



FAY-VAR- IOS (PID 117955)

Ohio Department of Transportation District 6

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Table of Contents

Project Background 1

Study Area..... 1

Existing (No-Build) Condition 1

Traffic Volumes.....2

Traffic Analysis.....7

Turn Lane Sizing31

Summary of Improvements..... 34

Conclusions & Recommendations 38



List of Figures

Figure 1 – general location map.....	1
Figure 2-study analysis points	3
Figure 3- No Build Condition (SR 435 CORRIDOR)	4
Figure 4- No Build Condition (SR 41 corridor)	5
Figure 5-Freeway facilities geometry	6
Figure 6 – Build Conditions (SR 435 corridor).....	28
Figure 7 – Build Conditions (SR 41 corridor).....	29
Figure 8 – sr 435/bluegrass – design year roundabout configuration.....	30
Figure 9- No-Build/Build LOS (SR 435 Corridor)	36
Figure 10 – No-Build/Build LOS (SR 41 corridor)	37

List of Tables

Table 1 - 2044 AM/PM HCS Results No-Build/Build (freeway facilities).....	8
Table 2 - 2044 HCS Facility Operations Summary.....	9
Table 3 – 2044 AM No-Build Intersections	10
Table 4 – 2044 PM No-Build Intersections	15
Table 5 – 2044 AM Build Intersections	20
Table 6 – 2044 PM Build Intersections.....	24
Table 7 – 2024 AM & PM Peak Roundabout LOS (SR 435 @ Bluegrass)	30
Table 8 – 2044 AM & PM Peak Roundabout LOS - (SR 435 @ Bluegrass).....	31
Table 9 – Turn Lane Length Calculations	32

Appendices

Appendix A - Certified Traffic Volumes and Peak Hour Factors
Appendix B –Build Schematics
Appendix C – Design Year (2044) HCS Reports (Freeway Facilities)
Appendix D – Design Year (2044) No-Build HCS Reports (Intersections)
Appendix E – Design Year (2044) Build HCS Reports (Intersections)
Appendix F – HCS Results Roundabout Improvement (SR 435 @ Bluegrass Boulevard)
Appendix G- Turn Lane Calculations
Appendix H- Turn Lane Warrants
Appendix I- SR 435 @ US 35 WB off-ramp intersection alternate concept (imbalanced lane configuration with WB LT lane)



Project Background

Fayette County currently has large undeveloped area loosely bordered by I-71, SR 41, and SR 435, referred to as the Midwest Mega Commerce Center Development Plan (M2C2) site that is attracting development. This development area covers 1,660 acres and is served by two interchanges with I-71: SR 41 to the northeast and SR 435 to the southwest.

The focus of this Interchange Operations Study (IOS) is to assess impacts of the M2C2 development traffic on the adjacent interchanges, intersections, and roadway facilities and provide recommendations for improvements. The general study area map is shown on **Figure 1**.

FIGURE 1 – GENERAL LOCATION MAP



Study Area

The study area encompasses the interchanges of I-71 at SR 435, I-71 at SR 41 and US 35 at Old US 35/SR 435. **Figure 2** shows the analysis points within the study area with Inset 1 and Inset 2 focused on the I-71/SR 435 and I-71/SR 41 interchange subareas, respectively.

Existing (No-Build) Condition

The existing conditions of the study elements are summarized below:

- I-71 is a limited access divided Interstate facility with three lanes in each direction and a posted speed of 70 mph travelling between south of SR 435 and SR 41 interchanges. The typical section of I-71 becomes two lanes in each direction approximately 3.7

miles south of the SR 435 interchange and 1.5 miles north of the SR 41 interchange.

- US 35 is a limited access divided freeway with two lanes in each direction and a posted speed limit of 70 mph.
- SR 435 is a major collector with varying typical section and posted speed limits of 35 mph or 55 mph.

The section of SR 435 from Garringer Edgefield Road to Factory Shops Blvd./TA Travel Center Drive is a 4-lane divided facility with a posted speed limit of 35 mph, and transitions to a 4-lane undivided section to the US 35 partial interchange (East side) with a posted speed limit of 50 MPH, and further transitions to a 2-lane section east of US 35 interchange. See **Figure 3** for SR 435 corridor intersections lane configuration.

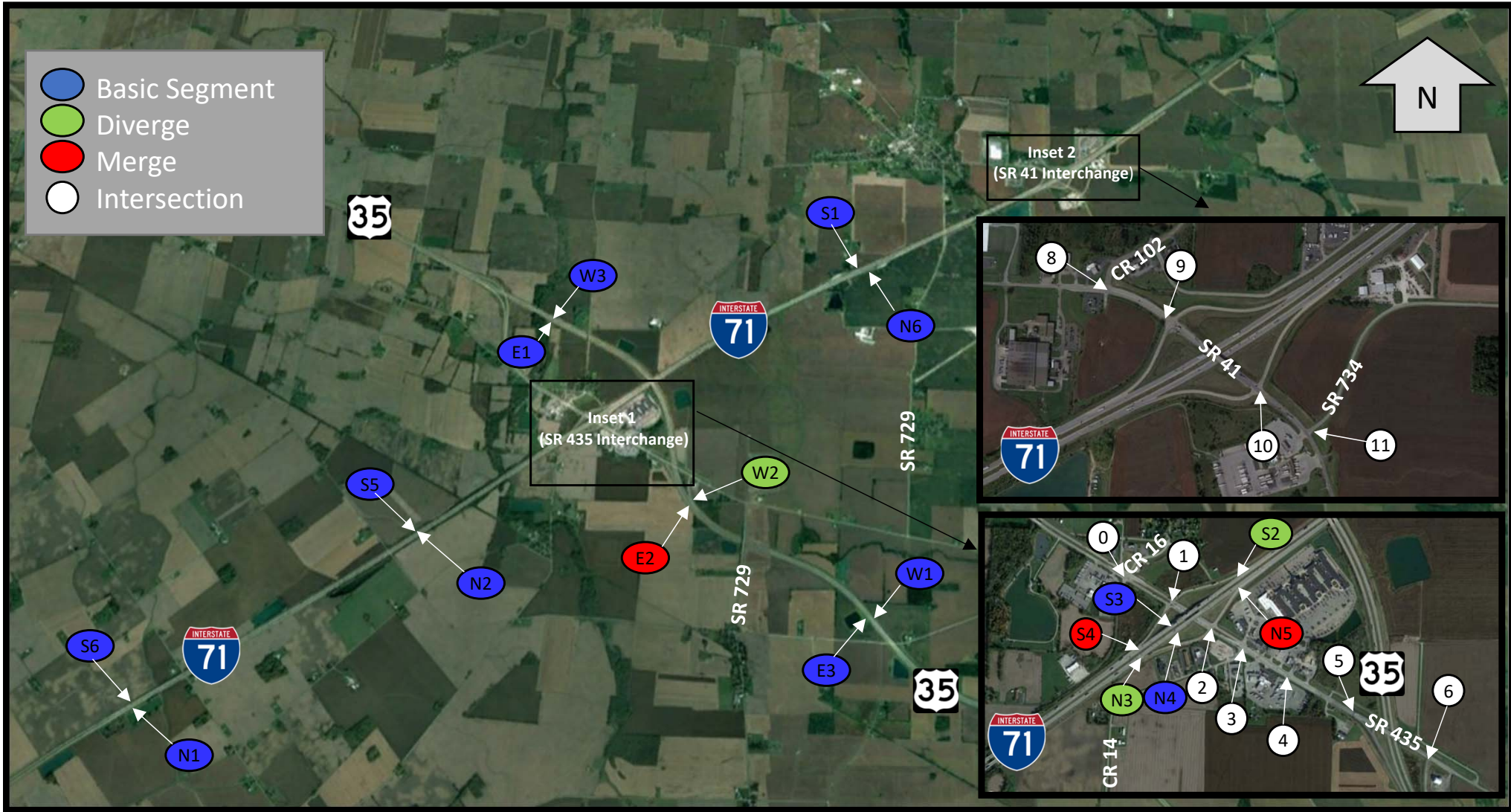
- The I-71 and SR 435 interchange has a tight-diamond configuration with single lane entrance and exit ramps.
- The US 35 and SR 435 interchange (East) is a partial diamond interchange with ramps on the south side only.
- The I-71 and SR 41 interchange has a tight-diamond configuration with single lane exit and entrance ramps.
- SR 41 is a two-lane undivided major collector with a posted speed of 35 mph at the I-71 interchange, and to the east. See **Figure 4** for SR 41 corridor intersections lane configuration.
- **Figure 5** shows the lane configuration along I-71 and US 35 corridors along with interchange merge/diverge lane configuration.

Traffic Volumes

Design traffic volumes were prepared by TEC and approved by ODOT's Office of State-wide Planning & Research, Modeling & Forecasting Section in May 2023 for the opening year (2024) and design year (2044) conditions. The No-Build and Build volumes are the same. The traffic plates along with the peak hour factors used in this IOS are included in **Appendix A**.

No Build analyses assume existing conditions (i.e., geometry, intersection traffic control and/or optimized traffic signal phasing). Build analyses assume the proposed conditions (i.e. geometry improvements, intersection traffic control and/or optimized traffic signal phasing). The Build conditions includes a roundabout improvement on SR 435 at Bluegrass Boulevard. The Build Schematics are included in **Appendix B**.

FIGURE 2 - STUDY ANALYSIS POINTS



- 0 – SR 435 & Garringer-Edgerton Rd
- 1 – SR 435 & I-71 SB Ramps
- 2 – SR 435 & I-71 NB Ramps
- 3 – SR 435 & Allen Rd
- 4 – SR 435 & TA Center
- 5 – SR 435 & US 35 EB

- 6 – SR 435 & US 35 WB
- 7 – SR 435 & Bluegrass Blvd
- 8 – SR 41 & Carr Rd
- 9 – SR 41 & I-71 SB Ramps
- 10 – SR 41 & I-71 NB Ramps
- 11 – SR 41 & SR 734

Figure 3 - No-Build Condition (SR 435 Corridor)

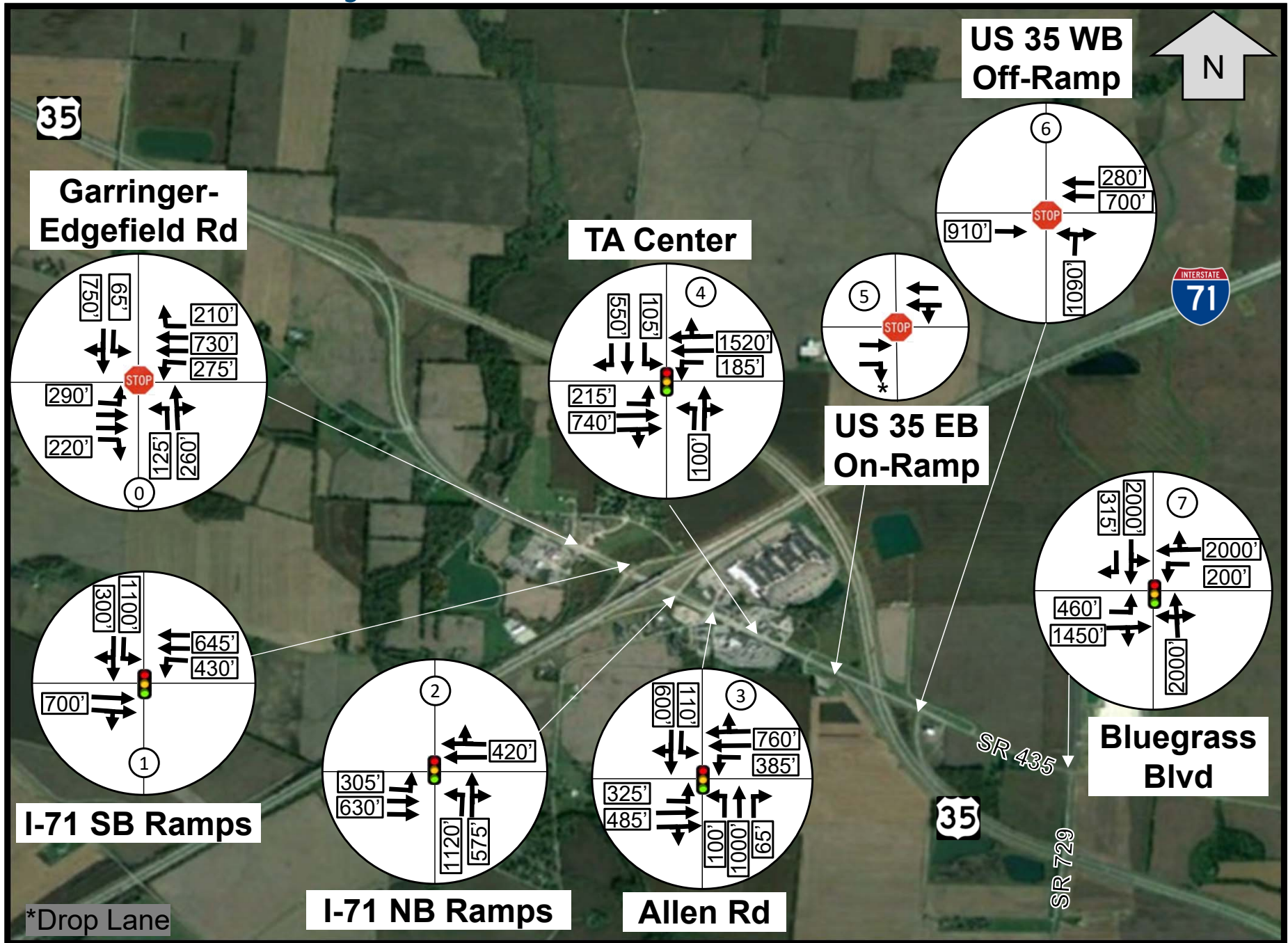


Figure 4 - No-Build Condition (SR 41 Interchange)

