

US 59 – Delay Benefit and Initial B-C Calcs

Traffic Benefit and Preliminary B/C - Upgrade US 59 to 6-lane freeway with frontage roads

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Narrative Explanation of Analysis

The benefit/cost analysis approach relies on two main benefits: congestion relief and crash savings. This spreadsheet provides the delay saving calculations which, together with the original AECOM analysis report referenced on the next and the attached SimTraffic simulations by Atkins, give all data needed to review the calculations. Excerpts from the AECOM report, including the traffic counts and VHT summaries, are included in this spreadsheet.

This spreadsheet also summarizes the crash saving benefits and project costs in order to provide a preliminary benefit/cost ratio that ranges from about 3.8 for a 3% discount ratio and 2.5 for a 7% discount ratio. Thus the project demonstrates reasonable returns for the investment.

Build delay was based on AECOM HCS and SimTraffic analyses. No-build delay was based on Atkins SimTraffic simulations of the entire network, with extension to capture spillback of queuing as necessary. See pdf of Atkins SimTraffic simulations for 2020, 2040, and 2050, which correspond to the analysis years used by AECOM. Because AECOM analyzed only design hour, which would be the PM peak hour, daily results are based on factoring up the PM peak hour by 5-10% by year to account for inclusion of the AM peak hour and by 25% to account for the current peak period being at least 75 minutes per the attached counts (most main movements have a 90-minute peak period in 2013).

The 2015 value of time was adjusted to reflect 13.4% trucks instead of the H-CAG average.

Crash savings assume 50% reduction in current crashes because of proposed interchanges separating currently conflicting movements onto and across the mainline. Given the projected increase in traffic and the breakdown queuing documented in the SimTraffic no-build analyses, congestion related crashes could be expected to increase dramatically through the analysis period from opening year of 2023 to the end analysis year of 2042. Thus the projected crash savings could be conservative.

See "Atkins SimTraffic No-build Report.pdf" from additional traffic analysis detail. The parallel crash saving template spreadsheet presents the crash detail.

Construction jobs and economic output calculations are given in attached US 59 REIMHS Model Construction Jobs.xlsx

No-Build Traffic Volumes for US-59 - H-GAC Grant Application

Note: 2020, 2040, and 2050 PM no-build volumes were computed from combination of 2020, 2040, and 2050 design hour volumes shown below on build network and selected growth adjustments to northbound volumes to allow a 1%/yr growth for northbound volumes (compared with 1.8%/yr growth for southbound volumes from DHV). AM volumes were assumed to retain similar ratios to existing PM volumes by location. Direct application of DHV to northbound volumes otherwise led to an unreasonable 2%/yr drop in northbound volumes between 2013 and 2020 and an overall 0.4-0.7%/yr growth between 2013 and 2040. Compared with 1.8%/yr growth in SB volumes, 1%/yr growth in NB volumes is conservative and will understate 2040 delay. Location numbers and descriptions below show points where traffic volumes were computed.

Source: *Traffic Operational Analysis, US 59 Schematic*, November 2013. Prepared for TxDOT by AECOM (US 59 Schematic_Draft_11-06-2013_with ALL App except Schematic.pdf); Atkins 2014.

Number	Location	Description
1	Mainline SB North	
2	SH 105 Intersection SB	
3	Mainline SB Central	
4	CR 381 Intersection SB	
5	Mainline SB South	
6	Mainline NB South	
7	CR 381 Intersection NB	
8	Mainline NB Central	
9	Mainline NB North	

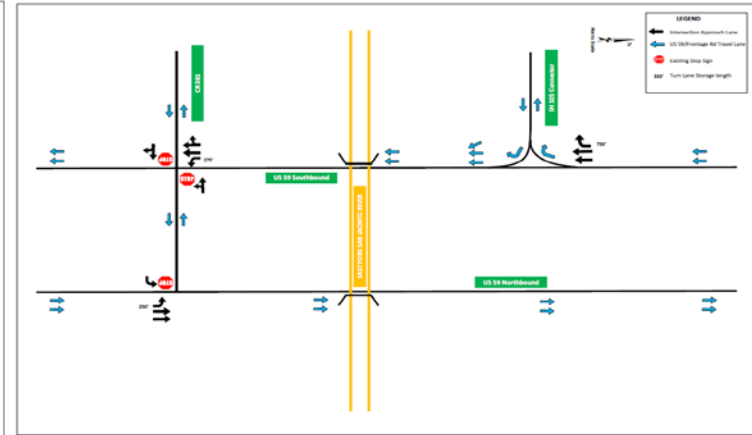
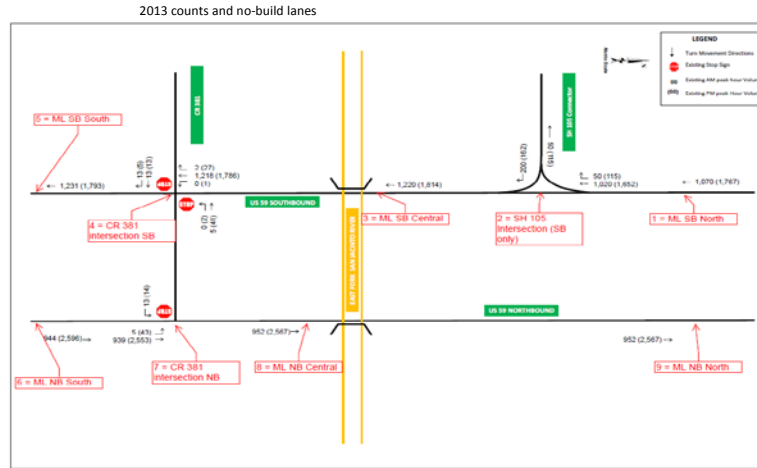
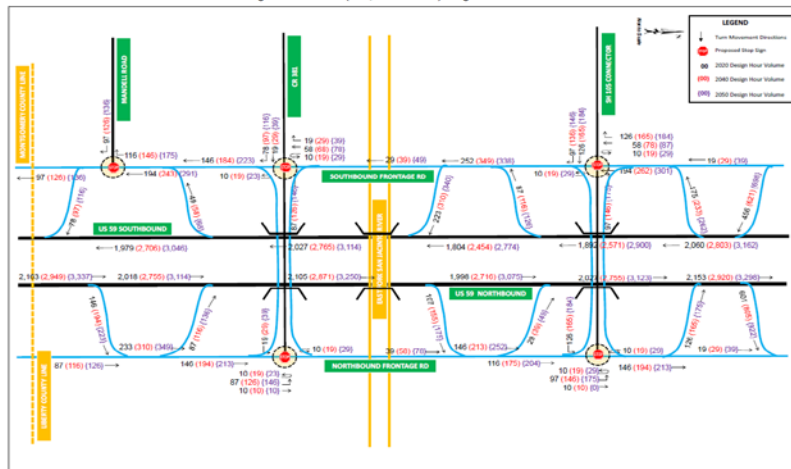
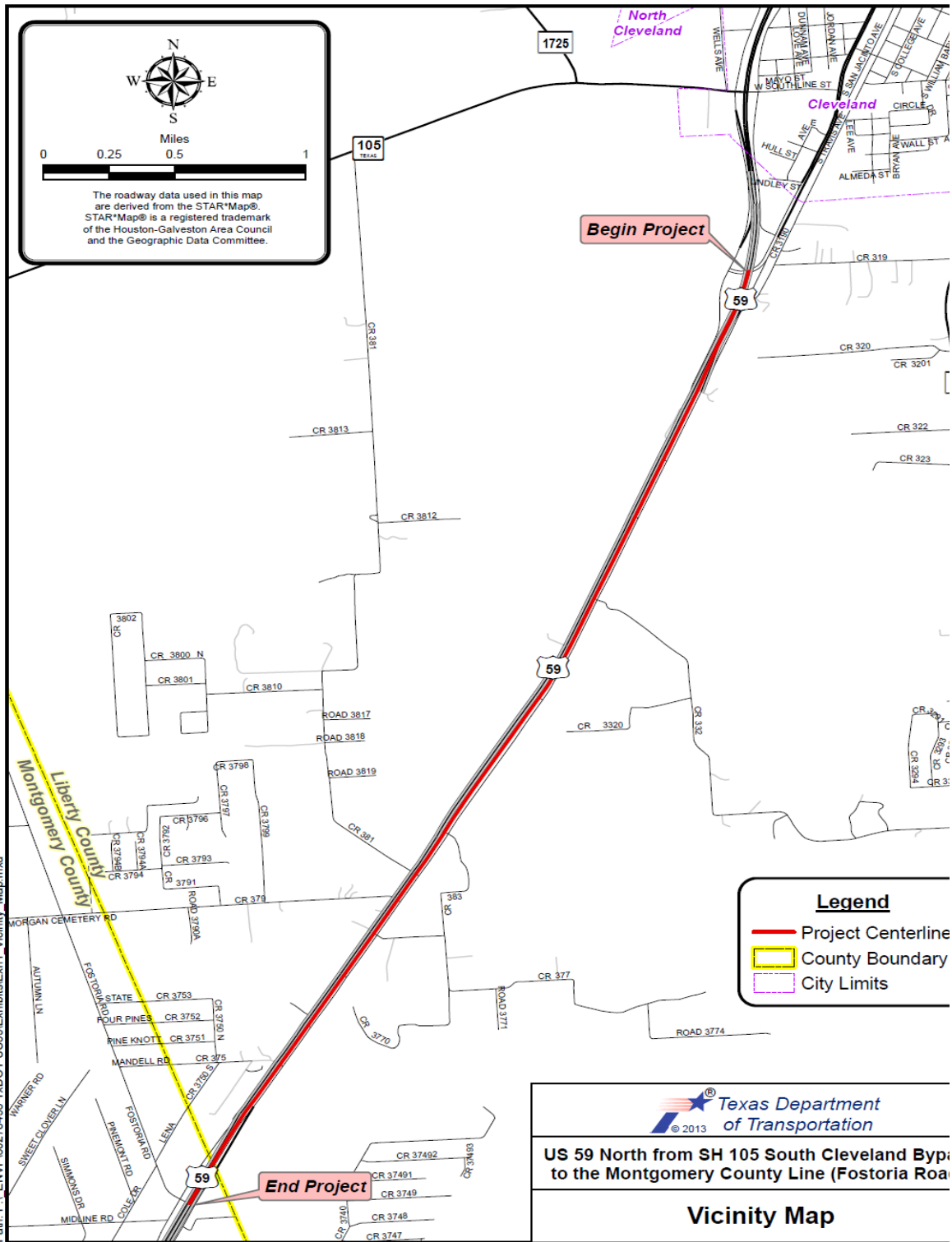


