

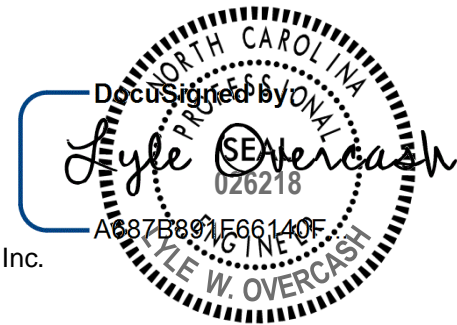
MEMORANDUM

To: Jason Brown, ACIP, CZO, Town of Knightdale
Daniel Boulware, PE, NCDOT

From: Lyle Overcash, P.E. – Kimley-Horn and Associates, Inc.

Date: October 20, 2023

Subject: Knightdale Gateway – Farmwell Road Site Access Assessment – Apex, NC



10/20/2023

The *Knightdale Gateway TIA* (Kimley-Horn, May 2022) assessed the traffic impacts of constructing a development in the northwest quadrant of the US 64 Business (Knightdale Boulevard) at Farmwell Road intersection in Knightdale, North Carolina. That development was assumed to include 450,000 square feet (SF) of warehousing space, 60,000 SF of general office space, and 25,000 SF of retail space. Site access was proposed via two full-movement driveways along a new roadway, Milburnie Lake Drive, that forms the north leg of the Farmwell Road at Farmwell Road intersection.

The developer has updated the concept plan as part of a proposed rezoning amendment. For the purposes of this analysis, the updated plan was assumed to include a 26,000 SF flex building as general light industrial space. The plan was also assumed to include a 10,800 SF “retail building”. The building was assumed to consist of medical office space in this analysis to be conservative, however it is likely the building could serve as retail instead. The developer proposes two additional access points – one along the new roadway north of Farmwell Road and one along the existing Farmwell Road. This memorandum assesses the traffic impact of the proposed development and recommends roadway improvements required to support the updated plan.

Background Traffic

Projected 2025 and 2034 background traffic volumes were obtained from the *Knightdale Gateway TIA* and were not modified as part of this analysis. The intersection spreadsheets attached to this memo show the projected background traffic volumes.

Site Traffic

Trip Generation

Consistent with the *Knightdale Gateway TIA*, trip generation calculations for the proposed development were performed using the data included in the 11th Edition of the ITE Trip Generation Manual. Table 1 below summarizes the results of these calculations and provides a trip comparison with the original TIA.

Table 1 ITE Traffic Generation (Vehicles)									
Land Use Code	Land Use	Intensity		Daily		AM Peak Hour		PM Peak Hour	
				In	Out	In	Out	In	Out
110	General Light Industrial	26,000	s.f.	74	74	18	3	2	13
150	Warehousing	450,000	s.f.	375	375	60	18	22	58
710	General Office Building	60,000	s.f.	372	372	95	13	19	90
720	Medical-Dental Office Building	10,800	s.f.	178	178	26	7	12	29
Total New Trips – TIA Update		546,800	s.f.	999	999	199	41	55	190
Total New Trips – May 2022 TIA		535,000	s.f.	1,078	1,078	182	47	84	190

As shown in Table 1, the proposed development has the potential to generate 1,998 new trips during a typical weekday, with 240 new trips during the AM peak hour and 245 new trips during the PM peak hour. The new land use plan is anticipated to generate 158 less daily, 11 greater AM, and 29 less PM trips than assumed in the original TIA.

Trip Distribution and Assignment

The proposed generated trips were assigned to the surrounding roadway network based on the same overall distribution used in the *Knightdale Gateway TIA*. However, the percent assignment to the study intersections was modified to account for the additional West Site Access along Farmwell Road. **Figures 1 and 2** show the site traffic distribution and percent assignments at the study intersections for passenger cars and trucks, respectively.

Build-out Traffic

Projected 2025 and 2034 background traffic volumes were added to projected site traffic volumes to obtain projected 2025 and 2034 build-out traffic volumes. **Figures 3 – 8** show the projected background, site, and build-out traffic volumes at the study intersections for the 2025 and 2034 analysis years.

Capacity Analysis

Capacity analyses were performed for the AM and PM peak hours for the projected build-out +1 (2025) and build-out +10 (2034) scenarios using Synchro Version 11 software to determine the operating characteristics of the adjacent road network and the impacts of the proposed project. Synchro LOS reports are attached. Table 2 summarizes the results of these capacity analyses.

Table 2 Level-of-Service Summary		
Condition	AM Peak Hour LOS (Delay)	PM Peak Hour LOS (Delay)
US 64 Business at Old Milburnie Road (Signalized)		
Build-Out +1 (2025) Traffic – <i>with Recommended Improvements</i>	B (18.0)	C (29.5)
Build-Out +10 (2034) Traffic – <i>with Committed and Recommended Improvements</i>	C (33.2)	D (48.7)
US 64 Business at Westover Drive/Farmwell Road (Signalized)		
Build-Out +1 (2025) Traffic – <i>with Recommended Improvements</i>	A (9.1)	B (14.1)
Build-Out +10 (2034) Traffic – <i>with Committed and Recommended Improvements</i>	B (10.5)	B (12.4)
US 64 Business at Hodge Road (Signalized)		
Build-Out +1 (2025) Traffic – <i>with Recommended Improvements</i>	C (20.4)	C (28.2)
Build-Out +10 (2034) Traffic – <i>with Committed and Recommended Improvements</i>	C (20.1)	D (36.2)
US 64 Business at I-540 Eastbound Ramps (Signalized)		
Build-Out +1 (2025) Traffic – <i>with Recommended Improvements</i>	A (2.4)	A (3.5)
Build-Out +10 (2034) Traffic – <i>with Committed and Recommended Improvements</i>	A (2.9)	A (4.9)
US 64 Business at I-540 Westbound Ramps (Signalized)		
Build-Out +1 (2025) Traffic – <i>with Recommended Improvements</i>	B (18.0)	B (17.5)
Build-Out +10 (2034) Traffic – <i>with Committed and Recommended Improvements</i>	C (22.7)	C (22.3)
Old Milburnie Road at Farmwell Road (Unsignalized)		
Build-Out +1 (2025) Traffic – <i>with Recommended Improvements</i>	WB – B (11.5) SBL – A (7.7)	WB – B (12.9) SBL – A (8.5)
Build-Out +10 (2034) Traffic – <i>with Committed and Recommended Improvements</i>	WB – B (12.6) SBL – A (7.9)	WB – C (16.5) SBL – A (9.2)
Farmwell Road at Milburnie Lake Drive (Unsignalized)		
Build-Out +1 (2025) Traffic – <i>with Recommended Improvements</i>	EB – E (39.4) WB – B (13.3)	EB – F (58.4) WB – D (27.0)
Build-Out +10 (2034) Traffic – <i>with Committed and Recommended Improvements</i>	EB – C (25.0) WB – B (14.3)	EB – F (234.1) WB – F (57.5)
Farmwell Road at West Site Access (Unsignalized)		
Build-Out +1 (2025) Traffic – <i>with Recommended Improvements</i>	SB – A (9.0) EBL – A (7.4)	SB – A (9.2) EBL – A (7.3)
Build-Out +10 (2034) Traffic – <i>with Committed and Recommended Improvements</i>	SB – A (9.0) EBL – A (7.4)	SB – A (9.3) EBL – A (7.3)

Recommendations

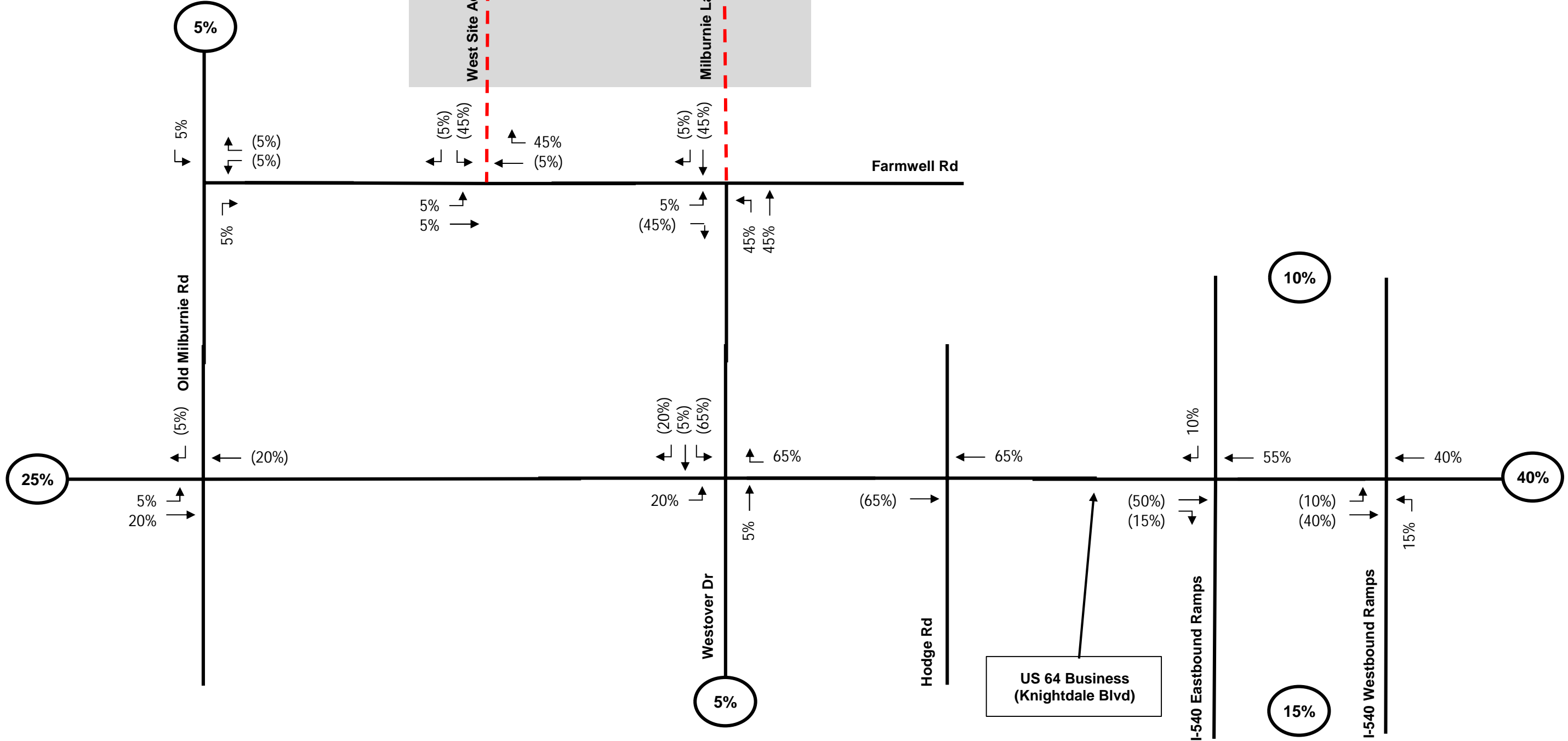
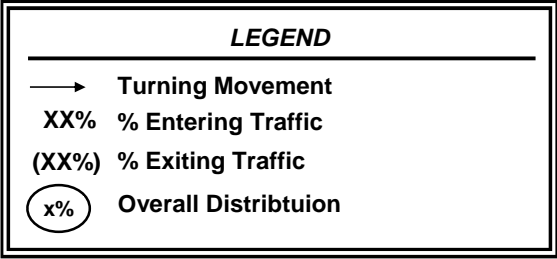
Based on the analysis presented herein, the proposed changes to the development plan are expected to produce minor changes in delays and queues in the 2025 and 2034 build-out traffic conditions. The set of roadway improvements recommended in the *Knightdale Gateway TIA* are anticipated to provide acceptable levels-of-service at all study intersections with the exception of the Farmwell Road at Milburnie Lake Drive intersection. Synchro indicates some elevated delays on the stop-controlled approaches along Farmwell Road, however, simulations show no major queueing issues at this intersection. In addition, queuing on the southbound approach of Milburnie Lake Drive will not block the new proposed driveway to the outparcel. Therefore, no additional improvements are recommended to mitigate the impact of the proposed development beyond the proposed signal at US 64 Business at Farmwell Road/Westover Drive. Approved signal plans are included in the Appendix for this location. The committed and recommended roadway laneage is shown in **Figure 9**.

Should you have any questions or comments, please do not hesitate to contact me at (919) 678-4131 or lyle.overcash@kimley-horn.com.

Attachments: Figures 1-9, Site Plan, Trip Generation Calculations, Volume Development Worksheets, Synchro PDF Reports, Signal Plans

Appendix

Appendix A:
Figures 1-9



Trip Distribution & Assignment - Passenger Vehicles

Knightdale Gateway Traffic Impact Analysis Knightdale, NC



Figure 1



PROJECT SITE

West Site Access

Milburnie Lake Dr

Farmwell Rd

Old Milburnie Rd

Westover Dr

Hodge Rd

US 64 Business
(Knightdale Blvd)

I-540 Eastbound Ramps

I-540 Westbound Ramps

LEGEND

- Turning Movement
- XX% % Entering Traffic
- (XX%) % Exiting Traffic
- (x%) Overall Distribution

40%

40% →

← (40%)

40% ↗

(40%)
(60%)

↖ 60%

100% ↑

(100%) ↓

(60%) →

← 60%

(40%)
(20%)

↖ 15%

← 45%

15%

(15%)
(25%)

↗

20% ↖

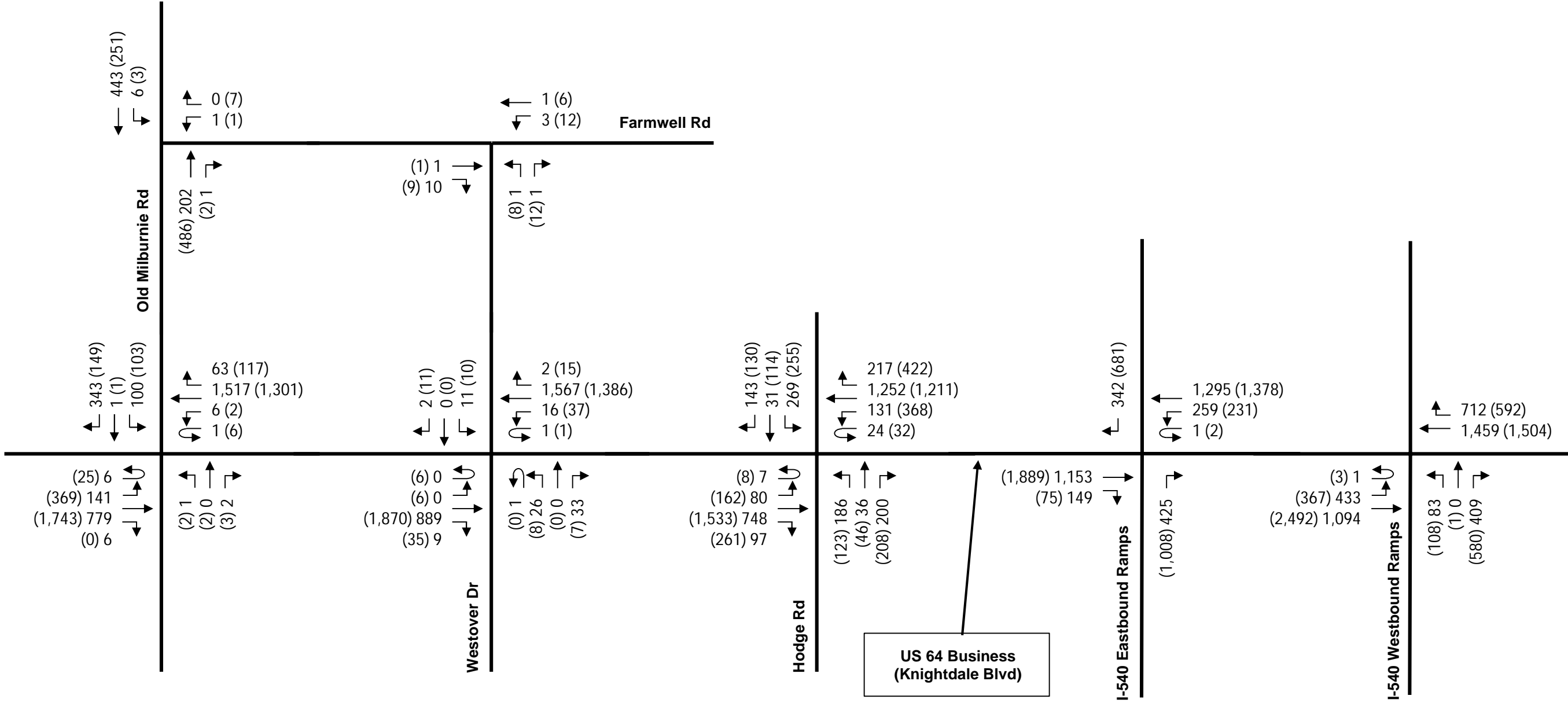
← 25%

25%



LEGEND

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



Projected (2025) Background Traffic Volumes

Knightdale Gateway Traffic Impact Analysis
 Knightdale, NC

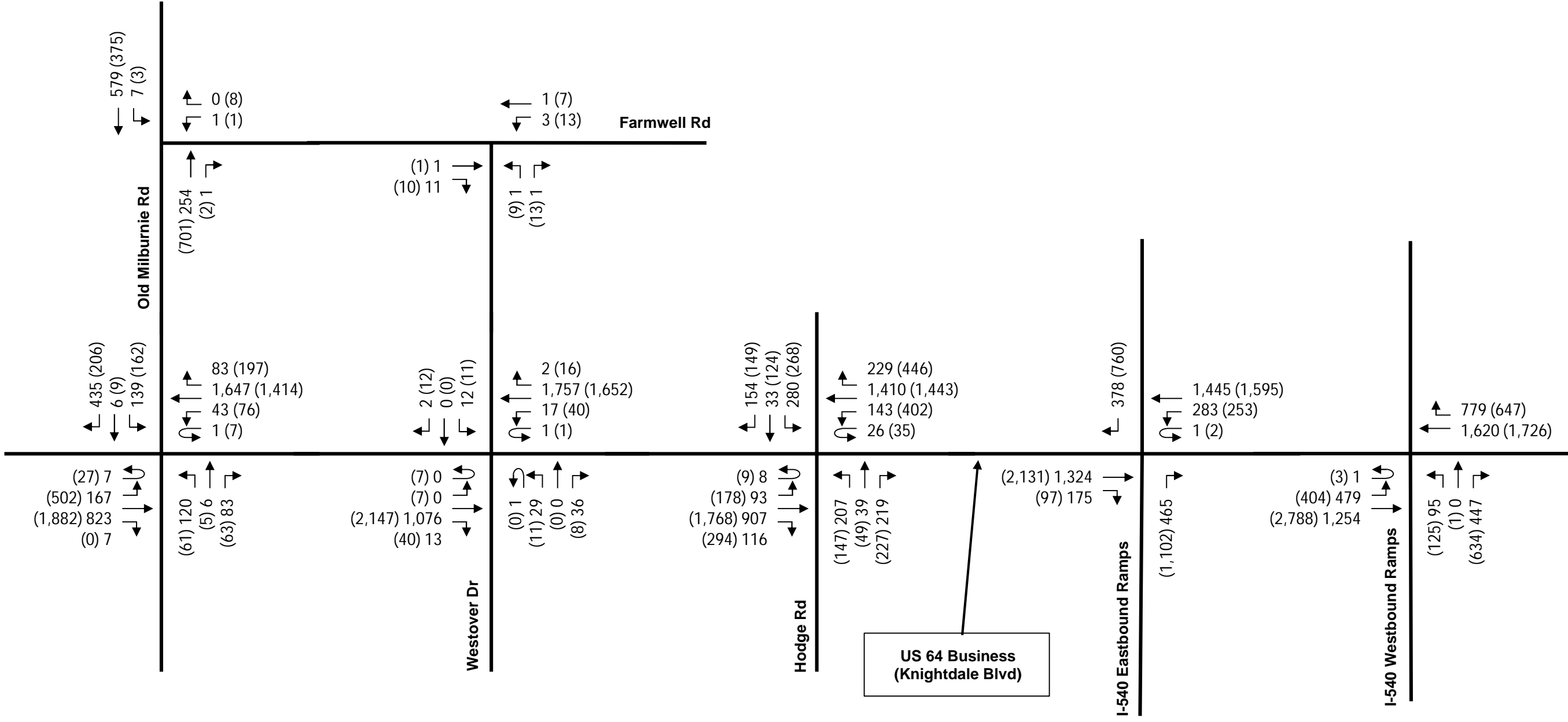


Figure 3



LEGEND

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

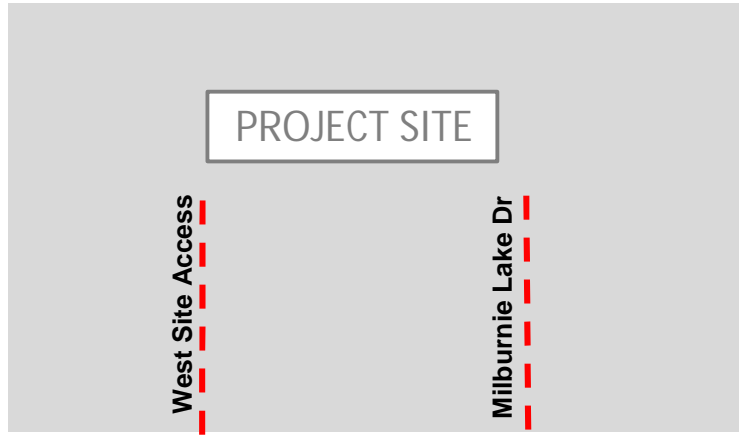


Projected (2034) Background Traffic Volumes

Knightdale Gateway Traffic Impact Analysis Knightdale, NC

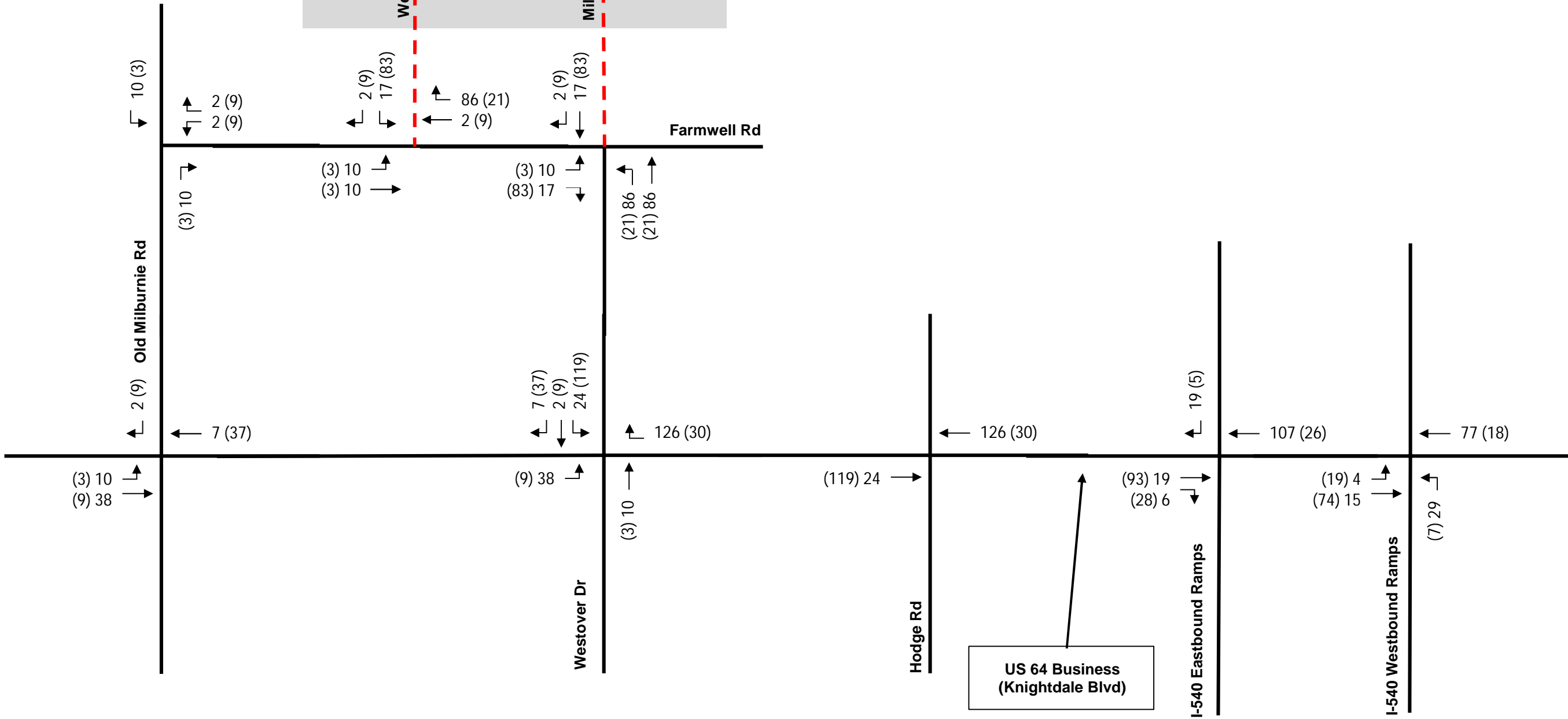


Figure 4



LEGEND

- Turning Movement
- XX AM Peak Hour Project Trips
- (XX) PM Peak Hour Project Trips

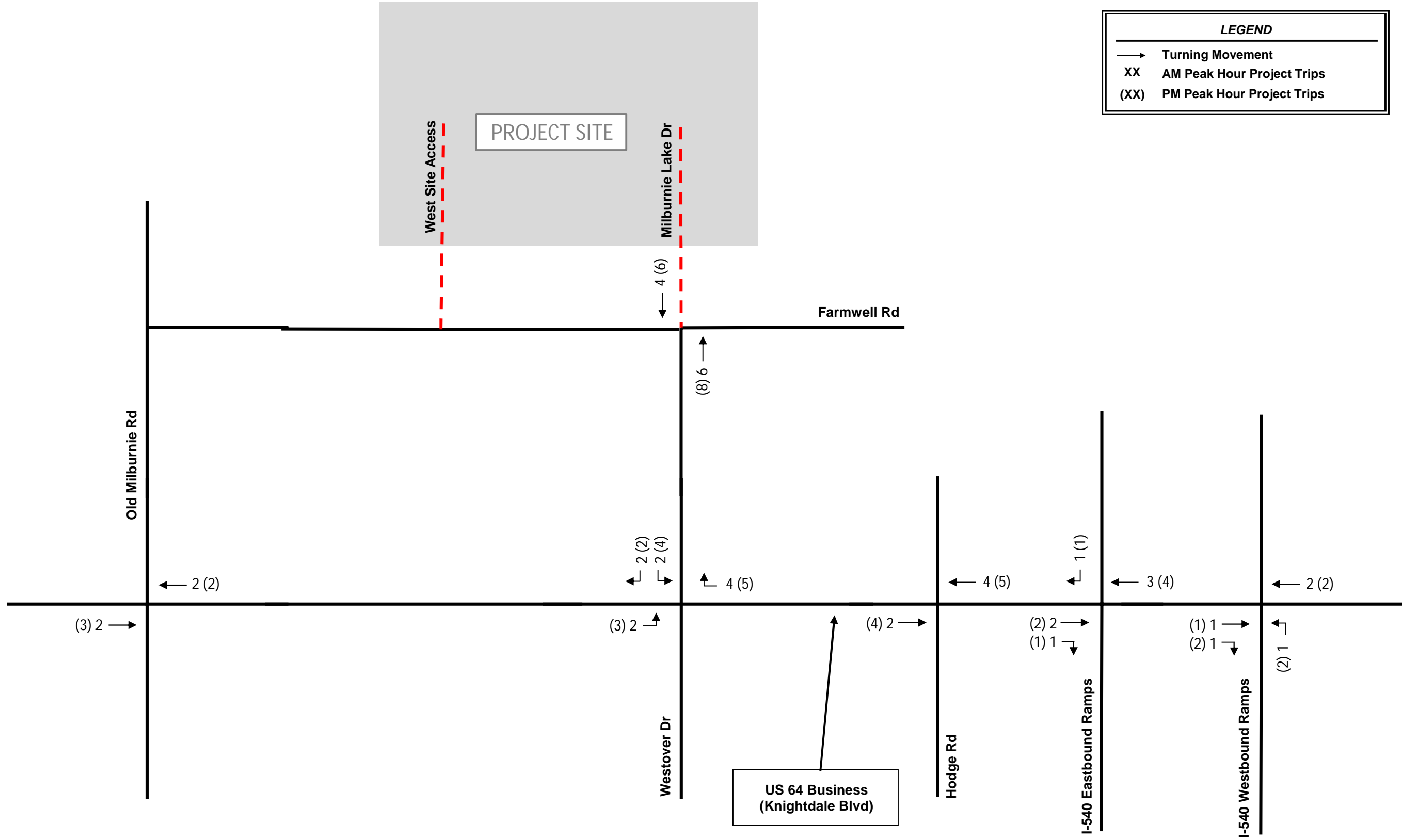


Site Traffic Volumes - Passenger Vehicles

Knightdale Gateway
Traffic Impact Analysis
Knightdale, NC



Figure 5



LEGEND

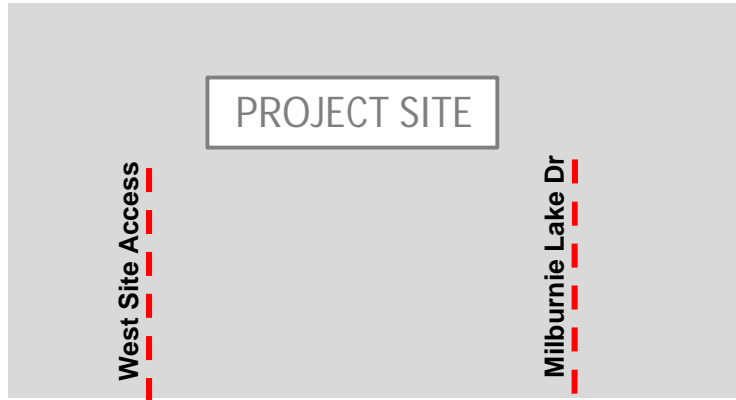
- Turning Movement
- XX AM Peak Hour Project Trips
- (XX) PM Peak Hour Project Trips