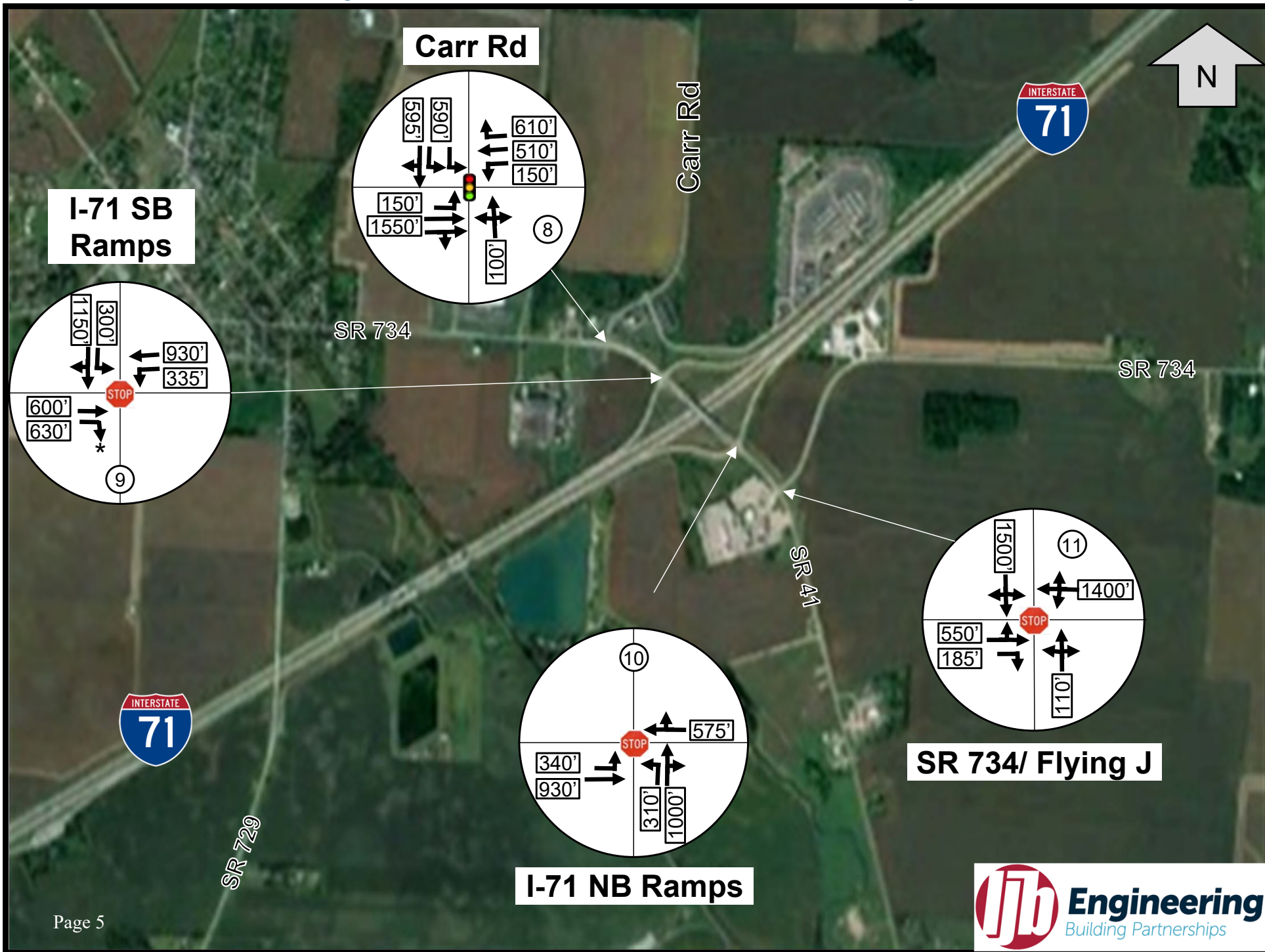
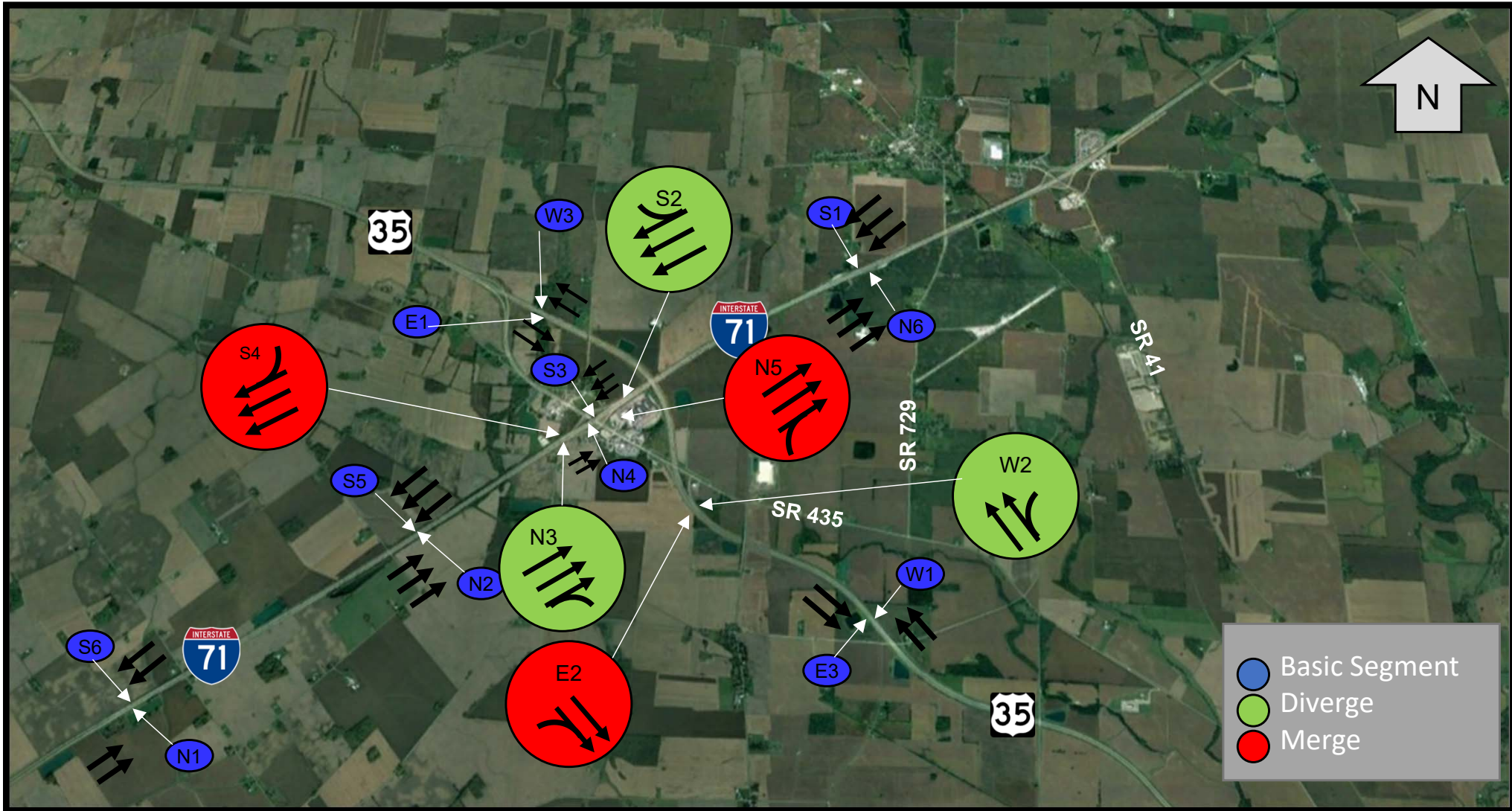


FIGURE 5 - STUDY AREA (FREEWAY FACILITIES)



Traffic Analysis

This section describes traffic analysis prepared using certified design traffic volume plates and Highway Capacity Software (HCS 2023), Release 8.2. Traffic analysis has been completed for freeway facilities (mainline, ramp merge/diverge) and intersections. The intersection types for No-build condition included signals and two-way stop-controlled intersections. For the build conditions, along with signals and stop controlled intersections, roundabout analysis is also performed.

Mainline Analysis (Design Year – 2044)

The existing lane configuration on I-71 and US 35 corridors will remain unchanged; therefore, analysis of the No-Build and Build conditions are the same. Analyses for the study freeway segments of I-71 and US 35 were prepared using the Facilities module of the HCS using 2044 volumes and existing lane configuration as shown on **Figure 5**. The results for the AM/PM analyses are summarized in **Table 1** and **Table 2**, and detailed reports are included in **Appendix C**.

As shown in **Table 1**, all freeway elements operate at an acceptable LOS D or better through the design year – 2044 under the AM and PM peak conditions. The overall facility LOS by direction is C or better as shown in **Table 2**.

TABLE 1 - 2044 AM/PM HCS RESULTS NO-BUILD/BUILD (FREEWAY FACILITIES)

Figures Reference No.	HCS Segment No.	Analysis Type	Analysis Point	2044 AM Peak					2044 PM Peak				
				LOS	Density	D/C Ratio		V/C Ratio	LOS	Density	D/C Ratio		V/C Ratio
						Freeway	Ramp				Freeway	Ramp	
I-71 Northbound													
N1	Seg-1	Basic	from SR 72 On-ramp to "Lane Add" (2-lane section)	C	19.4			0.59	C	18.2			0.56
N2	Seg-2	Basic	from "Lane Add" to SR 435 Off-ramp (3-lane section)	B	12.6			0.39	B	12.0			0.37
N3	Seg-3	Diverge	Off-ramp to SR 435	B	13.4	0.39	0.33		B	12.6	0.37	0.27	
N4	Seg-4	Basic	Between SR 435 ramps	A	9.0			0.28	A	9.3			0.29
N5	Seg-5	Merge	SR 435 on-Ramp	B	13.5	0.39	0.35		B	16.9	0.48	0.61	
N6	Seg-6	Basic	from SR 435 On-ramp to SR 41 Off-ramp	B	12.1			0.38	B	14.9			0.47
Is Operational Goal Met?			LOS "D" or better & D/C < 0.93	YES					YES				
I-71 Southbound													
S1	Seg-1	Basic	from SR 41 On-ramp to SR 435 off-Ramp	A	8.4			0.26	B	15.5			0.48
S2	Seg-2	Diverge	Off Ramp to SR 435	B	9.1	0.26	0.40		C	16.3	0.48	0.31	
S3	Seg-3	Basic	Between SR 435 Ramps	A	4.4			0.14	B	12.4			0.39
S4	Seg-4	Merge	On-ramp from SR 435	A	7.7	0.22	0.28		B	18.9	0.53	0.47	
S5	Seg-5	Basic	from SR 435 On-ramp to "Lane drop" (3-lane section)	A	7.0			0.22	B	17.3			0.53
S6	Seg-6	Basic	from "Lane Drop" to SR 72 SB On-ramp (2-lane section)	A	10.5			0.33	D	29.3			0.80
Is Operational Goal Met?			LOS "D" or better & D/C < 0.93	YES					YES				
US 35 Eastbound													
E1	Seg-1	Basic	From Old US 35 EB Off-ramp to SR 435 EB On-ramp	A	2.9			0.09	A	4.6			0.14
E2	Seg-2	Merge	SR 435 On-ramp	A	6.6	0.18	0.20		A	9.0	0.25	0.23	
E3	Seg-3	Basic	From SR 435 On-ramp to Palmer Rd Off-ramp	A	6.5			0.20	A	9.0			0.28
Operational Goal			LOS "D" or better, D/C < 0.93	YES					YES				
US 35 Westbound													
W1	Seg-1	Basic	From Palmer Rd On-ramp to SR 435 Off-ramp	B	12.4			0.39	A	9.3			0.29
W2	Seg-2	Diverge	SR 435 Off-ramp	B	14.1	0.39	0.52		B	10.4	0.29	0.30	
W3	Seg-3	Basic	From SR 435 Off-ramp to Old US 35 On-ramp	A	3.9			0.12	A	4.3			0.13
Operational Goal			LOS "D" or better & D/C < 0.93	YES					YES				

LOS=Level of Service, D/C=Demand to Capacity Ratio, V/C= Volume to Capacity Ratio

TABLE 2 - 2044 HCS FREEWAY FACILITY OPERATIONS SUMMARY

Facility Overall Results	2044 AM No-Build/Build	2044 PM No-Build/Build
I-71 NB		
Facility Length (mi)	10.47	
Space Mean Speed (mi/h)	74.1	74.3
Average Travel Time (min)	8.50	8.50
Density (veh/mi/ln)	10.7	11.1
Density (pc/mi/ln)	13.7	14.3
LOS	B	B
Is Operational Goal Met?		
LOS "D" or better	YES	YES
I-71 SB		
Facility Length (mi)	10.39	
Space Mean Speed (mi/h)	74.6	71.2
Average Travel Time (min)	8.40	8.80
Density (veh/mi/ln)	6.4	14.8
Density (pc/mi/ln)	8.2	19.1
LOS	A	C
Is Operational Goal Met?		
LOS "D" or better	YES	YES
US 35 EB		
Facility Length (mi)	9.21	
Space Mean Speed (mi/h)	74.7	74.7
Average Travel Time (min)	7.40	7.40
Density (veh/mi/ln)	3.9	5.8
Density (pc/mi/ln)	5.5	7.8
LOS	A	A
Is Operational Goal Met?		
LOS "D" or better	YES	YES
US 35 WB		
Facility Length (mi)	9.48	
Space Mean Speed (mi/h)	74.6	74.7
Average Travel Time (min)	7.60	7.60
Density (veh/mi/ln)	6.9	5.9
Density (pc/mi/ln)	9.9	7.8
LOS	A	A
Is Operational Goal Met?		
LOS "D" or better	YES	YES

Intersection Analysis (Design Year – 2044 No Build)

Intersections are graded using a level of service (LOS) designation expressed in terms of letter grades. Level of service is a quality measure describing operational conditions of traffic stream with LOS A representing the highest quality traffic flow and minimal delay, and LOS F representing poor traffic operations, significant delay, and substantial queuing. Intersection analyses were prepared using the HCS 2023 software.

No-Build analyses are based on 2044 traffic volumes with existing geometry (**Figure 3 & Figure 4**). The results of the AM and PM peak hour analyses for the design year No-build conditions are summarized in **Table 3** and **Table 4**, respectively. The HCS summary reports are included in **Appendix D**.

Eight intersections listed below operate at an overall intersection LOS E or F during the AM and/or PM peak. Along with these intersections, the SR 435 & I-71 SB ramps intersection has some movements operating at LOS F and volume-to-capacity (v/c) ratios exceeding 1.0 during both peaks. Geometric improvements and/or traffic control improvements are necessary at each of these intersections to improve operations to an acceptable level.



