

APPENDIX A

INTERSECTION CAPACITY ANALYSIS

HCM Signalized Intersection Capacity Analysis

1: SR 32 & US 31 NB On-Ramp

9/30/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	555	1019	0	0	1351	100	189	0	522	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0		4.0			
Lane Util. Factor	0.97	0.95			0.86	1.00	0.97		0.88			
Frt	1.00	1.00			1.00	0.85	1.00		0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (prot)	3433	3539			6408	1583	3433		2787			
Flt Permitted	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	3433	3539			6408	1583	3433		2787			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	584	1073	0	0	1422	105	199	0	549	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	31	0	0	124	0	0	0
Lane Group Flow (vph)	584	1073	0	0	1422	74	199	0	425	0	0	0
Turn Type	Prot					Perm	custom		custom			
Protected Phases	7	4			8							
Permitted Phases						8	2		2			
Actuated Green, G (s)	20.0	51.2			27.2	27.2	30.8		30.8			
Effective Green, g (s)	20.0	51.2			27.2	27.2	30.8		30.8			
Actuated g/C Ratio	0.22	0.57			0.30	0.30	0.34		0.34			
Clearance Time (s)	4.0	4.0			4.0	4.0	4.0		4.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0		3.0			
Lane Grp Cap (vph)	763	2013			1937	478	1175		954			
v/s Ratio Prot	c0.17	0.30			c0.22							
v/s Ratio Perm						0.05	0.06		c0.15			
v/c Ratio	0.77	0.53			0.73	0.16	0.17		0.45			
Uniform Delay, d1	32.8	12.0			28.2	23.0	20.7		23.0			
Progression Factor	1.00	1.00			1.00	1.00	1.00		1.00			
Incremental Delay, d2	4.6	0.3			1.5	0.2	0.3		1.5			
Delay (s)	37.4	12.3			29.6	23.1	21.0		24.5			
Level of Service	D	B			C	C	C		C			
Approach Delay (s)		21.1			29.2			23.6			0.0	
Approach LOS		C			C			C			A	
Intersection Summary												
HCM Average Control Delay			24.7			HCM Level of Service			C			
HCM Volume to Capacity ratio			0.63									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			53.1%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

4: SR 32 & Union St.

9/30/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	977	56	0	1254	132	79	347	97	310	589	136
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		0.95			0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.99			0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		1.00			1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		3510			3489		1770	1863	1583	1770	1863	1583
Flt Permitted		1.00			1.00		0.17	1.00	1.00	0.24	1.00	1.00
Satd. Flow (perm)		3510			3489		322	1863	1583	450	1863	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1028	59	0	1320	139	83	365	102	326	620	143
RTOR Reduction (vph)	0	4	0	0	9	0	0	0	50	0	0	30
Lane Group Flow (vph)	0	1083	0	0	1450	0	83	365	52	326	620	113
Turn Type							pm+pt		Perm	pm+pt		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases							2		2	6		6
Actuated Green, G (s)		39.7			39.7		28.7	25.5	25.5	42.3	35.1	35.1
Effective Green, g (s)		39.7			39.7		28.7	25.5	25.5	42.3	35.1	35.1
Actuated g/C Ratio		0.44			0.44		0.32	0.28	0.28	0.47	0.39	0.39
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		1548			1539		154	528	449	399	727	617
v/s Ratio Prot		0.31			c0.42		0.02	0.20		c0.12	c0.33	
v/s Ratio Perm							0.15		0.03	0.27		0.07
v/c Ratio		0.70			0.94		0.54	0.69	0.12	0.82	0.85	0.18
Uniform Delay, d1		20.3			24.1		23.3	28.7	23.9	17.7	25.1	18.0
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		1.4			11.8		3.6	7.3	0.5	12.2	12.1	0.7
Delay (s)		21.7			35.9		26.9	36.0	24.4	29.9	37.2	18.7
Level of Service		C			D		C	D	C	C	D	B
Approach Delay (s)		21.7			35.9			32.5			32.6	
Approach LOS		C			D			C			C	
Intersection Summary												
HCM Average Control Delay			30.9			HCM Level of Service			C			
HCM Volume to Capacity ratio			0.88									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)			8.0			
Intersection Capacity Utilization			84.3%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

8: SR 32 & Grassy Branch

9/30/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	839	483	529	1264	51	58	76	321	163	116	201
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3519		1770	1863	1583	1770	1863	1583
Flt Permitted	0.19	1.00	1.00	0.15	1.00		0.68	1.00	1.00	0.70	1.00	1.00
Satd. Flow (perm)	363	3539	1583	287	3519		1264	1863	1583	1313	1863	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	47	883	508	557	1331	54	61	80	338	172	122	212
RTOR Reduction (vph)	0	0	232	0	4	0	0	0	262	0	0	117
Lane Group Flow (vph)	47	883	276	557	1381	0	61	80	76	172	122	95
Turn Type	pm+pt		Perm	pm+pt			Perm		Perm	Perm		Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8			2		2	6		6
Actuated Green, G (s)	24.4	22.0	22.0	46.2	39.8		15.8	15.8	15.8	15.8	15.8	15.8
Effective Green, g (s)	24.4	22.0	22.0	46.2	39.8		15.8	15.8	15.8	15.8	15.8	15.8
Actuated g/C Ratio	0.35	0.31	0.31	0.66	0.57		0.23	0.23	0.23	0.23	0.23	0.23
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	175	1112	498	617	2001		285	421	357	296	421	357
v/s Ratio Prot	0.01	0.25		c0.26	0.39			0.04			0.07	
v/s Ratio Perm	0.08		0.17	c0.34			0.05		0.05	c0.13		0.06
v/c Ratio	0.27	0.79	0.55	0.90	0.69		0.21	0.19	0.21	0.58	0.29	0.27
Uniform Delay, d1	15.3	21.9	19.9	16.6	10.7		22.0	21.9	22.0	24.2	22.5	22.3
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8	4.0	1.3	16.5	1.0		1.7	1.0	1.4	8.1	1.7	1.8
Delay (s)	16.1	25.9	21.3	33.1	11.8		23.8	22.9	23.4	32.2	24.2	24.1
Level of Service	B	C	C	C	B		C	C	C	C	C	C
Approach Delay (s)		23.9			17.9			23.4			26.9	
Approach LOS		C			B			C			C	
Intersection Summary												
HCM Average Control Delay			21.5			HCM Level of Service			C			
HCM Volume to Capacity ratio			0.80									
Actuated Cycle Length (s)			70.0			Sum of lost time (s)			8.0			
Intersection Capacity Utilization			78.2%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

2: SR 32 & Shamrock Blvd

9/30/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Volume (veh/h)	430	891	220	172	1128	176	120	34	12	82	4	203
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	453	938	232	181	1187	185	126	36	13	86	4	214
Approach Volume (veh/h)	1622			1554			175			304		
Crossing Volume (veh/h)	272			615			1477#			1495#		
High Capacity (veh/h)	1119			851			419			413		
High v/c (veh/h)	1.45			1.82			0.42			0.74		
Low Capacity (veh/h)	921			682			311			306		
Low v/c (veh/h)	1.76			2.28			0.56			0.99		
Intersection Summary												
Maximum v/c High	1.82											
Maximum v/c Low	2.28											
Intersection Capacity Utilization	111.0%			ICU Level of Service			H					
# Crossing flow exceeds 1200, method is not applicable												

HCM Unsignalized Intersection Capacity Analysis

3: SR 32 & Westlea Dr.

9/30/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	976	9	0	1453	16	0	0	56	0	0	22
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	1027	9	0	1529	17	0	0	59	0	0	23
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)					575							
pX, platoon unblocked	0.61						0.61	0.61		0.61	0.61	0.61
vC, conflicting volume	1546			1037			1820	2578	518	2111	2575	773
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	608			1037			1059	2306	518	1537	2300	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	88	100	100	96
cM capacity (veh/h)	587			666			105	23	502	42	23	659
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	514	523	765	782	59	23						
Volume Left	0	0	0	0	0	0						
Volume Right	0	9	0	17	59	23						
cSH	587	1700	666	1700	502	659						
Volume to Capacity	0.00	0.31	0.00	0.46	0.12	0.04						
Queue Length 95th (ft)	0	0	0	0	10	3						
Control Delay (s)	0.0	0.0	0.0	0.0	13.1	10.7						
Lane LOS					B	B						
Approach Delay (s)	0.0		0.0		13.1	10.7						
Approach LOS					B	B						
Intersection Summary												
Average Delay			0.4									
Intersection Capacity Utilization			50.8%		ICU Level of Service		A					
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

5: SR 32 & Walnut St

9/30/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	1372	11	0	1384	4	0	0	15	0	0	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	1444	12	0	1457	4	0	0	16	0	0	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)		380										
pX, platoon unblocked				0.75			0.75	0.75	0.75	0.75	0.75	
vC, conflicting volume	1461			1456			2181	2911	728	2197	2915	731
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1461			946			1910	2882	0	1932	2887	731
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	98	100	100	99
cM capacity (veh/h)	458			542			31	12	815	29	12	364
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	963	493	971	490	16	2						
Volume Left	0	0	0	0	0	0						
Volume Right	0	12	0	4	16	2						
cSH	1700	1700	1700	1700	815	364						
Volume to Capacity	0.57	0.29	0.57	0.29	0.02	0.01						
Queue Length 95th (ft)	0	0	0	0	1	0						
Control Delay (s)	0.0	0.0	0.0	0.0	9.5	14.9						
Lane LOS					A	B						
Approach Delay (s)	0.0		0.0		9.5	14.9						
Approach LOS					A	B						
Intersection Summary												
Average Delay			0.1									
Intersection Capacity Utilization			48.4%		ICU Level of Service		A					
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

6: SR 32 & Cherry St.

9/30/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	1390	11	0	1360	4	0	0	15	0	0	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	1463	12	0	1432	4	0	0	16	0	0	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)		757										
pX, platoon unblocked				0.76			0.76	0.76	0.76	0.76	0.76	
vC, conflicting volume	1436			1475			2187	2905	737	2181	2908	718
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1436			989			1928	2874	17	1920	2879	718
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	98	100	100	99
cM capacity (veh/h)	469			527			30	12	802	30	12	372
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	975	499	954	481	16	2						
Volume Left	0	0	0	0	0	0						
Volume Right	0	12	0	4	16	2						
cSH	1700	1700	1700	1700	802	372						
Volume to Capacity	0.57	0.29	0.56	0.28	0.02	0.01						
Queue Length 95th (ft)	0	0	0	0	2	0						
Control Delay (s)	0.0	0.0	0.0	0.0	9.6	14.7						
Lane LOS					A	B						
Approach Delay (s)	0.0		0.0		9.6	14.7						
Approach LOS					A	B						
Intersection Summary												
Average Delay			0.1									
Intersection Capacity Utilization			48.8%		ICU Level of Service		A					
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

7: SR 32 & East St.

9/30/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Volume (veh/h)	218	1188	0	129	1287	107	23	58	89	90	98	56
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	229	1251	0	136	1355	113	24	61	94	95	103	59
Approach Volume (veh/h)	1480			1603			179			257		
Crossing Volume (veh/h)	334			315			1575#			1515#		
High Capacity (veh/h)	1066			1082			386			406		
High v/c (veh/h)	1.39			1.48			0.46			0.63		
Low Capacity (veh/h)	872			887			284			300		
Low v/c (veh/h)	1.70			1.81			0.63			0.86		
Intersection Summary												
Maximum v/c High	1.48											
Maximum v/c Low	1.81											
Intersection Capacity Utilization	108.7%			ICU Level of Service			G					
# Crossing flow exceeds 1200, method is not applicable												

HCM Signalized Intersection Capacity Analysis

1: SR 32 & US 31 NB On-Ramp

9/30/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	138	1318	0	0	1392	92	357	0	332	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0		4.0			
Lane Util. Factor	0.97	0.95			0.86	1.00	0.97		0.88			
Frt	1.00	1.00			1.00	0.85	1.00		0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (prot)	3433	3539			6408	1583	3433		2787			
Flt Permitted	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	3433	3539			6408	1583	3433		2787			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	145	1387	0	0	1465	97	376	0	349	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	36	0	0	70	0	0	0
Lane Group Flow (vph)	145	1387	0	0	1465	61	376	0	279	0	0	0
Turn Type	Prot					Perm	custom		custom			
Protected Phases	7	4			8							
Permitted Phases						8	2		2			
Actuated Green, G (s)	8.8	45.0			32.2	32.2	37.0		37.0			
Effective Green, g (s)	8.8	45.0			32.2	32.2	37.0		37.0			
Actuated g/C Ratio	0.10	0.50			0.36	0.36	0.41		0.41			
Clearance Time (s)	4.0	4.0			4.0	4.0	4.0		4.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0		3.0			
Lane Grp Cap (vph)	336	1770			2293	566	1411		1146			
v/s Ratio Prot	0.04	c0.39			0.23							
v/s Ratio Perm						0.04	c0.11		0.10			
v/c Ratio	0.43	0.78			0.64	0.11	0.27		0.24			
Uniform Delay, d1	38.2	18.5			24.1	19.3	17.5		17.3			
Progression Factor	1.00	1.00			1.00	1.00	1.00		1.00			
Incremental Delay, d2	0.9	2.3			0.6	0.1	0.5		0.5			
Delay (s)	39.1	20.8			24.7	19.4	18.0		17.8			
Level of Service	D	C			C	B	B		B			
Approach Delay (s)		22.6			24.3			17.9			0.0	
Approach LOS		C			C			B			A	
Intersection Summary												
HCM Average Control Delay			22.4			HCM Level of Service			C			
HCM Volume to Capacity ratio			0.55									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)			8.0			
Intersection Capacity Utilization			54.7%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

4: SR 32 & Union St.

9/30/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	1356	65	0	1034	149	249	424	230	433	356	118
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		0.95			0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.99			0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		1.00			1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		3515			3472		1770	1863	1583	1770	1863	1583
Flt Permitted		1.00			1.00		0.46	1.00	1.00	0.15	1.00	1.00
Satd. Flow (perm)		3515			3472		861	1863	1583	276	1863	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1427	68	0	1088	157	262	446	242	456	375	124
RTOR Reduction (vph)	0	4	0	0	12	0	0	0	24	0	0	51
Lane Group Flow (vph)	0	1491	0	0	1233	0	262	446	218	456	375	73
Turn Type							pm+pt		Perm	pm+pt		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases							2		2	6		6
Actuated Green, G (s)		37.0			37.0		32.8	23.0	23.0	45.0	31.2	31.2
Effective Green, g (s)		37.0			37.0		32.8	23.0	23.0	45.0	31.2	31.2
Actuated g/C Ratio		0.41			0.41		0.36	0.26	0.26	0.50	0.35	0.35
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		1445			1427		413	476	405	437	646	549
v/s Ratio Prot		c0.42			0.35		0.07	0.24		c0.21	0.20	
v/s Ratio Perm							0.16		0.14	c0.31		0.05
v/c Ratio		1.03			0.86		0.63	0.94	0.54	1.04	0.58	0.13
Uniform Delay, d1		26.5			24.2		21.5	32.8	28.9	25.3	24.0	20.1
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		32.4			5.7		3.2	28.2	5.1	54.8	3.8	0.5
Delay (s)		58.9			29.9		24.6	61.0	34.0	80.1	27.8	20.6
Level of Service		E			C		C	E	C	F	C	C
Approach Delay (s)		58.9			29.9			44.1			51.9	
Approach LOS		E			C			D			D	
Intersection Summary												
HCM Average Control Delay			46.6			HCM Level of Service				D		
HCM Volume to Capacity ratio			1.02									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)			8.0			
Intersection Capacity Utilization			95.9%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

8: SR 32 & Grassy Branch

9/30/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	1862	236	359	1169	40	51	236	439	78	185	147
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3522		1770	1863	1583	1770	1863	1583
Flt Permitted	0.20	1.00	1.00	0.06	1.00		0.40	1.00	1.00	0.27	1.00	1.00
Satd. Flow (perm)	379	3539	1583	115	3522		750	1863	1583	510	1863	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	89	1960	248	378	1231	42	54	248	462	82	195	155
RTOR Reduction (vph)	0	0	88	0	2	0	0	0	176	0	0	128
Lane Group Flow (vph)	89	1960	160	378	1271	0	54	248	286	82	195	27
Turn Type	pm+pt		Perm	pm+pt			Perm		Perm	Perm		Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8			2		2	6		6
Actuated Green, G (s)	65.6	60.8	60.8	82.8	74.0		19.2	19.2	19.2	19.2	19.2	19.2
Effective Green, g (s)	65.6	60.8	60.8	82.8	74.0		19.2	19.2	19.2	19.2	19.2	19.2
Actuated g/C Ratio	0.60	0.55	0.55	0.75	0.67		0.17	0.17	0.17	0.17	0.17	0.17
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	287	1956	875	357	2369		131	325	276	89	325	276
v/s Ratio Prot	0.01	0.55		c0.17	0.36			0.13			0.10	
v/s Ratio Perm	0.17		0.10	c0.62			0.07		c0.18	0.16		0.02
v/c Ratio	0.31	1.00	0.18	1.06	0.54		0.41	0.76	1.04	0.92	0.60	0.10
Uniform Delay, d1	9.5	24.6	12.2	38.7	9.2		40.4	43.2	45.4	44.7	41.9	38.1
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	20.8	0.1	64.0	0.2		9.3	15.6	64.1	75.6	8.0	0.7
Delay (s)	10.2	45.4	12.3	102.7	9.5		49.7	58.8	109.5	120.2	49.8	38.8
Level of Service	B	D	B	F	A		D	E	F	F	D	D
Approach Delay (s)		40.5			30.8			88.8			59.2	
Approach LOS		D			C			F			E	

Intersection Summary

HCM Average Control Delay	46.1	HCM Level of Service	D
HCM Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	101.4%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

2: SR 32 & Shamrock Blvd

9/30/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Volume (veh/h)	207	1276	167	117	1190	48	129	2	29	76	10	165
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	218	1343	176	123	1253	51	136	2	31	80	11	174
Approach Volume (veh/h)	1737			1426			168			264		
Crossing Volume (veh/h)	214			356			1641#			1512#		
High Capacity (veh/h)	1171			1047			365			407		
High v/c (veh/h)	1.48			1.36			0.46			0.65		
Low Capacity (veh/h)	968			856			266			301		
Low v/c (veh/h)	1.79			1.67			0.63			0.88		
Intersection Summary												
Maximum v/c High	1.48											
Maximum v/c Low	1.79											
Intersection Capacity Utilization	108.3%			ICU Level of Service						G		
# Crossing flow exceeds 1200, method is not applicable												

HCM Unsignalized Intersection Capacity Analysis

3: SR 32 & Westlea Dr.

9/30/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	1356	16	0	1342	60	0	0	65	0	0	13
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	1427	17	0	1413	63	0	0	68	0	0	14
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)					575							
pX, platoon unblocked	0.69						0.69	0.69		0.69	0.69	0.69
vC, conflicting volume	1476			1444			2156	2912	722	2226	2888	738
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	785			1444			1773	2872	722	1876	2838	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	81	100	100	98
cM capacity (veh/h)	571			465			35	11	369	25	12	746
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	714	731	706	769	68	14						
Volume Left	0	0	0	0	0	0						
Volume Right	0	17	0	63	68	14						
cSH	571	1700	465	1700	369	746						
Volume to Capacity	0.00	0.43	0.00	0.45	0.19	0.02						
Queue Length 95th (ft)	0	0	0	0	17	1						
Control Delay (s)	0.0	0.0	0.0	0.0	17.0	9.9						
Lane LOS					C	A						
Approach Delay (s)	0.0		0.0		17.0	9.9						
Approach LOS					C	A						
Intersection Summary												
Average Delay			0.4									
Intersection Capacity Utilization			49.7%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

5: SR 32 & Walnut St

9/30/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	1972	47	0	1170	13	0	0	62	0	0	14
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	2076	49	0	1232	14	0	0	65	0	0	15
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (ft)		380										
pX, platoon unblocked				0.60			0.60	0.60	0.60	0.60	0.60	
vC, conflicting volume	1245			2125			2731	3346	1063	2342	3364	623
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1245			1543			2552	3576	0	1903	3606	623
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	90	100	100	97
cM capacity (veh/h)	555			256			8	3	651	23	3	429
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	1384	741	821	424	65	15						
Volume Left	0	0	0	0	0	0						
Volume Right	0	49	0	14	65	15						
cSH	1700	1700	1700	1700	651	429						
Volume to Capacity	0.81	0.44	0.48	0.25	0.10	0.03						
Queue Length 95th (ft)	0	0	0	0	8	3						
Control Delay (s)	0.0	0.0	0.0	0.0	11.1	13.7						
Lane LOS					B	B						
Approach Delay (s)	0.0		0.0		11.1	13.7						
Approach LOS					B	B						
Intersection Summary												
Average Delay			0.3									
Intersection Capacity Utilization			66.5%		ICU Level of Service				C			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

6: SR 32 & Cherry St.

