BURY

DRAFT TRAFFIC IMPACT ANALYSIS REPORT

Austin Oaks
Austin, Travis County, Texas

June 26, 2014

TBPE #F-1048

Draft

This Document is released for Review Only
under the authority of Bobak J. Tehrany, P.E.
Texas Professional Engineers No. 116095,
on June 26, 2014.

LET'S SOLVE IT.

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CERTIFICATION STATEMENT

I hereby certify that this report complies with Ordinance requirements and applicable technical requirements of the City of Austin and the Texas Department of Transportation and is complete and accurate to the best of my knowledge.

(Signature of Responsible Engineer) Texas P.E. No.	Date
Signature of Submitter	Date
Bobak J. Tehrany, P.E. Printed Name of Submitter	Date

EXECUTIVE SUMMARY

The purpose of this report is to summarize the findings of the Traffic Impact Analysis (TIA) performed by Bury-AUS, Inc. (Bury) for the proposed Austin Oaks development which is planned to be fully constructed by 2031. The proposed development will be located at the southwest corner of Spicewood Springs Road and Loop 1 (Mopac) in Austin, Travis County, Texas. A Site Location Map of the proposed development is included as ***Exhibit 1*** and a Conceptual Plan is included as ***Exhibit 2*** within the Appendix of this report.

The Austin Oaks site is currently fully developed and occupied with office land uses. The proposed redevelopment of the existing site will serve as a more mixed use development providing land uses such as Shopping Center, High Turnover (Sit-Down) Restaurant, General Office Building, Condominiums/Townhomes, and Apartments. Given the current occupancy of the development, the redevelopment of Austin Oaks will occur in various phases of construction. For the purposes of this TIA, the development has been analyzed in four (4) major build-out conditions: 2018, 2023, 2028, and 2031. Based on the proposed land use intensities, it is anticipated that the development will generate a total of 24,984 unadjusted daily trips; however, due to the existing office land uses, the proposed redevelopment is anticipated to generate a net increase of 20,736 unadjusted daily trips. This is taking into consideration the trips which already exist on the roadway network due to the existing development. A summary of the proposed phasing, land uses, and intensities can be seen within the **Table 1** below. The Trip Generation Output is included as ***Exhibit 3*** within the Appendix of this report.

TABLE 1– SUMMARY OF UNADJUSTED DAILY AND PEAK HOUR TRIP GENERATION

Phase	ITE Code	Proposed Land Use	Size		24-Hour Two-Way Volume	AM Peak Hour		PM Peak Hour	
						Enter	Exit	Enter	Exit
Existing									
	710	General Office Building	450,000	sf	4,248	550	75	99	484
				Existing Subtotal	**4,248**	**550**	**75**	**99**	**484**
Phase I									
	820	Shopping Center	51,200	sf	4,395	63	40	199	207
	932	High Turnover (Sit-Down) Restaurant	8,000	sf	1,017	48	44	53	37
	710	General Office Building	300,000	sf	3,109	397	54	71	344
				Phase I Subtotal	**8,521**	**508**	**138**	**323**	**588**
Phase II									
	820	Shopping Center	50,500	sf	5,512	83	53	246	257
	710	General Office Building	318,700	sf	3,440	436	60	87	427
				Phase II Subtotal	**8,952**	**519**	**113**	**333**	**684**
Phase III									
	210	Apartment	574	du	3,725	57	231	228	122
	230	Condominium/Townhouse	36	du	288	5	21	20	10
				Phase III Subtotal	**4,013**	**62**	**252**	**248**	**132**
Phase IV									
	710	General Office Building	252,800	sf	3,193	398	54	75	366
	932	High Turnover (Sit-Down) Restaurant	2,400	du	305	14	13	16	11
				Phase IV Subtotal	**3,498**	**412**	**67**	**91**	**377**
				Total Proposed Development	**24,984**	**1,501**	**570**	**995**	**1,781**
				Net Increase of Trips	**20,736**	**951**	**495**	**896**	**1,297**

As agreed upon during the scoping process, reductions were taken for internal circulation to account for persons using the same trip for multiple land-uses (an individual working in an office and dining at a restaurant within the same development, for example). Pass-by reductions were allowed for the various land-uses in which pass-by reductions are available and no transit reductions were applied due to the lack of public transportation within close proximity to this property. As a result, **Table 2** summarizes the total number of trips with regard to impact on the adjacent roadway network with these reductions in mind.

TABLE 2– SUMMARY OF ADJUSTED DAILY AND PEAK HOUR TRIP GENERATION

Phase	ITE Code	Proposed Land Use	Size		24-Hour Two-Way Volume	AM Peak Hour		PM Peak Hour	
						Enter	Exit	Enter	Exit
Existing									
	710	General Office Building	450,000	sf	4,036	523	71	94	460
		Existing Subtotal			**4,036**	**523**	**71**	**94**	**460**
Phase I									
	820	Shopping Center	51,200	sf	3,428	60	38	121	126
	932	High Turnover (Sit-Down) Restaurant	8,000	sf	747	46	42	28	19
	710	General Office Building	300,000	sf	2,954	377	51	67	327
		Phase I Subtotal			**7,129**	**483**	**131**	**216**	**472**
Phase II									
	820	Shopping Center	50,500	sf	4,299	79	50	150	157
	710	General Office Building	318,700	sf	3,268	414	57	83	406
		Phase II Subtotal			**7,567**	**493**	**107**	**233**	**562**
Phase III									
	210	Apartment	574	du	3,539	54	219	217	116
	230	Condominium/Townhouse	36	du	274	5	20	19	10
		Phase III Subtotal			**3,812**	**59**	**239**	**236**	**125**
Phase IV									
	710	General Office Building	252,800	sf	3,033	378	51	71	348
	932	High Turnover (Sit-Down) Restaurant	2,400	du	224	13	12	8	6
		Phase IV Subtotal			**3,258**	**391**	**64**	**80**	**353**
		Total Proposed Development			**21,766**	**1,426**	**542**	**764**	**1,514**
		Net Increase of Trips			**17,731**	**903**	**470**	**670**	**1,054**

Based on the Scoping Agreement with the City of Austin, the TIA analyzed 14 existing intersections and 11 proposed driveways which have been identified in **Table 3**, below. **Table 3** summarizes the operations at each intersection under the Existing, Forecasted (future, no-build with Background Traffic) and Site+Forecasted (future, build) conditions for each of the phases. Additionally, **Table 3** represents the intersections as they would perform as they exist today, with no improvements.

TABLE 3 - SUMMARY OF INTERSECTION LEVEL OF SERVICE AND DELAY

Intersection	2014		2018		2018		2023		2023		2028		2028		2031		2031	
	Existing		Forecasted		Site + Forecasted		Forecasted		Site + Forecasted		Forecasted		Site + Forecasted		Forecasted		Site + Forecasted	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
	LOS																	
	Delay (s)																	
Far West Boulevard & Hart Lane	D	C	D	C	D	C	E	C	E	D	F	D	F	D	F	E	F	F
	46.1	31.7	50.9	31.7	53.8	31.9	68.7	33.5	76.2	37.1	103.1	45.7	117.6	52.2	138.2	78.4	144.1	86.1
Far West Boulevard & Wood Hollow Drive	D	D	D	D	D	D	D	D	D	E	E	E	E	E	E	F	E	F
	44.4	48.2	44.1	49.0	44.0	47.8	49.2	51.8	50.1	60.2	59.5	69.9	59.6	70.8	69.4	81.6	73.3	92.2
Far West Boulevard & Mopac SB FR	C	E	C	F	C	E	C	F	C	F	D	F	D	F	D	F	D	F
	25.2	78.4	28.5	97.4	28.3	72.6	34.7	97.7	34.1	114.2	45.4	161.4	46.3	166.2	54.3	197.2	54.8	209.5
Far West Boulevard & Mopac NB FR	B	E	C	E	D	E	D	E	F	E	F	E	F	F	F	F	F	F
	19.2	67.2	20.8	68.7	41.7	60.1	53.8	56.9	131.2	55.3	162.9	69.9	186.5	91.1	210.5	117.5	315.9	126.3
Spicewood Springs Road & Mopac SB FR	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
	127.2	92.4	159.6	119.3	183.0	191.6	224.3	229.7	250.5	301.2	304.5	350.2	331.2	366.4	369.1	404.1	385.7	448.1
Spicewood Springs Road & Mopac NB FR	D	E	E	E	F	F	F	F	F	F	F	F	F	F	F	F	F	F
	53.6	61.2	67.6	78.3	96.8	92.0	117.0	118.9	137.6	147.1	173.9	171.3	176.5	190.8	197.3	211.7	219.8	227.0
Spicewood Springs Road & Wood Hollow Drive / Private Driveway	D	C	E	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F
	45.6	24.4	59.9	25.4	145.2	107.7	177.5	135.4	275.4	249.6	350.3	293.6	412.1	342.4	455.3	370.0	548.1	451.0
Greystone Drive & Hart Lane	C	B	C	C	D	D	E	F	F	F	F	F	F	F	F	F	F	F
	18.2	14.3	24.1	16.8	31.0	32.2	48.2	51.4	68.5	93.3	106.3	138.0	128.7	163.7	220.5	200.2	245.6	223.3
Greystone Drive & Wood Hollow Drive	B	C	B	C	B	C	B	D	C	E	C	F	C	F	C	F	D	F
	10.6	15.2	11.5	18.7	13.0	22.5	14.8	31.8	16.4	38.1	19.7	55.7	19.7	57.0	22.7	71.1	25.6	79.2
Greystone Drive & Mopac SB FR	C	A	D	A	D	A	E	A	E	A	F	B	F	B	F	C	F	C
	15.7	3.2	26.5	4.8	27.0	3.4	45.1	5.6	45.7	6.6	711.0	13.4	701.3	13.9	701.2	20.9	698.9	23.1
Executive Center Drive & Mopac SB FR	A	A	A	A	A	D	A	F	A	F	A	F	C	F	C	F	E	F
	0.3	2.2	0.3	2.8	0.6	29.8	0.7	51.3	2.3	167.8	4.5	2233.6	16.1	2269.1	22.7	2267.8	39.2	2594.3
Executive Center Drive & Wood Hollow Drive	A	A	A	B	C	F	E	F	F	F	F	F	F	F	F	F	F	F
	4.0	9.0	4.6	11.8	21.7	256.8	47.6	3350.4	>9999.9	>9999.9	>9999.9	>9999.9	>9999.9	>9999.9	>9999.9	>9999.9	>9999.9	>9999.9
Executive Center Drive & Hart Lane	A	A	A	A	A	A	A	A	A	F	A	F	F	F	F	F	F	F
	1.8	3.1	1.9	3.4	2.8	6.4	3.0	7.9	4.9	128.1	5.9	196.4	55.9	359.3	82.1	4552.2	127.2	4758.8
Spicewood Springs Road & Hart Lane	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
	373.6	91.4	379.4	892.5	386.3	855.9	386.0	856.5	397.6	954.9	400.6	960.4	440.7	951.7	451.6	960.0	455.6	988.0