- SR 435 & I-71 NB ramps (AM, PM)
- SR 435 & Allen Road (PM)
- SR 435 & Outlet Mall/TA Center (PM)
- SR 435 & US 35 WB Off-ramp (AM, PM)
- SR 435 & Bluegrass (AM, PM)
- SR 41 & I-71 SB ramps (AM, PM)
- SR 41 & I-71 NB ramps (AM, PM)
- SR 41 & SR 734 (AM, PM)

TABLE 3 – 2044 AM NO-BUILD INTERSECTIONS

AM Peak No-Build	Eastbound			Westbound			Northbound			Southbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
0-SR 435 @ Garringer Edgefield Rd (Two-Way Stop Control, Stop on Garringer Edgefield Rd, PHF=0.89)												
Street	SR 435 (EB)			SR 435 (WB)			Garringer Edgefield Rd (NB)			Garringer Edgefield Rd (SB)		
Volume	10	500	10	160	420	80	30	10	90	10	10	40
Heavy Vehicle %	17	17	17	29	29	29	16	16	16	0	0	0
Storage	290'	-	220'	275'		210'	125'	-	260'	65'	-	750'
LOS	A	-	-	B			B		B	B		B
Delay (secs/veh)	9.0			10.5			13.6		11.5	14		11.3
V/C ratio	0.01	-	-	0.22			0.07		0.17	0.03		0.09
QSR	0	-	-	.07			.02		.06			.01
95 th %ile Queue	0.0	-	-	20			5		15	2.5		7.5
Approach LOS/Delay	A/0.2			A/2.6			B/12.0			B/11.8		
Intersection LOS/Delay	N/A											
Operational Goal	Intersection LOS D or better	Approach LOS E or better	Approach LOS E or better			Control LOS E or better	V/C <1.0	V/C (preferred) <=0.93	QSR<1.0			
Is Operational Goal Met?	N/A	YES	YES			YES	YES	YES	YES			
1-I-71 SB Ramps @ SR 435 (Signalized, Cycle Length =110s, PHF=0.96)												
Street	SR 435 (EB)			SR 435 (WB)			-			I-71 SB Ramp (SB)		
Volume	-	570	50	380	500	-	-	-	-	500	10	160
Heavy Vehicle %		16	16	19	19					16	16	16
Storage		700'		430'	645'					1100'	300'	
LOS		E	E	F	A					D	C	
Delay		57.4	58.2	69.0	9.4					50.7	24.9	
V/C		0.836	0.838	1.068	0.379					0.949	0.359	
QSR		0.62	0.61	0.96	0.17					0.55	0.54	
95 th %ile Queue		434.9	379.9	411.7	109.7					609.6	162.4	
Approach LOS/Delay		E/57.8			D/35.1							
Intersection LOS/Delay	D/44.2											
Operational Goal	Intersection LOS D or better			Approach LOS E or better			Control LOS E or better	V/C <1.0	V/C (preferred) <=0.93	QSR<1.0		
Is Operational Goal Met?	N/A			YES			YES	NO	NO	YES		



2-I-71 NB Ramps @ SR 435 (Signalized, Cycle Length =110s, PHF=0.94)												
Street	SR 435 (EB)			SR 435 (WB)			I-71 NB Ramp (NB)			-		
Volume	160	910			860	340	20	10	560			
Heavy Vehicle %	12	12			21	21	13	13	13			
Storage	305'	630'			420'		1120'	575'				
LOS	F	A			B	B	C	F				
Delay	220.4	6.4			19.3	15.5	23.3	176.9				
V/C	1.325	0.585			0.884	0.896	0.040	1.280				
QSR	1.31	0.18			0.90	0.49	0.02	2.20				
95 th %ile Queue	399.2	110.7			376.2	176.5	17.4	1263.3				
Approach LOS/Delay	D/38.4			B/17.5			F/171.7			-		
Intersection LOS/Delay	E/56.6											
Operational Goal	Intersection LOS D or better			Approach LOS E or better			Control LOS E or better	V/C <1.0	V/C (preferred) <=0.93	QSR<1.0		
Is Operational Goal Met?	NO			NO			NO	NO	NO	NO		
3-SR 435 @ Allen Rd (Signalized, Cycle Length =110s, PHF=0.91)												
Street	SR 435 (EB)			SR 435 (WB)			Allen Rd (NB)			Allen Rd (SB)		
Volume	180	1190	100	40	920	90	110	10	60	90	10	190
Heavy Vehicle %	11	11	11	18	18	18	10	10	10	15	15	15
Storage	325	485	-	385	760	-	100	1000	65	110	600	-
LOS	C	C	C	C	C	C	D	C	C	D	D	-
Delay	22.5	24.7	25.5	21.3	26.9	27.1	38.7	26.6	27.8	39.5	47.5	-
V/C	0.660	0.813	0.815	0.231	0.824	0.824	0.629	0.022	0.157	0.327	0.88 ₃	
QSR	0.33	0.91	0.91	0.08	0.57	0.56	1.35	0.01	0.94	1.10	0.47	
95 th %ile Queue	106.6	440.1	439.6	30	429.7	418.5	134.8	9.8	61.1	120.6	284.9	
Approach LOS/Delay	C/24.8			C/26.8			C/34.4			D/45.0		
Intersection LOS/Delay	C/28.2											
Operational Goal	Intersection LOS D or better			Approach LOS E or better			Control LOS E or better	V/C <1.0	V/C (preferred) <=0.93	QSR<1.0		
Is Operational Goal Met?	YES			YES			YES	YES	YES	NO		
4-SR 435 @ TA Center/Outlet Mall Dr (Signalized, Cycle Length =110s, PHF=0.92)												
Street	SR 435 (EB)			SR 435 (WB)			TA Center (NB)			Shopping Center (SB)		
Volume	50	1280	10	50	870	50	120	10	50	30	10	60
Heavy Vehicle %	10	10	10	15	15	15	71	71	71	43	43	43
Storage	215'	740'	-	185'	1520'	-	400'	100'	-	105'	550'	550'
LOS	B	A	A	B	C	C	D	D	-	D	D	D
Delay	13.8	7.8	7.8	11.0	20.3	20.4	51.0	46.4	-	43.2	46.1	44.5
V/C	0.163	0.724	0.725	0.183	0.603	0.603	0.680	0.639	-	0.221	0.103	0.473



QSR	0.11	0.20	0.20	0.15	0.25	0.25	0.30	1.24	-	0.47	0.03	0.19
95 th %ile Queue	24.5	145.8	144.8	27	386.5	380.8	121.5	123.6	-	49.2	17	101.9
Approach LOS/Delay	A/8.0			B/19.9			D/49.5			D/44.3		
Intersection LOS/Delay	B/17.2											
Operational Goal	Intersection LOS D or better			Approach LOS E or better			Control LOS E or better	V/C <1.0	V/C (preferred) <=0.93	QSR<1.0		
Is Operational Goal Met?	YES			YES			YES	YES	YES	NO		
5-SR 435 @ US 35 EB On-ramp (Unsignalized, WBLT Yield on SR 435, PHF=0.89)												
Street	SR 435 (EB)			SR 435 (WB)						-		
Volume	-	1030	330	30	970	-	-	-	-	-	-	-
Heavy Vehicle %		5	5	8	8							
Storage				-								
LOS				B	A							
Delay				14.7	1.7							
V/C				0.08		-						
QSR				-								
95 th %ile Queue				7.5								
Approach LOS/Delay	-			A/2.1			-			-		
Intersection LOS/Delay	N/A											
Operational Goal	Intersection LOS D or better			Approach LOS E or better			Control LOS E or better	V/C <1.0	V/C (preferred) <=0.93	QSR<1.0		
Is Operational Goal Met?	YES			YES			YES	YES	YES	N/A		
6-SR 435 @ US 35 WB Off-ramp (Two Way Stop Control, Stop on US 35 WB Off-ramp, PHF=0.89)												
Street	SR 435 (EB)			SR 435 (WB)			US 35 WB Off-ramp (NB)					
Volume		1030			580		420	-	420			
Heavy Vehicle %		5			8		25		25			
Storage								1090				
LOS								F				
Delay								2971.6				
V/C								7.46				
QSR								2.42				
95 th %ile Queue								2637.5				
Approach LOS/Delay	-						F/2971.6					
Intersection LOS/Delay	N/A											
Operational Goal	Intersection LOS D or better	Approach LOS E or better	Control LOS E or better	V/C <1.0	V/C (preferred) <=0.93	QSR<1.0						
Is Operational Goal Met?	N/A	NO	NO	NO	NO	NO						



7-SR 435 @ SR 727/Bluegrass Blvd (Signalized, Cycle Length =110s, PHF=0.81)												
Street	SR 435 (EB)			SR 435 (WB)			SR 729 (NB)			Bluegrass Blvd (SB)		
Volume	1400	30	20	10	50	240	80	160	10	10	10	450
Heavy Vehicle %	5	5	5	6	6	6	4	4	4	5	5	5
Storage	460'	1450'	-	200'	2000'	-	-	2000'	-	-	2000'	315'
LOS	F	A		D	F			F			E	C
Delay	616.2	9.3		52.3	278.5			384.2			60.5	26.7
V/C	2.279	0.060		0.046	1.432			1.655			0.134	0.701
QSR	13.61	0.02		0.09	0.50			0.48			0.02	1.68
95 th %ile Queue	6259.7	34.2		18.7	996.4			960.6			39.7	530.5
Approach LOS/Delay	F/595.2			F/270.9				F/384.2			C/28.1	
Intersection LOS/Delay	F/426.6											
Operational Goal	Intersection LOS D or better		Approach LOS E or better		Control LOS E or better		V/C <1.0		V/C (preferred) <=0.93		QSR<1.0	
Is Operational Goal Met?	NO		NO		NO		NO		NO		NO	
8-SR 41 @ Carr Rd (Signalized, Cycle Length =110s, PHF=0.84)												
Street	SR 41 (EB)			SR 41 (WB)			Carr Rd (NB)			Carr Rd (SB)		
Volume	10	350	10	20	300	50	10	10	10	40	10	10
Heavy Vehicle %	10	10	10	9	9	9	0	0	0	0	0	0
Storage	150'	1550'	-	150'	510'	610'	-	100'	-	590'	595'	-
LOS	A	B	B	A	B	A		D		D	D	
Delay	8.4	10.3	10.3	7.4	11.1	5.2		50.5		47.3	47.4	
V/C	0.021	0.219	0.220	0.039	0.353	0.061		0.364		0.182	0.184	
QSR	0.03	0.07	0.07	0.06	0.39	0.03		0.43		0.05	0.05	
95 th %ile Queue	4.8	113.9	113.2	9.2	199.8	19.4		43.1		26.9	27.1	
Approach LOS/Delay	B/10.2			B/10.1				D/50.5			D/47.3	
Intersection LOS/Delay	B/14.3											
Operational Goal	Intersection LOS D or better		Approach LOS E or better		Control LOS E or better		V/C <1.0		V/C (preferred) <=0.93		QSR<1.0	
Is Operational Goal Met?	YES		YES		YES		YES		YES		YES	
9-SR 41 @ I-71 SB Ramps (Two Way Stop Control, Stop on I-71 SB Ramp, PHF=0.91)												
Street	SR 41 (EB)			SR 41 (WB)			I-71 SB Ramp (SB)					
Volume	-	320	80	130	300	-	-	630	10	70		
Heavy Vehicle %		10	10	30	30			9	9	9		
Storage		630	335	930	300			1150				
LOS		A	F	B								
Delay		9.3	1322.5	13.3								
V/C		0.14	3.82	0.17								
QSR		0.4	5.64	0.01								



95 th %ile Queue			12.5				1692.5		15			
Approach LOS/Delay	-		A/2.8				F/1175.0					
Intersection LOS/Delay	N/A											
Operational Goal	Intersection LOS D or better	Approach LOS E or better	Control LOS E or better	V/C <1.0	V/C (preferred) <=0.93	QSR<1.0						
Is Operational Goal Met?	N/A	NO	NO	NO	NO	NO						
10-SR 41 @ I-71 NB Ramps (Two Way Stop Control, Stop on I-71 NB Ramp, PHF=0.86)												
Street	SR 41 (EB)			SR 41 (WB)			I-71 NB Ramp (NB)			-		
Volume	70	880	-	-	370	240	60	10	230			
Heavy Vehicle %	10						25	25	25			
Storage	340						310	1000				
LOS	A						F		F			
Delay	9.7						361.7		186.3			
V/C	0.10						1.33		1.25			
QSR	-						0.51		0.36			
95 th %ile Queue	7.5						157.5		355			
Approach LOS/Delay	A/0.7						F/221.3			-		
Intersection LOS/Delay	N/A											
Operational Goal	Intersection LOS D or better	Approach LOS E or better	Control LOS E or better	V/C <1.0	V/C (preferred) <=0.93	QSR<1.0						
Is Operational Goal Met?	N/A	NO	NO	NO	NO	NO						
11-SR 41 @ SR 734 (Two Way Stop Control, Stop on SR 734 & Flying J driveway, PHF=0.93)												
Street	SR 41 (EB)			SR 41 (WB)			Flying J Driveway (NB)			SR 734 (SB)		
Volume	20	1040	50	10	500	10	50	10	10	10	10	60
Heavy Vehicle %	10	10	10	5	5	5	18	18	18	28	28	28
Storage		-	175									
LOS	A	A	-	B	A	A		F			E	
Delay	8.7	0.3	-	11.2	0.3	0.3		225.4			36.4	
V/C	0.02			0.02				1.06			0.43	
QSR								N/A				
95 th %ile Queue	2.5			2.5				140			50	
Approach LOS/Delay	A/0.4			A/0.5			F/225.4			E/36.4		
Intersection LOS/Delay	N/A											
Operational Goal	Intersection LOS D or better	Approach LOS E or better	Control LOS E or better	V/C <1.0	V/C (preferred) <=0.93	QSR<1.0						
Is Operational Goal Met?	N/A	NO	NO	NO	NO	N/A						