9/30/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑			↕			↕	
Volume (veh/h)	0	1981	47	0	1173	13	0	0	62	0	0	7
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	2085	49	0	1235	14	0	0	65	0	0	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)		757										
pX, platoon unblocked				0.61			0.61	0.61	0.61	0.61	0.61	
vC, conflicting volume	1248			2135			2735	3358	1067	2349	3376	624
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1248			1592			2568	3583	0	1942	3612	624
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	90	100	100	98
cM capacity (veh/h)	553			251			8	3	667	22	3	428
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1						
Volume Total	1390	745	823	425	65	7						
Volume Left	0	0	0	0	0	0						
Volume Right	0	49	0	14	65	7						
cSH	1700	1700	1700	1700	667	428						
Volume to Capacity	0.82	0.44	0.48	0.25	0.10	0.02						
Queue Length 95th (ft)	0	0	0	0	8	1						
Control Delay (s)	0.0	0.0	0.0	0.0	11.0	13.6						
Lane LOS					B	B						
Approach Delay (s)	0.0		0.0		11.0	13.6						
Approach LOS					B	B						
Intersection Summary												
Average Delay			0.2									
Intersection Capacity Utilization			66.8%		ICU Level of Service				C			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

7: SR 32 & East St.

9/30/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized												
Volume (veh/h)	172	1871	0	177	1050	141	76	70	211	100	59	60
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	181	1969	0	186	1105	148	80	74	222	105	62	63
Approach Volume (veh/h)		2151			1440			376			231	
Crossing Volume (veh/h)		354			335			2256#			1372#	
High Capacity (veh/h)		1049			1065			215			458	
High v/c (veh/h)		2.05			1.35			1.75			0.50	
Low Capacity (veh/h)		857			872			147			343	
Low v/c (veh/h)		2.51			1.65			2.55			0.67	
Intersection Summary												
Maximum v/c High			2.05									
Maximum v/c Low			2.55									
Intersection Capacity Utilization			120.7%			ICU Level of Service				H		
# Crossing flow exceeds 1200, method is not applicable												

HCM Signalized Intersection Capacity Analysis

1: SR 32 & US 31 NB On-Ramp

9/30/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	555	1019	0	0	1351	100	189	0	522	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0		4.0			
Lane Util. Factor	0.97	0.95			0.86	1.00	0.97		0.88			
Frt	1.00	1.00			1.00	0.85	1.00		0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (prot)	3433	3539			6408	1583	3433		2787			
Flt Permitted	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	3433	3539			6408	1583	3433		2787			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	584	1073	0	0	1422	105	199	0	549	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	31	0	0	124	0	0	0
Lane Group Flow (vph)	584	1073	0	0	1422	74	199	0	425	0	0	0
Turn Type	Prot				Perm				custom			
Protected Phases	7	4			8							
Permitted Phases						8	2		2			
Actuated Green, G (s)	20.0	51.2			27.2	27.2	30.8		30.8			
Effective Green, g (s)	20.0	51.2			27.2	27.2	30.8		30.8			
Actuated g/C Ratio	0.22	0.57			0.30	0.30	0.34		0.34			
Clearance Time (s)	4.0	4.0			4.0	4.0	4.0		4.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0		3.0			
Lane Grp Cap (vph)	763	2013			1937	478	1175		954			
v/s Ratio Prot	c0.17	0.30			c0.22							
v/s Ratio Perm						0.05	0.06		c0.15			
v/c Ratio	0.77	0.53			0.73	0.16	0.17		0.45			
Uniform Delay, d1	32.8	12.0			28.2	23.0	20.7		23.0			
Progression Factor	1.00	1.00			0.81	0.95	1.00		1.00			
Incremental Delay, d2	4.6	0.3			0.7	0.1	0.3		1.5			
Delay (s)	37.4	12.3			23.5	22.0	21.0		24.5			
Level of Service	D	B			C	C	C		C			
Approach Delay (s)		21.1			23.4			23.6			0.0	
Approach LOS		C			C			C			A	
Intersection Summary												
HCM Average Control Delay			22.5			HCM Level of Service			C			
HCM Volume to Capacity ratio			0.63									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			53.1%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: SR 32 & Shamrock Blvd

9/30/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	316	1005	220	72	1128	176	120	34	12	82	4	203
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	0.97		1.00	0.98			0.99			0.90	
Flt Protected	0.95	1.00		0.95	1.00			0.97			0.99	
Satd. Flow (prot)	1770	3444		1770	3468			1780			1662	
Flt Permitted	0.09	1.00		0.17	1.00			0.49			0.87	
Satd. Flow (perm)	174	3444		311	3468			897			1469	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	333	1058	232	76	1187	185	126	36	13	86	4	214
RTOR Reduction (vph)	0	19	0	0	14	0	0	3	0	0	97	0
Lane Group Flow (vph)	333	1271	0	76	1358	0	0	172	0	0	207	0
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	59.3	50.3		43.9	38.9			22.7			22.7	
Effective Green, g (s)	59.3	50.3		43.9	38.9			22.7			22.7	
Actuated g/C Ratio	0.66	0.56		0.49	0.43			0.25			0.25	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	405	1925		233	1499			226			371	
v/s Ratio Prot	c0.15	0.37		0.02	c0.39							
v/s Ratio Perm	0.39			0.14				c0.19			0.14	
v/c Ratio	0.82	0.66		0.33	0.91			0.76			0.56	
Uniform Delay, d1	24.8	13.9		12.8	23.8			31.1			29.3	
Progression Factor	1.59	0.80		1.00	1.00			1.00			1.00	
Incremental Delay, d2	11.3	0.8		0.8	8.2			21.2			5.9	
Delay (s)	50.6	11.8		13.7	32.0			52.3			35.2	
Level of Service	D	B		B	C			D			D	
Approach Delay (s)		19.8			31.0			52.3			35.2	
Approach LOS		B			C			D			D	
Intersection Summary												
HCM Average Control Delay			27.3			HCM Level of Service				C		
HCM Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			84.7%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

4: SR 32 & Union St.

9/30/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	143	1001	56	51	1276	132	54	347	97	243	589	136
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	0.97	1.00	1.00
Flt	1.00	0.99		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3511		1770	3489		1770	1863	1583	3433	1863	1583
Flt Permitted	0.09	1.00		0.12	1.00		0.12	1.00	1.00	0.30	1.00	1.00
Satd. Flow (perm)	171	3511		233	3489		231	1863	1583	1095	1863	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	151	1054	59	54	1343	139	57	365	102	256	620	143
RTOR Reduction (vph)	0	4	0	0	8	0	0	0	29	0	0	31
Lane Group Flow (vph)	151	1109	0	54	1474	0	57	365	73	256	620	112
Turn Type	pm+pt			pm+pt			pm+pt			pm+ov		pm+pt
Protected Phases	7	4		3	8		5	2	3	1	6	7
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	48.6	43.6		45.0	41.8		35.4	32.2	35.4	39.0	34.0	39.0
Effective Green, g (s)	48.6	43.6		45.0	41.8		35.4	32.2	35.4	39.0	34.0	39.0
Actuated g/C Ratio	0.49	0.44		0.45	0.42		0.35	0.32	0.35	0.39	0.34	0.39
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	163	1531		154	1458		131	600	624	544	633	681
v/s Ratio Prot	c0.05	0.32		0.01	c0.42		0.01	0.20	0.00	c0.02	c0.33	0.01
v/s Ratio Perm	0.40			0.15			0.14		0.04	0.16		0.06
v/c Ratio	0.93	0.72		0.35	1.01		0.44	0.61	0.12	0.47	0.98	0.16
Uniform Delay, d1	23.0	23.2		18.2	29.1		25.7	28.6	21.8	21.4	32.7	19.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	48.9	1.7		1.4	26.4		2.3	4.5	0.1	0.6	31.1	0.1
Delay (s)	71.9	25.0		19.6	55.5		28.0	33.1	21.9	22.1	63.7	20.0
Level of Service	E	C		B	E		C	C	C	C	E	B
Approach Delay (s)		30.6			54.2			30.4			47.1	
Approach LOS		C			D			C			D	
Intersection Summary												
HCM Average Control Delay			42.8			HCM Level of Service				D		
HCM Volume to Capacity ratio			1.03									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			20.0			
Intersection Capacity Utilization			95.1%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

7: SR 32 & East St.

9/30/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	132	1195	0	0	1416	107	14	58	89	83	98	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95			0.95			1.00			1.00	
Frt	1.00	1.00			0.99			0.93			0.97	
Flt Protected	0.95	1.00			1.00			1.00			0.98	
Satd. Flow (prot)	1770	3539			3502			1716			1772	
Flt Permitted	0.08	1.00			1.00			0.96			0.80	
Satd. Flow (perm)	147	3539			3502			1663			1436	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	139	1258	0	0	1491	113	15	61	94	87	103	59
RTOR Reduction (vph)	0	0	0	0	6	0	0	49	0	0	13	0
Lane Group Flow (vph)	139	1258	0	0	1598	0	0	121	0	0	236	0
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	58.9	58.9			46.7			23.1			23.1	
Effective Green, g (s)	58.9	58.9			46.7			23.1			23.1	
Actuated g/C Ratio	0.65	0.65			0.52			0.26			0.26	
Clearance Time (s)	4.0	4.0			4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)	244	2316			1817			427			369	
v/s Ratio Prot	0.05	c0.36			c0.46							
v/s Ratio Perm	0.32							0.07			c0.16	
v/c Ratio	0.57	0.54			0.88			0.28			0.64	
Uniform Delay, d1	16.4	8.3			19.2			26.8			29.8	
Progression Factor	1.00	1.00			0.48			1.00			1.00	
Incremental Delay, d2	3.0	0.3			3.6			1.7			8.3	
Delay (s)	19.5	8.6			12.8			28.5			38.0	
Level of Service	B	A			B			C			D	
Approach Delay (s)		9.7			12.8			28.5			38.0	
Approach LOS		A			B			C			D	
Intersection Summary												
HCM Average Control Delay			14.1			HCM Level of Service			B			
HCM Volume to Capacity ratio			0.78									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			85.6%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

8: SR 32 & Grassy Branch

9/30/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	839	483	529	1264	51	58	76	321	163	116	201
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3519		1770	1863	1583	1770	1863	1583
Flt Permitted	0.17	1.00	1.00	0.14	1.00		0.64	1.00	1.00	0.69	1.00	1.00
Satd. Flow (perm)	310	3539	1583	266	3519		1200	1863	1583	1292	1863	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	47	883	508	557	1331	54	61	80	338	172	122	212
RTOR Reduction (vph)	0	0	192	0	3	0	0	0	52	0	0	101
Lane Group Flow (vph)	47	883	316	557	1382	0	61	80	286	172	122	111
Turn Type	pm+pt		pm+ov	pm+pt			pm+pt		pm+ov	pm+pt		pm+ov
Protected Phases	7	4	5	3	8		5	2	3	1	6	7
Permitted Phases	4		4	8			2		2	6		6
Actuated Green, G (s)	29.0	24.0	30.7	53.0	44.0		24.7	18.0	43.0	25.3	18.3	23.3
Effective Green, g (s)	29.0	24.0	30.7	53.0	44.0		24.7	18.0	43.0	25.3	18.3	23.3
Actuated g/C Ratio	0.32	0.27	0.34	0.59	0.49		0.27	0.20	0.48	0.28	0.20	0.26
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	181	944	610	574	1720		372	373	827	400	379	480
v/s Ratio Prot	0.01	0.25	c0.04	c0.27	0.39		0.01	0.04	0.10	0.03	0.07	0.01
v/s Ratio Perm	0.07		0.16	c0.30			0.03		0.08	c0.09		0.06
v/c Ratio	0.26	0.94	0.52	0.97	0.80		0.16	0.21	0.35	0.43	0.32	0.23
Uniform Delay, d1	21.6	32.2	23.7	24.4	19.4		24.5	30.1	14.7	25.8	30.6	26.3
Progression Factor	1.23	0.86	1.04	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	14.1	0.6	30.1	2.8		0.2	1.3	0.3	0.7	2.2	0.2
Delay (s)	27.3	41.7	25.4	54.5	22.2		24.7	31.4	15.0	26.5	32.8	26.5
Level of Service	C	D	C	D	C		C	C	B	C	C	C
Approach Delay (s)		35.5			31.4			18.9			28.0	
Approach LOS		D			C			B			C	
Intersection Summary												
HCM Average Control Delay			31.0			HCM Level of Service			C			
HCM Volume to Capacity ratio			0.73									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)			4.0			
Intersection Capacity Utilization			78.2%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

3: SR 32 & Westlea Dr.

9/30/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	7	1083	9	112	1338	16	16	0	56	60	0	22
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	7	1140	9	118	1408	17	17	0	59	63	0	23
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	TWLTL			TWLTL								
Median storage veh	2			2								
Upstream signal (ft)	840			575								
pX, platoon unblocked	0.61			0.78			0.72	0.72	0.78	0.72	0.72	0.61
vC, conflicting volume	1425			1149			2123	2821	575	2296	2817	713
vC1, stage 1 conf vol							1159	1159		1653	1653	
vC2, stage 2 conf vol							963	1661		644	1164	
vCu, unblocked vol	419			613			386	1352	0	627	1347	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			84			95	100	93	64	100	96
cM capacity (veh/h)	693			746			328	180	841	175	173	662
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1				
Volume Total	7	760	389	118	939	486	76	86				
Volume Left	7	0	0	118	0	0	17	63				
Volume Right	0	0	9	0	0	17	59	23				
cSH	693	1700	1700	746	1700	1700	624	218				
Volume to Capacity	0.01	0.45	0.23	0.16	0.55	0.29	0.12	0.40				
Queue Length 95th (ft)	1	0	0	14	0	0	10	44				
Control Delay (s)	10.2	0.0	0.0	10.7	0.0	0.0	11.6	31.9				
Lane LOS	B			B			B	D				
Approach Delay (s)	0.1			0.8			11.6	31.9				
Approach LOS							B	D				
Intersection Summary												
Average Delay			1.7									
Intersection Capacity Utilization			62.2%			ICU Level of Service			B			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

5: SR 32 & Walnut St

9/30/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	25	1305	11	33	1448	4	9	0	15	7	0	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	26	1374	12	35	1524	4	9	0	16	7	0	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh		2			2							
Upstream signal (ft)		380			757							
pX, platoon unblocked	0.59			0.70			0.74	0.74	0.70	0.74	0.74	0.59
vC, conflicting volume	1528			1385			2266	3030	693	2351	3034	764
vC1, stage 1 conf vol							1432	1432		1596	1596	
vC2, stage 2 conf vol							834	1598		755	1438	
vCu, unblocked vol	513			697			195	1226	0	310	1231	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			94			98	100	98	98	100	100
cM capacity (veh/h)	620			628			530	204	760	362	201	642
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1				
Volume Total	26	916	469	35	1016	512	25	9				
Volume Left	26	0	0	35	0	0	9	7				
Volume Right	0	0	12	0	0	4	16	2				
cSH	620	1700	1700	628	1700	1700	654	401				
Volume to Capacity	0.04	0.54	0.28	0.06	0.60	0.30	0.04	0.02				
Queue Length 95th (ft)	3	0	0	4	0	0	3	2				
Control Delay (s)	11.1	0.0	0.0	11.1	0.0	0.0	10.7	14.2				
Lane LOS	B			B			B	B				
Approach Delay (s)	0.2			0.2			10.7	14.2				
Approach LOS							B	B				
Intersection Summary												
Average Delay			0.4									
Intersection Capacity Utilization			50.2%			ICU Level of Service		A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

6: SR 32 & Cherry St.

9/30/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	25	1305	11	33	1448	4	9	0	15	7	0	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	26	1374	12	35	1524	4	9	0	16	7	0	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage (veh)		2			2							
Upstream signal (ft)		757			380							
pX, platoon unblocked	0.59			0.74			0.72	0.72	0.74	0.72	0.72	0.59
vC, conflicting volume	1528			1385			2266	3030	693	2351	3034	764
vC1, stage 1 conf vol							1432	1432		1596	1596	
vC2, stage 2 conf vol							834	1598		755	1438	
vCu, unblocked vol	498			812			340	1403	0	459	1408	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			94			98	100	98	97	100	100
cM capacity (veh/h)	625			598			404	191	800	245	185	638
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1				
Volume Total	26	916	469	35	1016	512	25	9				
Volume Left	26	0	0	35	0	0	9	7				
Volume Right	0	0	12	0	0	4	16	2				
cSH	625	1700	1700	598	1700	1700	585	283				
Volume to Capacity	0.04	0.54	0.28	0.06	0.60	0.30	0.04	0.03				
Queue Length 95th (ft)	3	0	0	5	0	0	3	3				
Control Delay (s)	11.0	0.0	0.0	11.4	0.0	0.0	11.4	18.1				
Lane LOS	B			B			B	C				
Approach Delay (s)	0.2			0.3			11.4	18.1				
Approach LOS							B	C				
Intersection Summary												
Average Delay			0.4									
Intersection Capacity Utilization			50.2%			ICU Level of Service		A				
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

1: SR 32 & US 31 NB On-Ramp

9/30/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	138	1318	0	0	1392	92	357	0	332	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0		4.0			
Lane Util. Factor	0.97	0.95			0.86	1.00	0.97		0.88			
Frt	1.00	1.00			1.00	0.85	1.00		0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (prot)	3433	3539			6408	1583	3433		2787			
Flt Permitted	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	3433	3539			6408	1583	3433		2787			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	145	1387	0	0	1465	97	376	0	349	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	36	0	0	70	0	0	0
Lane Group Flow (vph)	145	1387	0	0	1465	61	376	0	279	0	0	0
Turn Type	Prot					Perm	custom		custom			
Protected Phases	7	4			8							
Permitted Phases						8	2		2			
Actuated Green, G (s)	8.8	45.0			32.2	32.2	37.0		37.0			
Effective Green, g (s)	8.8	45.0			32.2	32.2	37.0		37.0			
Actuated g/C Ratio	0.10	0.50			0.36	0.36	0.41		0.41			
Clearance Time (s)	4.0	4.0			4.0	4.0	4.0		4.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0		3.0			
Lane Grp Cap (vph)	336	1770			2293	566	1411		1146			
v/s Ratio Prot	0.04	c0.39			0.23							
v/s Ratio Perm						0.04	c0.11		0.10			
v/c Ratio	0.43	0.78			0.64	0.11	0.27		0.24			
Uniform Delay, d1	38.2	18.5			24.1	19.3	17.5		17.3			
Progression Factor	1.00	1.00			0.78	1.08	1.00		1.00			
Incremental Delay, d2	0.9	2.3			0.4	0.1	0.5		0.5			
Delay (s)	39.1	20.8			19.3	20.8	18.0		17.8			
Level of Service	D	C			B	C	B		B			
Approach Delay (s)		22.6			19.4			17.9			0.0	
Approach LOS		C			B			B			A	
Intersection Summary												
HCM Average Control Delay			20.4			HCM Level of Service			C			
HCM Volume to Capacity ratio			0.55									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)			8.0			
Intersection Capacity Utilization			54.7%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: SR 32 & Shamrock Blvd

9/30/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	107	1376	167	27	1190	48	129	2	29	76	10	165
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	0.98		1.00	0.99			0.98			0.91	
Flt Protected	0.95	1.00		0.95	1.00			0.96			0.99	
Satd. Flow (prot)	1770	3482		1770	3518			1746			1672	
Flt Permitted	0.09	1.00		0.09	1.00			0.54			0.87	
Satd. Flow (perm)	161	3482		169	3518			979			1476	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	113	1448	176	28	1253	51	136	2	31	80	11	174
RTOR Reduction (vph)	0	11	0	0	3	0	0	8	0	0	74	0
Lane Group Flow (vph)	113	1613	0	28	1301	0	0	161	0	0	191	0
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	54.6	48.9		45.7	44.0			27.4			27.4	
Effective Green, g (s)	54.6	48.9		45.7	44.0			27.4			27.4	
Actuated g/C Ratio	0.61	0.54		0.51	0.49			0.30			0.30	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	216	1892		116	1720			298			449	
v/s Ratio Prot	c0.04	c0.46		0.00	0.37							
v/s Ratio Perm	0.28			0.12				c0.16			0.13	
v/c Ratio	0.52	0.85		0.24	0.76			0.54			0.43	
Uniform Delay, d1	13.7	17.5		15.8	18.7			26.0			25.0	
Progression Factor	2.12	0.62		1.00	1.00			1.00			1.00	
Incremental Delay, d2	2.0	3.4		1.1	1.9			6.8			2.9	
Delay (s)	31.0	14.3		16.9	20.6			32.9			28.0	
Level of Service	C	B		B	C			C			C	
Approach Delay (s)		15.4			20.5			32.9			28.0	
Approach LOS		B			C			C			C	
Intersection Summary												
HCM Average Control Delay			19.1			HCM Level of Service				B		
HCM Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			77.5%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

4: SR 32 & Union St.