Figure 4: Future Year (2020, 2040 and 2050) Design Hour Traffic Volume

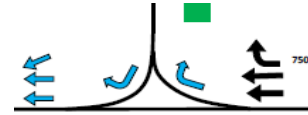


Project Map

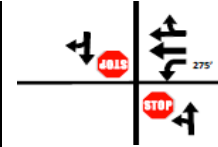


No-Build Traffic Volumes for US-59 - H-GAC Grant Application - Intersections - 1% NB Case

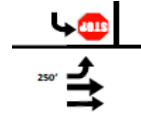
Location / Year		AM*			PM		
2	SH 105 Intersection SB	SB-R	SB-T	EB-R	SB-R	SB-T	EB-R
	2013	50	1,020	200	115	1,652	162
	2020	143	1,259	143	223	1,970	223
	2040	199	1,717	192	311	2,687	301
	2050	229	1,946	211	359	3,045	330



Location / Year		AM*						PM							
4	CR 381 Intersection SB	SB-R	SB-T	SB-L	WB-T	WB-L	EB-R	EB-T	SB-R	SB-T	SB-L	WB-T	WB-L	EB-R	EB-T
	2013	2	1,218	0	5	0	13	13	27	1,786	1	41	2	5	13
	2020	7	1,422	7	32	7	78	19	19	2,085	20	87	20	78	19
	2040	11	1,932	14	47	14	97	29	29	2,833	38	126	38	97	29
	2050	14	2,177	22	54	17	116	39	39	3,192	58	146	46	116	39



Location / Year		AM*			PM		
7	CR 381 Intersection NB	NB-T	NB-L	EB-L	NB-T	NB-L	EB-L
	2013	939	5	13	2,553	43	14
	2020	1,015	36	29	2,737	97	29
	2040	1,239	54	48	3,340	145	48
	2050	1,368	63	68	3,689	169	68



*Values for AM movements calculated from AM/PM ratios on Mainline Volumes sheet unless otherwise shown.

No-Build Traffic Volumes for US-59 - H-GAC Grant Application - Mainline Only - 1% NB Case

		2013				2020				2040				2050			
Location		AM		PM		AM		PM		AM		PM		AM		PM	
Number	Description	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB	NB	SB
1	Mainline SB North		1,070		1,767		1,324		2,186		1,815		2,997		2,062		3,405
2	SH 105 Intersection SB																
3	Mainline SB Central		1,220		1,814		1,389		2,066		1,885		2,803		2,093		3,112
4	CR 381 Intersection SB																
5	Mainline SB South		1,231		1,793		1,492		2,173		2,025		2,949		2,211		3,221
6	Mainline NB South	944		2,596		1,012		2,783		1,235		3,396		1,364		3,751	
7	CR 381 Intersection NB																
8	Mainline NB Central	952		2,567		1,021		2,752		1,245		3,358		1,376		3,710	
9	Mainline NB North	952		2,567		1,021		2,752		1,245		3,358		1,376		3,710	

Assumptions:

PH Peak Hour = DHV; AM Peak Hour = PM Peak Hour * Existing AM/PM ratios below

Northbound growth assumed to be uniform 1%/yr between 2013 and 2040 (compared with 1.8% southbound) to avoid 2%/yr drop shown in NB DHV 2013 to 2020.

Location	AM/PM Ratios		2013-2020 Growth/yr		2020-2040 Growth/yr	2013-2040 Growth/yr	3-seg Ave Average
	NB	SB	NB	SB	NB	SB	
Mainline SB North		61%		1.030865		1.01590203 Average =	1.01976043
Mainline SB Central		67%		1.018757		1.01537073 Average =	1.01624746
Mainline SB South		69%		1.02784		1.01538502 Average =	1.0185996
Mainline NB South	36%		1.01		1.01 Average =	1.01	
Mainline NB Central	37%		1.01		1.01 Average =	1.01	
Mainline NB North	37%		1.01		1.01 Average =	1.01	

Comparison of No-Build and Build Simulation and Operational Analysis Results

1-Hour SimTraffic Simulation Results for No-Build 2020, 2040, and 2050 (Entire Network)

	2020		2040		2050	
	AM	PM	AM	PM	AM	PM
Vehs Entered	2,640	5,234	3,537	6,006	3,998	6,451
Vehs Exited	2,644	4,212	3,490	4,821	3,823	4,899
Starting Vehs	301	729	472	1,018	546	1,093
Ending Vehs	297	1,751	519	2,203	721	2,645
Travel Distance (mi)	10,568	20,248	16,082	25,646	18,771	28,460
Travel Time (hr)	307.1	1,193.1	537.0	1,906.3	675.6	2,582.1
Total Delay (hr)	33.3	687.3	116.2	1,257.3	186.7	1,860.2
Total Stops	226	2,970	369	4,261	913	4,975
Fuel Used (gal)	310.4	706.9	482.6	989.9	577.0	1,204.5

Source: Atkins, 2015.

AM/PM Ratios for Stats Opposite

	2020	2040	2050
	0.50	0.59	0.62
	0.63	0.72	0.78
	0.52	0.63	0.66
	0.26	0.28	0.26
	0.05	0.09	0.10
	0.08	0.09	0.18
	0.44	0.49	0.48

Note: inflate delay savings by 5-10% to include AM in daily based on only PM results from above **delay ratios by year.**

1-Hour SimTraffic Simulation Results for Build 2020, 2040, and 2050 (Interchanges Only)

	2020		2040		2050	
	AM	PM	AM	PM	AM	PM
Vehs Entered	N/A	4,818	N/A	6,599	N/A	7,519
Vehs Exited	N/A	4,824	N/A	6,601	N/A	7,469
Starting Vehs	N/A	74	N/A	112	N/A	103
Ending Vehs	N/A	68	N/A	110	N/A	153
Travel Distance (mi)	N/A	2,650	N/A	3,613	N/A	4,115
Travel Time (hr)	N/A	73.2	N/A	102.8	N/A	121.1
Total Delay (hr)	N/A	5.7	N/A	11.2	N/A	16.3
Total Stops	N/A	540	N/A	823	N/A	1,134
Fuel Used (gal)	N/A	93.9	N/A	130.0	N/A	149.4

Source: Traffic Operational Analysis, US 59 Schematic, November 2013. Prepared for TxDOT by AECOM.

HCS Results for Build 2020, 2040, and 2050 (Freeway Segment Analysis, 4-Lane)

	2020		2040		2050	
	AM	PM	AM	PM	AM	PM
Northbound						
Ave Speed (mph)		61.8		61.3		60.5
VMT Volume (veh-mi)	N/A	2,225.2	N/A	3,027.8	N/A	3,427.9
VHT (veh-hr)	N/A	36.0	N/A	49.4	N/A	56.7
VHD (veh-hr)	N/A	1.7	N/A	2.8	N/A	3.9
Southbound						
Ave Speed (mph)		62.0		61.5		61.0
VMT Volume (veh-mi)	N/A	2,094.0	N/A	2,851.5	N/A	3,219.3
VHT (veh-hr)	N/A	33.8	N/A	46.4	N/A	52.8
VHD (veh-hr)	N/A	1.6	N/A	2.5	N/A	3.3
Total						
Ave Speed (mph)		61.9		61.4		60.7
VMT Volume (veh-mi)	N/A	4,319.2	N/A	5,879.3	N/A	6,647.2
VHT (veh-hr)	N/A	69.8	N/A	95.8	N/A	109.5
VHD (veh-hr)	N/A	3.3	N/A	5.3	N/A	7.2

Source: Traffic Operational Analysis, US 59 Schematic, November 2013. Prepared for TxDOT by AECOM.

Daily Peak-Hour VHT Totals from Above Tables (veh-hr)

	2020		2040		2050	
	AM	PM	AM	PM	AM	PM
No-Build	307.1	1,193.1	537.0	1,906.3	675.6	2,582.1
Build	N/A	143.0	N/A	198.6	N/A	230.6
Savings		1,050.1		1,707.7		2,351.5
Factored Savings*		1,376.2		2,331.9		3,234.4

*VHT savings factored by AM/PM no-build delay ratios above to approximate total AM & PM peak hour VHT savings per day, plus additional factor for peak periods being at least 1.25 peak hours each based on attached counts.

Annual VHT Savings for 2020 2040 2050
 Annualization Factor of 357,818 606,296 840,941

Cost Worksheet

0177-03-096

US 59 Widening in Liberty County

Project Expenditures	Fiscal Year (Sept 1 - Aug 31)										Project Total
	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	
Design and Environmental	200,000	2,000,000	2,000,000								4,200,000
Property/ROW Acquisition				1,500,000	1,000,000						2,500,000
Construction						22,000,000	30,000,000	30,000,000			82,000,000
Other											---
Total Expenditures	200,000	2,000,000	2,000,000	1,500,000	1,000,000	22,000,000	30,000,000	30,000,000	---	---	88,700,000
	6,700,000					82,000,000					
Project Funding											
TxDOT	\$200,000	\$2,000,000	\$2,000,000	\$1,500,000	\$1,000,000	\$4,400,000	\$6,000,000	\$6,000,000	\$0		23,100,000
REQUESTED FEDERAL FUNDS						17,600,000	24,000,000	24,000,000	---		65,600,000
Total Funding	200,000	2,000,000	2,000,000	1,500,000	1,000,000	22,000,000	30,000,000	30,000,000	---	---	88,700,000
	6,700,000					82,000,000					

YOE \$	200,000	2,000,000	2,000,000	1,500,000	1,000,000	22,000,000	30,000,000	30,000,000			88,700,000
2015 \$	200,000	1923076.9	1923076.9	1386834.3	888996.36	18805692	24657813	23709436	0	0	73,494,926

US 59 AND SH 105 INTERSECTION TRAFFIC COUNTS

Date: 1/30/2013 Source: Counts from *Traffic Operational Analysis, US 59 Schematic*, November 2013. Prepared for TxDOT by AECOM (US 59 Schematic_Draft_11-06-2013_with ALL App except Schematic.pdf); Totals from Atkins 2014.