TABLE 4 – 2044 PM NO-BUILD INTERSECTIONS

PM Peak No-Build	Eastbound			Westbound			Northbound			Southbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
0-SR 435 @ Garringer Edgefield Rd (Two-Way Stop Control, Stop on Garringer Edgefield Rd, PHF=0.94)												
Street	SR 435 (EB)			SR 435 (WB)			Garringer Edgefield Rd (NB)			Garringer Edgefield Rd (SB)		
Volume	10	440	30	230	790	60	20	10	130	90	10	10
Heavy Vehicle %	20	20	20	13	13	13	16	16	16	3	3	3
Storage	290'	-	220'	275'		210'	125'	-	-	65'	-	-
LOS	B	-	-	A			B		B	C		B
Delay	10.7			9.8			13.6		11.4	19.6		14.5
V/C	0.02	-	-	0.25			0.05		0.21	0.28		0.05
QSR	0	-	-	.09			.04			0.42		
95 th %ile Queue	2.5	-	-	25			5		20	27.5		5
Approach LOS/Delay	A/0.2			A/2.1			B/11.7			C/18.7		
Intersection LOS/Delay	N/A											
Operational Goal	Intersection LOS D or better		Approach LOS E or better		Control LOS E or better		V/C <1.0		V/C (preferred) <=0.93		QSR<1.0	
Is Operational Goal Met?	N/A		YES		YES		YES		YES		YES	
1-I-71 SB Ramps @ SR 435 (Signalized, Cycle Length =110s, PHF=0.89)												
Street	SR 435 (EB)			SR 435 (WB)			-			I-71 SB Ramp (SB)		
Volume		600	60	690	840		-			240	10	240
Heavy Vehicle %		17	17	13	13					19	19	19
Storage		700'		430'	645'					1100'	300'	
LOS		C	C	F	B					D	E	
Delay		30.2	30.3	80.6	15.5					47.3	63.1	
V/C		0.583	0.584	1.128	0.342					0.792	0.921	
QSR		0.55	0.54	1.11	0.32					0.32	1.39	
95 th %ile Queue		385.1	376.7	475.5	206.9					352	416.7	
Approach LOS/Delay	C/30.3			D/44.9			-			E/55.4		
Intersection LOS/Delay	D/42.9											
Operational Goal	Intersection LOS D or better		Approach LOS E or better		Control LOS E or better		V/C <1.0		V/C (preferred) <=0.93		QSR<1.0	
Is Operational Goal Met?	YES		YES		NO		NO		NO		NO	
2-I-71 NB Ramps @ SR 435 (Signalized, Cycle Length =110s, PHF=0.89)												
Street	SR 435 (EB)			SR 435 (WB)			I-71 NB Ramp (NB)			-		
Volume	150	690	-	-	1470	750	60	10	360			
Heavy Vehicle %	17	17			11	11	16	16	16			
Storage	305'	630'			420'		1120'	575'				
LOS	F	A			F	F	C	D				
Delay	894.7	5.4			51.2	106.4	27.8	43.8				



V/C	2.809	0.476			1.082	1.214	0.137	0.948				
QSR	2.66	0.15			1.56	2.15	0.06	0.86				
95 th %ile Queue	810.4	95.9			656.1	904.7	66.9	496.8				
Approach LOS/Delay	F/164.2			E/78.8			D/41.6			-		
Intersection LOS/Delay	F/97.3											
Operational Goal	Intersection LOS D or better			Approach LOS E or better			Control LOS E or better	V/C <1.0	V/C (preferred) <=0.93	QSR<1.0		
Is Operational Goal Met?	NO			NO			NO	NO	NO	NO		
3-SR 435 @ Allen Rd (Signalized, Cycle Length =110s, PHF=0.93)												
Street	SR 435 (EB)			SR 435 (WB)			Allen Rd (NB)			Allen Rd (SB)		
Volume	200	750	100	40	1890	90	100	20	50	130	20	230
Heavy Vehicle %	15	15	15	9	9	9	10	10	10	15	15	15
Storage	325'	485'	-	385'	760'	-	100'	1000'	65'	110'	600'	-
LOS	F	B	B	B	F	F	E	D	D	F	F	-
Delay	146.7	11.3	12.4	10.8	51.9	59.0	60.5	39.8	41.0	93.8	777.5	-
V/C	1.153	0.513	0.513	0.109	1.082	1.110	0.719	0.070	0.205	0.877	2.545	
QSR	1.51	0.51	0.53	0.05	0.92	0.95	1.67	0.03	1.00	2.62	1.91	
95 th %ile Queue	490.2	245.8	258.8	19.8	696.8	723.9	167	25.4	65.3	288	1143.8	
Approach LOS/Delay	D/37.5			D/54.6			D/52.3			F/543.6		
Intersection LOS/Delay	F/101.7											
Operational Goal	Intersection LOS D or better			Approach LOS E or better			Control LOS E or better	V/C <1.0	V/C <=0.93 (preferred)	QSR<1.0		
Is Operational Goal Met?	NO			NO			NO	NO	NO	NO		
4-SR 435 @ TA Center/Outlet Mall Dr (Signalized, Cycle Length =110s, PHF=0.89)												
Street	SR 435 (EB)			SR 435 (WB)			TA Center (NB)			Shopping Center (SB)		
Volume	110	790	30	30	1740	70	170	10	80	80	20	110
Heavy Vehicle %	11	11	11	10	10	10	43	43	43	7	7	7
Storage	215'	740'	-	185'	1520'	-	400'	100'	-	105'	550'	550'
LOS	D	B	B	B	F	B	D	E	-	D	D	D
Delay	36.7	13.8	13.8	12.6	96.8	13.5	53.0	61.1	-	46.1	50.4	50.5
V/C	0.824	0.520	0.520	0.098	1.136	0.054	0.725	0.702	-	0.449	0.148	0.588
QSR	0.46	0.34	0.33	0.10	0.97	0.00	0.29	2.05	-	1.11	0.05	0.32
95 th %ile Queue	99.9	251.3	247.8	18.7	1480.8	25.1	116.5	205.4	-	116.8	30.2	173.4
Approach LOS/Delay	B/16.5			F/92.3			E/55.8			D/48.8		
Intersection LOS/Delay	E/64.9											
Operational Goal	Intersection LOS D or better			Approach LOS E or better			Control LOS E or better	V/C <1.0	V/C (preferred) <=0.93	QSR<1.0		
Is Operational Goal Met?	NO			NO			NO	NO	NO	NO		



5-SR 435 @ US 35 EB On-ramp (Unsignalized, WBLT Yield on SR 435, PHF=0.86)												
Street	SR 435 (EB)			SR 435 (WB)						-		
Volume	-	660	290	170	1840	-						
Heavy Vehicle %		5	5	6	6							
Storage				-								
LOS				B	A							
Delay				13.8	9.8							
V/C				0.33								
QSR				-								
95 th %ile Queue				35								
Approach LOS/Delay	-			B/10.1			-			-		
Intersection LOS/Delay	N/A											
Operational Goal	Intersection LOS D or better			Approach LOS E or better			Control LOS E or better	V/C <1.0	V/C (preferred) <=0.93	QSR<1.0		
Is Operational Goal Met?	N/A			YES			YES	YES	YES	N/A		
6-SR 435 @ US 35 WB Off-ramp (Two Way Stop Control, Stop on US 35 WB Off-ramp, PHF=0.87)												
Street	SR 435 (EB)			SR 435 (WB)			US 35 WB Off-ramp (NB)			-		
Volume	-	660	-	-	1550	-	460	-	70			
Heavy Vehicle %		5			5		10		10			
Storage								1090				
LOS								F				
Delay								2517.9				
V/C								6.40				
QSR								1.55				
95 th %ile Queue								1690				
Approach LOS/Delay	-			-			F/2517.9			-		
Intersection LOS/Delay	N/A											
Operational Goal	Intersection LOS D or better		Approach LOS E or better		Control LOS E or better		V/C <1.0		V/C (preferred) <=0.93		QSR<1.0	
Is Operational Goal Met?	N/A		NO		NO		NO		NO		NO	
7-SR 435 @ SR 729/Bluegrass Blvd (Signalized, Cycle Length =120s, PHF=0.90)												
Street	SR 435 (EB)			SR 435 (WB)			SR 729 (NB)			Bluegrass Blvd (SB)		
Volume	560	130	40	20	150	30	40	50	10	270	110	1360
Heavy Vehicle %	5	5	5	7	7	7	9	9	9	5	5	5
Storage	460'	1450'	-	200'	2000'	-	-	2000'	-	-	2000'	315'
LOS	F	B		D	E			F			E	F
Delay	115.7	18.9		43.2	64.8			91.0			64.5	449.2
V/C	1.147	0.242		0.088	0.747			0.851			0.918	1.928



QSR	2.07	0.10		0.14	0.15			0.11			0.27	14.14
95 th %ile Queue	950.4	148.7		28.9	296.4			218.1			539.7	4452.6
Approach LOS/Delay	F/93.1			E/62.7			F/91.0			F/365.2		
Intersection LOS/Delay	F/261.8											
Operational Goal	Intersection LOS D or better		Approach LOS E or better		Control LOS E or better		V/C <1.0		V/C (preferred) <=0.93		QSR<1.0	
Is Operational Goal Met?	NO		NO		NO		NO		NO		NO	
8-SR 41 @ Carr Rd (Signalized, Cycle Length =90s, PHF=0.77)												
Street	SR 41 (EB)			SR 41 (WB)			Carr Rd (NB)			Carr Rd (SB)		
Volume	10	480	10	10	320	100	10	10	20	100	10	20
Heavy Vehicle %	7	7	7	5	5	5	7	7	7	0	0	0
Storage	150'	1550'	-	150'	510'	610'	-	100'	-	590'	595'	-
LOS	A	A	A	A	B	A	-	E	-	D	D	-
Delay	8.0	7.4	7.4	8.6	12.1	5.8	-	55.3	-	53.1	52.2	-
V/C	0.023	0.276	0.277	0.024	0.394	0.128	-	0.505	-	0.483	0.300	-
QSR	0.03	0.09	0.09	0.04	0.47	0.08	-	0.73	-	0.14	0.08	-
95 th %ile Queue	5	139.3	138.4	6.3	241.2	46.8	-	73.4	-	83.0	49.3	-
Approach LOS/Delay	A/7.4			B/10.6			E/55.3			D/52.9		
Intersection LOS/Delay	B/15.7											
Operational Goal	Intersection LOS D or better		Approach LOS E or better		Control LOS E or better		V/C <1.0		V/C (preferred) <=0.93		QSR<1.0	
Is Operational Goal Met?	YES		YES		YES		YES		YES		YES	
9-SR 41 @ I-71 SB Ramps (Two Way Stop Control, Stop on I-71 SB Ramp, PHF=0.82)												
Street	SR 41 (EB)			SR 41 (WB)			-			I-71 SB Ramp (SB)		
Volume		460	140	240	240					300	10	190
Heavy Vehicle %		10		18						18	18	18
Storage		600	630	335	930					300	1150	
LOS				B						F		C
Delay				12.0						2610.9		21.0
V/C				0.36						6.49		0.53
QSR				0.13						3.5		0.07
95 th %ile Queue				42.5						1050		75
Approach LOS/Delay	-			A/6.0			-			F/1575		
Intersection LOS/Delay	N/A											
Operational Goal	Intersection LOS D or better		Approach LOS E or better		Control LOS E or better		V/C <1.0		V/C (preferred) <=0.93		QSR<1.0	
Is Operational Goal Met?	N/A		NO		NO		NO		NO		NO	



10-SR 41 @ I-71 NB Ramps (Two Way Stop Control, Stop on I-71 NB Ramp, PHF=0.84)																	
Street	SR 41 (EB)			SR 41 (WB)			I-71 NB Ramp (NB)			-							
Volume	70	690	-	-	420	630	60	10	150	-							
Heavy Vehicle %	17							38	38				38				
Storage	340							310	1000								
LOS	B							F					F				
Delay	13.5							653.5					108.9				
V/C	0.16							1.90					0.98				
QSR	0.04							0.62					0.21				
95 th %ile Queue	15							192.5					205				
Approach LOS/Delay	A/1.2												F/257.4				
Intersection LOS/Delay	N/A																
Operational Goal	Intersection LOS D or better	Approach LOS E or better	Control LOS E or better	V/C <1.0	V/C (preferred) <=0.93	QSR<1.0											
Is Operational Goal Met?	N/A	NO	NO	NO	NO	NO											
11-SR 41 @ SR 734 (Two Way Stop Control, Stop on SR 734 & Flying J driveway, PHF=0.91)																	
Street	SR 41 (EB)			SR 41 (WB)			Flying J (NB)			SR 734 (SB)							
Volume	100	690	50	10	930	20	60	10	10	10	10	60					
Heavy Vehicle %	21	21	21	5	5	5	12	12	12	18	18	18					
Storage		-	175														
LOS	B	A	-	A	A	A		F			F						
Delay	11.9	2.1	-	9.5	0.3	0.3		1219.8			139.0						
V/C	0.17			0.01				3.07			0.89						
QSR								N/A									
95 th %ile Queue	15			0				262.5			127.5						
Approach LOS/Delay	A/3.2			A/0.4			F/1219.8			F/139.0							
Intersection LOS/Delay	N/A																
Operational Goal	Intersection LOS D or better	Approach LOS E or better	Control LOS E or better	V/C <1.0	V/C (preferred) <=0.93	QSR<1.0											
Is Operational Goal Met?	N/A	NO	NO	NO	NO	N/A											



Intersection Analysis (Design Year – 2044 Build)

Build analyses are based on proposed improvements as shown on **Figures 6 & 7**. Tables 5 & 6 provide a summary of results based on the Build geometry.

- As shown, all intersections will operate at an acceptable LOS during the AM peak. Two intersections, SR 435 & Allen Road and SR 435 & TA Center/Factory Shops Drive experience Queue Storage Ratio (QSR) exceeding 1.0 for certain movements.
- During the PM peak, two intersections experience LOS E or F for some movements and/or approaches.
 - The intersection of SR 435 & Allen Road will operate at LOS D, however, southbound approach will experience LOS F with QSR>1.0 and the shared through/right lane will experience V/C ratio exceeding 1.0. The EB left turn movement will also experience QSR>1.0, meaning left turn queues will spill into adjacent through lane.
 - At the intersection of SR 435 & TA Center/Outlet Mall Drive, the overall intersection LOS will be E, the southbound approach will operate at LOS E and the northbound approach will operate at LOS F. The QSR exceeds 1.0 for NB left, NB through-right, SB left and EB left movements. The EB left turn movement will also experience LOS F due to long delay.
 - The PM peak queues on the westbound through lanes are over 1200 feet long, and will be close to the upstream intersection (US 35 EB Entrance ramp).
 - Three additional intersections have some movements where queues exceed available storage (QSR>1.0). The WB left turn lanes at SR 435 & I-71 SB ramps intersection and the WB right turn lane at SR 41 & I-71 NB ramps are constrained due to the upstream intersections. Also, the NB approach at SR 41 & SR 734 intersection is a private drive (Flying J gas station), and the available storage is maximized without impacting parking.