9/30/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	116	1365	65	76	1075	149	187	424	230	386	356	118
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	0.97	1.00	
Flt Protected	1.00	0.99		1.00	0.98		1.00	1.00	0.85	1.00	0.96	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3515		1770	3475		1770	1863	1583	3433	1793	
Satd. Flow (perm)	173	3515		182	3475		248	1863	1583	688	1793	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	122	1437	68	80	1132	157	197	446	242	406	375	124
RTOR Reduction (vph)	0	3	0	0	11	0	0	0	8	0	12	0
Lane Group Flow (vph)	122	1502	0	80	1278	0	197	446	234	406	487	0
Turn Type	pm+pt			pm+pt			pm+pt			pm+ov		pm+pt
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	49.0	43.0		45.0	41.0		38.0	30.0	34.0	36.0	29.0	
Effective Green, g (s)	49.0	43.0		45.0	41.0		38.0	30.0	34.0	36.0	29.0	
Actuated g/C Ratio	0.49	0.43		0.45	0.41		0.38	0.30	0.34	0.36	0.29	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	181	1511		145	1425		216	559	602	440	520	
v/s Ratio Prot	c0.04	c0.43		0.02	0.37		c0.07	0.24	0.02	0.06	0.27	
v/s Ratio Perm	0.29			0.23			c0.27		0.13	0.27		
v/c Ratio	0.67	0.99		0.55	0.90		0.91	0.80	0.39	0.92	0.94	
Uniform Delay, d1	20.7	28.4		23.0	27.5		25.1	32.2	25.1	28.2	34.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	9.5	21.5		4.5	7.8		37.8	11.3	0.4	24.8	26.5	
Delay (s)	30.2	49.9		27.5	35.3		62.9	43.5	25.5	53.0	61.1	
Level of Service	C	D		C	D		E	D	C	D	E	
Approach Delay (s)		48.4			34.8			42.9			57.5	
Approach LOS		D			C			D			E	
Intersection Summary												
HCM Average Control Delay			45.2			HCM Level of Service				D		
HCM Volume to Capacity ratio			0.93									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			93.6%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

7: SR 32 & East St.

9/30/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	107	1880	0	0	1227	141	47	70	211	91	59	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95			0.95			1.00			1.00	
Frt	1.00	1.00			0.98			0.91			0.96	
Flt Protected	0.95	1.00			1.00			0.99			0.98	
Satd. Flow (prot)	1770	3539			3485			1689			1753	
Flt Permitted	0.08	1.00			1.00			0.93			0.54	
Satd. Flow (perm)	153	3539			3485			1575			962	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	113	1979	0	0	1292	148	49	74	222	96	62	63
RTOR Reduction (vph)	0	0	0	0	9	0	0	68	0	0	16	0
Lane Group Flow (vph)	113	1979	0	0	1431	0	0	277	0	0	205	0
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	59.0	59.0			49.4			23.0			23.0	
Effective Green, g (s)	59.0	59.0			49.4			23.0			23.0	
Actuated g/C Ratio	0.66	0.66			0.55			0.26			0.26	
Clearance Time (s)	4.0	4.0			4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)	201	2320			1913			403			246	
v/s Ratio Prot	0.04	c0.56			0.41							
v/s Ratio Perm	0.33							0.18			c0.21	
v/c Ratio	0.56	0.85			0.75			0.69			0.83	
Uniform Delay, d1	12.9	12.1			15.5			30.3			31.7	
Progression Factor	1.00	1.00			1.00			1.00			1.00	
Incremental Delay, d2	3.6	3.3			1.6			9.2			27.1	
Delay (s)	16.5	15.4			17.2			39.5			58.8	
Level of Service	B	B			B			D			E	
Approach Delay (s)		15.4			17.2			39.5			58.8	
Approach LOS		B			B			D			E	
Intersection Summary												
HCM Average Control Delay			20.4			HCM Level of Service			C			
HCM Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)			8.0			
Intersection Capacity Utilization			93.1%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

8: SR 32 & Grassy Branch

9/30/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	1862	236	359	1169	40	51	236	439	78	185	147
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3522		1770	1863	1583	1770	1863	1583
Satd. Flow (perm)	361	3539	1583	101	3522		552	1863	1583	414	1863	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	89	1960	248	378	1231	42	54	248	462	82	195	155
RTOR Reduction (vph)	0	0	56	0	2	0	0	0	12	0	0	83
Lane Group Flow (vph)	89	1960	192	378	1271	0	54	248	450	82	195	72
Turn Type	pm+pt		pm+ov	pm+pt			pm+pt		pm+ov	pm+pt		pm+ov
Protected Phases	7	4	5	3	8		5	2	3	1	6	7
Permitted Phases	4		4	8			2		2	6		6
Actuated Green, G (s)	77.1	70.0	74.0	96.0	84.9		22.0	18.0	40.0	22.0	18.0	25.1
Effective Green, g (s)	77.1	70.0	74.0	96.0	84.9		22.0	18.0	40.0	22.0	18.0	25.1
Actuated g/C Ratio	0.59	0.54	0.57	0.74	0.65		0.17	0.14	0.31	0.17	0.14	0.19
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	291	1906	950	357	2300		131	258	536	112	258	354
v/s Ratio Prot	0.02	0.55	0.01	c0.18	0.36		0.01	c0.13	c0.14	c0.02	0.10	0.01
v/s Ratio Perm	0.16		0.11	c0.60			0.06		0.14	0.10		0.03
v/c Ratio	0.31	1.03	0.20	1.06	0.55		0.41	0.96	0.84	0.73	0.76	0.20
Uniform Delay, d1	11.6	30.0	13.6	46.5	12.2		46.6	55.7	42.0	50.7	53.9	44.1
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	28.2	0.1	64.0	0.3		2.1	46.9	11.0	21.7	18.5	0.3
Delay (s)	12.2	58.2	13.7	110.5	12.5		48.7	102.6	53.0	72.4	72.4	44.3
Level of Service	B	E	B	F	B		D	F	D	E	E	D
Approach Delay (s)		51.6			35.0			68.8			62.3	
Approach LOS		D			C			E			E	
Intersection Summary												
HCM Average Control Delay			49.7			HCM Level of Service				D		
HCM Volume to Capacity ratio			0.99									
Actuated Cycle Length (s)			130.0			Sum of lost time (s)			8.0			
Intersection Capacity Utilization			101.4%			ICU Level of Service			G			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

3: SR 32 & Westlea Dr.

9/30/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	13	1443	16	94	1227	60	25	0	65	38	0	13
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	14	1519	17	99	1292	63	26	0	68	40	0	14
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	TWLTL			TWLTL								
Median storage (veh)	2			2								
Upstream signal (ft)	840			575								
pX, platoon unblocked	0.67			0.60			0.76	0.76	0.60	0.76	0.76	0.67
vC, conflicting volume	1355			1536			2412	3107	768	2376	3084	677
vC1, stage 1 conf vol							1555	1555		1521	1521	
vC2, stage 2 conf vol							857	1553		855	1563	
vCu, unblocked vol	561			568			316	1226	0	270	1195	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			84			93	100	90	91	100	98
cM capacity (veh/h)	679			602			360	181	653	426	167	731
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1				
Volume Total	14	1013	523	99	861	494	95	54				
Volume Left	14	0	0	99	0	0	26	40				
Volume Right	0	0	17	0	0	63	68	14				
cSH	679	1700	1700	602	1700	1700	532	477				
Volume to Capacity	0.02	0.60	0.31	0.16	0.51	0.29	0.18	0.11				
Queue Length 95th (ft)	2	0	0	15	0	0	16	9				
Control Delay (s)	10.4	0.0	0.0	12.1	0.0	0.0	13.2	13.5				
Lane LOS	B			B			B	B				
Approach Delay (s)	0.1			0.8			13.2	13.5				
Approach LOS							B	B				
Intersection Summary												
Average Delay			1.1									
Intersection Capacity Utilization			62.3%			ICU Level of Service			B			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

5: SR 32 & Walnut St

9/30/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	18	1916	47	41	1250	13	37	0	62	9	0	14
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	19	2017	49	43	1316	14	39	0	65	9	0	15
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage veh		2			2							
Upstream signal (ft)		380			757							
pX, platoon unblocked	0.71			0.50			0.64	0.64	0.50	0.64	0.64	0.71
vC, conflicting volume	1329			2066			2838	3495	1033	2521	3513	665
vC1, stage 1 conf vol							2079	2079		1409	1409	
vC2, stage 2 conf vol							759	1416		1112	2104	
vCu, unblocked vol	641			1115			701	1725	0	205	1753	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			86			62	100	88	97	100	98
cM capacity (veh/h)	665			308			103	118	537	379	79	768
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1				
Volume Total	19	1345	722	43	877	452	104	24				
Volume Left	19	0	0	43	0	0	39	9				
Volume Right	0	0	49	0	0	14	65	15				
cSH	665	1700	1700	308	1700	1700	209	548				
Volume to Capacity	0.03	0.79	0.42	0.14	0.52	0.27	0.50	0.04				
Queue Length 95th (ft)	2	0	0	12	0	0	63	3				
Control Delay (s)	10.6	0.0	0.0	18.6	0.0	0.0	38.3	11.9				
Lane LOS	B			C			E	B				
Approach Delay (s)	0.1			0.6			38.3	11.9				
Approach LOS							E	B				
Intersection Summary												
Average Delay			1.5									
Intersection Capacity Utilization			68.6%			ICU Level of Service			C			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

6: SR 32 & Cherry St.

9/30/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	18	1916	47	56	1265	13	29	0	62	9	0	7
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	19	2017	49	59	1332	14	31	0	65	9	0	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		TWLTL			TWLTL							
Median storage (veh)		2			2							
Upstream signal (ft)		757			380							
pX, platoon unblocked	0.69			0.53			0.68	0.68	0.53	0.68	0.68	0.69
vC, conflicting volume	1345			2066			2871	3543	1033	2568	3561	673
vC1, stage 1 conf vol							2079	2079		1456	1456	
vC2, stage 2 conf vol							791	1463		1112	2104	
vCu, unblocked vol	603			1231			770	1754	0	327	1781	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)							6.5	5.5		6.5	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			80			67	100	89	97	100	99
cM capacity (veh/h)	670			296			93	110	572	294	57	749
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1				
Volume Total	19	1345	722	59	888	458	96	17				
Volume Left	19	0	0	59	0	0	31	9				
Volume Right	0	0	49	0	0	14	65	7				
cSH	670	1700	1700	296	1700	1700	217	400				
Volume to Capacity	0.03	0.79	0.42	0.20	0.52	0.27	0.44	0.04				
Queue Length 95th (ft)	2	0	0	18	0	0	52	3				
Control Delay (s)	10.5	0.0	0.0	20.1	0.0	0.0	34.0	14.4				
Lane LOS	B			C			D	B				
Approach Delay (s)	0.1			0.8			34.0	14.4				
Approach LOS							D	B				
Intersection Summary												
Average Delay			1.4									
Intersection Capacity Utilization			66.9%		ICU Level of Service					C		
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

1: SR 32 & US 31 NB On-Ramp

9/30/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	555	1019	0	0	1351	100	189	0	522	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0		4.0			
Lane Util. Factor	0.97	0.95			0.86	1.00	0.97		0.88			
Frt	1.00	1.00			1.00	0.85	1.00		0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (prot)	3433	3539			6408	1583	3433		2787			
Flt Permitted	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	3433	3539			6408	1583	3433		2787			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	584	1073	0	0	1422	105	199	0	549	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	31	0	0	124	0	0	0
Lane Group Flow (vph)	584	1073	0	0	1422	74	199	0	425	0	0	0
Turn Type	Prot					Perm	custom		custom			
Protected Phases	7	4			8							
Permitted Phases						8	2		2			
Actuated Green, G (s)	20.0	51.2			27.2	27.2	30.8		30.8			
Effective Green, g (s)	20.0	51.2			27.2	27.2	30.8		30.8			
Actuated g/C Ratio	0.22	0.57			0.30	0.30	0.34		0.34			
Clearance Time (s)	4.0	4.0			4.0	4.0	4.0		4.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0		3.0			
Lane Grp Cap (vph)	763	2013			1937	478	1175		954			
v/s Ratio Prot	c0.17	0.30			c0.22							
v/s Ratio Perm						0.05	0.06		c0.15			
v/c Ratio	0.77	0.53			0.73	0.16	0.17		0.45			
Uniform Delay, d1	32.8	12.0			28.2	23.0	20.7		23.0			
Progression Factor	1.00	1.00			1.00	1.00	1.00		1.00			
Incremental Delay, d2	4.6	0.3			1.5	0.2	0.3		1.5			
Delay (s)	37.4	12.3			29.6	23.1	21.0		24.5			
Level of Service	D	B			C	C	C		C			
Approach Delay (s)		21.1			29.2			23.6			0.0	
Approach LOS		C			C			C			A	
Intersection Summary												
HCM Average Control Delay			24.7			HCM Level of Service			C			
HCM Volume to Capacity ratio			0.63									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			53.1%			ICU Level of Service			A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

4: SR 32 & Union St.

9/30/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	176	911	56	145	1199	132	79	347	97	310	589	136
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		0.91			0.91		1.00	1.00	1.00	0.97	1.00	
Frt		0.99			0.99		1.00	1.00	0.85	1.00	0.97	
Flt Protected		0.99			1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		5009			4992		1770	1863	1583	3433	1810	
Flt Permitted		0.64			0.65		0.09	1.00	1.00	0.32	1.00	
Satd. Flow (perm)		3240			3270		159	1863	1583	1151	1810	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	185	959	59	153	1262	139	83	365	102	326	620	143
RTOR Reduction (vph)	0	4	0	0	9	0	0	0	50	0	7	0
Lane Group Flow (vph)	0	1199	0	0	1545	0	83	365	52	326	756	0
Turn Type	Perm			Perm			pm+pt			Perm	pm+pt	
Protected Phases		4			8		5	2			1	6
Permitted Phases	4			8			2		2		6	
Actuated Green, G (s)		62.0			62.0		51.0	47.0	47.0	60.0	52.0	
Effective Green, g (s)		62.0			62.0		51.0	47.0	47.0	60.0	52.0	
Actuated g/C Ratio		0.48			0.48		0.39	0.36	0.36	0.46	0.40	
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		1545			1560		112	674	572	689	724	
v/s Ratio Prot							c0.02	0.20		0.03	c0.42	
v/s Ratio Perm		0.37			c0.47		0.27		0.03	0.19		
v/c Ratio		2.31dl			1.03dl		0.74	0.54	0.09	0.47	1.04	
Uniform Delay, d1		28.2			33.7		32.6	32.9	27.4	22.9	39.0	
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		2.5			20.4		22.9	3.1	0.3	0.5	45.7	
Delay (s)		30.7			54.2		55.5	36.1	27.7	23.4	84.7	
Level of Service		C			D		E	D	C	C	F	
Approach Delay (s)		30.7			54.2			37.4			66.4	
Approach LOS		C			D			D			E	
Intersection Summary												
HCM Average Control Delay			48.7			HCM Level of Service			D			
HCM Volume to Capacity ratio			1.01									
Actuated Cycle Length (s)			130.0		Sum of lost time (s)				12.0			
Intersection Capacity Utilization			108.4%		ICU Level of Service				G			
Analysis Period (min)			15									
dl Defacto Left Lane. Recode with 1 though lane as a left lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

8: SR 32 & Grassy Branch

9/30/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	839	483	529	1264	51	58	76	321	163	116	201
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3519		1770	1863	1583	1770	1863	1583
Flt Permitted	0.19	1.00	1.00	0.12	1.00		0.65	1.00	1.00	0.70	1.00	1.00
Satd. Flow (perm)	363	3539	1583	226	3519		1205	1863	1583	1313	1863	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	47	883	508	557	1331	54	61	80	338	172	122	212
RTOR Reduction (vph)	0	0	212	0	3	0	0	0	258	0	0	115
Lane Group Flow (vph)	47	883	296	557	1382	0	61	80	80	172	122	98
Turn Type	pm+pt		Perm	pm+pt			Perm		Perm	Perm		Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8			2		2	6		6
Actuated Green, G (s)	32.0	29.0	29.0	60.7	53.7		21.3	21.3	21.3	21.3	21.3	21.3
Effective Green, g (s)	32.0	29.0	29.0	60.7	53.7		21.3	21.3	21.3	21.3	21.3	21.3
Actuated g/C Ratio	0.36	0.32	0.32	0.67	0.60		0.24	0.24	0.24	0.24	0.24	0.24
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	176	1140	510	628	2100		285	441	375	311	441	375
v/s Ratio Prot	0.01	0.25		c0.27	0.39			0.04			0.07	
v/s Ratio Perm	0.09		0.19	c0.33			0.05		0.05	c0.13		0.06
v/c Ratio	0.27	0.77	0.58	0.89	0.66		0.21	0.18	0.21	0.55	0.28	0.26
Uniform Delay, d1	19.2	27.5	25.4	22.4	12.1		27.6	27.4	27.6	30.2	28.1	27.9
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8	3.4	1.7	14.2	0.8		1.7	0.9	1.3	6.9	1.6	1.7
Delay (s)	20.0	30.9	27.1	36.6	12.8		29.3	28.3	28.9	37.1	29.6	29.6
Level of Service	C	C	C	D	B		C	C	C	D	C	C
Approach Delay (s)		29.2			19.6			28.9			32.2	
Approach LOS		C			B			C			C	
Intersection Summary												
HCM Average Control Delay			25.3			HCM Level of Service			C			
HCM Volume to Capacity ratio			0.79									
Actuated Cycle Length (s)			90.0			Sum of lost time (s)			8.0			
Intersection Capacity Utilization			78.2%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

2: SR 32 & Shamrock Blvd

9/30/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized			Yes			Yes						
Volume (veh/h)	320	1001	220	117	1128	176	120	34	12	82	4	203
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	337	1054	232	123	1187	185	126	36	13	86	4	214
Approach Volume (veh/h)		1391			1311			175			304	
Crossing Volume (veh/h)		214			499			1477#			1437#	
High Capacity (veh/h)		1171			934			419			433	
High v/c (veh/h)		1.19			1.40			0.42			0.70	
Low Capacity (veh/h)		968			755			311			323	
Low v/c (veh/h)		1.44			1.74			0.56			0.94	
Intersection Summary												
Maximum v/c High			1.40									
Maximum v/c Low			1.74									
Intersection Capacity Utilization			96.6%			ICU Level of Service				F		
# Crossing flow exceeds 1200, method is not applicable												

HCM Unsignalized Intersection Capacity Analysis

3: SR 32 & Westlea Dr.

9/30/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	1086	9	0	1398	16	0	0	56	0	0	22
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	1143	9	0	1472	17	0	0	59	0	0	23
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)					575							
pX, platoon unblocked	0.80						0.80	0.80		0.80	0.80	0.80
vC, conflicting volume	1488			1153			1662	2636	386	1920	2633	499
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	718			1153			936	2160	386	1260	2155	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	90	100	100	97
cM capacity (veh/h)	700			602			170	37	613	91	38	863
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1				
Volume Total	286	572	295	368	736	385	59	23				
Volume Left	0	0	0	0	0	0	0	0				
Volume Right	0	0	9	0	0	17	59	23				
cSH	700	1700	1700	602	1700	1700	613	863				
Volume to Capacity	0.00	0.34	0.17	0.00	0.43	0.23	0.10	0.03				
Queue Length 95th (ft)	0	0	0	0	0	0	8	2				
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	11.5	9.3				
Lane LOS							B	A				
Approach Delay (s)	0.0			0.0			11.5	9.3				
Approach LOS							B	A				
Intersection Summary												
Average Delay			0.3									
Intersection Capacity Utilization			37.5%			ICU Level of Service		A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

5: SR 32 & Walnut Street

9/30/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	1307	11	0	1474	4	0	0	15	0	0	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	1376	12	0	1552	4	0	0	16	0	0	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)		380										
pX, platoon unblocked				0.85			0.85	0.85	0.85	0.85	0.85	
vC, conflicting volume	1556			1387			1901	2937	464	2028	2941	519
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1556			835			1440	2660	0	1589	2664	519
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	98	100	100	100
cM capacity (veh/h)	421			675			79	19	921	60	19	501
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1				
Volume Total	550	550	287	621	621	315	16	2				
Volume Left	0	0	0	0	0	0	0	0				
Volume Right	0	0	12	0	0	4	16	2				
cSH	1700	1700	1700	1700	1700	1700	921	501				
Volume to Capacity	0.32	0.32	0.17	0.37	0.37	0.19	0.02	0.00				
Queue Length 95th (ft)	0	0	0	0	0	0	1	0				
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	9.0	12.2				
Lane LOS							A	B				
Approach Delay (s)	0.0			0.0			9.0	12.2				
Approach LOS							A	B				
Intersection Summary												
Average Delay			0.1									
Intersection Capacity Utilization			38.6%			ICU Level of Service			A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

6: SR 32 & Cherry St.