TABLE 3 - SUMMARY OF INTERSECTION LEVEL OF SERVICE AND DELAY

Intersection	2014		2018		2018		2023		2023		2028		2028		2031		2031	
	Existing		Forecasted		Site + Forecasted		Forecasted		Site + Forecasted		Forecasted		Site + Forecasted		Forecasted		Site + Forecasted	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
	LOS																	
	Delay (s)																	
Executive Center Drive & Driveway 1	-	-	-	-	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	-	-	-	-	0.0	0.0	0.0	0.0	3.8	7.4	4.1	8.2	4.1	8.4	4.3	9.4	4.5	9.8
Executive Center Drive & Driveway 2	-	-	-	-	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	-	-	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	4.9
Executive Center Drive & Driveway 3	-	-	-	-	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	-	-	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	9.1
Executive Center Drive & Driveway 4	-	-	-	-	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	-	-	-	-	2.6	5.7	2.7	5.8	2.2	4.1	2.4	4.6	2.4	4.7	2.5	5.1	2.8	9.2
Executive Center Drive & Driveway 5	-	-	-	-	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	-	-	-	-	0.0	0.0	0.0	0.0	0.3	0.7	0.3	0.7	0.3	0.6	0.3	0.6	0.3	0.4
Executive Center Drive & Driveway 6	-	-	-	-	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	-	-	-	-	0.0	0.0	0.0	0.0	0.8	3.5	0.9	3.7	0.8	3.4	0.8	3.6	0.7	3.6
Executive Center Drive & Driveway 7	-	-	-	-	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	-	-	-	-	0.0	0.0	0.0	0.0	0.2	0.7	0.2	0.8	0.2	0.6	0.2	0.7	0.2	0.6
Executive Center Drive & Driveway 8	-	-	-	-	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	-	-	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1	2.0	2.3	2.1	2.3	2.1
Executive Center Drive & Driveway 9	-	-	-	-	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	-	-	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.2	0.3	0.2	0.3	0.2
Executive Center Drive & Driveway 10	-	-	-	-	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	-	-	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	2.2	3.2	2.3	3.3	2.3
Wood Hollow Drive & Driveway 11	-	-	-	-	A	A	A	B	C	F	F	F	F	F	F	F	F	F
	-	-	-	-	4.5	9.0	5.5	10.9	17.2	997.9	237.9	>9999.9	340.5	>9999.9	340.0	>9999.9	308.3	>9999.9

In order to mitigate the impacts to the various intersections which are failing, improvements has been evaluated for the failing intersections. Additionally, a discussion of these improvements can be found in the Findings and Recommendations. **Table 4** below provides a summary of the level of service grade and delay for the intersections in which improvements have been implemented for AM and PM peak period, respectively.

TABLE 5– INTERSECTION LEVEL OF SERVICE AND DELAY WITH IMPROVEMENTS

	2014		2018		2018		2018		2023		2023		2023		2028		2028		2028		2031		2031		2031	
	Existing		Forecasted		Site + Forecasted		Site + Forecasted w/Imps		Forecasted		Site + Forecasted		Site + Forecasted w/Imps		Forecasted		Site + Forecasted		Site + Forecasted w/Imps		Forecasted		Site + Forecasted		Site + Forecasted w/Imps	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
	LOS																									
Intersection	Delay (s)																									
Far West Boulevard and Hart Lane	D	C	D	C	D	C	-	-	E	C	E	D	D	C	F	D	F	D	E	D	F	E	F	F	F	D
	46.1	31.7	50.9	31.7	53.8	31.9	-	-	68.7	33.5	76.2	37.1	47.9	30.2	103.1	45.7	117.6	52.2	66.3	36.0	138.2	78.4	144.1	86.1	91.1	42.8
Far West Boulevard and Wood Hollow Drive	D	D	D	D	D	D	-	-	D	D	D	E	C	C	E	E	E	E	C	C	E	F	E	F	D	D
	44.4	48.2	44.1	49.0	44.0	47.8	-	-	49.2	51.8	50.1	60.2	29.0	30.8	59.5	69.9	59.6	70.8	30.0	33.4	69.4	81.6	73.3	92.2	45.2	35.6
Far West Boulevard and Mopac SB FR	C	E	C	F	C	E	C	D	C	F	C	F	C	E	D	F	D	F	D	F	D	F	D	F	D	F
	25.2	78.4	28.5	97.4	28.3	72.6	28.2	41.9	34.7	97.7	34.1	114.2	31.4	76.2	45.4	161.4	46.3	166.2	45.3	96.2	54.3	197.2	54.8	209.5	54.1	100.6
Far West Boulevard and Mopac NB FR	B	E	C	E	D	E	D	C	D	E	F	E	F	D	F	E	F	F	F	F	F	F	F	F	F	F
	19.2	67.2	20.8	68.7	41.7	60.1	38.4	31.5	53.8	56.9	131.2	55.3	100.9	54.0	162.9	69.9	186.5	91.1	93.7	91.8	210.5	117.5	315.9	126.3	139.0	125.9
Spicewood Springs Road and Mopac SB FR	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
	127.2	92.4	159.6	119.3	183.0	191.6	144.3	107.4	224.3	229.7	250.5	301.2	212.9	180.9	304.5	350.2	331.2	366.4	275.0	236.6	369.1	404.1	385.7	448.1	327.9	287.1
Spicewood Springs Road and Mopac NB FR	D	E	E	E	F	F	E	E	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
	53.6	61.2	67.6	78.3	96.8	92.0	59.6	74.1	117.0	118.9	137.6	147.1	87.8	111.3	173.9	171.3	176.5	190.8	110.3	157.6	197.3	211.7	219.8	227.0	148.3	194.4
Spicewood Springs Road & Wood Hollow Drive / Private Driveway	D	C	E	C	F	F	F	D	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
	45.6	24.4	59.9	25.4	145.2	107.7	108.6	40.7	177.5	135.4	275.4	249.6	190.0	96.7	350.3	293.6	412.1	342.4	251.8	158.7	455.3	370.0	548.1	451.0	331.2	217.4
Greystone Drive and Hart Lane	C	B	C	C	D	D	-	-	E	F	F	F	C	C	F	F	F	F	D	D	F	F	F	F	E	E
	18.2	14.3	24.1	16.8	31.0	32.2	-	-	48.2	51.4	68.5	93.3	20.4	18.9	106.3	138.0	128.7	163.7	29.8	27.1	220.5	217.2	245.6	223.3	42.7	39.1
Greystone Drive and Wood Hollow Drive	B	C	B	C	B	C	-	-	B	D	C	E	C	C	C	F	C	F	C	E	C	F	D	F	D	E
	10.6	15.2	11.5	18.7	13.0	22.5	-	-	14.8	31.8	16.4	38.1	16.7	24.3	19.7	55.7	19.7	57.0	20.8	35.1	22.7	71.1	25.6	79.2	27.3	49.9
Executive Center Drive and Wood Hollow Drive	A	A	A	B	C	F	A	B	E	F	F	F	B	B	F	F	F	F	B	B	F	F	F	F	D	C
	4.0	9.0	4.6	11.8	21.7	256.8	9.8	11.9	47.6	3350.4	>9999.9	>9999.9	11.4	13.5	>9999.9	>9999.9	>9999.9	>9999.9	17.1	17.6	>9999.9	>9999.9	>9999.9	>9999.9	52.1	34.1
Executive Center Drive and Hart Lane	A	A	A	A	A	A	-	-	A	A	A	F	A	C	A	F	F	F	B	F	F	F	F	F	C	F
	1.8	3.1	1.9	3.4	2.8	6.4	-	-	3.0	7.9	4.9	128.1	4.5	18.9	5.9	196.4	55.9	359.3	11.9	86.0	82.1	4552.2	127.2	4758.8	24.9	155.9
Spicewood Springs Road and Hart Lane	F	F	F	F	F	F	C	B	F	F	F	F	C	B	F	F	F	F	D	C	F	F	F	F	E	C
	373.6	91.4	379.4	892.5	386.3	855.9	24.1	15.7	386.0	856.5	397.6	954.9	29.3	19.1	400.6	960.4	440.7	951.7	41.1	29.8	451.6	960.0	455.6	988.0	66.1	34.3

FINDINGS AND RECOMMENDATIONS

Upon completing the analysis for the roadway network, it became evident that with the anticipated future growth of the area and the proposed development, improvements will be needed in order to mitigate the degradation of specific intersections. The intersections identified below will require traffic improvements to improve the level of service. All other intersections perform at an acceptable level of service and do not require any improvements. A summary of the recommended improvements has been provided in the Appendix of this report as ***Exhibit 4***.