Site Traffic Volumes - Trucks

Knightdale Gateway
Traffic Impact Analysis
Knightdale, NC

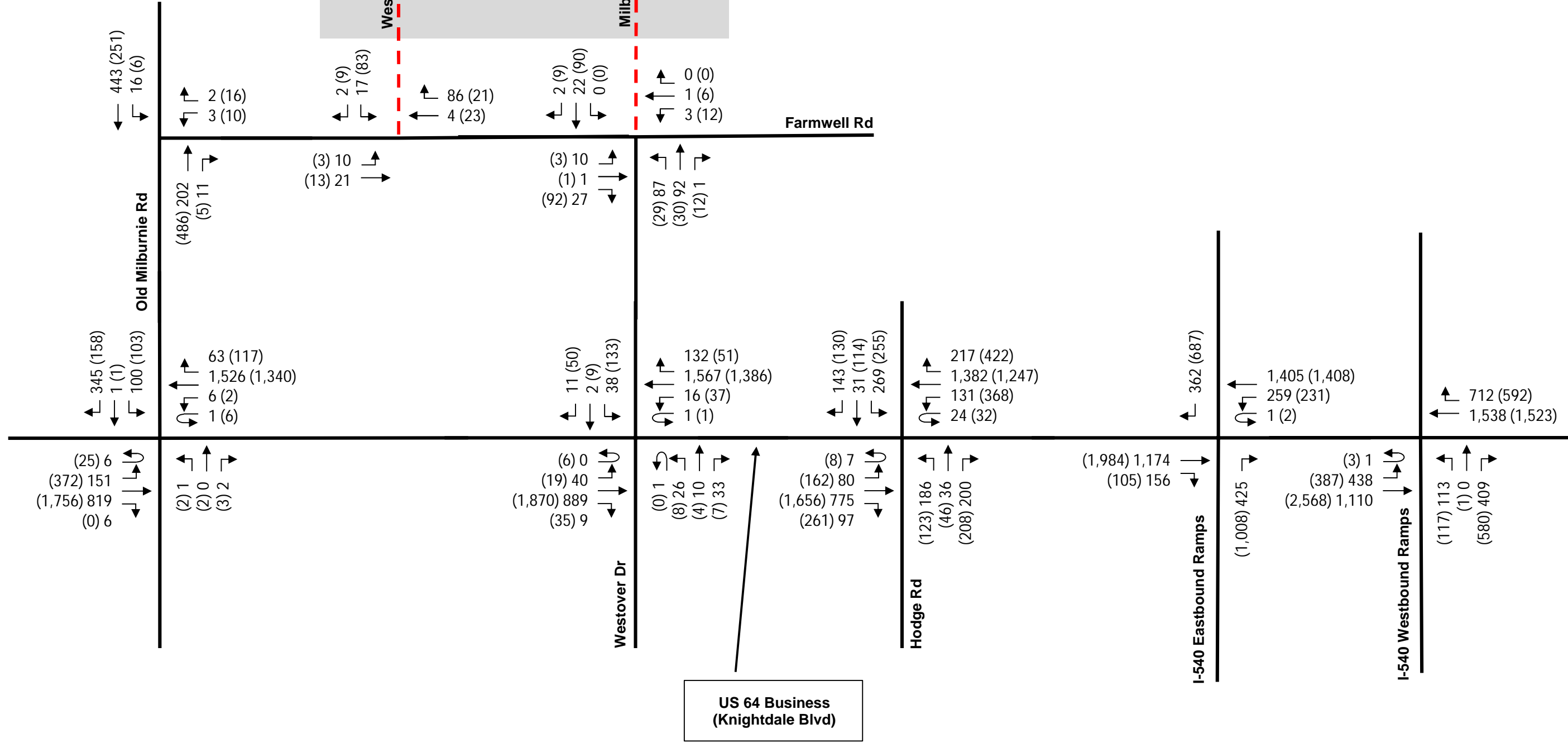


Figure 6



LEGEND

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



Projected (2025) Build-out +1
Traffic Volumes

Knightdale Gateway
Traffic Impact Analysis
Knightdale, NC

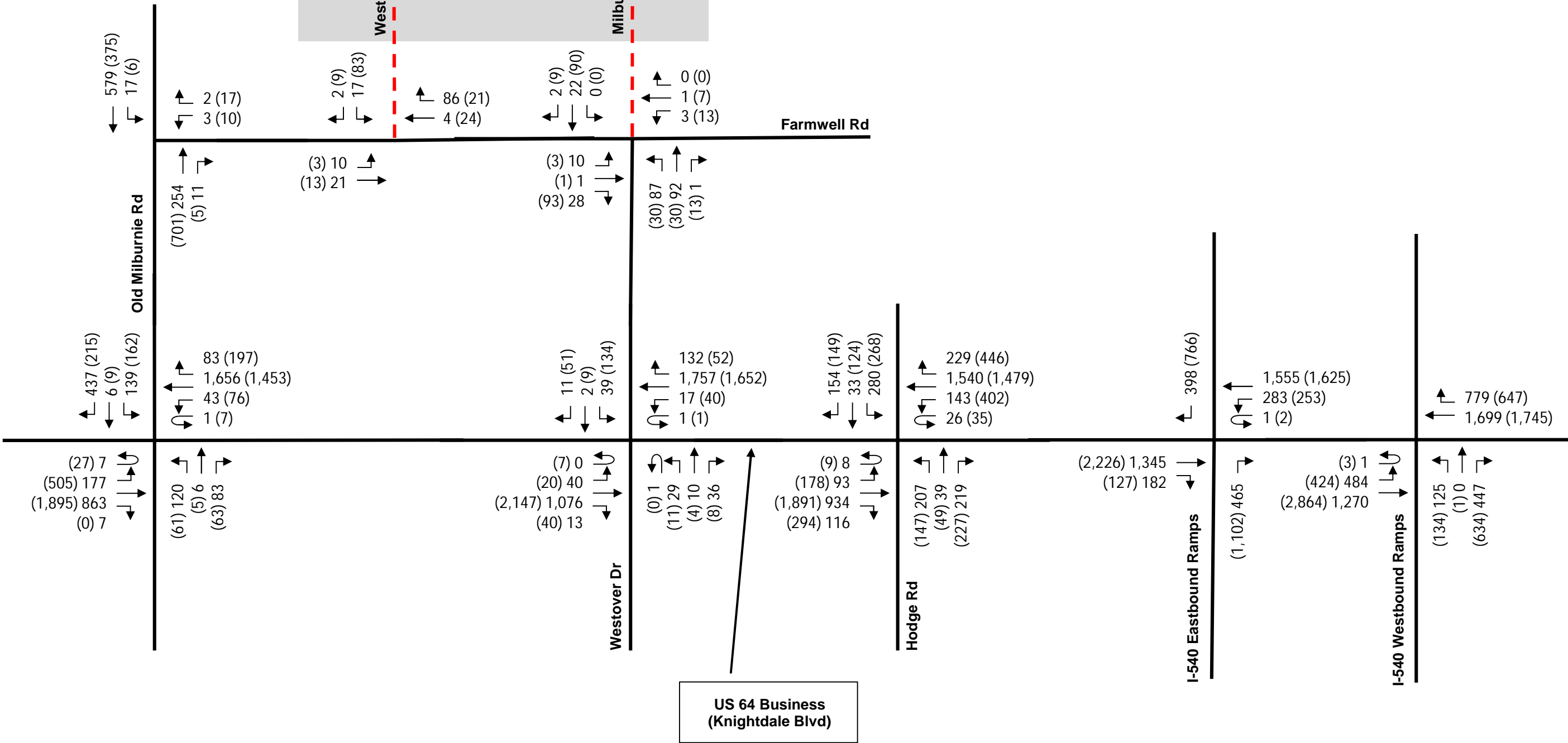


Figure 7



LEGEND

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

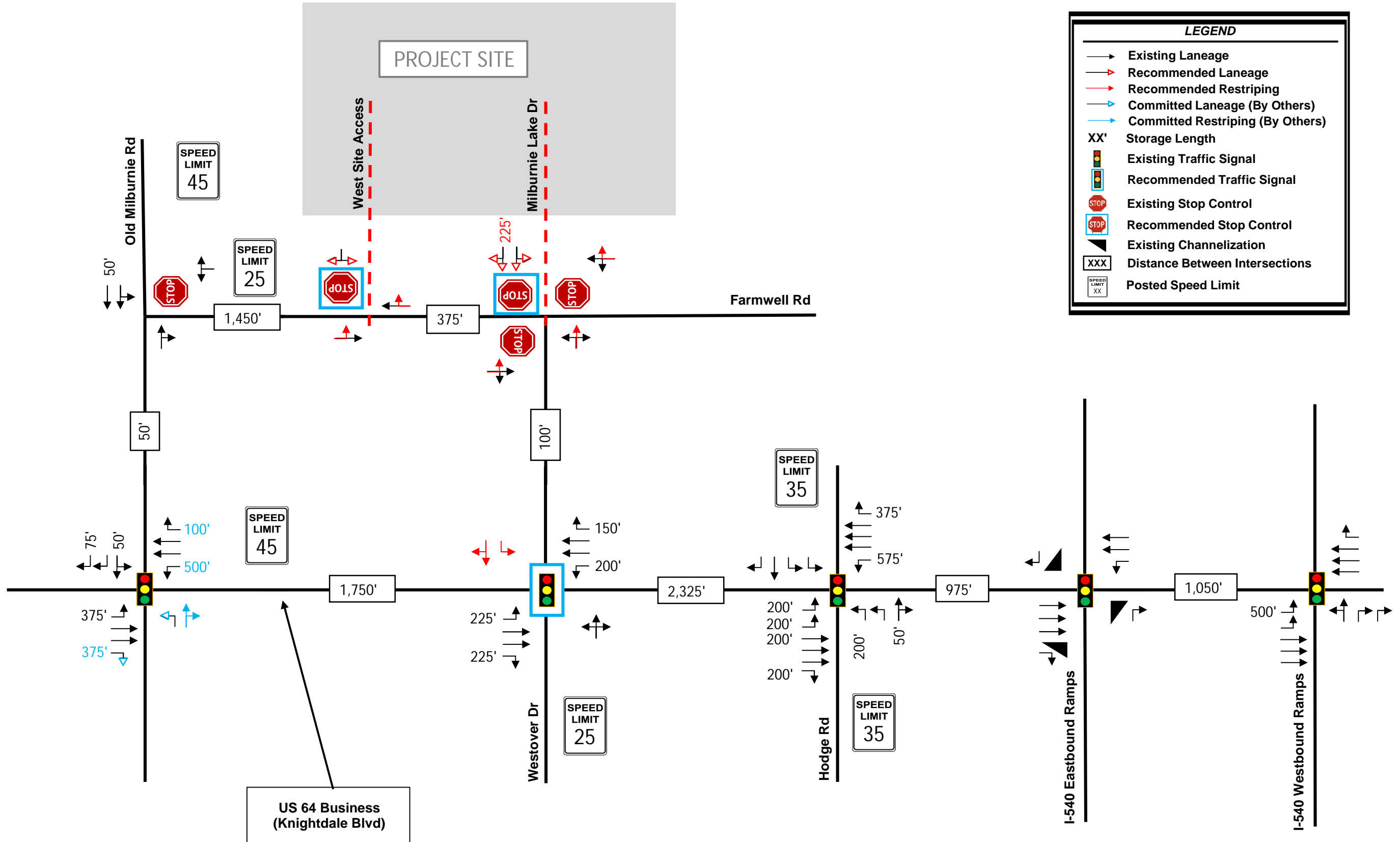


Projected (2034) Build-out +10
 Traffic Volumes

Knightdale Gateway
 Traffic Impact Analysis
 Knightdale, NC



Figure 8



LEGEND

- Existing Laneage
- Recommended Laneage
- Recommended Restriping
- Committed Laneage (By Others)
- Committed Restriping (By Others)
- XX' Storage Length
- Existing Traffic Signal
- Recommended Traffic Signal
- Existing Stop Control
- Recommended Stop Control
- Existing Channelization
- XXX Distance Between Intersections
- SPEED LIMIT XX Posted Speed Limit

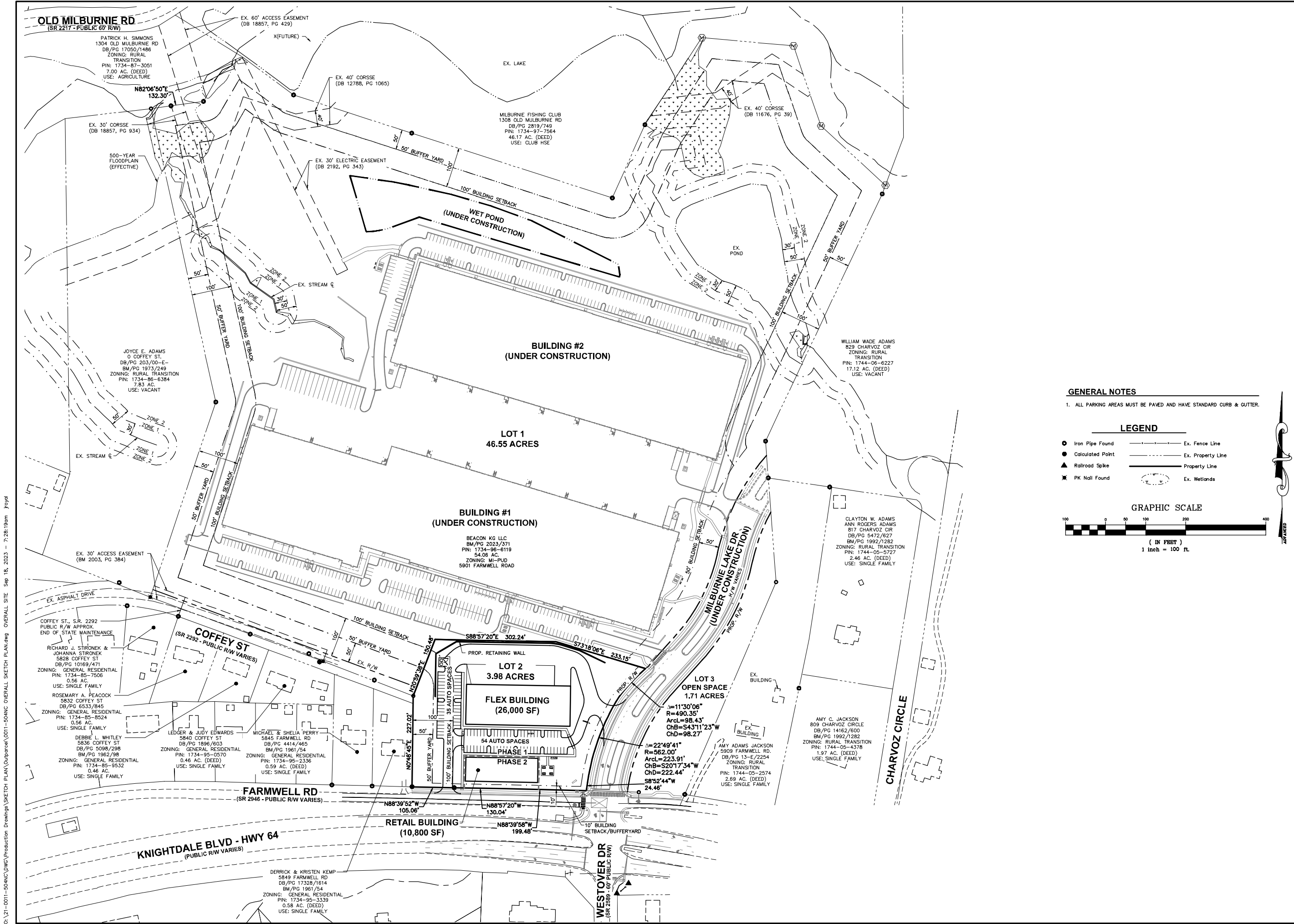
Committed and Recommended
Roadway Laneage (2025)

Knightdale Gateway
Traffic Impact Analysis
Knightdale, NC



Figure 9

Appendix B:
Site Plan



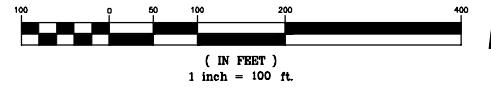
GENERAL NOTES

- 1. ALL PARKING AREAS MUST BE PAVED AND HAVE STANDARD CURB & GUTTER.

LEGEND

- Iron Pipe Found
- Calculated Point
- ▲ Railroad Spike
- ✕ PK Nail Found
- Ex. Fence Line
- - - Ex. Property Line
- Property Line
- Ex. Wetlands

GRAPHIC SCALE



PLAN PREPARED BY:

51 Kilmayne Drive, Suite 102
Cary, North Carolina 27511
ph 919-484-8290
fax 919-336-9277
ADVANCED CIVIL DESIGN
ENGINEERS & SURVEYORS

PLAN PREPARED FOR:

BEACON PARTNERS
500 East Main Street
Suite 200
Clemens, North Carolina 28609
Tel. 704-597-7757
Fax 704-598-6335

St. Matthews Township - 5901 Farmwell Road, Knightdale, NC 27610 - Wake County

KNIGHTDALE GATEWAY OUTPARCEL
SKETCH PLAN
FOR
BEACON PARTNERS
OVERALL SKETCH PLAN

RELEASARY

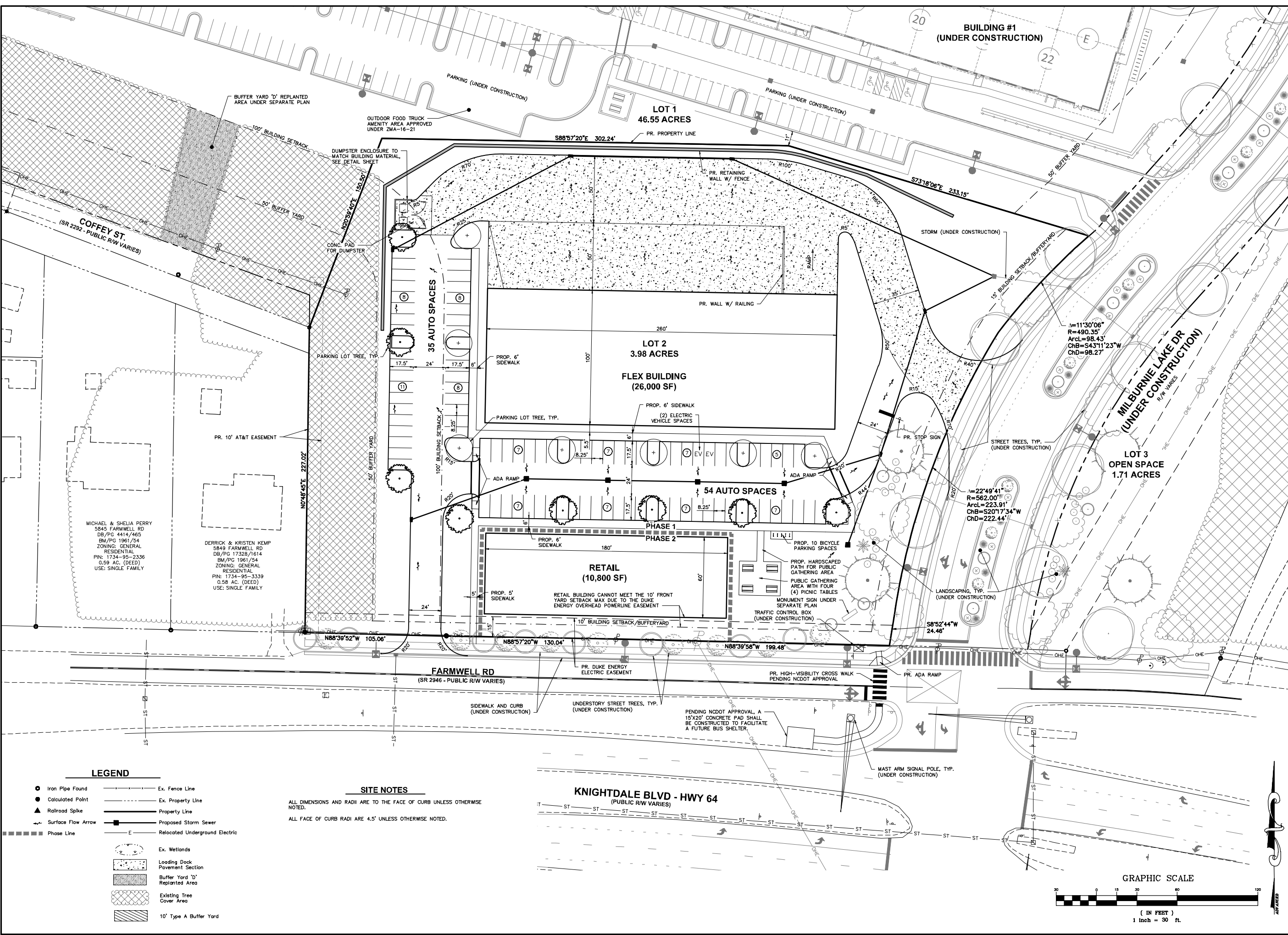
Issue Dates:

05/04/2023	- Town Submittal #1
09/18/2023	- Town Submittal #2

Date:	09/18/2023
Scale:	1" = 100'
Drawn By:	AMK
Checked By:	JRR
Project Number:	21-0011-504
Drawing Number:	C.3.0

C:\21-0011-504\NC\DWG\Production Drawings\SKETCH PLAN\Outparcel\0011-504-NC OVERALL SKETCH PLAN.dwg OVERALL SITE Sep 18, 2023 - 7:26:19am Jrr

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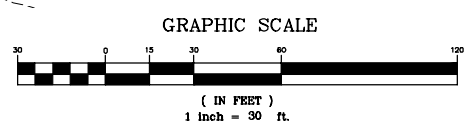


LEGEND

- Iron Pipe Found
- Calculated Point
- ▲ Railroad Spike
- Surface Flow Arrow
- Phase Line
- Ex. Fence Line
- Ex. Property Line
- Property Line
- Proposed Storm Sewer
- Relocated Underground Electric
- Ex. Wetlands
- Loading Dock Pavement Section
- Buffer Yard 'D' Replanted Area
- Existing Tree Cover Area
- 10' Type A Buffer Yard

SITE NOTES

ALL DIMENSIONS AND RADII ARE TO THE FACE OF CURB UNLESS OTHERWISE NOTED.
 ALL FACE OF CURB RADII ARE 4.5' UNLESS OTHERWISE NOTED.



PLAN PREPARED BY: **ADVANCED CIVIL DESIGN ENGINEERS SURVEYORS**
 51 Kilmayne Drive, Suite 102
 Cary, North Carolina 27511
 ph 919.484.8990
 fax 919.338.9127

PLAN PREPARED FOR: **BEACON PARTNERS**
 500 Park Meadows
 Suite 200
 Cary, North Carolina 27519
 tel. 704.597.7757
 fax 704.598.6335

St. Matthews Township - 5901 Farmwell Road, Knightdale, NC 27610 - Wake County

KNIGHTDALE GATEWAY OUTPARCEL
SKETCH PLAN
 FOR
BEACON PARTNERS
SKETCH PLAN

RELEASARY
 NORTH CAROLINA PROFESSIONAL ENGINEER
 043555
 JAY ROYAL, P.E.

Issue Dates:
 08/04/2023 - Town Submittal #1
 09/18/2023 - Town Submittal #2

Date: 09/18/2023
 Scale: 1" = 30'

Drawn By: AMK
 Checked By: JRR

Project Number:
21-0011-504

Drawing Number:
C.3.1

Appendix C: Trip Generation

Trip Generation Analysis (11th Ed. With *2nd Edition Handbook* Daily IC & *3rd Edition AM/PM IC*)
 Knightdale Gateway
 Knightdale, NC

Land Use	Density	Daily Trips			AM Peak Hour			PM Peak Hour		
		Total	In	Out	Total	In	Out	Total	In	Out
Proposed Project Trips										
110 General Light Industrial	26,000 Sq. Ft. GFA	148	74	74	21	18	3	15	2	13
150 Warehousing	450,000 Sq. Ft. GFA	750	375	375	78	60	18	80	22	58
710 General Office	60,000 Sq. Ft. GFA	744	372	372	108	95	13	109	19	90
720 Medical-Dental Office Building	10,800 Sq. Ft. GFA	356	178	178	33	26	7	41	12	29
Industrial Trips		898	449	449	99	78	21	95	24	71
Truck Trips		270	136	134	10	6	4	14	8	6
Car Trips		628	313	315	89	72	17	81	16	65
General and Medical Office Trips		1,100	550	550	141	121	20	150	31	119
New Trips		1,998	999	999	240	199	41	245	55	190

Appendix D:
Volume Development Worksheets

INTERSECTION VOLUME DEVELOPMENT

INTERSECTION #1
US 64 Business (Knightdale Boulevard) at Old Milburnie Road

AM PEAK HOUR

	Old Milburnie Road Northbound				Old Milburnie Road Southbound				US 64 Business (Knightdale Boulevard) Eastbound				US 64 Business (Knightdale Boulevard) Westbound			
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right
Observed 2021 Traffic Volumes	0	1	0	2	0	86	1	305	5	125	658	5	1	5	1,292	52
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	1				0				0				0			
Conflicting Pedestrians	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Conflicting Bicycles	0				0				0				0			
Heavy Vehicles	0	0	0	0	0	3	0	2	0	3	63	1	1	0	70	1
Heavy Vehicle %	2%	2%	2%	2%	2%	3%	2%	2%	2%	2%	10%	20%	100%	2%	5%	2%
Peak Hour Factor	0.91				0.91				0.91				0.91			
Adjustment Factor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Adjusted 2021 Volumes	0	1	0	2	0	86	1	305	5	125	658	5	1	5	1,292	52
Annual Growth Rate	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Growth Factor	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13
Annual Growth Rate (Design Year)	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
Growth Factor (Design Year)	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Background Growth Trips	0	1	0	2	0	97	1	343	6	141	741	6	1	6	1454	59
Background Growth Trips (Design Year)	0	1	0	2	0	106	1	375	7	154	810	7	1	7	1590	65
Legacy Oaks TIA (2025 & 2034)					3											
Allen Park TIA (2034)					30				60				10			
River's Edge TIA (2034)					59				8				2			
Total Approved Development Trips	0	119	6	81	0	33	5	60	0	13	13	0	0	0	36	57
2025 No-Build Traffic	0	1	0	2	0	100	1	343	6	141	779	6	1	6	1,517	63
2034 No-Build Traffic (Design Year)	0	120	6	83	0	139	6	435	7	167	823	7	1	43	1,647	83
Trip Distribution IN													40%			
Trip Distribution OUT													(40%)			
Warehouse Truck Trips	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	0
Trip Distribution IN									5%				20%			
Trip Distribution OUT									(5%)				(20%)			
Warehouse Car Trips	0	0	0	0	0	0	0	1	0	4	14	0	0	0	3	0
Trip Distribution IN									5%				20%			
Trip Distribution OUT									(5%)				(20%)			
Office Trips	0	0	0	0	0	0	0	1	0	6	24	0	0	0	4	0
Trip Distribution IN									5%				20%			
Trip Distribution OUT									(5%)				(20%)			
Retail Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Project Trips (Unbalanced)	0	0	0	0	0	0	0	2	0	10	40	0	0	0	9	0
Balancing Adjustment																
Total Vehicular Project Trips	0	0	0	0	0	0	0	2	0	10	40	0	0	0	9	0
2025 Build Traffic	0	1	0	2	0	100	1	345	6	151	819	6	1	6	1,526	63
2025 Build Heavy Vehicle %	2%	2%	2%	2%	2%	3%	2%	2%	2%	2%	9%	19%	113%	2%	5%	2%
2034 Build Traffic (Design Year)	0	120	6	83	0	139	6	437	7	177	863	7	1	43	1,656	83
2034 Build Heavy Vehicle % (Design Year)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	8%	16%	109%	2%	5%	2%