Start Time	Southbound			Westbound			Northbound			Eastbound			1-Hr Volumes			All Movements		
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	WB-L	NB-R	Total	Total		
7:15 AM	0	0	0	0	0	0	69	29	0	1	3	0	0	244	60	304	319	peak hour begin
7:30 AM	0	0	0	0	0	0	49	10	0	1	2	0	0	211	38	249	264	
7:45 AM	0	0	0	0	0	0	79	11	0	1	3	0	0	193	41	234	250	0.790984 0.683333 0.769737
8:00 AM	0	0	0	0	0	0	47	10	0	1	3	0	0	153	42	195	211	
8:15 AM	0	0	0	0	0	0	36	7	0	4	0	0	0					
8:30 AM	0	0	0	0	0	0	31	13	0	3	1	0	0					
8:45 AM	0	0	0	0	0	0	39	12	0	2	2	0	0					
9:45 AM	0	0	0	0	2	36	11	0	1	2	0	0	89	25	114	126		
10:00 AM	0	0	0	0	0	16	4	0	0	1	0	0	66	18	84	94		
10:15 AM	0	0	0	0	0	19	7	0	2	0	0	0	73	22	95	106		
10:30 AM	0	0	0	0	0	18	3	0	3	1	0	0	80	20	100	119		
10:45 AM	0	0	0	0	0	13	4	0	0	2	1	0	83	28	111	129		
11:00 AM	0	0	0	0	0	23	8	0	1	1	0	0	80	33	113	133		
11:15 AM	0	0	0	0	0	26	5	0	6	4	0	0	69	37	106	126		
11:30 AM	0	0	0	0	0	21	11	0	1	2	0	0	43	32	75	85		
11:45 AM	0	0	0	0	0	10	9	0	1	4	0	0	22	21	43	50		
12:00 PM	0	0	0	0	0	12	12	0	0	2	0	0	12	12	24	26		
12:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	17	9	26	32		
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	43	25	68	82		
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	60	36	96	115		
1:00 PM	0	0	0	0	0	17	9	0	3	3	0	0	74	54	128	152		
1:15 PM	0	0	0	0	0	26	16	0	2	6	0	0	74	55	129	151		
1:30 PM	0	0	0	0	1	17	11	0	4	0	0	0	65	53	118	141		
1:45 PM	0	0	0	0	0	14	18	0	3	2	0	0	62	54	116	137		
2:00 PM	0	0	0	0	0	17	10	0	2	2	0	0	70	47	117	138		
2:15 PM	0	0	0	0	1	17	14	0	6	2	0	0	88	54	142	165		
2:30 PM	0	0	0	0	0	14	12	0	1	2	0	0	83	61	144	161		
2:45 PM	0	0	0	0	0	22	11	0	4	1	0	0	94	62	156	174		
3:00 PM	0	0	0	0	1	35	17	0	5	0	0	0	72	51	123	136		
3:15 PM	0	0	0	0	0	12	21	0	3	0	0	0	37	34	71	78		
3:30 PM	0	0	0	0	1	25	13	0	1	2	0	0	62	27	89	97		
3:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	74	35	109	120		
4:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	91	59	150	164		
4:15 PM	0	0	0	0	0	37	14	0	2	2	0	0	121	77	198	218		
4:30 PM	0	0	0	0	3	37	21	0	1	2	1	0	124	80	204	223		
4:45 PM	0	0	0	0	2	17	24	0	0	1	0	0	133	93	226	243		
5:00 PM	0	0	0	0	1	30	18	0	2	2	1	0	155	97	252	270		
5:15 PM	0	0	0	0	0	40	17	0	3	0	0	0	159	108	267	280	peak hour begin	
5:30 PM	0	0	0	0	2	46	34	0	2	1	0	0						
5:45 PM	0	0	0	0	1	39	28	0	1	2	0	0						
6:00 PM	0	0	0	0	0	34	29	0	1	0	0	0						

US 59 AND CR 381 S TRAFFIC COUNTS

Date: 11/27/2012

Source: Counts from *Traffic Operational Analysis, US 59 Schematic*, November 2013. Prepared for TxDOT by AECOM (US 59 Schematic_Draft_11-06-2013_with ALL App except Schematic.pdf); totals include

Start Time	Southbound				Westbound				Northbound				Eastbound				1-Hr Volumes			All Movements
	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	Right	Thru	Left	SB-T	NB-T	Total	Total	
7:45 AM	0	319	0	0	0	0	0	0	224	1	0	0	2	1218	939	2157	2190			
8:00 AM	0	299	0	0	0	0	0	0	204	1	6	0	5	1229	1045	2274	2308			
8:15 AM	0	273	0	0	0	0	0	0	244	3	0	0	2	1236	1125	2361	2393			
8:30 AM	2	327	0	0	0	0	0	0	267	0	7	0	4	1244	1122	2366	2399			
8:45 AM	2	330	0	0	0	0	0	0	330	1	1	0	0	1210	1114	2324	2352			
9:00 AM	4	306	0	0	0	0	0	0	284	2	4	0	0	1160	1018	2178	2213			
9:15 AM	1	281	0	0	0	0	0	0	241	1	4	0	0	1151	939	2090	2118			
9:30 AM	0	293	0	0	0	0	0	0	259	3	4	0	1	870	698	1568	1590			
9:45 AM	5	280	0	0	0	0	0	0	234	3	3	0	0	577	439	1016	1030			
10:00 AM	0	297	0	0	0	0	0	0	205	0	2	0	1	555	422	977	992			
10:15 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	500	481	981	1000			
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	739	671	1410	1436			
10:45 AM	3	258	0	0	0	0	0	0	217	3	4	0	2	982	905	1887	1920			
11:00 AM	2	242	0	0	0	0	0	0	264	0	1	0	4	965	970	1935	1964			
11:15 AM	4	239	0	0	0	0	0	0	190	0	2	0	1	950	963	1913	1951			
11:30 AM	2	243	0	0	0	0	0	0	234	1	2	0	2	976	1034	2010	2048			
11:45 AM	4	241	0	0	0	0	0	0	282	3	0	0	1	733	800	1533	1564			
12:00 PM	7	227	0	0	0	0	0	0	257	4	5	0	0	492	518	1010	1033			
12:15 PM	2	265	0	0	0	0	0	0	261	0	4	0	1	495	553	1048	1066			
12:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	472	537	1009	1033			
12:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	767	889	1656	1686			
1:00 PM	3	230	1	0	0	0	0	0	292	4	1	0	2	1048	1223	2271	2309			
1:15 PM	3	242	1	0	0	0	0	0	245	4	3	0	2	1054	1249	2303	2338			
1:30 PM	2	295	0	0	0	0	0	0	352	2	1	0	1	1082	1291	2373	2404			
1:45 PM	4	281	0	0	0	0	0	0	334	0	0	0	4	1076	1188	2264	2294			
2:00 PM	4	236	0	0	0	0	0	0	318	1	2	0	1	1062	1121	2183	2209			
2:15 PM	2	270	0	0	0	0	0	0	287	3	0	0	4	1110	1131	2241	2266			
3:00 PM	1	289	0	0	0	0	0	0	249	2	1	0	1	1089	1136	2225	2253			
3:15 PM	0	267	0	0	0	0	0	0	267	3	0	0	1	1077	1217	2294	2327			
3:30 PM	1	284	0	0	0	0	0	0	328	3	2	0	1	1040	1305	2345	2394			
3:45 PM	2	249	0	0	0	0	0	0	292	4	5	0	1	1044	1339	2383	2437			
4:00 PM	4	277	0	0	0	0	0	0	330	3	1	0	2	1127	1471	2598	2651			
4:15 PM	5	230	0	0	0	0	0	0	355	10	3	0	2	1306	1719	3025	3081			
4:30 PM	0	288	0	0	0	0	0	0	362	6	1	0	5	1523	2005	3528	3577			
4:45 PM	2	332	0	0	0	0	0	0	424	4	2	0	3	1679	2251	3930	3981			
5:00 PM	4	456	0	0	0	0	0	0	578	5	1	0	3	1792	2471	4263	4338			
5:15 PM	5	447	0	0	0	0	0	0	641	6	1	0	1	1792	2569	4361	4430			
5:30 PM	9	444	0	0	0	0	0	0	608	3	2	0	0	1806	2658	4464	4537			
5:45 PM	7	445	1	0	0	0	0	0	644	19	1	0	7							
6:15 PM	1	456	1	0	0	0	0	0	676	3	1	0	1							
6:30 PM	3	461	0	0	0	0	0	0	730	9	3	0	2							

Atkins SimTraffic No-Build Report

SimTraffic Simulation Results for Upgrade US 59 to 6-lane Freeway with Frontage Roads

2020, 2040, and 2050 AM and PM Peak Hours

Prepared for TxDOT by Atkins

January 7, 2015

Summary of All Intervals

Start Time	6:50
End Time	8:00
Total Time (min)	70
Time Recorded (min)	60
# of Intervals	2
# of Recorded Intervals	1
Vehs Entered	2640
Vehs Exited	2644
Starting Vehs	301
Ending Vehs	297
Travel Distance (mi)	10568
Travel Time (hr)	307.1
Total Delay (hr)	33.3
Total Stops	226
Fuel Used (gal)	310.4

Interval #0 Information Seeding

Start Time	6:50
End Time	7:00
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	
Vehs Entered	2640
Vehs Exited	2644
Starting Vehs	301
Ending Vehs	297
Travel Distance (mi)	10568
Travel Time (hr)	307.1
Total Delay (hr)	33.3
Total Stops	226
Fuel Used (gal)	310.4

2: I-69 & SH 105 Performance by movement

Movement	EBR	SBT	SBR	All
Denied Delay (hr)	0.0	0.1	0.1	0.2
Total Delay (hr)	0.1	1.6	0.1	1.9

4: CR 381 & I-69 Performance by movement

Movement	EBT	EBR	WBL	WBT	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (hr)	0.2	0.7	0.0	0.2	0.0	4.2	0.0	5.4