9/30/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑↑			↔			↔	
Volume (veh/h)	0	1325	11	0	1450	4	0	0	15	0	0	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	1395	12	0	1526	4	0	0	16	0	0	2
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)		757										
pX, platoon unblocked				0.89			0.89	0.89	0.89	0.89	0.89	
vC, conflicting volume	1531			1406			1911	2931	471	2009	2935	511
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1531			1009			1579	2730	0	1689	2734	511
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	98	100	100	100
cM capacity (veh/h)	431			605			65	18	961	53	18	508
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1				
Volume Total	558	558	291	611	611	309	16	2				
Volume Left	0	0	0	0	0	0	0	0				
Volume Right	0	0	12	0	0	4	16	2				
cSH	1700	1700	1700	1700	1700	1700	961	508				
Volume to Capacity	0.33	0.33	0.17	0.36	0.36	0.18	0.02	0.00				
Queue Length 95th (ft)	0	0	0	0	0	0	1	0				
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	8.8	12.1				
Lane LOS							A	B				
Approach Delay (s)	0.0			0.0			8.8	12.1				
Approach LOS							A	B				
Intersection Summary												
Average Delay			0.1									
Intersection Capacity Utilization			38.1%			ICU Level of Service			A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

7: SR 32 & East St.

9/30/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized			Yes			Yes						
Volume (veh/h)	152	1188	0	40	1376	107	23	58	89	90	98	56
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	160	1251	0	42	1448	113	24	61	94	95	103	59
Approach Volume (veh/h)		1411			1491			179			257	
Crossing Volume (veh/h)		240			245			1505#			1515#	
High Capacity (veh/h)		1147			1143			409			406	
High v/c (veh/h)		1.23			1.30			0.44			0.63	
Low Capacity (veh/h)		946			942			303			300	
Low v/c (veh/h)		1.49			1.58			0.59			0.86	
Intersection Summary												
Maximum v/c High	1.30											
Maximum v/c Low	1.58											
Intersection Capacity Utilization	103.3%			ICU Level of Service					G			
# Crossing flow exceeds 1200, method is not applicable												

HCM Signalized Intersection Capacity Analysis

1: SR 32 & US 31 NB On-Ramp

9/30/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	138	1318	0	0	1392	92	357	0	332	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0		4.0			
Lane Util. Factor	0.97	0.95			0.86	1.00	0.97		0.88			
Frt	1.00	1.00			1.00	0.85	1.00		0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (prot)	3433	3539			6408	1583	3433		2787			
Flt Permitted	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	3433	3539			6408	1583	3433		2787			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	145	1387	0	0	1465	97	376	0	349	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	36	0	0	70	0	0	0
Lane Group Flow (vph)	145	1387	0	0	1465	61	376	0	279	0	0	0
Turn Type	Prot				Perm				custom			
Protected Phases	7	4			8							
Permitted Phases						8	2		2			
Actuated Green, G (s)	8.8	45.0			32.2	32.2	37.0		37.0			
Effective Green, g (s)	8.8	45.0			32.2	32.2	37.0		37.0			
Actuated g/C Ratio	0.10	0.50			0.36	0.36	0.41		0.41			
Clearance Time (s)	4.0	4.0			4.0	4.0	4.0		4.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0		3.0			
Lane Grp Cap (vph)	336	1770			2293	566	1411		1146			
v/s Ratio Prot	0.04	c0.39			0.23							
v/s Ratio Perm						0.04	c0.11		0.10			
v/c Ratio	0.43	0.78			0.64	0.11	0.27		0.24			
Uniform Delay, d1	38.2	18.5			24.1	19.3	17.5		17.3			
Progression Factor	1.00	1.00			1.00	1.00	1.00		1.00			
Incremental Delay, d2	0.9	2.3			0.6	0.1	0.5		0.5			
Delay (s)	39.1	20.8			24.7	19.4	18.0		17.8			
Level of Service	D	C			C	B	B		B			
Approach Delay (s)		22.6			24.3			17.9			0.0	
Approach LOS		C			C			B			A	
Intersection Summary												
HCM Average Control Delay		22.4			HCM Level of Service				C			
HCM Volume to Capacity ratio		0.55										
Actuated Cycle Length (s)		90.0			Sum of lost time (s)				8.0			
Intersection Capacity Utilization		54.7%			ICU Level of Service				A			
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

4: SR 32 & Union St.

9/30/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	143	1305	65	170	981	149	249	424	230	433	356	118
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		0.91			0.91		1.00	1.00	1.00	0.97	1.00	
Frt		0.99			0.98		1.00	1.00	0.85	1.00	0.96	
Flt Protected		1.00			0.99		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		5029			4965		1770	1863	1583	3433	1793	
Flt Permitted		0.65			0.65		0.15	1.00	1.00	0.20	1.00	
Satd. Flow (perm)		3284			3231		276	1863	1583	719	1793	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	151	1374	68	179	1033	157	262	446	242	456	375	124
RTOR Reduction (vph)	0	5	0	0	18	0	0	0	15	0	14	0
Lane Group Flow (vph)	0	1588	0	0	1351	0	262	446	227	456	485	0
Turn Type	Perm			Perm			pm+pt			Perm	pm+pt	
Protected Phases	4			8			5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	44.0			44.0			35.0	27.0	27.0	33.0	26.0	
Effective Green, g (s)	44.0			44.0			35.0	27.0	27.0	33.0	26.0	
Actuated g/C Ratio	0.49			0.49			0.39	0.30	0.30	0.37	0.29	
Clearance Time (s)	4.0			4.0			4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0			3.0			3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	1606			1580			240	559	475	475	518	
v/s Ratio Prot							c0.10	0.24		0.07	0.27	
v/s Ratio Perm	c0.48			0.42			c0.33		0.14	0.28		
v/c Ratio	1.25dl			1.75dl			1.09	0.80	0.48	0.96	0.94	
Uniform Delay, d1	22.8			20.2			23.7	29.0	25.7	25.4	31.2	
Progression Factor	1.00			1.00			1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	19.6			4.8			84.7	11.3	3.4	31.2	26.7	
Delay (s)	42.3			24.9			108.5	40.3	29.1	56.6	57.9	
Level of Service	D			C			F	D	C	E	E	
Approach Delay (s)	42.3			24.9				56.3			57.3	
Approach LOS	D			C				E			E	
Intersection Summary												
HCM Average Control Delay	43.1			HCM Level of Service				D				
HCM Volume to Capacity ratio	1.00											
Actuated Cycle Length (s)	90.0			Sum of lost time (s)				8.0				
Intersection Capacity Utilization	108.3%			ICU Level of Service				G				
Analysis Period (min)	15											
dl Defacto Left Lane. Recode with 1 though lane as a left lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

8: SR 32 & Grassy Branch

9/30/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	1862	236	359	1169	40	51	236	439	78	185	147
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	3539	1583	1770	3522		1770	1863	1583	1770	1863	1583
Flt Permitted	0.20	1.00	1.00	0.06	1.00		0.40	1.00	1.00	0.27	1.00	1.00
Satd. Flow (perm)	379	3539	1583	115	3522		750	1863	1583	510	1863	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	89	1960	248	378	1231	42	54	248	462	82	195	155
RTOR Reduction (vph)	0	0	85	0	2	0	0	0	176	0	0	128
Lane Group Flow (vph)	89	1960	163	378	1271	0	54	248	286	82	195	27
Turn Type	pm+pt		Perm	pm+pt			Perm		Perm	Perm		Perm
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4		4	8			2		2	6		6
Actuated Green, G (s)	65.6	60.8	60.8	82.8	74.0		19.2	19.2	19.2	19.2	19.2	19.2
Effective Green, g (s)	65.6	60.8	60.8	82.8	74.0		19.2	19.2	19.2	19.2	19.2	19.2
Actuated g/C Ratio	0.60	0.55	0.55	0.75	0.67		0.17	0.17	0.17	0.17	0.17	0.17
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	287	1956	875	357	2369		131	325	276	89	325	276
v/s Ratio Prot	0.01	0.55		c0.17	0.36			0.13			0.10	
v/s Ratio Perm	0.17		0.10	c0.62			0.07		c0.18	0.16		0.02
v/c Ratio	0.31	1.00	0.19	1.06	0.54		0.41	0.76	1.04	0.92	0.60	0.10
Uniform Delay, d1	9.5	24.6	12.3	38.7	9.2		40.4	43.2	45.4	44.7	41.9	38.1
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	20.8	0.1	64.0	0.2		9.3	15.6	64.1	75.6	8.0	0.7
Delay (s)	10.2	45.4	12.4	102.7	9.5		49.7	58.8	109.5	120.2	49.8	38.8
Level of Service	B	D	B	F	A		D	E	F	F	D	D
Approach Delay (s)		40.5			30.8			88.8			59.2	
Approach LOS		D			C			F			E	

Intersection Summary

HCM Average Control Delay	46.1	HCM Level of Service	D
HCM Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	101.4%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

2: SR 32 & Shamrock Blvd

9/30/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized			Yes			Yes						
Volume (veh/h)	115	1368	167	65	1190	48	129	2	29	76	10	165
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	121	1440	176	68	1253	51	136	2	31	80	11	174
Approach Volume (veh/h)		1561			1321			168			264	
Crossing Volume (veh/h)		159			259			1641#			1457#	
High Capacity (veh/h)		1223			1130			365			426	
High v/c (veh/h)		1.28			1.17			0.46			0.62	
Low Capacity (veh/h)		1014			931			266			317	
Low v/c (veh/h)		1.54			1.42			0.63			0.83	
Intersection Summary												
Maximum v/c High			1.28									
Maximum v/c Low			1.54									
Intersection Capacity Utilization			99.9%			ICU Level of Service				F		
# Crossing flow exceeds 1200, method is not applicable												

SR 32 and Shamrock/Poplar – AM Peak 2035

25:5:11 SR 32 CORRIDOR STUDY POPLAR AM ALT 1 83

Input	Value	Input	Value	Input	Value	Input	Value	Input	Value
E	<m> 8.50	9.10	4.50	9.10	TIME PERIOD	min	90		
L'	<m> 10.00	10.00	10.00	10.00	TIME SLICE	min	15		
U	<m> 3.60	7.20	3.60	7.20	RESULTS PERIOD	min	15	75	
RAD	<m> 30.48	30.48	30.48	30.48	TIME COST	\$/hr	15.00		
PHI	<d> 25.00	25.00	25.00	25.00	FLOW PERIOD	min	15	75	
DIA	<m> 48.77	48.77	48.77	48.77	FLOW TYPE	pcu/veh		VEH	
GRAD	SEP 0	0	0	0	FLOW PEAK	am/op/pm		AM	

LEG NAME	PCU	Flows	<1st exit	2nd etc...U>	FLOF	CL	Flow Ratio	Flow Time
NORTHLEG	1.08	203	004	082	0	1.00	85 0.75 0.891 0.75	15 45 75
WESTLEG	1.10	220	891	430	0	1.00	85 0.75 0.891 0.75	15 45 75
SOUTHLEG	1.02	012	034	120	0	1.00	85 0.75 0.891 0.75	15 45 75
EASTLEG	1.10	176	1128	172	0	1.00	85 0.75 0.891 0.75	15 45 75

MODE 2

Flow	veh	289	1541	166	1476		
CAPACITY	veh	564	2053	341	1800	AUDEL	s 9.8
AUE DELAY	mins	0.22	0.12	0.34	0.18	L O S	A
MAX DELAY	mins	0.28	0.15	0.47	0.25	UEH HRS	9.5
AUE QUEUE	veh	1	3	1	5	COST	\$ 142.1
MAX QUEUE	veh	1	4	1	6		

F1mode F2direct F3peak CtrlF3rev F4fact F6stats F8econ F9prnt F10run Esc

SR 32 and Shamrock/Poplar – PM Peak 2035

C:\WINDOWS\system32\cmd.exe

25:5:11 SR 32 CORRIDOR STUDY POPLAR pm ALT 1 73

E	<m>	8.50	9.10	4.50	9.10	TIME PERIOD	min	90
L'	<m>	10.00	10.00	10.00	10.00	TIME SLICE	min	15
U	<m>	3.60	7.20	3.60	7.20	RESULTS PERIOD	min	15 75
RAD	<m>	30.48	30.48	30.48	30.48	TIME COST	\$/hr	15.00
PHI	<d>	25.00	25.00	25.00	25.00	FLOW PERIOD	min	15 75
DIA	<m>	48.77	48.77	48.77	48.77	FLOW TYPE	pcu/veh	VEH
GRAD SEP		0	0	0	0	FLOW PEAK	am/op/pm	PM

LEG NAME	PCU	FLOWS	<1st exit	2nd etc...U>	FLOF	CL	FLOW RATIO	FLOW TIME
NORTHLEG	1.08	165	010	076	0	1.00	85 0.75 0.891 0.75	15 45 75
WESTLEG	1.10	167	1276	207	0	1.00	85 0.75 0.891 0.75	15 45 75
SOUTHLEG	1.02	029	002	129	0	1.00	85 0.75 0.891 0.75	15 45 75
EASTLEG	1.10	048	1190	117	0	1.00	85 0.75 0.891 0.75	15 45 75

MODE 2

FLOW	veh	251	1650	160	1355		
CAPACITY	veh	554	2097	248	1996		
AUE DELAY	mins	0.20	0.13	0.78	0.09	AUDEL s	9.0
MAX DELAY	mins	0.25	0.17	1.25	0.11	L O S	A
AUE QUEUE	veh	1	4	2	2	VEH HRS	8.6
MAX QUEUE	veh	1	5	3	2	COST \$	128.8

F1mode F2direct F3peak CtrlF3rev F4fact F6stats F8econ F9prnt F10run Esc

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C:\WINDOWS\system32\cmd.exe
25:55:11      SR 32 CORRIDOR STUDY east AM ALT 1      74
E  <m>      4.50      9.10      4.50      9.10      TIME PERIOD      min      90
L' <m>      10.00     10.00     10.00     10.00     TIME SLICE      min      15
U  <m>      3.60      7.20      3.60      7.20     RESULTS PERIOD  min      15 75
RAD <m>      30.48     30.48     30.48     30.48     TIME COST      $/hr     15.00
PHI <d>      25.00     25.00     25.00     25.00     FLOW PERIOD      min      15 75
DIA <m>      48.77     48.77     48.77     48.77     FLOW TYPE      pcu/veh     VEH
GRAD SEP      0      0      0      0      FLOW PEAK      am/op/pm     AM

LEG NAME  PCU  FLOWS <1st exit 2nd etc...U>  FLOF  CL  FLOW RATIO  FLOW TIME
NORTHLEG  1.02  056 098 090 0  1.00  85  0.75 0.891 0.75 15 45 75
WESTLEG   1.10  050 1188 218 0  1.00  85  0.75 0.891 0.75 15 45 75
SOUTHLEG  1.02  089 058 023 0  1.00  85  0.75 0.891 0.75 15 45 75
EASTLEG   1.10  107 1287 129 0  1.00  85  0.75 0.891 0.75 15 45 75

MODE 2
FLOW      veh      244      1456      170      1523
CAPACITY  veh      320      2016      288      2024
AVE DELAY mins    0.88      0.10      0.53      0.12
MAX DELAY mins    1.46      0.13      0.79      0.15
AVE QUEUE  veh      4      3      2      3
MAX QUEUE  veh      6      3      2      4
AUDEL s      11.2
L O S      B
VEH HRS      10.6
COST $      159.0

F1mode F2direct F3peak CtrlF3rev F4fact F6stats F8econ F9prnt F10run Esc

```

25:5:11 SR 32 CORRIDOR STUDY east pm ALT 1 91

E	<m>	4.50	9.10	8.50	9.10	TIME PERIOD	min	90
L'	<m>	10.00	30.48	15.24	10.00	TIME SLICE	min	15
U	<m>	3.60	7.20	6.60	7.20	RESULTS PERIOD	min	15 75
RAD	<m>	30.48	30.48	30.48	30.48	TIME COST	\$/hr	15.00
PHI	<d>	25.00	25.00	25.00	25.00	FLOW PERIOD	min	15 75
DIA	<m>	48.77	48.77	48.77	48.77	FLOW TYPE	pcu/veh	VEH
GRAD SEP		0	0	0	0	FLOW PEAK	am/op/pm	PM

LEG NAME	PCU	FLWS	<1st exit	2nd etc...U>	FLOF	CL	FLOW RATIO	FLOW TIME
NORTHLEG	1.02	060	059	100	0	1.00	85 0.75 0.891 0.75	15 45 75
WESTLEG	1.10	050	1871	172	0	1.00	85 0.75 0.891 0.75	15 45 75
SOUTHLEG	1.02	211	070	076	0	1.00	85 0.75 0.891 0.75	15 45 75
EASTLEG	1.10	141	1050	177	0	1.00	85 0.75 0.891 0.75	15 45 75

MODE 2

FLOW	veh	219	2093	357	1368	AUDEL s	36.8
CAPACITY	veh	403	2106	553	2015	L O S	E
AUE DELAY	mins	0.33	1.04	0.29	0.09	VEH HRS	41.3
MAX DELAY	mins	0.44	1.89	0.41	0.11	COST \$	618.9
AUE QUEUE	veh	1	41	2	2		
MAX QUEUE	veh	2	66	2	2		

F1mode F2direct F3peak CtrlF3rev F4fact F6stats F8econ F9prnt F10run Esc

SR 32 and Shamrock/Poplar – AM Peak 2035

```

C:\WINDOWS\system32\cmd.exe
21:5:11 SR32 CORR. STUDY SHAMROCK PREF ALT 2035 39
E (m) 4.50 9.10 4.50 9.10 TIME PERIOD min 90
L' (m) 10.00 30.48 10.00 30.48 TIME SLICE min 15
U (m) 3.60 7.20 3.60 7.20 RESULTS PERIOD min 15 75
RAD (m) 30.48 30.48 30.48 30.48 TIME COST $/hr 15.00
PHI (d) 25.00 25.00 25.00 25.00 FLOW PERIOD min 15 75
DIA (m) 48.77 48.77 48.77 48.77 FLOW TYPE pcu/veh VEH
GRAD SEP 0 0 0 0 FLOW PEAK am/op/pm AM

LEG NAME PCU FLOWS (1st exit 2nd etc...U) FLOF CL FLOW RATIO FLOW TIME
SHAMROCK 1.08 206 4 82 0 1.00 85 0.75 0.891 0.75 15 45 75
SR 32 W 1.10 238 987 308 0 1.00 85 0.75 0.891 0.75 15 45 75
POPLAR 1.02 14 34 123 0 1.00 85 0.75 0.891 0.75 15 45 75
SR 32 E 1.10 176 1108 72 0 1.00 85 0.75 0.891 0.75 15 45 75

MODE 2
FLOW veh 292 1533 171 1356
CAPACITY veh 383 2244 357 1999
AVE DELAY mins 0.68 0.08 0.32 0.09
MAX DELAY mins 1.07 0.10 0.44 0.11
AVE QUEUE veh 3 2 1 2
MAX QUEUE veh 5 2 1 2
AUDEL s 9.1
L O S A
VEH HRS 8.4
COST $ 126.4

F1mode F2direct F3peak CtrlF3rev F4fact F6stats F8econ F9prnt F10run Esc

```

SR 32 and Shamrock/Poplar – PM Peak 2035

```

C:\WINDOWS\system32\cmd.exe
21:5:11 SR32 CORR. STUDY SHAMROCK PREF ALT 2035 40
E (m) 4.50 9.10 4.50 9.10 TIME PERIOD min 90
L' (m) 10.00 30.48 10.00 30.48 TIME SLICE min 15
U (m) 3.60 7.20 3.60 7.20 RESULTS PERIOD min 15 75
RAD (m) 30.48 30.48 30.48 30.48 TIME COST $/hr 15.00
PHI (d) 25.00 25.00 25.00 25.00 FLOW PERIOD min 15 75
DIA (m) 48.77 48.77 48.77 48.77 FLOW TYPE pcu/veh VEH
GRAD SEP 0 0 0 0 FLOW PEAK am/op/pm PM