PM PEAK HOUR

	Old Milburnie Road Northbound				Old Milburnie Road Southbound				US 64 Business (Knightdale Boulevard) Eastbound				US 64 Business (Knightdale Boulevard) Westbound			
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right
Observed 2021 Traffic Volumes	0	2	2	3	0	87	1	132	22	328	1,490	0	5	2	1,114	101
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0				0				0				0			
Conflicting Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Conflicting Bicycles	0				0				0				0			
Heavy Vehicles	0	1	0	0	0	1	0	0	0	5	24	0	0	0	21	0
Heavy Vehicle %	2%	50%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Peak Hour Factor	0.94				0.94				0.94				0.94			
Adjustment Factor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Adjusted 2021 Volumes	0	2	2	3	0	87	1	132	22	328	1,490	0	5	2	1,114	101
Annual Growth Rate	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Growth Factor	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13
Annual Growth Rate (Design Year)	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
Growth Factor (Design Year)	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Background Growth Trips	0	2	2	3	0	98	1	149	25	369	1677	0	6	2	1254	114
Background Growth Trips (Design Year)	0	2	2	3	0	107	1	163	27	404	1834	0	7	2	1371	125
Legacy Oaks TIA (2025 & 2034)					5								66			
Allen Park TIA (2034)					50				43				96			
River's Edge TIA (2034)					59				8				2			
Total Approved Development Trips	0	59	3	60	0	55	8	43	0	98	48	0	0	74	43	72
2025 No-Build Traffic	0	2	2	3	0	103	1	149	25	369	1,743	0	6	2	1,301	117
2034 No-Build Traffic (Design Year)	0	61	5	63	0	162	9	206	27	502	1,882	0	7	76	1,414	197
Trip Distribution IN													40%			
Trip Distribution OUT													(40%)			
Warehouse Truck Trips	0	0	0	0	0	0	0	0	0	0	3	0	0	0	2	0
Trip Distribution IN									5%				20%			
Trip Distribution OUT									(5%)				(20%)			
Warehouse Car Trips	0	0	0	0	0	0	0	3	0	1	3	0	0	0	13	0
Trip Distribution IN									5%				20%			
Trip Distribution OUT									(5%)				(20%)			
Office Trips	0	0	0	0	0	0	0	6	0	2	6	0	0	0	24	0
Trip Distribution IN									5%				20%			
Trip Distribution OUT									(5%)				(20%)			
Retail Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Project Trips (Unbalanced)	0	0	0	0	0	0	0	9	0	3	12	0	0	0	39	0
Balancing Adjustment																
Total Vehicular Project Trips	0	0	0	0	0	0	0	9	0	3	13	0	0	0	39	0
2025 Build Traffic	0	2	2	3	0	103	1	158	25	372	1,756	0	6	2	1,340	117
2025 Build Heavy Vehicle %	2%	56%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
2034 Build Traffic (Design Year)	0	61	5	63	0	162	9	215	27	505	1,895	0	7	76	1,453	197
2034 Build Heavy Vehicle % (Design Year)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%

INTERSECTION VOLUME DEVELOPMENT

INTERSECTION #2
US 64 Business (Knightdale Boulevard) at Westover Drive/Farmwell Road

AM PEAK HOUR

	Westover Drive Northbound				Farmwell Road Southbound				US 64 Business (Knightdale Boulevard) Eastbound				US 64 Business (Knightdale Boulevard) Westbound			
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right
Observed 2021 Traffic Volumes	1	23	0	28	0	10	0	2	0	0	753	8	1	13	1,333	2
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0				0				0				0			
Conflicting Pedestrians	0				0				0				0			
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Conflicting Bicycles	0				0				0				0			
Heavy Vehicles	0	1	0	1	0	1	0	0	0	0	71	0	1	1	72	0
Heavy Vehicle %	2%	4%	2%	4%	2%	10%	2%	2%	2%	2%	9%	2%	100%	8%	5%	2%
Peak Hour Factor	0.89				0.89				0.89				0.89			
Adjustment Factor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Adjusted 2021 Volumes	1	23	0	28	0	10	0	2	0	0	753	8	1	13	1,333	2
Annual Growth Rate	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Growth Factor	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13
Annual Growth Rate (Design Year)	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
Growth Factor (Design Year)	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Background Growth Trips	1	26	0	32	0	11	0	2	0	0	848	9	1	15	1,500	2
Background Growth Trips (Design Year)	1	28	0	35	0	12	0	2	0	0	927	10	1	16	1,641	2
Legacy Oaks TIA (2025 & 2034)	0				0				41				67			
Allen Park TIA (2034)	0				0				29				14			
River's Edge TIA (2034)	0				0				79				35			
Total Approved Development Trips	0	1	0	1	0	0	0	0	0	0	149	3	0	1	116	0
2025 No-Build Traffic	1	26	0	33	0	11	0	2	0	0	889	9	1	16	1,567	2
2034 No-Build Traffic (Design Year)	1	29	0	36	0	12	0	2	0	0	1,076	13	1	17	1,757	2
Trip Distribution IN					(60%)				40%							
Trip Distribution OUT					(40%)				20%				65%			
Warehouse Truck Trips	0	0	0	0	0	2	0	2	0	2	0	0	0	0	0	4
Trip Distribution IN					(65%)				20%				65%			
Trip Distribution OUT					(5%)				(20%)							
Warehouse Car Trips	0	0	4	0	0	11	1	3	0	14	0	0	0	0	0	47
Trip Distribution IN					(65%)				20%				65%			
Trip Distribution OUT					(5%)				(20%)							
Office Trips	0	0	6	0	0	13	1	4	0	24	0	0	0	0	0	79
Trip Distribution IN					(65%)				20%				65%			
Trip Distribution OUT					(5%)				(20%)							
Retail Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Project Trips (Unbalanced)	0	0	10	0	0	26	2	9	0	40	0	0	0	0	0	130
Balancing Adjustment					1											
Total Vehicular Project Trips	0	0	10	0	0	27	2	9	0	40	0	0	0	0	0	130
2025 Build Traffic	1	26	10	33	0	38	2	11	0	40	889	9	1	16	1,567	132
2025 Build Heavy Vehicle %	2%	4%	2%	3%	2%	8%	2%	18%	2%	5%	9%	2%	113%	7%	5%	3%
2034 Build Traffic (Design Year)	1	29	10	36	0	39	2	11	0	40	1,076	13	1	17	1,757	132
2034 Build Heavy Vehicle % (Design Year)	2%	4%	2%	3%	2%	8%	2%	18%	2%	5%	7%	2%	109%	6%	4%	3%

PM PEAK HOUR

	Westover Drive Northbound				Farmwell Road Southbound				US 64 Business (Knightdale Boulevard) Eastbound				US 64 Business (Knightdale Boulevard) Westbound			
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right
Observed 2021 Traffic Volumes	0	7	0	5	0	9	0	10	5	5	1,598	31	1	32	1,187	13
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0				0				0				0			
Conflicting Pedestrians	0				0				0				0			
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Conflicting Bicycles	0				0				0				0			
Heavy Vehicles	0	0	0	0	0	0	0	3	0	0	30	0	0	0	25	0
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	30%	2%	2%	2%	2%	2%	2%	2%	2%
Peak Hour Factor	0.95				0.95				0.95				0.95			
Adjustment Factor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Adjusted 2021 Volumes	0	7	0	5	0	9	0	10	5	5	1,598	31	1	32	1,187	13
Annual Growth Rate	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Growth Factor	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13
Annual Growth Rate (Design Year)	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
Growth Factor (Design Year)	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Background Growth Trips	0	8	0	6	0	10	0	11	6	6	1,799	35	1	36	1,336	15
Background Growth Trips (Design Year)	0	9	0	7	0	11	0	12	7	7	1,968	38	1	39	1,461	16
Legacy Oaks TIA (2025 & 2034)	0				0				71				50			
Allen Park TIA (2034)	0				0				49				68			
River's Edge TIA (2034)	0				0				59				73			
Total Approved Development Trips	0	2	0	1	0	0	0	0	0	0	179	2	0	1	191	0
2025 No-Build Traffic	0	8	0	7	0	10	0	11	6	6	1,870	35	1	37	1,386	15
2034 No-Build Traffic (Design Year)	0	11	0	8	0	11	0	12	7	7	2,147	40	1	40	1,652	16
Trip Distribution IN					(60%)				40%							
Trip Distribution OUT					(40%)				20%				65%			
Warehouse Truck Trips	0	0	0	0	0	4	0	2	0	3	0	0	0	0	0	5
Trip Distribution IN					(65%)				20%				65%			
Trip Distribution OUT					(5%)				(20%)							
Warehouse Car Trips	0	0	1	0	0	42	3	13	0	3	0	0	0	0	0	10
Trip Distribution IN					(65%)				20%				65%			
Trip Distribution OUT					(5%)				(20%)							
Retail Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Project Trips (Unbalanced)	0	0	3	0	0	123	9	39	0	12	0	0	0	0	0	35
Balancing Adjustment					1								1			
Total Vehicular Project Trips	0	0	4	0	0	123	9	39	0	13	0	0	0	0	0	36
2025 Build Traffic	0	8	4	7	0	133	9	50	6	19	1,870	35	1	37	1,386	51
2025 Build Heavy Vehicle %	2%	2%	2%	2%	2%	3%	2%	11%	2%	16%	2%	2%	2%	2%	2%	10%
2034 Build Traffic (Design Year)	0	11	4	8	0	134	9	51	7	20	2,147	40	1	40	1,652	52
2034 Build Heavy Vehicle % (Design Year)	2%	2%	2%	2%	2%	3%	2%	10%	2%	15%	2%	2%	2%	2%	2%	10%

INTERSECTION VOLUME DEVELOPMENT

INTERSECTION #3
US 64 Business (Knightdale Boulevard) at Hodge Road

AM PEAK HOUR

	Hodge Road Northbound				Hodge Road Southbound				US 64 Business (Knightdale Boulevard) Eastbound				US 64 Business (Knightdale Boulevard) Westbound			
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right
Observed 2021 Traffic Volumes	0	165	26	178	0	108	18	67	6	34	665	86	21	116	1,112	111
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0				0				0				0			
Conflicting Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Conflicting Bicycles	0				0				0				0			
Heavy Vehicles	0	7	0	4	0	1	1	0	0	0	68	4	2	6	63	5
Heavy Vehicle %	2%	4%	2%	2%	2%	2%	6%	2%	2%	2%	10%	5%	10%	5%	6%	5%
Peak Hour Factor	0.96				0.96				0.96				0.96			
Adjustment Factor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Adjusted 2021 Volumes	0	165	26	178	0	108	18	67	6	34	665	86	21	116	1,112	111
Annual Growth Rate	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Growth Factor	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13
Annual Growth Rate (Design Year)	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
Growth Factor (Design Year)	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Background Growth Trips	0	186	29	200	0	122	20	75	7	38	748	97	24	131	1,252	125
Background Growth Trips (Design Year)	0	203	32	219	0	133	22	82	8	42	818	106	26	143	1,369	137
Legacy Oaks TIA (2025 & 2034)			7			147	11	68		2	42					92
Allen Park TIA (2034)											24	3				12
River's Edge TIA (2034)										7	65	7				29
Total Approved Development Trips	0	4	7	0	0	147	11	72	0	51	89	10	0	0	41	92
2025 No-Build Traffic	0	186	36	200	0	269	31	143	7	80	748	97	24	131	1,252	217
2034 No-Build Traffic (Design Year)	0	207	39	219	0	280	33	154	8	93	907	116	26	143	1,410	229
Trip Distribution IN																60%
Trip Distribution OUT											(60%)					
Warehouse Truck Trips	0	0	0	0	0	0	0	0	0	0	2	0	0	0	4	0
Trip Distribution IN																65%
Trip Distribution OUT											(65%)					
Warehouse Car Trips	0	0	0	0	0	0	0	0	0	0	11	0	0	0	47	0
Trip Distribution IN																65%
Trip Distribution OUT											(65%)					
Office Trips	0	0	0	0	0	0	0	0	0	0	13	0	0	0	79	0
Trip Distribution IN																65%
Trip Distribution OUT											(65%)					
Retail Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Project Trips (Unbalanced)	0	0	0	0	0	0	0	0	0	0	26	0	0	0	130	0
Balancing Adjustment											1					
Total Vehicular Project Trips	0	0	0	0	0	0	0	0	0	0	27	0	0	0	130	0
2025 Build Traffic	0	186	36	200	0	269	31	143	7	80	775	97	24	131	1,382	217
2025 Build Heavy Vehicle %	2%	4%	2%	2%	2%	2%	4%	2%	2%	2%	10%	5%	9%	5%	5%	3%
2034 Build Traffic (Design Year)	0	207	39	219	0	280	33	154	8	93	934	116	26	143	1,540	229
2034 Build Heavy Vehicle % (Design Year)	2%	4%	2%	2%	2%	2%	3%	2%	2%	2%	8%	4%	8%	5%	5%	2%

PM PEAK HOUR

	Hodge Road Northbound				Hodge Road Southbound				US 64 Business (Knightdale Boulevard) Eastbound				US 64 Business (Knightdale Boulevard) Westbound			
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right
Observed 2021 Traffic Volumes	0	109	30	185	0	122	94	63	7	70	1,372	232	28	327	1,084	229
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0				1				0				0			
Conflicting Pedestrians	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Conflicting Bicycles	0				0				0				0			
Heavy Vehicles	0	1	0	0	0	0	1	1	1	0	29	3	0	8	32	1
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	14%	2%	2%	2%	2%	2%	3%	2%
Peak Hour Factor	0.93				0.93				0.93				0.93			
Adjustment Factor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Adjusted 2021 Volumes	0	109	30	185	0	122	94	63	7	70	1,372	232	28	327	1,084	229
Annual Growth Rate	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Growth Factor	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13
Annual Growth Rate (Design Year)	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
Growth Factor (Design Year)	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Background Growth Trips	0	123	34	208	0	137	106	71	8	79	1,544	261	32	368	1,220	258
Background Growth Trips (Design Year)	0	135	37	227	0	150	116	78	9	86	1,689	285	35	402	1,334	282
Legacy Oaks TIA (2025 & 2034)			12			118	8	59			83	-11			-9	164
Allen Park TIA (2034)										4	41	4				57
River's Edge TIA (2034)										5	49	5				61
Total Approved Development Trips	0	12	12	0	0	118	8	71	0	92	79	9	0	0	109	164
2025 No-Build Traffic	0	123	46	208	0	255	114	130	8	162	1,533	261	32	368	1,211	422
2034 No-Build Traffic (Design Year)	0	147	49	227	0	268	124	149	9	178	1,768	294	35	402	1,443	446
Trip Distribution IN																60%
Trip Distribution OUT											(60%)					
Warehouse Truck Trips	0	0	0	0	0	0	0	0	0	0	4	0	0	0	5	0
Trip Distribution IN																65%
Trip Distribution OUT											(65%)					
Warehouse Car Trips	0	0	0	0	0	0	0	0	0	0	42	0	0	0	10	0
Trip Distribution IN																65%
Trip Distribution OUT											(65%)					
Office Trips	0	0	0	0	0	0	0	0	0	0	77	0	0	0	20	0
Trip Distribution IN																65%
Trip Distribution OUT											(65%)					
Retail Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Project Trips (Unbalanced)	0	0	0	0	0	0	0	0	0	0	123	0	0	0	35	0
Balancing Adjustment											1					
Total Vehicular Project Trips	0	0	0	0	0	0	0	0	0	0	123	0	0	0	36	0
2025 Build Traffic	0	123	46	208	0	255	114	130	8	162	1,656	261	32	368	1,247	422
2025 Build Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	14%	2%	2%	2%	2%	2%	3%	2%
2034 Build Traffic (Design Year)	0	147	49	227	0	268	124	149	9	178	1,891	294	35	402	1,479	446
2034 Build Heavy Vehicle % (Design Year)	2%	2%	2%	2%	2%	2%	2%	2%	12%	2%	2%	2%	2%	2%	3%	2%

INTERSECTION VOLUME DEVELOPMENT

INTERSECTION #4
US 64 Business (Knightdale Boulevard) at I-540 Eastbound Ramps

	AM PEAK HOUR																
	I-540 Eastbound Ramps Northbound				I-540 Eastbound Ramps Southbound				US 64 Business (Knightdale Boulevard) Eastbound				US 64 Business (Knightdale Boulevard) Westbound				
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	
Observed 2021 Traffic Volumes	0	0	0	378	0	0	0	273	0	0	914	112	1	230	1101	0	
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Pedestrians	0				0				0				0				
Conflicting Pedestrians	0				0				0				0				
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Conflicting Bicycles	0				0				0				0				
Heavy Vehicles	0	0	0	21	0	0	0	12	0	0	60	19	0	17	66	0	
Heavy Vehicle %	2%	2%	2%	6%	2%	2%	2%	4%	2%	2%	7%	17%	2%	7%	6%	2%	
Peak Hour Factor	0.95				0.95				0.95				0.95				
Adjustment Factor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Adjusted 2021 Volumes	0	0	0	378	0	0	0	273	0	0	914	112	1	230	1101	0	
Annual Growth Rate	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	
Growth Factor	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	
Annual Growth Rate (Design Year)	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	
Growth Factor (Design Year)	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	
Background Growth Trips	0	0	0	425	0	0	0	367	0	0	1029	126	1	259	1239	0	
Background Growth Trips (Design Year)	0	0	0	465	0	0	0	336	0	0	1125	138	1	283	1355	0	
Legacy Oaks TIA (2025 & 2034)	0				0				0				0				
Allen Park TIA (2034)	0				0				0				0				
River's Edge TIA (2034)	0				0				0				0				
Total Approved Development Trips	0	0	0	0	0	0	0	42	0	0	199	37	0	0	90	0	
2025 No-Build Traffic	0	0	0	425	0	0	0	342	0	0	1,153	149	1	259	1,295	0	
2034 No-Build Traffic (Design Year)	0	0	0	465	0	0	0	378	0	0	1,324	175	1	283	1,445	0	
Trip Distribution IN																	
Trip Distribution OUT																	
Warehouse Truck Trips	0	0	0	0	0	0	0	0	1	0	0	(40%)	(20%)	1	0	0	3
Trip Distribution IN																	
Trip Distribution OUT																	
Warehouse Car Trips	0	0	0	0	0	0	0	7	0	0	0	(50%)	(15%)	3	0	0	40
Trip Distribution IN																	
Trip Distribution OUT																	
Office Trips	0	0	0	0	0	0	0	12	0	0	0	(50%)	(15%)	3	0	0	67
Trip Distribution IN																	
Trip Distribution OUT																	
Retail Trips	0	0	0	0	0	0	0	0	0	0	0	(50%)	(15%)	0	0	0	0
Project Trips (Unbalanced)	0	0	0	0	0	0	0	20	0	0	0	21	7	0	0	110	
Balancing Adjustment																	
Total Vehicular Project Trips	0	0	0	0	0	0	0	20	0	0	0	21	7	0	0	110	
2025 Build Traffic	0	0	0	425	0	0	0	362	0	0	1,174	156	1	259	1,405	0	
2025 Build Heavy Vehicle %	2%	2%	2%	6%	2%	2%	2%	4%	2%	2%	6%	14%	2%	7%	6%	2%	
2034 Build Traffic (Design Year)	0	0	0	465	0	0	0	398	0	0	1,345	182	1	283	1,555	0	
2034 Build Heavy Vehicle % (Design Year)	2%	2%	2%	5%	2%	2%	2%	4%	2%	2%	5%	12%	2%	7%	5%	2%	

	PM PEAK HOUR																
	I-540 Eastbound Ramps Northbound				I-540 Eastbound Ramps Southbound				US 64 Business (Knightdale Boulevard) Eastbound				US 64 Business (Knightdale Boulevard) Westbound				
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	
Observed 2021 Traffic Volumes	0	0	0	896	0	0	0	553	0	0	1,597	53	2	205	1,139	0	
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Pedestrians	0				0				0				0				
Conflicting Pedestrians	0				0				0				0				
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Conflicting Bicycles	0				0				0				0				
Heavy Vehicles	0	0	0	26	0	0	0	23	0	0	28	0	0	1	17	0	
Heavy Vehicle %	2%	2%	2%	3%	2%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%	2%	
Peak Hour Factor	0.91				0.91				0.91				0.91				
Adjustment Factor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Adjusted 2021 Volumes	0	0	0	896	0	0	0	553	0	0	1,597	53	2	205	1,139	0	
Annual Growth Rate	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	
Growth Factor	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	
Annual Growth Rate (Design Year)	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	
Growth Factor (Design Year)	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	
Background Growth Trips	0	0	0	1008	0	0	0	622	0	0	1797	60	2	231	1282	0	
Background Growth Trips (Design Year)	0	0	0	1102	0	0	0	680	0	0	1965	66	2	253	1402	0	
Legacy Oaks TIA (2025 & 2034)	0				0				0				0				
Allen Park TIA (2034)	0				0				0				0				
River's Edge TIA (2034)	0				0				0				0				
Total Approved Development Trips	0	0	0	0	0	0	0	80	0	0	166	31	0	0	193	0	
2025 No-Build Traffic	0	0	0	1,008	0	0	0	681	0	0	1,889	75	2	231	1,378	0	
2034 No-Build Traffic (Design Year)	0	0	0	1,102	0	0	0	760	0	0	2,131	97	2	253	1,595	0	
Trip Distribution IN																	
Trip Distribution OUT																	
Warehouse Truck Trips	0	0	0	0	0	0	0	1	0	0	2	(40%)	(20%)	1	0	0	4
Trip Distribution IN																	
Trip Distribution OUT																	
Warehouse Car Trips	0	0	0	0	0	0	0	2	0	0	33	(50%)	(15%)	10	0	0	9
Trip Distribution IN																	
Trip Distribution OUT																	
Office Trips	0	0	0	0	0	0	0	3	0	0	60	(50%)	(15%)	18	0	0	17
Trip Distribution IN																	
Trip Distribution OUT																	
Retail Trips	0	0	0	0	0	0	0	0	0	0	0	(50%)	(15%)	0	0	0	0
Project Trips (Unbalanced)	0	0	0	0	0	0	0	6	0	0	95	29	1	0	0	30	
Balancing Adjustment																	
Total Vehicular Project Trips	0	0	0	0	0	0	0	6	0	0	95	30	1	0	0	30	
2025 Build Traffic	0	0	0	1,008	0	0	0	687	0	0	1,984	105	2	231	1,408	0	
2025 Build Heavy Vehicle %	2%	2%	2%	3%	2%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%	2%	
2034 Build Traffic (Design Year)	0	0	0	1,102	0	0	0	766	0	0	2,226	127	2	253	1,625	0	
2034 Build Heavy Vehicle % (Design Year)	2%	2%	2%	3%	2%	2%	2%	3%	2%	2%	2%	2%	2%	2%	2%	2%	

INTERSECTION VOLUME DEVELOPMENT

INTERSECTION #5
US 64 Business (Knightdale Boulevard) at I-540 Westbound Ramps

	AM PEAK HOUR																
	I-540 Westbound Ramps Northbound				I-540 Westbound Ramps Southbound				US 64 Business (Knightdale Boulevard) Eastbound				US 64 Business (Knightdale Boulevard) Westbound				
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	
Observed 2021 Traffic Volumes	0	60	0	363	0	0	0	0	1	335	912	0	0	0	0	1,259	633
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0				1				0				0				
Conflicting Pedestrians	0				0				1				0				
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Conflicting Bicycles	0				0				0				0				
Heavy Vehicles	0	1	0	27	0	0	0	0	0	20	60	0	0	0	0	82	30
Heavy Vehicle %	2%	2%	2%	7%	2%	2%	2%	2%	2%	6%	7%	2%	2%	2%	7%	5%	5%
Peak Hour Factor	0.94				0.94				0.94				0.94				
Adjustment Factor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Adjusted 2021 Volumes	0	60	0	363	0	0	0	0	1	335	912	0	0	0	0	1,259	633
Annual Growth Rate	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Growth Factor	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13
Annual Growth Rate (Design Year)	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
Growth Factor (Design Year)	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Background Growth Trips	0	68	0	409	0	0	0	0	1	377	1026	0	0	0	0	1417	712
Background Growth Trips (Design Year)	0	74	0	447	0	0	0	0	1	412	1122	0	0	0	0	1550	779
Legacy Oaks TIA (2025 & 2034)	2								5				8				
Allen Park TIA (2034)	4								8				20				
River's Edge TIA (2034)	21				0				67				132				
Total Approved Development Trips	0	21	0	0	0	0	0	0	0	67	132	0	0	0	0	70	0
2025 No-Build Traffic	0	83	0	409	0	0	0	0	1	433	1,094	0	0	0	0	1,459	712
2034 No-Build Traffic (Design Year)	0	95	0	447	0	0	0	0	1	479	1,254	0	0	0	0	1,620	779
Trip Distribution IN	20%												25%				
Trip Distribution OUT									(15%)				(25%)				
Warehouse Truck Trips	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0	2	0
Trip Distribution IN	15%												40%				
Trip Distribution OUT									(10%)				(40%)				
Warehouse Car Trips	0	11	0	0	0	0	0	0	0	2	7	0	0	0	0	29	0
Trip Distribution IN	15%												40%				
Trip Distribution OUT									(10%)				(40%)				
Office Trips	0	18	0	0	0	0	0	0	0	2	8	0	0	0	0	48	0
Trip Distribution IN	15%												40%				
Trip Distribution OUT									(10%)				(40%)				
Retail Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Project Trips (Unbalanced)	0	30	0	0	0	0	0	0	0	5	16	0	0	0	0	79	0
Balancing Adjustment																	
Total Vehicular Project Trips	0	30	0	0	0	0	0	0	0	5	16	0	0	0	0	79	0
2025 Build Traffic	0	113	0	409	0	0	0	0	1	438	1,110	0	0	0	0	1,538	712
2025 Build Heavy Vehicle %	2%	2%	2%	7%	2%	2%	2%	2%	2%	5%	6%	2%	2%	2%	7%	5%	5%
2034 Build Traffic (Design Year)	0	125	0	447	0	0	0	0	1	484	1,270	0	0	0	0	1,699	779
2034 Build Heavy Vehicle % (Design Year)	2%	2%	2%	7%	2%	2%	2%	2%	2%	5%	5%	2%	2%	2%	7%	5%	5%

	PM PEAK HOUR																
	I-540 Westbound Ramps Northbound				I-540 Westbound Ramps Southbound				US 64 Business (Knightdale Boulevard) Eastbound				US 64 Business (Knightdale Boulevard) Westbound				
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	
Observed 2021 Traffic Volumes	0	75	1	515	0	0	0	0	3	289	2,170	0	0	0	0	1,272	526
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0				0				0				0				
Conflicting Pedestrians	0				0				0				0				
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Conflicting Bicycles	0				0				0				0				
Heavy Vehicles	0	2	0	11	0	0	0	0	0	11	48	0	0	0	0	14	8
Heavy Vehicle %	2%	3%	2%	2%	2%	2%	2%	2%	2%	4%	2%	2%	2%	2%	2%	2%	2%
Peak Hour Factor	0.98				0.98				0.98				0.98				
Adjustment Factor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Adjusted 2021 Volumes	0	75	1	515	0	0	0	0	3	289	2,170	0	0	0	0	1,272	526
Annual Growth Rate	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Growth Factor	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13
Annual Growth Rate (Design Year)	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
Growth Factor (Design Year)	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Background Growth Trips	0	84	1	580	0	0	0	0	3	325	2442	0	0	0	0	1432	592
Background Growth Trips (Design Year)	0	92	1	634	0	0	0	0	3	355	2671	0	0	0	0	1566	647
Legacy Oaks TIA (2025 & 2034)	24								42				50				
Allen Park TIA (2034)	4								3				31				
River's Edge TIA (2034)	5								4				36				
Total Approved Development Trips	0	33	0	0	0	0	0	0	0	49	117	0	0	0	0	160	0
2025 No-Build Traffic	0	108	1	580	0	0	0	0	3	367	2,492	0	0	0	0	1,504	592
2034 No-Build Traffic (Design Year)	0	125	1	634	0	0	0	0	3	404	2,788	0	0	0	0	1,726	647
Trip Distribution IN	20%												25%				
Trip Distribution OUT									(15%)				(25%)				
Warehouse Truck Trips	0	2	0	0	0	0	0	0	0	1	2	0	0	0	0	2	0
Trip Distribution IN	15%												40%				
Trip Distribution OUT									(10%)				(40%)				
Warehouse Car Trips	0	2	0	0	0	0	0	0	0	7	26	0	0	0	0	6	0
Trip Distribution IN	15%												40%				
Trip Distribution OUT									(10%)				(40%)				
Office Trips	0	5	0	0	0	0	0	0	0	12	48	0	0	0	0	12	0
Trip Distribution IN	15%												40%				
Trip Distribution OUT									(10%)				(40%)				
Retail Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Project Trips (Unbalanced)	0	9	0	0	0	0	0	0	0	20	76	0	0	0	0	20	0
Balancing Adjustment																	
Total Vehicular Project Trips	0	9	0	0	0	0	0	0	0	20	76	0	0	0	0	19	0
2025 Build Traffic	0	117	1	580	0	0	0	0	3	387	2,568	0	0	0	0	1,523	592
2025 Build Heavy Vehicle %	2%	4%	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	2%	2%	2%	2%	2%
2034 Build Traffic (Design Year)	0	134	1	634	0	0	0	0	3	424	2,864	0	0	0	0	1,745	647
2034 Build Heavy Vehicle % (Design Year)	2%	3%	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	2%	2%	2%	2%	2%