7: I-69 & CR 381 Performance by movement

Movement	EBL	EBT	NBL	NBT	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0
Total Delay (hr)	0.1	0.0	0.1	3.5	3.6

Total Network Performance

Denied Delay (hr)	0.3
Total Delay (hr)	33.0

Intersection: 2: I-69 & SH 105

Movement

Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 4: CR 381 & I-69

Movement

EB WB

Directions Served	TR	LT
Maximum Queue (ft)	195	53
Average Queue (ft)	54	26
95th Queue (ft)	129	54
Link Distance (ft)	865	97
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 7: I-69 & CR 381

Movement

EB

Directions Served	L
Maximum Queue (ft)	77
Average Queue (ft)	21
95th Queue (ft)	54
Link Distance (ft)	97
Upstream Blk Time (%)	0
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 0

Summary of All Intervals

Start Time	4:50
End Time	6:00
Total Time (min)	70
Time Recorded (min)	60
# of Intervals	2
# of Recorded Intervals	1
Vehs Entered	5234
Vehs Exited	4212
Starting Vehs	729
Ending Vehs	1751
Travel Distance (mi)	20248
Travel Time (hr)	1193.1
Total Delay (hr)	687.3
Total Stops	2970
Fuel Used (gal)	706.9

Interval #0 Information Seeding

Start Time	4:50
End Time	5:00
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	5:00
End Time	6:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	
Vehs Entered	5234
Vehs Exited	4212
Starting Vehs	729
Ending Vehs	1751
Travel Distance (mi)	20248
Travel Time (hr)	1193.1
Total Delay (hr)	687.3
Total Stops	2970
Fuel Used (gal)	706.9

2: I-69 & SH 105 Performance by movement

Movement	EBR	SBT	SBR	All
Denied Delay (hr)	0.0	0.4	0.1	0.5
Total Delay (hr)	0.1	3.3	0.2	3.6

3: External Performance by approach

Approach	WB	All
Denied Delay (hr)	0.0	0.0
Total Delay (hr)	0.3	0.3

4: I-69 & CR 381 Performance by movement

Movement	EBT	EBR	WBL	WBT	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (hr)	5.4	40.2	0.7	3.6	0.0	9.8	0.1	59.9

5: Bend Performance by approach

Approach	SB	All
Denied Delay (hr)	0.0	0.0
Total Delay (hr)	2.0	2.0

6: Bend Performance by approach

Approach	SB	NW	All
Denied Delay (hr)	0.0	0.0	0.0
Total Delay (hr)	0.0	0.0	0.0

7: I-69 & CR 381 Performance by movement

Movement	EBL	EBT	NBL	NBT	All
Denied Delay (hr)	0.0	0.0	0.1	3.3	3.4
Total Delay (hr)	0.2	0.0	41.3	538.5	580.1

8: External Performance by approach

Approach	SW	All
Denied Delay (hr)	0.0	0.0
Total Delay (hr)	27.6	27.6

9: External Performance by approach

Approach	NB	All
Denied Delay (hr)	0.0	0.0
Total Delay (hr)	10.0	10.0

11: External Performance by approach

Approach	NB	All
Denied Delay (hr)	0.0	0.0
Total Delay (hr)	0.0	0.0

Total Network Performance

Denied Delay (hr)		3.9
Total Delay (hr)		683.4

Intersection: 2: I-69 & SH 105

Movement	EB
Directions Served	R
Maximum Queue (ft)	118
Average Queue (ft)	13
95th Queue (ft)	66
Link Distance (ft)	586
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 4: I-69 & CR 381

Movement	EB	WB
Directions Served	TR	LT
Maximum Queue (ft)	1627	117
Average Queue (ft)	1047	103
95th Queue (ft)	1602	117
Link Distance (ft)	1888	96
Upstream Blk Time (%)		98
Queuing Penalty (veh)		95
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 7: I-69 & CR 381

Movement	EB	NB	NB	NB
Directions Served	L	L	T	T
Maximum Queue (ft)	73	275	15850	15874
Average Queue (ft)	21	262	7367	7372
95th Queue (ft)	58	305	16199	16228
Link Distance (ft)	96		15835	15835
Upstream Blk Time (%)			6	5
Queuing Penalty (veh)			0	0
Storage Bay Dist (ft)		250		
Storage Blk Time (%)		86	0	
Queuing Penalty (veh)		1174	0	

Network Summary

Network wide Queuing Penalty: 1269

SimTraffic Simulation Summary

2040

1/5/2015

Summary of All Intervals

Start Time	6:50
End Time	8:00
Total Time (min)	70
Time Recorded (min)	60
# of Intervals	2
# of Recorded Intervals	1
Vehs Entered	3537
Vehs Exited	3490
Starting Vehs	472
Ending Vehs	519
Travel Distance (mi)	16082
Travel Time (hr)	537.0
Total Delay (hr)	116.2
Total Stops	369
Fuel Used (gal)	482.6

Interval #0 Information Seeding

Start Time	6:50
End Time	7:00
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	
Vehs Entered	3537
Vehs Exited	3490
Starting Vehs	472
Ending Vehs	519
Travel Distance (mi)	16082
Travel Time (hr)	537.0
Total Delay (hr)	116.2
Total Stops	369
Fuel Used (gal)	482.6

2: I-69 & SH 105 Performance by movement

Movement	EBR	SBT	SBR	All
Denied Delay (hr)	0.0	0.3	0.1	0.4
Total Delay (hr)	0.1	2.7	0.2	3.0

3: External Performance by approach

Approach	WB	All
Denied Delay (hr)	0.0	0.0
Total Delay (hr)	0.2	0.2

4: I-69 & CR 381 Performance by movement

Movement	EBT	EBR	WBL	WBT	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (hr)	18.6	39.6	0.4	1.4	0.0	7.5	0.0	67.6

5: Bend Performance by approach

Approach	SB	All
Denied Delay (hr)	0.0	0.0
Total Delay (hr)	1.7	1.7

6: Bend Performance by approach

Approach	SB	NW	All
Denied Delay (hr)	0.0	0.0	0.0
Total Delay (hr)	0.6	0.0	0.6

7: I-69 & CR 381 Performance by movement

Movement	EBL	NBL	NBT	All
Denied Delay (hr)	0.0	0.0	0.1	0.1
Total Delay (hr)	0.1	0.5	6.3	6.9

8: External Performance by approach

Approach	SW	All
Denied Delay (hr)	0.0	0.0
Total Delay (hr)	27.4	27.4

9: External Performance by approach

Approach	NB	All
Denied Delay (hr)	0.0	0.0
Total Delay (hr)	8.3	8.3

11: External Performance by approach

Approach	NB	All
Denied Delay (hr)	0.0	0.0
Total Delay (hr)	0.0	0.0

Total Network Performance

Denied Delay (hr)	0.5
Total Delay (hr)	115.7

Queuing and Blocking Report 2040

1/5/2015

Intersection: 2: I-69 & SH 105

Movement	EB
Directions Served	R
Maximum Queue (ft)	84
Average Queue (ft)	3
95th Queue (ft)	28
Link Distance (ft)	586
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 4: I-69 & CR 381

Movement	EB	B6	WB
Directions Served	TR	T	LT
Maximum Queue (ft)	1933	125	116
Average Queue (ft)	1379	25	59
95th Queue (ft)	2216	93	113
Link Distance (ft)	1848	3359	96
Upstream Blk Time (%)	32		20
Queuing Penalty (veh)	0		11
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 7: I-69 & CR 381

Movement	EB	NB
Directions Served	L	L
Maximum Queue (ft)	71	72
Average Queue (ft)	22	11
95th Queue (ft)	53	49
Link Distance (ft)	96	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		250
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 11

SimTraffic Simulation Summary

2040

1/5/2015

Summary of All Intervals

Start Time	4:50
End Time	6:00
Total Time (min)	70
Time Recorded (min)	60
# of Intervals	2
# of Recorded Intervals	1
Vehs Entered	6006
Vehs Exited	4821
Starting Vehs	1018
Ending Vehs	2203
Travel Distance (mi)	25646
Travel Time (hr)	1906.3
Total Delay (hr)	1257.3
Total Stops	4261
Fuel Used (gal)	989.9

Interval #0 Information Seeding

Start Time	4:50
End Time	5:00
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	5:00
End Time	6:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	
Vehs Entered	6006
Vehs Exited	4821
Starting Vehs	1018
Ending Vehs	2203
Travel Distance (mi)	25646
Travel Time (hr)	1906.3
Total Delay (hr)	1257.3
Total Stops	4261
Fuel Used (gal)	989.9

2: I-69 & SH 105 Performance by movement

Movement	EBR	SBT	SBR	All
Denied Delay (hr)	0.0	1.1	0.2	1.3
Total Delay (hr)	3.9	5.8	0.4	10.0

4: I-69 & CR 381 Performance by movement

Movement	EBT	EBR	WBL	WBT	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (hr)	5.1	61.7	2.0	3.0	0.6	42.3	0.6	115.2

7: I-69 & CR 381 Performance by movement

Movement	EBL	NBL	NBT	All
Denied Delay (hr)	0.0	6.1	151.1	157.1
Total Delay (hr)	0.2	76.6	829.2	906.0

Total Network Performance

Denied Delay (hr)	158.5
Total Delay (hr)	1098.8

Queuing and Blocking Report 2040

1/5/2015

Intersection: 2: I-69 & SH 105

Movement	EB
Directions Served	R
Maximum Queue (ft)	417
Average Queue (ft)	179
95th Queue (ft)	367
Link Distance (ft)	586
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 4: I-69 & CR 381

Movement	EB	B6	WB	SB	SB
Directions Served	TR	T	LT	LT	T
Maximum Queue (ft)	1972	648	103	1203	1299
Average Queue (ft)	1510	117	103	80	85
95th Queue (ft)	2308	449	103	572	604
Link Distance (ft)	1911	3302	97	6911	6911
Upstream Blk Time (%)	32		100		
Queuing Penalty (veh)	0		145		
Storage Bay Dist (ft)					
Storage Blk Time (%)					2
Queuing Penalty (veh)					1

