number of vehicles allowed for that movement per cycle. The estimated cost of providing dual southbound right turns is \$500,000.

Both alternatives would be expected to improve operations at the intersection. The dual southbound right turn lanes would result in an LOS C in the Without Development scenarios as well as the With Development Opening Year scenarios; LOS D would be exhibited in the With Development Design Year scenarios. The multilane roundabout would provide the most benefit as the intersection would operate at LOS B or better in all scenarios.

#### *SR 5 Business/Riverstone Parkway at Riverstone Boulevard (Intersection #33)*

The intersection of SR 5 Business/Riverstone Parkway and Riverstone Boulevard is a signalized, three-legged intersection with three lanes in each direction along the mainline. A left turn lane is provided on the northbound approach and the southbound approach contains a right turn lane. The eastbound approach on Riverstone Boulevard contains dual left turns lanes and a single right turn lane. This intersection is expected to operate acceptably; however, it was selected for improvement as a result of higher ranked locations being removed from the list due to upcoming projects. Although the intersection is expected to operate acceptably through all scenarios in the No-Build condition, the high volume of the eastbound left turn movement is expected to result in an LOS F for the movement by the Design Year in the evening peak hour.

The proposed improvement at this location includes **installing an additional left turn lane on the eastbound approach** along Riverstone Boulevard by repurposing the existing striped median in order to provide triple left turn lanes. The estimated cost of this improvement is \$250,000.

The analysis results indicate that implementing this improvement would reduce intersection delay times in all scenarios with the greater benefit occurring in the With Development conditions.

## 5.2. Safety Improvements

The top intersections identified for safety improvements in the existing conditions report were further evaluated to look for crash trends and patterns to determine what type of improvement would be best suited for the study intersections. Most of the intersections solicit the need for multiple safety improvements that when implemented together will result in a more effective, overall improvement than if each were to be implemented individually. Safety mitigated alternatives for each intersection are summarized in

Table 5.4 below, along with the number of crashes reported for each. Details on the improvements at each location are provided in the sections that follow.

Table 5.4 – Improvements to Mitigate Safety Concerns

No.	Intersection	Crashes from 2016-2020						Improvement
		K	A	B	C	O	Total	
9	Holly Springs Pkwy at E Cherokee Dr	0	0	3	21	119	143	Minor Safety Improvements: Dynamic Warning Flashers, Resurface Pavement, Signal Timing Adjustments, Supplemental Signal Heads, Elongated Right Turn
23	Marietta Hwy at Butterworth Rd/Univeter Rd	1	1	4	22	112	140	Minor Safety Improvements: Absence of Access Points, Elongated Right Turns, Protected-Only by TOD, Install FYAs, Improve Street Lighting  Convert to Roundabout
35	SR 5 BUS/Riverstone Pkwy at I-575 SB Ramps	0	4	15	24	89	132	Minor Safety Improvements: Install FYA, Transverse Rumble Strips, Elongated Right-Turn, Protected-Only by TOD, Clearance Interval Adjustment
33	SR 5 BUS/Riverstone Pkwy at Riverstone Blvd	0	1	4	22	101	128	Minor Safety Improvements: Install FYA, Absence of Access Points, Improve Signal Visibility
13	Holly Springs Pkwy at Sixes Rd	0	0	0	16	103	119	Minor Safety Improvements: Elongated Right Turns, Install Right-Turn Lane
36	SR 5 BUS/Riverstone Pkwy at I-575 NB Ramps	1	1	5	18	88	113	Minor Safety Improvements: Install FYA, Supplemental Signal Head, Transverse Rumble Strips, Advance Warning Flashers, Protected-Only by TOD
20	Holly Springs Pkwy/Marietta Hwy at I-575 SB Ramps	0	0	6	18	56	80	Minor Safety Improvements: Install Transverse Rumble Strips, Elongated Right Turn, Post-Mounted Delineators
11	Holly Springs Pkwy at Misty Hollow Way/Toonigh Rd	0	1	4	13	57	75	Minor Safety Improvements: Protected-Only by TOD, Elongated Right Turn, Dynamic Warning Flashers
21	Marietta Hwy at Prominence Point Pkwy/Driveway #3	0	0	3	11	60	74	Minor Safety Improvements: Install Permissive Only FYA (WB), Elongated Right Turns, Physical Channelization of Right Turn Lanes  Convert to Roundabout

*Holly Springs Parkway at East Cherokee Drive (Intersection #9)*

A total of 143 crashes were reported at the intersection of Holly Springs Parkway and East Cherokee Drive during the five-year period between 2016 and 2020. Of the 143 crashes, 80 percent were rear end crashes and 13 percent were angle crashes. The majority of the crashes reported occurred between 2018 and 2020, which coincides with a 2018 intersection improvement project to reconfigure each approach that was completed at the intersection. **A combination of safety improvements is recommended for this intersection.** Pavement resurfacing and advance warning signs to alert drivers of the lane configuration ahead are recommended for the southbound approach on Holly Springs Parkway. Installing an elongated right turn is recommended to improve the visibility angle for the channelized right turns on the westbound and northbound approaches. The FHWA crash modification factors suggest that implementing an elongated right turn would result in a 44 percent reduction in all crash types (FHWA Clearinghouse Numbers 8428/8429). In addition to the right turn modification, signal timing adjustments are recommended for the northbound approach on Holly Springs Parkway, which include verifying appropriate clearances are used as well as potentially increasing vehicle extension time. Finally, a supplemental signal head is recommended for the eastbound approach to address the sight distance concern presented when exiting the Publix driveway due to the downgrade. The estimated cost associated with these improvements is \$400,000.

*Marietta Highway at Butterworth Road/Univeter Road (Intersection #23)*

A total of 140 crashes were reported at the intersection of Marietta Highway and Butterworth Road/Univeter Road. The intersection has a significant skew, which presents many challenges with respect to sight distance and turning maneuvers. **Potential solutions for mitigation include converting the intersection to a roundabout or implementing a combination of intersection improvements.** Converting the intersection to a roundabout would result in a 74 percent reduction in fatal and injury crashes and a 35 percent reduction in property damage crashes (FHWA Clearinghouse Numbers 209/212). Conversion to a roundabout was also proposed to mitigate the operational deficiencies at this location; both a single lane and multilane were analyzed. The intersection improvement project would include improved intersection lighting as well as a combination of improvements on

each approach. Improvements for the southbound approach along Marietta Highway include the elimination or reduction of access points, both entering and exiting the intersection, installation of an elongated right turn, and implementation of protected-only signal phasing. Elongated right turns and the implementation of protected-only signal phasing is also proposed for the northbound approach on Marietta Highway. Improvements for the eastbound and westbound approaches on Butterworth Road and Univeter Road include the installation of directional striping for the left turn lanes. The estimated cost for a single lane roundabout is \$1,800,000 and that for a multilane roundabout is \$3,000,000. The estimated cost associated with the intersection improvements is \$500,000.