TABLE 5 – 2044 AM BUILD INTERSECTIONS

AM Peak Build	Eastbound			Westbound			Northbound			Southbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
0-SR 435 @ Garringer Edgefield Rd (Two-Way Stop Control, Stop on Garringer Edgefield Rd, PHF=0.89)												
<u>Same as No-Build</u>												
1-I-71 SB Ramps @ SR 435 (Signalized, Cycle Length =110s, PHF=0.96)												
Street	SR 435 (EB)			SR 435 (WB)			-			I-71 SB Ramp (SB)		
Volume		570	50	380	500					500	10	160
Heavy Vehicle %		16	16	19	19					16	16	16
Storage		700'		355'	645'					500'	1100'	
LOS		C	C	D	A					D	D	
Delay		23.2	23.3	38.2	1.3					44.4	39.7	
V/C		0.471	0.473	0.895	0.291					0.876	0.644	
QSR		0.41	0.40	0.58	0.03					0.62	0.20	
95 th %ile Queue		286.3	281.0	205.5	21.2					311.2	216.9	
Approach LOS/Delay		C/23.2			B/17.2						D/43.5	



Intersection LOS/Delay	C/26.7												
Operational Goal	Intersection LOS D or better			Approach LOS E or better			Control LOS E or better		V/C <1.0		V/C (preferred) <=0.93		QSR<1.0
Is Operational Goal Met?	YES			YES			YES		YES		YES		YES
2-I-71 NB Ramps @ SR 435 (Signalized, Cycle Length =110s, PHF=0.94)													
Street	SR 435 (EB)			SR 435 (WB)			I-71 NB Ramp (NB)			-			
Volume	160	910			860	340	20	10	560				
Heavy Vehicle %	12	12			21	21	13	13	13				
Storage	305	630			420	420	500		600				
LOS	B	A			B	B	C		D				
Delay	17.3	6.2			19.5	12.7	29.4		44.0				
V/C	0.569	0.512			0.762	0.637	0.076		0.910				
QSR	0.29	0.22			0.79	0.40	0.03		0.57				
95 th %ile Queue	87.9	136.1			331.3	169.9	30.2		344.7				
Approach LOS/Delay	A/7.8			B17.6			D/43.2			-			
Intersection LOS/Delay	B/19.3												
Operational Goal	Intersection LOS D or better			Approach LOS E or better			Control LOS E or better		V/C <1.0		V/C (preferred) <=0.93		QSR<1.0
Is Operational Goal Met?	YES			YES			YES		YES		YES		YES
3-SR 435 @ Allen Rd (Signalized, Cycle Length =110s, PHF=0.91)													
Street	SR 435 (EB)			SR 435 (WB)			Allen Rd (NB)			Allen Rd (SB)			
Volume	180	1190	100	40	920	90	110	10	60	90	10	190	
Heavy Vehicle %	11	11	11	18	18	18	10	10	10	15	15	15	
Storage	325	485	-	385	760	-	100	1000	65	110	600	-	
LOS	B	C	C	C	B	C	D	C	C	D	E	-	
Delay	18.2	32.9	34.0	23.8	19.3	20.8	39.5	26.8	28.0	39.8	61.9	-	
V/C	0.605	0.884	0.888	0.269	0.661	0.662	0.639	0.022	0.158	0.330	0.894		
QSR	0.37	1.21	1.21	0.08	0.31	0.38	1.37	0.01	0.95	1.10	0.54		
95 th %ile Queue	119.1	646.9	639.1	31	239.1	290.5	136.6	9.8	61.4	121.2	321.2		
Approach LOS/Delay	C/31.6			C/20.1			C/35.0			E/55.1			
Intersection LOS/Delay	C/29.9												
Operational Goal	Intersection LOS D or better			Approach LOS E or better			Control LOS E or better		V/C <1.0		V/C (preferred) <=0.93		QSR<1.0
Is Operational Goal Met?	YES			YES			YES		YES		YES		NO
4-SR 435 @ TA Center/Outlet Mall Dr (Signalized, Cycle Length =110s, PHF=0.90)													
Street	SR 435 (EB)			SR 435 (WB)			TA Center (NB)			Shopping Center (SB)			
Volume	50	1280	10	50	870	50	120	10	50	30	10	60	
Heavy Vehicle %	10	10	10	15	15	15	71	71	71	43	43	43	
Storage	215	740	-	185	1520	-	400	100	-	105	550	550	



LOS	B	A	A	B	B	C	E	D	-	D	D	D	
Delay	13.5	7.5	7.4	11.0	20.0	20.1	56.0	48.4	-	43.4	46.1	44.4	
V/C	0.175	0.770	0.771	0.199	0.608	0.608	0.720	0.697	-	0.244	0.106	0.478	
QSR	0.12	0.19	0.18	0.14	0.26	0.25	0.39	1.29	-	0.48	0.03	0.19	
95 th %ile Queue	25.6	137.6	136.7	26.8	390.4	384.7	157.2	129.5	-	50.3	17.3	104.1	
Approach LOS/Delay	A/7.7			B/19.6			D/53.5			D/44.3			
Intersection LOS/Delay	B/17.0												
Operational Goal	Intersection LOS D or better			Approach LOS E or better			Control LOS E or better	V/C <1.0	V/C (preferred) <=0.93	QSR<1.0			
Is Operational Goal Met?	YES			YES			YES	YES	YES	NO			
5-SR 435 @ US 35 EB On-ramp (Unsignalized, WBLT Yield on SR 435, PHF=0.89)													
Street	SR 435 (EB)			SR 435 (WB)						-			
Volume	-	1030	330	30	970	-							
Heavy Vehicle %				8									
Storage													
LOS				B	A								
Delay				14.7	1.2								
V/C				0.08									
QSR				-									
95 th %ile Queue				7.5									
Approach LOS/Delay	-			A/1.6			-			-			
Intersection LOS/Delay	N/A												
Operational Goal	Intersection LOS D or better			Approach LOS E or better			Control LOS E or better	V/C <1.0	V/C (preferred) <=0.93	QSR<1.0			
Is Operational Goal Met?	YES			YES			YES	YES	YES	N/A			
6-SR 435 @ US 35 WB Off-ramp (Signalized, Cycle Length=80s, PHF=0.89)													
Street	SR 435 (EB)			SR 435 (WB)			US 35 WB Off-ramp (NB)			-			
Volume		1030			580		420	-	420				
Heavy Vehicle %		5			5		25		25				
Storage		910			700		1090		700				
LOS		C			B		C		D				
Delay		27.1			17.7		27.1		41.1				
V/C		0.846			0.476		0.832		0.935				
QSR		0.43			0.28		0.35		0.66				
95 th %ile Queue		394.2			194.9		383.1		465.1				
Approach LOS/Delay	C/27.1			B/17.7			C/34.1			-			
Intersection LOS/Delay	C/27.3												
Operational Goal	Intersection LOS D or better		Approach LOS E or better		Control LOS E or better		V/C <1.0		V/C (preferred) <=0.93		QSR<1.0		
Is Operational Goal Met?	YES		YES		YES		YES		NO		YES		



8-SR 41 @ Carr Rd (Signalized, Cycle Length =110s, PHF=0.84)												
Street	SR 41 (EB)			SR 41 (WB)			Carr Rd (NB)			Carr Rd (SB)		
Volume	10	350	10	20	300	50	10	10	10	40	10	10
Heavy Vehicle %	10	10	10	9	9	9	0	0	0	0	0	0
Storage	150	1550	-	150	510	610	-	100	-	590	595	-
LOS	A	B	B	A	A	A	-	D	-	D	D	-
Delay	7.6	10.1	10.1	7.6	2.8	0.4	-	50.5	-	47.3	47.4	-
V/C	0.018	0.218	0.219	0.034	0.309	0.054	-	0.364	-	0.182	0.184	-
QSR	0.03	0.07	0.07	0.06	0.09	0	-	0.43	-	0.05	0.05	-
95 th %ile Queue	4.8	112.7	112.0	8.3	43.4	2.0	-	43.1	-	26.9	27.1	-
Approach LOS/Delay	B/10.1			A/2.8			D/50.5			D/47.3		
Intersection LOS/Delay	B/11.4											
Operational Goal	Intersection LOS D or better		Approach LOS E or better		Control LOS E or better		V/C <1.0		V/C (preferred) <=0.93		QSR<1.0	
Is Operational Goal Met?	YES		YES		YES		YES		YES		YES	
9-SR 41 @ I-71 SB Ramps (Signalized, Cycle Length=110s, PHF=0.91)												
Street	SR 41 (EB)			SR 41 (WB)			-			I-71 SB Ramp (SB)		
Volume		320	80	130	300					630	10	70
Heavy Vehicle %		8	8	30						9	9	9
Storage		600	630	335	930					760	1150	
LOS		D	C	C	C					D	B	
Delay		45.4	24.6	25.0	21.2					46.5	16.8	
V/C		0.826	0.244	0.56	0.539					0.961	0.135	
QSR		0.66	0.12	0.36	0.27					0.92	0.05	
95 th %ile Queue		394.7	77.4	120.9	254.6					738.7	60.1	
Approach LOS/Delay	D/41.2			C/22.4			-			D/43.2		
Intersection LOS/Delay	D/37.2											
Operational Goal	Intersection LOS D or better		Approach LOS E or better		Control LOS E or better		V/C <1.0		V/C (preferred) <=0.93		QSR<1.0	
Is Operational Goal Met?	YES		YES		YES		YES		NO		YES	
10-SR 41 @ I-71 NB Ramps (Signalized, Cycle Length=110s, PHF=0.86)												
Street	SR 41 (EB)			SR 41 (WB)			I-71 NB Ramp (NB)			-		
Volume	70	880			370	240	60	10	230			
Heavy Vehicle %	10	10			24	24	25	25	25			
Storage	340	930			575	450	310	1000				
LOS	B	B			C	B	C	E				
Delay	10.9	14.2			20.6	19.3	32.7	60.7				
V/C	0.163	0.962			0.495	0.379	0.208	0.928				
QSR	0.10	0.23			0.56	0.49	0.26	0.41				
95 th %ile Queue	34.7	216.3			320.9	221.3	79.3	413.7				
Approach LOS/Delay	B/14.0			C/20.1			E/55.1			-		
Intersection LOS/Delay	C/22.9											
Operational Goal	Intersection LOS D or better		Approach LOS E or better		Control LOS E or better		V/C <1.0		V/C (preferred) <=0.93		QSR<1.0	
Is Operational Goal Met?	YES		YES		YES		YES		NO		YES	



11-SR 41 @ SR 734 (Signalized, Cycle Length=110s, PHF=0.93)												
Street	SR 41 (EB)			SR 41 (WB)			Flying J (NB)			SR 734 (SB)		
Volume	20	1040	50	10	500	50	10	50	10	10	10	60
Heavy Vehicle %	10	10	10	5	5	5	18	18	18	28	28	28
Storage		550	185		1400			110			1500	
LOS		A	A		A			D			D	
Delay		4.9	5.0		4.5			48.7			50.4	
V/C		0.493	0.052		0.450			0.448			0.593	
QSR		0.29	0.07		0.11			0.93			0.09	
95 th %ile Queue		162.1	13.4		151.4			102.5			129.0	
Approach LOS/Delay	A/4.9			A/4.5			D/48.7			D/50.4		
Intersection LOS/Delay	A/8.4											
Operational Goal	Intersection LOS D or better		Approach LOS E or better		Control LOS E or better		V/C <1.0		V/C (preferred) <=0.93		QSR<1.0	
Is Operational Goal Met?	YES		YES		YES		YES		YES		YES	

TABLE 6 – 2044 PM BUILD INTERSECTIONS

PM Peak Build	Eastbound			Westbound			Northbound			Southbound				
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
0-I-SR 435 @ Garringer Edgefield Rd (Two-Way Stop Control, Stop on Garringer Edgefield Rd, PHF=0.94)														
Same as No-build														
1-I-71 SB Ramps @ SR 435 (Signalized, Cycle Length =130s, PHF=0.89)														
Street	SR 435 (EB)			SR 435 (WB)			42.0			I-71 SB Ramp (SB)				
Volume		600	60	690	840							240	10	240
Heavy Vehicle %		17	17	13	13							19	19	19
Storage		700'		355'	645'							500'	1100'	
LOS		D	D	D	A							D	E	
Delay		43.1	43.4	39.0	1.5							42.0	74.0	
V/C		0.697	0.698	0.934	0.441							0.411	0.929	
QSR		0.68	0.66	1.03	0.06							0.37	0.42	
95 th %ile Queue		473.4	463.1	366.0	37.0							186.1	465.5	
Approach LOS/Delay	D/43.3			B/18.4									E/58.3	
Intersection LOS/Delay	C/32.3													
Operational Goal	Intersection LOS D or better		Approach LOS E or better		Control LOS E or better		V/C <1.0		V/C (preferred) <=0.93		QSR<1.0			
Is Operational Goal Met?	YES		YES		YES		YES		NO		NO			
2-I-71 NB Ramps @ SR 435 (Signalized, Cycle Length =130s, PHF=0.89)														
Street	SR 435 (EB)			SR 435 (WB)			I-71 NB Ramp (NB)			-				
Volume	150	690			1470	750	60	10	360					
Heavy Vehicle %	17	17			11	11	16	16	16					
Storage	305	630			420	420		1120	600					