LEG NAME PCU FLOWS (1st exit 2nd etc...U) FLOF CL FLOW RATIO FLOW TIME
SHAMROCK 1.08 173 10 76 0 1.00 85 0.75 0.891 0.75 15 45 75
SR 32 W 1.10 167 1361 110 0 1.00 85 0.75 0.891 0.75 15 45 75
POPLAR 1.02 30 2 130 0 1.00 85 0.75 0.891 0.75 15 45 75
SR 32 E 1.10 27 873 48 0 1.00 85 0.75 0.891 0.75 15 45 75

MODE 2
FLOW veh 259 1638 162 948
CAPACITY veh 526 2264 255 2182 AUDEL s 7.5
AVE DELAY mins 0.22 0.09 0.73 0.05 L O S A
MAX DELAY mins 0.28 0.12 1.16 0.05 VEH HRS 6.2
AVE QUEUE veh 1 3 2 1 COST $ 93.6
MAX QUEUE veh 1 3 3 1

F1mode F2direct F3peak CtrlF3rev F4fact F6stats F8econ F9prnt F10run Esc

```

```

C:\WINDOWS\system32\cmd.exe
21:5:11          SR32 CORRIDOR STUDY EAST PREF ALT 2035          117
E   <m>      4.50   9.10   8.50   9.10          TIME PERIOD      min      90
L'  <m>     10.00  30.48  10.00  30.48          TIME SLICE       min      15
U   <m>      3.60   7.20   7.20   7.20          RESULTS PERIOD  min     15 75
RAD <m>     30.48  30.48  30.48  30.48          TIME COST        $/hr    15.00
PHI <d>     25.00  25.00  25.00  25.00          FLOW PERIOD      min     15 75
DIA <m>     48.77  48.77  48.77  48.77          FLOW TYPE        pcu/veh   VEH
GRAD SEP      0      0      0      0          FLOW PEAK        am/op/pm   AM

LEG NAME  PCU    FLOWS <1st exit 2nd etc...U>  FLOF  CL    FLOW RATIO      FLOW TIME
NORTHLEG  1.10    56   98   90   0   1.00  85  0.75 0.891 0.75 15 45 75
WESTLEG   1.02    50 1188 152  0   1.00  85  0.75 0.891 0.75 15 45 75
SOUTHLEG  1.10    89   58   23  0   1.00  85  0.75 0.891 0.75 15 45 75
EASTLEG   1.02   107 1376  40  0   1.00  85  0.75 0.891 0.75 15 45 75

MODE 2
FLOW      veh      244    1390    170    1523
CAPACITY  veh      352    2360    1138    2362
AVE DELAY mins    0.57    0.06    0.06    0.07
MAX DELAY mins    0.85    0.07    0.07    0.08
AVE QUEUE  veh       2       1       0       2
MAX QUEUE  veh       3       2       0       2
AUDEL s      6.2
L O S        A
VEH HRS      5.7
COST $      85.3

F1mode F2direct F3peak CtrlF3rev F4fact F6stats F8econ F9prnt F10run Esc

```

```

C:\WINDOWS\system32\cmd.exe
21:5:11 SR32 CORRIDOR STUDY EAST PREF ALT 2035 118
E (m) 4.50 9.10 8.50 9.10 TIME PERIOD min 90
L' (m) 10.00 30.48 10.00 30.48 TIME SLICE min 15
U (m) 3.60 7.20 7.20 7.20 RESULTS PERIOD min 15 75
RAD (m) 30.48 30.48 30.48 30.48 TIME COST $/hr 15.00
PHI (d) 25.00 25.00 25.00 25.00 FLOW PERIOD min 15 75
DIA (m) 48.77 48.77 48.77 48.77 FLOW TYPE pcu/veh VEH
GRAD SEP 0 0 0 0 FLOW PEAK am/op/pm PM

LEG NAME PCU FLOWS (1st exit 2nd etc...U) FLOF CL FLOW RATIO FLOW TIME
NORTHLEG 1.02 060 059 100 0 1.00 85 0.75 0.891 0.75 15 45 75
WESTLEG 1.10 050 1871 121 0 1.00 85 0.75 0.891 0.75 15 45 75
SOUTHLEG 1.02 211 070 076 0 1.00 85 0.75 0.891 0.75 15 45 75
EASTLEG 1.10 141 1167 060 0 1.00 85 0.75 0.891 0.75 15 45 75

MODE 2
FLOW veh 219 2042 357 1368
CAPACITY veh 403 2202 594 2162 AUDEL s 15.3
AVE DELAY mins 0.33 0.37 0.26 0.07 L O S C
MAX DELAY mins 0.44 0.61 0.39 0.09 VEH HRS 17.0
AVE QUEUE veh 1 13 2 2 COST $ 254.3
MAX QUEUE veh 2 20 2 2