#### *SR 5 Business/Riverstone Parkway at I-575 SB Ramps (Intersection #35)*

A total of 132 crashes were reported at the intersection of SR 5 Business/Riverstone Parkway and the I-575 Southbound Ramps. Just under half (44 percent) of the crashes were angle crashes, 53 of which involved vehicles turning left to access the I-575 southbound entrance ramp and vehicles traveling through the intersection to continue north on SR 5 Business/Riverstone Parkway. This southbound left turn movement is currently controlled by a 5-stack (“doghouse”) signal head which is not aligned with the center of the left turn lane. **A combination of safety improvements is recommended for this intersection.** Replacing the signal head with a flashing yellow arrow (FYA) signal head that is properly aligned would increase the signal visibility and potentially reduce the occurrence of crashes involving left-turning vehicles. In addition to the signal head modifications, signal timing adjustments are recommended which include implementing protected-only phasing during peak periods and verifying appropriate clearances are used as well as potentially increasing vehicle extension time. Other improvements proposed to mitigate safety concerns include installing elongated right turns on the eastbound approach along the I-575 exit ramp and the northbound approach along SR 5 Business/Riverstone Parkway as well as installing transverse rumble strips along the exit ramp to reduce approaching speeds. The estimated cost associated with the improvements is \$400,000.

#### *SR 5 Business/Riverstone Parkway at Riverstone Blvd (Intersection #33)*

A total of 128 crashes were reported at the intersection of SR 5 Business/Riverstone Parkway and Riverstone Boulevard. Of the collisions reported, 68 were angle crashes, 33 were rear end crashes, 23 were sideswipe crashes and 4 were single vehicle crashes. Several angle crashes occurred along the eastbound approach on Riverstone Boulevard at the McDonald’s driveway approximately 160 feet west of the intersection. Half of the angle crashes reported involved northbound vehicles turning left onto Riverstone Boulevard and southbound vehicle continuing straight on SR 5 Business/Riverstone Parkway. **A combination of safety improvements is recommended for this intersection** which includes closing the McDonald’s driveway on Riverstone Boulevard, installing backplates on the signal heads and trimming roadside vegetation to increase visibility of the signals on the eastbound approach, and installing an FYA signal head at a proper alignment for the northbound left turn lane on SR 5 Business/Riverstone Parkway. Additionally, signal timing adjustments are recommended which include verifying appropriate clearances are used as well as potentially increasing vehicle extension time for each approach. The estimated cost of these improvements is \$400,000.

#### *Holly Springs Parkway at Sixes Road (Intersection #13)*

There was a total of 119 crashes reported at the intersection of Holly Springs Parkway and Sixes Road for the five-year period, with more than 75 percent being rear end crashes. The majority of the rear end crashes were associated with right turn movements on the northbound, southbound, and eastbound approaches. **Improvements for mitigation at this location include the installation of elongated right turns and a right turn lane at the QT/Zaxby’s driveway.** Installing elongated right turns is proposed for the southbound and eastbound approaches in order to improve the visibility angle and therefore increase drivers’ comfort level when merging. Several of the rear end crashes on the northbound approach occurred near the driveway to QT/Zaxby’s. The installation of a right turn lane at the driveway is proposed in order to reduce the potential for rear end crashes caused by vehicles turning at the driveway. The estimated cost associated with these improvements is \$500,000.

#### *SR 5 Business/Riverstone Parkway at I-575 NB Ramps (Intersection #36)*

A total of 113 crashes were reported at the intersection of SR 5 Business/Riverstone Parkway and the I-575 Northbound Ramps, including one fatal crash. The majority (73 percent) of the crashes were rear end crashes, followed by angle collisions (14 percent). The crash resulting in a fatality was the result of a northbound vehicle attempting a left turn onto the I-575 entrance ramp and neglecting the yield to the oncoming southbound vehicle on SR 5 Business/Riverstone Parkway. There was a high number of rear end and left angle crashes occurring on the



westbound approach along the I-575 exit ramp. **A combination of safety improvements is recommended for this intersection** which includes replacing the existing doghouse signal head with an FYA signal head, repositioning the signal heads to be aligned with the lane centerline of each approach, adjusting the signal timings, and installing a supplemental signal head, advance warning flashers, and transverse rumble strips on the exit ramp. The estimated cost of the improvements is \$300,000.

*Holly Springs Parkway/Marietta Highway at I-575 SB Ramps (Intersection #20)*

A total of 80 crashes were reported at the intersection of Holly Springs Parkway and the I-575 Southbound Ramps. Of the crashes report, the majority (70 percent) were rear end crashes, 33 of which occurred on the westbound approach on the I-575 exit ramp. Approximately 27 percent of the total collisions were angle crashes which occurred near the center of the intersection. Additionally, data associated with the 7 crashes which occurred on the I-575 entrance ramp suggests that entering vehicles were attempting to merge too early. **A combination of safety improvements is proposed for this intersection** which includes an elongated right turn and transverse rumble strips along the I-575 exit ramp, post-mounted delineators along the entrance ramp to eliminate early merging, and reducing the clearance distance along the northbound approach on Holly Springs Parkway or implementing signal timing adjustments which include verifying appropriate clearances are used as well as potentially increasing vehicle extension time. The estimated cost of these improvements is \$350,000.

*Holly Springs Parkway at Misty Hollow Way/Toonigh Road (Intersection #11)*

A total of 75 crashes were reported at the intersection of Holly Springs Parkway and Misty Hollow Way/Toonigh Road, with the majority being rear end crashes. The vertical curvature on the northbound approach on Holly Springs Parkway could be inhibiting judgement for drivers attempting to complete a southbound left turn. **The improvements for mitigation at this location include converting the southbound left turn phase to be protected-only during the peak periods and elongating the existing channelized right turn on the westbound approach along Toonigh Road to improve the visibility angle.** The estimated cost of these improvements is \$250,000.