LOS	B	A			A	A		D	D				
Delay	17.4	8.7			5.7	5.8		44.5	53.6				
V/C	0.674	0.377			0.850	0.964		0.273	0.897				
QSR	0.38	0.34			0.27	0.16		0.10	0.50				
95 th %ile Queue	117.3	214.6			115.0	66.5		108.1	297.7				
Approach LOS/Delay	B/10.2				A/5.7			D/52.1					
Intersection LOS/Delay	B/12.8												
Operational Goal	Intersection LOS D or better			Approach LOS E or better		Control LOS E or better		V/C <1.0		V/C (preferred) <=0.93		QSR<1.0	
Is Operational Goal Met?	YES			YES		YES		YES		NO		YES	
3-SR 435 @ Allen Rd (Signalized, Cycle Length =130s, PHF=0.93)													
Street	SR 435 (EB)				SR 435 (WB)			Allen Rd (NB)			Allen Rd (SB)		
Volume	200	750	100	40	1890	90	100	20	50	130	20	230	
Heavy Vehicle %	15	15	15	9	9	9	10	10	10	15	15	15	
Storage	325	485	-	385	760	-	100	1000	65	110	600	-	
LOS	E	B	B	B	B	B	E	D	D	E	F	-	
Delay	79.6	14.7	14.1	13.4	15.5	16.3	71.4	40.6	41.8	66.3	423.7	-	
V/C	0.945	0.523	0.523	0.124	0.935	0.940	0.778	0.062	0.183	0.701	1.757		
QSR	1.26	0.67	0.62	0.07	0.44	0.49	0.69	0.03	1.06	2.24	1.56		
95 th %ile Queue	410.7	324.1	300.4	25.4	330.9	373.9	68.6	26.8	69.0	246.9	935.1		
Approach LOS/Delay	C/26.8				B/15.8			E/59.1			F/301.4		
Intersection LOS/Delay	D/50.2												
Operational Goal	Intersection LOS D or better				Approach LOS E or better			Control LOS E or better		V/C <1.0		V/C (preferred) <=0.93	QSR<1.0
Is Operational Goal Met?	YES				NO			NO		NO		NO	NO
4-SR 435 @ TA Center/Outlet Mall Dr (Signalized, Cycle Length =130s, PHF=0.89)													
Street	SR 435 (EB)				SR 435 (WB)			TA Center (NB)			Shopping Center (SB)		
Volume	110	790	30	30	1740	70	170	10	80	80	20	110	
Heavy Vehicle %	11	11	11	10	10	10	43	43	43	7	7	7	
Storage	215	740	-	185	1520	-	400	100	-	105	550	550	
LOS	F	A	A	A	D	F	F	F	-	E	E	E	
Delay	83.5	8.2	8.2	8.1	52.0	55.7	189.5	328.7	-	59.9	56.4	53.9	
V/C	0.892	0.444	0.444	0.081	0.999	1.013	1.188	1.457	-	0.641	0.177	0.674	
QSR	1.17	0.26	0.26	0.08	0.81	0.84	1.24	4.46	-	1.37	0.06	0.37	
95 th %ile Queue	251.4	191.6	189.3	14.9	1238.3	1270.9	494.3	446.1	-	143.7	33.6	202.7	
Approach LOS/Delay	B/17.1				D/53.1			F/237.7			E/60.5		
Intersection LOS/Delay	E/58.1												
Operational Goal	Intersection LOS D or better				Approach LOS E or better			Control LOS E or better		V/C <1.0		V/C (preferred) <=0.93	QSR<1.0
Is Operational Goal Met?	NO				NO			NO		NO		NO	NO



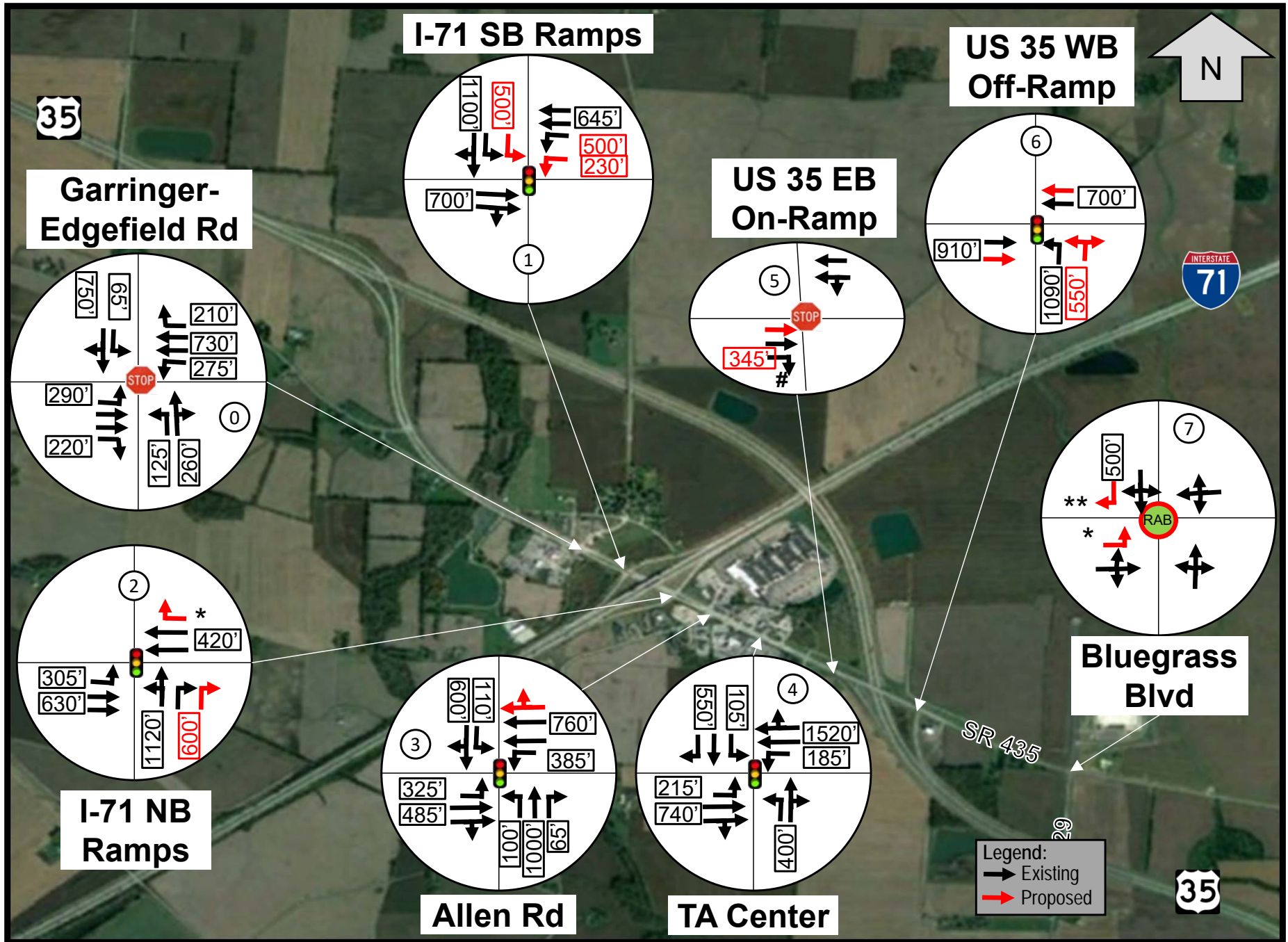
5-SR 435 @ US 35 EB On-ramp (Unsignalized, WBLT Yield on SR 435, PHF=0.86)												
Street	SR 435 (EB)			SR 435 (WB)						-		
Volume	-	660	290	170	1840	-						
Heavy Vehicle %				6	6							
Storage												
LOS				B	A							
Delay				13.8	3.8							
V/C				0.33								
QSR				-								
95 th %ile Queue				35								
Approach LOS/Delay	-			A/4.7			-			-		
Intersection LOS/Delay	N/A											
Operational Goal	Intersection LOS D or better			Approach LOS E or better			Control LOS E or better	V/C <1.0	V/C (preferred) <=0.93	QSR<1.0		
Is Operational Goal Met?	YES			YES			YES	YES	YES	N/A		
6-SR 435 @ US 35 WB Off-ramp (Signalized Cycle Length=100s, PHF=0.87)												
Street	SR 435 (EB)			SR 435 (WB)			US 35 WB Off-ramp (NB)			-		
Volume		660			1550		460		70			
Heavy Vehicle %		5			5		10		10			
Storage		910			700		1090		400			
LOS		B			C		D		D			
Delay		10.3			24.3		38.7		41.1			
V/C		0.386			0.906		0.906		0.608			
QSR		0.20			0.90		0.34		0.40			
95 th %ile Queue		184.4			627.5		368.6		277.6			
Approach LOS/Delay	B/10.3			C/24.3			D/39.6			-		
Intersection LOS/Delay	C/23.9											
Operational Goal	Intersection LOS D or better		Approach LOS E or better		Control LOS E or better		V/C <1.0	V/C (preferred) <=0.93		QSR<1.0		
Is Operational Goal Met?	YES		YES		YES		YES	YES		YES		
8-SR 41 @ Carr Rd (Signalized, Cycle Length =120s, PHF=0.77)												
Street	SR 41 (EB)			SR 41 (WB)			Carr Rd (NB)			Carr Rd (SB)		
Volume	10	480	10	10	320	100	10	10	20	100	10	20
Heavy Vehicle %	7	7	7	5	5	5	7	7	7	0	0	0
Storage	150	1550	-	150	510	610	-	100	-	590	595	-
LOS	A	B	B	A	B	A	-	E	-	D	D	-
Delay	8.5	10.5	10.5	7.9	18.6	3.6	-	55.4	-	53.1	52.2	-
V/C	0.023	0.303	0.303	0.023	0.347	0.113	-	0.418	-	0.483	0.300	-
QSR	0.03	0.12	0.11	0.03	0.61	0.04	-	0.55	-	0.14	0.08	-
95 th %ile Queue	5.2	178.8	177.8	4.6	310.8	25.3	-	55	-	83	49.3	-
Approach LOS/Delay	B/10.5			B/14.8			E/55.4			D/52.9		
Intersection LOS/Delay	B/18.6											
Operational Goal	Intersection LOS D or better		Approach LOS E or better		Control LOS E or better		V/C <1.0	V/C (preferred) <=0.93		QSR<1.0		
Is Operational Goal Met?	YES		YES		YES		YES	YES		YES		



9-SR 41 @ I-71 SB Ramps (Signalized, Cycle Length=120s, PHF=0.82)												
Street	SR 41 (EB)			SR 41 (WB)			-			I-71 SB Ramp (SB)		
Volume		460	140	240	240					300	10	190
Heavy Vehicle %		10	10	18	18					18	18	18
Storage		600	630	335	930					760	1150	
LOS		C	B	C	A					E	D	
Delay		29.5	13.0	24.9	8.0					59.6	40.2	
V/C		0.808	0.290	0.767	0.283					0.929	0.691	
QSR		0.84	0.15	0.56	0.13					0.64	0.26	
95 th %ile Queue		504.9	97.5	187.5	120					514.2	304.2	
Approach LOS/Delay	C/25.7			B/16.5			-			D/51.9		
Intersection LOS/Delay	C/31.4											
Operational Goal	Intersection LOS D or better	Approach LOS E or better		Control LOS E or better		V/C <1.0		V/C (preferred) <=0.93		QSR<1.0		
Is Operational Goal Met?	YES	YES		YES		YES		YES		YES		
10-SR 41 @ I-71 NB Ramps (Signalized, Cycle Length=120s, PHF=0.84)												
Street	SR 41 (EB)			SR 41 (WB)			I-71 NB Ramp (NB)			-		
Volume	70	690	-	-	420	630	60	10	150			
Heavy Vehicle %	17	17			13	13	38	38	38			
Storage	340	930			575	450	310	1000				
LOS	A	A			B	C	D	E				
Delay	9.6	7.6			18.5	34.0	41.5	67.8				
V/C	0.188	0.820			0.491	0.869	0.309	0.917				
QSR	0.11	0.21			0.59	1.68	0.34	0.36				
95 th %ile Queue	36.7	191.9			340.3	757.5	106.7	356.4				
Approach LOS/Delay	A/7.7			C/27.8			E/60.6					
Intersection LOS/Delay	C/23.3											
Operational Goal	Intersection LOS D or better	Approach LOS E or better		Control LOS E or better		V/C <1.0		V/C (preferred) <=0.93		QSR<1.0		
Is Operational Goal Met?	YES	YES		YES		YES		YES		NO		
11-SR 41 @ SR 734 (Signalized, Cycle Length=120s, PHF=0.91)												
Street	SR 41 (EB)			SR 41 (WB)			Flying J (NB)			SR 734 (SB)		
Volume	100	690	50	10	930	20	60	10	10	10	10	60
Heavy Vehicle %	21	21	21	5	5	5	12	12	12	18	18	18
Storage	-	550'	185'		1400'	-	-	110'	-	-	1500'	-
LOS	-	A	A		A	-	-	E	-	-	E	-
Delay	-	8.5	3.7		9.4	-	-	61.0	-	-	57.8	-
V/C	-	0.596	0.062		0.759	-	-	0.619	-	-	0.585	-
QSR	-	0.52	0.10		0.28	-	-	1.28	-	-	0.09	-
95 th %ile Queue	-	285.3	18.5		396.4	-	-	141.2	-	-	141.0	-
Approach LOS/Delay	A/7.5			A/9.4			E/61.0			E/57.8		
Intersection LOS/Delay	B/12.4											
Operational Goal	Intersection LOS D or better	Approach LOS E or better		Control LOS E or better		V/C <1.0		V/C (preferred) <=0.93		QSR<1.0		
Is Operational Goal Met?	YES	YES		YES		YES		YES		NO		

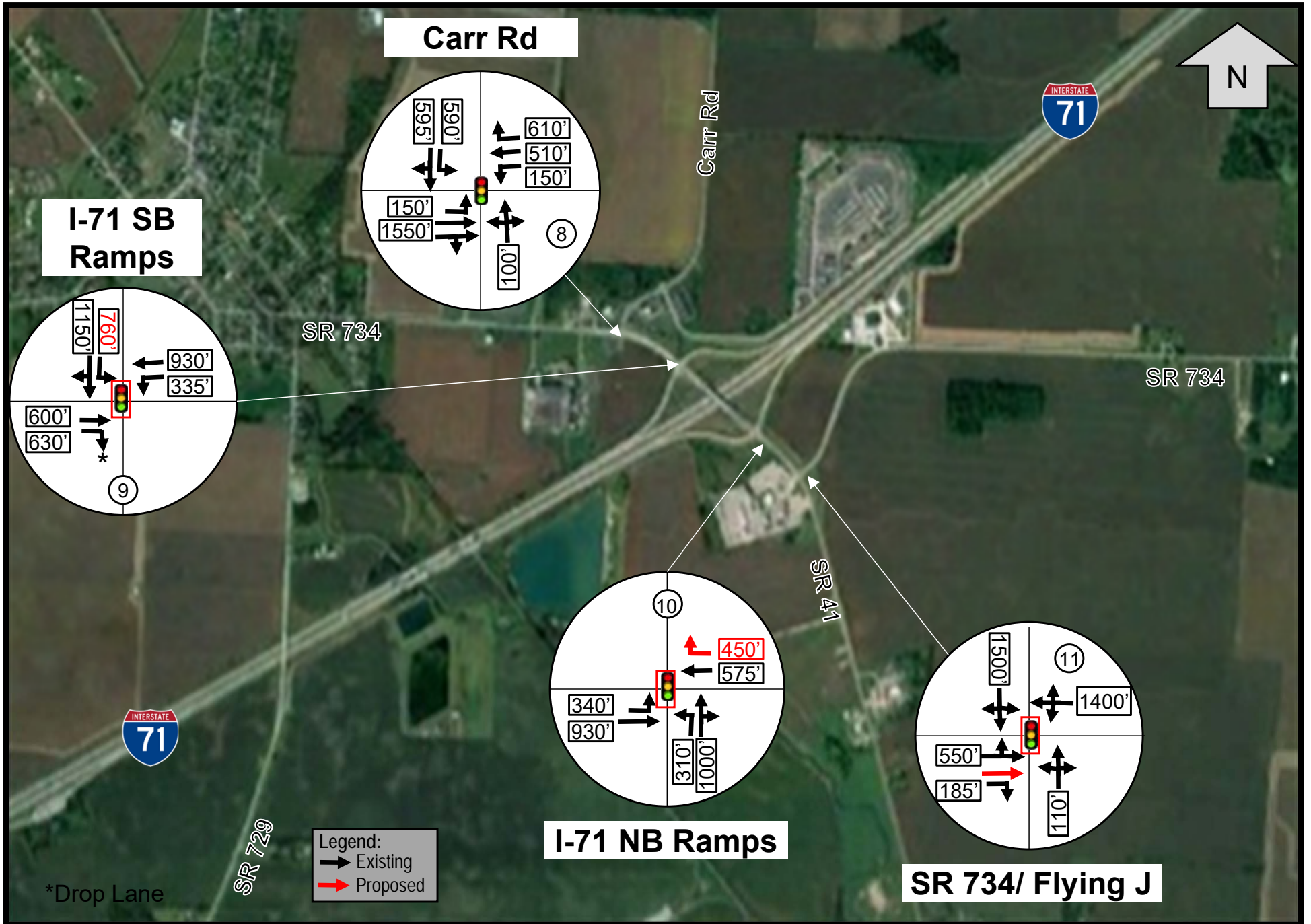


FIGURE 6 – BUILD CONDITIONS (SR 435 CORRIDOR)