Intersection: 7: I-69 & CR 381

Movement	EB	NB	NB	NB
Directions Served	L	L	T	T
Maximum Queue (ft)	97	259	18558	18534
Average Queue (ft)	28	256	10768	10270
95th Queue (ft)	64	271	21799	21383
Link Distance (ft)	97		18495	18495
Upstream Blk Time (%)	3		27	26
Queuing Penalty (veh)	1		0	0
Storage Bay Dist (ft)		250		
Storage Blk Time (%)		96	0	
Queuing Penalty (veh)		1602	0	

Network Summary

Network wide Queuing Penalty: 1749

Summary of All Intervals

Start Time	6:50
End Time	8:00
Total Time (min)	70
Time Recorded (min)	60
# of Intervals	2
# of Recorded Intervals	1
Vehs Entered	3998
Vehs Exited	3823
Starting Vehs	546
Ending Vehs	721
Travel Distance (mi)	18771
Travel Time (hr)	675.6
Total Delay (hr)	186.7
Total Stops	913
Fuel Used (gal)	577.0

Interval #0 Information Seeding

Start Time	6:50
End Time	7:00
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	7:00
End Time	8:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	
Vehs Entered	3998
Vehs Exited	3823
Starting Vehs	546
Ending Vehs	721
Travel Distance (mi)	18771
Travel Time (hr)	675.6
Total Delay (hr)	186.7
Total Stops	913
Fuel Used (gal)	577.0

2: I-69 & SH 105 Performance by movement

Movement	EBR	SBT	SBR	All
Denied Delay (hr)	0.0	0.4	0.1	0.5
Total Delay (hr)	0.5	3.3	0.2	4.0

3: External Performance by approach

Approach	WB	All
Denied Delay (hr)	0.0	0.0
Total Delay (hr)	0.2	0.2

4: CR 381 & I-69 Performance by movement

Movement	EBT	EBR	WBL	WBT	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (hr)	14.6	53.7	1.0	3.3	0.1	10.6	0.1	83.4

5: Bend Performance by approach

Approach	SB	All
Denied Delay (hr)	0.0	0.0
Total Delay (hr)	2.6	2.6

6: Bend Performance by approach

Approach	SB	NW	All
Denied Delay (hr)	0.0	0.0	0.0
Total Delay (hr)	17.6	0.0	17.6

7: I-69 & CR 381 Performance by movement

Movement	EBL	NBL	NBT	All
Denied Delay (hr)	0.0	0.0	0.1	0.1
Total Delay (hr)	0.1	25.7	13.4	39.2

8: External Performance by approach

Approach	SW	All
Denied Delay (hr)	0.0	0.0
Total Delay (hr)	31.9	31.9

9: External Performance by approach

Approach	NB	All
Denied Delay (hr)	0.0	0.0
Total Delay (hr)	7.2	7.2

11: External Performance by approach

Approach	NB	All
Denied Delay (hr)	0.0	0.0
Total Delay (hr)	0.0	0.0

Total Network Performance

Denied Delay (hr)	0.6
Total Delay (hr)	186.2

Queuing and Blocking Report
2050

1/5/2015

Intersection: 2: I-69 & SH 105

Movement	EB
Directions Served	R
Maximum Queue (ft)	228
Average Queue (ft)	42
95th Queue (ft)	151
Link Distance (ft)	586
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 4: CR 381 & I-69

Movement	EB	B6	WB	SB
Directions Served	TR	T	LT	R
Maximum Queue (ft)	1957	1385	117	21
Average Queue (ft)	1566	414	104	1
95th Queue (ft)	2368	1243	118	10
Link Distance (ft)	1896	3302	96	
Upstream Blk Time (%)	51		95	
Queuing Penalty (veh)	0		60	
Storage Bay Dist (ft)				275
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 7: I-69 & CR 381

Movement	EB	NB	NB	NB
Directions Served	L	L	T	T
Maximum Queue (ft)	50	275	1092	1079
Average Queue (ft)	26	234	619	591
95th Queue (ft)	44	363	1267	1264
Link Distance (ft)	96		17794	17794
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		250		
Storage Blk Time (%)		78		
Queuing Penalty (veh)		534		

Network Summary

Network wide Queuing Penalty: 594

SimTraffic Simulation Summary

2050

1/5/2015

Summary of All Intervals

Start Time	4:50
End Time	6:00
Total Time (min)	70
Time Recorded (min)	60
# of Intervals	2
# of Recorded Intervals	1
Vehs Entered	6451
Vehs Exited	4899
Starting Vehs	1093
Ending Vehs	2645
Travel Distance (mi)	28460
Travel Time (hr)	2582.1
Total Delay (hr)	1860.2
Total Stops	4975
Fuel Used (gal)	1204.5

Interval #0 Information Seeding

Start Time	4:50
End Time	5:00
Total Time (min)	10
Volumes adjusted by Growth Factors.	
No data recorded this interval.	

Interval #1 Information Recording

Start Time	5:00
End Time	6:00
Total Time (min)	60
Volumes adjusted by Growth Factors.	
Vehs Entered	6451
Vehs Exited	4899
Starting Vehs	1093
Ending Vehs	2645
Travel Distance (mi)	28460
Travel Time (hr)	2582.1
Total Delay (hr)	1860.2
Total Stops	4975
Fuel Used (gal)	1204.5

2: I-69 & SH 105 Performance by movement

Movement	EBR	SBT	SBR	All
Denied Delay (hr)	100.0	4.2	0.7	104.9
Total Delay (hr)	24.4	9.5	0.6	34.5

4: CR 381 & I-69 Performance by movement

Movement	EBT	EBR	WBL	WBT	SBL	SBT	SBR	All
Denied Delay (hr)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay (hr)	3.7	64.8	1.0	2.0	1.6	97.4	1.1	171.5

7: I-69 & CR 381 Performance by movement

Movement	EBL	NBL	NBT	All
Denied Delay (hr)	0.0	15.9	436.2	452.2
Total Delay (hr)	0.1	83.0	914.0	997.1

Total Network Performance

Denied Delay (hr)	557.0
Total Delay (hr)	1303.2

Intersection: 2: I-69 & SH 105

Movement	EB
Directions Served	R
Maximum Queue (ft)	601
Average Queue (ft)	597
95th Queue (ft)	609
Link Distance (ft)	586
Upstream Blk Time (%)	100
Queuing Penalty (veh)	0
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 4: CR 381 & I-69

Movement	EB	B6	WB	SB	SB	B5	B5
Directions Served	TR	T	LT	LT	T	T	T
Maximum Queue (ft)	1970	1599	98	4604	5770	378	409
Average Queue (ft)	1570	449	98	153	497	25	26
95th Queue (ft)	2441	1355	98	1517	2972	180	183
Link Distance (ft)	1909	3448	97	6911	6911	1518	1518
Upstream Blk Time (%)	52		100				
Queuing Penalty (veh)	0		169				
Storage Bay Dist (ft)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 7: I-69 & CR 381

Movement	EB	NB	NB	NB
Directions Served	L	L	T	T
Maximum Queue (ft)	54	273	20611	20582
Average Queue (ft)	28	271	11903	11912
95th Queue (ft)	53	272	23411	23400
Link Distance (ft)	97		20548	20548
Upstream Blk Time (%)			23	23
Queuing Penalty (veh)			0	0
Storage Bay Dist (ft)		250		
Storage Blk Time (%)		100		
Queuing Penalty (veh)		1844		

Network Summary

Network wide Queuing Penalty: 2013

US 59 – Delay Benefits

INPUTS

Project Information	
Name:	US 59 Upgrade
Application ID Number:	300828
Sponsor ID Number (CSJ, etc.):	0177-03-096
Year Open to Traffic? (Must be >=2018)	2023

Daily Travel Demand	With Project	Without Project
2018 VHT		
2018 Volume		
2018 Capacity		
2025 Volume		
2025 Capacity		
2040 Volume		
2040 Capacity		

OUTPUTS

Benefit Results	
Discounted Delay Benefits @ 7% (2015 \$, '000s)	\$86,175
Discounted Delay Benefits @ 3% (2015 \$, '000s)	\$165,739

Assumptions	
Base Year	2015
Vehicle Occupancy	1.32
Value of Travel Time (VoTT), 2015 \$	\$17.14
Real wage growth rate	1.2%
Annual Days of Travel	260
Years to include in BCA Analysis	20

Interim Calculations	With Project	Without Project
2018 VHT (Annual)	0	0
2018-2025 Demand Growth	#DIV/0!	
2025-2040 Demand Growth	#DIV/0!	
2018-2040 Demand Growth	#DIV/0!	
2018 V/C Ratio	#DIV/0!	
2025 V/C Ratio	#DIV/0!	
2040 V/C Ratio	#DIV/0!	
2018-2025 V/C Growth	#DIV/0!	
2025-2040 V/C Growth	#DIV/0!	
2018-2040 V/C Growth	#DIV/0!	