*Marietta Highway at Prominence Point Parkway/Driveway #3 (Intersection #21)*

A total of 74 crashes were reported during the five-year period at the intersection of Marietta Highway and Prominence Point Parkway/Driveway #3. The most common collision type was rear end crashes (62 percent), while angle crashes made up 20 percent of all collisions. The large width of the intersection could be contributing to the occurrence of both types of crashes. **Potential solutions for mitigation at this location include converting the intersection to a multilane roundabout or implementing a combination of intersection improvements.** Converting the intersection to a roundabout would result in a 74 percent reduction in fatal and injury crashes and a 35 percent reduction in property damage crashes (FHWA Clearinghouse Numbers 209/212). The intersection improvement project would include replacing the existing permissive-only signals for the driveway on the westbound approach with permissive-only FYA signal heads, providing physical channelization for all right turn lanes and/or installing elongated right turns, and implementing signal timing adjustments which include verifying appropriate clearances are used as well as potentially increasing vehicle extension time. The estimated cost for the multilane roundabout is \$2,500,000; the estimated cost of the intersection improvements is \$300,000.

### 5.3. Pedestrian Infrastructure Improvements

Using the data collected during the existing pedestrian infrastructure evaluation and information obtained regarding planned projects and developments within the study area, the top five locations in need of pedestrian improvements were identified. Any locations with planned roadway or pedestrian improvement projects were excluded from further analysis. Additional information on planned projects can be found in Section 3 as well as in Appendix C. A summary of the pedestrian improvements is included in Table 5.5.

Table 5.5 – Pedestrian Infrastructure Improvements

Roadway	Limits	Side	Segment Length
Main St	from Linton St to Haney Rd	west	766 ft
Holly Springs Pkwy	from Seth Ridge Rd to New Park Dr	east	329 ft
	from Seth Ridge Rd to Riverside Pkwy	west	0.28 miles
Marietta Hwy	from Prominence Point Pkwy to Univeter Rd	east	0.71 miles
	from Prominence Point Pkwy to Butterworth Rd	west	0.75 miles
Marietta Hwy	from Univeter Rd to Boling Park	east	2.18 miles
	from Butterworth Rd to Boling Park	west	2.15 miles
SR 5 BUS/Riverstone Pkwy	from Tiffany Ln to Milton Dr	west	0.52 miles

*Main Street, between Linton Street and Haney Road*

Construct a new sidewalk along the west side of Main Street from a point just north of Linton Street to the existing sidewalk which was recently completed as part of the roundabout project at the intersection of Main Street and Haney Road. This new segment would serve to connect the downtown Woodstock area to the new housing developments as well as the Woodstock Library located just north of Haney Road. It would also provide additional access to the multi-use path located along Main Street, north of the roundabout.

*Holly Springs Parkway, between Seth Ridge Drive and Riverside Parkway*

Install a new segment of sidewalk along the east side of Holly Springs Parkway to provide connectivity between Seth Ridge Drive and New Park Drive. Also install a segment along the west side of Holly Springs Parkway between Seth Ridge Drive and Riverside Parkway. Additional lighting would also need to be added in order to match the areas located just north and south of the new sidewalk segments. Several planned housing developments are zoned for Johnston Elementary School, which is located just east of Holly Springs Parkway along East Cherokee Drive. Additional pedestrian connectivity in this area would allow students and faculty to safely walk to and from the school.

*Marietta Highway, between Prominence Point Parkway and Butterworth Road/Univeter Road*

Although there are sections along this segment which contain sidewalks that were installed as part of various developments, there are still connectivity concerns throughout this area. It is recommended that new sidewalks be installed along both sides of Marietta Highway between Prominence Point Parkway and Butterworth Road/Univeter Road as needed to fill the gaps in connectivity throughout the segment. There are two developments planned for the area in addition to the several existing neighborhoods and apartment complexes. During the pedestrian infrastructure evaluation, several individuals were observed walking along the shoulder of this segment of Marietta Highway. This new segment of sidewalk would provide connectivity between the new and existing residential areas and the various shopping areas in the vicinity.

*Marietta Highway, between Butterworth Road/Univeter Road and Boling Park*

Construct new sidewalk along both sides of Marietta Highway between Butterworth Road/Univeter Road and Boling Park, including along the bridge over Etowah River. Providing sidewalk along this segment would connect multiple residential areas to retail locations, future planned developments, the existing facilities at Boling Park, as well as Cherokee High School.

*SR 5 Business/Riverstone Parkway, between Tiffany Lane (Blue Ridge Hills Apartments) and Milton Drive*

Install a new sidewalk along the west side of SR 5 Business/Riverstone Parkway from just north of Tiffany Lane to Milton Drive. Providing a sidewalk along this segment would connect the neighborhoods and apartment complexes south of Tiffany Lane to the various retail establishments along SR 5 Business/Riverstone Parkway in the Canton area. There appears to be worn areas in the landscaping adjacent to SR 5 Business/Riverstone Parkway near the intersection with Reinhardt College Parkway, suggesting that pedestrians may already be walking along that area.

## 6. TRAFFIC SIGNAL TIMING EVALUATIONS

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The existing signal timings for the 38 study intersections were evaluated through a variety of sources. During the early stages of this project, GDOT's MaxView server was utilized to obtain the existing signal timing databases from each study intersection along the corridor. These databases were used in assessing the current signal timing operation along the corridor through the Synchro traffic simulation software. Additional field visits were conducted to review the effectiveness of operating plans, to observe traffic patterns, and to identify intersections or segments in need of improvement. Once that was completed, the corridor was analyzed using probe data from the RITIS platform, which aided in the identification of directional speed data and average travel times as well as bottleneck locations and areas with higher congestion. Lastly, detector data from each of the signal cabinets was utilized to measure the performance of each signalized intersection through the ATSPM platform. This data provided insights to arrivals on green for mainline approaches and split failure identification to further identify issues along the system.