Far West Boulevard and Hart Lane

The intersection of Far West Boulevard and Hart Lane currently performs at acceptable level of service (LOS) until the 2023 Forecasted AM Peak condition at which it operates at a LOS E. This unacceptable intersection delay is due to the southbound Hart Lane approach and westbound Far West Boulevard left turn movement. Re-striping southbound the Hart Lane approach from a shared left-through lane and a shared through-right lane to provide an exclusive left-turn lane, and a shared through-right lane in addition to converting the split phasing on the north and south approach to a permissive phase on the northbound and a Permissive+Protected phase on the southbound approach will bring the LOS to an acceptable LOS D. This improvement is carried through the successive phases which does improve the delay but with remains at an unacceptable LOS in future phases. No additional improvements can be recommended at this time.

Far West Boulevard and Wood Hollow Drive

The intersection of Far West Boulevard and Wood Hollow Drive currently operates at an acceptable LOS until the 2023 Site+Forecasted PM Peak condition at which it operates at a LOS E. The high intersection delay is mainly due to the southbound Wood Hollow Drive approach. The northbound and southbound Wood Hollow Drive approaches are currently operating as split phase and based on our evaluation it is recommended to convert it to permissive phases. The recommended signal phasing for the northbound and southbound approaches have been incorporated starting with 2023 Site+Forecasted condition; with this mitigation measure the intersection will operate at acceptable LOS of D or better on all conditions. No additional improvements are recommended at this time.

Far West Boulevard and Mopac Southbound Frontage Road

The intersection of Far West Boulevard and Mopac Southbound Frontage Road currently performs at acceptable LOS in the AM peak and unacceptable LOS in the PM peak periods. It continues to operate the same for the successive conditions with increased delay. Since no physical improvements can be made to these intersections, the traffic signal timing splits have been optimized starting with 2018 Site+Forecasted condition in which the optimization improved the delay allowing the intersection to operate at acceptable LOS during the AM Peak condition through all phases of the proposed redevelopment. Thus, signal timing improvements have been recommended for this intersection. No additional improvements are recommended at this time.

Far West Boulevard and Mopac Northbound Frontage Road

The intersection of Far West Boulevard and the Mopac Northbound Frontage Road currently performs at acceptable LOS in the AM peak and unacceptable LOS in the PM peak periods. It continues to operate the same until 2023 Site+Forecasted condition at which it operates at an unacceptable LOS during both AM and PM periods. Similar to the Mopac Southbound intersection, signal timing split optimization have been evaluated for all conditions as the mitigation measure since physical improvements are not possible at this location. Optimizing the splits did not bring it to an acceptable LOS, but it did improve the delay at this intersection. No additional improvements are recommended at this time.

Spicewood Springs Road and Mopac Southbound Frontage Road

The intersection of Spicewood Springs Road and Mopac Southbound Frontage Road currently operates at an unacceptable LOS F and it continues to do so for all the future conditions with increased delay. Physical improvements are not possible at this location; therefore, the only mitigation measures that has been evaluated is the signal split optimization. This did not bring the LOS to be acceptable; but it should be noted that the delay has been improved significantly and operates better when compared to the Forecasted Conditions. No additional improvements are recommended at this time.

Spicewood Springs Road and Mopac Northbound Frontage Road

The intersection of Spicewood Springs Road and Mopac Northbound Frontage Road currently performs at acceptable LOS in the existing AM peak but at unacceptable LOS in the existing PM Peak period. The intersection begins to operate at an unacceptable LOS during both peak periods starting with 2018 Forecasted condition, and it continues to do the same with increased delay through the final phase of the proposed redevelopment. Similar to the other interchange intersections, no physical improvements can be evaluated at this intersection. The only mitigation measure considered at this location is the signal timing splits optimization. This did not bring the intersection to perform at acceptable LOS, but this mitigation measure does allow the intersection to perform better than the Forecasted Conditions for each phase. No additional improvements are recommended at this time.

Spicewood Springs Road and Wood Hollow Drive/Private Driveway

The Spicewood Springs Road and Wood Hollow Drive/Private Driveway currently operates at acceptable LOS, however the LOS is unacceptable starting with 2018 Forecasted AM condition. The intersection is starting to fail at 2018 Site+Forecasted condition. The mitigation measures that has been evaluated is converting the lane configuration on the northbound Wood Hollow Drive from two (2) lanes to three (3) lanes to provide an exclusive left turn lane, shared thru-right turn lane, and an exclusive right turn lane in addition to the optimized splits. With these improvements the intersection continues to operate at LOS F, but with improved delay. No additional improvements are recommended at this time.

Greystone Drive and Hart Lane

The intersection of Greystone Drive and Hart Lane currently operates at acceptable LOS and continues to do the same until 2023 Forecasted condition. Therefore, mitigations measures have been evaluated starting with 2023 Site+Forecasted condition. Converting the existing lane configurations to provide two (2) lanes (one (1) shared left-through lane and one (1)shared through-right turn lane) on all approaches will improve the LOS to an acceptable LOS all the way to the 2028 Site+Forecasted Condition. Even though the LOS is unacceptable at the 2031 Site+Forecasted condition, the LOS and delay have been improved. The eastbound and westbound Greystone Drive approaches have two (2) lanes (one (1) shared left-through and an exclusive right-turn lane) in the existing condition; therefore, it is a matter of re-striping to provide the recommended mitigation. However, the northbound and southbound Hart Lane have only one (1) lane in each direction and therefore, in order to provide the recommended two (2) lanes, the existing bike lanes should be re-striped and have it with travel lanes within the vicinity of the intersection. No additional improvements are recommended at this time.

Greystone Drive and Wood Hollow Drive

The intersection of Greystone Drive and Wood Hollow Drive intersection currently operates at acceptable LOS all the way until 2023 Site+Forecasted PM Peak condition. The intersection operates at acceptable LOS in the AM Peak until full built-out, but the LOS and delay continue to increase in the PM Peak period. Physical improvements have been evaluated for this intersection starting at 2023 Site+Forecasted condition. Re-striping the existing lane configurations for the eastbound and westbound Greystone Drive from two (2) lanes (one (1) shared left-through lane and an exclusive right-turn lane) to two (2) lanes (one (1) shared left-through, and one (1) shared through-right lane) will improve the LOS and delay to full build-out, however the LOS is unacceptable in the 2028 and 2031 Site+Forecasted conditions. No additional improvements are recommended at this time.

Executive Center Drive and Wood Hollow Drive

The intersection of Executive Center Drive and Wood Hollow Drive currently operates at an acceptable LOS until the 2018 Site+Forecasted PM Peak condition. In order to mitigate the failing condition, a signal has been proposed for this intersection starting at 2018 Site+Forecasted condition. With the proposed signal the intersection, LOS and delay have been improved to perform at an acceptable LOS until the development is completely built-out in 2031. Without the signal the intersections fails with immeasurable delay. No additional improvements are recommended at this time.

Executive Center Drive and Hart Lane

The intersection of Executive Center Drive and Hart Lane currently operates at an acceptable LOS until 2023 Site+Forecasted PM peak condition. In order to mitigate the failing condition the existing lane configuration on northbound Executive Center Drive is recommended to be converted from one (1) shared left-through lane to two (2) lanes (exclusive left-turn lane and an exclusive right-turn lane). This improvement allows the intersection to operate at an acceptable LOS only in the 2023 AM and PM Site+Forecasted, 2028 AM Site+Forecasted, and 2031 AM Site+Forecasted conditions. The delay has been improved in all other conditions. No additional improvements are recommended at this time.

Spicewood Springs Road and Hart Lane

The intersection of Spicewood Springs Road and Hart Lane is failing in the existing condition and it continues to operate the same with increased delay through to the 2031 Site+Forecasted conditions. This intersection geometry is very unique given the upstream/downstream condition as well as the fact that it is a T-intersection. Signalization of this intersection is the only means in which it will perform at an acceptable level of service; however in-lieu of a full signal, a Continuous Green T-intersection signal was evaluated as an option for this intersection. This solution allows westbound traffic along Spicewood Springs Road to never need to stop and be affected by the signal operations. This allows for a higher level of capacity at this intersection. With this recommended improvement, the intersection operates at acceptable LOS for all condition except for 2031 Site+Forecasted AM peak condition where it operates at LOS E. No additional improvements are recommended at this time.

Neighborhood Traffic Study (NTS) Results and Recommendations

Based on the results of the NTS, the maximum desirable volumes are currently being exceeded along the roadway segments which were evaluated. Additionally, with the increase in volumes due to the natural growth of the roadway, and with the Austin Oaks redevelopment, the volumes along those roadway segments will continue to increase.

While the volumes have exceed the City of Austin's maximum desirable volumes along those roadways that does not mean that the roadways have exceed their capacity. The results of the Roadway Capacity Analysis show us that roadway segments are performing at an acceptable level of service in the existing conditions as well and all future conditions of the redevelopment. None of the roadway segments analyzed have exceeded capacity.

In order to address the roadway segments exceeding the City' of Austin's maximum desirable volumes, the following mitigation measures are recommended to persuade drivers to utilize the major arterials and minimize the use of the neighborhood collectors. Since all these six (6) segments are 2-lane roadways with on-street parking and bicycle lanes, new improvements are limited. The intersection improvements recommended in the previous section will reduce the intersection delays and thus, improving the travel time on the arterial roadway. This will encourage through traffic to return to the arterial roadway system rather than the use of residential streets. The other mitigation measures recommended are as follows:

- Provide adequate striping and signage;
- Install speed limit signs along all street segments;
- Speed cushion installation and
- Speed enforcement.