F1mode F2direct F3peak CtrlF3rev F4fact F6stats F8econ F9prnt F10run Esc

```

HCM Unsignalized Intersection Capacity Analysis

3: SR 32 & Westlea Dr.

9/30/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	1448	16	0	1289	60	0	0	65	0	0	13
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	1524	17	0	1357	63	0	0	68	0	0	14
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)					575							
pX, platoon unblocked	0.88						0.88	0.88		0.88	0.88	0.88
vC, conflicting volume	1420			1541			1999	2953	516	1965	2929	484
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	988			1541			1648	2736	516	1609	2709	0
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	86	100	100	99
cM capacity (veh/h)	610			427			56	17	504	53	18	951
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1				
Volume Total	381	762	398	339	678	402	68	14				
Volume Left	0	0	0	0	0	0	0	0				
Volume Right	0	0	17	0	0	63	68	14				
cSH	610	1700	1700	427	1700	1700	504	951				
Volume to Capacity	0.00	0.45	0.23	0.00	0.40	0.24	0.14	0.01				
Queue Length 95th (ft)	0	0	0	0	0	0	12	1				
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	13.3	8.8				
Lane LOS							B	A				
Approach Delay (s)	0.0			0.0			13.3	8.8				
Approach LOS							B	A				
Intersection Summary												
Average Delay			0.3									
Intersection Capacity Utilization			39.0%			ICU Level of Service		A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

5: SR 32 & Walnut Street

9/30/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	1922	47	0	1287	13	0	0	62	0	0	14
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	2023	49	0	1355	14	0	0	65	0	0	15
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (ft)		380										
pX, platoon unblocked				0.75			0.75	0.75	0.75	0.75	0.75	
vC, conflicting volume	1368			2073			2514	3416	699	2101	3434	458
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1368			1259			1849	3053	0	1298	3077	458
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	92	100	100	97
cM capacity (veh/h)	498			410			34	9	812	82	9	549
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1				
Volume Total	809	809	454	542	542	285	65	15				
Volume Left	0	0	0	0	0	0	0	0				
Volume Right	0	0	49	0	0	14	65	15				
cSH	1700	1700	1700	1700	1700	1700	812	549				
Volume to Capacity	0.48	0.48	0.27	0.32	0.32	0.17	0.08	0.03				
Queue Length 95th (ft)	0	0	0	0	0	0	7	2				
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	9.8	11.7				
Lane LOS							A	B				
Approach Delay (s)	0.0			0.0			9.8	11.7				
Approach LOS							A	B				
Intersection Summary												
Average Delay			0.2									
Intersection Capacity Utilization			48.7%			ICU Level of Service		A				
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

6: SR 32 & Cherry St.

9/30/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑↑			↕			↕	
Volume (veh/h)	0	1931	47	0	1290	13	0	0	62	0	0	7
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	2033	49	0	1358	14	0	0	65	0	0	7
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)		757										
pX, platoon unblocked				0.81			0.81	0.81	0.81	0.81	0.81	
vC, conflicting volume	1372			2082			2517	3429	702	2108	3447	459
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1372			1529			2064	3184	0	1561	3206	459
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			100	100	93	100	100	99
cM capacity (veh/h)	496			351			25	8	883	57	8	549
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	NB 1	SB 1				
Volume Total	813	813	456	543	543	285	65	7				
Volume Left	0	0	0	0	0	0	0	0				
Volume Right	0	0	49	0	0	14	65	7				
cSH	1700	1700	1700	1700	1700	1700	883	549				
Volume to Capacity	0.48	0.48	0.27	0.32	0.32	0.17	0.07	0.01				
Queue Length 95th (ft)	0	0	0	0	0	0	6	1				
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	9.4	11.7				
Lane LOS							A	B				
Approach Delay (s)	0.0			0.0			9.4	11.7				
Approach LOS							A	B				
Intersection Summary												
Average Delay			0.2									
Intersection Capacity Utilization			48.9%			ICU Level of Service			A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

7: SR 32 & East St.

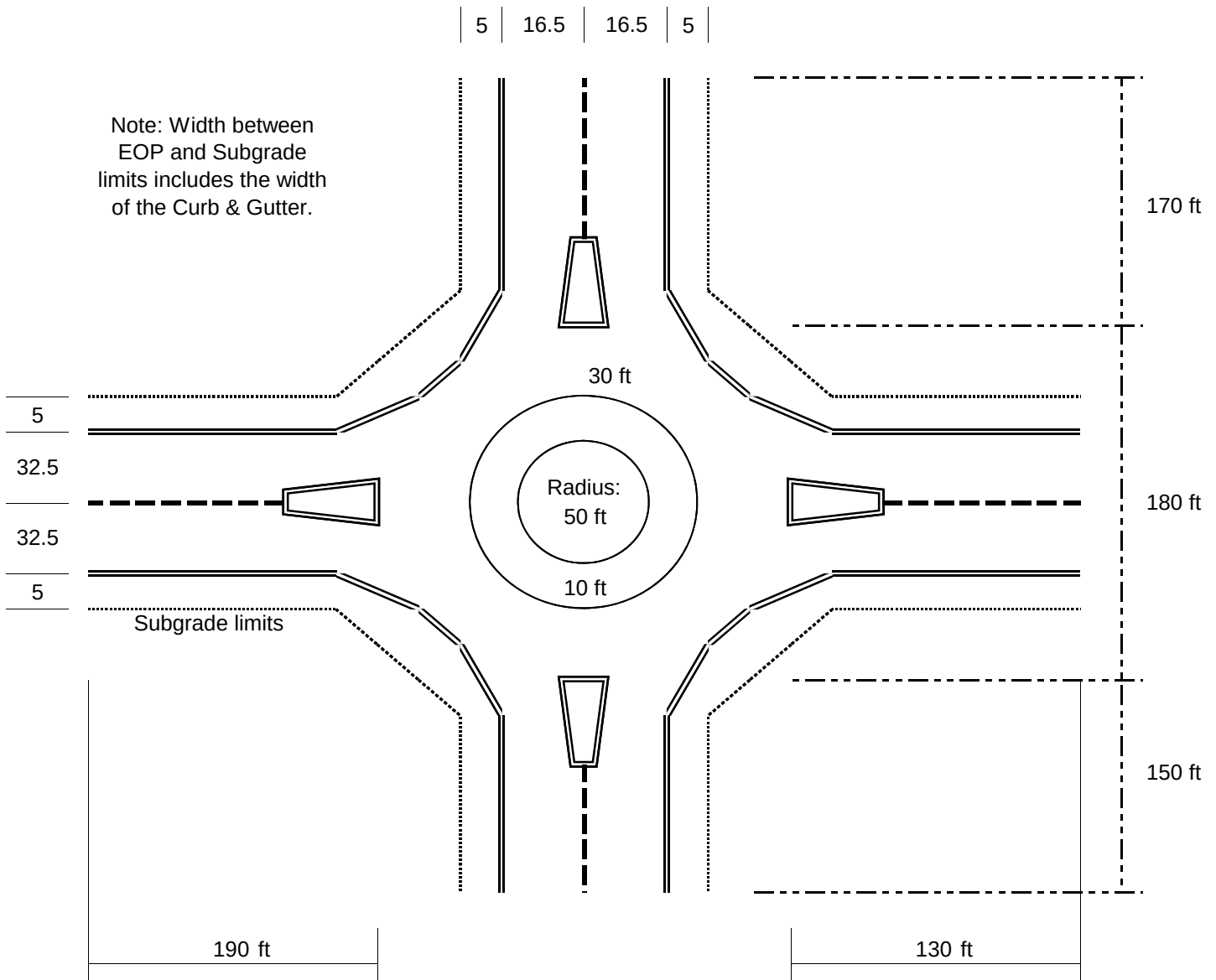
9/30/2010

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Right Turn Channelized			Yes			Yes						
Volume (veh/h)	121	1871	0	60	1167	141	76	70	211	100	59	60
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	127	1969	0	63	1228	148	80	74	222	105	62	63
Approach Volume (veh/h)		2097			1292			376			231	
Crossing Volume (veh/h)		231			281			2202#			1372#	
High Capacity (veh/h)		1156			1111			225			458	
High v/c (veh/h)		1.81			1.16			1.67			0.50	
Low Capacity (veh/h)		954			913			155			343	
Low v/c (veh/h)		2.20			1.41			2.42			0.67	
Intersection Summary												
Maximum v/c High			1.81									
Maximum v/c Low			2.42									
Intersection Capacity Utilization			114.5%			ICU Level of Service				H		
# Crossing flow exceeds 1200, method is not applicable												

APPENDIX B

PLANNING LEVEL COST ESTIMATE

CONSTRUCTION COST ESTIMATE
Alternative 1 - Poplar Roundabout
 Prepared By: Jeromy Grenard Date: 09/17/10

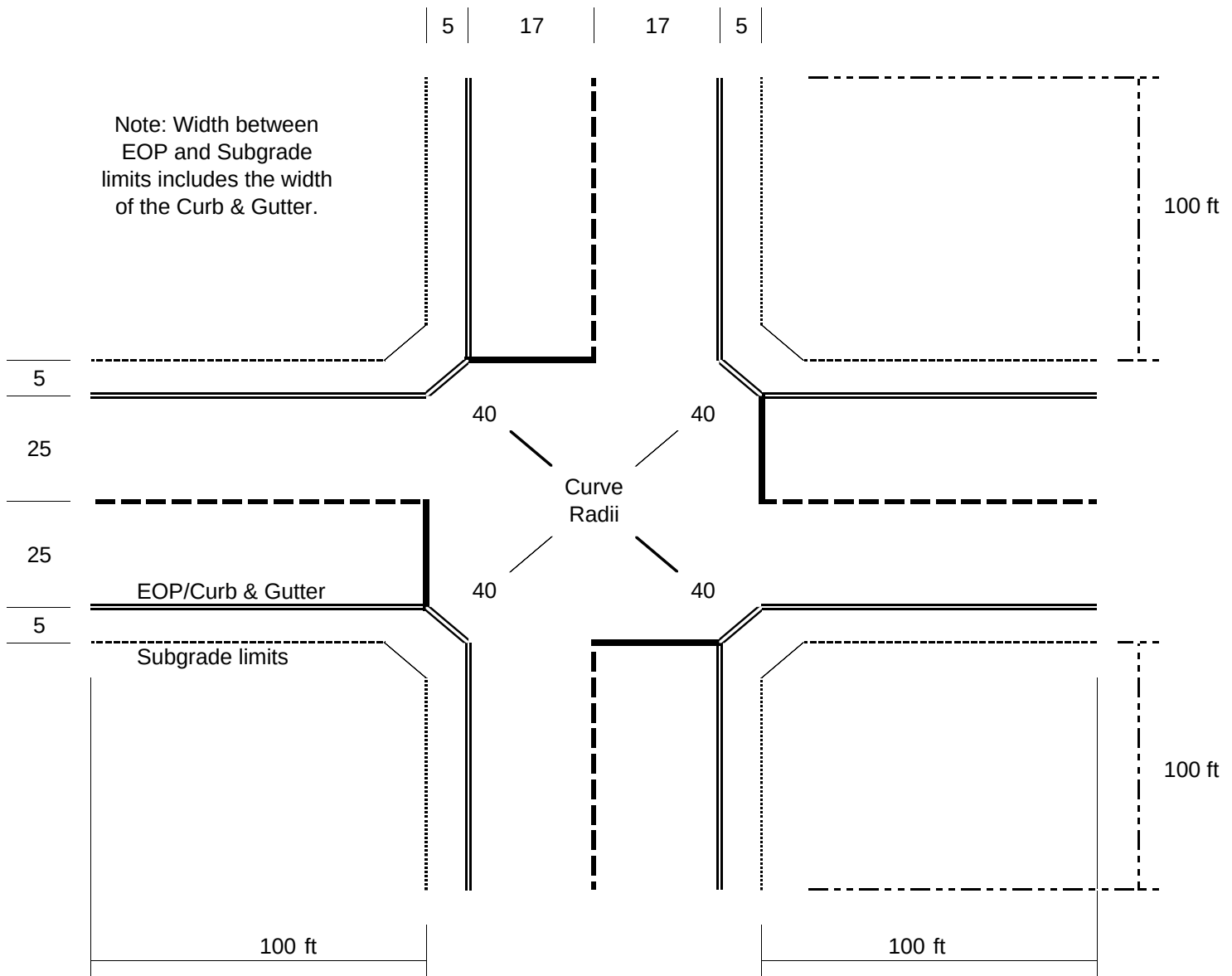


						Unit Price	Subtotal
Subgrade Treatment, Type XX:							
Assume subgrade extends 2-feet beyond curb and gutter.							
Area = 7796 SYS						\$ 12.00	\$ 93,552
Excavation, Common:							
Assume 8 inches of cut needed in the area of the subgrade treatment.							
Excavation = 1733 CYS						\$ 20.00	\$ 34,660
HMA:							
Surface:	1.5 inches	Area:	5056	SYS	=	417.2 TON	\$ 75.00 \$ 31,290
Intermediate:	5.5 inches	Area:	5207	SYS	=	1575.2 TON	\$ 65.00 \$ 102,388
Base:	7.0 inches	Area:	5309	SYS	=	2044.0 TON	\$ 60.00 \$ 122,640

CONSTRUCTION COST ESTIMATE
Alternative 1 - Poplar Roundabout
Prepared By: Jeromy Grenard Date: 09/17/10

PCCP, 9 inches:							
Truck Apron:	384 SYS				\$	75.00	\$ 28,800
Curb & Gutter:							
Length =	1846 LFT				\$	25.00	\$ 46,150
Drainage:							
Assume the drainage cost will be equal in a standard intersection and a roundabout.							\$ 40,000
Includes: 6-8 inlets, 1-2 manholes, and 150-ft of pipe.							
Assume underdrain needed is equal to curb & gutter length:	1846 LFT				\$	7.50	\$ 13,845
Geotextiles for Underdrain (1.10 SYS/LFT):	2031 SYS				\$	1.00	\$ 2,031
Aggregate for Underdrain (0.09 CYS/LFT):	167 SYS				\$	32.00	\$ 5,344
Island Curbs:							
North Island:	130 LFT	East Island:	495 LFT				
South Island:	130 LFT	West Island:	430 LFT				
Center:	315 LFT			TOTAL:			
				1500 LFT	\$	28.00	\$ 42,000
Roll Curb:	377 LFT			TOTAL:			
				377 LFT	\$	20.00	\$ 7,540
Lighting (poles, luminaires, wires, etc.):						1 LS	\$ 36,000
Construction Engineering						3%	\$ 18,187
Mobilization and Demobilization						5%	\$ 30,312
Clearing Right-of-Way						10%	\$ 60,624
Maintaining Traffic						8%	\$ 48,499
TOTAL:							\$ 763,862
Contingency:						30%	\$ 229,159
CONSTRUCTION COST ESTIMATE:							\$ 993,021

CONSTRUCTION COST ESTIMATE
Alternative 1 - Union Intersection
 Prepared By: Jeromy Grenard Date: 09/17/10

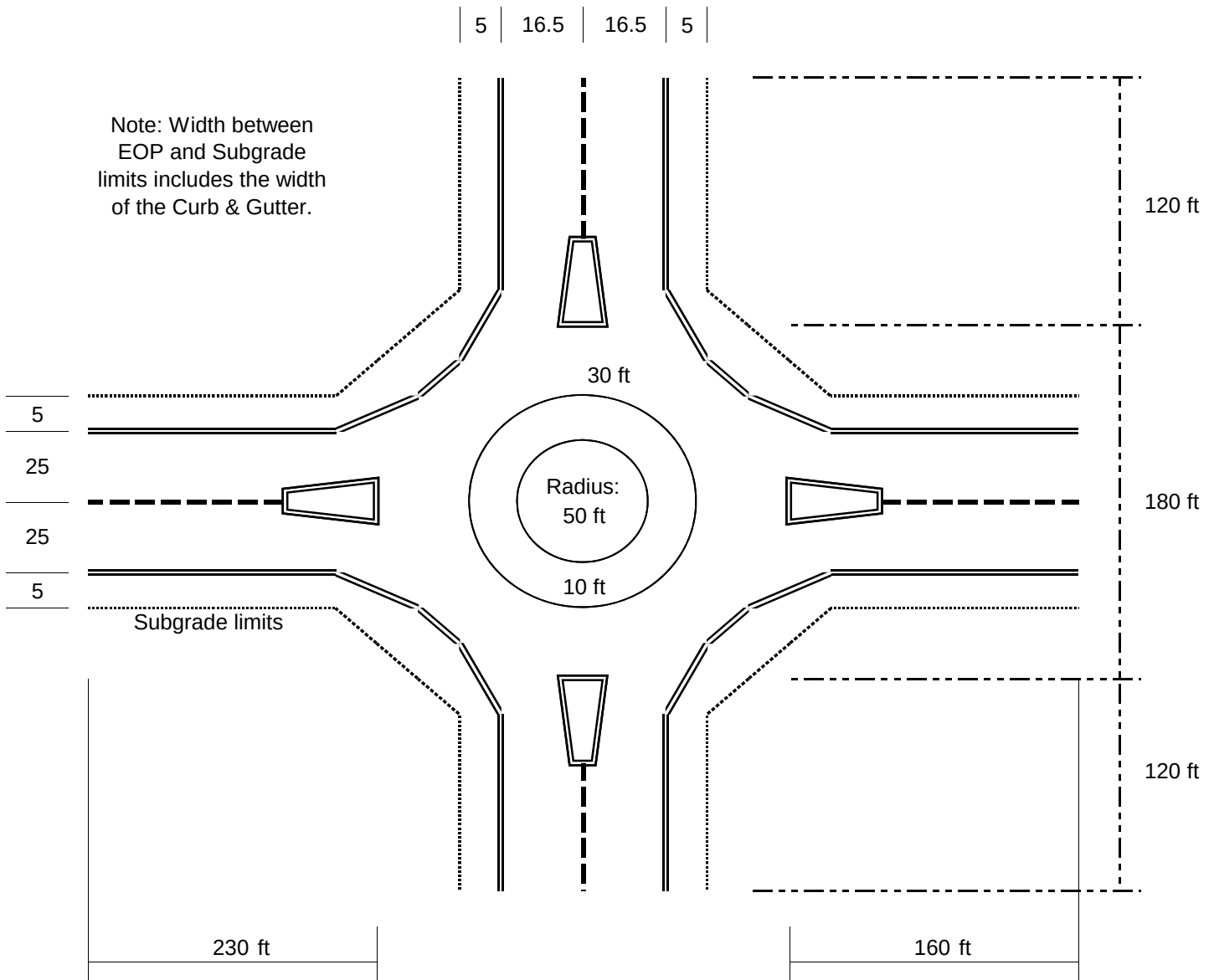


						Unit Price	Subtotal
Subgrade Treatment, Type XX:							
<i>Assume subgrade extends 2-feet beyond curb and gutter.</i>							
Area = 2470 SYS							
						\$ 12.00	\$ 29,640
Excavation, Common:							
<i>Assume 8 inches of cut needed in the area of the subgrade treatment.</i>							
Excavation = 549 CYS							
						\$ 20.00	\$ 10,980
HMA:							
Surface:	1.5 inches	Area:	2037	SYS	=	168.1 TON	
						\$ 75.00	\$ 12,608
Intermediate:	5.5 inches	Area:	2098	SYS	=	634.7 TON	
						\$ 65.00	\$ 41,256
Base:	8.0 inches	Area:	2139	SYS	=	941.2 TON	
						\$ 60.00	\$ 56,472

CONSTRUCTION COST ESTIMATE
Alternative 1 - Union Intersection
 Prepared By: Jeromy Grenard Date: 09/17/10

Curb & Gutter:			
Length = 1052 LFT		\$ 25.00	\$ 26,300
Drainage:			
Assume the drainage cost will be equal in a standard intersection and a roundabout.			\$ 30,000
Includes: 6-8 inlets, 1-2 manholes, and 150-ft of pipe.			
Assume underdrain needed is equal to curb & gutter length:	1052 LFT	\$ 7.50	\$ 7,890
Geotextiles for Underdrain (1.10 SYS/LFT):	1158 SYS	\$ 1.00	\$ 1,158
Aggregate for Underdrain (0.09 CYS/LFT):	95 SYS	\$ 32.00	\$ 3,040
Signals and Components (poles, heads, cables, wires, etc.):		1 LS	\$ 125,000
Construction Engineering		3%	\$ 10,330
Mobilization and Demobilization		5%	\$ 17,217