Based on all of the data obtained along the Old Highway 5 corridor, the following 5 segments, or subgroups, were identified:

- SR 92 Area: Signals from Mauldin Drive north to Serenade Lane
- Arnold Mill Road Area: Signals from Dupree Road north to Arnold Mill Road
- Sixes Road Area: Signals from East Cherokee Drive north to Home Depot Driveway
- Holly Springs Area: Signals from Pinecrest Road north to Univeter Road
- Riverstone Parkway Area: Signals from Juniper Street north to River Pointe Parkway

### 6.1. Existing Traffic Signal Timing

#### *SR 92 Area*

For the four signals included within the SR 92 area, no in-depth evaluation was completed. These signals are actively monitored, and the signal timings are actively maintained by one of the GDOT SigOps Metro teams. Since the signal timings for these locations are tied to the SR 92 corridor, it is expected that the SigOps Metro team will continue to make timing adjustments as-needed. It is recommended that the County and/or the City of Woodstock understand who the point of contact is for that project

#### *Arnold Mill Road Area*

For the four signals included in the Arnold Mill Road area, signal timings were evaluated to see if improvements could be made to the existing signal timing plans. Based on the average travel speed data obtained from RITIS shown in Figure 6.1, the evening peak period for this segment of Old Highway 5 was identified for further analysis. Heavy northbound traffic during the evening peak period is creating a bottleneck at the intersection of Old Highway 5 and Arnold Mill Road, with long queues extending to the south. Similarly, eastbound traffic approaching from I-575 on Towne Lake Parkway are contributing to the delay and queueing that occur at the intersection. During the evaluation of this segment, and specifically this intersection, it was discovered that there is currently a streetscape project to modify both lane assignments and phasing at the intersection. Based on the overall scope of the project, it was decided to conclude the evaluation process and allow that project to cover the necessary timing adjustments once construction is complete.

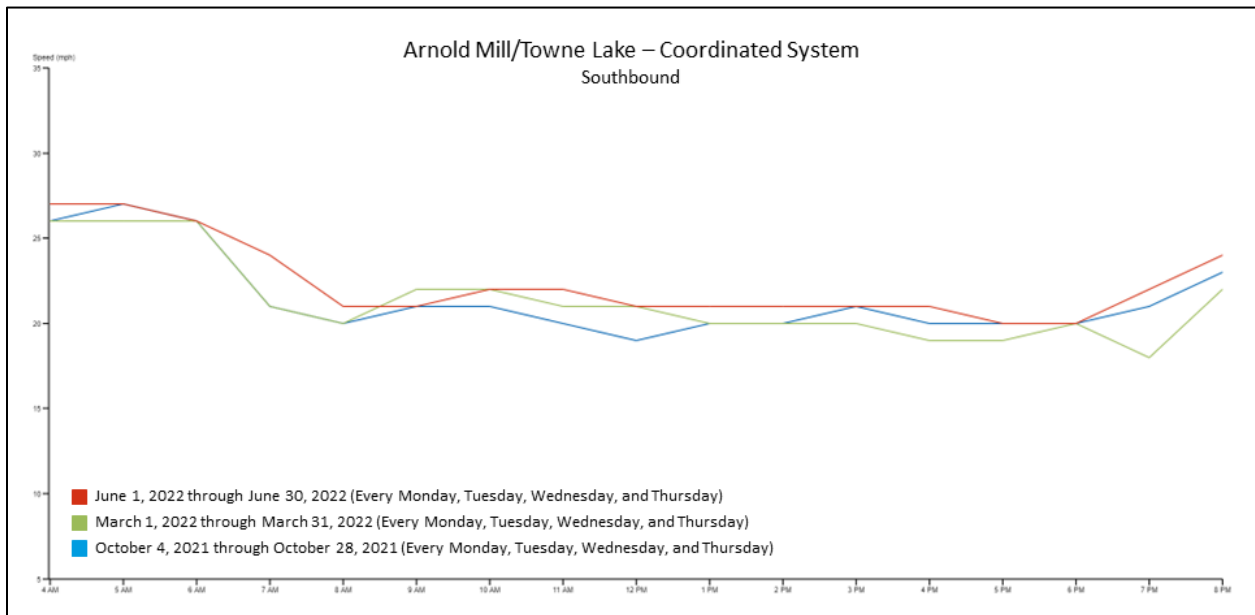
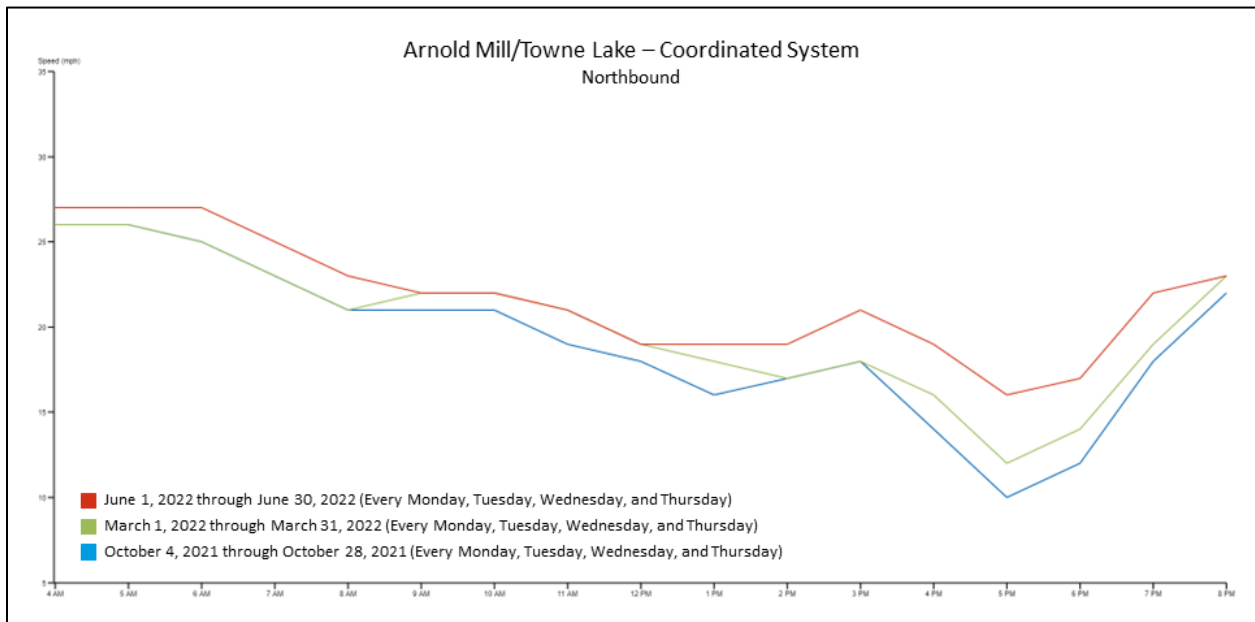