INTERSECTION VOLUME DEVELOPMENT

INTERSECTION #7
Farmwell Road/Milburnie Lake Drive at Farmwell Road

AM PEAK HOUR

	Farmwell Road Northbound				Milburnie Lake Drive Southbound				Farmwell Road Eastbound				Farmwell Road Westbound				
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	
Observed 2021 Traffic Volumes	0	1	0	1	0	0	0	0	0	0	1	9	0	0	3	1	0
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0				0				0				0				
Conflicting Pedestrians	0				0				0				0				
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Conflicting Bicycles	0				0				0				0				
Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	33%	2%	2%	
Peak Hour Factor	0.89				0.89				0.89				0.89				
Adjustment Factor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Adjusted 2021 Volumes	0	1	0	1	0	0	0	0	0	0	1	9	0	0	3	1	0
Annual Growth Rate	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	
Growth Factor	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	
Annual Growth Rate (Design Year)	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	
Growth Factor (Design Year)	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	
Background Growth Trips	0	1	0	1	0	0	0	0	0	0	1	10	0	3	1	0	0
Background Growth Trips (Design Year)	0	1	0	1	0	0	0	0	0	0	1	11	0	3	1	0	0
Legacy Oaks TIA (2025 & 2034)																	
Allen Park TIA (2034)																	
River's Edge TIA (2034)																	
Total Approved Development Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2025 No-Build Traffic	0	1	0	1	0	0	0	0	0	0	1	10	0	3	1	0	0
2034 No-Build Traffic (Design Year)	0	1	0	1	0	0	0	0	0	0	1	11	0	3	1	0	0
Trip Distribution IN			100%														
Trip Distribution OUT							(100%)										
Warehouse Truck Trips	0	0	6	0	0	0	4	0	0	0	0	0	0	0	0	0	0
Trip Distribution IN		45%	45%							5%							
Trip Distribution OUT							(45%)	(5%)				(45%)					
Warehouse Car Trips	0	32	32	0	0	0	8	1	0	4	0	8	0	0	0	0	0
Trip Distribution IN		45%	45%							5%							
Trip Distribution OUT							(45%)	(5%)				(45%)					
Office Trips	0	54	54	0	0	0	9	1	0	6	0	9	0	0	0	0	0
Trip Distribution IN		45%	45%							5%							
Trip Distribution OUT							(45%)	(5%)				(45%)					
Retail Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Project Trips (Unbalanced)	0	86	92	0	0	0	21	2	0	10	0	17	0	0	0	0	0
Balancing Adjustment							1										
Total Vehicular Project Trips	0	86	92	0	0	0	22	2	0	10	0	17	0	0	0	0	0
2025 Build Traffic	0	87	92	1	0	0	22	2	0	10	1	27	0	3	1	0	0
2025 Build Heavy Vehicle %	2%	2%	7%	2%	2%	2%	18%	2%	2%	2%	2%	2%	2%	38%	2%	2%	
2034 Build Traffic (Design Year)	0	87	92	1	0	0	22	2	0	10	1	28	0	3	1	0	0
2034 Build Heavy Vehicle % (Design Year)	2%	2%	7%	2%	2%	2%	18%	2%	2%	2%	2%	2%	2%	36%	2%	2%	

PM PEAK HOUR

	Farmwell Road Northbound				Milburnie Lake Drive Southbound				Farmwell Road Eastbound				Farmwell Road Westbound				
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	
Observed 2021 Traffic Volumes	0	7	0	11	0	0	0	0	0	0	1	8	0	11	5	0	0
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0				0				0				0				
Conflicting Pedestrians	0				0				0				0				
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Conflicting Bicycles	0				0				0				0				
Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	1	0	0	3	0	0	0
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	100%	2%	2%	27%	2%	2%	
Peak Hour Factor	0.95				0.95				0.95				0.95				
Adjustment Factor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Adjusted 2021 Volumes	0	7	0	11	0	0	0	0	0	0	1	8	0	11	5	0	0
Annual Growth Rate	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	
Growth Factor	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	
Annual Growth Rate (Design Year)	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	
Growth Factor (Design Year)	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	
Background Growth Trips	0	8	0	12	0	0	0	0	0	0	1	9	0	12	6	0	0
Background Growth Trips (Design Year)	0	9	0	13	0	0	0	0	0	0	1	10	0	13	7	0	0
Legacy Oaks TIA (2025 & 2034)																	
Allen Park TIA (2034)																	
River's Edge TIA (2034)																	
Total Approved Development Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2025 No-Build Traffic	0	8	0	12	0	0	0	0	0	0	1	9	0	12	6	0	0
2034 No-Build Traffic (Design Year)	0	9	0	13	0	0	0	0	0	0	1	10	0	13	7	0	0
Trip Distribution IN			100%														
Trip Distribution OUT							(100%)										
Warehouse Truck Trips	0	0	8	0	0	0	6	0	0	0	0	0	0	0	0	0	0
Trip Distribution IN		45%	45%							5%							
Trip Distribution OUT							(45%)	(5%)				(45%)					
Warehouse Car Trips	0	7	7	0	0	0	29	3	0	1	0	29	0	0	0	0	0
Trip Distribution IN		45%	45%							5%							
Trip Distribution OUT							(45%)	(5%)				(45%)					
Office Trips	0	14	14	0	0	0	54	6	0	2	0	54	0	0	0	0	0
Trip Distribution IN		45%	45%							5%							
Trip Distribution OUT							(45%)	(5%)				(45%)					
Retail Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Project Trips (Unbalanced)	0	21	29	0	0	0	89	9	0	3	0	83	0	0	0	0	0
Balancing Adjustment			1				1										
Total Vehicular Project Trips	0	21	30	0	0	0	90	9	0	3	0	83	0	0	0	0	0
2025 Build Traffic	0	29	30	12	0	0	90	9	0	3	1	92	0	12	6	0	0
2025 Build Heavy Vehicle %	2%	2%	27%	2%	2%	2%	7%	2%	2%	2%	113%	2%	2%	28%	2%	2%	
2034 Build Traffic (Design Year)	0	30	30	13	0	0	90	9	0	3	1	93	0	13	7	0	0
2034 Build Heavy Vehicle % (Design Year)	2%	2%	27%	2%	2%	2%	7%	2%	2%	2%	109%	2%	2%	25%	2%	2%	

INTERSECTION VOLUME DEVELOPMENT

INTERSECTION #8
Farmwell Road at West Site Access

	AM PEAK HOUR															
	Northbound				West Site Access Southbound				Farmwell Road Eastbound				Farmwell Road Westbound			
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right
Observed 2021 Traffic Volumes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0				0				0				0			
Conflicting Pedestrians	0				0				0				0			
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Conflicting Bicycles	0				0				0				0			
Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Peak Hour Factor	0.90				0.90				0.90				0.90			
Adjustment Factor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Adjusted 2021 Volumes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Annual Growth Rate	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Growth Factor	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13
Annual Growth Rate (Design Year)	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
Growth Factor (Design Year)	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Background Growth Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Background Growth Trips (Design Year)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Legacy Oaks TIA (2025 & 2034)																
Allen Park TIA (2034)																
River's Edge TIA (2034)																
Total Approved Development Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2025 No-Build Traffic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2034 No-Build Traffic (Design Year)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trip Distribution IN																
Trip Distribution OUT																
Warehouse Truck Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trip Distribution IN																
Trip Distribution OUT																
Warehouse Car Trips	0	0	0	0	0	(45%)	8	(5%)	0	1	0	4	4	0	0	(5%)
Trip Distribution IN																
Trip Distribution OUT																
Office Trips	0	0	0	0	0	(45%)	9	(5%)	0	1	0	6	6	0	0	(5%)
Trip Distribution IN																
Trip Distribution OUT																
Retail Trips	0	0	0	0	0	(45%)	0	(5%)	0	0	0	0	0	0	0	(5%)
Project Trips (Unbalanced)	0	0	0	0	0	0	17	0	2	0	10	10	0	0	0	2
Balancing Adjustment																
Total Vehicular Project Trips	0	0	0	0	0	0	17	0	2	0	10	10	0	0	0	2
2025 Build Traffic	0	0	0	0	0	0	17	0	2	0	10	10	0	0	0	4
2025 Build Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
2034 Build Traffic (Design Year)	0	0	0	0	0	0	17	0	2	0	10	10	0	0	0	4
2034 Build Heavy Vehicle % (Design Year)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%

	PM PEAK HOUR															
	Northbound				West Site Access Southbound				Farmwell Road Eastbound				Farmwell Road Westbound			
	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right	U-Turn	Left	Through	Right
Observed 2021 Traffic Volumes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Count Balancing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pedestrians	0				0				0				0			
Conflicting Pedestrians	0				0				0				0			
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Conflicting Bicycles	0				0				0				0			
Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	12%	2%
Peak Hour Factor	0.9				0.9				0.9				0.9			
Adjustment Factor	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Adjusted 2021 Volumes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Annual Growth Rate	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Growth Factor	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13
Annual Growth Rate (Design Year)	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
Growth Factor (Design Year)	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09	1.09
Background Growth Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Background Growth Trips (Design Year)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Legacy Oaks TIA (2025 & 2034)																
Allen Park TIA (2034)																
River's Edge TIA (2034)																
Total Approved Development Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2025 No-Build Traffic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2034 No-Build Traffic (Design Year)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trip Distribution IN																
Trip Distribution OUT																
Warehouse Truck Trips	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trip Distribution IN																
Trip Distribution OUT																
Warehouse Car Trips	0	0	0	0	0	(45%)	29	(5%)	0	3	0	1	1	0	0	(5%)
Trip Distribution IN																
Trip Distribution OUT																
Office Trips	0	0	0	0	0	(45%)	54	(5%)	0	6	0	2	2	0	0	(5%)
Trip Distribution IN																
Trip Distribution OUT																
Retail Trips	0	0	0	0	0	(45%)	0	(5%)	0	0	0	0	0	0	0	(5%)
Project Trips (Unbalanced)	0	0	0	0	0	0	83	0	9	0	3	3	0	0	0	9
Balancing Adjustment																
Total Vehicular Project Trips	0	0	0	0	0	0	83	0	9	0	3	3	0	0	0	9
2025 Build Traffic	0	0	0	0	0	0	83	0	9	0	3	13	0	0	0	23
2025 Build Heavy Vehicle %	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
2034 Build Traffic (Design Year)	0	0	0	0	0	0	83	0	9	0	3	14	0	0	0	24
2034 Build Heavy Vehicle % (Design Year)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%

Appendix E:
Synchro PDF Reports

Knightsdale Gateway
1: Old Milburnie Road & US 64 Bus (Knightsdale Blvd)

Build-out AM (2025) - Improved
10/19/2023



Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔		↔	↔	↔		↔			↔	↔
Traffic Volume (vph)	6	151	819	6	7	1526	63	4	4	4	100	4	345
Future Volume (vph)	6	151	819	6	7	1526	63	4	4	4	100	4	345
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)			3%			-1%			1%			4%	
Storage Length (ft)		375		0	150		75	0		0	0		0
Storage Lanes		1		0	1		1	0		0	0		2
Taper Length (ft)		100			100			25			25		
Satd. Flow (prot)	0	1743	3256	0	1778	3455	1591	0	1742	0	0	1725	2731
Flt Permitted		0.066			0.262				0.844			0.346	
Satd. Flow (perm)	0	121	3256	0	490	3455	1591	0	1494	0	0	626	2731
Right Turn on Red				Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			1				145		4				379
Link Speed (mph)			45			45			25			45	
Link Distance (ft)			1108			1778			230			106	
Travel Time (s)			16.8			26.9			6.3			1.6	
Confl. Peds. (#/hr)				1	1								
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	2%	2%	9%	19%	2%	5%	2%	2%	2%	2%	3%	2%	2%
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	173	907	0	8	1677	69	0	12	0	0	114	379
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)			36			36			0			0	
Link Offset(ft)			0			0			0			0	
Crosswalk Width(ft)			16			16			16			16	
Two way Left Turn Lane													
Headway Factor	1.02	1.02	1.02	1.02	0.99	0.99	0.99	1.01	1.01	1.01	1.03	1.03	1.03
Turning Speed (mph)	9	15		9	15		9	15		9	15		9
Number of Detectors	1	1	1		1	1	0	1	1			1	1
Detector Template	Left										Left		
Leading Detector (ft)	20	55	306		60	306	0	40	55		20	60	60
Trailing Detector (ft)	0	-5	300		0	300	0	0	-5		0	0	0
Detector 1 Position(ft)	0	-5	300		0	300	0	0	-5		0	0	0
Detector 1 Size(ft)	20	60	6		60	6	20	40	60		20	60	60
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel													
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	15.0	0.0		15.0	0.0	0.0	3.0	10.0		0.0	3.0	15.0
Turn Type	D.P+P	D.P+P	NA		D.P+P	NA	Perm	Perm	NA		Perm	NA	Prot
Protected Phases	5	5	2		1	6			3			4	4
Permitted Phases	6	6			2		6	3			4		
Detector Phase	5	5	2		1	6	6	3	3		4	4	4
Switch Phase													
Minimum Initial (s)	7.0	7.0	12.0		7.0	12.0	12.0	7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	15.0	15.0	20.0		14.0	20.0	20.0	15.0	15.0		15.0	15.0	15.0
Total Split (s)	15.0	15.0	65.0		14.0	64.0	64.0	15.0	15.0		26.0	26.0	26.0
Total Split (%)	12.5%	12.5%	54.2%		11.7%	53.3%	53.3%	12.5%	12.5%		21.7%	21.7%	21.7%
Yellow Time (s)	3.0	3.0	4.6		3.0	4.6	4.6	4.2	4.2		3.1	3.1	3.1
All-Red Time (s)	3.3	3.3	2.0		2.8	2.0	2.0	1.9	1.9		3.2	3.2	3.2
Lost Time Adjust (s)		-1.3	-1.6		-0.8	-1.6	-1.6		-1.1			-1.3	-1.3
Total Lost Time (s)		5.0	5.0		5.0	5.0	5.0		5.0			5.0	5.0
Lead/Lag	Lag	Lag	Lag		Lead	Lead	Lead	Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	C-Max		None	C-Max	C-Max	None	None		None	None	None
Act Effct Green (s)		78.8	81.2		82.8	68.8	68.8		8.1			21.0	21.0
Actuated g/C Ratio		0.66	0.68		0.69	0.57	0.57		0.07			0.18	0.18
v/c Ratio		0.81	0.41		0.02	0.85	0.07		0.12			1.05	0.48
Control Delay		64.3	11.0		1.3	11.4	0.3		44.9			147.8	6.5
Queue Delay		0.0	0.0		0.0	0.0	0.0		0.0			0.0	0.0
Total Delay		64.3	11.0		1.3	11.4	0.3		44.9			147.8	6.5
LOS		E	B		A	B	A		D			F	A
Approach Delay			19.6			10.9			44.9			39.1	
Approach LOS			B			B			D			D	

Knighdale Gateway
 1: Old Milburnie Road & US 64 Bus (Knighdale Blvd)

Build-out AM (2025) - Improved
 10/19/2023

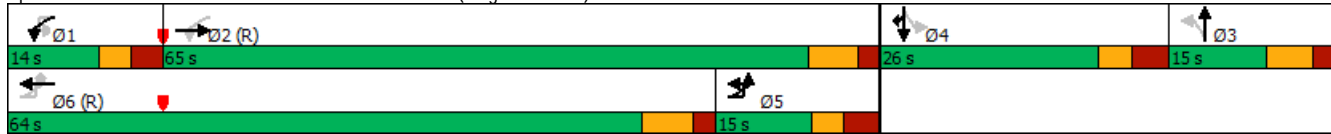


Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		70	114		0	23	0		6			-96	0
Queue Length 95th (ft)		#208	292		m1	#803	m1		26			#216	46
Internal Link Dist (ft)			1028			1698			150			26	
Turn Bay Length (ft)		375			150		75						
Base Capacity (vph)		214	2203		435	1979	973		128			109	790
Starvation Cap Reductn		0	0		0	0	0		0			0	0
Spillback Cap Reductn		0	0		0	0	0		0			0	0
Storage Cap Reductn		0	0		0	0	0		0			0	0
Reduced v/c Ratio		0.81	0.41		0.02	0.85	0.07		0.09			1.05	0.48

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 9 (8%), Referenced to phase 2:EBWB and 6:EBWB, Start of Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.05
 Intersection Signal Delay: 18.0 Intersection LOS: B
 Intersection Capacity Utilization 85.4% ICU Level of Service E
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Old Milburnie Road & US 64 Bus (Knighdale Blvd)



Knightsdale Gateway
2: Westover Drive/Farmwell Road & US 64 Bus (Knightsdale Blvd)

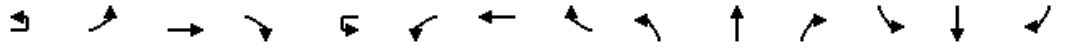
Build-out AM (2025) - Improved
10/19/2023



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	889	9	17	1567	132	27	10	33	38	4	11
Future Volume (vph)	40	889	9	17	1567	132	27	10	33	38	4	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		225	200		150	0		0	0		0
Storage Lanes	1		1	1		1	0		0	1		0
Taper Length (ft)	100			100			25			25		
Satd. Flow (prot)	1719	3312	1583	1687	3438	1568	0	1690	0	1671	1478	0
Flt Permitted	0.950			0.950				0.867		0.646		
Satd. Flow (perm)	1719	3312	1583	1687	3438	1568	0	1493	0	1136	1478	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			100			112		30			12	
Link Speed (mph)		45			45			25			30	
Link Distance (ft)		1778			1589			405			118	
Travel Time (s)		26.9			24.1			11.0			2.7	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	5%	9%	2%	7%	5%	3%	4%	2%	3%	8%	2%	18%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	45	999	10	19	1761	148	0	78	0	43	16	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		36			36			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1	0	1	1	0	1	1		1	1	
Detector Template							Left					
Leading Detector (ft)	40	306	0	40	306	0	20	40		40	40	
Trailing Detector (ft)	0	300	0	0	300	0	0	0		0	0	
Detector 1 Position(ft)	0	300	0	0	300	0	0	0		0	0	
Detector 1 Size(ft)	40	6	20	40	6	20	20	40		40	40	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8				4
Permitted Phases			2			6	8			4		
Detector Phase	5	2	2	1	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	7.0	12.0	12.0	7.0	12.0	12.0	7.0	7.0		7.0	7.0	
Minimum Split (s)	15.0	20.0	20.0	15.0	20.0	20.0	15.0	15.0		15.0	15.0	
Total Split (s)	15.0	89.0	89.0	15.0	89.0	89.0	16.0	16.0		16.0	16.0	
Total Split (%)	12.5%	74.2%	74.2%	12.5%	74.2%	74.2%	13.3%	13.3%		13.3%	13.3%	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0		-2.0	-2.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0		5.0	5.0	
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	
Act Effct Green (s)	9.8	97.5	97.5	9.3	91.4	91.4		10.4		10.4	10.4	
Actuated g/C Ratio	0.08	0.81	0.81	0.08	0.76	0.76		0.09		0.09	0.09	
v/c Ratio	0.32	0.37	0.01	0.15	0.67	0.12		0.50		0.44	0.12	
Control Delay	53.0	5.7	0.0	74.5	6.9	0.6		45.1		66.2	30.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	
Total Delay	53.0	5.7	0.0	74.5	6.9	0.6		45.1		66.2	30.1	
LOS	D	A	A	E	A	A		D		E	C	
Approach Delay		7.7			7.0			45.1			56.4	
Approach LOS		A			A			D			E	
Queue Length 50th (ft)	34	67	0	14	419	0		36		32	3	
Queue Length 95th (ft)	m56	m214	m0	m32	193	4		86		71	25	

Knightsdale Gateway
3: Hodge Road & US 64 Bus (Knightsdale Blvd)

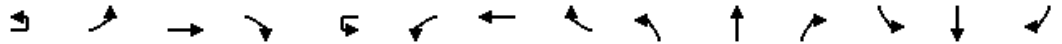
Build-out AM (2025) - Improved
10/19/2023



Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations														
Traffic Volume (vph)	7	80	775	97	24	131	1382	217	186	36	200	269	31	143
Future Volume (vph)	7	80	775	97	24	131	1382	217	186	36	200	269	31	143
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)			3%				-3%			-2%			1%	
Storage Length (ft)		200		200		575		375	200		50	0		0
Storage Lanes		3		1		1		1	1		1	2		1
Taper Length (ft)		300				100			100			25		
Satd. Flow (prot)	0	3382	4645	1515	0	1735	5014	1591	3401	1642	0	3416	1818	1575
Flt Permitted		0.950				0.950			0.950			0.950		
Satd. Flow (perm)	0	3382	4645	1515	0	1735	5014	1591	3401	1642	0	3416	1818	1575
Right Turn on Red				Yes				Yes			Yes			Yes
Satd. Flow (RTOR)				219				226		199				151
Link Speed (mph)			45				45			35				25
Link Distance (ft)			746				963			562				518
Travel Time (s)			11.3				14.6			10.9				14.1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	2%	2%	10%	5%	9%	5%	5%	3%	4%	2%	2%	2%	4%	2%
Shared Lane Traffic (%)														
Lane Group Flow (vph)	0	90	807	101	0	161	1440	226	194	246	0	280	32	149
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Right	R NA	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)			36				24			24			24	
Link Offset(ft)			0				0			0			0	
Crosswalk Width(ft)			16				16			16			16	
Two way Left Turn Lane														
Headway Factor	1.02	1.02	1.02	1.02	0.98	0.98	0.98	0.98	0.99	0.99	0.99	1.01	1.01	1.01
Turning Speed (mph)	9	15		9	9	15		9	15		9	15		9
Number of Detectors	1	1	1	0	1	1	1	0	1	1	1	1	1	1
Detector Template	Left				Left									
Leading Detector (ft)	20	40	306	0	20	40	306	0	50	40		40	40	40
Trailing Detector (ft)	0	0	300	0	0	0	300	0	-10	0		0	0	0
Detector 1 Position(ft)	0	0	300	0	0	0	300	0	-10	0		0	0	0
Detector 1 Size(ft)	20	40	6	20	20	40	6	20	60	40		40	40	40
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel														
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	10.0		0.0	0.0	15.0
Turn Type	Prot	Prot	NA	pm+ov	Prot	Prot	NA	pm+ov	Prot	NA		Prot	NA	pm+ov
Protected Phases	5!	5	2	3	1	1	6	7	3	8		7	4	5!
Permitted Phases				2				6						4
Detector Phase	5	5	2	3	1	1	6	7	3	8		7	4	5
Switch Phase														
Minimum Initial (s)	7.0	7.0	12.0	7.0	7.0	7.0	12.0	7.0	7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	15.0	15.0	19.0	15.0	15.0	15.0	20.0	15.0	15.0	16.0		15.0	15.0	15.0
Total Split (s)	15.0	15.0	45.0	17.0	26.0	26.0	56.0	23.0	17.0	26.0		23.0	32.0	15.0
Total Split (%)	12.5%	12.5%	37.5%	14.2%	21.7%	21.7%	46.7%	19.2%	14.2%	21.7%		19.2%	26.7%	12.5%
Yellow Time (s)	3.0	3.0	4.3	3.0	3.0	3.0	4.8	3.0	3.0	4.0		3.0	3.1	3.0
All-Red Time (s)	3.9	3.9	1.7	3.9	3.5	3.5	1.7	3.9	3.9	3.1		3.9	3.7	3.9
Lost Time Adjust (s)		-1.9	-1.0	-1.9			-1.5	-1.5	-1.9	-2.1		-1.9	-1.8	-1.9
Total Lost Time (s)		5.0	5.0	5.0			5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lead	Lag	Lag	Lag	Lead	Lead	Lag	Lag		Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	C-Max	None	None	None	C-Max	None	None	None		None	None	None
Act Effect Green (s)		9.5	51.5	80.7			20.5	62.5	78.1	24.2		15.6	9.4	18.3
Actuated g/C Ratio		0.08	0.43	0.67			0.17	0.52	0.65	0.20		0.13	0.08	0.15
v/c Ratio		0.34	0.40	0.09			0.55	0.55	0.20	0.28		0.63	0.23	0.40
Control Delay		62.9	21.7	1.7			45.1	8.7	0.5	42.1		55.9	55.6	9.4
Queue Delay		0.0	0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay		62.9	21.7	1.7			45.1	8.7	0.5	42.1		55.9	55.6	9.4
LOS		E	C	A			D	A	A	D		C	E	E
Approach Delay			23.4				10.9			31.6			40.8	
Approach LOS			C				B			C			D	
Queue Length 50th (ft)		31	175	1			123	84	0	71		35	107	24

Knightsdale Gateway
 3: Hodge Road & US 64 Bus (Knightsdale Blvd)

Build-out AM (2025) - Improved
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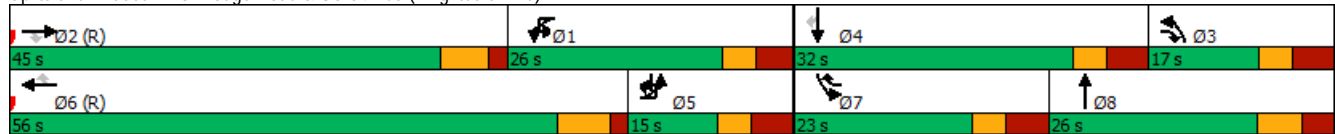


Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)		64	156	27		201	205	1	98	114		150	56	53
Internal Link Dist (ft)			666				883			482			438	
Turn Bay Length (ft)		200		200		575		375	200					
Base Capacity (vph)		281	1993	1090		303	2611	1141	685	451		512	409	362
Starvation Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio		0.32	0.40	0.09		0.53	0.55	0.20	0.28	0.55		0.55	0.08	0.41

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 61 (51%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 70
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.71
 Intersection Signal Delay: 20.4 Intersection LOS: C
 Intersection Capacity Utilization 71.1% ICU Level of Service C
 Analysis Period (min) 15
 ! Phase conflict between lane groups.