INTRODUCTION

STUDY PURPOSE AND OBJECTIVE

The purpose of this report is to summarize the findings of the Traffic Impact Analysis (TIA) performed by Bury-AUS, Inc. (Bury) for the proposed Austin Oaks development which is planned to be fully constructed by 2031. The proposed development will be located at the southwest corner of Spicewood Springs Road and Loop 1 (Mopac) in Austin, Travis County, Texas. A Site Location Map of the proposed development is included as ***Exhibit 1***. This report will document the change in existing traffic volumes to be generated by the development and understand the impacts of it on the roadway network. The scope of this study includes the following:

- Data collection of the existing roadway system;
- Estimate the number of trips to be generated by the existing development and the net increase of trips at the completion of the redevelopment;
- Distribute new trips to the proposed full build-out years for four (4) phases at 2018, 2023, 2028, and 2031, respectively;
- Evaluate capacity of the study area intersections using the latest version of Synchro and SimTraffic software for the 2014 Existing, 2018 Forecasted (future, no-build with Background), 2018 Site+Forecasted (future, build), 2023 Forecasted and Site+Forecasted, 2028 Forecasted and Site+Forecasted, , 2031 Forecasted and Site+Forecasted traffic conditions;
- Suggest roadway or intersection improvements to mitigate significant impacts, if any, due to the proposed development;
- Perform Neighborhood Traffic Study (NTS) to evaluate the traffic issues on the neighborhood bounded by the study intersections due to the proposed development.

The Austin Oaks site is currently fully developed and occupied with office land uses. The proposed redevelopment of the existing site will serve as a more mixed use development providing land uses such as Shopping Center, High Turnover (Sit-Down) Restaurant, General Office Building, Condominiums/Townhomes, and Apartments. Given the current occupancy of the development, the redevelopment of Austin Oaks will occur in various phases of construction. The Conceptual Plan for the proposed development has been included within the Appendix of this report as ***Exhibit 2***. The land uses proposed for each phases are as follows:

- **Phase I – 2018:** Denoted as Block C in the Conceptual Plan. The land uses proposed for Block C are Retail (Shopping Center), High Turnover (Sit-Down) Restaurant, and General Office.
- **Phase II – 2023:** Denoted as Block B and D in the Conceptual Plan. The land uses proposed for Blocks B and D are Retail (Shopping Center), and General Office Buildings.

- **Phase III – 2028:** Denoted as Block A and G in the Conceptual Plan. The land uses proposed for Blocks A and G are Residential (Townhomes and Apartments).

- **Phase IV – 2031:** Denoted as Block E and F in the Conceptual Plan. The land uses proposed for Blocks E and F are General Office Buildings and High Turnover (Sit-Down) Restaurant.

A summary of the proposed phasing, land uses, and intensities can be seen within the **Table 4** below. The TIA Scoping Document, defining the parameters of this report, is contained within the Appendix as ***Exhibit 3.*** The Trip Generation outputs generated based on the Institute of Transportation Engineers (ITE) Trip Generation Handbook, 9th Edition, are also contained within ***Exhibit 3.***

STUDY METHODOLOGY

This study consists of six (6) major components listed below.

- Data Collection and Roadway System – Peak hour manual turning movement counts (TMC) were performed at the existing study intersections. Additionally, for the NTS, Average Daily Traffic (ADT) counts were also collected along adjacent roadways. All TMC and ADT data is included within the Appendix of this report as ***Exhibit 5***;

- Trip Generation – An estimation of new trips generated by the existing and proposed development was determined using the ITE Trip Generation Handbook, 9th Edition as well as research done by Bury;

- Trip Distribution – The origins and destinations of site-related trips were determined by comparing existing traffic patterns on the study area roadways and by observing the existing land use in the area;

- Trip Assignment – New trips were assigned to the completion of the development for each phase of development: 2018, 2023, 2028, and 2031;

- Analysis – An operational analysis of the surrounding roadway network was completed for the 2014 Existing, 2018 Forecasted (future, no-build with Background), 2018 Site+Forecasted (future, build), 2023 Forecasted and Site+Forecasted, 2028 Forecasted and Site+Forecasted, 2031 Forecasted and Site+Forecasted traffic conditions. The existing and projected traffic volume figures have been included within the Appendix of this report as ***Exhibit 6***.

- Neighborhood Traffic Study – A Neighborhood Traffic Study was conducted for six (6) neighborhood street segments bounded by the study intersections. The study evaluated the existing 24-hour bi-directional traffic volumes along the roadways, identified capacity deficiencies, if any, and provides recommendations for improvements to the roadway segments.

DATA COLLECTION OF ROADWAY SYSTEM

Manual TMC's for the peak periods were performed for 7:00 a.m. to 9:00 a.m. for AM Peak Hour, and 4:00 p.m. to 6:00 p.m. for the PM Peak Hour in March 2014. 24-hour bi-directional tube counts, ADT's, were also performed on the six (6) street segments selected for the NTS. All TMC and ADT traffic data has been included within the Appendix of this report as ***Exhibit 5***. The roadway network with the associated traffic volumes for the 2014 existing and future conditions can be seen within Appendix of this report as ***Exhibit 6***.

A site investigation was performed to understand the existing conditions of the roadway network within the analysis. Intersection geometries, traffic behavior, and unique characteristics were noted during the investigation. The following provides a description of the roadway system within the study area based upon the data obtained in the field:

- Far West Boulevard is classified as a 6-lane divided major arterial in the vicinity of the proposed redevelopment. The roadway provides east-west travel with a posted speed limit of 35 miles per hour (mph). Far West Boulevard is traffic signal controlled at its intersection with Hart Lane, Wood Hollow Drive, and Mopac.

- Hart Lane is classified as a 2-lane undivided neighborhood collector in the vicinity of the proposed redevelopment. The roadway provides north-south travel with a posted speed limit of 30 mph. A bicycle lane is provided for both northbound and southbound travel along Hart Lane with on-street parking along the northbound side of the roadway. Hart Lane is traffic signal controlled at its intersection with Far West Boulevard, an all-way stop controlled at its intersection with Greystone Drive, and one-way stop controlled at its intersection with Executive Center Drive. Based on traffic counts obtained by Bury in March 2014, Hart Lane experienced 4,266 vehicles per hour (vph) between Greystone Drive and Executive Center Drive, and 6,196 vph between Far West Boulevard and Greystone Drive.

- Wood Hollow Drive is classified as a 2-lane undivided neighborhood collector in the vicinity of the proposed redevelopment. The roadway provides north-south travel with a posted speed limit of 30 mph. The roadway provides for on-street parking on both the northbound and southbound sides of the roadway. Wood Hollow Drive is signal controlled where it intersects at Far West Boulevard, and also at Spicewood Springs Road. Wood Hollow Drive at Greystone Drive is all-way stop controlled while at Executive Center Drive it is two-way stop controlled. Based on traffic counts obtained by Bury in March 2014, Wood Hollow Drive experienced 4,755 vph between Greystone Drive and Executive Center Drive, and 6,595 vph between Far West Boulevard and Greystone Drive.

- Loop 1 (Mopac) is classified as a 6-lane freeway with a 3-lane southbound frontage road. A northbound frontage road is not provided between Far West Boulevard and Spicewood Springs Road. The posted speed limit along the Mopac southbound frontage road is 50 mph. Based on the Texas Department of Transportation District Traffic Map for Austin, the 2012 Annual Average Daily Traffic (AADT) on Mopac main-lanes, near Far West Boulevard is approximately 148,000 vpd. Additionally, the future addition of the express lanes along Mopac have been designed such that an entrance/exit to and from the express lane has been provided to be able to access Far West Boulevard and Spicewood Springs Road. This improvement will allow patrons and residents of the Austin Oaks redevelopment to travel to downtown efficiently via the new express lane if they so choose.

- Greystone Drive is classified as a 2-lane undivided neighborhood collector in the vicinity of the proposed redevelopment. The roadway provides east-west travel with assumed speed limit of 30 mph since there is no posted speed limit. A bicycle lane is provided for both eastbound and westbound travel along Greystone Drive with on-street parking along the westbound side of the roadway. There are no intersections along Greystone Drive which are signal controlled. Based on traffic counts obtained by Bury in March 2014, Greystone Drive experienced 4,853 vph between Wood Hollow Drive and Hart Lane, and 5,785 vph between Mopac and Wood Hollow Drive.

- Executive Center Drive is classified as a 2-lane undivided commercial collector in the vicinity of the proposed redevelopment. The roadway provides east-west travel with an assumed 30 mph speed limit since there is not a posted speed limit. There are no signal controls provided on Executive Center Drive within the study limits; all the study intersections on Executive Center Drive are stop controlled. The roadway provides on-street parking on both the westbound and eastbound sides.

- Spicewood Springs Road is classified as a 4-lane divided major arterial within the vicinity of the proposed redevelopment. The roadway provides east-west travel with a posted speed limit of 35 mph. The roadway provides bicycle lanes both the eastbound and westbound sides of the roadway.

TRIP GENERATION

SITE TRAFFIC

The proposed Austin Oaks will be in a property that is currently fully developed with office land uses. Per the City of Austin Transportation Criteria Manual, the existing traffic associated with the existing land uses may be utilized within the trip generation calculations for this redevelopment. Since these trips are already on the roadway network, the proposed redevelopment will be a net increase to take into account these trips. Based on the Proposed Conceptual Plan and the area, site generated trips were estimated using the equation based on recommendations and data contained in the Trip Generation Manual, 9th Edition by ITE. The proposed project will generate 20,736 unadjusted daily trips by full build out in 2031. **Table 4** provides a detailed summary of traffic production for each land use, which is directly related to

the assumed land use plan. The trip generation and associated equations have been included as ***Exhibit 3*** within the Appendix of this report. The Conceptual Plan for the proposed redevelopment has also been included within the Appendix of this report as ***Exhibit 2***.