Figure 6.1 – Average Travel Speeds: Arnold Mill Rd Area

### Sixes Road Area

For the six signals included in the Sixes Road area, signal timings were evaluated to see if improvements could be made to the existing signal timing plans. Based on the average travel speed data obtained from RITIS shown in Figure 6.2, the morning peak period experiences steep speed reductions in both the northbound and southbound directions along the roadway segment. Heavy northbound left-turn volumes at the Sixes Road intersection and heavy southbound left-turn volumes at the East Cherokee Drive intersection create chokepoints along the corridor, reducing throughput along the mainline in either direction. Additional observations reveal that the current phasing, or ring structure, of several intersections is resulting in an inefficient use of split time. With several heavy movements along the corridor, these extra seconds could provide noticeable reduction in delay and queuing along the roadway. For the evening peak period, the northbound direction of travel experiences the greatest reduction in vehicle speeds. Commuters traveling to and from the I-575 area using Sixes Road create added congestion along this segment. The northbound left-turn onto Sixes Road remains heavy for much of the evening peak period, with increasing volumes on the side street approach of Sixes Road as the evening peak progresses. The current split allocation does not appear to provide enough time for the heavy northbound left-turn movement, causing queues

to spill back into the through lane. Looking at the RITIS data below, this likely occurs most between the 4:30 PM and 5:30 PM time period when northbound speeds reach their lowest points.

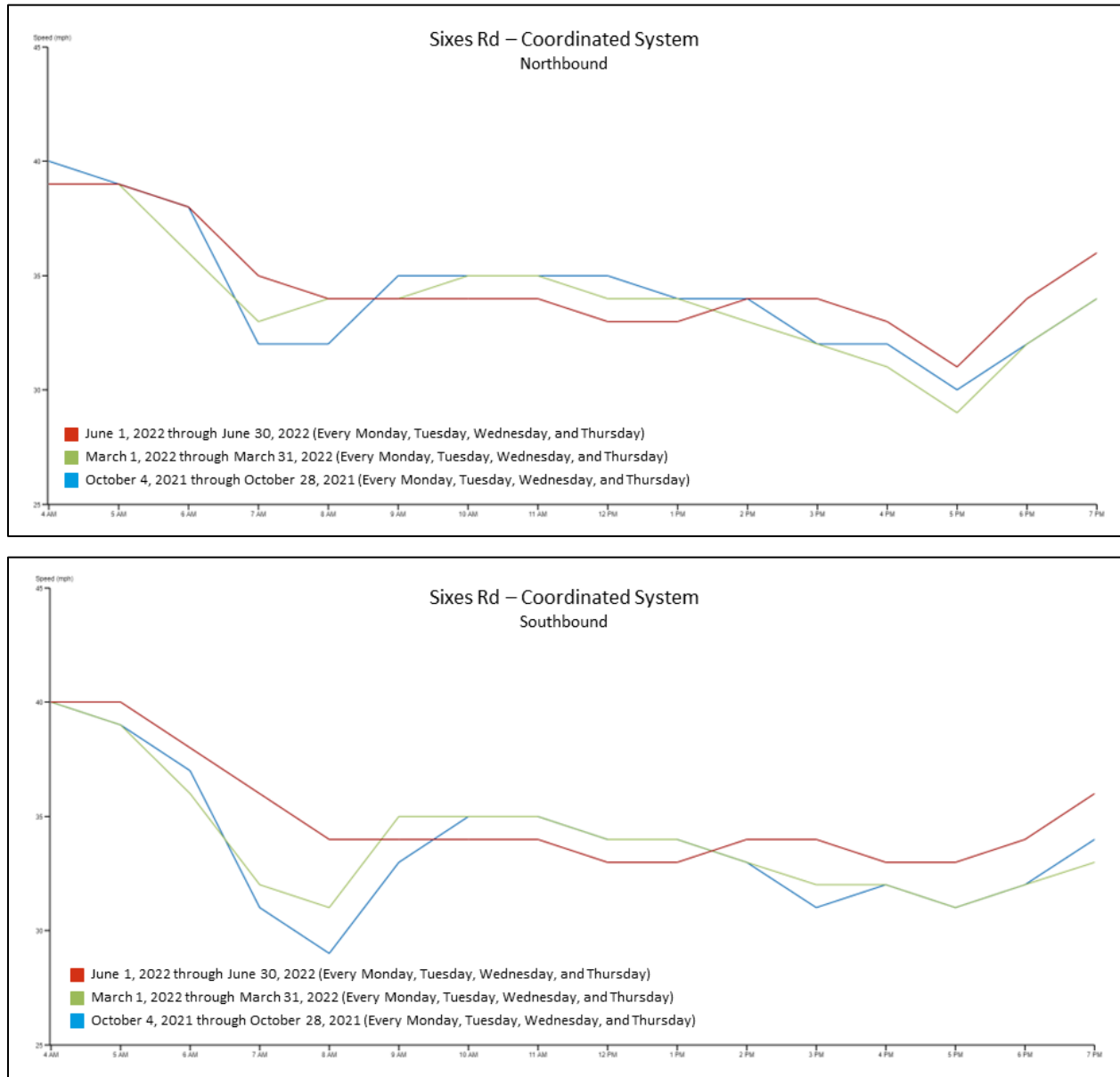


Figure 6.2 – Average Travel Speeds: Sixes Rd Area

### Holly Springs Area

For the seven signals included in the Holly Springs area, signal timings were evaluated to see if improvements could be made to the existing signal timing plans. Each of the intersections within this segment are currently operating in free operation at all times of day. Based on the average travel speed data obtained from RITIS shown in Figure 6.3, significant slowdowns occur during both peak periods in the southbound direction. Since the signals do not currently work together to platoon vehicles through this section of the corridor, an accordion effect takes place. Groups of vehicles may get through one signal but then encounter a red light at the next. This constant stop-and-go operation creates long startup times stretching the groups of vehicles further apart. As the peak period goes on, the signals can no longer process all of the vehicles creating excess delay and queuing. Another observation made along this segment was at the I-575 ramp intersections. With both ramp intersections operating independently of one another, there are multiple occasions where vehicles from the exit ramp approach arrive at the next intersection while on red. This operation creates queuing on the bridge throughout the day and is magnified during the peak periods.