Clearing Right-of-Way		10%	\$ 34,434
Maintaining Traffic		10%	\$ 34,434
TOTAL:			\$ 440,759
Contingency:		30%	\$ 132,228
CONSTRUCTION COST ESTIMATE:			\$ 572,987

CONSTRUCTION COST ESTIMATE
Alternative 1 - East Roundabout
 Prepared By: Jeromy Grenard Date: 09/17/10

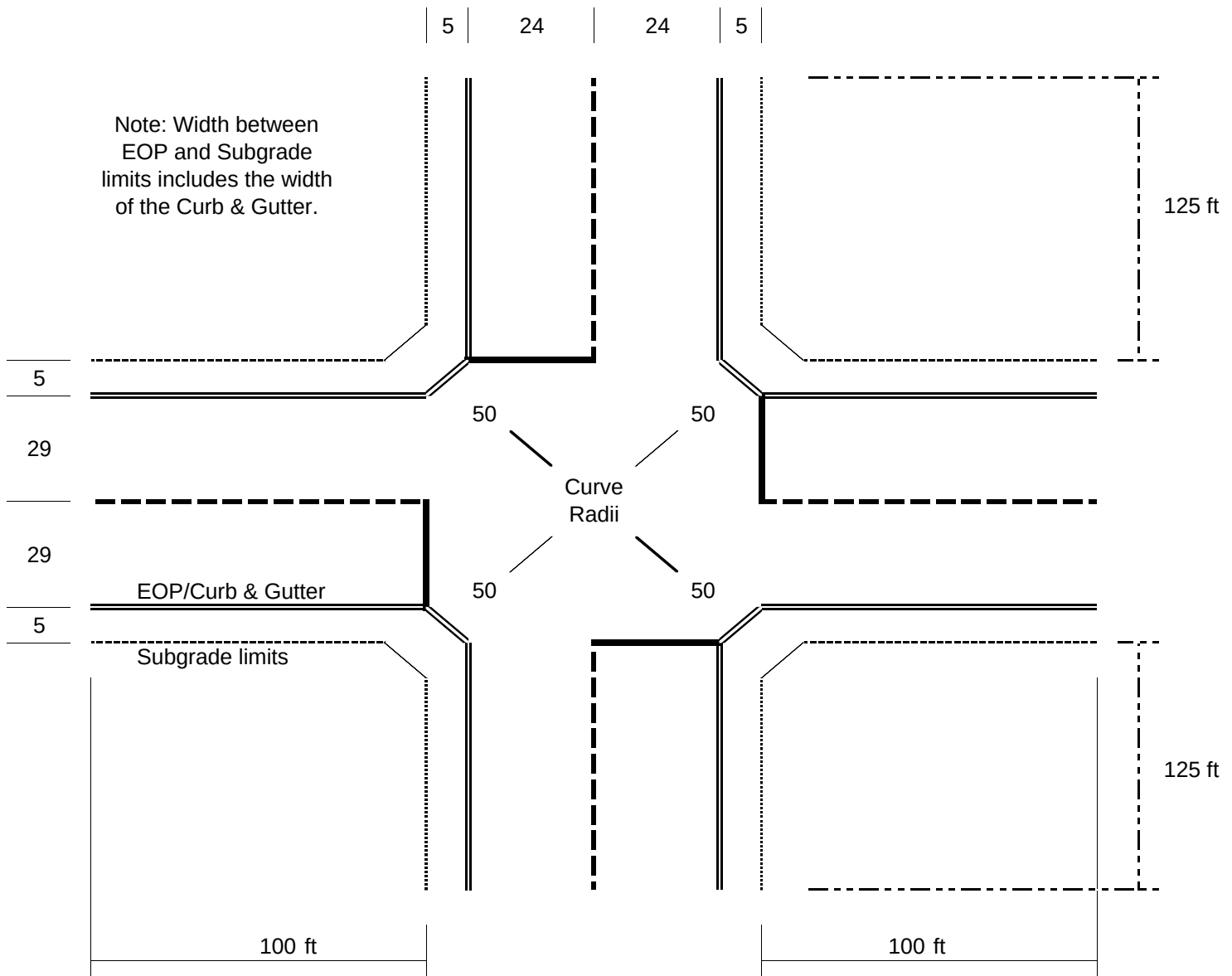


						Unit Price	Subtotal
Subgrade Treatment, Type XX:							
Assume subgrade extends 2-feet beyond curb and gutter.							
Area = 7347 SYS						\$ 12.00	\$ 88,164
Excavation, Common:							
Assume 8 inches of cut needed in the area of the subgrade treatment.							
Excavation = 1633 CYS						\$ 20.00	\$ 32,660
HMA:							
Surface:	1.5 inches	Area:	4618	SYS	= 381.0 TON	\$ 75.00	\$ 28,575
Intermediate:	5.5 inches	Area:	4756	SYS	= 1438.7 TON	\$ 65.00	\$ 93,516
Base:	7.0 inches	Area:	4849	SYS	= 1866.9 TON	\$ 60.00	\$ 112,014

CONSTRUCTION COST ESTIMATE
Alternative 1 - East Roundabout
Prepared By: Jeromy Grenard Date: 09/17/10

PCCP, 9 inches:								
Truck Apron:	384 SYS					\$	75.00	\$ 28,800
Curb & Gutter:								
Length =	1826 LFT					\$	25.00	\$ 45,650
Drainage:								
Assume the drainage cost will be equal in a standard intersection and a roundabout.								\$ 40,000
Includes: 6-8 inlets, 1-2 manholes, and 150-ft of pipe.								
Assume underdrain needed is equal to curb & gutter length:	1826 LFT					\$	7.50	\$ 13,695
Geotextiles for Underdrain (1.10 SYS/LFT):	2009 SYS					\$	1.00	\$ 2,009
Aggregate for Underdrain (0.09 CYS/LFT):	165 SYS					\$	32.00	\$ 5,280
Island Curbs:								
North Island:	130 LFT	East Island:	385 LFT					
South Island:	135 LFT	West Island:	505 LFT					
Center:	315 LFT			TOTAL:	1470 LFT	\$	28.00	\$ 41,160
Roll Curb:	377 LFT			TOTAL:	377 LFT	\$	20.00	\$ 7,540
Lighting (poles, luminaires, wires, etc.):							1 LS	\$ 36,000
Construction Engineering							3%	\$ 17,252
Mobilization and Demobilization							5%	\$ 28,753
Clearing Right-of-Way							10%	\$ 57,506
Maintaining Traffic							8%	\$ 46,005
TOTAL:								\$ 724,579
Contingency:							30%	\$ 217,374
CONSTRUCTION COST ESTIMATE:								\$ 941,952

CONSTRUCTION COST ESTIMATE
Alternative 1 - Carey Intersection
 Prepared By: Jeromy Grenard Date: 09/17/10

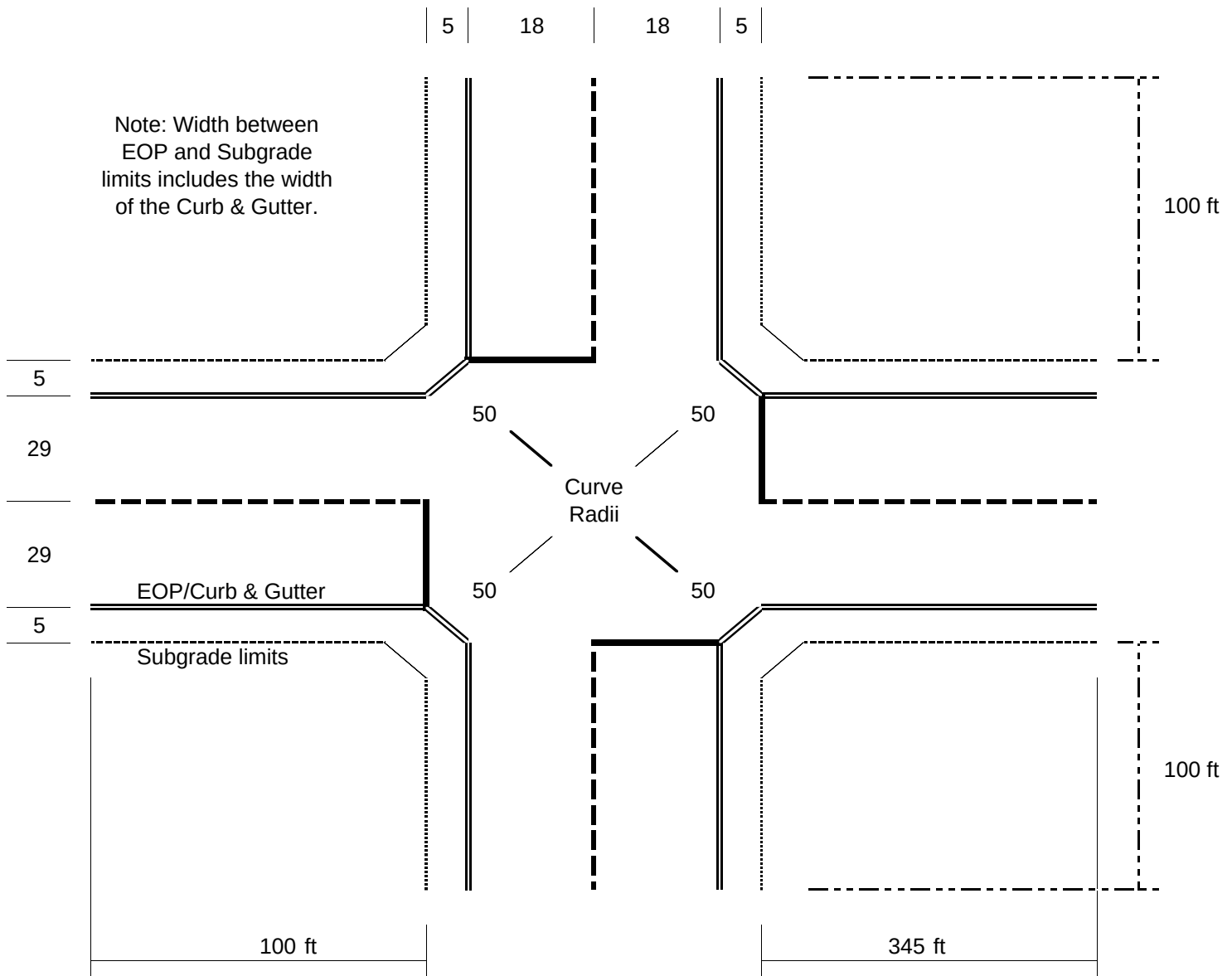


						Unit Price	Subtotal
Subgrade Treatment, Type XX:							
<i>Assume subgrade extends 2-feet beyond curb and gutter.</i>							
Area = 3398 SYS						\$ 12.00	\$ 40,776
Excavation, Common:							
<i>Assume 8 inches of cut needed in the area of the subgrade treatment.</i>							
Excavation = 756 CYS						\$ 20.00	\$ 15,120
HMA:							
Surface:	1.5 inches	Area:	2909	SYS	=	240.0 TON	\$ 75.00 \$ 18,000
Intermediate:	5.5 inches	Area:	2996	SYS	=	906.3 TON	\$ 65.00 \$ 58,910
Base:	8.0 inches	Area:	3054	SYS	=	1343.8 TON	\$ 60.00 \$ 80,628

CONSTRUCTION COST ESTIMATE
Alternative 1 - Carey Intersection
Prepared By: Jeromy Grenard Date: 09/17/10

Curb & Gutter:			
Length =	1215 LFT	\$ 25.00	\$ 30,375
Drainage:			
Assume the drainage cost will be equal in a standard intersection and a roundabout.			\$ 40,000
Includes: 6-8 inlets, 1-2 manholes, and 150-ft of pipe.			
Assume underdrain needed is equal to curb & gutter length:	1215 LFT	\$ 7.50	\$ 9,113
Geotextiles for Underdrain (1.10 SYS/LFT):	1337 SYS	\$ 1.00	\$ 1,337
Aggregate for Underdrain (0.09 CYS/LFT):	110 SYS	\$ 32.00	\$ 3,520
Signals and Components (poles, heads, cables, wires, etc.):		1 LS	\$ 125,000
Construction Engineering		3%	\$ 12,683
Mobilization and Demobilization		5%	\$ 21,139
Clearing Right-of-Way		10%	\$ 42,278
Maintaining Traffic		10%	\$ 42,278
TOTAL:			\$ 541,156
Contingency:		30%	\$ 162,347
CONSTRUCTION COST ESTIMATE:			\$ 703,503

CONSTRUCTION COST ESTIMATE
Alternative 1 - Moontown Intersection
 Prepared By: Jeromy Grenard Date: 09/17/10



						Unit Price	Subtotal
Subgrade Treatment, Type XX:							
Assume subgrade extends 2-feet beyond curb and gutter.							
Area = 4588 SYS						\$ 12.00	\$ 55,056
Excavation, Common:							
Assume 8 inches of cut needed in the area of the subgrade treatment.							
Excavation = 1020 CYS						\$ 20.00	\$ 20,400
HMA:							
Surface:	1.5 inches	Area:	3883	SYS	= 320.4 TON	\$ 75.00	\$ 24,030
Intermediate:	5.5 inches	Area:	3999	SYS	= 1209.7 TON	\$ 65.00	\$ 78,631
Base:	8.0 inches	Area:	4077	SYS	= 1793.9 TON	\$ 60.00	\$ 107,634

CONSTRUCTION COST ESTIMATE
Alternative 1 - Moontown Intersection
 Prepared By: Jeromy Grenard Date: 09/17/10

Curb & Gutter:			
Length = 1605 LFT		\$ 25.00	\$ 40,125
Drainage:			
Assume the drainage cost will be equal in a standard intersection and a roundabout.			\$ 40,000
Includes: 6-8 inlets, 1-2 manholes, and 150-ft of pipe.			
Assume underdrain needed is equal to curb & gutter length:	1605 LFT	\$ 7.50	\$ 12,038
Geotextiles for Underdrain (1.10 SYS/LFT):	1766 SYS	\$ 1.00	\$ 1,766
Aggregate for Underdrain (0.09 CYS/LFT):	145 SYS	\$ 32.00	\$ 4,640
Signals and Components (poles, heads, cables, wires, etc.):		1 LS	\$ 125,000
Construction Engineering		3%	\$ 15,280
Mobilization and Demobilization		5%	\$ 25,466
Clearing Right-of-Way		5%	\$ 25,466
Maintaining Traffic		10%	\$ 50,932
TOTAL:			\$ 626,462
Contingency:		30%	\$ 187,939
CONSTRUCTION COST ESTIMATE:			\$ 814,401

CONSTRUCTION COST ESTIMATE
Alternative 1 - Mainline from Poplar St to East St
 Prepared By: Jeromy Grenard Date: 09/17/10

Preliminary Cost Estimate

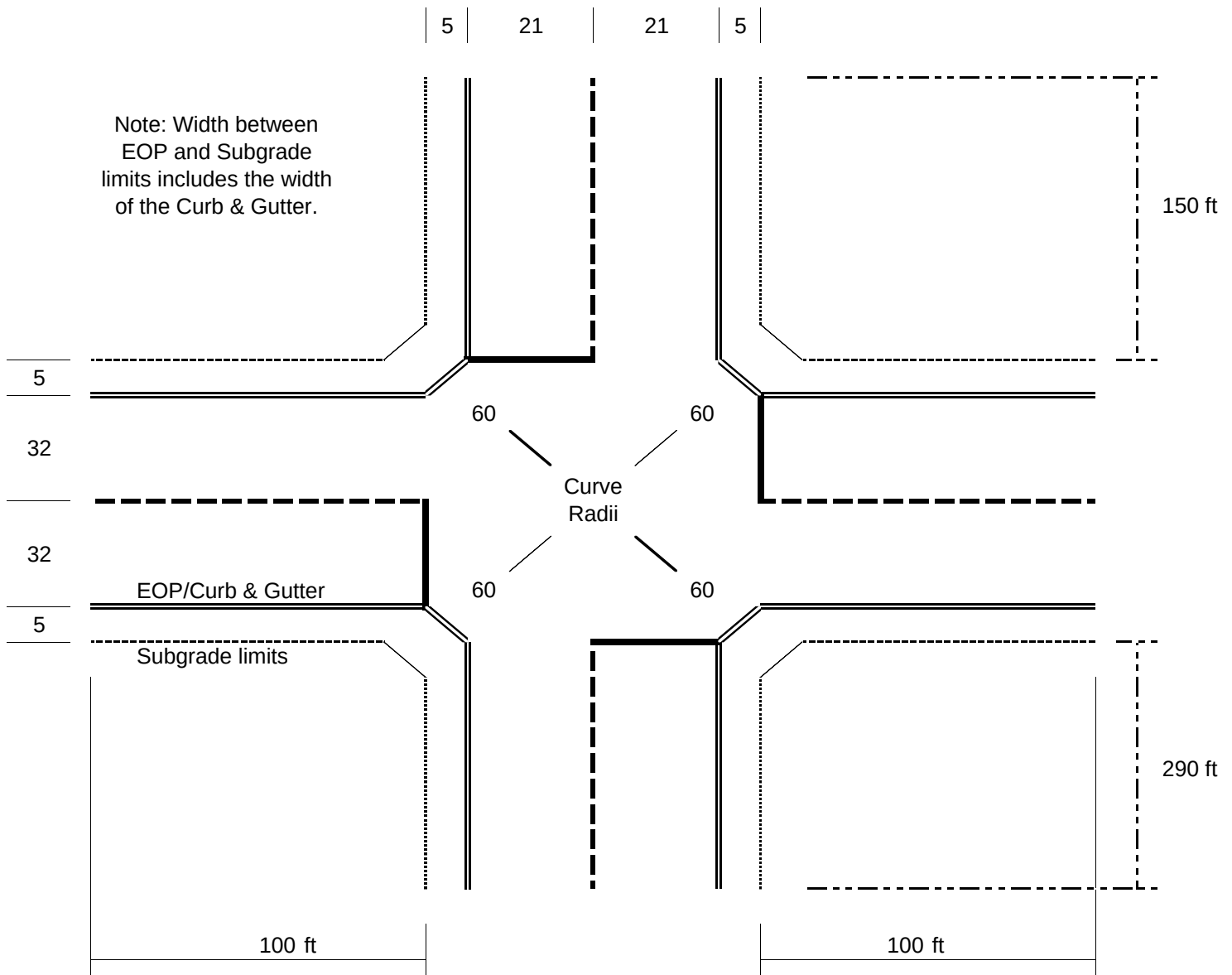
Project: SR 32 From Poplar Street St to East Street

Item No.	Description	Unit	Qty.	Unit Cost	Item Cost
	Mobilization / Demobilization	LSUM	1	\$ 76,737.00	\$ 76,737.00
	Clearing Right of Way	LSUM	1	\$ 61,389.60	\$ 61,389.60
	Maintenance of Traffic	LSUM	1	\$ 30,694.80	\$ 30,694.80
	Common Excavation	CYS	3,464	\$ 33.00	\$ 114,309.19
	HMA Surface, 9.5mm	TON	773	\$ 85.00	\$ 65,735.18
	HMA Intermediate, 19.0mm	TON	1,289	\$ 75.00	\$ 96,669.38
	HMA Base, 25.0mm	TON	5,069	\$ 70.00	\$ 354,836.53
	Subgrade Treatment, Type A	SYS	10,589	\$ 12.00	\$ 127,062.93
	Subgrade Treatment, Type IIIA	SYS	569	\$ 12.00	\$ 6,830.67
	Curb & Gutter	LFT	5,754	\$ 25.00	\$ 143,850.00
	PCCP for Driveways, 6in	SYS	569	\$ 60.00	\$ 34,153.33
	6" Underdrain Pipe	LFT	3,360	\$ 13.00	\$ 43,680.00
	Aggregate for Underdrains	CYS	290	\$ 50.00	\$ 14,522.67
	Geotextile for Underdrains	SYS	2,676	\$ 2.50	\$ 6,689.20
	Inlet	EACH	27	\$ 2,000.00	\$ 54,000.00
	12" Pipe	LFT	1,210	\$ 40.00	\$ 48,393.60
	18" Pipe	LFT	420	\$ 45.00	\$ 18,900.00
	24" Pipe	LFT	840	\$ 55.00	\$ 46,200.00
	Structure Backfill	CYS	735	\$ 32.00	\$ 23,526.47
	Manhole	EACH	14	\$ 2,500.00	\$ 33,750.00
	Pavement Markings & Signing	LSUM	1	\$ 38,368.50	\$ 38,368.50
	Sod	SYS	5,600	\$ 9.00	\$ 50,400.00
	Mulched Seeding	SYS	0	\$ 5.00	\$ -
	Pavement, Removal	SYS	10,533	\$ 5.00	\$ 52,666.67
	Culvert Extension	LFT	20	\$ 5,000.00	\$ 100,000.00
	Construction Engineering	LSUM	1	\$ 30,694.80	\$ 30,694.80
	Contingencies (30%)	LSUM	1	\$ 74,463.36	\$ 74,463.36

TOTAL OF ROAD ITEMS = \$ 1,847,088.01

PROJECT TOTAL = \$ 1,847,088.01

CONSTRUCTION COST ESTIMATE
Alternative 2 - Poplar Intersection
 Prepared By: Jeromy Grenard Date: 09/17/10

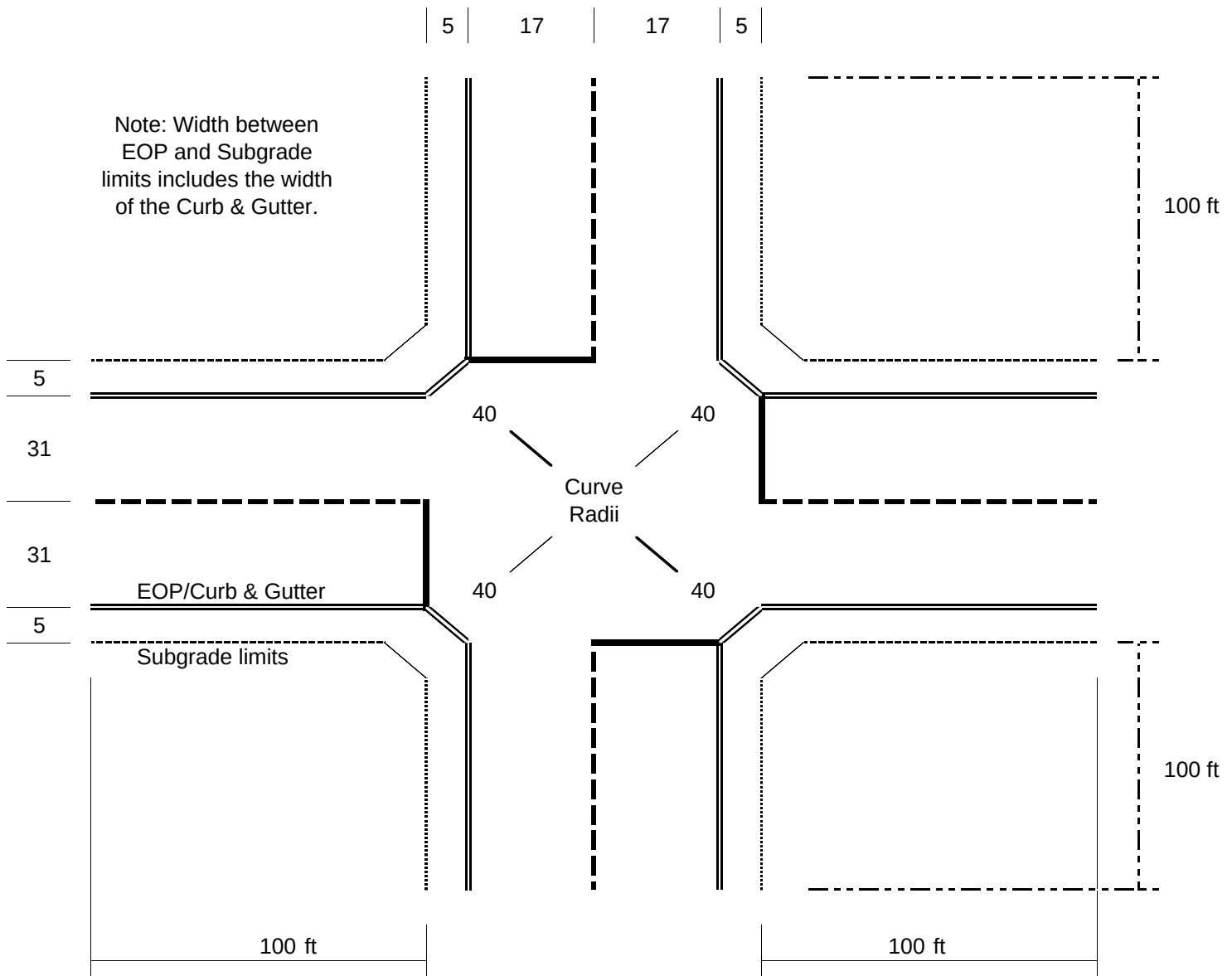


						Unit Price	Subtotal
Subgrade Treatment, Type XX:							
<i>Assume subgrade extends 2-feet beyond curb and gutter.</i>							
Area = 4488 SYS							
						\$ 12.00	\$ 53,856
Excavation, Common:							
<i>Assume 8 inches of cut needed in the area of the subgrade treatment.</i>							
Excavation = 998 CYS							
						\$ 20.00	\$ 19,960
HMA:							
Surface:	1.5 inches	Area:	3788	SYS	=	312.6 TON	
						\$ 75.00	\$ 23,445
Intermediate:	5.5 inches	Area:	3902	SYS	=	1180.4 TON	
						\$ 65.00	\$ 76,726
Base:	8.0 inches	Area:	3977	SYS	=	1749.9 TON	
						\$ 60.00	\$ 104,994

CONSTRUCTION COST ESTIMATE
Alternative 2 - Poplar Intersection
Prepared By: Jeromy Grenard Date: 09/17/10

Curb & Gutter:			
Length =	1657 LFT	\$ 30.00	\$ 49,710
Drainage:			
Assume the drainage cost will be equal in a standard intersection and a roundabout.			\$ 40,000
Includes: 6-8 inlets, 1-2 manholes, and 150-ft of pipe.			
Assume underdrain needed is equal to curb & gutter length:	1657 LFT	\$ 7.50	\$ 12,428
Geotextiles for Underdrain (1.10 SYS/LFT):	1823 SYS	\$ 1.00	\$ 1,823
Aggregate for Underdrain (0.09 CYS/LFT):	150 SYS	\$ 32.00	\$ 4,800
Signals and Components (poles, heads, cables, wires, etc.):		1 LS	\$ 125,000