* Drop Lane, ** Bypass RT Lane, # - Drop lane converted to a traditional turn lane

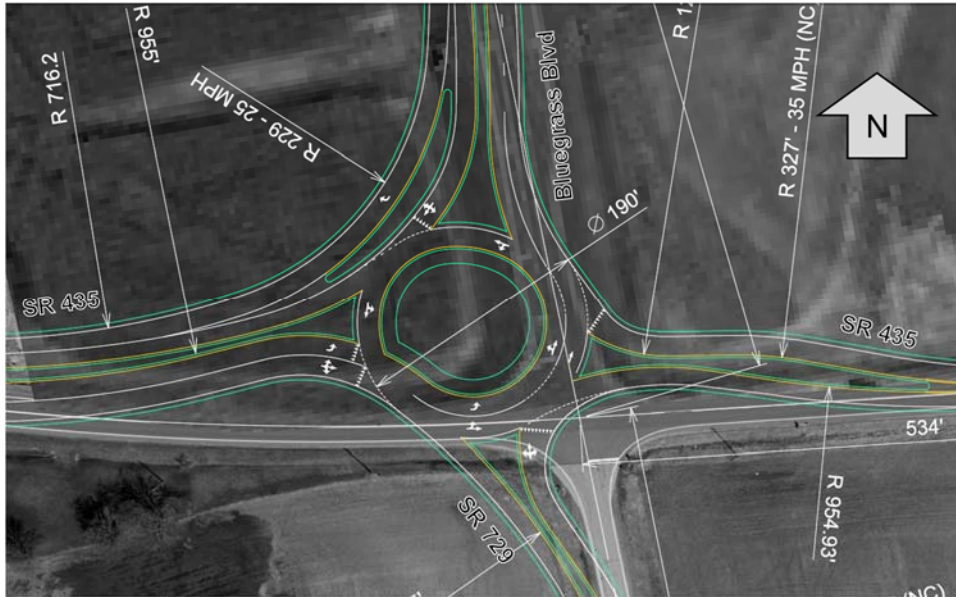
FIGURE 7 – BUILD CONDITIONS (SR 41 INTERCHANGE)



SR 435 & Bluegrass Blvd. Build Analysis

A roundabout is the preferred build geometry at the SR 435 & Bluegrass Blvd. intersection. **Figure 8** shows the design year build configuration of the roundabout with a southbound by-pass right turn lane. The opening year analysis is based on a single lane roundabout configuration with the SB right turn lane by-pass lane. The HCS reports are included in **Appendix F**.

FIGURE 8 – SR 435/BLUEGRASS – DESIGN YEAR ROUNDABOUT CONFIGURATION



The LOS results for the opening year (2024) and design year (2044) are included in **Table 7** and **Table 8**, respectively. As shown, the roundabout will operate at an acceptable LOS C or better during the opening year. During the design year, the overall LOS is D or better. During the AM peak, the HCS analysis shows that the northbound and westbound approaches will experience LOS F. The roundabout configuration improves LOS when compared to the signalized intersection under the No-build conditions.

TABLE 7 – 2024 AM & PM PEAK ROUNDABOUT LOS (SR 435 @ BLUEGRASS)

AM Peak 2024 Build	Eastbound			Westbound			Northbound			Southbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Single Lane Roundabout with SB Right turn by-pass lane, AM PHF=0.90, PM PHF= 0.90												
Street	SR 435 (EB)			SR 435 (WB)			SR 729 (NB)			Bluegrass Blvd (SB)		
AM PEAK												
Volume	890	30	20	10	30	20	50	20	10	10	10	220
Heavy Vehicle %	5	5	5	6	6	6	4	4	4	5	5	5
Storage	1450			2000			2000			2000 500		
LOS	C			B			B			A A		
Delay	18.6			11.1			11.3			3.2 4.8		
V/C	0.82			0.16			0.20			0.02 0.20		
QSR	0.18			0.01			0.01			0.01 0.04		
95 th %ile Queue	257.5			15.0			20			2.5 20.0		
Approach LOS/Delay	C/18.6			B/11.1			B/11.3			A/4.7		
Intersection LOS/Delay	C/15.2											



PM PEAK												
Volume	250	80	20	10	70	40	30	20	10	80	20	830
Heavy Vehicle %	5	5	5	7	7	7	9	9	9	5	5	5
Storage	1450			2000			2000				2000	500
LOS	A			A			A				A	C
Delay	6.4			5.4			5.5				3.9	8.8
V/C	0.34			0.15			0.08				0.10	0.79
QSR	0.03			0.01			0.01				0.01	0.44
95 th %ile Queue	37.5			12.5			7.5				7.5	220
Approach LOS/Delay	A/6.4			A/5.4			A/5.5			C/16.2		
Intersection LOS/Delay	B/12.5											

TABLE 8 – 2044 AM & PM PEAK ROUNDABOUT LOS - (SR 435 @ BLUEGRASS)

AM Peak 2044 Build	Eastbound			Westbound			Northbound			Southbound		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Design Year (Hybrid 2-lane) Roundabout with SB right turn bypass lane, AM PHF=0.90, PM PHF= 0.90												
Street	SR 435 (EB)			SR 435 (WB)			SR 729 (NB)			Bluegrass Blvd (SB)		
AM PEAK												
Volume	1400	30	20	10	50	240	80	160	10	10	10	450
Heavy Vehicle %	5	5	5	6	6	6	4	4	4	5	5	5
Storage	1450	1450	-	2000			2000			-	2000	500
LOS	B	A	-	F			F				A	
Delay	11.0	9.3	-	184.3			54.4				3.4	
V/C	0.65	0.58	-	1.26			0.85				0.02	
QSR	0.09	0.07	-	0.05			0.205				0.095	
95 th %ile Queue	130	97.5	-	410			190				2.5	
Approach LOS/Delay	B/10.2		F/184.3				F/54.4			A/0.1		
Intersection LOS/Delay	D/34.0											
PM PEAK												
Volume	560	130	40	20	150	30	40	50	10	270	110	1360
Heavy Vehicle %	5	5	5	7			9			5		
Storage	1450	1450	-	2000			2000			-	2000	500
LOS	B	A		A			B			A		A
Delay	10.3	9.3		9.2			10.3			8.1		0
V/C	0.49	0.43		0.32			0.22			0.41		0
QSR	0.05	0.04		0.02			0.01			0.03		0
95 th %ile Queue	67.5	55		35			20			52.5		0
Approach LOS/Delay	A/9.8			A/9.2			B/10.3			A/1.8		
Intersection LOS/Delay	A/4.7											

Turn Lane Sizing

Turn lane storage lengths at the study intersections were calculated in accordance with *ODOT's Location & Design Manual Volume 1, Section 400, Figures 401-9 and 401-10 for the design year (2044)*. The required and proposed lengths are summarized in Table 9 and detailed calculations are included in **Appendix G**. Turn Lane warrant calculations are included in **Appendix H**.



TABLE 9 - TURN LANE SIZING SUMMARY

Intersection	Direction	Build Lane Configuration	Existing Length (feet) ^A	Calculated Storage (feet) ^B	Calculated Decleration & taper	Calculated Total Length	Calculated No-Block Distance (feet)	HCS 95th %ile Queue (Turn Lane) - AM	HCS 95th %ile Queue (Through Lane)-AM	HCS 95th %ile Queue (Turn Lane)-PM	HCS 95th %ile Queue (Through Lane)-PM	Proposed Length ^C	Other Notes
SR 435 & Garringer-Edgefield Rd	EB Left	L-T-T-R	340	50	111	161	NA	0	0	3	0	NO CHANGES	
	EB Right		275	50	111	161	NA	0	0	0	0	NO CHANGES	
	WB Left	L-T-T-R	325	170	111	281	NA	20	0	25	0	NO CHANGES	
	WB Right		270	65	111	176	NA	0	0	0	0	NO CHANGES	
	NB Left	L-TR	125	50	50	100	NA	5	15	5	20	NO CHANGES	
	SB Left	L-TR	135	50	50	100	NA	3	7.5	27.5	5	NO CHANGES	
SR 435 @ I-71 SB Ramps	WB Left	L-L-T-T	480	463	111	574	528	206	22	366	37	500 FT (OUTSIDE) 230 FT (INSIDE)	Existing: Single LT Lane, Proposed: Dual LT Lanes
	SB Left	L-L-TR	1110	305	143	448	205	311	217	186	466	500 FT (OUTSIDE) 500 FT (INSIDE)	Existing: Single LT Lane, Proposed: Dual LT Lanes
SR 435 @ I-71 NB Ramps	EB Left	L-T-T	350	220	111	331	460	88	136	118	215	NO CHANGES	
	WB Right	T-T-R	NA	888	111	999	870	170	332	67	115	1000 FT	RT Lane extends past Allen Rd intersection
	NB Left	LT-R-R	1120	110	143	253	0	31	345	108	298	NO CHANGES	
	NB Right		620	340	143	483	0	345	31	298	108	600 FT (OUTSIDE) 600 FT (INSIDE)	Existing: Single RT Lane, Proposed: Dual RT Lanes
SR 435 @ Allen Rd	EB Left	L-T-TR	375	285	111	396	533	119	647	411	324	NO CHANGES	
	WB Left	L-T-T-TR	550	70	181	251	795	31	291	26	331	NO CHANGES	A third WB through lane is added that serves as a drop RT lane at I-71 NB ramps intersection
	SB Left	L-TR	125	193	50	243	350	121	321	247	935	NO CHANGES	
	NB Left	L-T-R	155	165	50	215	0	137	10	69	27	NO CHANGES	
	NB Right		100	90	50	140	0	62	10	69	27	NO CHANGES	
SR 435 @ TA Center	EB Left	L-T-TR	245	175	111	286	520	26	138	252	192	NO CHANGES	
	WB Left	L-T-TR	245	55	111	166	1053	27	391	15	1239	NO CHANGES	
	SB Left	L-T-R	135	145	50	195	0	50	17	144	34	NO CHANGES	
	SB Right		550	175	50	225	0	104	17	203	34	NO CHANGES	
	NB Left	L-TR	400	253	50	303	155	157	130	495	446	NO CHANGES	
SR 435 @ US-35 EB On Ramp	EB Right	T-T-R	Lane Drop	295	50	345	0	0	0	0	0	345 FT	
SR 435 @ US-35 WB Off Ramp	NB Left	L-LR	1100	470	181	651	95	383	465	369	278	NO CHANGES	Upgrade from Two-way stop to Signal, Add a turn lane
	NB Right		NA	358	181	539	358	465	383	278	369	550 FT	
SR 41 @ Carr Rd	EB Left	L-T-TR	175	50	111	161	328	5	113	6	178	NO CHANGES	
	WB Left	L-T-R	185	50	111	161	390	9	44	5	311	NO CHANGES	
	WB Right		540	158	111	269	390	2	44	26	311	NO CHANGES	
	SB Left	L-L-TR	590	85	50	135	50	27	27	83	50	NO CHANGES	

Intersection	Direction	Build Lane Configuration	Existing Length (feet) ^A	Calculated Storage (feet) ^B	Calculated Deceleration & taper	Calculated Total Length	Calculated No-Block Distance (feet)	HCS 95th %ile Queue (Turn Lane) - AM	HCS 95th %ile Queue (Through Lane)-AM	HCS 95th %ile Queue (Turn Lane)-PM	HCS 95th %ile Queue (Through Lane)-PM	Proposed Length ^C	Other Notes
SR 41 @ I-71 SB Ramps	EB Right	T-R	600	193	111	304	533	78	395	98	505	NO CHANGES	Upgrade from Two-way stop to Signal, increase storage of SB left turn lane
	WB Left	L-T	400	325	111	436	325	121	255	188	120	NO CHANGES	
	SB Left	L-TR	360	658	143	801	120	739	60	515	305	800 FT	
SR 41 @ I-71 NB Ramps	EB Left	L-T	390	105	111	216	879	35	217	37	192	NO CHANGES	Upgrade from Two-way stop to Signal
	WB Right	T-R	NA	725	111	836	500	222	321	758	341	500 FT (Maxed out/constrained due to upstream SR 734 intersection)	
	NB Left	L-TR	350	100	143	243	215	80	414	107	357	NO CHANGES	
SR 41 @ SR 734	EB Right	LT-T-R	225	85	111	196	478	14	163	19	286	NO CHANGES	Upgrade from Two-way stop to Signal and add a second EB through lane

A, C: Existing and Proposed Storage reflects total lane length, including diverging taper

B: Calculated Storage includes vehicle storage only

Summary of Improvements

Below is a summary of improvements at each of the study intersections.