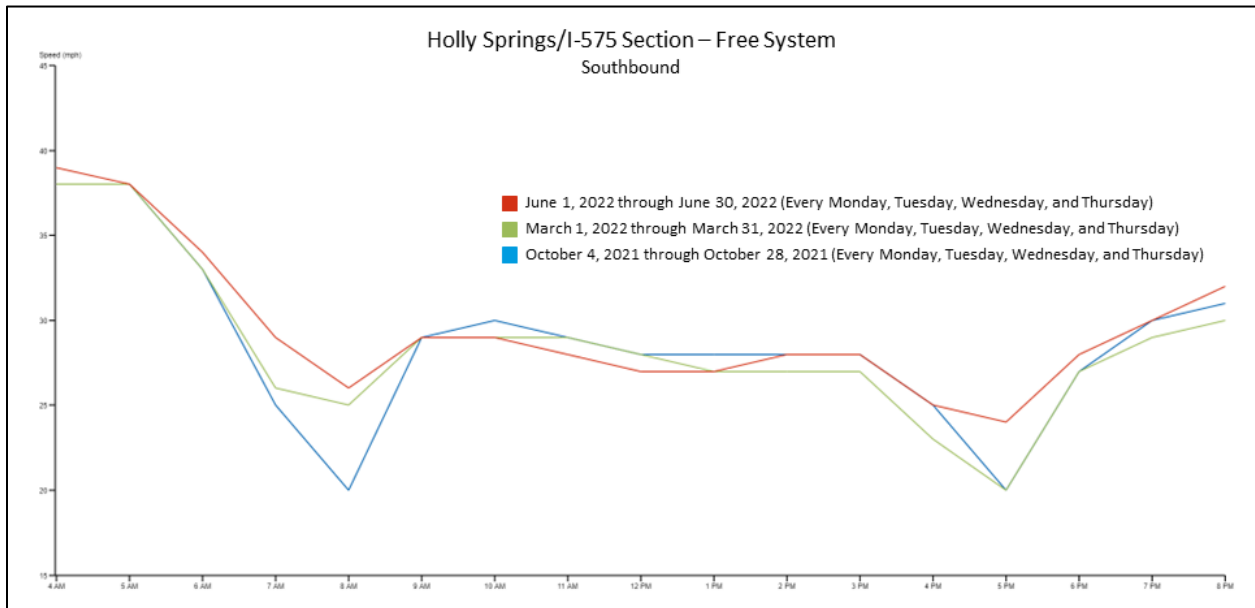
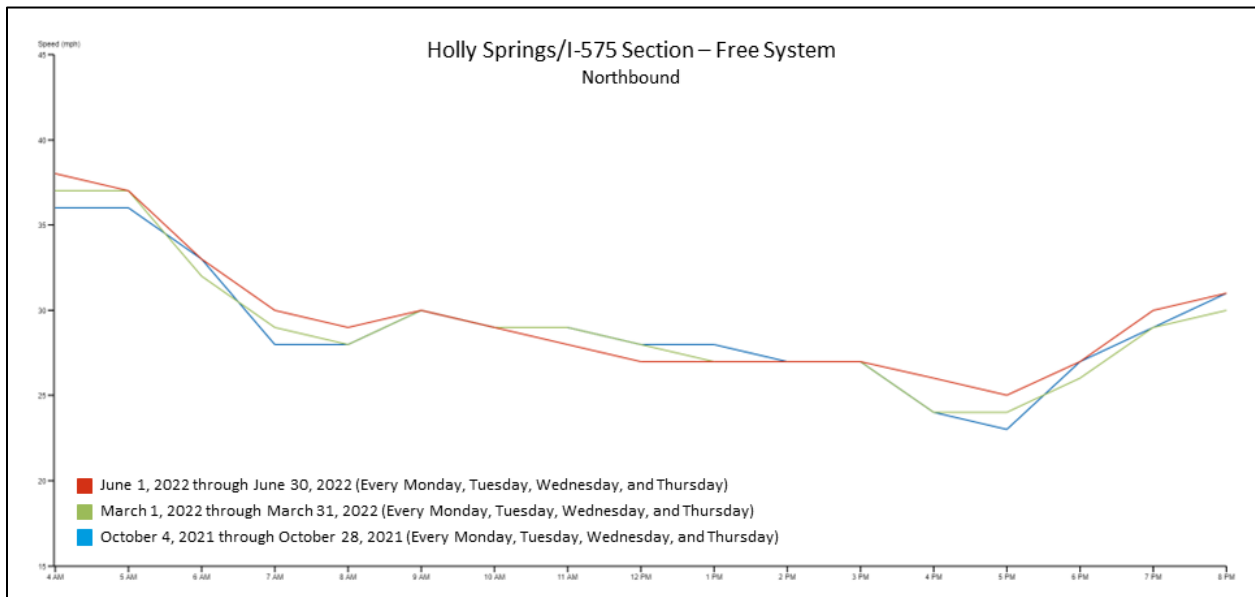


Figure 6.3 – Average Travel Speeds: Holly Springs Area

### Riverstone Parkway Area

The last segment that was evaluated was the Riverstone Parkway area, which consists of ten signals on the north end of the study area. Peak congestion for this segment occurs between Reinhardt College Parkway and Keith Drive, with the heaviest volumes stemming from exit ramp traffic at the I-575 intersections. There were three main observations found for this segment that apply to both the morning and evening peak periods. As shown in Figure 6.4, once traffic volumes begin to increase for the morning peak period, they continue to increase throughout the course of the day until the conclusion of the evening peak period. The first observation for this area was focused at the I-575 ramp intersections. For each of the plans evaluated, heavy exit ramp traffic is stopped at the next ramp intersection. Due to the high volumes for each of the exit ramps, these stops create shockwaves along the segment making progression more sluggish. The next observation was based on the phasing, or ring structure, along the segment. Based on observations and the Synchro time space diagram, progression along the corridor could be improved by introducing lead-lag operations along the corridor. While FYA signal heads are not present at all intersections, there are several T-intersections that could operate with lead-lag operations to improve traffic flow. Lastly, observations reveal that it may be beneficial to include Juniper Street, Keith Drive, and River Pointe Parkway

into the coordinated system. Currently these signals run in free operation at all times of day. Additionally, tying the signals to the north into the system could help platoon vehicles through the I-575 ramp area by reducing stops in that section.