Year	VHT nobuild	VHT build	Demand Growth	Facility V/C Ratio	Benefit Cap	Annual VHT Savings	Use in Analysis?	Value of Time (Real, 2015\$)	Value of Delay Savings (2015 \$, '000s)
2018	0	0	n/a	#DIV/0!	#DIV/0!	0	0	\$17.76	\$0.00
2019			#DIV/0!	#DIV/0!	#DIV/0!	0	0	\$17.98	\$0.00
2020			#DIV/0!	#DIV/0!	#DIV/0!	357,818	0	\$18.19	\$0.00
2021			#DIV/0!	#DIV/0!	#DIV/0!	367,378	0	\$18.41	\$0.00
2022			#DIV/0!	#DIV/0!	#DIV/0!	377,194	0	\$18.63	\$0.00
2023			#DIV/0!	#DIV/0!	#DIV/0!	387,271	1	\$18.86	\$9,639.27
2024			#DIV/0!	#DIV/0!	#DIV/0!	397,618	1	\$19.08	\$10,015.57
2025			#DIV/0!	#DIV/0!	#DIV/0!	408,242	1	\$19.31	\$10,406.57
2026			#DIV/0!	#DIV/0!	#DIV/0!	419,149	1	\$19.54	\$10,812.82
2027			#DIV/0!	#DIV/0!	#DIV/0!	430,348	1	\$19.78	\$11,234.94
2028			#DIV/0!	#DIV/0!	#DIV/0!	441,846	1	\$20.02	\$11,673.54
2029			#DIV/0!	#DIV/0!	#DIV/0!	453,651	1	\$20.26	\$12,129.25
2030			#DIV/0!	#DIV/0!	#DIV/0!	465,772	1	\$20.50	\$12,602.76
2031			#DIV/0!	#DIV/0!	#DIV/0!	478,216	1	\$20.74	\$13,094.76
2032			#DIV/0!	#DIV/0!	#DIV/0!	490,993	1	\$20.99	\$13,605.96
2033			#DIV/0!	#DIV/0!	#DIV/0!	504,112	1	\$21.25	\$14,137.11
2034			#DIV/0!	#DIV/0!	#DIV/0!	517,580	1	\$21.50	\$14,689.00
2035			#DIV/0!	#DIV/0!	#DIV/0!	531,409	1	\$21.76	\$15,262.44
2036			#DIV/0!	#DIV/0!	#DIV/0!	545,607	1	\$22.02	\$15,858.26
2037			#DIV/0!	#DIV/0!	#DIV/0!	560,185	1	\$22.28	\$16,477.35
2038			#DIV/0!	#DIV/0!	#DIV/0!	575,152	1	\$22.55	\$17,120.60
2039			#DIV/0!	#DIV/0!	#DIV/0!	590,519	1	\$22.82	\$17,788.96
2040			#DIV/0!	#DIV/0!	#DIV/0!	606,296	1	\$23.10	\$18,483.42
2041			#DIV/0!	#DIV/0!	#DIV/0!	626,459	1	\$23.37	\$19,327.28
2042			#DIV/0!	#DIV/0!	#DIV/0!	647,293	1	\$23.65	\$20,209.68
2043			#DIV/0!	#DIV/0!	#DIV/0!	668,819	0	\$23.94	\$0.00
2044			#DIV/0!	#DIV/0!	#DIV/0!	691,062	0	\$24.22	\$0.00
2045			#DIV/0!	#DIV/0!	#DIV/0!	714,044	0	\$24.51	\$0.00
2046			#DIV/0!	#DIV/0!	#DIV/0!	737,791	0	\$24.81	\$0.00
2047			#DIV/0!	#DIV/0!	#DIV/0!	762,327	0	\$25.11	\$0.00
2048			#DIV/0!	#DIV/0!	#DIV/0!	787,679	0	\$25.41	\$0.00
2049			#DIV/0!	#DIV/0!	#DIV/0!	813,874	0	\$25.71	\$0.00
2050			#DIV/0!	#DIV/0!	#DIV/0!	840,941	0	\$26.02	\$0.00

2015-2018 TIP Call For Projects - Benefit-Cost Analysis Assumptions*

Common Values:

Base Year for Analysis	2015
Real Discount Rate	3% and 7%
Historic Capital Costs Nominal-to-Real Conversion Rates	See "GDP Deflators" tab
Future Capital Costs Nominal-to-Real Conversion Rate	2.08%

Safety Analysis Values:

Value of Statistical Life (VSL), 2015 \$	\$9,587,303
<i>Values for non-fatal injuries provided in "Value of Statistical Life" tab.</i>	

Delay Analysis Values:

Value of Travel Time (VoTT), 2015 \$	\$17.14
Real wage growth rate	1.2%

Emissions Reduction Values:

Volatile Organic Compounds (VOCs), \$ / metric ton (2015 \$)	\$2,083
Nitrogen oxides (NOx), \$ / metric ton (2015 \$)	\$8,209
VOC emissions factor, Ped/Bike Projects Only (g/VMT)	0.323402
NOx emissions factor, Ped/Bike Projects Only (g/VMT)	0.191063
Applicable Project Life	See Texas Guide to Accepted Mobile Source Emission Reduction Strategies (MOSER), page A.8.9

* To the greatest extent possible, these values are taken from or consistent with the "TIGER Benefit-Cost Analysis (BCA) Resource Guide" published by US DOT for the FY 2014 Transportation Investment Generating Economic Recovery (TIGER) application. The full resource guide is available online at: <http://www.dot.gov/sites/dot.gov/files/docs/TIGER%20BCA%20Resource%20Guide%202014.pdf>.

Person Trips by Purpose, H-GAC Regional Travel Demand Model (2040 RTP - 2010 Census Data & Household Survey)

					Original	Modified*
Home	Work	2,792,941	13.02%	Non-Work	74.41%	66.9%
Home	Non-Work	10,901,839	50.82%	Work	21.93%	19.7%
Non-Home	Work	1,856,330	8.65%	Truck	3.65%	13.4%
Non-Home	Non-Work	4,856,431	22.64%		100.00%	100.00%
Cargo	Truck	101,057	0.47%			
Service	Truck	682,557	3.18%			
Taxi	Work	56,389	0.26%			
External Auto	Non-Work	206,340	0.96%			
		21,453,884	100.00%			

Value of Travel Time, TIGER BCA Resource Guide (2014)

	<u>2013 \$ per person-hour)</u>	<u>2015 \$ per person-hour)</u>
Personal	\$ 12.42	\$ 12.72
Business	\$ 25.23	\$ 25.84
Truck	\$ 25.75	\$ 26.37
Weighted Average:*	\$ 16.73	\$ 17.14

*Truck % modified by Atkins to reflect forecast US 59 / I 69 truck % = 13.4%

Value of Injuries, TIGER BCA Resource Guide (2014)

AIS Level	Severity	Fraction of VSL	Unit value (\$2013)	Unit value (\$2015)
AIS 1	Minor	0.003	\$27,600	\$28,762
AIS 2	Moderate	0.047	\$432,400	\$450,603
AIS 3	Serious	0.105	\$966,000	\$1,006,667
AIS 4	Severe	0.266	\$2,447,200	\$2,550,223
AIS 5	Critical	0.593	\$5,455,600	\$5,685,271
AIS 6	Unsurvivable	1.000	\$9,200,000	\$9,587,303

Value of Emissions, TIGER BCA Resource Guide

Emission Type	\$ / metric ton (\$2013)	\$ / metric ton (\$2015)
Volatile Organic Compounds (VOCs)	\$1,999	\$2,083
Nitrogen oxides (NOx)	\$7,877	\$8,209

GDP Deflators

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	10 Yr Avg
Gross domestic product	81.891	83.766	85.054	86.754	89.132	91.991	94.818	97.335	99.236	100.000	101.211	103.199	105.002	106.588	
Deflator to Next Year	1.023	1.015	1.020	1.027	1.032	1.031	1.027	1.020	1.008	1.012	1.020	1.017	1.015		1.021
Deflator to 2012	1.282	1.254	1.235	1.210	1.178	1.141	1.107	1.079	1.058	1.050	1.037	1.017	1.000	0.985	

Bureau of Economic Analysis, See Table 1.1.9. Implicit Price Deflators for Gross Domestic Product

<http://www.bea.gov/iTable/iTable.cfm?ReqID=9&step=1>

US 59 – Safety Benefits

INPUTS

Project Identification	
Name:	US 59 Upgrade
Application ID Number:	300828
Sponsor ID Number (CSJ, etc.):	0177-03-096

Improvement Information	
Year Open to Traffic? (Must be >=2018)	2023
Appropriate Crash Reduction Factor (%):	50%
Service Life (years):	30

Daily Travel Demand	With Project
2020 Volume	45,400
2020 Capacity	52,577
2040 Volume	61,800
2040 Capacity	52,577
2050 Volume	69,700
2050 Capacity	52,577

* Capacity reduced in NB direction during Peak Hour--only 1 lane capacity due to left turn queuing blocking through lane.

Import from Crash History Data Tab?		

Preventable Crash History	Year 1	Year 2	Year 3	Average
Death_Cnt	1	1	1	1.00
Incap_Injry_Cnt	1	1	1	1.00
Nonincap_Injry_Cnt	2	1	1	1.33
Poss_Injry_Cnt	6	2	3	3.67
Non_Injry_Cnt	6	8	4	6.00
Unkn_Injry_Cnt	0	0	1	0.33

OUTPUTS

Benefit Results	
Discounted Safety Benefits @ 7% (2015 \$, '000s)	\$39,567
Discounted Safety Benefits @ 3% (2015 \$, '000s)	\$72,548

Crash_ID	Crash_Fatal	Cmv_Invol	Schl_Bus_F	Rr_Relat_F	Medical_A	Amend_Su	Active_Sch	Crash_Date	Crash_Time	Case_ID	Rpt_CRIS_C	Rpt_City_IL
	N	N	N	N	N	N	N					
	N	N	N	N	N	N	N					
	N	N	N	N	N	N	N					
	N	N	N	N	N	N	N					

Rpt_Outside	Thousand	Rpt_Latitude	Rpt_Longitude	Rpt_Rdwy	Rpt_Hwy_I	Rpt_Hwy_S	Rpt_Road	Rpt_Block	Rpt_Street	Rpt_Street	Rpt_Street	Private_Dr
Y	Y			15			1				RD	N
Y	Y			19			1				RD	N
Y	Y			19			1				RD	N
Y	Y			19			1				RD	N

Toll_Road_	Crash_Spee	Road_Cons	Road_Cons	At_Intrst	Rpt_Sec_R	Rpt_Sec_H	Rpt_Sec_H	Rpt_Sec_R	Rpt_Sec_B	Rpt_Sec_St
N	45	N	N	N	15					
N	45	N	N	N	19					
N	45	N	N	Y	19			1	8400	
N	45	N	N	Y	19			1	8400	

Rpt_Sec_Street_Name	Rpt_Sec_St	Rpt_Ref_M	Rpt_Ref_M	Rpt_Ref_M	Rpt_Ref_M	Rpt_Crossi	Wthr_Cond	Light_Cond	Entr_Road	Road_Type
							11	3	0	
							11	1	0	
							11	1	2	
							12	1	2	

Road_Algn	Surf_Cond	Traffic_Cnt	Investigat	Bridge_Det	Harm_Evnt	Intrscct_Rel	FHE_Collsn	Obj_Struck	Othr_Factr	Road_Part	Road_Cls_I	Road_Relat
1	1	1		8	2	4	30	64	54	1	4	1
1	1	1		8	2	4	34	64	54	1	4	1
1	1	11		8	2	2	30	64	54	1	4	1
1	2	11		8	2	2	22	64	47	1	4	1