- **SR 435 & Garringer Edgefield Rd:** Same as existing, no improvements are proposed.
- **SR 435 & I-71 SB ramps intersection**
 - **SB approach:** Convert from a L-TR to L-L-TR configuration by adding dual left turn lanes of 500 feet in length (including 50' taper).
 - **WB Left turn:** Convert from a L-T-T to a L-L-T-T. The two left turn lanes would be 230 feet and 500 feet long. This improvement would require a second receiving lane on the entrance ramp that would need to be tapered back to a single lane prior to the ramp gore area on southbound I-71.
- **SR 435 & I-71 NB ramps intersection**
 - **EB left turn:** Convert permissive only phase to Prot/Permissive LT phase.
 - **WB approach:** Convert the WB approach from a T-TR to a T-T-R configuration by adding a right turn lane. Required length of the right turn lane is 1000 feet. The length of this right turn lane will be maximized by extending it past Allen Road intersection to TA Center drive intersection.
 - **NB approach:** Convert from a L-TR to LT-R-R configuration by adding dual right turn lanes of 600 feet in length (including 50' taper).
- **SR 435 & TA Center Driveway** – No improvements are proposed.
 - **NB approach:** Traffic plates show decent traffic growth for the NB approach (TA drive), longer delays/LOS F/long queues should be expected during the PM peak. This is a driveway for truck stop. During the AM peak, QSR exceeds 1.0. Note that the HCS analysis assumed 0 'right-turn on red' vehicles to meet OATS Manual methodology, right turn on reds may be feasible, and LOS/queues would likely be better than shown. The IOS has not recommended any improvements to this approach (private drive).
 - **WB approach:** The PM peak capacity analysis shows LOS F with V/C ratios of 1.01 by design year 2044 for the WB through movement. Traffic growth, queueing and operations will be monitored over time, and additional improvements such as a third WB through lane will be considered during a future phase.
 - This intersection operates at an acceptable LOS under the opening year conditions without any improvements.
- **SR 435 @ US 35 EB On ramp:** A 4-lane section with two through lanes in each direction along SR 435 is assumed, a dedicated EB right turn movement will be added. A westbound left turn lane is warranted based on design year volumes, however, the proximity of this intersection to the existing SR 435 bridge structure over US 35 does not allow for the addition of a WB left turn lane without widening for a 5-lane section, hence a dedicated LT lane is not assumed.

This WB left turn lane can be provided without widening, if a single EB through lane would be sufficient over the US 35 bridge. The concept plan for this imbalanced configuration is included in **Appendix I**. The analysis completed in previous studies has

shown that a single EB through lane would cause queueing on EB lanes to extend to SR 435/I-71 interchange, and hence this configuration is not preferred.

In the current conditions, this westbound left turn movement is a low demand movement, the demand will likely be higher under the build conditions due to the megasite traffic. As part of this initial phase, signage will be included to redirect traffic from Bluegrass Blvd. to turn left onto SR 435 and then use Palmer Road interchange to access eastbound US 35. The travel times would be similar, and this alternative route alleviates any queueing/safety concerns due to lack of dedicated WB left turn lane at this 'SR 435 @ US 35 EB On ramp' intersection.

- **SR 435 @ US-35 WB Off Ramp:** Upgrade this intersection to include a traffic signal and revise the NB approach from a single lane (LR) to a L-LR configuration.

Turn lane calculations shows that the queues will be longer at this intersection during both AM and PM peaks. The new shared left-right turn lane to be 550 feet.

The westbound approach will also include two through lanes, the second lane will be an add lane from Bluegrass Blvd. intersection.

- **SR 435 & Bluegrass Blvd:** A roundabout is recommended for 2044 build conditions. The design year configuration includes a hybrid 2-lane roundabout with a southbound by-pass right turn lane. The opening year configuration may consist of a single lane roundabout with a southbound by-pass right turn lane.
- **SR 41 & Carr Road:** No improvements are proposed for this intersection.
- **SR 41 & I-71 SB ramps:** This intersection is assumed to be converted to a traffic signal along with the widening of southbound left turn lane from 360 feet to 800 feet. By the design year 2044, a second SB left turn lane may be necessary. The dual southbound left turn lanes will require widening of SR 41 bridge over I-71.
- **SR 41 & I-71 NB ramps:** This intersection is assumed to be converted to a traffic signal along with the addition of a WB right turn lane.
 - **EB approach:** By design year 2044, a single EB through lane would result in V/C ratios of 0.96 during the AM peak, nearing capacity.
 - **WB approach:** Add a WB right turn lane of 450 feet, this turn lane is maximized by extending it to the SR 734 intersection.
- **SR 41 & SR 734 intersection:** By design year 2044, improvements such as a traffic signal and a second EB through lane on SR 41 will be necessary to achieve acceptable LOS at this intersection.
 - The northbound approach is a private driveway and will experience queue storage ratios (QSR) exceeding 1.0 during the PM peak. No improvements are recommended at this time for this approach.

During the opening year 2024, the proposed Honda/LG plant is not anticipated to have site access via SR 41, and traffic growth along SR 41 corridor is anticipated to be minimal. All improvements along SR 41 corridor will not be implemented with Phase I (PID 117955) project, and will be implemented as a future phase. **Figure 9** and **Figure 10** compare the No-Build and Build LOS conditions for the design year 2044.

FIGURE 9- NO BUILD/BUILD LOS (SR 435 CORRIDOR)

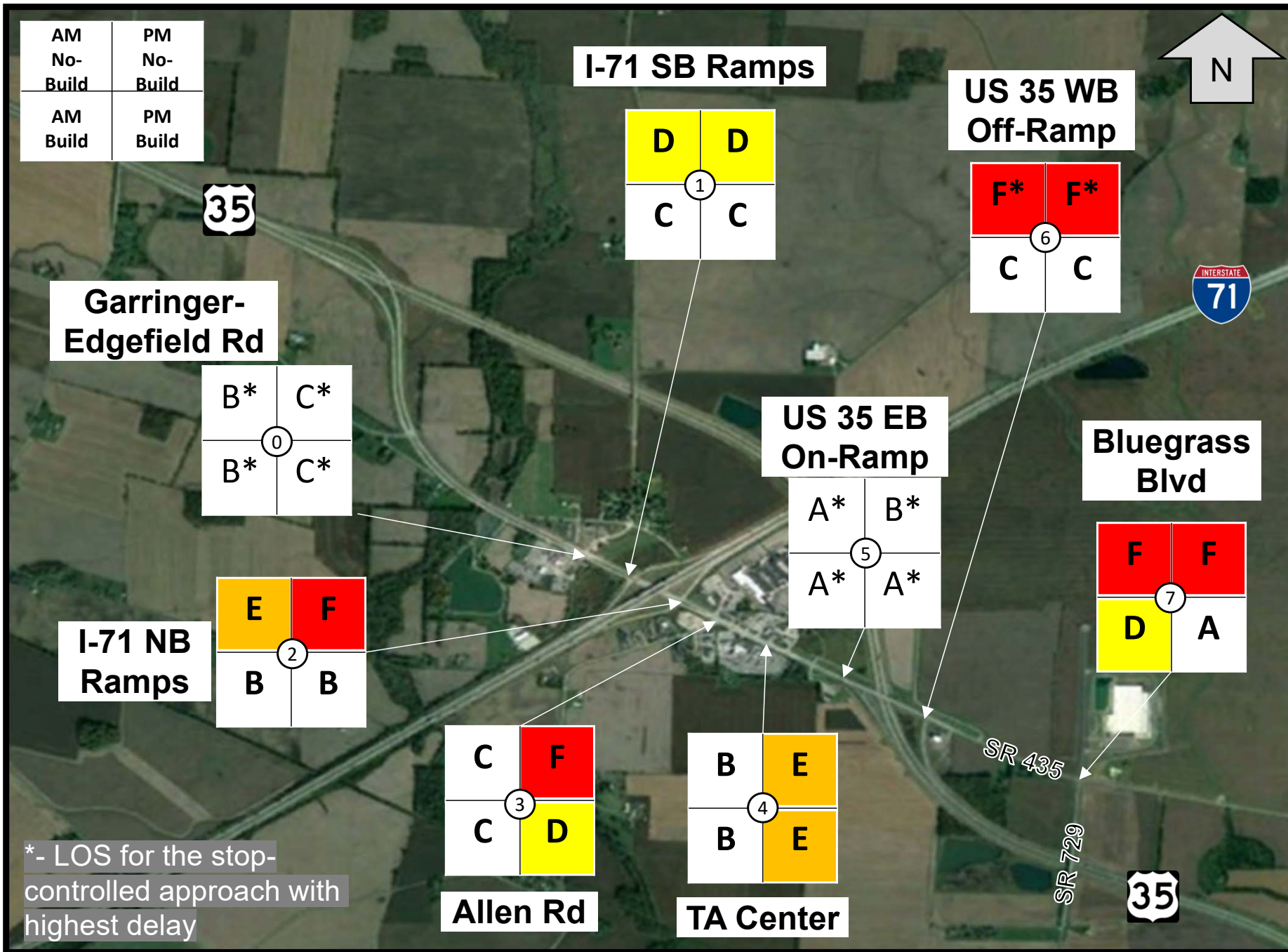
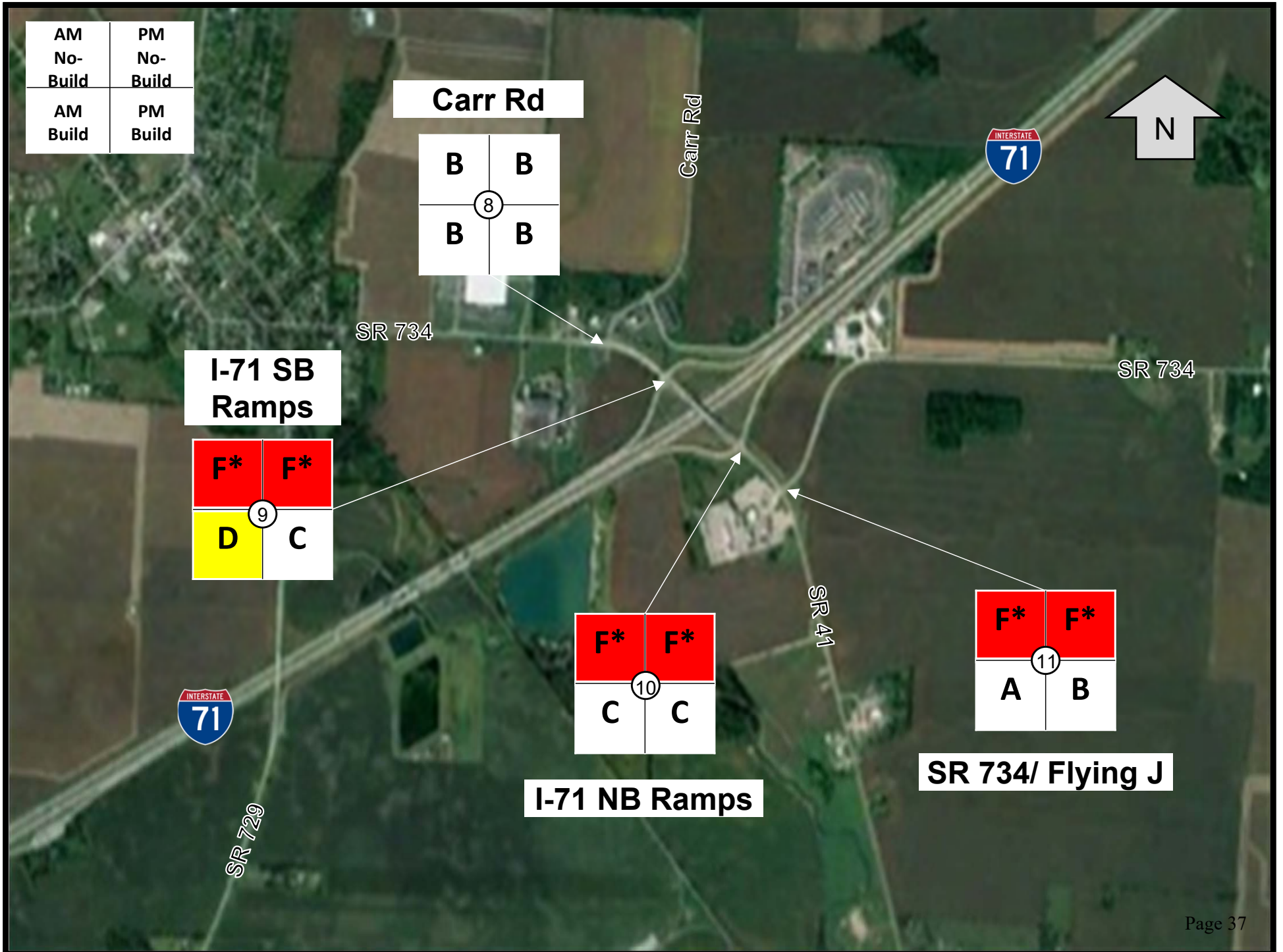


FIGURE 10 – NO BUILD/BUILD LOS (SR 41 CORRIDOR)



Conclusions & Recommendations

Fayette County currently has large undeveloped area loosely bordered by I-71, SR 41, and SR 435, referred to as the Midwest Mega Commerce Center (M2C2) site and is attracting development. The focus of this IOS is to assess impacts of the M2C2 development traffic on the I-71 mainline, US 35 mainline and their interchanges with SR 435, I-71/SR 41 interchange, SR 435 corridor and SR 41 corridor and provide recommendations for improvements.

- The proposed improvements are projected to reduce delays and improve operations at the study intersections for the design year Build conditions when compared to the No-build conditions.
- **Freeway Facilities:** The design year 2044 Build conditions are not anticipated to degrade the operations along I-71 mainline, US 35 mainline, SR 435/I-71 interchange or US 35/SR 435 partial (east) interchange.
- **Intersections:**
 - Two intersections along SR 435 (Allen Road, TA Center/Factory Shops Dr.) will experience adverse LOS during the design year build conditions, these intersections will be monitored over time, and additional improvements will be considered as part of future phases.
 - **SR 435 & Bluegrass Blvd. intersection:** During the 2044 AM peak conditions, the SR 435 & Bluegrass Blvd. intersection will likely have 2 approaches: westbound and northbound operating at LOS F. Research has indicated that the roundabouts experience higher capacity over time than opening year as drivers get acclimated to using a roundabout. Additionally, as M2C2 site expands, Bluegrass Blvd. will be extended to SR 41, and traffic patterns will likely change in the vicinity. Traffic operations including delay and queues will be monitored at this intersection, and if operational goals are not met, additional improvements will be considered as part of future phases.
 - By the design year 2044, some intersections are shown to experience QSR values exceeding 1.0 indicating queue spillback onto adjacent lanes or upstream intersection. Growth in traffic volumes between opening year 2024 and design year 2044 will be monitored by ODOT District 6, and any adverse traffic operations will be mitigated with future projects.
- Improvements along SR 435 corridor including the roundabout at SR 435/Bluegrass Blvd. intersection will be constructed with PID 117955.

Improvements along SR 41 are not planned to be implemented as part of this initial phase. The opening year development will not have direct access to SR 41, hence these improvements are deferred for future implementation.