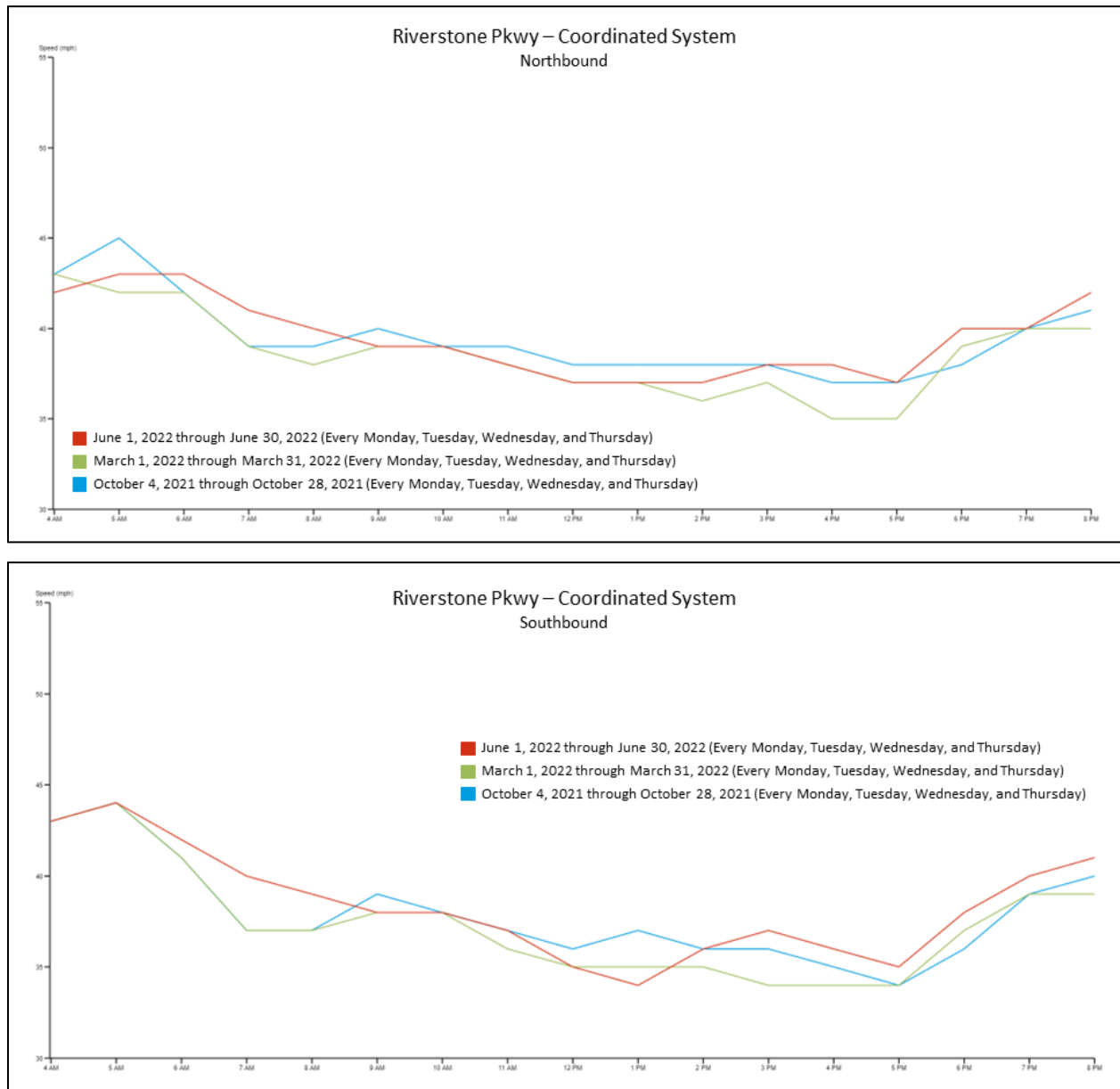


Figure 6.4 – Average Travel Speeds: Riverstone Pkwy Area

## 6.2. Traffic Signal Timing Recommendations

Based on feedback and information gathered during the evaluation phase, the Sixes Road, Holly Springs, and Riverstone Parkway Areas were selected for further evaluation of potential mitigations. For each segment, the objective of the mitigations was to minimize delay for motorists driving the corridor, improve progression through the corridor, and platoon vehicles at the speed limit to reduce stops. Determining the most adequate cycle length, split, and offset combinations for specific time-of-day plans is necessary to achieve optimal traffic progression.

### Sixes Road Area

For the Sixes Road area, the primary focus will be to field fine-tune the existing signal timings for the morning and evening peak periods. Evaluations of the Synchro models and ADT volume data along this segment revealed that

the current cycle lengths are adequate for both peak periods; however, it is expected that both split time and offsets for each of the intersections will be adjusted. Additional recommendations are as follows:

- Implement lead-lag operations at East Cherokee Drive intersection for morning and evening peak periods.
- Flip the sequence, or ring structure, for the side street intersections at East Cherokee Drive so that unused time from the eastbound approach is added to the westbound approach.
- Develop queue-responsive actions to allow East Cherokee Drive to transition from coordinated operation to free operation when delay and queues dictate.
- Develop additional morning and evening peak plans that allow the northbound left turn at Sixes Road to be double-served.
- Implement lead-lag operations at the Toonigh Road intersection for the evening peak period.

#### *Holly Springs Area*

For the Holly Springs area, the primary focus will be to implement coordinated signal timing plans for the morning and evening peak periods. A low cycle length plan will also be developed and implemented which can be used for off-peak and overnight time periods to improve operations at the I-575 Ramp intersections. The proposed recommendations are as follows:

- Implement a 130-second cycle length for the morning peak period.
- Implement a 140-second cycle length for the evening peak period.
- Implement lead-lag operations at both I-575 Ramp intersections.
- Implement lead-lag operations at Prominence Point Parkway.
- Implement lead-lag operations at Pinecrest Drive.

#### *Riverstone Parkway Area*

For the Riverstone Parkway area, the primary focus will be improving progression around the I-575 Ramp intersections. The existing timing plan for the morning peak period will be field fine-tuned and a new timing plan with a higher cycle length will be implemented for the evening peak period. The proposed recommendations are as follows:

- Implement a 120-second cycle length for the evening peak period.
- Incorporate Juniper Street, Keith Drive, and River Pointe Parkway into the coordinated system.
- Implement lead-lag operations at both I-575 Ramp intersections.
- Evaluate lead-lag operations at other T-intersections along the corridor as needed.
- Flip the sequence, or ring structure, for the side street intersections at Keith Drive so that unused time from the eastbound approach is added to the westbound approach.