Splits and Phases: 3: Hodge Road & US 64 Bus (Knightsdale Blvd)



Knightsdale Gateway
4: I-540 Eastbound Ramps & US 64 Bus (Knightsdale Blvd)

Build-out AM (2025) - Improved
10/19/2023



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑	↓	↑↑							↑
Traffic Volume (vph)	0	1174	156	260	1405	0	0	0	0	0	0	362
Future Volume (vph)	0	1174	156	260	1405	0	0	0	0	0	0	362
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		1%			-1%			0%			2%	
Satd. Flow (prot)	0	4869	1410	1695	3423	0	0	0	0	0	0	1564
Flt Permitted				0.206								
Satd. Flow (perm)	0	4869	1380	368	3423	0	0	0	0	0	0	1564
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			164									156
Link Speed (mph)		45			45			35				35
Link Distance (ft)		963			225			613				525
Travel Time (s)		14.6			3.4			11.9				10.2
Confl. Peds. (#/hr)	1		1	1		1						
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	6%	14%	7%	6%	2%	2%	2%	6%	2%	2%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1236	164	274	1479	0	0	0	0	0	0	381
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	L NA	Right	Left	Left	Right	Left	Left	R NA
Median Width(ft)		24			36			0				0
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	0.99	0.99	0.99	1.00	1.00	1.00	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		1	0	1	0							0
Detector Template												
Leading Detector (ft)		306	0	60	0							0
Trailing Detector (ft)		300	0	0	0							0
Detector 1 Position(ft)		300	0	0	0							0
Detector 1 Size(ft)		6	20	60	6							20
Detector 1 Type		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex							Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0	0.0	0.0							0.0
Detector 1 Queue (s)		0.0	0.0	0.0	0.0							0.0
Detector 1 Delay (s)		0.0	0.0	15.0	0.0							0.0
Turn Type		NA	Perm	D.P+P	NA							Free
Protected Phases		2		7	2 7							
Permitted Phases			2	2								Free
Detector Phase		2	2	7	2 7							
Switch Phase												
Minimum Initial (s)		12.0	12.0	7.0								
Minimum Split (s)		19.0	19.0	15.0								
Total Split (s)		76.0	76.0	44.0								
Total Split (%)		63.3%	63.3%	36.7%								
Yellow Time (s)		4.4	4.4	3.0								
All-Red Time (s)		1.6	1.6	3.1								
Lost Time Adjust (s)		-1.0	-1.0	-1.1								
Total Lost Time (s)		5.0	5.0	5.0								
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode		C-Max	C-Max	None								
Act Effct Green (s)		93.7	93.7	110.0	120.0							120.0
Actuated g/C Ratio		0.78	0.78	0.92	1.00							1.00
v/c Ratio		0.33	0.15	0.53	0.43							0.24
Control Delay		2.5	0.4	7.3	2.3							0.4
Queue Delay		0.0	0.0	0.0	0.0							0.0
Total Delay		2.5	0.4	7.3	2.3							0.4
LOS		A	A	A	A							A
Approach Delay		2.2			3.1						0.4	
Approach LOS		A			A						A	
Queue Length 50th (ft)		25	0	2	0							0
Queue Length 95th (ft)		67	1	37	59							0
Internal Link Dist (ft)		883			145			533			445	

Knightsdale Gateway
5: I-540 Westbound Ramps & US 64 Bus (Knightsdale Blvd)

Build-out AM (2025) - Improved
10/19/2023



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↕↕↕			↕↕↕	↕		↕	↕↕			
Traffic Volume (vph)	439	1110	0	0	1538	712	113	4	409	0	0	0
Future Volume (vph)	439	1110	0	0	1538	712	113	4	409	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-1%			1%			2%			0%	
Storage Length (ft)	500		0	0		0	0		0	0	0	0
Storage Lanes	1		0	0		1	0		2	0	0	0
Taper Length (ft)	200			25			25			25		
Satd. Flow (prot)	3352	4918	0	0	4869	1530	0	1759	2630	0	0	0
Flt Permitted	0.950							0.954				
Satd. Flow (perm)	3351	4918	0	0	4869	1511	0	1759	2630	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						505			246			
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		848			814			733			573	
Travel Time (s)		12.8			12.3			14.3			11.2	
Confl. Peds. (#/hr)	1					1						
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	5%	6%	2%	2%	6%	5%	2%	2%	7%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	467	1181	0	0	1636	757	0	124	435	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		36			24			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	1.01	1.01	1.01	1.01	1.01	1.01	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1			1	0	1	1	1			
Detector Template							Left					
Leading Detector (ft)	60	330			306	0	20	60	40			
Trailing Detector (ft)	0	300			300	0	0	0	0			
Detector 1 Position(ft)	0	300			300	0	0	0	0			
Detector 1 Size(ft)	60	30			6	20	20	60	40			
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Detector 1 Queue (s)	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Detector 1 Delay (s)	0.0	0.0			0.0	0.0	0.0	0.0	15.0			
Turn Type	Prot	NA			NA	Perm	Perm	NA	Perm			
Protected Phases	5	2			6			4				
Permitted Phases						6	4		4			
Detector Phase	5	2			6	6	4	4	4			
Switch Phase												
Minimum Initial (s)	7.0	12.0			12.0	12.0	7.0	7.0	7.0			
Minimum Split (s)	15.0	20.0			20.0	20.0	15.0	15.0	15.0			
Total Split (s)	27.0	96.0			69.0	69.0	24.0	24.0	24.0			
Total Split (%)	22.5%	80.0%			57.5%	57.5%	20.0%	20.0%	20.0%			
Yellow Time (s)	3.0	4.6			4.4	4.4	3.7	3.7	3.7			
All-Red Time (s)	3.3	1.6			2.0	2.0	2.7	2.7	2.7			
Lost Time Adjust (s)	-1.3	-1.2			-1.4	-1.4		-1.4	-1.4			
Total Lost Time (s)	5.0	5.0			5.0	5.0		5.0	5.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Recall Mode	None	C-Max			C-Max	C-Max	None	None	None			
Act Effct Green (s)	22.0	95.9			68.9	68.9		14.1	14.1			
Actuated g/C Ratio	0.18	0.80			0.57	0.57		0.12	0.12			
v/c Ratio	0.76	0.30			0.58	0.70		0.60	0.83			
Control Delay	43.3	2.3			18.0	9.8		61.9	35.8			
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	43.3	2.3			18.0	9.8		61.9	35.8			
LOS	D	A			B	A		E	D			
Approach Delay		14.0			15.4			41.6				
Approach LOS		B			B			D				

Knightsdale Gateway
 5: I-540 Westbound Ramps & US 64 Bus (Knightsdale Blvd)

Build-out AM (2025) - Improved
 10/19/2023



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	184	40			283	117		92	82			
Queue Length 95th (ft)	202	63			363	294		151	142			
Internal Link Dist (ft)		768			734			653			493	
Turn Bay Length (ft)	500											
Base Capacity (vph)	614	3932			2797	1082		278	623			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.76	0.30			0.58	0.70		0.45	0.70			

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	24 (20%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.83
Intersection Signal Delay:	18.0
Intersection Capacity Utilization:	75.7%
Analysis Period (min):	15
Intersection LOS:	B
ICU Level of Service:	D

Splits and Phases: 5: I-540 Westbound Ramps & US 64 Bus (Knightsdale Blvd)





Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Volume (vph)	4	4	202	11	16	443
Future Volume (vph)	4	4	202	11	16	443
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	0%		0%			4%
Storage Length (ft)	0	0		0	0	
Storage Lanes	1	0		0	0	
Taper Length (ft)	25				25	
Satd. Flow (prot)	1440	0	1842	0	0	3461
Flt Permitted	0.976					0.998
Satd. Flow (perm)	1440	0	1842	0	0	3461
Link Speed (mph)	35		45			45
Link Distance (ft)	737		106			487
Travel Time (s)	14.4		1.6			7.4
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	38%	2%	2%	10%	2%	2%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	8	0	234	0	0	505
Enter Blocked Intersection	1 veh	No	Yes	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Right
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			12
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.03	1.03
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	33.9%
ICU Level of Service	A
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	4	4	202	11	16	443
Future Vol, veh/h	4	4	202	11	16	443
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	4
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	38	2	2	10	2	2
Mvmt Flow	4	4	222	12	18	487

Major/Minor	Minor1	Major1	Major2	Major3	Major4
Conflicting Flow All	508	228	0	0	234
Stage 1	228	-	-	-	-
Stage 2	280	-	-	-	-
Critical Hdwy	7.17	6.23	-	-	4.13
Critical Hdwy Stg 1	5.97	-	-	-	-
Critical Hdwy Stg 2	6.37	-	-	-	-
Follow-up Hdwy	3.861	3.319	-	-	2.219
Pot Cap-1 Maneuver	440	811	-	-	1332
Stage 1	720	-	-	-	-
Stage 2	658	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	432	811	-	-	1332
Mov Cap-2 Maneuver	432	-	-	-	-
Stage 1	720	-	-	-	-
Stage 2	645	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	11.5	0	0.3
HCM LOS	B		

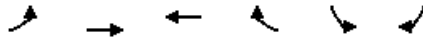
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	564	1332	-
HCM Lane V/C Ratio	-	-	0.016	0.013	-
HCM Control Delay (s)	-	-	11.5	7.7	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0	0	-

7: Farmwell Road & Milburnie Lake Drive Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.1	0.0	1.6	0.2
Total Del/Veh (s)	39.4	13.3	0.5	41.4	12.1

Intersection: 7: Farmwell Road & Milburnie Lake Drive

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	LTR	LT	TR
Maximum Queue (ft)	97	64	36	100	33
Average Queue (ft)	37	14	2	20	3
95th Queue (ft)	81	45	20	72	19
Link Distance (ft)	301	276	20	462	
Upstream Blk Time (%)			1		
Queuing Penalty (veh)			1		
Storage Bay Dist (ft)				225	
Storage Blk Time (%)					
Queuing Penalty (veh)					



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	10	21	4	86	17	4
Future Volume (vph)	10	21	4	86	17	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1833	1621	0	1747	0
Flt Permitted		0.984			0.960	
Satd. Flow (perm)	0	1833	1621	0	1747	0
Link Speed (mph)		35	35		25	
Link Distance (ft)		719	375		448	
Travel Time (s)		14.0	7.3		12.2	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	34	100	0	23	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	18.3%
ICU Level of Service	A
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	1.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	10	21	4	86	17	4
Future Vol, veh/h	10	21	4	86	17	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	23	4	96	19	4

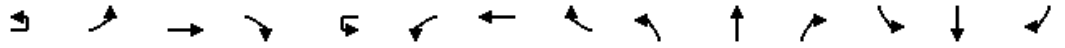
Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	100	0	-	0	97 52
Stage 1	-	-	-	-	52 -
Stage 2	-	-	-	-	45 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1493	-	-	-	902 1016
Stage 1	-	-	-	-	970 -
Stage 2	-	-	-	-	977 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1493	-	-	-	896 1016
Mov Cap-2 Maneuver	-	-	-	-	896 -
Stage 1	-	-	-	-	963 -
Stage 2	-	-	-	-	977 -

Approach	EB	WB	SB
HCM Control Delay, s	2.4	0	9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1493	-	-	-	917
HCM Lane V/C Ratio	0.007	-	-	-	0.025
HCM Control Delay (s)	7.4	0	-	-	9
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

Knightsdale Gateway
1: Old Milburnie Road & US 64 Bus (Knightsdale Blvd)

Build-out PM (2025) - Improved
10/19/2023



Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔			↔	↔	↔		↔			↔	↔
Traffic Volume (vph)	25	372	1756	4	6	4	1340	117	4	4	4	103	4	158
Future Volume (vph)	25	372	1756	4	6	4	1340	117	4	4	4	103	4	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)			3%				-1%			1%			4%	
Storage Length (ft)		375		0		150		75	0		0	0		0
Storage Lanes		1		0		1		1	0		0	0		2
Taper Length (ft)		100				100			25			25		
Satd. Flow (prot)	0	1743	3486	0	0	1778	3557	1591	0	1480	0	0	1742	2731
Flt Permitted		0.072				0.060				0.844			0.382	
Satd. Flow (perm)	0	132	3486	0	0	112	3557	1591	0	1270	0	0	697	2731
Right Turn on Red				Yes				Yes			Yes			Yes
Satd. Flow (RTOR)								143		4				205
Link Speed (mph)			45				45			25			45	
Link Distance (ft)			1108				1778			230			106	
Travel Time (s)			16.8				26.9			6.3			1.6	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	56%	2%	2%	2%	2%	2%
Shared Lane Traffic (%)														
Lane Group Flow (vph)	0	423	1872	0	0	10	1426	124	0	12	0	0	114	168
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Right	R NA	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)			36				36			0			0	
Link Offset(ft)			0				0			0			0	
Crosswalk Width(ft)			16				16			16			16	
Two way Left Turn Lane														
Headway Factor	1.02	1.02	1.02	1.02	0.99	0.99	0.99	0.99	1.01	1.01	1.01	1.03	1.03	1.03
Turning Speed (mph)	9	15		9	9	15		9	15		9	15		9
Number of Detectors	1	1	1		1	1	1	0	1	1		1	1	1
Detector Template	Left				Left							Left		
Leading Detector (ft)	20	55	306		20	60	306	0	40	55		20	60	60
Trailing Detector (ft)	0	-5	300		0	0	300	0	0	-5		0	0	0
Detector 1 Position(ft)	0	-5	300		0	0	300	0	0	-5		0	0	0
Detector 1 Size(ft)	20	60	6		20	60	6	20	40	60		20	60	60
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel														
Detector 1 Extend (s)	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	15.0	0.0		0.0	15.0	0.0	0.0	3.0	10.0		0.0	3.0	15.0
Turn Type	D.P+P	D.P+P	NA		D.P+P	D.P+P	NA	Perm	Perm	NA		Perm	NA	Prot
Protected Phases	5	5	2		1	1	6			3			4	4
Permitted Phases	6	6			2	2		6	3			4		
Detector Phase	5	5	2		1	1	6	6	3	3		4	4	4
Switch Phase														
Minimum Initial (s)	7.0	7.0	12.0		7.0	7.0	12.0	12.0	7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	15.0	15.0	20.0		14.0	14.0	20.0	20.0	15.0	15.0		15.0	15.0	15.0
Total Split (s)	31.0	31.0	75.0		14.0	14.0	58.0	58.0	15.0	15.0		16.0	16.0	16.0
Total Split (%)	25.8%	25.8%	62.5%		11.7%	11.7%	48.3%	48.3%	12.5%	12.5%		13.3%	13.3%	13.3%
Yellow Time (s)	3.0	3.0	4.6		3.0	3.0	4.6	4.6	4.2	4.2		3.1	3.1	3.1
All-Red Time (s)	3.3	3.3	2.0		2.8	2.8	2.0	2.0	1.9	1.9		3.2	3.2	3.2
Lost Time Adjust (s)		-1.3	-1.6			-0.8	-1.6	-1.6		-1.1			-1.3	-1.3
Total Lost Time (s)		5.0	5.0			5.0	5.0	5.0		5.0			5.0	5.0
Lead/Lag	Lead	Lead	Lead		Lag	Lag	Lag	Lag	Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	C-Max		None	None	C-Max	C-Max	None	None		None	None	None
Act Effect Green (s)		88.7	90.9			92.7	59.5	59.5		8.2			11.0	11.0
Actuated g/C Ratio		0.74	0.76			0.77	0.50	0.50		0.07			0.09	0.09
v/c Ratio		0.87	0.71			0.05	0.81	0.14		0.13			1.81	0.39
Control Delay		51.8	12.1			5.9	17.4	1.1		45.7			451.2	5.8
Queue Delay		0.0	0.0			0.0	0.0	0.0		0.0			0.0	0.0
Total Delay		51.8	12.1			5.9	17.4	1.1		45.7			451.2	5.8
LOS		D	B			A	B	A		D			F	A
Approach Delay			19.4				16.0			45.7			185.9	
Approach LOS			B				B			D			F	
Queue Length 50th (ft)		240	222			1	100	0		6			-132	0



Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)		#467	761			m3	#609	12		26			#253	21
Internal Link Dist (ft)			1028				1698			150			26	
Turn Bay Length (ft)		375				150		75						
Base Capacity (vph)		489	2639			211	1763	860		109			63	436
Starvation Cap Reductn		0	0			0	0	0		0			0	0
Spillback Cap Reductn		0	0			0	0	0		0			0	0
Storage Cap Reductn		0	0			0	0	0		0			0	0
Reduced v/c Ratio		0.87	0.71			0.05	0.81	0.14		0.11			1.81	0.39

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 47 (39%), Referenced to phase 2:EBWB and 6:EBWB, Start of Green
 Natural Cycle: 140
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.81
 Intersection Signal Delay: 29.5 Intersection LOS: C
 Intersection Capacity Utilization 87.4% ICU Level of Service E
 Analysis Period (min) 15
 - Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Old Milburnie Road & US 64 Bus (Knightsdale Blvd)



Knightsdale Gateway
2: Westover Drive/Farmwell Road & US 64 Bus (Knightsdale Blvd)

Build-out PM (2025) - Improved
10/19/2023



Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↕	↗	↖	↕	↗		↕	↖	↗	↕	↖
Traffic Volume (vph)	6	19	1870	35	38	1386	51	8	4	7	133	9	50
Future Volume (vph)	6	19	1870	35	38	1386	51	8	4	7	133	9	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		225		225	200		150	0		0	0		0
Storage Lanes		1		1	1		1	0		0	1		0
Taper Length (ft)		100			100			25			25		
Satd. Flow (prot)	0	1601	3539	1583	1770	3539	1468	0	1732	0	1752	1510	0
Flt Permitted		0.950			0.950				0.894		0.745		
Satd. Flow (perm)	0	1601	3539	1583	1770	3539	1468	0	1582	0	1374	1510	0
Right Turn on Red				Yes			Yes			Yes			Yes
Satd. Flow (RTOR)				100			100		7				53
Link Speed (mph)			45			45			25				30
Link Distance (ft)			1778			1589			405				118
Travel Time (s)			26.9			24.1			11.0				2.7
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	16%	2%	2%	2%	2%	10%	2%	2%	2%	3%	2%	11%
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	26	1968	37	40	1459	54	0	19	0	140	62	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)			36			36			12				12
Link Offset(ft)			0			0			0				0
Crosswalk Width(ft)			16			16			16				16
Two way Left Turn Lane													
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9	15		9	15		9	15		9	15		9
Number of Detectors	1	1	1	0	1	1	0	1	1		1	1	
Detector Template	Left							Left					
Leading Detector (ft)	20	40	306	0	40	306	0	20	40		40	40	
Trailing Detector (ft)	0	0	300	0	0	300	0	0	0		0	0	
Detector 1 Position(ft)	0	0	300	0	0	300	0	0	0		0	0	
Detector 1 Size(ft)	20	40	6	20	40	6	20	20	40		40	40	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel													
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Turn Type	Prot	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	5	2		1	6			8				4
Permitted Phases				2			6	8			4		
Detector Phase	5	5	2	2	1	6	6	8	8		4	4	
Switch Phase													
Minimum Initial (s)	7.0	7.0	12.0	12.0	7.0	12.0	12.0	7.0	7.0		7.0	7.0	
Minimum Split (s)	15.0	15.0	20.0	20.0	15.0	20.0	20.0	15.0	15.0		15.0	15.0	
Total Split (s)	15.0	15.0	69.0	69.0	15.0	69.0	69.0	36.0	36.0		36.0	36.0	
Total Split (%)	12.5%	12.5%	57.5%	57.5%	12.5%	57.5%	57.5%	30.0%	30.0%		30.0%	30.0%	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-2.0	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0		-2.0	-2.0	
Total Lost Time (s)		5.0	5.0	5.0	5.0	5.0	5.0		5.0		5.0	5.0	
Lead/Lag	Lag	Lag	Lag	Lag	Lead	Lead	Lead						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	
Act Effct Green (s)		9.6	77.8	77.8	10.5	81.5	81.5		19.5		19.5	19.5	
Actuated g/C Ratio		0.08	0.65	0.65	0.09	0.68	0.68		0.16		0.16	0.16	
v/c Ratio		0.20	0.86	0.03	0.26	0.61	0.05		0.07		0.63	0.21	
Control Delay		44.5	16.6	0.1	66.5	5.1	0.2		29.7		58.6	14.9	
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	
Total Delay		44.5	16.6	0.1	66.5	5.1	0.2		29.7		58.6	14.9	
LOS		D	B	A	E	A	A		C		E	B	
Approach Delay			16.6			6.5			29.7			45.2	
Approach LOS			B			A			C			D	
Queue Length 50th (ft)		20	654	0	31	74	1		8		102	6	
Queue Length 95th (ft)		m25	m#930	m0	m56	264	0		28		161	43	



Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)			1698			1509			325			38	
Turn Bay Length (ft)		225		225	200		150						
Base Capacity (vph)		133	2294	1061	160	2403	1028		413		354	429	
Starvation Cap Reductn		0	0	0	0	0	0		0		0	0	
Spillback Cap Reductn		0	0	0	0	0	0		0		0	0	
Storage Cap Reductn		0	0	0	0	0	0		0		0	0	
Reduced v/c Ratio		0.20	0.86	0.03	0.25	0.61	0.05		0.05		0.40	0.14	

Intersection Summary

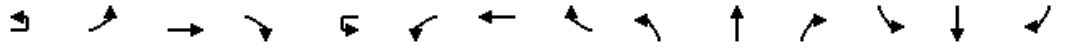
Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 42 (35%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.86
 Intersection Signal Delay: 14.1 Intersection LOS: B
 Intersection Capacity Utilization 74.1% ICU Level of Service D
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Westover Drive/Farmwell Road & US 64 Bus (Knightsdale Blvd)



Knightsdale Gateway
3: Hodge Road & US 64 Bus (Knightsdale Blvd)

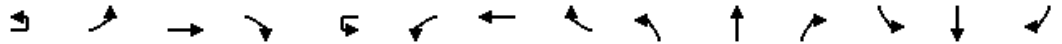
Build-out PM (2025) - Improved
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Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations														
Traffic Volume (vph)	8	162	1656	261	32	368	1247	422	123	46	208	255	114	130
Future Volume (vph)	8	162	1656	261	32	368	1247	422	123	46	208	255	114	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)			3%				-3%			-2%			1%	
Storage Length (ft)		200		200		575		375	200		50	0		0
Storage Lanes		3		1		1		1	1		1	2		1
Taper Length (ft)		300				100			100			25		
Satd. Flow (prot)	0	3362	5009	1560	0	1796	5111	1607	3467	1650	0	3416	1853	1575
Flt Permitted		0.950				0.950			0.950			0.950		
Satd. Flow (perm)	0	3359	5009	1560	0	1796	5111	1587	3467	1650	0	3416	1853	1575
Right Turn on Red				Yes				Yes			Yes			Yes
Satd. Flow (RTOR)				154				316		151				149
Link Speed (mph)			45				45			35			25	
Link Distance (ft)			746				963			562			518	
Travel Time (s)			11.3				14.6			10.9			14.1	
Confl. Peds. (#/hr)		1							1					
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	14%	2%	2%	2%	2%	2%	3%	2%	2%	2%	2%	2%	2%	2%
Shared Lane Traffic (%)														
Lane Group Flow (vph)	0	183	1781	281	0	430	1341	454	132	273	0	274	123	140
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Right	R NA	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)			36				24			24			24	
Link Offset(ft)			0				0			0			0	
Crosswalk Width(ft)			16				16			16			16	
Two way Left Turn Lane														
Headway Factor	1.02	1.02	1.02	1.02	0.98	0.98	0.98	0.98	0.99	0.99	0.99	1.01	1.01	1.01
Turning Speed (mph)	9	15		9	9	15		9	15		9	15		9
Number of Detectors	1	1	1	0	1	1	1	0	1	1	1	1	1	1
Detector Template	Left				Left									
Leading Detector (ft)	20	40	306	0	20	40	306	0	50	40		40	40	40
Trailing Detector (ft)	0	0	300	0	0	0	300	0	-10	0		0	0	0
Detector 1 Position(ft)	0	0	300	0	0	0	300	0	-10	0		0	0	0
Detector 1 Size(ft)	20	40	6	20	20	40	6	20	60	40		40	40	40
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel														
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	10.0		0.0	0.0	15.0
Turn Type	Prot	Prot	NA	pm+ov	Prot	Prot	NA	pm+ov	Prot	NA		Prot	NA	pm+ov
Protected Phases	5!	5	2	3	1	1	6	7	3	8		7	4	5!
Permitted Phases				2				6						4
Detector Phase	5	5	2	3	1	1	6	7	3	8		7	4	5
Switch Phase														
Minimum Initial (s)	7.0	7.0	12.0	7.0	7.0	7.0	12.0	7.0	7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	15.0	15.0	19.0	15.0	15.0	15.0	20.0	15.0	15.0	16.0		15.0	15.0	15.0
Total Split (s)	16.0	16.0	53.0	15.0	36.0	36.0	73.0	15.0	15.0	16.0		15.0	16.0	16.0
Total Split (%)	13.3%	13.3%	44.2%	12.5%	30.0%	30.0%	60.8%	12.5%	12.5%	13.3%		12.5%	13.3%	13.3%
Yellow Time (s)	3.0	3.0	4.3	3.0	3.0	3.0	4.8	3.0	3.0	4.0		3.0	3.1	3.0
All-Red Time (s)	3.9	3.9	1.7	3.9	3.5	3.5	1.7	3.9	3.9	3.1		3.9	3.7	3.9
Lost Time Adjust (s)		-1.9	-1.0	-1.9			-1.5	-1.5	-1.9	-2.1		-1.9	-1.8	-1.9
Total Lost Time (s)		5.0	5.0	5.0			5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lead	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	C-Max	None	None	None	C-Max	None	None	None		None	None	None
Act Effct Green (s)		10.7	48.0	63.3			31.0	68.3	78.3	10.3		10.0	10.7	21.4
Actuated g/C Ratio		0.09	0.40	0.53			0.26	0.57	0.65	0.09		0.08	0.09	0.18
v/c Ratio		0.61	0.89	0.31			0.93	0.46	0.40	0.45		0.96	0.75	0.35
Control Delay		58.2	25.0	1.4			56.4	6.4	1.1	57.5		100.2	80.0	6.4
Queue Delay		0.0	0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay		58.2	25.0	1.4			56.4	6.4	1.1	57.5		100.2	80.0	6.4
LOS		E	C	A			E	A	A	E		F	E	A
Approach Delay			24.8				15.0			63.2			71.1	
Approach LOS			C				B			E			E	

Knightsdale Gateway
 3: Hodge Road & US 64 Bus (Knightsdale Blvd)

Build-out PM (2025) - Improved
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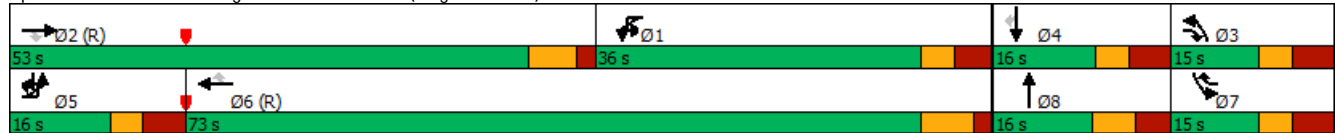


Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		65	477	13		330	84	0	51	97		110	94	0
Queue Length 95th (ft)		m81	421	m0		#514	105	4	84	#268		#198	#187	38
Internal Link Dist (ft)			666				883			482			438	
Turn Bay Length (ft)		200		200		575		375	200					
Base Capacity (vph)		308	2003	895		463	2910	1146	296	288		284	169	407
Starvation Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio		0.59	0.89	0.31		0.93	0.46	0.40	0.45	0.95		0.96	0.73	0.34

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 108 (90%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.96
 Intersection Signal Delay: 28.2 Intersection LOS: C
 Intersection Capacity Utilization 93.3% ICU Level of Service F
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.
 ! Phase conflict between lane groups.