TABLE 6– SUMMARY OF UNADJUSTED DAILY AND PEAK HOUR TRIP GENERATION

Phase	ITE Code	Proposed Land Use	Size		24-Hour Two-Way Volume	AM Peak Hour		PM Peak Hour	
						Enter	Exit	Enter	Exit
Existing									
	710	General Office Building	450,000	sf	4,248	550	75	99	484
		Existing Subtotal			**4,248**	**550**	**75**	**99**	**484**
Phase I									
	820	Shopping Center	51,200	sf	4,395	63	40	199	207
	932	High Turnover (Sit-Down) Restaurant	8,000	sf	1,017	48	44	53	37
	710	General Office Building	300,000	sf	3,109	397	54	71	344
		Phase I Subtotal			**8,521**	**508**	**138**	**323**	**588**
Phase II									
	820	Shopping Center	50,500	sf	5,512	83	53	246	257
	710	General Office Building	318,700	sf	3,440	436	60	87	427
		Phase II Subtotal			**8,952**	**519**	**113**	**333**	**684**
Phase III									
	210	Apartment	574	du	3,725	57	231	228	122
	230	Condominium/Townhouse	36	du	288	5	21	20	10
		Phase III Subtotal			**4,013**	**62**	**252**	**248**	**132**
Phase IV									
	710	General Office Building	252,800	sf	3,193	398	54	75	366
	932	High Turnover (Sit-Down) Restaurant	2,400	du	305	14	13	16	11
		Phase IV Subtotal			**3,498**	**412**	**67**	**91**	**377**
		Total Proposed Development			**24,984**	**1,501**	**570**	**995**	**1,781**
		Net Increase of Trips			**20,736**	**951**	**495**	**896**	**1,297**

Pass-by and internal trips can account for a significant portion of a site's generated traffic. Internal trips use only internal roadways within the site, traveling from one land use to another. Per the approved TIA Scope negotiated with the City of Austin and Texas Department of Transportation (TxDOT), a 5% internal reduction has been applied to this analysis.

Pass-by trips are attracted to the site from traffic passing on an adjacent street and are based on information contained in the ITE Trip Generation Handbook (Trip Generation Handbook, ITE). Pass-by reductions, therefore, allow for a reduction in site traffic at the existing intersections, but not at site driveways. Pass-by trips have been assumed only for the following land-uses:

	AM Peak	PM Peak
Shopping Center	0%	34%
High-Turnover Sit-Down Restaurant	0%	43%

Detailed calculations on trip reductions have been provided in the Appendix of this report as ***Exhibit 7***. **Table 6**, below, provides a summary of the proposed land uses and trips after adjustments.

TABLE 7– SUMMARY OF ADJUSTED DAILY AND PEAK HOUR TRIP GENERATION

Phase	ITE Code	Proposed Land Use	Size		24-Hour Two-Way Volume	AM Peak Hour		PM Peak Hour	
						Enter	Exit	Enter	Exit
Existing									
	710	General Office Building	450,000	sf	4,036	523	71	94	460
		Existing Subtotal			**4,036**	**523**	**71**	**94**	**460**
Phase I									
	820	Shopping Center	51,200	sf	3,428	60	38	121	126
	932	High Turnover (Sit-Down) Restaurant	8,000	sf	747	46	42	28	19
	710	General Office Building	300,000	sf	2,954	377	51	67	327
		Phase I Subtotal			**7,129**	**483**	**131**	**216**	**472**
Phase II									
	820	Shopping Center	50,500	sf	4,299	79	50	150	157
	710	General Office Building	318,700	sf	3,268	414	57	83	406
		Phase II Subtotal			**7,567**	**493**	**107**	**233**	**562**
Phase III									
	210	Apartment	574	du	3,539	54	219	217	116
	230	Condominium/Townhouse	36	du	274	5	20	19	10
		Phase III Subtotal			**3,812**	**59**	**239**	**236**	**125**
Phase IV									
	710	General Office Building	252,800	sf	3,033	378	51	71	348
	932	High Turnover (Sit-Down) Restaurant	2,400	du	224	13	12	8	6
		Phase IV Subtotal			**3,258**	**391**	**64**	**80**	**353**
		Total Proposed Development			**21,766**	**1,426**	**542**	**764**	**1,514**
		Net Increase of Trips			**17,731**	**903**	**470**	**670**	**1,054**

BACKGROUND TRAFFIC

Background traffic is the traffic generated by other proposed developments to be constructed during or before the time period of the proposed redevelopment within the boundary of the proposed study area. Within the vicinity of the Austin Oaks redevelopment, various developments are expected to occur within the time period of this development. The following projects have been included as background traffic per scoping with the City of Austin:

- Northwest Skyline (C8-2012-00530A)
- Austin Oaks Restaurant (SP-2013-0058CT)

The above developments have been included within the analysis of this report and fall within the Phase I (2018) Forecasted condition. The roadway network with the associated trips from the background projects have been distributed within the Austin Oaks study area network. **Table 7** provides a detailed summary of traffic production for each background projects used in this TIA.

TABLE 8– SUMMARY OF BACKGROUND DEVELOPMENT TRIP GENERATION

Background Developments	ITE Code	Land Use	Size		24-Hour Two-Way Volume	AM Peak Hour		PM Peak Hour	
						Enter	Exit	Enter	Exit
Austin Oaks Restaurant	932	High Turnover (Sit-Down) Restaurant	3,700	sf	470	22	20	24	17
Northwest Skyline	210	Single Family Detached Housing	6	du	78	3	10	5	3
Total Proposed Background Development					**548**	**25**	**30**	**29**	**20**

TRIP DISTRIBUTION

The distribution for the site traffic has been based on the existing turning movement counts as well as evaluating where major attractors and residential areas are located relative to the proposed Austin Oaks redevelopment. These data provided the basis for the directional distribution of traffic approaching and departing the site as well as applying engineering judgment for the projected traffic utilizing the study roadways accessing to and from the site and is summarized in **Table 8**. The Traffic Distribution Map can also be seen in the Appendix of this report as ***Exhibit 8***.

TABLE 9– OVERALL DIRECTIONAL DISTRIBUTION OF SITE TRAFFIC

Direction	% of Site Traffic
West Spicewood Springs Road	20%
East Anderson Lane	20%
North Mopac	20%
South Mopac	15%
South Hart Lane	5%
South Wood Hollow Drive	5%
West Greystone Drive	5%
West Far West Boulevard	10%

TRIP ASSIGNMENT

New site trips were assigned to the roadway network in accordance with the trip distribution patterns identified in the **Table 8** above. Trips to and from the site were assigned to each study area roadway and intersection. The existing trips captured in March 2014 were increased using a conservative growth factor of 2% provided by the City of Austin Staff within the TIA Scoping document. This growth rate was applied at each of the Forecasted traffic conditions for the analysis to count for the natural growth of the area. All traffic generated by the proposed Austin Oaks development was distributed throughout the study area and added to the Forecasted AM and PM Peak Hour conditions which can be seen within ***Exhibit 6*** as the Site+Forecasted Condition for each of the phases.

ANALYSIS

INTERSECTION OPERATIONAL ANALYSIS

Following the assignment of projected traffic volumes onto the study area roadways, a detailed Operational Analysis was undertaken using techniques outlined in the Highway Capacity Manual 2010 (HCM 2010). For purposes of Traffic Operational Analyses, geometric conditions within the study area were input into the microcomputer based traffic model, Synchro, Version 8.0 (by David Husch in Trafficware, Synchro 8.0). Synchro follows procedures developed in the HCM 2010 and analyzes the study area in its entirety, rather than as a series of isolated intersections and driveways. All of the various scenarios, including Existing, Forecasted, and Site+Forecasted conditions for this study area were analyzed using Synchro. Traffic Signal Timing Plans were provided by City of Austin and TxDOT and these timing plans have been included with the Synchro Outputs for each scenario within the Appendix as ***Exhibit 9***.

For the evaluation of existing and proposed conditions, measures of effectiveness were utilized such as intersection LOS and delay associated with these LOS. The intersection delay is the average control delay for the signalized intersection and is calculated by taking a volumes-weighted average of all the delays occurring at the intersection. Control delay is defined as 'the component of delay that results when a traffic control device such as signal, stop etc. causes a lane group to reduce speed or brings traffic to a complete stop'. Control delay includes deceleration delay, queue move-up time, stopped delay, and acceleration delay. LOS refers to the operational conditions within a traffic stream and their perception by motorists in terms of delay, freedom to maneuver, traffic interruptions, comfort, convenience, and safety. There are six (6) LOS capacity conditions for each roadway facility. These are designated from "A" to "F," with "A" representing a free-flow optimal best condition and "F" representing a congested forced flow worst condition. The LOS criteria for signalized and un-signalized intersections are different and is mainly because how the drivers function at a signalized versus un-signalized intersections. The general criteria associated with each LOS reported for signalized and un-signalized intersections are presented in **Table 9** below.

TABLE 10– LEVEL OF SERVICE MEASUREMENT AND QUALITATIVE DESCRIPTIONS

Level of Service	Control Delay for Signalized Intersection (sec/veh)	Control Delay for Unsignalized Intersection (sec/veh)	Description
A	≤ 10	≤ 10	Good progression and short cycle lengths
B	> 10 and ≤ 20	> 10 and ≤ 15	Good progression or short cycle lengths, more vehicle stops
C	> 20 and ≤ 35	> 15 and ≤ 25	Fair progression and/or longer cycle lengths, some cycle failures
D	> 35 and ≤ 55	> 25 and ≤ 35	Congestion becomes noticeable, high volume-to-capacity ratio
E	> 55 and ≤ 80	> 35 and ≤ 50	Limit of acceptable delay, poor progression, long cycles, and/or high volume
F	> 80	> 50	Unacceptable to drivers, volume greater than capacity

Table 10 provided below presents the analysis results in terms of LOS and Delay for each study intersection for the existing and proposed AM and PM peak Hours conditions.