## 7. CONCLUSION

A list of all operational and safety improvements with their estimated construction costs is provided in Table 7.1. The improvements are broken down by the agency of ownership and listed in order of the highest to lowest potential B/C ratio. The B/C ratio calculations for the potential operational improvements at each location are included in Appendix J. The B/C ratio calculations for each proposed safety improvement are presented in Appendix K.

Table 7.1 – Proposed Operational and Safety Improvements with B/C Ratios

No.	Intersection	Improvement	Estimated Cost of Construction	B/C Ratio		
				Operational	Safety	Combined
<b>City of Woodstock</b>						
8	Main St at Ridgewalk Pkwy	Dual SBR	\$500,000	4.10		
		Multilane Roundabout	\$2,000,000	3.84		
<b>City of Holly Springs</b>						
16	Holly Springs Pkwy at Holly St/Hickory Rd	Add SBR	\$300,000	65.83		
		Dual SBL	\$1,000,000	19.69		
		Add SBR, Dual SBL	\$1,250,000	18.37		
		Add SBR, Dual SBL, Dual WBR	\$1,500,000	16.18		
13	Holly Springs Pkwy at Sixes Rd	Remove EBR, Dual EBL, FF SBR	\$1,200,000	46.72		
		Minor Safety Improvements	\$500,000		6.76	
11	Holly Springs Pkwy at Misty Hollow Way/Toonigh Rd	Minor Safety Improvements	\$250,000		30.65	
9	Holly Springs Pkwy at E Cherokee Dr	Dual NBR & WBR	\$900,000	16.36		
		Minor Safety Improvements	\$400,000		9.25	
<b>City of Canton</b>						
21	Marietta Hwy at Prominence Point Pkwy/ Driveway #3 (Kroger)	Dual NBL	\$750,000	67.92		
		Multilane Roundabout	\$3,000,000	19.08	1.92	17.71
		Minor Safety Improvements	\$300,000		13.14	
23	Marietta Hwy at Butterworth Rd/ Univeter Rd	Minor Safety Improvements	\$500,000		63.34	
		Single Lane Roundabout	\$1,800,000	36.32	17.42	34.81
		Multilane Roundabout	\$3,000,000	24.96	10.45	23.80
22	Marietta Hwy at Ridge Rd	Add NBT, EBL, and WBL	\$600,000	30.99		
20	Holly Springs Pkwy/Marietta Hwy at I-575 SB Ramps	Minor Safety Improvements	\$350,000		27.99	
<b>GDOT District 6</b>						
35	SR 5 BUS/Riverstone Pkwy at I-575 SB Ramps	Minor Safety Improvements	\$400,000		83.81	
		Dual SBL	\$750,000	40.37		
		DDI	\$5,000,000	-1.61		
36	SR 5 BUS/Riverstone Pkwy at I-575 NB Ramps	Free-Flow Right from Ramp	\$400,000	61.56		
		Minor Safety Improvements	\$300,000		33.07	
33	SR 5 BUS/Riverstone Pkwy at Riverstone Blvd	Minor Safety Improvements	\$400,000		23.95	
		Triple EBL	\$250,000	8.90		

In addition to operational and safety improvements, evaluations were conducted of the existing pedestrian infrastructure along the corridor as well as the traffic signal timing plans. A list of the recommended locations for the installation of new sidewalk segments is presented in Table 7.2. A summary of the recommended signal timing adjustments is shown in Table 7.3.

Table 7.2 – Proposed Pedestrian Infrastructure Improvements

Proposed Sidewalk Segments
Main St, west side, from Linton St to Haney Rd
Holly Springs Pkwy, east side, from Seth Ridge Rd to New Park Dr
Holly Springs Pkwy, west side, from Seth Ridge Rd to Riverside Pkwy
Marietta Hwy, east side, from Prominence Point Pkwy to Univeter Rd
Marietta Hwy, west side, from Prominence Point Pkwy to Butterworth Rd
Marietta Hwy, east side, from Univeter Rd to Boling Park
Marietta Hwy, west side, from Butterworth Rd to Boling Park
SR 5 BUS/Riverstone Pkwy, west side, from Tiffany Ln to Milton Dr

Table 7.3 – Proposed Signal Timing Recommendations by Area

Sixes Road Area
Lead-lag operations at E Cherokee Dr for AM and PM peak hours
Flip sequence for side street intersections at E Cherokee Dr so that unused time for EB approach is added to WB approach
Develop queue-responsive actions to allow E Cherokee Dr to transition from coordinated operation to free operation when delay dictates
Develop additional AM and PM peak plans that allow the NB left turn at Sixes Rd to be double-served
Lead-lag operations at Toonigh Rd for AM and PM peak hours
Holly Springs Area
Implement 130-sec cycle length for AM peak
Implement 140-sec cycle length for PM peak
Lead-lag operations at both I-575 ramp intersections
Lead-lag operations at Prominence Point Pkwy
Lead-lag operations at Pinecrest Dr
Riverstone Pkwy Area
Implement 120-sec cycle length for PM peak
Incorporate Juniper St, Keith Dr, and River Pointe Pkwy into coordinated system
Lead-lag operations at both I-575 ramp intersections
Evaluate lead-lag operations at other T-intersections along corridor
Flip sequence for side street intersections at Keith Dr so that unused time for EB approach is added to WB approach

# APPENDIX A: EXISTING CAPACITY ANALYSIS REPORTS

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## APPENDIX B: CRASH DIAGRAMS

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# APPENDIX C: INFORMATION FROM STAKEHOLDERS

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## APPENDIX D: RAW TRAFFIC COUNTS

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## APPENDIX E: GDOT TRAFFIC FACTORS

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# APPENDIX F: ADJUSTED TRAFFIC COUNTS

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# APPENDIX G: GROWTH RATE CALCULATIONS

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# APPENDIX H: NO-BUILD CAPACITY ANALYSIS REPORTS

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# APPENDIX I: BUILD CAPACITY ANALYSIS REPORTS

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APPENDIX J: B/C RATIOS – OPERATIONAL IMPROVEMENTS

## APPENDIX K: B/C RATIOS – SAFETY IMPROVEMENTS

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