Splits and Phases: 3: Hodge Road & US 64 Bus (Knightsdale Blvd)



Knightsdale Gateway
4: I-540 Eastbound Ramps & US 64 Bus (Knightsdale Blvd)

Build-out PM (2025) - Improved
10/19/2023



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑	↓	↑↑							↑
Traffic Volume (vph)	0	1984	105	233	1408	0	0	0	0	0	0	687
Future Volume (vph)	0	1984	105	233	1408	0	0	0	0	0	0	687
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		1%			-1%			0%			2%	
Satd. Flow (prot)	0	5060	1575	1778	3557	0	0	0	0	0	0	1564
Flt Permitted				0.060								
Satd. Flow (perm)	0	5060	1575	112	3557	0	0	0	0	0	0	1564
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			115									142
Link Speed (mph)		45			45			35				35
Link Distance (ft)		963			225			613				525
Travel Time (s)		14.6			3.4			11.9				10.2
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	2180	115	256	1547	0	0	0	0	0	0	755
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	L NA	Right	Left	Left	Right	Left	Left	R NA
Median Width(ft)		24			36			0				0
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	0.99	0.99	0.99	1.00	1.00	1.00	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		1	0	1	0							0
Detector Template												
Leading Detector (ft)		306	0	60	0							0
Trailing Detector (ft)		300	0	0	0							0
Detector 1 Position(ft)		300	0	0	0							0
Detector 1 Size(ft)		6	20	60	6							20
Detector 1 Type		CI+Ex	CI+Ex	CI+Ex	CI+Ex							CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0	0.0	0.0							0.0
Detector 1 Queue (s)		0.0	0.0	0.0	0.0							0.0
Detector 1 Delay (s)		0.0	0.0	15.0	0.0							0.0
Turn Type		NA	Perm	D,P+P	NA							Free
Protected Phases		2		7	2 7							
Permitted Phases			2	2								Free
Detector Phase		2	2	7	2 7							
Switch Phase												
Minimum Initial (s)		12.0	12.0	7.0								
Minimum Split (s)		19.0	19.0	15.0								
Total Split (s)		86.0	86.0	34.0								
Total Split (%)		71.7%	71.7%	28.3%								
Yellow Time (s)		4.4	4.4	3.0								
All-Red Time (s)		1.6	1.6	3.1								
Lost Time Adjust (s)		-1.0	-1.0	-1.1								
Total Lost Time (s)		5.0	5.0	5.0								
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode		C-Max	C-Max	None								
Act Effct Green (s)		88.7	88.7	110.0	120.0							120.0
Actuated g/C Ratio		0.74	0.74	0.92	1.00							1.00
v/c Ratio		0.58	0.10	0.64	0.43							0.48
Control Delay		0.9	0.1	36.1	3.3							1.1
Queue Delay		0.0	0.0	0.0	0.0							0.0
Total Delay		0.9	0.1	36.1	3.3							1.1
LOS		A	A	D	A							A
Approach Delay		0.9			8.0						1.1	
Approach LOS		A			A						A	
Queue Length 50th (ft)		17	0	153	103							0
Queue Length 95th (ft)		m27	m1	234	102							0
Internal Link Dist (ft)		883			145			533			445	
Turn Bay Length (ft)												

Knightsdale Gateway
 4: I-540 Eastbound Ramps & US 64 Bus (Knightsdale Blvd)

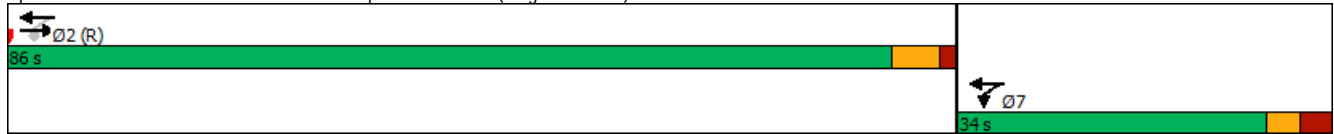
Build-out PM (2025) - Improved
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		3740	1194	508	3543							1564
Starvation Cap Reductn		0	0	0	0							0
Spillback Cap Reductn		0	0	0	0							0
Storage Cap Reductn		0	0	0	0							0
Reduced v/c Ratio		0.58	0.10	0.50	0.44							0.48

Intersection Summary
 Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 73 (61%), Referenced to phase 2:EBWB, Start of Green
 Natural Cycle: 40
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.64
 Intersection Signal Delay: 3.5 Intersection LOS: A
 Intersection Capacity Utilization 107.4% ICU Level of Service G
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: I-540 Eastbound Ramps & US 64 Bus (Knightsdale Blvd)



Knightsdale Gateway
5: I-540 Westbound Ramps & US 64 Bus (Knightsdale Blvd)

Build-out PM (2025) - Improved
10/19/2023



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↕↕↕			↕↕↕	↕↔		↕↔	↕↕↕			
Traffic Volume (vph)	390	2568	0	0	1523	592	117	4	580	0	0	0
Future Volume (vph)	390	2568	0	0	1523	592	117	4	580	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-1%			1%			2%			0%	
Storage Length (ft)	500		0	0		0	0		0	0	0	0
Storage Lanes	1		0	0		1	0		2	0	0	0
Taper Length (ft)	200			25			25			25		
Satd. Flow (prot)	3417	5111	0	0	5060	1575	0	1727	2759	0	0	0
Flt Permitted	0.950							0.954				
Satd. Flow (perm)	3417	5111	0	0	5060	1575	0	1727	2759	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						604			88			
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		848			814			733			573	
Travel Time (s)		12.8			12.3			14.3			11.2	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	3%	2%	2%	2%	2%	2%	4%	2%	2%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	398	2620	0	0	1554	604	0	123	592	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		36			24			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	1.01	1.01	1.01	1.01	1.01	1.01	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1			1	0	1	1	1			
Detector Template							Left					
Leading Detector (ft)	60	330			306	0	20	60	40			
Trailing Detector (ft)	0	300			300	0	0	0	0			
Detector 1 Position(ft)	0	300			300	0	0	0	0			
Detector 1 Size(ft)	60	30			6	20	20	60	40			
Detector 1 Type	CI+Ex	CI+Ex			CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex			
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Detector 1 Queue (s)	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Detector 1 Delay (s)	0.0	0.0			0.0	0.0	0.0	0.0	15.0			
Turn Type	Prot	NA			NA	Perm	Perm	NA	Perm			
Protected Phases	5	2			6			4				
Permitted Phases						6	4		4			
Detector Phase	5	2			6	6	4	4	4			
Switch Phase												
Minimum Initial (s)	7.0	12.0			12.0	12.0	7.0	7.0	7.0			
Minimum Split (s)	15.0	20.0			20.0	20.0	15.0	15.0	15.0			
Total Split (s)	26.0	83.0			57.0	57.0	37.0	37.0	37.0			
Total Split (%)	21.7%	69.2%			47.5%	47.5%	30.8%	30.8%	30.8%			
Yellow Time (s)	3.0	4.6			4.4	4.4	3.7	3.7	3.7			
All-Red Time (s)	3.3	1.6			2.0	2.0	2.7	2.7	2.7			
Lost Time Adjust (s)	-1.3	-1.2			-1.4	-1.4		-1.4	-1.4			
Total Lost Time (s)	5.0	5.0			5.0	5.0		5.0	5.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Recall Mode	None	C-Max			C-Max	C-Max	None	None	None			
Act Effect Green (s)	21.0	83.1			57.1	57.1		26.9	26.9			
Actuated g/C Ratio	0.18	0.69			0.48	0.48		0.22	0.22			
v/c Ratio	0.67	0.74			0.65	0.57		0.32	0.86			
Control Delay	35.0	4.3			26.0	4.0		40.0	51.0			
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	35.0	4.3			26.0	4.0		40.0	51.0			
LOS	D	A			C	A		D	D			
Approach Delay		8.3			19.9			49.1				
Approach LOS		A			B			D				
Queue Length 50th (ft)	140	108			328	0		79	215			

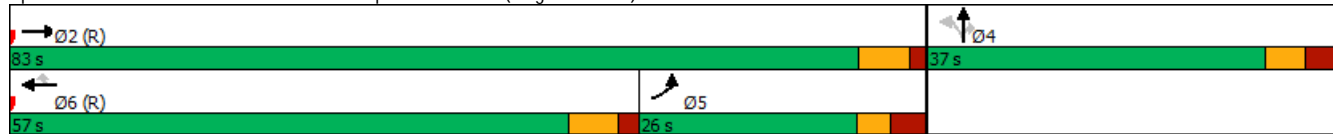


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	187	154			410	66		130	280			
Internal Link Dist (ft)		768			734			653			493	
Turn Bay Length (ft)	500											
Base Capacity (vph)	597	3538			2406	1065		460	800			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.67	0.74			0.65	0.57		0.27	0.74			

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	92 (77%), Referenced to phase 2:EBT and 6:WBT, Start of Green
Natural Cycle:	60
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.86
Intersection Signal Delay:	17.5
Intersection Capacity Utilization:	78.2%
Analysis Period (min):	15
Intersection LOS:	B
ICU Level of Service:	D

Splits and Phases: 5: I-540 Westbound Ramps & US 64 Bus (Knightsdale Blvd)





Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	10	16	486	5	6	251
Future Volume (vph)	10	16	486	5	6	251
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	0%		0%			4%
Storage Length (ft)	0	0		0	0	
Storage Lanes	1	0		0	0	
Taper Length (ft)	25				25	
Satd. Flow (prot)	1678	0	1861	0	0	3465
Flt Permitted	0.981					0.999
Satd. Flow (perm)	1678	0	1861	0	0	3465
Link Speed (mph)	30		45			45
Link Distance (ft)	737		106			487
Travel Time (s)	16.8		1.6			7.4
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Shared Lane Traffic (%)						
Lane Group Flow (vph)	28	0	522	0	0	273
Enter Blocked Intersection	1 veh	No	Yes	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Right
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			12
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.03	1.03
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	35.9%
ICU Level of Service	A
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	0.5					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	10	16	486	5	6	251
Future Vol, veh/h	10	16	486	5	6	251
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	4
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	17	517	5	6	267

Major/Minor	Minor1	Major1	Major2	Major3	Major4
Conflicting Flow All	666	520	0	0	522
Stage 1	520	-	-	-	-
Stage 2	146	-	-	-	-
Critical Hdwy	6.63	6.23	-	-	4.13
Critical Hdwy Stg 1	5.43	-	-	-	-
Critical Hdwy Stg 2	5.83	-	-	-	-
Follow-up Hdwy	3.519	3.319	-	-	2.219
Pot Cap-1 Maneuver	408	555	-	-	1042
Stage 1	596	-	-	-	-
Stage 2	867	-	-	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	405	555	-	-	1042
Mov Cap-2 Maneuver	405	-	-	-	-
Stage 1	596	-	-	-	-
Stage 2	861	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.9	0	0.2
HCM LOS	B		

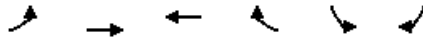
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	486	1042	-
HCM Lane V/C Ratio	-	-	0.057	0.006	-
HCM Control Delay (s)	-	-	12.9	8.5	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.2	0	-

7: Farmwell Road & Milburnie Lake Drive Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.8	0.1	0.0	1.6	0.8
Total Del/Veh (s)	58.4	27.0	0.6	33.0	32.9

Intersection: 7: Farmwell Road & Milburnie Lake Drive

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	LTR	LT	TR
Maximum Queue (ft)	207	73	20	130	70
Average Queue (ft)	83	22	1	53	12
95th Queue (ft)	175	58	10	114	45
Link Distance (ft)	301	276	20	462	
Upstream Blk Time (%)	0		0		
Queuing Penalty (veh)	0		0		
Storage Bay Dist (ft)				225	
Storage Blk Time (%)					
Queuing Penalty (veh)					



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	4	13	23	21	83	9
Future Volume (vph)	4	13	23	21	83	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1842	1742	0	1759	0
Flt Permitted		0.989			0.957	
Satd. Flow (perm)	0	1842	1742	0	1759	0
Link Speed (mph)		35	35		25	
Link Distance (ft)		719	375		448	
Travel Time (s)		14.0	7.3		12.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	18	46	0	96	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	60			60	60	60
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	16.0%
ICU Level of Service	A
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	5.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	4	13	23	21	83	9
Future Vol, veh/h	4	13	23	21	83	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	14	24	22	87	9

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	46	0	-	0	57 35
Stage 1	-	-	-	-	35 -
Stage 2	-	-	-	-	22 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1562	-	-	-	950 1038
Stage 1	-	-	-	-	987 -
Stage 2	-	-	-	-	1001 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1562	-	-	-	947 1038
Mov Cap-2 Maneuver	-	-	-	-	947 -
Stage 1	-	-	-	-	984 -
Stage 2	-	-	-	-	1001 -

Approach	EB	WB	SB
HCM Control Delay, s	1.7	0	9.2
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1562	-	-	-	955
HCM Lane V/C Ratio	0.003	-	-	-	0.101
HCM Control Delay (s)	7.3	0	-	-	9.2
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.3

Knightsdale Gateway
1: Old Milburnie Road & US 64 Bus (Knightsdale Blvd)

Build-out AM (2034) - Improved
10/19/2023



Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↕	↗	↔	↕	↗	↔	↕	↗		↖	↗
Traffic Volume (vph)	7	177	863	7	44	1656	83	120	6	83	139	6	437
Future Volume (vph)	7	177	863	7	44	1656	83	120	6	83	139	6	437
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)			3%			-1%			1%			4%	
Storage Length (ft)		375		375	500		100	0		0	0		0
Storage Lanes		1		1	1		1	1		0	0		2
Taper Length (ft)		100			100			25			25		
Satd. Flow (prot)	0	1743	3292	1371	1778	3455	1591	1761	1596	0	0	1742	2731
Flt Permitted		0.059			0.244			0.950				0.954	
Satd. Flow (perm)	0	108	3292	1343	457	3455	1591	1761	1596	0	0	1742	2731
Right Turn on Red				Yes			Yes			Yes			Yes
Satd. Flow (RTOR)				138			138		91				217
Link Speed (mph)			45			45			25			45	
Link Distance (ft)			1108			1778			230			106	
Travel Time (s)			16.8			26.9			6.3			1.6	
Confl. Peds. (#/hr)				1	1								
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	2%	2%	8%	16%	2%	5%	2%	2%	2%	2%	2%	2%	2%
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	203	948	8	48	1820	91	132	98	0	0	160	480
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)			36			36			12			0	
Link Offset(ft)			0			0			0			0	
Crosswalk Width(ft)			16			16			16			16	
Two way Left Turn Lane													
Headway Factor	1.02	1.02	1.02	1.02	0.99	0.99	0.99	1.01	1.01	1.01	1.03	1.03	1.03
Turning Speed (mph)	9	15		9	15		9	15		9	15		9
Number of Detectors	1	1	1	0	1	1	0	1	1	1	1	1	1
Detector Template	Left										Left		
Leading Detector (ft)	20	55	306	0	60	306	0	40	55		20	60	60
Trailing Detector (ft)	0	-5	300	0	0	300	0	0	-5		0	0	0
Detector 1 Position(ft)	0	-5	300	0	0	300	0	0	-5		0	0	0
Detector 1 Size(ft)	20	60	6	20	60	6	20	40	60		20	60	60
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel													
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	15.0	0.0	0.0	15.0	0.0	0.0	3.0	10.0		0.0	3.0	15.0
Turn Type	D.P+P	D.P+P	NA	Perm	D.P+P	NA	Perm	Split	NA		Split	NA	Prot
Protected Phases	5	5	2		1	6		3	3		4	4	4
Permitted Phases	6	6		2	2		6						
Detector Phase	5	5	2	2	1	6	6	3	3		4	4	4
Switch Phase													
Minimum Initial (s)	7.0	7.0	12.0	12.0	7.0	12.0	12.0	7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	15.0	15.0	20.0	20.0	14.0	20.0	20.0	15.0	15.0		15.0	15.0	15.0
Total Split (s)	15.0	15.0	74.0	74.0	14.0	73.0	73.0	15.0	15.0		17.0	17.0	17.0
Total Split (%)	12.5%	12.5%	61.7%	61.7%	11.7%	60.8%	60.8%	12.5%	12.5%		14.2%	14.2%	14.2%
Yellow Time (s)	3.0	3.0	4.6	4.6	3.0	4.6	4.6	4.2	4.2		3.1	3.1	3.1
All-Red Time (s)	3.3	3.3	2.0	2.0	2.8	2.0	2.0	1.9	1.9		3.2	3.2	3.2
Lost Time Adjust (s)		-1.3	-1.6	-1.6	-0.8	-1.6	-1.6	-1.1	-1.1			-1.3	-1.3
Total Lost Time (s)		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead	Lead	Lag	Lag	Lead	Lag	Lag	Lag	Lag		Lead	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	None
Act Effect Green (s)		78.0	72.8	72.8	79.0	68.0	68.0	10.0	10.0			12.0	12.0
Actuated g/C Ratio		0.65	0.61	0.61	0.66	0.57	0.57	0.08	0.08			0.10	0.10
v/c Ratio		0.99	0.48	0.01	0.12	0.93	0.09	0.90	0.45			0.92	1.03
Control Delay		91.5	14.6	0.0	4.0	16.3	0.4	107.5	19.5			103.8	77.5
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay		91.5	14.6	0.0	4.0	16.3	0.4	107.5	19.5			103.8	77.5
LOS		F	B	A	A	B	A	F	B			F	E
Approach Delay			28.0			15.3			70.0			84.1	
Approach LOS			C			B			E			F	

Knightsdale Gateway
1: Old Milburnie Road & US 64 Bus (Knightsdale Blvd)

Build-out AM (2034) - Improved
10/19/2023



Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		108	213	0	2	175	1	103	5			125	-132
Queue Length 95th (ft)		#266	265	0	m9	#573	m2	#223	58			#258	#252
Internal Link Dist (ft)			1028			1698			150			26	
Turn Bay Length (ft)		375		375	500		100						
Base Capacity (vph)		206	1995	868	403	1957	961	146	216			174	468
Starvation Cap Reductn		0	0	0	0	0	0	0	0			0	0
Spillback Cap Reductn		0	0	0	0	0	0	0	0			0	0
Storage Cap Reductn		0	0	0	0	0	0	0	0			0	0
Reduced v/c Ratio		0.99	0.48	0.01	0.12	0.93	0.09	0.90	0.45			0.92	1.03

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 107 (89%), Referenced to phase 2:EBWB and 6:EBWB, Start of Green
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.03
 Intersection Signal Delay: 33.2
 Intersection Capacity Utilization 94.6%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service F

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

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

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Old Milburnie Road & US 64 Bus (Knightsdale Blvd)

Ø1 14 s	Ø2 (R) 74 s	Ø4 17 s	Ø3 15 s
Ø5 15 s	Ø6 (R) 73 s		

Knightsdale Gateway
2: Westover Drive/Farmwell Road & US 64 Bus (Knightsdale Blvd)

Build-out AM (2034) - Improved
10/19/2023



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	1076	13	18	1757	132	30	10	36	39	4	11
Future Volume (vph)	40	1076	13	18	1757	132	30	10	36	39	4	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	225		225	200		150	0		0	0		0
Storage Lanes	1		1	1		1	0		0	1		0
Taper Length (ft)	100			100			25			25		
Satd. Flow (prot)	1719	3374	1583	1703	3471	1568	0	1688	0	1671	1478	0
Flt Permitted	0.950			0.950				0.862		0.617		
Satd. Flow (perm)	1719	3374	1583	1703	3471	1568	0	1484	0	1085	1478	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			100			100		29			12	
Link Speed (mph)		45			45			25			30	
Link Distance (ft)		1778			1589			405			118	
Travel Time (s)		26.9			24.1			11.0			2.7	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles (%)	5%	7%	2%	6%	4%	3%	4%	2%	3%	8%	2%	18%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	45	1209	15	20	1974	148	0	85	0	44	16	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		36			36			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1	0	1	1	0	1	1		1	1	
Detector Template							Left			Left		
Leading Detector (ft)	40	306	0	40	306	0	20	40		40	40	
Trailing Detector (ft)	0	300	0	0	300	0	0	0		0	0	
Detector 1 Position(ft)	0	300	0	0	300	0	0	0		0	0	
Detector 1 Size(ft)	40	6	20	40	6	20	20	40		40	40	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8				4
Permitted Phases			2			6	8			4		
Detector Phase	5	2	2	1	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	7.0	12.0	12.0	7.0	12.0	12.0	7.0	7.0		7.0	7.0	
Minimum Split (s)	15.0	20.0	20.0	15.0	20.0	20.0	15.0	15.0		15.0	15.0	
Total Split (s)	15.0	89.0	89.0	15.0	89.0	89.0	16.0	16.0		16.0	16.0	
Total Split (%)	12.5%	74.2%	74.2%	12.5%	74.2%	74.2%	13.3%	13.3%		13.3%	13.3%	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	-2.0	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0		-2.0	-2.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0		5.0		5.0	5.0	
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	
Act Effct Green (s)	9.6	97.4	97.4	9.4	91.6	91.6		10.4		10.4	10.4	
Actuated g/C Ratio	0.08	0.81	0.81	0.08	0.76	0.76		0.09		0.09	0.09	
v/c Ratio	0.33	0.44	0.01	0.15	0.75	0.12		0.55		0.47	0.12	
Control Delay	52.0	8.1	0.0	42.7	8.3	0.4		49.2		68.8	30.1	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	
Total Delay	52.0	8.1	0.0	42.7	8.3	0.4		49.2		68.8	30.1	
LOS	D	A	A	D	A	A		D		E	C	
Approach Delay		9.6			8.1			49.2			58.5	
Approach LOS		A			A			D			E	
Queue Length 50th (ft)	34	84	0	16	214	1		42		33	3	
Queue Length 95th (ft)	m67	m331	m0	m29	311	1		95		73	25	

Knightsdale Gateway
 2: Westover Drive/Farmwell Road & US 64 Bus (Knightsdale Blvd)

Build-out AM (2034) - Improved
 10/19/2023



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		1698			1509			325			38	
Turn Bay Length (ft)	225		225	200		150						
Base Capacity (vph)	143	2738	1303	141	2648	1220		162		99	146	
Starvation Cap Reductn	0	0	0	0	0	0		0		0	0	
Spillback Cap Reductn	0	0	0	0	0	0		0		0	0	
Storage Cap Reductn	0	0	0	0	0	0		0		0	0	
Reduced v/c Ratio	0.31	0.44	0.01	0.14	0.75	0.12		0.52		0.44	0.11	

Intersection Summary

Area Type: Other

Cycle Length: 120

Actuated Cycle Length: 120

Offset: 76 (63%), Referenced to phase 2:EBTU and 6:WBT, Start of Green

Natural Cycle: 80

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.75

Intersection Signal Delay: 10.5

Intersection LOS: B

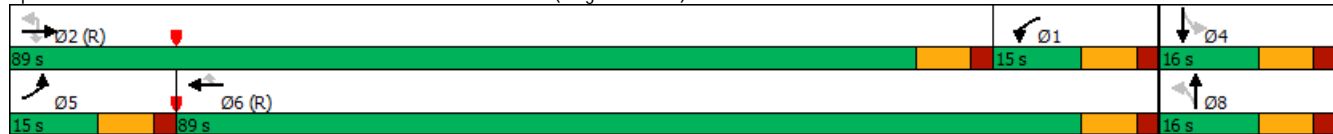
Intersection Capacity Utilization 68.0%

ICU Level of Service C

Analysis Period (min) 15

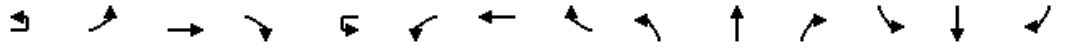
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Westover Drive/Farmwell Road & US 64 Bus (Knightsdale Blvd)



Knightsdale Gateway
3: Hodge Road & US 64 Bus (Knightsdale Blvd)

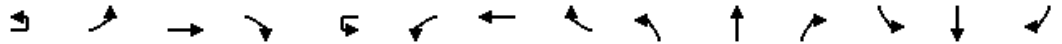
Build-out AM (2034) - Improved
10/19/2023



Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔↔	↑↑↑	↗		↔↔	↑↑↑	↗	↔↔	↔		↔↔	↑	↗
Traffic Volume (vph)	8	93	934	116	26	143	1540	229	207	39	219	280	33	154
Future Volume (vph)	8	93	934	116	26	143	1540	229	207	39	219	280	33	154
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)			3%				-3%			-2%			1%	
Storage Length (ft)		200		200		575		375	200		50	0		0
Storage Lanes		3		1		1		1	1		1	2		1
Taper Length (ft)		300				100			100			25		
Satd. Flow (prot)	0	3382	4731	1530	0	1737	5014	1607	3401	1642	0	3416	1835	1575
Flt Permitted		0.950				0.950			0.950			0.950		
Satd. Flow (perm)	0	3382	4731	1530	0	1737	5014	1607	3401	1642	0	3416	1835	1575
Right Turn on Red				Yes				Yes			Yes			Yes
Satd. Flow (RTOR)				156				239		200				155
Link Speed (mph)			45				45			35				25
Link Distance (ft)			746				963			562				518
Travel Time (s)			11.3				14.6			10.9				14.1
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	2%	2%	8%	4%	8%	5%	5%	2%	4%	2%	2%	2%	3%	2%
Shared Lane Traffic (%)														
Lane Group Flow (vph)	0	105	973	121	0	176	1604	239	216	269	0	292	34	160
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Right	R NA	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)			36				24			24			24	
Link Offset(ft)			0				0			0			0	
Crosswalk Width(ft)			16				16			16			16	
Two way Left Turn Lane														
Headway Factor	1.02	1.02	1.02	1.02	0.98	0.98	0.98	0.98	0.99	0.99	0.99	1.01	1.01	1.01
Turning Speed (mph)	9	15		9	9	15		9	15		9	15		9
Number of Detectors	1	1	1	0	1	1	1	0	1	1	1	1	1	1
Detector Template	Left				Left									
Leading Detector (ft)	20	40	306	0	20	40	306	0	50	40		40	40	40
Trailing Detector (ft)	0	0	300	0	0	0	300	0	-10	0		0	0	0
Detector 1 Position(ft)	0	0	300	0	0	0	300	0	-10	0		0	0	0
Detector 1 Size(ft)	20	40	6	20	20	40	6	20	60	40		40	40	40
Detector 1 Type	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex		CI+Ex	CI+Ex	CI+Ex
Detector 1 Channel														
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	10.0		0.0	0.0	15.0
Turn Type	Prot	Prot	NA	pm+ov	Prot	Prot	NA	pm+ov	Prot	NA		Prot	NA	pm+ov
Protected Phases	5!	5	2	3	1	1	6	7	3	8		7	4	5!
Permitted Phases				2				6						4
Detector Phase	5	5	2	3	1	1	6	7	3	8		7	4	5
Switch Phase														
Minimum Initial (s)	7.0	7.0	12.0	7.0	7.0	7.0	12.0	7.0	7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	15.0	15.0	19.0	15.0	15.0	15.0	20.0	15.0	15.0	16.0		15.0	15.0	15.0
Total Split (s)	15.0	15.0	48.0	18.0	26.0	26.0	59.0	21.0	18.0	25.0		21.0	28.0	15.0
Total Split (%)	12.5%	12.5%	40.0%	15.0%	21.7%	21.7%	49.2%	17.5%	15.0%	20.8%		17.5%	23.3%	12.5%
Yellow Time (s)	3.0	3.0	4.3	3.0	3.0	3.0	4.8	3.0	3.0	4.0		3.0	3.1	3.0
All-Red Time (s)	3.9	3.9	1.7	3.9	3.5	3.5	1.7	3.9	3.9	3.1		3.9	3.7	3.9
Lost Time Adjust (s)		-1.9	-1.0	-1.9			-1.5	-1.5	-1.9	-2.1		-1.9	-1.8	-1.9
Total Lost Time (s)		5.0	5.0	5.0			5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lag	Lag		Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	C-Max	None	None	None	C-Max	None	None	None		None	None	None
Act Effect Green (s)		10.0	54.4	80.8			17.3	61.7	76.7	24.4		13.3	15.0	9.4
Actuated g/C Ratio		0.08	0.45	0.67			0.14	0.51	0.64	0.20		0.12	0.08	0.16
v/c Ratio		0.37	0.45	0.11			0.71	0.62	0.21	0.31		0.68	0.24	0.42
Control Delay		42.7	15.0	1.3			66.8	9.7	0.6	42.5		58.8	55.8	10.3
Queue Delay		0.0	0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay		42.7	15.0	1.3			66.8	9.7	0.6	42.5		58.8	55.8	10.3
LOS		D	B	A			E	A	A	D		C	E	E
Approach Delay			16.1				13.6			34.2			42.7	
Approach LOS			B				B			C			D	
Queue Length 50th (ft)		39	173	12			114	104	0	78		51	111	25

Knightsdale Gateway
 3: Hodge Road & US 64 Bus (Knightsdale Blvd)

Build-out AM (2034) - Improved
 10/19/2023

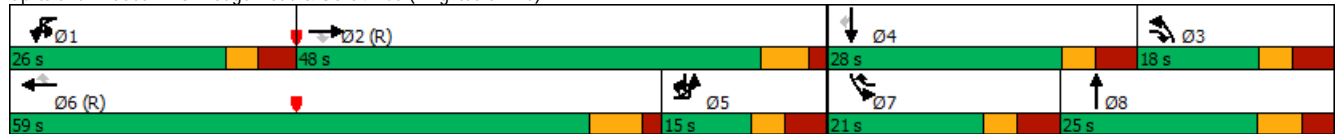


Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)		62	124	1		187	256	9	109	137		159	58	60
Internal Link Dist (ft)			666				883			482			438	
Turn Bay Length (ft)		200		200		575		375	200					
Base Capacity (vph)		281	2144	1081		303	2577	1124	692	440		455	351	378
Starvation Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio		0.37	0.45	0.11		0.58	0.62	0.21	0.31	0.61		0.64	0.10	0.42

Intersection Summary

Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 90 (75%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 75
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.75
 Intersection Signal Delay: 20.1 Intersection LOS: C
 Intersection Capacity Utilization 75.8% ICU Level of Service D
 Analysis Period (min) 15
 ! Phase conflict between lane groups.