TABLE 10 - SUMMARY OF INTERSECTION LEVEL OF SERVICE AND DELAY

Intersection	2014		2018		2018		2023		2023		2028		2028		2031		2031	
	Existing		Forecasted		Site + Forecasted		Forecasted		Site + Forecasted		Forecasted		Site + Forecasted		Forecasted		Site + Forecasted	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
	LOS																	
	Delay (s)																	
Far West Boulevard & Hart Lane	D	C	D	C	D	C	E	C	E	D	F	D	F	D	F	E	F	F
	46.1	31.7	50.9	31.7	53.8	31.9	68.7	33.5	76.2	37.1	103.1	45.7	117.6	52.2	138.2	78.4	144.1	86.1
Far West Boulevard & Wood Hollow Drive	D	D	D	D	D	D	D	D	D	E	E	E	E	E	E	F	E	F
	44.4	48.2	44.1	49.0	44.0	47.8	49.2	51.8	50.1	60.2	59.5	69.9	59.6	70.8	69.4	81.6	73.3	92.2
Far West Boulevard & Mopac SB FR	C	E	C	F	C	E	C	F	C	F	D	F	D	F	D	F	D	F
	25.2	78.4	28.5	97.4	28.3	72.6	34.7	97.7	34.1	114.2	45.4	161.4	46.3	166.2	54.3	197.2	54.8	209.5
Far West Boulevard & Mopac NB FR	B	E	C	E	D	E	D	E	F	E	F	E	F	F	F	F	F	F
	19.2	67.2	20.8	68.7	41.7	60.1	53.8	56.9	131.2	55.3	162.9	69.9	186.5	91.1	210.5	117.5	315.9	126.3
Spicewood Springs Road & Mopac SB FR	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
	127.2	92.4	159.6	119.3	183.0	191.6	224.3	229.7	250.5	301.2	304.5	350.2	331.2	366.4	369.1	404.1	385.7	448.1
Spicewood Springs Road & Mopac NB FR	D	E	E	E	F	F	F	F	F	F	F	F	F	F	F	F	F	F
	53.6	61.2	67.6	78.3	96.8	92.0	117.0	118.9	137.6	147.1	173.9	171.3	176.5	190.8	197.3	211.7	219.8	227.0
Spicewood Springs Road & Wood Hollow Drive / Private Driveway	D	C	E	C	F	F	F	F	F	F	F	F	F	F	F	F	F	F
	45.6	24.4	59.9	25.4	145.2	107.7	177.5	135.4	275.4	249.6	350.3	293.6	412.1	342.4	455.3	370.0	548.1	451.0
Greystone Drive & Hart Lane	C	B	C	C	D	D	E	F	F	F	F	F	F	F	F	F	F	F
	18.2	14.3	24.1	16.8	31.0	32.2	48.2	51.4	68.5	93.3	106.3	138.0	128.7	163.7	220.5	200.2	245.6	223.3
Greystone Drive & Wood Hollow Drive	B	C	B	C	B	C	B	D	C	E	C	F	C	F	C	F	D	F
	10.6	15.2	11.5	18.7	13.0	22.5	14.8	31.8	16.4	38.1	19.7	55.7	19.7	57.0	22.7	71.1	25.6	79.2
Greystone Drive & Mopac SB FR	C	A	D	A	D	A	E	A	E	A	F	B	F	B	F	C	F	C
	15.7	3.2	26.5	4.8	27.0	3.4	45.1	5.6	45.7	6.6	711.0	13.4	701.3	13.9	701.2	20.9	698.9	23.1
Executive Center Drive & Mopac SB FR	A	A	A	A	A	D	A	F	A	F	A	F	C	F	C	F	E	F
	0.3	2.2	0.3	2.8	0.6	29.8	0.7	51.3	2.3	167.8	4.5	2233.6	16.1	2269.1	22.7	2267.8	39.2	2594.3
Executive Center Drive & Wood Hollow Drive	A	A	A	B	C	F	E	F	F	F	F	F	F	F	F	F	F	F
	4.0	9.0	4.6	11.8	21.7	256.8	47.6	3350.4	>9999.9	>9999.9	>9999.9	>9999.9	>9999.9	>9999.9	>9999.9	>9999.9	>9999.9	>9999.9
Executive Center Drive & Hart Lane	A	A	A	A	A	A	A	A	A	F	A	F	F	F	F	F	F	F
	1.8	3.1	1.9	3.4	2.8	6.4	3.0	7.9	4.9	128.1	5.9	196.4	55.9	359.3	82.1	4552.2	127.2	4758.8
Spicewood Springs Road & Hart Lane	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
	373.6	91.4	379.4	892.5	386.3	855.9	386.0	856.5	397.6	954.9	400.6	960.4	440.7	951.7	451.6	960.0	455.6	988.0

TABLE 10 - SUMMARY OF INTERSECTION LEVEL OF SERVICE AND DELAY

Intersection	2014		2018		2018		2023		2023		2028		2028		2031		2031	
	Existing		Forecasted		Site + Forecasted		Forecasted		Site + Forecasted		Forecasted		Site + Forecasted		Forecasted		Site + Forecasted	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
	LOS																	
	Delay (s)																	
Executive Center Drive & Driveway 1	-	-	-	-	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	-	-	-	-	0.0	0.0	0.0	0.0	3.8	7.4	4.1	8.2	4.1	8.4	4.3	9.4	4.5	9.8
Executive Center Drive & Driveway 2	-	-	-	-	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	-	-	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3	4.9
Executive Center Drive & Driveway 3	-	-	-	-	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	-	-	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	9.1
Executive Center Drive & Driveway 4	-	-	-	-	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	-	-	-	-	2.6	5.7	2.7	5.8	2.2	4.1	2.4	4.6	2.4	4.7	2.5	5.1	2.8	9.2
Executive Center Drive & Driveway 5	-	-	-	-	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	-	-	-	-	0.0	0.0	0.0	0.0	0.3	0.7	0.3	0.7	0.3	0.6	0.3	0.6	0.3	0.4
Executive Center Drive & Driveway 6	-	-	-	-	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	-	-	-	-	0.0	0.0	0.0	0.0	0.8	3.5	0.9	3.7	0.8	3.4	0.8	3.6	0.7	3.6
Executive Center Drive & Driveway 7	-	-	-	-	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	-	-	-	-	0.0	0.0	0.0	0.0	0.2	0.7	0.2	0.8	0.2	0.6	0.2	0.7	0.2	0.6
Executive Center Drive & Driveway 8	-	-	-	-	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	-	-	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1	2.0	2.3	2.1	2.3	2.1
Executive Center Drive & Driveway 9	-	-	-	-	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	-	-	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.2	0.3	0.2	0.3	0.2
Executive Center Drive & Driveway 10	-	-	-	-	A	A	A	A	A	A	A	A	A	A	A	A	A	A
	-	-	-	-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	2.2	3.2	2.3	3.3	2.3
Wood Hollow Drive & Driveway 11	-	-	-	-	A	A	A	B	C	F	F	F	F	F	F	F	F	F
	-	-	-	-	4.5	9.0	5.5	10.9	17.2	997.9	237.9	>9999.9	340.5	>9999.9	340.0	>9999.9	308.3	>9999.9

In order to mitigate the impacts to the various intersections which are failing, improvements has been evaluated for the failing intersections. Additionally, a discussion of these improvements can be found in the Findings and Recommendations. **Table 11** below provides a summary of the level of service grade and delay for the intersection in which improvements have been implemented for both AM and PM peak periods. The Synchro files associated with proposed improvements has been included within the Appendix of this report as ***Exhibit 10***. Additionally, a detailed table has been provided in the Appendix of this report as ***Exhibit 11*** showing the approach LOS and delay for each intersection.

TABLE 13– INTERSECTION LEVEL OF SERVICE AND DELAY WITH IMPROVEMENTS

	2014		2018		2018		2018		2023		2023		2023		2028		2028		2028		2031		2031		2031	
	Existing		Forecasted		Site + Forecasted		Site + Forecasted w/Imps		Forecasted		Site + Forecasted		Site + Forecasted w/Imps		Forecasted		Site + Forecasted		Site + Forecasted w/Imps		Forecasted		Site + Forecasted		Site + Forecasted w/Imps	
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
	LOS																									
Intersection	Delay (s)																									
Far West Boulevard and Hart Lane	D	C	D	C	D	C	-	-	E	C	E	D	D	C	F	D	F	D	E	D	F	E	F	F	F	D
	46.1	31.7	50.9	31.7	53.8	31.9	-	-	68.7	33.5	76.2	37.1	47.9	30.2	103.1	45.7	117.6	52.2	66.3	36.0	138.2	78.4	144.1	86.1	91.1	42.8
Far West Boulevard and Wood Hollow Drive	D	D	D	D	D	D	-	-	D	D	D	E	C	C	E	E	E	E	C	C	E	F	E	F	D	D
	44.4	48.2	44.1	49.0	44.0	47.8	-	-	49.2	51.8	50.1	60.2	29.0	30.8	59.5	69.9	59.6	70.8	30.0	33.4	69.4	81.6	73.3	92.2	45.2	35.6
Far West Boulevard and Mopac SB FR	C	E	C	F	C	E	C	D	C	F	C	F	C	E	D	F	D	F	D	F	D	F	D	F	D	F
	25.2	78.4	28.5	97.4	28.3	72.6	28.2	41.9	34.7	97.7	34.1	114.2	31.4	76.2	45.4	161.4	46.3	166.2	45.3	96.2	54.3	197.2	54.8	209.5	54.1	100.6
Far West Boulevard and Mopac NB FR	B	E	C	E	D	E	D	C	D	E	F	E	F	D	F	E	F	F	F	F	F	F	F	F	F	F
	19.2	67.2	20.8	68.7	41.7	60.1	38.4	31.5	53.8	56.9	131.2	55.3	100.9	54.0	162.9	69.9	186.5	91.1	93.7	91.8	210.5	117.5	315.9	126.3	139.0	125.9
Spicewood Springs Road and Mopac SB FR	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
	127.2	92.4	159.6	119.3	183.0	191.6	144.3	107.4	224.3	229.7	250.5	301.2	212.9	180.9	304.5	350.2	331.2	366.4	275.0	236.6	369.1	404.1	385.7	448.1	327.9	287.1
Spicewood Springs Road and Mopac NB FR	D	E	E	E	F	F	E	E	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
	53.6	61.2	67.6	78.3	96.8	92.0	59.6	74.1	117.0	118.9	137.6	147.1	87.8	111.3	173.9	171.3	176.5	190.8	110.3	157.6	197.3	211.7	219.8	227.0	148.3	194.4
Spicewood Springs Road & Wood Hollow Drive / Private Driveway	D	C	E	C	F	F	F	D	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
	45.6	24.4	59.9	25.4	145.2	107.7	108.6	40.7	177.5	135.4	275.4	249.6	190.0	96.7	350.3	293.6	412.1	342.4	251.8	158.7	455.3	370.0	548.1	451.0	331.2	217.4
Greystone Drive and Hart Lane	C	B	C	C	D	D	-	-	E	F	F	F	C	C	F	F	F	F	D	D	F	F	F	F	E	E
	18.2	14.3	24.1	16.8	31.0	32.2	-	-	48.2	51.4	68.5	93.3	20.4	18.9	106.3	138.0	128.7	163.7	29.8	27.1	220.5	217.2	245.6	223.3	42.7	39.1
Greystone Drive and Wood Hollow Drive	B	C	B	C	B	C	-	-	B	D	C	E	C	C	C	F	C	F	C	E	C	F	D	F	D	E
	10.6	15.2	11.5	18.7	13.0	22.5	-	-	14.8	31.8	16.4	38.1	16.7	24.3	19.7	55.7	19.7	57.0	20.8	35.1	22.7	71.1	25.6	79.2	27.3	49.9
Executive Center Drive and Wood Hollow Drive	A	A	A	B	C	F	A	B	E	F	F	F	B	B	F	F	F	F	B	B	F	F	F	F	D	C
	4.0	9.0	4.6	11.8	21.7	256.8	9.8	11.9	47.6	3350.4	>9999.9	>9999.9	11.4	13.5	>9999.9	>9999.9	>9999.9	>9999.9	17.1	17.6	>9999.9	>9999.9	>9999.9	>9999.9	52.1	34.1
Executive Center Drive and Hart Lane	A	A	A	A	A	A	-	-	A	A	A	F	A	C	A	F	F	F	B	F	F	F	F	F	C	F
	1.8	3.1	1.9	3.4	2.8	6.4	-	-	3.0	7.9	4.9	128.1	4.5	18.9	5.9	196.4	55.9	359.3	11.9	86.0	82.1	4552.2	127.2	4758.8	24.9	155.9
Spicewood Springs Road and Hart Lane	F	F	F	F	F	F	C	B	F	F	F	F	C	B	F	F	F	F	D	C	F	F	F	F	E	C
	373.6	91.4	379.4	892.5	386.3	855.9	24.1	15.7	386.0	856.5	397.6	954.9	29.3	19.1	400.6	960.4	440.7	951.7	41.1	29.8	451.6	960.0	455.6	988.0	66.1	34.3