Onsys_Fl	Rural_Fl	Crash_Sev	Pop_Group	Located_Fl	Day_of_W	Hwy_Dsgn	Hwy_Dsgn	Hp_Shldr_L	Hp_Shldr_R	Hp_Medial	Base_Type	Nbr_Of_La
N	Y	1	0	Y	Sat							
N	Y	5	0	Y	Mon							
N	Y	2	0	N	Sat							
N	Y	5	0	N	Mon							

Bridge_Dir	Bridge_Rte	Bridge_IR_	CrossingNu	RRCo	Poscrossing	WDCode_I	Standstop	Yield	Incap_Injry	Nonincap_	Poss_Injry	Non_Injry_
									1	0	0	3
									0	0	0	2
									0	3	0	0
									0	0	0	5

Unkn_Injry	Tot_Injry_C	Death_Cnt	Year
0	1	0	2013
0	0	0	2011
0	3	0	2012
0	0	0	2013

Assumptions	
Base Year	2015
Years to include in BCA Analysis	20

Interim Calculations	
2018-2025 Demand Growth	4.50%
2025-2040 Demand Growth	0.81%
2018-2040 Demand Growth	1.97%
2018 V/C Ratio	0.86
2025 V/C Ratio	1.18
2040 V/C Ratio	1.33
2018-2025 V/C Growth	4.50%
2025-2040 V/C Growth	0.81%
2018-2040 V/C Growth	1.97%

Crash Data on Abbreviated Injury Scale (AIS)	
AIS 0	No Injuries
AIS 1	Minor
AIS 2	Moderate
AIS 3	Serious
AIS 4	Severe
AIS 5	Critical
AIS 6	Unsurvivable

Death_Cnt	Incap_Injry_Cnt	Nonincap_Injry_Cnt	Poss_Injry_Cnt	Non_Injry_Cnt	Unkn_Injry_Cnt	Sum
1.00	1.00	1.33	3.67	6.00	0.33	
0.00000	0.01719	0.05565	0.42968	2.77602	0.07279	3.35132
0.00000	0.27725	0.51229	1.26401	0.21771	0.06957	2.34082
0.00000	0.10454	0.07265	0.11717	0.00594	0.01479	0.31509
0.00000	0.07219	0.02127	0.01964	0.00024	0.00803	0.12136
0.00000	0.01993	0.00413	0.00260	0.00000	0.00103	0.02770
0.00000	0.00892	0.00067	0.00024	0.00009	0.00047	0.01038
0.50000	0.00000	0.00000	0.00000	0.00000	0.00000	0.50000

Year	Demand Growth	Facility V/C Ratio	Benefit Cap	Potential Value of Crash Savings (2015 \$)	Use in Analysis?	Value of Delay Savings (2015 \$, '000s)
2018	n/a	0.86	1	\$5,254,779.29	0	\$0.00
2019	4.50%	0.90	1	\$5,491,458.57	0	\$0.00
2020	4.50%	0.94	1	\$5,738,798.07	0	\$0.00
2021	4.50%	0.99	1	\$5,997,277.92	0	\$0.00
2022	4.50%	1.03	0	\$5,997,277.92	0	\$0.00
2023	4.50%	1.08	0	\$5,997,277.92	1	\$5,997.28
2024	4.50%	1.12	0	\$5,997,277.92	1	\$5,997.28
2025	4.50%	1.18	0	\$5,997,277.92	1	\$5,997.28
2026	0.81%	1.18	0	\$5,997,277.92	1	\$5,997.28
2027	0.81%	1.19	0	\$5,997,277.92	1	\$5,997.28
2028	0.81%	1.20	0	\$5,997,277.92	1	\$5,997.28
2029	0.81%	1.21	0	\$5,997,277.92	1	\$5,997.28
2030	0.81%	1.22	0	\$5,997,277.92	1	\$5,997.28
2031	0.81%	1.23	0	\$5,997,277.92	1	\$5,997.28
2032	0.81%	1.24	0	\$5,997,277.92	1	\$5,997.28
2033	0.81%	1.25	0	\$5,997,277.92	1	\$5,997.28
2034	0.81%	1.26	0	\$5,997,277.92	1	\$5,997.28
2035	0.81%	1.27	0	\$5,997,277.92	1	\$5,997.28
2036	0.81%	1.28	0	\$5,997,277.92	1	\$5,997.28
2037	0.81%	1.29	0	\$5,997,277.92	1	\$5,997.28
2038	0.81%	1.30	0	\$5,997,277.92	1	\$5,997.28
2039	0.81%	1.32	0	\$5,997,277.92	1	\$5,997.28
2040	0.81%	1.33	0	\$5,997,277.92	1	\$5,997.28
2041	0.81%	1.34	0	\$5,997,277.92	1	\$5,997.28
2042	0.81%	1.35	0	\$5,997,277.92	1	\$5,997.28
2043	0.81%	1.36	0	\$5,997,277.92	0	\$0.00
2044	0.81%	1.37	0	\$5,997,277.92	0	\$0.00
2045	0.81%	1.38	0	\$5,997,277.92	0	\$0.00
2046	0.81%	1.39	0	\$5,997,277.92	0	\$0.00
2047	0.81%	1.40	0	\$5,997,277.92	0	\$0.00
2048	0.81%	1.41	0	\$5,997,277.92	0	\$0.00
2049	0.81%	1.42	0	\$5,997,277.92	0	\$0.00
2050	0.81%	1.44	0	\$5,997,277.92	0	\$0.00

2015-2018 TIP Call For Projects - Benefit-Cost Analysis Assumptions*

Common Values:

Base Year for Analysis	2015
Real Discount Rate	3% and 7%
Historic Capital Costs Nominal-to-Real Conversion Rates	See "GDP Deflators" tab
Future Capital Costs Nominal-to-Real Conversion Rate	2.08%

Safety Analysis Values:

Value of Statistical Life (VSL), 2015 \$	\$9,587,303
<i>Values for non-fatal injuries provided in "Value of Statistical Life" tab.</i>	

Delay Analysis Values:

Value of Travel Time (VoTT), 2015 \$	\$16.10
Real wage growth rate	1.2%

Emissions Reduction Values:

Volatile Organic Compounds (VOCs), \$ / metric ton (2015 \$)	\$2,083
Nitrogen oxides (NOx), \$ / metric ton (2015 \$)	\$8,209
VOC emissions factor, Ped/Bike Projects Only (g/VMT)	0.323402
NOx emissions factor, Ped/Bike Projects Only (g/VMT)	0.191063
Applicable Project Life	See Texas Guide to Accepted Mobile Source Emission Reduction Strategies (MOSER), page A.8.9

* To the greatest extent possible, these values are taken from or consistent with the "TIGER Benefit-Cost Analysis (BCA) Resource Guide" published by US DOT for the FY 2014 Transportation Investment Generating Economic Recovery (TIGER) application. The full resource guide is available online at: <http://www.dot.gov/sites/dot.gov/files/docs/TIGER%20BCA%20Resource%20Guide%202014.pdf>.

Person Trips by Purpose, H-GAC Regional Travel Demand Model (2040 RTP - 2010 Census Data & Household Survey)

Home	Work	2,792,941	13.02%	Non-Work	74.41%
Home	Non-Work	10,901,839	50.82%	Work	21.93%
Non-Home	Work	1,856,330	8.65%	Truck	3.65%
Non-Home	Non-Work	4,856,431	22.64%		100.00%
Cargo	Truck	101,057	0.47%		
Service	Truck	682,557	3.18%		
Taxi	Work	56,389	0.26%		
External Auto	Non-Work	206,340	0.96%		
		21,453,884	100.00%		

Value of Travel Time, TIGER BCA Resource Guide (2014)

	<u>2013 \$ per person-hour)</u>	<u>2015 \$ per person-hour)</u>
Personal	\$ 12.42	\$ 12.72
Business	\$ 25.23	\$ 25.84
Truck	\$ 25.75	\$ 26.37
Weighted Average:	\$ 15.72	\$ 16.10

Value of Emissions, TIGER BCA Resource Guide

Emission Type	\$ / metric ton (\$2013)	\$ / metric ton (\$2015)
Volatile Organic Compounds (VOCs)	\$1,999	\$2,083
Nitrogen oxides (NOx)	\$7,877	\$8,209

GDP Deflators

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	10 Yr Avg
Gross domestic product	81.891	83.766	85.054	86.754	89.132	91.991	94.818	97.335	99.236	100.000	101.211	103.199	105.002	106.588	
Deflator to Next Year	1.023	1.015	1.020	1.027	1.032	1.031	1.027	1.020	1.008	1.012	1.020	1.017	1.015		1.021
Deflator to 2012	1.282	1.254	1.235	1.210	1.178	1.141	1.107	1.079	1.058	1.050	1.037	1.017	1.000	0.985	

Bureau of Economic Analysis, See Table 1.1.9. Implicit Price Deflators for Gross Domestic Product

<http://www.bea.gov/iTable/iTable.cfm?ReqID=9&step=1>

US 59 – Benefit Discounting

Project Information	
Name:	US 59 Upgrade
Application ID Number:	
Sponsor ID Number (CSJ, etc.):	
Initial Year of Analysis?	2023
Benefit Values Nominal/YOE? (1 if yes, 0 if real)	0

Benefit Results	
Discounted Delay Benefits @ 7% (2015 \$, '000s)	\$126
Discounted Delay Benefits @ 3% (2015 \$, '000s)	\$238

Assumptions	
Base Year	2015
Years to include in BCA Analysis (20 years max)	20

Interim Calculations	

Year	Annual Benefit Savings	Use in Analysis?	YOE/Nominal to Real Multiplier	Value of Benefit Savings (2015 \$, '000s)
2023	15,637	1	1.00	\$15.64
2024	16,013	1	1.00	\$16.01
2025	16,404	1	1.00	\$16.40
2026	16,810	1	1.00	\$16.81
2027	17,232	1	1.00	\$17.23
2028	17,671	1	1.00	\$17.67
2029	18,127	1	1.00	\$18.13
2030	18,600	1	1.00	\$18.60
2031	19,092	1	1.00	\$19.09
2032	19,603	1	1.00	\$19.60
2033	20,134	1	1.00	\$20.13
2034	20,686	1	1.00	\$20.69
2035	21,260	1	1.00	\$21.26
2036	21,856	1	1.00	\$21.86
2037	22,475	1	1.00	\$22.47
2038	23,118	1	1.00	\$23.12
2039	23,786	1	1.00	\$23.79
2040	24,481	1	1.00	\$24.48
2041	25,325	1	1.00	\$25.32
2042	26,207	1	1.00	\$26.21