Splits and Phases: 3: Hodge Road & US 64 Bus (Knightsdale Blvd)



Knightsdale Gateway
4: I-540 Eastbound Ramps & US 64 Bus (Knightsdale Blvd)

Build-out AM (2034) - Improved
10/19/2023



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑	↓	↑↑							↑
Traffic Volume (vph)	0	1345	182	284	1555	0	0	0	0	0	0	398
Future Volume (vph)	0	1345	182	284	1555	0	0	0	0	0	0	398
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		1%			-1%			0%			2%	
Satd. Flow (prot)	0	4915	1435	1695	3455	0	0	0	0	0	0	1564
Flt Permitted				0.162								
Satd. Flow (perm)	0	4915	1405	289	3455	0	0	0	0	0	0	1564
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			192									125
Link Speed (mph)		45			45			35				35
Link Distance (ft)		963			225			613				525
Travel Time (s)		14.6			3.4			11.9				10.2
Confl. Peds. (#/hr)	1		1	1		1						
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	5%	12%	7%	5%	2%	2%	2%	5%	2%	2%	4%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	1416	192	299	1637	0	0	0	0	0	0	419
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	L NA	Right	Left	Left	Right	Left	Left	R NA
Median Width(ft)		24			36			0				0
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	0.99	0.99	0.99	1.00	1.00	1.00	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		1	0	1	0							0
Detector Template												
Leading Detector (ft)		306	0	60	0							0
Trailing Detector (ft)		300	0	0	0							0
Detector 1 Position(ft)		300	0	0	0							0
Detector 1 Size(ft)		6	20	60	6							20
Detector 1 Type		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex							Cl+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0	0.0	0.0							0.0
Detector 1 Queue (s)		0.0	0.0	0.0	0.0							0.0
Detector 1 Delay (s)		0.0	0.0	15.0	0.0							0.0
Turn Type		NA	Perm	D.P+P	NA							Free
Protected Phases		2		7	2 7							
Permitted Phases			2	2								Free
Detector Phase		2	2	7	2 7							
Switch Phase												
Minimum Initial (s)		12.0	12.0	7.0								
Minimum Split (s)		19.0	19.0	15.0								
Total Split (s)		75.0	75.0	45.0								
Total Split (%)		62.5%	62.5%	37.5%								
Yellow Time (s)		4.4	4.4	3.0								
All-Red Time (s)		1.6	1.6	3.1								
Lost Time Adjust (s)		-1.0	-1.0	-1.1								
Total Lost Time (s)		5.0	5.0	5.0								
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode		C-Max	C-Max	None								
Act Effct Green (s)		89.0	89.0	110.0	120.0							120.0
Actuated g/C Ratio		0.74	0.74	0.92	1.00							1.00
v/c Ratio		0.39	0.18	0.59	0.47							0.27
Control Delay		2.1	0.3	11.5	3.0							0.4
Queue Delay		0.0	0.0	0.0	0.0							0.0
Total Delay		2.1	0.3	11.5	3.0							0.4
LOS		A	A	B	A							A
Approach Delay		1.8			4.3						0.4	
Approach LOS		A			A						A	
Queue Length 50th (ft)		23	0	113	248							0
Queue Length 95th (ft)		45	0	172	27							0
Internal Link Dist (ft)		883			145			533			445	

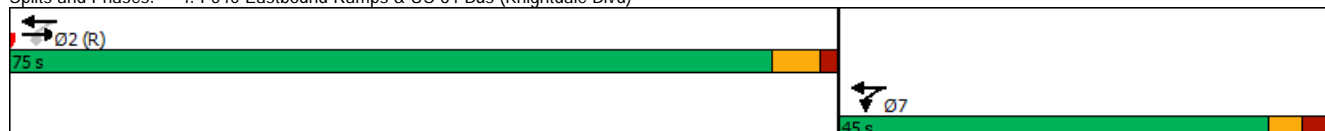


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Bay Length (ft)												
Base Capacity (vph)		3646	1092	745	3455							1564
Starvation Cap Reductn		0	0	0	0							0
Spillback Cap Reductn		0	0	0	0							0
Storage Cap Reductn		0	0	0	0							0
Reduced v/c Ratio		0.39	0.18	0.40	0.47							0.27

Intersection Summary

Area Type:	Other
Cycle Length:	120
Actuated Cycle Length:	120
Offset:	111 (93%), Referenced to phase 2:EBWB, Start of Green
Natural Cycle:	40
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.59
Intersection Signal Delay:	2.9
Intersection LOS:	A
Intersection Capacity Utilization:	61.4%
ICU Level of Service:	B
Analysis Period (min):	15

Splits and Phases: 4: I-540 Eastbound Ramps & US 64 Bus (Knightsdale Blvd)



Knightsdale Gateway
5: I-540 Westbound Ramps & US 64 Bus (Knightsdale Blvd)

Build-out AM (2034) - Improved
10/19/2023



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↕↕↕			↕↕↕	↕↔		↕↔	↕↕↕			
Traffic Volume (vph)	485	1270	0	0	1699	779	125	4	447	0	0	0
Future Volume (vph)	485	1270	0	0	1699	779	125	4	447	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-1%			1%			2%			0%	
Storage Length (ft)	500		0	0		0	0		0	0	0	0
Storage Lanes	1		0	0		1	0		2	0	0	0
Taper Length (ft)	200			25			25			25		
Satd. Flow (prot)	3352	4965	0	0	4915	1545	0	1759	2630	0	0	0
Flt Permitted	0.950							0.954				
Satd. Flow (perm)	3351	4965	0	0	4915	1526	0	1759	2630	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						499			181			
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		848			814			733			573	
Travel Time (s)		12.8			12.3			14.3			11.2	
Confl. Peds. (#/hr)	1					1						
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	5%	5%	2%	2%	5%	4%	2%	2%	7%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	516	1351	0	0	1807	829	0	137	476	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		36			24			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	1.01	1.01	1.01	1.01	1.01	1.01	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1			1	0	1	1	1			
Detector Template							Left					
Leading Detector (ft)	60	330			306	0	20	60	40			
Trailing Detector (ft)	0	300			300	0	0	0	0			
Detector 1 Position(ft)	0	300			300	0	0	0	0			
Detector 1 Size(ft)	60	30			6	20	20	60	40			
Detector 1 Type	Cl+Ex	Cl+Ex			Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Detector 1 Queue (s)	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Detector 1 Delay (s)	0.0	0.0			0.0	0.0	0.0	0.0	15.0			
Turn Type	Prot	NA			NA	Perm	Perm	NA	Perm			
Protected Phases	5	2			6			4				
Permitted Phases						6	4		4			
Detector Phase	5	2			6	6	4	4	4			
Switch Phase												
Minimum Initial (s)	7.0	12.0			12.0	12.0	7.0	7.0	7.0			
Minimum Split (s)	15.0	20.0			20.0	20.0	15.0	15.0	15.0			
Total Split (s)	27.0	96.0			69.0	69.0	24.0	24.0	24.0			
Total Split (%)	22.5%	80.0%			57.5%	57.5%	20.0%	20.0%	20.0%			
Yellow Time (s)	3.0	4.6			4.4	4.4	3.7	3.7	3.7			
All-Red Time (s)	3.3	1.6			2.0	2.0	2.7	2.7	2.7			
Lost Time Adjust (s)	-1.3	-1.2			-1.4	-1.4		-1.4	-1.4			
Total Lost Time (s)	5.0	5.0			5.0	5.0		5.0	5.0			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Recall Mode	None	C-Max			C-Max	C-Max	None	None	None			
Act Effct Green (s)	21.1	92.7			66.7	66.7		17.3	17.3			
Actuated g/C Ratio	0.18	0.77			0.56	0.56		0.14	0.14			
v/c Ratio	0.88	0.35			0.66	0.78		0.54	0.89			
Control Delay	59.7	3.2			20.7	13.9		55.6	51.0			
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	59.7	3.2			20.7	13.9		55.6	51.0			
LOS	E	A			C	B		E	D			
Approach Delay		18.8			18.6			52.0				
Approach LOS		B			B			D				

Knightsdale Gateway
 5: I-540 Westbound Ramps & US 64 Bus (Knightsdale Blvd)

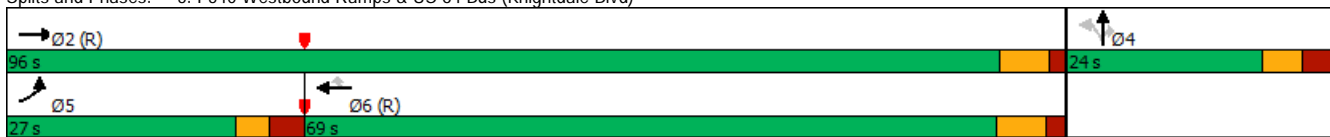
Build-out AM (2034) - Improved
 10/19/2023



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)	190	159			363	206		98	130			
Queue Length 95th (ft)	#277	24			418	408		164	#222			
Internal Link Dist (ft)		768			734			653			493	
Turn Bay Length (ft)	500											
Base Capacity (vph)	614	3836			2730	1069		278	568			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.84	0.35			0.66	0.78		0.49	0.84			

Intersection Summary
 Area Type: Other
 Cycle Length: 120
 Actuated Cycle Length: 120
 Offset: 24 (20%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.89
 Intersection Signal Delay: 22.7 Intersection LOS: C
 Intersection Capacity Utilization 81.8% ICU Level of Service D
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 5: I-540 Westbound Ramps & US 64 Bus (Knightsdale Blvd)





Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Volume (vph)	4	4	254	11	17	579
Future Volume (vph)	4	4	254	11	17	579
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	0%		0%			4%
Storage Length (ft)	0	0		0	0	
Storage Lanes	1	0		0	0	
Taper Length (ft)	25				25	
Satd. Flow (prot)	1452	0	1846	0	0	3465
Flt Permitted	0.976					0.999
Satd. Flow (perm)	1452	0	1846	0	0	3465
Link Speed (mph)	35		45			45
Link Distance (ft)	787		106			1670
Travel Time (s)	15.3		1.6			25.3
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	36%	2%	2%	10%	2%	2%
Shared Lane Traffic (%)						
Lane Group Flow (vph)	8	0	291	0	0	655
Enter Blocked Intersection	1 veh	No	Yes	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			12
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.03	1.03
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 38.3%

ICU Level of Service A

Analysis Period (min) 15

Intersection						
Int Delay, s/veh	0.3					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	4	4	254	11	17	579
Future Vol, veh/h	4	4	254	11	17	579
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	4
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	36	2	2	10	2	2
Mvmt Flow	4	4	279	12	19	636

Major/Minor	Minor1	Major1	Major2	Major3	Major4
Conflicting Flow All	641	285	0	0	291
Stage 1	285	-	-	-	-
Stage 2	356	-	-	-	-
Critical Hdwy	7.14	6.23	-	-	4.13
Critical Hdwy Stg 1	5.94	-	-	-	-
Critical Hdwy Stg 2	6.34	-	-	-	-
Follow-up Hdwy	3.842	3.319	-	-	2.219
Pot Cap-1 Maneuver	363	753	-	-	1269
Stage 1	679	-	-	-	-
Stage 2	602	-	-	-	-
Platoon blocked, %			-	-	-
Mov Cap-1 Maneuver	355	753	-	-	1269
Mov Cap-2 Maneuver	355	-	-	-	-
Stage 1	679	-	-	-	-
Stage 2	588	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	12.6	0	0.2
HCM LOS	B		

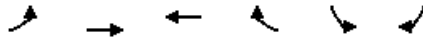
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	483	1269	-
HCM Lane V/C Ratio	-	-	0.018	0.015	-
HCM Control Delay (s)	-	-	12.6	7.9	-
HCM Lane LOS	-	-	B	A	-
HCM 95th %tile Q(veh)	-	-	0.1	0	-

7: Farmwell Road & Milburnie Lake Drive Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	0.0	0.1	0.0	1.4	0.2
Total Del/Veh (s)	25.0	14.3	0.4	27.6	7.8

Intersection: 7: Farmwell Road & Milburnie Lake Drive

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	LTR	LT	TR
Maximum Queue (ft)	84	51	45	68	26
Average Queue (ft)	28	11	3	11	2
95th Queue (ft)	67	38	23	45	13
Link Distance (ft)	302	267	20	916	
Upstream Blk Time (%)			0		
Queuing Penalty (veh)			0		
Storage Bay Dist (ft)				225	
Storage Blk Time (%)					
Queuing Penalty (veh)					



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Volume (vph)	10	22	4	86	17	4
Future Volume (vph)	10	22	4	86	17	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1835	1621	0	1747	0
Flt Permitted		0.985			0.960	
Satd. Flow (perm)	0	1835	1621	0	1747	0
Link Speed (mph)		35	35		25	
Link Distance (ft)		675	375		278	
Travel Time (s)		13.1	7.3		7.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	35	100	0	23	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Sign Control		Free	Free		Stop	

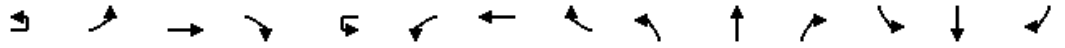
Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	18.4%
ICU Level of Service	A
Analysis Period (min)	15

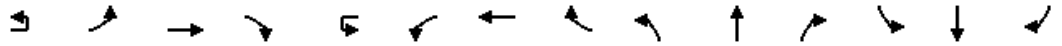
Intersection						
Int Delay, s/veh	1.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	10	22	4	86	17	4
Future Vol, veh/h	10	22	4	86	17	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	24	4	96	19	4
Major/Minor	Major1	Major2	Minor2			
Conflicting Flow All	100	0	-	0	98	52
Stage 1	-	-	-	-	52	-
Stage 2	-	-	-	-	46	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1493	-	-	-	901	1016
Stage 1	-	-	-	-	970	-
Stage 2	-	-	-	-	976	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	1493	-	-	-	895	1016
Mov Cap-2 Maneuver	-	-	-	-	895	-
Stage 1	-	-	-	-	963	-
Stage 2	-	-	-	-	976	-
Approach	EB	WB		SB		
HCM Control Delay, s	2.3	0		9		
HCM LOS				A		
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1	
Capacity (veh/h)	1493	-	-	-	916	
HCM Lane V/C Ratio	0.007	-	-	-	0.025	
HCM Control Delay (s)	7.4	0	-	-	9	
HCM Lane LOS	A	A	-	-	A	
HCM 95th %tile Q(veh)	0	-	-	-	0.1	

Knightdale Gateway
1: Old Milburnie Road & US 64 Bus (Knightdale Blvd)

Build-out PM (2034) - Improved
10/20/2023



Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations														
Traffic Volume (vph)	27	505	1895	4	7	76	1453	197	61	5	63	162	9	215
Future Volume (vph)	27	505	1895	4	7	76	1453	197	61	5	63	162	9	215
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)			3%				-1%			1%			4%	
Storage Length (ft)		375		375		500		100	0		0	0		0
Storage Lanes		1		1		1		1	1		0	0		2
Taper Length (ft)		100				100			25			25		
Satd. Flow (prot)	0	1743	3486	1560	0	1778	3557	1591	1761	1594	0	0	1743	2731
Flt Permitted		0.068				0.046			0.950				0.955	
Satd. Flow (perm)	0	125	3486	1560	0	86	3557	1591	1761	1594	0	0	1743	2731
Right Turn on Red				Yes				Yes			Yes			Yes
Satd. Flow (RTOR)				125				122		67				229
Link Speed (mph)			45				45			25			45	
Link Distance (ft)			1108				1778			230			106	
Travel Time (s)			16.8				26.9			6.3			1.6	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Shared Lane Traffic (%)														
Lane Group Flow (vph)	0	566	2016	4	0	88	1546	210	65	72	0	0	182	229
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Right	R NA	Left	Right	Left	Left	Right	Left	Left	Left	Right
Median Width(ft)			36				36			12			0	
Link Offset(ft)			0				0			0			0	
Crosswalk Width(ft)			16				16			16			16	
Two way Left Turn Lane														
Headway Factor	1.02	1.02	1.02	1.02	0.99	0.99	0.99	0.99	1.01	1.01	1.01	1.03	1.03	1.03
Turning Speed (mph)	9	15		9	9	15		9	15		9	15		9
Number of Detectors	1	1	1	0	1	1	1	0	1	1		1	1	1
Detector Template	Left				Left							Left		
Leading Detector (ft)	20	55	306	0	20	60	306	0	40	55		20	60	60
Trailing Detector (ft)	0	-5	300	0	0	0	300	0	0	-5		0	0	0
Detector 1 Position(ft)	0	-5	300	0	0	0	300	0	0	-5		0	0	0
Detector 1 Size(ft)	20	60	6	20	20	60	6	20	40	60		20	60	60
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel														
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	15.0	0.0	0.0	0.0	15.0	0.0	0.0	3.0	10.0		0.0	3.0	15.0
Turn Type	D.P+P	D.P+P	NA	Perm	D.P+P	D.P+P	NA	Perm	Split	NA		Split	NA	Prot
Protected Phases	5	5	2		1	1	6		3	3		4	4	4
Permitted Phases	6	6		2	2	2		6						
Detector Phase	5	5	2	2	1	1	6	6	3	3		4	4	4
Switch Phase														
Minimum Initial (s)	7.0	7.0	12.0	12.0	7.0	7.0	12.0	12.0	7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	15.0	15.0	20.0	20.0	14.0	14.0	20.0	20.0	15.0	15.0		15.0	15.0	15.0
Total Split (s)	42.0	42.0	92.0	92.0	14.0	14.0	64.0	64.0	15.0	15.0		19.0	19.0	19.0
Total Split (%)	30.0%	30.0%	65.7%	65.7%	10.0%	10.0%	45.7%	45.7%	10.7%	10.7%		13.6%	13.6%	13.6%
Yellow Time (s)	3.0	3.0	4.6	4.6	3.0	3.0	4.6	4.6	4.2	4.2		3.1	3.1	3.1
All-Red Time (s)	3.3	3.3	2.0	2.0	2.8	2.8	2.0	2.0	1.9	1.9		3.2	3.2	3.2
Lost Time Adjust (s)		-1.3	-1.6	-1.6		-0.8	-1.6	-1.6	-1.1	-1.1			-1.3	-1.3
Total Lost Time (s)		5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0			5.0	5.0
Lead/Lag	Lead	Lead	Lead	Lead	Lag	Lag	Lag	Lag	Lead	Lead		Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	C-Max	C-Max	None	None	C-Max	C-Max	None	None		None	None	None
Act Effct Green (s)		96.0	87.0	87.0		96.0	59.0	59.0	9.4	9.4			14.6	14.6
Actuated g/C Ratio		0.69	0.62	0.62		0.69	0.42	0.42	0.07	0.07			0.10	0.10
v/c Ratio		1.10	0.93	0.00		0.53	1.03	0.28	0.55	0.42			1.01	0.47
Control Delay		110.9	33.0	0.0		26.8	50.0	2.6	80.8	23.7			129.9	10.3
Queue Delay		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0			0.0	0.0
Total Delay		110.9	33.0	0.0		26.8	50.0	2.6	80.8	23.7			129.9	10.3
LOS		F	C	A		C	D	A	F	C			F	B
Approach Delay			50.0				43.5			50.8				63.2
Approach LOS			D				D			D				E
Queue Length 50th (ft)		-535	822	0		36	-801	26	58	4			-179	0
Queue Length 95th (ft)		#769	966	0		m60	#918	25	110	56			#338	44



Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)			1028				1698			150			26	
Turn Bay Length (ft)		375		375		500		100						
Base Capacity (vph)		513	2166	1016		167	1499	741	125	176			181	489
Starvation Cap Reductn		0	0	0		0	0	0	0	0			0	0
Spillback Cap Reductn		0	0	0		0	0	0	0	0			0	0
Storage Cap Reductn		0	0	0		0	0	0	0	0			0	0
Reduced v/c Ratio		1.10	0.93	0.00		0.53	1.03	0.28	0.52	0.41			1.01	0.47

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 21 (15%), Referenced to phase 2:EBWB and 6:EBWB, Start of Green
 Natural Cycle: 150
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.10
 Intersection Signal Delay: 48.7 Intersection LOS: D
 Intersection Capacity Utilization 99.7% ICU Level of Service F
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Old Milburnie Road & US 64 Bus (Knightsdale Blvd)



Knightsdale Gateway
2: Westover Drive/Farmwell Road & US 64 Bus (Knightsdale Blvd)

Build-out PM (2034) - Improved
10/20/2023



Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Traffic Volume (vph)	7	20	2147	40	41	1652	52	11	4	8	134	9	51
Future Volume (vph)	7	20	2147	40	41	1652	52	11	4	8	134	9	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		225		225	200		150	0		0	0		0
Storage Lanes		1		1	1		1	0		0	1		0
Taper Length (ft)		100			100			25			25		
Satd. Flow (prot)	0	1615	3539	1583	1770	3539	1468	0	1736	0	1752	1520	0
Flt Permitted		0.950			0.950				0.864		0.742		
Satd. Flow (perm)	0	1615	3539	1583	1770	3539	1468	0	1537	0	1369	1520	0
Right Turn on Red				Yes			Yes			Yes			Yes
Satd. Flow (RTOR)				86			86		8				54
Link Speed (mph)			45			45			25				30
Link Distance (ft)			1778			1589			405				118
Travel Time (s)			26.9			24.1			11.0				2.7
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	15%	2%	2%	2%	2%	10%	2%	2%	2%	3%	2%	10%
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	28	2260	42	43	1739	55	0	24	0	141	63	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)			36			36			12				12
Link Offset(ft)			0			0			0				0
Crosswalk Width(ft)			16			16			16				16
Two way Left Turn Lane													
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	9	15		9	15		9	15		9	15		9
Number of Detectors	1	1	1	0	1	1	0	1	1		1	1	
Detector Template	Left							Left			Left		
Leading Detector (ft)	20	40	306	0	40	306	0	20	40		40	40	40
Trailing Detector (ft)	0	0	300	0	0	300	0	0	0		0	0	0
Detector 1 Position(ft)	0	0	300	0	0	300	0	0	0		0	0	0
Detector 1 Size(ft)	20	40	6	20	40	6	20	20	40		40	40	40
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel													
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Turn Type	Prot	Prot	NA	Perm	Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	5	2		1	6			8				4
Permitted Phases				2			6	8			4		
Detector Phase	5	5	2	2	1	6	6	8	8		4	4	
Switch Phase													
Minimum Initial (s)	7.0	7.0	12.0	12.0	7.0	12.0	12.0	7.0	7.0		7.0	7.0	
Minimum Split (s)	15.0	15.0	20.0	20.0	15.0	20.0	20.0	15.0	15.0		15.0	15.0	
Total Split (s)	15.0	15.0	95.0	95.0	15.0	95.0	95.0	30.0	30.0		30.0	30.0	
Total Split (%)	10.7%	10.7%	67.9%	67.9%	10.7%	67.9%	67.9%	21.4%	21.4%		21.4%	21.4%	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)		-2.0	-2.0	-2.0	-2.0	-2.0	-2.0		-2.0		-2.0	-2.0	
Total Lost Time (s)		5.0	5.0	5.0	5.0	5.0	5.0		5.0		5.0	5.0	
Lead/Lag	Lag	Lag	Lag	Lag	Lead	Lead	Lead						
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes						
Recall Mode	None	None	C-Max	C-Max	None	C-Max	C-Max	None	None		None	None	
Act Effct Green (s)		9.6	97.2	97.2	9.9	100.3	100.3		20.7		20.7	20.7	
Actuated g/C Ratio		0.07	0.69	0.69	0.07	0.72	0.72		0.15		0.15	0.15	
v/c Ratio		0.25	0.92	0.04	0.34	0.69	0.05		0.10		0.70	0.23	
Control Delay		47.5	9.8	0.1	77.5	8.7	0.2		37.7		74.2	17.6	
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0		0.0		0.0	0.0	
Total Delay		47.5	9.8	0.1	77.5	8.7	0.2		37.7		74.2	17.6	
LOS		D	A	A	E	A	A		D		E	B	
Approach Delay			10.1			10.1			37.7			56.7	
Approach LOS			B			B			D			E	
Queue Length 50th (ft)		24	154	0	33	483	1		13		123	7	
Queue Length 95th (ft)		m27	m#1223	m0	m63	640	m1		40		194	49	

Knightsdale Gateway
 2: Westover Drive/Farmwell Road & US 64 Bus (Knightsdale Blvd)



Lane Group	EBU	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)			1698			1509			325			38	
Turn Bay Length (ft)		225		225	200		150						
Base Capacity (vph)		115	2456	1125	128	2534	1075		281		244	315	
Starvation Cap Reductn		0	0	0	0	0	0		0		0	0	
Spillback Cap Reductn		0	0	0	0	0	0		0		0	0	
Storage Cap Reductn		0	0	0	0	0	0		0		0	0	
Reduced v/c Ratio		0.24	0.92	0.04	0.34	0.69	0.05		0.09		0.58	0.20	

Intersection Summary

Area Type: Other

Cycle Length: 140

Actuated Cycle Length: 140

Offset: 136 (97%), Referenced to phase 2:EBT and 6:WBT, Start of Green

Natural Cycle: 90

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.92

Intersection Signal Delay: 12.4 Intersection LOS: B

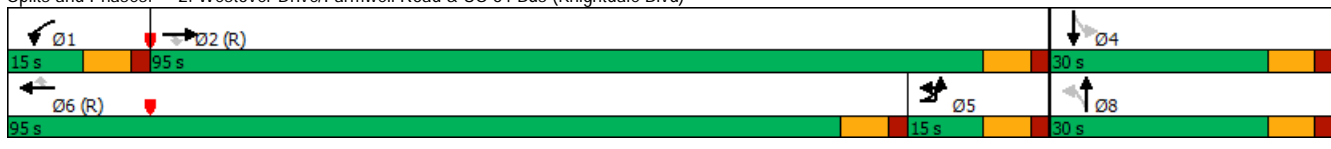
Intersection Capacity Utilization 81.3% ICU Level of Service D

Analysis Period (min) 15

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

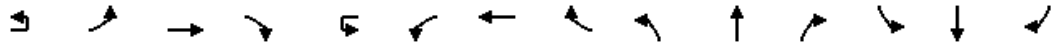
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Westover Drive/Farmwell Road & US 64 Bus (Knightsdale Blvd)

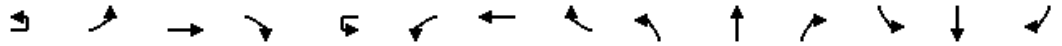


Knightsdale Gateway
3: Hodge Road & US 64 Bus (Knightsdale Blvd)

Build-out PM (2034) - Improved
10/20/2023



Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations														
Traffic Volume (vph)	9	178	1891	294	35	402	1479	446	147	49	227	268	124	149
Future Volume (vph)	9	178	1891	294	35	402	1479	446	147	49	227	268	124	149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)			3%				-3%			-2%			1%	
Storage Length (ft)		200		200		575		375	200		50	0		0
Storage Lanes		3		1		1		1	1		1	2		1
Taper Length (ft)		300				100			100			25		
Satd. Flow (prot)	0	3365	5009	1560	0	1796	5111	1607	3467	1650	0	3416	1853	1575
Flt Permitted		0.950				0.950			0.950			0.950		
Satd. Flow (perm)	0	3363	5009	1560	0	1796	5111	1587	3467	1650	0	3416	1853	1575
Right Turn on Red				Yes				Yes			Yes			Yes
Satd. Flow (RTOR)				149				317		132				128
Link Speed (mph)			45				45			35			25	
Link Distance (ft)			746				963			562			518	
Travel Time (s)			11.3				14.6			10.9			14.1	
Confl. Peds. (#/hr)		1							1					
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	12%	2%	2%	2%	2%	2%	3%	2%	2%	2%	2%	2%	2%	2%
Shared Lane Traffic (%)														
Lane Group Flow (vph)	0	201	2033	316	0	470	1590	480	158	297	0	288	133	160
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	R NA	Left	Left	Right	R NA	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)			36				24			24			24	
Link Offset(ft)			0				0			0			0	
Crosswalk Width(ft)			16				16			16			16	
Two way Left Turn Lane														
Headway Factor	1.02	1.02	1.02	1.02	0.98	0.98	0.98	0.98	0.99	0.99	0.99	1.01	1.01	1.01
Turning Speed (mph)	9	15		9	9	15		9	15		9	15		9
Number of Detectors	1	1	1	0	1	1	1	0	1	1		1	1	1
Detector Template	Left				Left									
Leading Detector (ft)	20	40	306	0	20	40	306	0	50	40		40	40	40
Trailing Detector (ft)	0	0	300	0	0	0	300	0	-10	0		0	0	0
Detector 1 Position(ft)	0	0	300	0	0	0	300	0	-10	0		0	0	0
Detector 1 Size(ft)	20	40	6	20	20	40	6	20	60	40		40	40	40
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel														
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	10.0		0.0	0.0	15.0
Turn Type	Prot	Prot	NA	pm+ov	Prot	Prot	NA	pm+ov	Prot	NA		Prot	NA	pm+ov
Protected Phases	5!	5	2	3	1	1	6	7	3	8		7	4	5!
Permitted Phases				2				6						4
Detector Phase	5	5	2	3	1	1	6	7	3	8		7	4	5
Switch Phase														
Minimum Initial (s)	7.0	7.0	12.0	7.0	7.0	7.0	12.0	7.0	7.0	7.0		7.0	7.0	7.0
Minimum Split (s)	15.0	15.0	19.0	15.0	15.0	15.0	20.0	15.0	15.0	16.0		15.0	15.0	15.0
Total Split (s)	19.0	19.0	63.0	15.0	41.0	41.0	85.0	17.0	15.0	19.0		17.0	21.0	19.0
Total Split (%)	13.6%	13.6%	45.0%	10.7%	29.3%	29.3%	60.7%	12.1%	10.7%	13.6%		12.1%	15.0%	13.6%
Yellow Time (s)	3.0	3.0	4.3	3.0	3.0	3.0	4.8	3.0	3.0	4.0		3.0	3.1	3.0
All-Red Time (s)	3.9	3.9	1.7	3.9	3.5	3.5	1.7	3.9	3.9	3.1		3.9	3.7	3.9
Lost Time Adjust (s)		-1.9	-1.0	-1.9			-1.5	-1.5	-1.9	-2.1		-1.9	-1.8	-1.9
Total Lost Time (s)		5.0	5.0	5.0			5.0	5.0	5.0	5.0		5.0	5.0	5.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lag	Lag	Lag	Lag	Lead	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	C-Max	None	None	None	C-Max	None	None	None		None	None	None
Act Effct Green (s)		13.2	58.0	74.5		36.0	80.8	92.8	11.5	14.0		12.0	14.5	27.7
Actuated g/C Ratio		0.09	0.41	0.53		0.26	0.58	0.66	0.08	0.10		0.09	0.10	0.20
v/c Ratio		0.64	0.98	0.35		1.02	0.54	0.41	0.56	1.05		0.99	0.70	0.39
Control Delay		65.8	34.7	2.0		81.5	8.0	1.1	70.4	99.8		112.4	79.5	11.3
Queue Delay		0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay		65.8	34.7	2.0		81.5	8.0	1.1	70.4	99.8		112.4	79.5	11.3
LOS		E	C	A		F	A	A	E	F		F	E	B
Approach Delay			33.1				20.3			89.6			77.0	
Approach LOS			C				C			F			E	



Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 50th (ft)		87	647	35		-461	119	0	73	-178		137	117	19
Queue Length 95th (ft)		m100	#774	m34		#667	158	1	112	#370		#234	190	70
Internal Link Dist (ft)			666				883			482			438	
Turn Bay Length (ft)		200		200		575		375	200					
Base Capacity (vph)		336	2075	899		461	2951	1161	284	283		292	211	422
Starvation Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn		0	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio		0.60	0.98	0.35		1.02	0.54	0.41	0.56	1.05		0.99	0.63	0.38

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 82 (59%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 110
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 1.05
 Intersection Signal Delay: 36.2
 Intersection Capacity Utilization 101.6%
 Analysis Period (min) 15
 Intersection LOS: D
 ICU Level of Service G

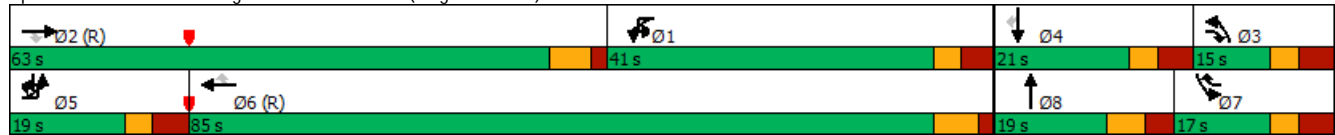
~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.