NEIGHBORHOOD TRAFFIC STUDY

STUDY PURPOSE

A Neighborhood Traffic Study (NTS) was performed to analyze the conditions of roadway segments for the roadways identified by the City of Austin to be included within the NTS. The goal of the study is to examine the existing capacities along the roadway segments, identify operational deficiencies, if any, and provide recommendations, if warranted, which may improve the roadway capacity along the segments analyzed. The roadway segments considered for the neighborhood study are as follows:

- **Hart Lane** between Far West Boulevard and Greystone Drive;
- **Hart Lane** between Greystone Drive and Executive Center Drive;
- **Wood Hollow Drive** between Far West Boulevard and Greystone Drive;
- **Wood Hollow Drive** Between Greystone Drive and Executive Center Drive;
- **Greystone Drive** between Hart Lane and Wood Hollow Drive and
- **Greystone Drive** between Wood Hollow Drive and Mopac Southbound Service Drive.

Exhibit 12 highlights the six (6) roadway segments listed above. The NTS was conducted for these roadway segments based on the desirable operation levels described in Section 25-6-114 (Neighborhood Traffic Analysis Required) and Section 25-6-116 (Desirable Operating Levels for Certain Streets) of the City of Austin Land Development Code (LDC). According to the LDC, the desirable operating criteria for a local or a collector roadway is as follows:

TABLE 14– DESIRABLE OPERATING CRITERIA FOR ROADWAYS

Pavement Width	Vehicles Per Day
<30 feet	1,200
≥ 30 feet and < 40 feet	1,800
≥ 40 feet	4,000

ANALYSIS

The site traffic travelling south or west within the neighborhood from the proposed site will access one of the segments in the NTS area. For purposes of the NTS, site traffic using any one of these street segments is estimated to be 5% of the total site generated weekday daily traffic. This is based on the trip distribution percentage assumptions made for these roadways as previously discussed in this report. **Table 13**, below, provides a summary of each roadway segments, various roadway characteristics, and the site related traffic anticipated to utilized these roadways.

TABLE 15– NEIGHBORHOOD TRAFFIC STUDY SUMMARY

Roadway Segment	Pavement Width (ft)	Maximum Desirable Volume (vpd)	Existing Volume (vpd)	Forecasted Volume (vpd)	Site Volume (vpd)	Total Site+ Forecasted Volume (vpd)	% Site
Hart Lane between Far West Boulevard and Greystone Drive	45	4,000	6,196	7,338	1,249	8,587	15%
Hart Lane between Greystone Drive and Executive Center Drive	45	4,000	4,266	5,052	1,249	6,301	20%
Wood Hollow Drive between Far West Boulevard and Greystone Drive	45	4,000	6,595	7,810	1,249	9,060	14%
Wood Hollow Drive between Greystone Drive and Executive Center Drive	45	4,000	4,755	5,631	1,249	6,881	18%
Greystone Drive between Hart Lane and Wood Hollow Drive	45	4,000	4,853	5,747	1,249	6,997	18%
Greystone Drive between Wood Hollow Drive and Mopac Southbound Service Drive	45	4,000	5,785	6,851	1,249	8,100	15%

According to **Table 13**, the total trips which include the proposed site generated volume plus the forecasted volume for the full build-out year at 2031 exceeds the desirable volume of 4,000 vehicles per day.

ROADWAY CAPACITY ANALYSIS

A Roadway Capacity Analysis was conducted for all six (6) roadway segments was also conducted for all phases of the proposed Austin Oaks redevelopment. The posted/assumed speed limits along these roadways are 30 mph and have been assumed to be the free flow speed (FFS) for the purposes of the analysis. The 2010 Highway Capacity Manual (HCM) provides Maximum Service Flow Rate (MSF) in passenger cars per hour per lane (pcphpl) and its associated LOS for Multilane Highway Segments (Exhibit 14-17, Page 14-22 of HCM) for FFS from 45 to 60 mph in five (5) mph increments. **Table 14** describes MSF in relation to LOS for a FFS of only 45 mph for a roadway segment.

TABLE 16– ROADWAY LOS CRITERIA (HCM 2010)

LOS	Maximum Service Flow Rate (pcphpl)
A	≤ 290
B	> 290 and ≤ 810
C	> 810 and ≤ 1,170
D	> 1,170 and ≤ 1,550
E	> 1,550 and ≤ 1,900
F	> 1,900

The 24-hour bi-directional tube counts (ADT's) taken along all six (6) segments were used to evaluate the capacity along these segments for the existing conditions. According to the counts, the peak hour was between 5:00 and 6:00 PM for all segments except for Hart Lane between Greystone Drive and Far West Boulevard. Based on the HCM methodology, MSF was determined by dividing the peak hour volume by the total number of lanes in one (1) direction, which on all segments is one-lane. Once the MSF was determined, the corresponding LOS was obtained from **Table 14** above. To perform the capacity analysis for the 2018, 2023, 2028, and 2031 Site+Forecasted conditions, the volumes were derived for each of the scenarios. First, the existing volumes were forecasted to its corresponding years by applying the same growth factor, 1%, used for the TIA; then, the PM Peak Hour site generated traffic volumes were applied with a 5%+ trip distribution percentage, as previously discussed in this report, and added to the respective forecasted volume to determine the Site+Forecasted trips for each build-out phases. **Table 15** below summarizes the analysis results of all six (6) roadway segments.

TABLE 17– ROADWAY CAPACITY ANALYSIS RESULTS FOR SEGMENTS

Roadway Segment	Analysis Period	Volume (vph)	Maximum Service Flow Rate (vphpl)	LOS
Hart Lane between Far West Boulevard and Greystone Drive	Existing 2014	648	648	B
	Site +Forecasted 2018	813	813	C
	Site +Forecasted 2023	993	993	C
	Site+Forecasted 2028	1,183	1,183	D
	Site+Forecasted 2031	1,358	1,358	D
Hart Lane between Greystone Drive and Executive Center Drive	Existing 2014	467	467	B
	Site +Forecasted 2018	625	625	B
	Site +Forecasted 2023	795	795	B
	Site+Forecasted 2028	975	975	C
	Site+Forecasted 2031	1,143	1,143	C
Wood Hollow Drive between Far West Boulevard and Greystone Drive	Existing 2014	623	623	B
	Site +Forecasted 2018	787	787	B
	Site +Forecasted 2023	966	966	C
	Site+Forecasted 2028	1,154	1,154	C
	Site+Forecasted 2031	1,328	1,328	D
Wood Hollow Drive between Greystone Drive and Executive Center Drive	Existing 2014	472	472	B
	Site +Forecasted 2018	630	630	B
	Site +Forecasted 2023	801	801	B
	Site+Forecasted 2028	981	981	C
	Site+Forecasted 2031	1,149	1,149	C
Greystone Drive between Hart Lane and Wood Hollow Drive	Existing 2014	472	472	B
	Site +Forecasted 2018	630	630	B
	Site +Forecasted 2023	801	801	B
	Site+Forecasted 2028	981	981	C
	Site+Forecasted 2031	1,149	1,149	C
Greystone Drive between Wood Hollow Drive and Mopac Southbound Frontage Road	Existing 2014	545	545	B
	Site +Forecasted 2018	706	706	B
	Site +Forecasted 2023	881	881	C
	Site+Forecasted 2028	1,064	1,064	C
	Site+Forecasted 2031	1,236	1,236	D

FINDINGS AND RECOMMENDATIONS

Upon completing the analysis for the roadway network, it became evident that with the anticipated future growth of the area and the proposed development, improvements will be needed in order to mitigate the degradation of specific intersections. The intersections identified below will require traffic improvements to improve the level of service. All other intersections perform at an acceptable level of service and do not require any improvements.