2015-2018 TIP Call For Projects - Benefit-Cost Analysis Assumptions*

Common Values:

Base Year for Analysis	2015
Real Discount Rate	3% and 7%
Historic Capital Costs Nominal-to-Real Conversion Rates	See "GDP Deflators" tab
Future Capital Costs Nominal-to-Real Conversion Rate	2.08%

Safety Analysis Values:

Value of Statistical Life (VSL), 2015 \$	\$9,587,303
<i>Values for non-fatal injuries provided in "Value of Statistical Life" tab.</i>	

Delay Analysis Values:

Value of Travel Time (VoTT), 2015 \$	\$16.10
Real wage growth rate	1.2%

Emissions Reduction Values:

Volatile Organic Compounds (VOCs), \$ / metric ton (2015 \$)	\$2,083
Nitrogen oxides (NOx), \$ / metric ton (2015 \$)	\$8,209
VOC emissions factor, Ped/Bike Projects Only (g/VMT)	0.323402
NOx emissions factor, Ped/Bike Projects Only (g/VMT)	0.191063
Applicable Project Life	See Texas Guide to Accepted Mobile Source Emission Reduction Strategies (MOSER), page A.8.9

* To the greatest extent possible, these values are taken from or consistent with the "TIGER Benefit-Cost Analysis (BCA) Resource Guide" published by US DOT for the FY 2014 Transportation Investment Generating Economic Recovery (TIGER) application. The full resource guide is available online at: <http://www.dot.gov/sites/dot.gov/files/docs/TIGER%20BCA%20Resource%20Guide%202014.pdf>.

Person Trips by Purpose, H-GAC Regional Travel Demand Model (2040 RTP - 2010 Census Data & Household Survey)

Home	Work	2,792,941	13.02%	Non-Work	74.41%
Home	Non-Work	10,901,839	50.82%	Work	21.93%
Non-Home	Work	1,856,330	8.65%	Truck	3.65%
Non-Home	Non-Work	4,856,431	22.64%		100.00%
Cargo	Truck	101,057	0.47%		
Service	Truck	682,557	3.18%		
Taxi	Work	56,389	0.26%		
External Auto	Non-Work	206,340	0.96%		
		21,453,884	100.00%		

Value of Travel Time, TIGER BCA Resource Guide (2014)

	<u>2013 \$ per person-hour)</u>	<u>2015 \$ per person-hour)</u>
Personal	\$ 12.42	\$ 12.72
Business	\$ 25.23	\$ 25.84
Truck	\$ 25.75	\$ 26.37
Weighted Average:	\$ 15.72	\$ 16.10

Value of Injuries, TIGER BCA Resource Guide (2014)

AIS Level	Severity	Fraction of VSL	Unit value (\$2013)	Unit value (\$2015)
AIS 1	Minor	0.003	\$27,600	\$28,762
AIS 2	Moderate	0.047	\$432,400	\$450,603
AIS 3	Serious	0.105	\$966,000	\$1,006,667
AIS 4	Severe	0.266	\$2,447,200	\$2,550,223
AIS 5	Critical	0.593	\$5,455,600	\$5,685,271
AIS 6	Unsurvivable	1.000	\$9,200,000	\$9,587,303

Value of Emissions, TIGER BCA Resource Guide

Emission Type	\$ / metric ton (\$2013)	\$ / metric ton (\$2015)
Volatile Organic Compounds (VOCs)	\$1,999	\$2,083
Nitrogen oxides (NOx)	\$7,877	\$8,209

GDP Deflators

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	10 Yr Avg
Gross domestic product	81.891	83.766	85.054	86.754	89.132	91.991	94.818	97.335	99.236	100.000	101.211	103.199	105.002	106.588	
Deflator to Next Year	1.023	1.015	1.020	1.027	1.032	1.031	1.027	1.020	1.008	1.012	1.020	1.017	1.015		1.021
Deflator to 2012	1.282	1.254	1.235	1.210	1.178	1.141	1.107	1.079	1.058	1.050	1.037	1.017	1.000	0.985	

Bureau of Economic Analysis, See Table 1.1.9. Implicit Price Deflators for Gross Domestic Product

<http://www.bea.gov/iTable/iTable.cfm?ReqID=9&step=1>

US 59 – REIMHS Model Construction Jobs

APPENDIX: US 59 H-GAC Grant Application - Construction Jobs

Sources:
 A.L. Politano and Carol J. Roadifer, Regional Economic Impact Model for Highway Systems (REIMHS), Transportation Research Record 1229, Transportation Research Board, Washington D.C., 1989. (Model adjusted to reflect inflation.)

Multipliers from REIMHS for Fringe Urban Areas				
	Output	Earnings	Employment	
Rural Ratios	original 1986	1.81	0.49	21.35
Multipliers	2014	No adjustment needed 1.81	Adjusted for inflation 0.49	9.83

Inflation adjustment 1986 to 2014
 US CPI, All Urban Consumers, not adj
 109.6 1986 annual
 232.957 2013 annual
 2.125520073 2013/1986

 224.939 2011 annual
 229.594 2012 annual

 For 2015 midpoint (half year of 2015 from 2014)
 Assume inflation in 2014-2015 = 2013:

 1.022 2015 1.5 year from 2013

Multipliers from REIMHS before adjusting jobs for inflation

Original jobs per \$10 million (total) from REIMHS
 203 urban interstate
 224 urban primary rehab
 159 bridge
 190 rural secondary construction (here for reconstruction)
 191 rural bridge (multipliers are 1.50 and 0.44, so assume ave of 1.78 and 1.50 = 1.64)

Weighted Averaging of interstate and urban multipliers (conservative on output since more urban than interstate)

	Assume %	Output	Earnings	Jobs
Interstate	50%	1.76	0.46	203
Urban	50%	1.85	0.51	224
Average	1	1.81	0.49	213.50

Economic Impact of US 59 Construction Investment and Resulting Travel Benefits
 (Millions of 2015 \$)

Alternative	Construction Value including Engineering	Regional Economic Output	Total Earnings	Total Jobs (Person Years of Employment)
Full Project	\$73.5	\$133.04	\$36.02	720

Sources: A.L. Politano and Carol J. Roadifer, Regional Economic Impact Model for Highway Systems, Transportation Research Record 1229, Transportation Research Board, Washington D.C., 1989. (Model adjusted to reflect inflation.)
 Atkins, 2014.

Quarterly Job Creation*	Jobs	Spending	Period	Total Jobs by Initial Quarter	Distributed by quarter					Estimated Expenditure by Quarter		
					First	Second	Third	Chk tot	Distributed	EB	WB	24.6
Q1 2015	12	\$2,400,000	January - March	24	11.8	7.9	3.9	23.6	11.8	2.4	2.4	0
Q2 2015	26	\$3,600,000	April - June	35	17.7	11.8	5.9	35.4	25.6	3.6	3.6	0
Q3 2015	35	\$3,900,000	July-September	38	19.2	12.8	6.4	38.3	34.9	3.9	3.9	0
Q4 2015	25	\$1,300,000	October - December	13	6.4	4.3	2.1	12.8	25.1	1.3	1.3	0
Q1 2016	23	\$2,600,000	January - March	26	12.8	8.5	4.3	25.6	23.4	2.6		2.6
Q2 2016	30	\$4,000,000	April - June	39	19.7	13.1	6.6	39.3	30.3	4		4
Q3 2016	39	\$4,400,000	July-September	43	21.6	14.4	7.2	43.2	39.0	4.4		4.4
Q4 2016	28	\$1,400,000	October - December	14	6.9	4.6	2.3	13.8	27.8	1.4		1.4
Q1 2017	25	\$2,600,000	January - March	26	12.8	8.5	4.3	25.6	24.6	2.6		2.6
Q2 2017	30	\$4,000,000	April - June	39	19.7	13.1	6.6	39.3	30.5	4		4
Q3 2017	38	\$4,300,000	July-September	42	21.1	14.1	7.0	42.3	38.5	4.3		4.3
Q4 2017	28	\$1,400,000	October - December	14	6.9	4.6	2.3	13.8	27.5	1.4		1.4
Total	339	\$35,900,000		353				353	338.9	35.9		24.7

*Based on 1/2 jobs in quarter of expenditure, 1/3 in following quarter, and 1/6 in quarter after that per President's Council of Economic Advisors, 2009.

ANALYSIS PLACEHOLDER

The analysis requested from H-GAC is under development.

(Attach the email requesting analysis support behind this page)

Scott Ayres

From: Scott Ayres
Sent: Friday, December 19, 2014 2:49 PM
To: 'david.wurdlow@h-gac.com'
Subject: H-GAC TIP Call Request for Assistance (US 59)
Attachments: US 59 0177-03-096.mpk; US 59 0177-03-096.pdf

David,

Yesterday, you and I discussed our district's desire to submit our US 59 project in Liberty (upgrade to 6-lanes with frontage roads – CSJ 0177-03-096) as a candidate for the H-GAC's current TIP call for projects. Since it is somewhat late in the call, you had recommended that we might want to wait for the next call for projects. I mentioned this to Phillip, but he believes it is important for us to go ahead and submit the project.

I understand that we missed the deadline to request H-GAC assistance with analysis for this project. However, you seemed to indicate that there may be a possibility that it could be added to the list. I believe we would need assistance with at least the emissions analysis for this added capacity project. Note that the current proposed let date for the project is March 2020.

I have attached a location map and I have completed the pre-application and the basic information in the application. The title and ID are:

Project Title

Upgrade US 59 to 6-lane freeway with frontage roads

Application ID

300828

Again, I understand that it is late to be asking for assistance. Any help getting this request added to the list is greatly appreciated.

Thank you,
Scott Ayres