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

m Volume for 95th percentile queue is metered by upstream signal.

! Phase conflict between lane groups.

Splits and Phases: 3: Hodge Road & US 64 Bus (Knightsdale Blvd)



Knightsdale Gateway
4: I-540 Eastbound Ramps & US 64 Bus (Knightsdale Blvd)

Build-out PM (2034) - Improved
10/20/2023



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑	↑	↓	↑↑							↑
Traffic Volume (vph)	0	2226	127	255	1625	0	0	0	0	0	0	766
Future Volume (vph)	0	2226	127	255	1625	0	0	0	0	0	0	766
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		1%			-1%			0%			2%	
Satd. Flow (prot)	0	5060	1575	1778	3557	0	0	0	0	0	0	1580
Flt Permitted				0.040								
Satd. Flow (perm)	0	5060	1575	75	3557	0	0	0	0	0	0	1580
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			138									102
Link Speed (mph)		45			45			35				35
Link Distance (ft)		963			225			613				525
Travel Time (s)		14.6			3.4			11.9				10.2
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	2446	140	280	1786	0	0	0	0	0	0	842
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	L NA	Right	Left	Left	Right	Left	Left	R NA
Median Width(ft)		24			36			0				0
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.01	1.01	1.01	0.99	0.99	0.99	1.00	1.00	1.00	1.01	1.01	1.01
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors		1	0	1	0							0
Detector Template												
Leading Detector (ft)		306	0	60	0							0
Trailing Detector (ft)		300	0	0	0							0
Detector 1 Position(ft)		300	0	0	0							0
Detector 1 Size(ft)		6	20	60	6							20
Detector 1 Type		CI+Ex	CI+Ex	CI+Ex	CI+Ex							CI+Ex
Detector 1 Channel												
Detector 1 Extend (s)		0.0	0.0	0.0	0.0							0.0
Detector 1 Queue (s)		0.0	0.0	0.0	0.0							0.0
Detector 1 Delay (s)		0.0	0.0	15.0	0.0							0.0
Turn Type		NA	Perm	D,P+P	NA							Free
Protected Phases		2		7	2 7							
Permitted Phases			2	2								Free
Detector Phase		2	2	7	2 7							
Switch Phase												
Minimum Initial (s)		12.0	12.0	7.0								
Minimum Split (s)		19.0	19.0	15.0								
Total Split (s)		100.0	100.0	40.0								
Total Split (%)		71.4%	71.4%	28.6%								
Yellow Time (s)		4.4	4.4	3.0								
All-Red Time (s)		1.6	1.6	3.1								
Lost Time Adjust (s)		-1.0	-1.0	-1.1								
Total Lost Time (s)		5.0	5.0	5.0								
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode		C-Max	C-Max	None								
Act Effct Green (s)		103.0	103.0	130.0	140.0							140.0
Actuated g/C Ratio		0.74	0.74	0.93	1.00							1.00
v/c Ratio		0.66	0.12	0.70	0.50							0.53
Control Delay		1.1	0.0	49.6	5.2							1.3
Queue Delay		0.1	0.0	0.0	0.0							0.0
Total Delay		1.1	0.0	49.6	5.2							1.3
LOS		A	A	D	A							A
Approach Delay		1.1			11.3							1.3
Approach LOS		A			B						A	
Queue Length 50th (ft)		20	0	217	196							0
Queue Length 95th (ft)		m24	m0	m310	184							0
Internal Link Dist (ft)		883			145			533			445	
Turn Bay Length (ft)												

Knightsdale Gateway
 4: I-540 Eastbound Ramps & US 64 Bus (Knightsdale Blvd)

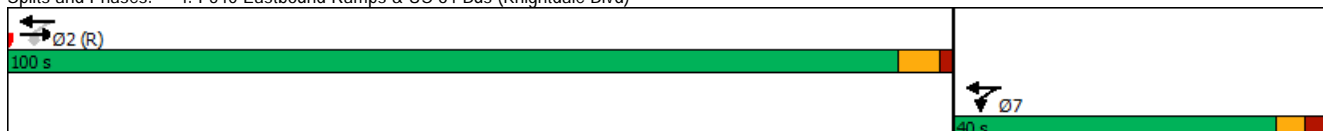
Build-out PM (2034) - Improved
 10/20/2023



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Base Capacity (vph)		3722	1195	497	3544							1580
Starvation Cap Reductn		162	0	0	0							0
Spillback Cap Reductn		0	0	0	0							0
Storage Cap Reductn		0	0	0	0							0
Reduced v/c Ratio		0.69	0.12	0.56	0.50							0.53

Intersection Summary
 Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 44 (31%), Referenced to phase 2:EBWB, Start of Green
 Natural Cycle: 50
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.70
 Intersection Signal Delay: 4.9 Intersection LOS: A
 Intersection Capacity Utilization 117.9% ICU Level of Service H
 Analysis Period (min) 15
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: I-540 Eastbound Ramps & US 64 Bus (Knightsdale Blvd)



Knightdale Gateway
5: I-540 Westbound Ramps & US 64 Bus (Knightdale Blvd)

Build-out PM (2034) - Improved
10/20/2023



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↕↕↕			↕↕↕	↕		↕	↕↕			
Traffic Volume (vph)	427	2864	0	0	1745	647	134	4	634	0	0	0
Future Volume (vph)	427	2864	0	0	1745	647	134	4	634	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-1%			1%			2%			0%	
Storage Length (ft)	500		0	0		0	0		0	0	0	0
Storage Lanes	1		0	0		1	0		2	0	0	0
Taper Length (ft)	200			25			25			25		
Satd. Flow (prot)	3417	5111	0	0	5060	1575	0	1743	2759	0	0	0
Flt Permitted	0.950							0.954				
Satd. Flow (perm)	3417	5111	0	0	5060	1575	0	1743	2759	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						514			76			
Link Speed (mph)		45			45			35			35	
Link Distance (ft)		848			814			733			573	
Travel Time (s)		12.8			12.3			14.3			11.2	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	3%	2%	2%	2%	2%	2%	3%	2%	2%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	436	2922	0	0	1781	660	0	141	647	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		36			24			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.99	0.99	0.99	1.01	1.01	1.01	1.01	1.01	1.01	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1			1	0	1	1	1			
Detector Template							Left					
Leading Detector (ft)	60	330			306	0	20	60	40			
Trailing Detector (ft)	0	300			300	0	0	0	0			
Detector 1 Position(ft)	0	300			300	0	0	0	0			
Detector 1 Size(ft)	60	30			6	20	20	60	40			
Detector 1 Type	CI+Ex	CI+Ex			CI+Ex	CI+Ex	CI+Ex	CI+Ex	CI+Ex			
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Detector 1 Queue (s)	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Detector 1 Delay (s)	0.0	0.0			0.0	0.0	0.0	0.0	15.0			
Turn Type	Prot	NA			NA	Perm	Perm	NA	Perm			
Protected Phases	5	2			6			4				
Permitted Phases						6	4		4			
Detector Phase	5	2			6	6	4	4	4			
Switch Phase												
Minimum Initial (s)	7.0	12.0			12.0	12.0	7.0	7.0	7.0			
Minimum Split (s)	15.0	20.0			20.0	20.0	15.0	15.0	15.0			
Total Split (s)	30.0	97.0			67.0	67.0	43.0	43.0	43.0			
Total Split (%)	21.4%	69.3%			47.9%	47.9%	30.7%	30.7%	30.7%			
Yellow Time (s)	3.0	4.6			4.4	4.4	3.7	3.7	3.7			
All-Red Time (s)	3.3	1.6			2.0	2.0	2.7	2.7	2.7			
Lost Time Adjust (s)	-1.3	-1.2			-1.4	-1.4		-1.4	-1.4			
Total Lost Time (s)	5.0	5.0			5.0	5.0		5.0	5.0			
Lead/Lag	Lag				Lead	Lead						
Lead-Lag Optimize?	Yes				Yes	Yes						
Recall Mode	None	C-Max			C-Max	C-Max	None	None	None			
Act Effct Green (s)	25.0	96.3			66.3	66.3		33.7	33.7			
Actuated g/C Ratio	0.18	0.69			0.47	0.47		0.24	0.24			
v/c Ratio	0.71	0.83			0.74	0.65		0.34	0.90			
Control Delay	42.5	5.9			33.0	9.4		45.3	61.1			
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	42.5	5.9			33.0	9.4		45.3	61.1			
LOS	D	A			C	A		D	E			
Approach Delay		10.6			26.6			58.2				
Approach LOS		B			C			E				
Queue Length 50th (ft)	186	172			481	84		106	289			

Knightsdale Gateway
 5: I-540 Westbound Ramps & US 64 Bus (Knightsdale Blvd)

Build-out PM (2034) - Improved
 10/20/2023

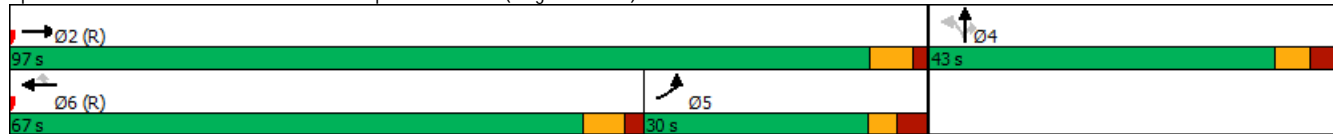


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	240	209			566	230		165	364			
Internal Link Dist (ft)		768			734			653			493	
Turn Bay Length (ft)	500											
Base Capacity (vph)	610	3514			2395	1016		473	804			
Starvation Cap Reductn	0	6			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.71	0.83			0.74	0.65		0.30	0.80			

Intersection Summary

Area Type: Other
 Cycle Length: 140
 Actuated Cycle Length: 140
 Offset: 63 (45%), Referenced to phase 2:EBT and 6:WBT, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.90
 Intersection Signal Delay: 22.3 Intersection LOS: C
 Intersection Capacity Utilization 85.8% ICU Level of Service E
 Analysis Period (min) 15

Splits and Phases: 5: I-540 Westbound Ramps & US 64 Bus (Knightsdale Blvd)





Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	10	17	701	5	6	375
Future Volume (vph)	10	17	701	5	6	375
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)	0%		0%			4%
Storage Length (ft)	0	0		0	0	
Storage Lanes	1	0		0	0	
Taper Length (ft)	25				25	
Satd. Flow (prot)	1674	0	1861	0	0	3465
Flt Permitted	0.981					0.999
Satd. Flow (perm)	1674	0	1861	0	0	3465
Link Speed (mph)	35		45			45
Link Distance (ft)	787		106			1670
Travel Time (s)	15.3		1.6			25.3
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Shared Lane Traffic (%)						
Lane Group Flow (vph)	29	0	751	0	0	405
Enter Blocked Intersection	1 veh	No	Yes	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(ft)	12		0			0
Link Offset(ft)	0		0			12
Crosswalk Width(ft)	16		16			16
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.03	1.03
Turning Speed (mph)	15	9		9	15	
Sign Control	Stop		Free			Free

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	47.2%
ICU Level of Service	A
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	0.4					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Vol, veh/h	10	17	701	5	6	375
Future Vol, veh/h	10	17	701	5	6	375
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	4
Peak Hour Factor	94	94	94	94	94	94
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	11	18	746	5	6	399

Major/Minor	Minor1	Major1	Major2	Major3	Major4
Conflicting Flow All	961	749	0	0	751
Stage 1	749	-	-	-	-
Stage 2	212	-	-	-	-
Critical Hdwy	6.63	6.23	-	-	4.13
Critical Hdwy Stg 1	5.43	-	-	-	-
Critical Hdwy Stg 2	5.83	-	-	-	-
Follow-up Hdwy	3.519	3.319	-	-	2.219
Pot Cap-1 Maneuver	269	411	-	-	856
Stage 1	466	-	-	-	-
Stage 2	804	-	-	-	-
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	267	411	-	-	856
Mov Cap-2 Maneuver	267	-	-	-	-
Stage 1	466	-	-	-	-
Stage 2	797	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	16.5	0	0.1
HCM LOS	C		

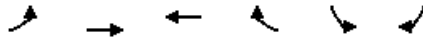
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	343	856	-
HCM Lane V/C Ratio	-	-	0.084	0.007	-
HCM Control Delay (s)	-	-	16.5	9.2	-
HCM Lane LOS	-	-	C	A	-
HCM 95th %tile Q(veh)	-	-	0.3	0	-

7: Farmwell Road & Milburnie Lake Drive Performance by approach

Approach	EB	WB	NB	SB	All
Denied Del/Veh (s)	12.4	0.1	0.0	1.6	4.7
Total Del/Veh (s)	234.1	57.5	0.8	101.3	118.8

Intersection: 7: Farmwell Road & Milburnie Lake Drive

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	LTR	LT	TR
Maximum Queue (ft)	301	96	18	192	111
Average Queue (ft)	189	26	1	89	14
95th Queue (ft)	353	78	11	202	62
Link Distance (ft)	302	267	20	916	
Upstream Blk Time (%)	18		1		
Queuing Penalty (veh)	18		1		
Storage Bay Dist (ft)					225
Storage Blk Time (%)				5	
Queuing Penalty (veh)				2	



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	
Traffic Volume (vph)	4	14	24	21	83	9
Future Volume (vph)	4	14	24	21	83	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Satd. Flow (prot)	0	1844	1747	0	1759	0
Flt Permitted		0.990			0.957	
Satd. Flow (perm)	0	1844	1747	0	1759	0
Link Speed (mph)		35	35		25	
Link Distance (ft)		675	375		278	
Travel Time (s)		13.1	7.3		7.6	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	20	50	0	102	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	60			60	60	60
Sign Control		Free	Free		Stop	

Intersection Summary

Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	16.0%
ICU Level of Service	A
Analysis Period (min)	15

Intersection						
Int Delay, s/veh	5.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	4	14	24	21	83	9
Future Vol, veh/h	4	14	24	21	83	9
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	90	90	90	90	90	90
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	16	27	23	92	10

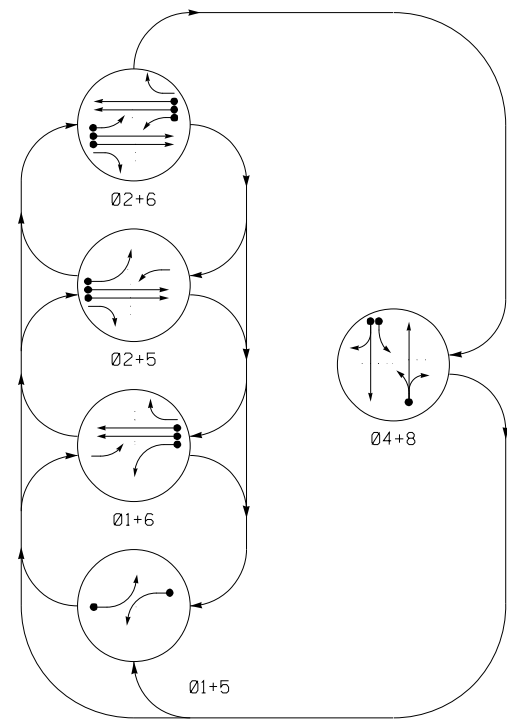
Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	50	0	-	0	63 39
Stage 1	-	-	-	-	39 -
Stage 2	-	-	-	-	24 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1557	-	-	-	943 1033
Stage 1	-	-	-	-	983 -
Stage 2	-	-	-	-	999 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1557	-	-	-	940 1033
Mov Cap-2 Maneuver	-	-	-	-	940 -
Stage 1	-	-	-	-	980 -
Stage 2	-	-	-	-	999 -

Approach	EB	WB	SB
HCM Control Delay, s	1.6	0	9.3
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1557	-	-	-	948
HCM Lane V/C Ratio	0.003	-	-	-	0.108
HCM Control Delay (s)	7.3	0	-	-	9.3
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.4

Appendix F: Signal Plans

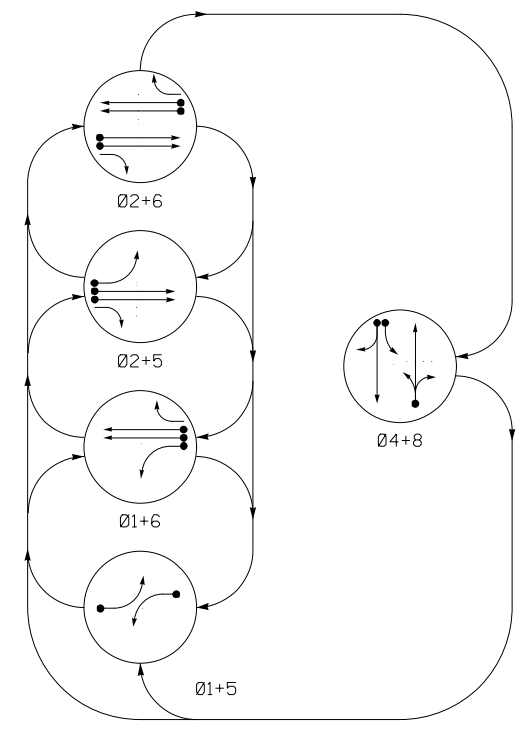
DEFAULT PHASING DIAGRAM



DEFAULT PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE				
	Ø 1+5	Ø 1+6	Ø 2+5	Ø 2+6	F HEADS
11	←	←	←	←	←
21, 22	R	R	G	G	R
41	←	←	←	←	←
42, 43, 44	R	R	R	G	R
51	←	←	←	←	←
61, 62	R	G	R	G	R
81, 82, 83	R	R	R	G	R

ALTERNATE PHASING DIAGRAM



ALTERNATE PHASING TABLE OF OPERATION

SIGNAL FACE	PHASE				
	Ø 1+5	Ø 1+6	Ø 2+5	Ø 2+6	F HEADS
11	←	←	←	←	←
21, 22	R	R	G	G	R
41	←	←	←	←	←
42, 43, 44	R	R	R	G	R
51	←	←	←	←	←
61, 62	R	G	R	G	R
81, 82, 83	R	R	R	G	R

OASIS 2070 LOOP & DETECTOR INSTALLATION CHART

LOOP	SIZE (FT)	DISTANCE FROM STOPBAR (FT)	TURNS	NEW LOOP	DETECTOR PROGRAMMING						
					PHASE	CALLING	EXTENSION	STRETCH TIME	DELAY TIME	SYSTEM LOOP	NEW CARD
1A	6X40	0	2-4-2	Y	1	Y	Y	-	15*	-	Y
2A	6X6	300	6	Y	2	Y	Y	-	-	-	Y
2B	6X6	300	6	Y	2	Y	Y	-	-	-	Y
4A	6X30	0	2-4-2	Y	4	Y	Y	-	3	-	Y
4B	6X30	0	2-4-2	Y	4	Y	Y	-	10	-	Y
4C	6X40	0	2-4-2	Y	4	Y	Y	-	5	-	Y
4D	6X40	0	2-4-2	Y	4	Y	Y	-	5	-	Y
4E	6X15	0	2-4-2	Y	4	Y	Y	-	15	-	Y
5A	6X40	0	2-4-2	Y	5	Y	Y	-	15*	-	Y
6A	6X6	300	6	Y	6	Y	Y	-	-	-	Y
6B	6X6	300	6	Y	6	Y	Y	-	-	-	Y
8A	6X40	0	2-4-2	Y	8	Y	Y	-	5	-	Y
8B	6X6	0	4	Y	8	Y	Y	-	10	-	Y

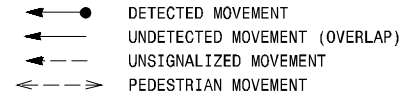
* Disable Delay during Alternate Phasing operation.
 # Disable phase call for loops during Alternate Phasing operation.

5 Phase Fully Actuated US 64 Bus. (Knightdale) CLS Signal System #: D05-28_Knightdale

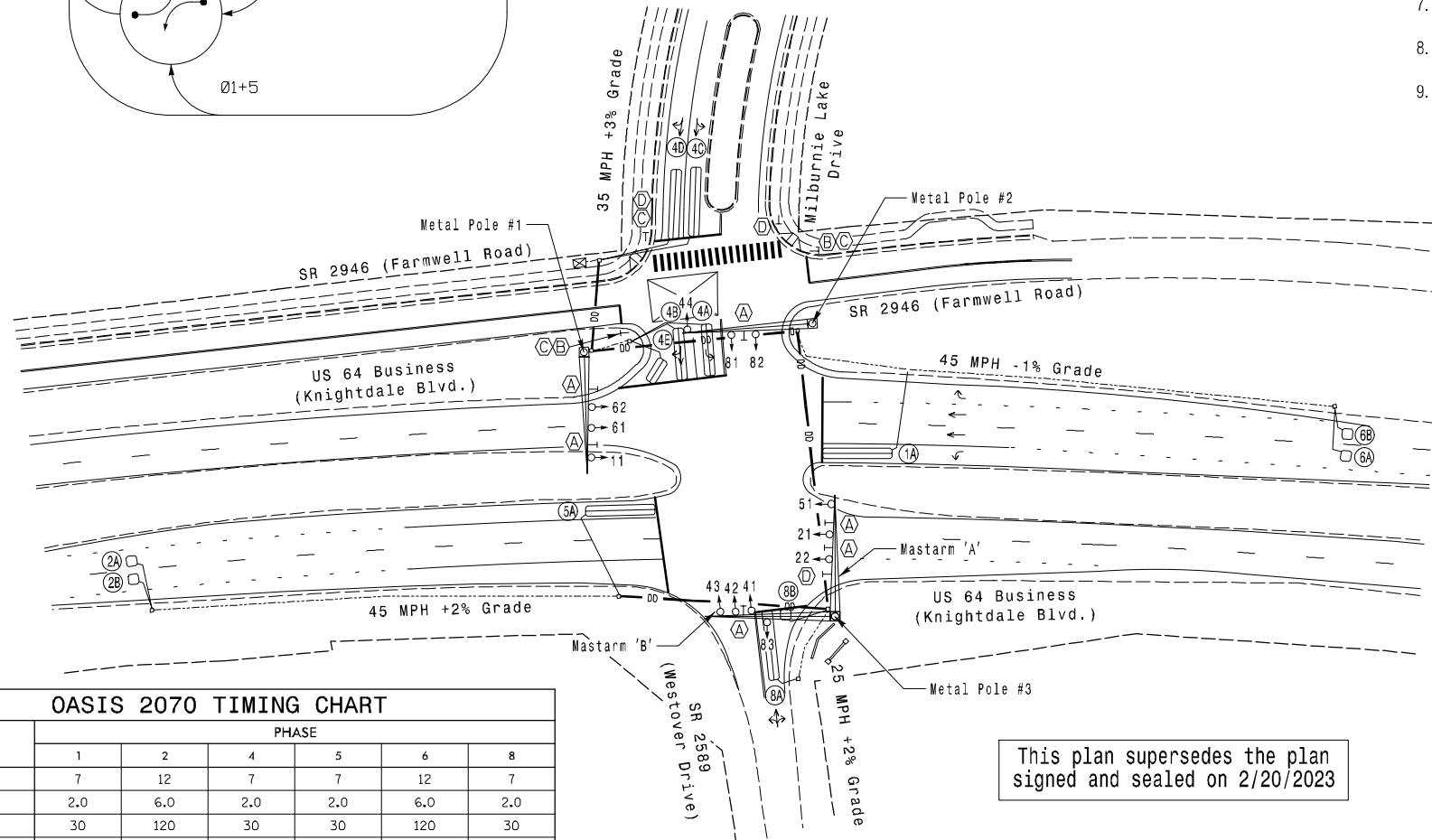
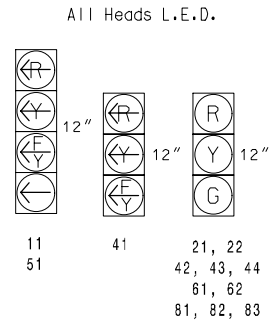
NOTES

- Refer to "Roadway Standard Drawings NCDOT" dated January 2018, "Standard Specifications for Roads and Structures" dated January 2018, and all applicable sections of the latest version of the generic Project Special Provisions. The PSP can be accessed at the following website: <https://connect.ncdot.gov/resources/safety/Pages/ITS-Design-Resources.aspx>
- Do not program signal for late night flashing operation unless otherwise directed by the Engineer.
- Phase 1 and/or 5 may be lagged.
- Set all detector units to presence mode.
- Locate new cabinet so as not to obstruct sight distance of vehicles turning right on red.
- Pavement markings are existing unless otherwise shown.
- The Division Traffic Engineer will determine the hours of use for each phasing plan.
- Maximum times shown in timing chart are for free-run operation only. Coordinated signal system timing values supersede these values.
- Closed loop system data: Controller Asset # 0930.

PHASING DIAGRAM DETECTION LEGEND



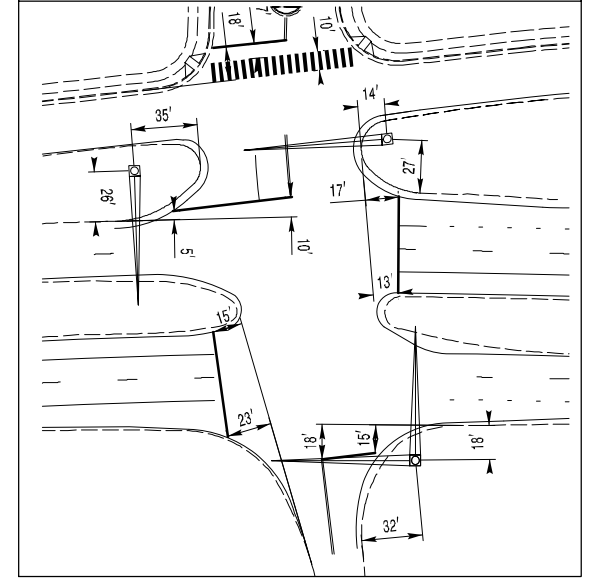
SIGNAL FACE I.D.



LEGEND

PROPOSED	EXISTING

STOPLINE AND POLE LOCATION DIAGRAM



OASIS 2070 TIMING CHART

FEATURE	PHASE					
	1	2	4	5	6	8
Min Green 1 *	7	12	7	7	12	7
Extension 1 *	2.0	6.0	2.0	2.0	6.0	2.0
Max Green 1 *	30	120	30	30	120	30
Yellow Clearance	3.0	4.6	3.7	3.0	4.6	3.1
Red Clearance	3.4	1.9	2.6	3.2	1.9	3.4
Red Revert	2.0	2.0	2.0	2.0	2.0	2.0
Walk 1 *	-	-	-	-	-	-
Don't Walk 1	-	-	-	-	-	-
Seconds Per Actuation *	-	1.5	-	-	1.5	-
Max Variable Initial *	-	34	-	-	34	-
Time Before Reduction *	-	15	-	-	15	-
Time To Reduce *	-	45	-	-	45	-
Minimum Gap	-	3.0	-	-	3.0	-
Recall Mode	-	MIN RECALL	-	-	MIN RECALL	-
Vehicle Call Memory	-	YELLOW	-	-	YELLOW	-
Dual Entry	-	-	ON	-	-	ON
Simultaneous Gap	ON	ON	ON	ON	ON	ON

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

This plan supersedes the plan signed and sealed on 2/20/2023

NC Dept of Transportation
 Division of Highways
 Final Drawing Date: 9/26/2023
 ITS & Signals Unit

New Installation

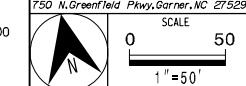


US 64 Business (Knightdale Blvd.)
 at
 SR 2589 (Westover Drive) and
 Milburnie Lake Drive
 Knightdale
 Division 5 Wake County
 PLAN DATE: September 2022 REVIEWED BY: Stacie Phillips
 PREPARED BY: SP Pennington REVIEWED BY:

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 SEAL 032607
 STACIE L. PHILLIPS
 9/25/2023
 SIGNATURE DATE
 S16. INVENTORY NO. 05-0930

PLANS PREPARED IN THE OFFICE OF:
Kimley-Horn
 NC License #F-0102
 421 Fayetteville Street, Suite 600
 Raleigh, NC 27601
 (919) 677-2000



REVISIONS	INIT.	DATE

9/25/2023 2:04:10 PM susan.pennington K:\RAL\TPT\OK-SIGNALS\SR17360007_Knightdale-Farmwell-11854 - Signal - Des\gn\oasis_Planes\050930_2023.dgn