Far West Boulevard and Hart Lane

The intersection of Far West Boulevard and Hart Lane currently performs at acceptable LOS until the 2023 Forecasted AM Peak condition at which it operates at a LOS E. This unacceptable intersection delay is due to the southbound Hart Lane approach and westbound Far West Boulevard left turn movement. Re-striping southbound the Hart Lane approach from a shared left-through lane and a shared through-right lane to provide an exclusive left-turn lane, and a shared through-right lane in addition to converting the split phasing on the north and south approach to a permissive phase on the northbound and a Permissive+Protected phase on the southbound approach will bring the LOS to an acceptable LOS D. This improvement is carried through the successive phases which does improve the delay but with remains at an unacceptable LOS in future phases. No additional improvements can be recommended at this time.

Far West Boulevard and Wood Hollow Drive

The intersection of Far West Boulevard and Wood Hollow Drive currently operates at an acceptable LOS until the 2023 Site+Forecasted PM Peak condition at which it operates at a LOS E. The high intersection delay is mainly due to the southbound Wood Hollow Drive approach. The northbound and southbound Wood Hollow Drive approaches are currently operating as split phase and based on our evaluation it is recommended to convert it to permissive phases. The recommended signal phasing for the northbound and southbound approaches have been incorporated starting with 2023 Site+Forecasted condition; with this mitigation measure the intersection will operate at acceptable LOS of D or better on all conditions. No additional improvements are recommended at this time.

Far West Boulevard and Mopac Southbound Frontage Road

The intersection of Far West Boulevard and Mopac Southbound Frontage Road currently performs at acceptable LOS in the AM peak and unacceptable LOS in the PM peak periods. It continues to operate the same for the successive conditions with increased delay. Since no physical improvements can be made to these intersections, the traffic signal timing splits have been optimized starting with 2018 Site+Forecasted condition in which the optimization improved the delay allowing the intersection to operate at acceptable LOS during the AM Peak condition through all phases of the proposed redevelopment. Thus, signal timing improvements have been recommended for this intersection. No additional improvements are recommended at this time.

Far West Boulevard and Mopac Northbound Frontage Road

The intersection of Far West Boulevard and the Mopac Northbound Frontage Road currently performs at acceptable LOS in the AM peak and unacceptable LOS in the PM peak periods. It continues to operate the same until 2023 Site+Forecasted condition at which it operates at an unacceptable LOS during both AM and PM periods. Similar to the Mopac Southbound intersection, signal timing split optimization have been evaluated for all conditions as the mitigation measure since physical improvements are not possible at this location. Optimizing the splits did not bring it to an acceptable LOS, but it did improve the delay at this intersection. No additional improvements are recommended at this time.

Spicewood Springs Road and Mopac Southbound Frontage Road

The intersection of Spicewood Springs Road and Mopac Southbound Frontage Road currently operates at an unacceptable LOS F and it continues to do so for all the future conditions with increased delay. Physical improvements are not possible at this location; therefore, the only mitigation measures that has been evaluated is the signal split optimization. This did not bring the LOS to be acceptable; but it should be noted that the delay has been improved significantly and operates better when compared to the Forecasted Conditions. No additional improvements are recommended at this time.

Spicewood Springs Road and Mopac Northbound Frontage Road

The intersection of Spicewood Springs Road and Mopac Northbound Frontage Road currently performs at acceptable LOS in the existing AM peak but at unacceptable LOS in the existing PM Peak period. The intersection begins to operate at an unacceptable LOS during both peak periods starting with 2018 Forecasted condition, and it continues do the same with increased delay through the final phase of the proposed redevelopment. Similar to the other interchange intersections, no physical improvements can be evaluated at this intersection. The only mitigation measure considered at this location is the signal timing splits optimization. This did not bring the intersection to perform at acceptable LOS, but this mitigation measure does allow the intersection to perform better than the Forecasted Conditions for each phase. No additional improvements are recommended at this time.

Spicewood Springs Road and Wood Hollow Drive/Private Driveway

The Spicewood Springs Road and Wood Hollow Drive/Private Driveway currently operates at acceptable LOS, however the LOS is unacceptable starting with 2018 Forecasted AM condition. The intersection is starting to fail at 2018 Site+Forecasted condition. The mitigation measures that has been evaluated is converting the lane configuration on the northbound Wood Hollow Drive from two (2) lanes to three (3) lanes to provide an exclusive left turn lane, shared thru-right turn lane, and an exclusive right turn lane in addition to the optimized splits. With these improvements the intersection continues to operate at LOS F, but with improved delay. No additional improvements are recommended at this time.

Greystone Drive and Hart Lane

The intersection of Greystone Drive and Hart Lane currently operates at acceptable LOS and continues to do the same until 2023 Forecasted condition. Therefore, mitigations measures have been evaluated starting with 2023 Site+Forecasted condition. Converting the existing lane configurations to provide two (2) lanes (one (1) shared left-through lane and one (1) shared through-right turn lane) on all approaches will improve the LOS to an acceptable LOS all the way to the 2028 Site+Forecasted Condition. Even though the LOS is unacceptable at the 2031 Site+Forecasted condition, the LOS and delay have been improved. The eastbound and westbound Greystone Drive approaches have two (2) lanes (one (1) shared left-through and an exclusive right-turn lane) in the existing condition; therefore, it is a matter of re-striping to provide the recommended mitigation. However, the northbound and southbound Hart Lane have only one (1) lane in each direction and therefore, in order to provide the recommended two (2) lanes, the existing bike lanes should be re-striped and have it with travel lanes within the vicinity of the intersection. No additional improvements are recommended at this time.

Greystone Drive and Wood Hollow Drive

The intersection of Greystone Drive and Wood Hollow Drive intersection currently operates at acceptable LOS all the way until 2023 Site+Forecasted PM Peak condition. The intersection operates at acceptable LOS in the AM Peak until full built-out, but the LOS and delay continue to increase in the PM Peak period. Physical improvements have been evaluated for this intersection starting at 2023 Site+Forecasted condition. Re-striping the existing lane configurations for the eastbound and westbound Greystone Drive from two (2) lanes (one (1) shared left-through lane and an exclusive right-turn lane) to two (2) lanes (one (1) shared left-through, and one (1) shared through-right lane) will improve the LOS and delay to full build-out, however the LOS is unacceptable in the 2028 and 2031 Site+Forecasted conditions. No additional improvements are recommended at this time.

Executive Center Drive and Wood Hollow Drive

The intersection of Executive Center Drive and Wood Hollow Drive currently operates at an acceptable LOS until the 2018 Site+Forecasted PM Peak condition. In order to mitigate the failing condition, a signal has been proposed for this intersection starting at 2018 Site+Forecasted condition. With the proposed signal the intersection, LOS and delay have been improved to perform at an acceptable LOS until the development is completely built-out in 2031. Without the signal the intersections fails with immeasurable delay. No additional improvements are recommended at this time.

Executive Center Drive and Hart Lane

The intersection of Executive Center Drive and Hart Lane currently operates at an acceptable LOS until 2023 Site+Forecasted PM peak condition. In order to mitigate the failing condition the existing lane configuration on northbound Executive Center Drive is recommended to be converted from one (1) shared left-through lane to two (2) lanes (exclusive left-turn lane and an exclusive right-turn lane). This improvement allows the intersection to operate at an acceptable LOS only in the 2023 AM and PM Site+Forecasted, 2028 AM Site+Forecasted, and 2031 AM Site+Forecasted conditions. The delay has been improved in all other conditions. No additional improvements are recommended at this time.

Spicewood Springs Road and Hart Lane

The intersection of Spicewood Springs Road and Hart Lane is failing in the existing condition and it continues to operate the same with increased delay through to the 2031 Site+Forecasted conditions. This intersection geometry is very unique given the upstream/downstream condition as well as the fact that it is a T-intersection. Signalization of this intersection is the only means in which it will perform at an acceptable level of service; however in-lieu of a full signal, a Continuous Green T-intersection signal was evaluated as an option for this intersection. This solution allows westbound traffic along Spicewood Springs Road to never need to stop and be affected by the signal operations. This allows for a higher level of capacity at this intersection. With this recommended improvement, the intersection operates at acceptable LOS for all condition except for 2031 Site+Forecasted AM peak condition where it operates at LOS E. No additional improvements are recommended at this time.

NTS Results and Recommendations

Based on the results of the NTS, the maximum desirable volumes are currently being exceeded along the roadway segments which were evaluated. Additionally, with the increase in volumes due to the natural growth of the roadway, and with the Austin Oaks redevelopment, the volumes along those roadway segments will continue to increase.

While the volumes have exceed the City of Austin's maximum desirable volumes along those roadways that does not mean that the roadways have exceed their capacity. The results of the Roadway Capacity Analysis show us that roadway segments are performing at an acceptable level of service in the existing conditions as well and all future conditions of the redevelopment. None of the roadway segments analyzed have exceeded capacity.

In order to address the roadway segments exceeding the City of Austin's maximum desirable volumes, the following mitigation measures are recommended to persuade drivers to utilize the major arterials and minimize the use of the neighborhood collectors. Since all these six (6) segments are 2-lane roadways with on-street parking and bicycle lanes, new improvements are limited. The intersection improvements recommended in the previous section will reduce the intersection delays and thus, improving the travel time on the arterial roadway. This will encourage through traffic to return to the arterial roadway system rather than the use of residential streets. The other mitigation measures recommended are as follows:

- Provide adequate striping and signage;
- Install speed limit signs along all street segments;
- Speed cushion installation and
- Speed enforcement.

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