Construction Engineering		3%	\$ 15,382
Mobilization and Demobilization		5%	\$ 25,637
Clearing Right-of-Way		10%	\$ 51,274
Maintaining Traffic		10%	\$ 51,274
TOTAL:			\$ 656,309
Contingency:		30%	\$ 196,893
CONSTRUCTION COST ESTIMATE:			\$ 853,202

CONSTRUCTION COST ESTIMATE
Alternative 2 - Union Intersection
 Prepared By: Jeromy Grenard Date: 09/17/10

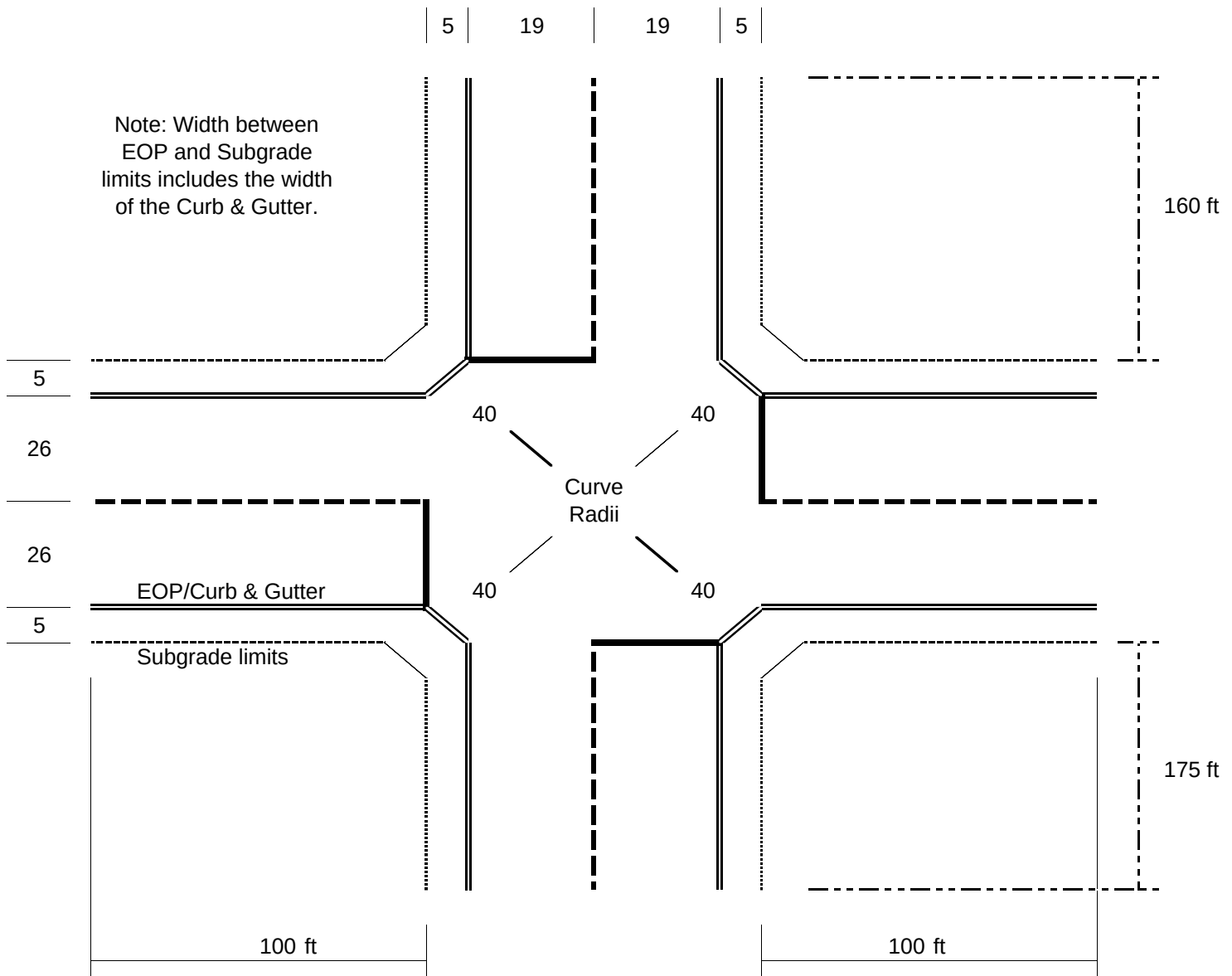


						Unit Price	Subtotal
Subgrade Treatment, Type XX:							
Assume subgrade extends 2-feet beyond curb and gutter.							
Area = 2781 SYS						\$ 12.00	\$ 33,372
Excavation, Common:							
Assume 8 inches of cut needed in the area of the subgrade treatment.							
Excavation = 618 CYS						\$ 20.00	\$ 12,360
HMA:							
Surface:	1.5 inches	Area:	2348 SYS	=	193.8 TON	\$ 75.00	\$ 14,535
Intermediate:	5.5 inches	Area:	2418 SYS	=	731.5 TON	\$ 65.00	\$ 47,548
Base:	8.0 inches	Area:	2465 SYS	=	1084.6 TON	\$ 60.00	\$ 65,076

CONSTRUCTION COST ESTIMATE
Alternative 2 - Union Intersection
 Prepared By: Jeromy Grenard Date: 09/17/10

Curb & Gutter:			
Length = 1052 LFT		\$ 30.00	\$ 31,560
Drainage:			
Assume the drainage cost will be equal in a standard intersection and a roundabout.			\$ 40,000
Includes: 6-8 inlets, 1-2 manholes, and 150-ft of pipe.			
Assume underdrain needed is equal to curb & gutter length:	1052 LFT	\$ 7.50	\$ 7,890
Geotextiles for Underdrain (1.10 SYS/LFT):	1158 SYS	\$ 1.00	\$ 1,158
Aggregate for Underdrain (0.09 CYS/LFT):	95 SYS	\$ 32.00	\$ 3,040
Signals and Components (poles, heads, cables, wires, etc.):		1 LS	\$ 125,000
Construction Engineering		3%	\$ 11,446
Mobilization and Demobilization		5%	\$ 19,077
Clearing Right-of-Way		10%	\$ 38,154
Maintaining Traffic		10%	\$ 38,154
TOTAL:			\$ 488,369
Contingency:		30%	\$ 146,511
CONSTRUCTION COST ESTIMATE:			\$ 634,880

CONSTRUCTION COST ESTIMATE
Alternative 2 - East Intersection
 Prepared By: Jeromy Grenard Date: 09/17/10

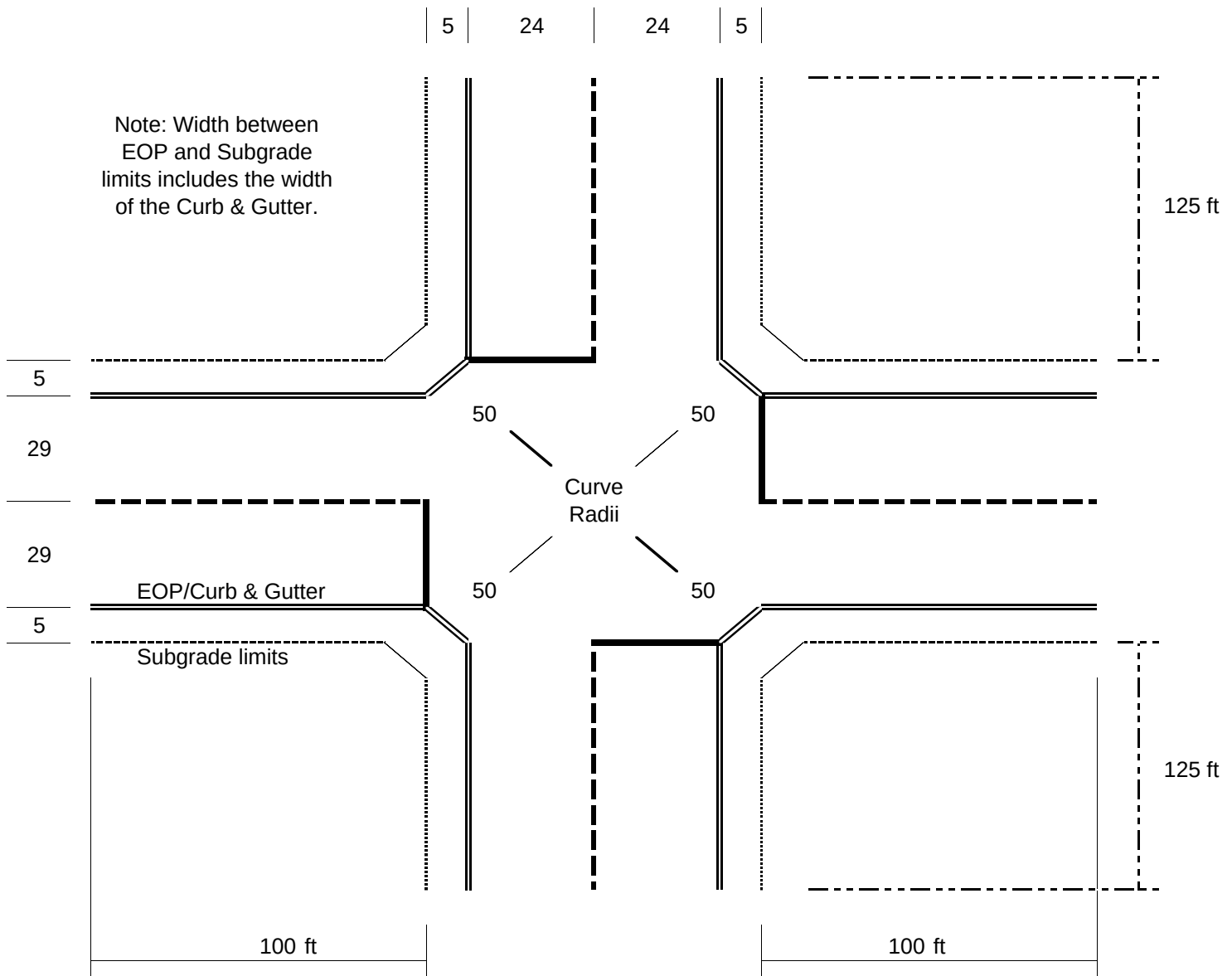


						Unit Price	Subtotal
Subgrade Treatment, Type XX:							
<i>Assume subgrade extends 2-feet beyond curb and gutter.</i>							
Area = 3382 SYS						\$ 12.00	\$ 40,584
Excavation, Common:							
<i>Assume 8 inches of cut needed in the area of the subgrade treatment.</i>							
Excavation = 752 CYS						\$ 20.00	\$ 15,040
HMA:							
Surface:	1.5 inches	Area:	2799	SYS	=	231.0 TON	\$ 75.00 \$ 17,325
Intermediate:	5.5 inches	Area:	2883	SYS	=	872.2 TON	\$ 65.00 \$ 56,693
Base:	8.0 inches	Area:	2939	SYS	=	1293.2 TON	\$ 60.00 \$ 77,592

CONSTRUCTION COST ESTIMATE
Alternative 2 - East Intersection
Prepared By: Jeromy Grenard Date: 09/17/10

Curb & Gutter:			
Length =	1322 LFT	\$ 30.00	\$ 39,660
Drainage:			
Assume the drainage cost will be equal in a standard intersection and a roundabout.			\$ 40,000
Includes: 6-8 inlets, 1-2 manholes, and 150-ft of pipe.			
Assume underdrain needed is equal to curb & gutter length:	1322 LFT	\$ 7.50	\$ 9,915
Geotextiles for Underdrain (1.10 SYS/LFT):	1455 SYS	\$ 1.00	\$ 1,455
Aggregate for Underdrain (0.09 CYS/LFT):	119 SYS	\$ 32.00	\$ 3,808
Signals and Components (poles, heads, cables, wires, etc.):	1 LS		\$ 125,000
Construction Engineering	3%		\$ 12,812
Mobilization and Demobilization	5%		\$ 21,354
Clearing Right-of-Way	10%		\$ 42,707
Maintaining Traffic	10%		\$ 42,707
TOTAL:			\$ 546,652
Contingency:	30%		\$ 163,996
CONSTRUCTION COST ESTIMATE:			\$ 710,648

CONSTRUCTION COST ESTIMATE
Alternative 2 - Carey Intersection
 Prepared By: Jeromy Grenard Date: 09/17/10

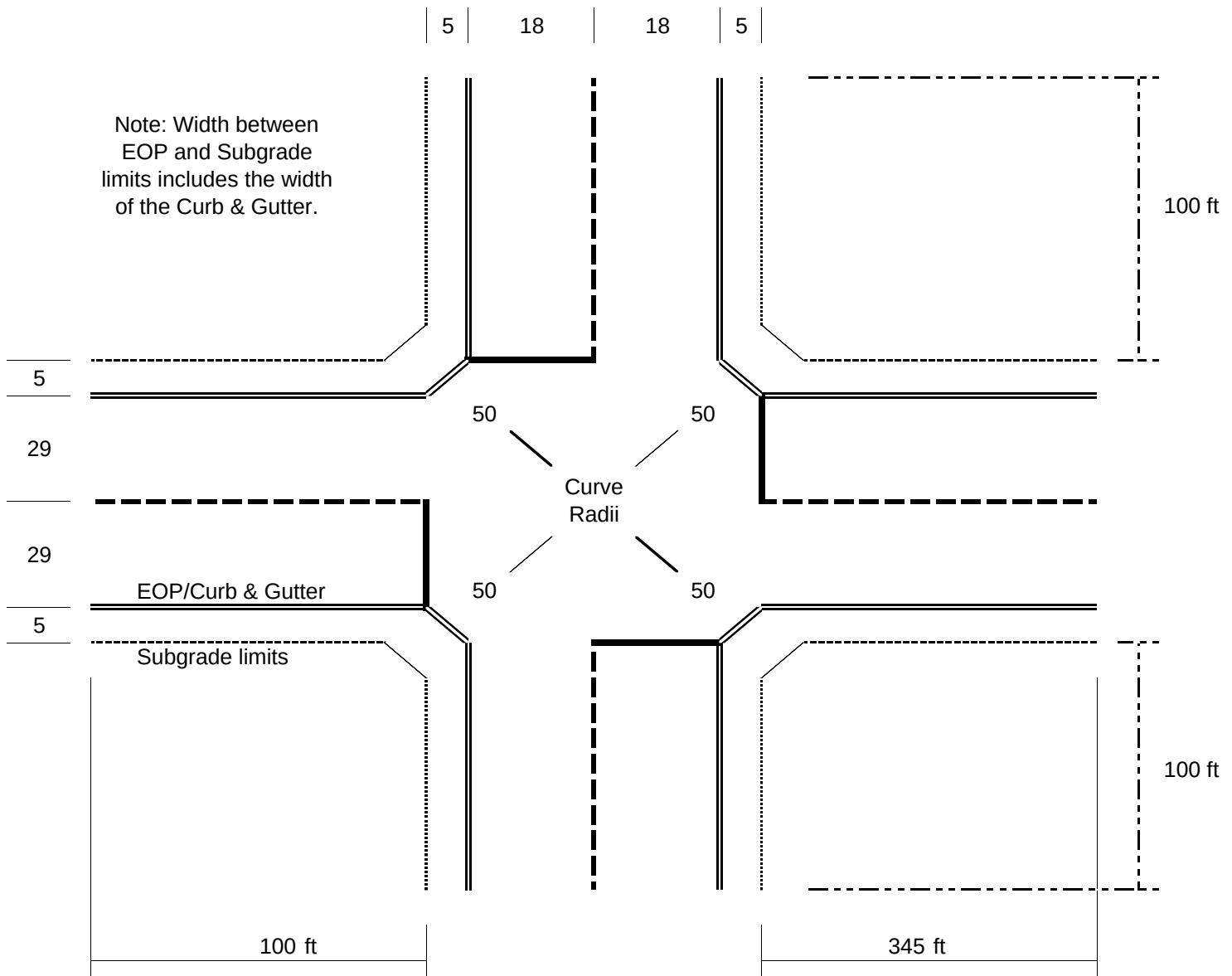


						Unit Price	Subtotal
Subgrade Treatment, Type XX:							
<i>Assume subgrade extends 2-feet beyond curb and gutter.</i>							
Area = 3398 SYS						\$ 12.00	\$ 40,776
Excavation, Common:							
<i>Assume 8 inches of cut needed in the area of the subgrade treatment.</i>							
Excavation = 756 CYS						\$ 20.00	\$ 15,120
HMA:							
Surface:	1.5 inches	Area:	2909 SYS	=	240.0 TON	\$ 75.00	\$ 18,000
Intermediate:	5.5 inches	Area:	2996 SYS	=	906.3 TON	\$ 65.00	\$ 58,910
Base:	8.0 inches	Area:	3054 SYS	=	1343.8 TON	\$ 60.00	\$ 80,628

CONSTRUCTION COST ESTIMATE
Alternative 2 - Carey Intersection
Prepared By: Jeromy Grenard Date: 09/17/10

Curb & Gutter:			
Length = 1215 LFT		\$ 25.00	\$ 30,375
Drainage:			
Assume the drainage cost will be equal in a standard intersection and a roundabout.			\$ 40,000
Includes: 6-8 inlets, 1-2 manholes, and 150-ft of pipe.			
Assume underdrain needed is equal to curb & gutter length:	1215 LFT	\$ 7.50	\$ 9,113
Geotextiles for Underdrain (1.10 SYS/LFT):	1337 SYS	\$ 1.00	\$ 1,337
Aggregate for Underdrain (0.09 CYS/LFT):	110 SYS	\$ 32.00	\$ 3,520
Signals and Components (poles, heads, cables, wires, etc.):		1 LS	\$ 125,000
Construction Engineering		3%	\$ 12,683
Mobilization and Demobilization		5%	\$ 21,139
Clearing Right-of-Way		10%	\$ 42,278
Maintaining Traffic		10%	\$ 42,278
TOTAL:			\$ 541,156
Contingency:		30%	\$ 162,347
CONSTRUCTION COST ESTIMATE:			\$ 703,503

CONSTRUCTION COST ESTIMATE
Alternative 2 - Moontown Intersection
 Prepared By: Jeromy Grenard Date: 09/17/10



						Unit Price	Subtotal
Subgrade Treatment, Type XX:							
<i>Assume subgrade extends 2-feet beyond curb and gutter.</i>							
Area = 4588 SYS						\$ 12.00	\$ 55,056
Excavation, Common:							
<i>Assume 8 inches of cut needed in the area of the subgrade treatment.</i>							
Excavation = 1020 CYS						\$ 20.00	\$ 20,400
HMA:							
Surface:	1.5 inches	Area:	3883	SYS	=	320.4 TON	\$ 75.00 \$ 24,030
Intermediate:	5.5 inches	Area:	3999	SYS	=	1209.7 TON	\$ 65.00 \$ 78,631
Base:	8.0 inches	Area:	4077	SYS	=	1793.9 TON	\$ 60.00 \$ 107,634

CONSTRUCTION COST ESTIMATE
Alternative 2 - Moontown Intersection
Prepared By: Jeromy Grenard Date: 09/17/10

Curb & Gutter:			
Length =	1605 LFT	\$ 25.00	\$ 40,125
Drainage:			
Assume the drainage cost will be equal in a standard intersection and a roundabout.			\$ 40,000
Includes: 6-8 inlets, 1-2 manholes, and 150-ft of pipe.			
Assume underdrain needed is equal to curb & gutter length:	1605 LFT	\$ 7.50	\$ 12,038
Geotextiles for Underdrain (1.10 SYS/LFT):	1766 SYS	\$ 1.00	\$ 1,766
Aggregate for Underdrain (0.09 CYS/LFT):	145 SYS	\$ 32.00	\$ 4,640
Signals and Components (poles, heads, cables, wires, etc.):		1 LS	\$ 125,000
Construction Engineering		3%	\$ 15,280
Mobilization and Demobilization		5%	\$ 25,466
Clearing Right-of-Way		5%	\$ 25,466
Maintaining Traffic		10%	\$ 50,932
TOTAL:			\$ 626,462
Contingency:		30%	\$ 187,939
CONSTRUCTION COST ESTIMATE:			\$ 814,401

CONSTRUCTION COST ESTIMATE
Alternative 2 - Mainline from Poplar St to East St
 Prepared By: Jeromy Grenard Date: 09/17/10

Preliminary Cost Estimate

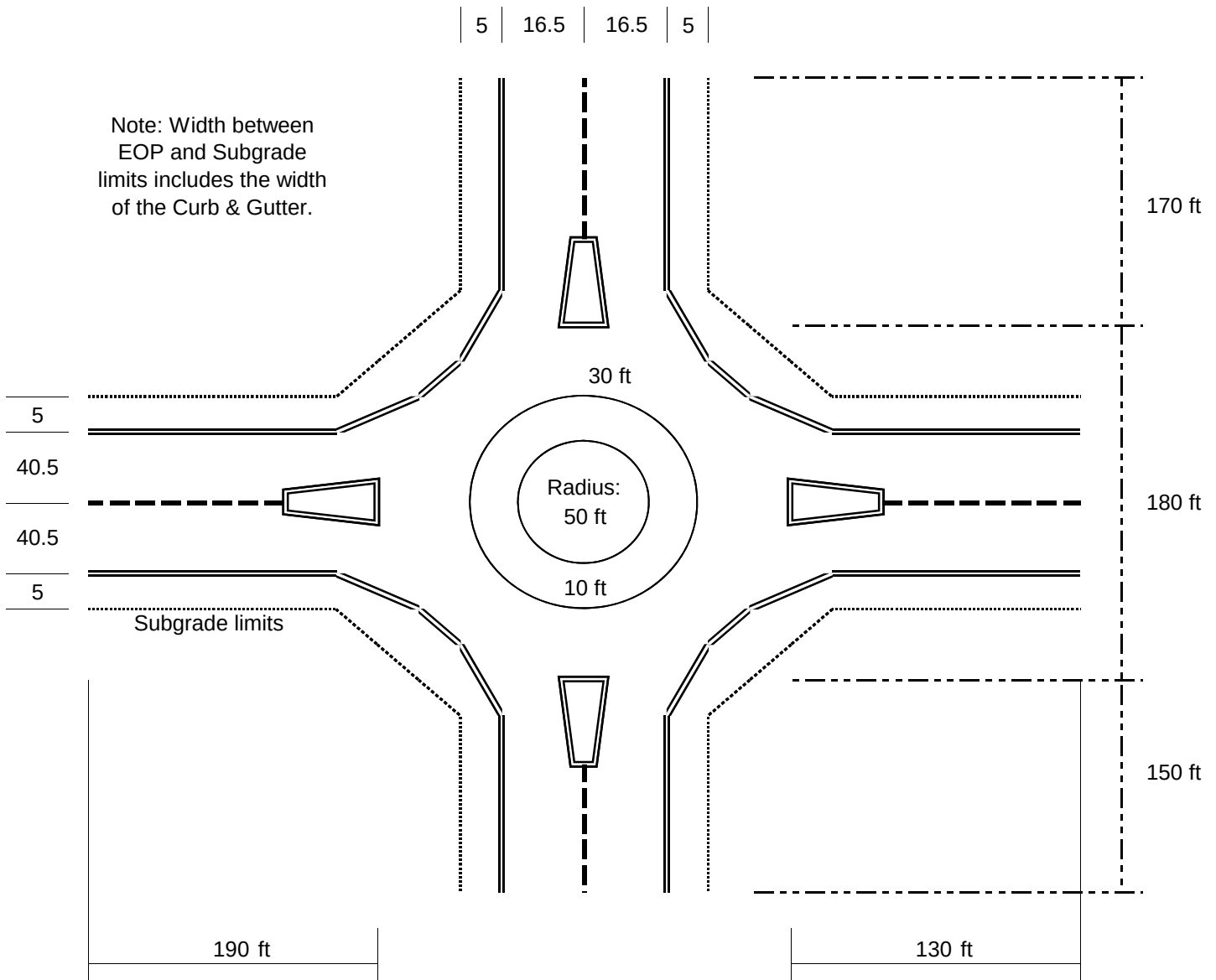
Project: SR 32 From Poplar Street St to East Street

Item No.	Description	Unit	Qty.	Unit Cost	Item Cost
	Mobilization / Demobilization	LSUM	1	\$ 99,746.09	\$ 99,746.09
	Clearing Right of Way	LSUM	1	\$ 79,796.87	\$ 79,796.87
	Maintenance of Traffic	LSUM	1	\$ 39,898.44	\$ 39,898.44
	Common Excavation	CYS	5,032	\$ 33.00	\$ 166,043.37
	HMA Surface, 9.5mm	TON	1,171	\$ 85.00	\$ 99,523.74
	HMA Intermediate, 19.0mm	TON	1,951	\$ 75.00	\$ 146,358.44
	HMA Base, 25.0mm	TON	7,719	\$ 70.00	\$ 540,342.37
	Subgrade Treatment, Type A	SYS	15,292	\$ 12.00	\$ 183,500.22
	Subgrade Treatment, Type IIIA	SYS	569	\$ 12.00	\$ 6,830.67
	Curb & Gutter	LFT	2,864	\$ 25.00	\$ 71,600.00
	PCCP for Driveways, 6in	SYS	569	\$ 60.00	\$ 34,153.33
	6" Underdrain Pipe	LFT	3,830	\$ 13.00	\$ 49,790.00
	Aggregate for Underdrains	CYS	331	\$ 50.00	\$ 16,554.11
	Geotextile for Underdrains	SYS	3,050	\$ 2.50	\$ 7,624.89
	Inlet	EACH	35	\$ 2,000.00	\$ 70,000.00
	12" Pipe	LFT	1,576	\$ 40.00	\$ 63,036.67
	18" Pipe	LFT	383	\$ 45.00	\$ 17,235.00
	24" Pipe	LFT	1,149	\$ 55.00	\$ 63,195.00
	Structure Backfill	CYS	883	\$ 32.00	\$ 28,255.98
	Manhole	EACH	15	\$ 2,500.00	\$ 38,500.00
	Pavement Markings & Signing	LSUM	1	\$ 49,873.05	\$ 49,873.05
	Mulched Seeding	SYS	0	\$ 5.00	\$ -
	Construction Engineering	LSUM	1	\$ 39,898.44	\$ 39,898.44
	Contingencies (30%)	LSUM	1	\$ 94,361.82	\$ 94,361.82

TOTAL OF ROAD ITEMS = \$ 2,223,496.55

PROJECT TOTAL = \$ 2,223,496.55

CONSTRUCTION COST ESTIMATE
Alternative 3 - Poplar Roundabout
 Prepared By: Jeromy Grenard Date: 09/17/10

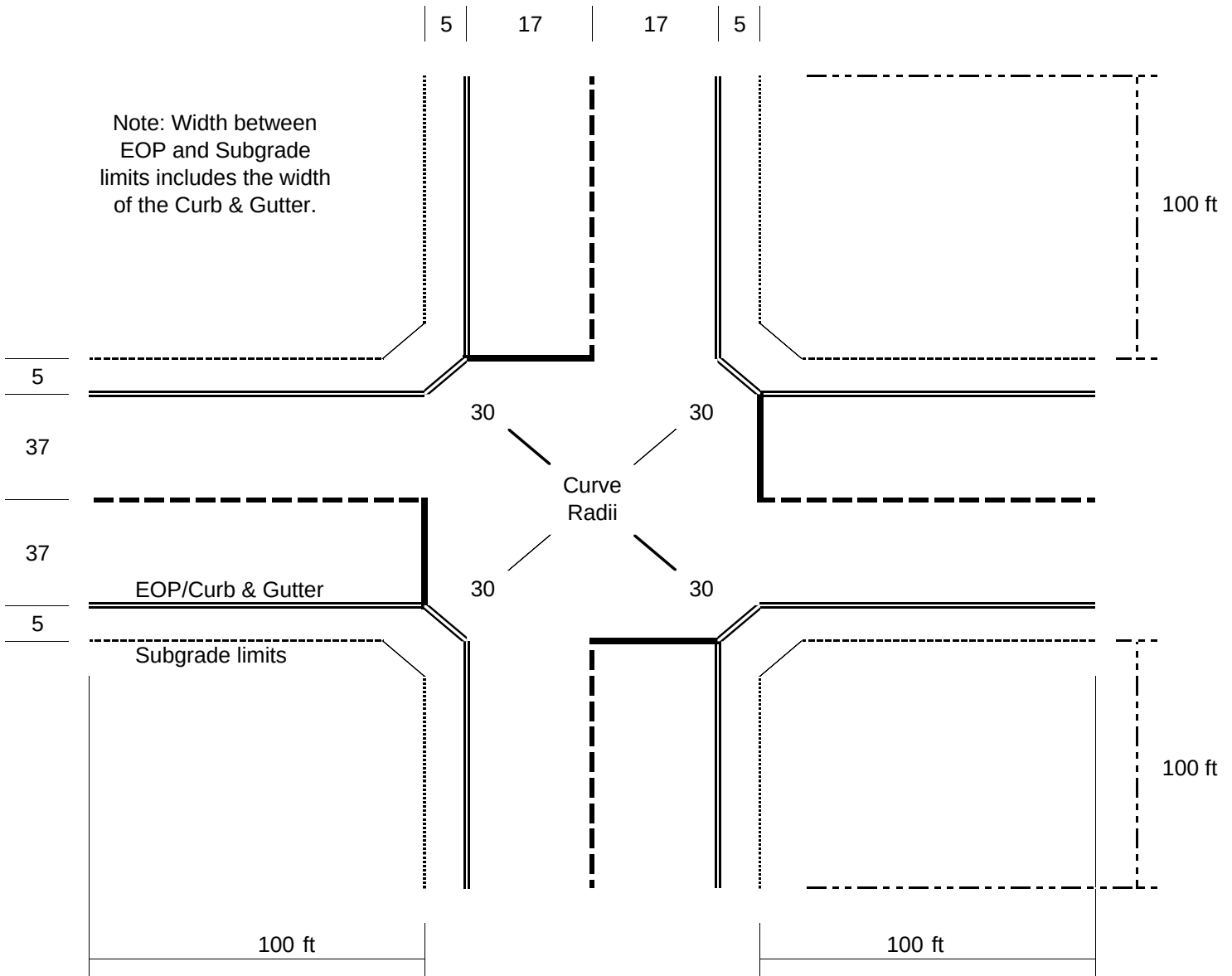


						Unit Price	Subtotal
Subgrade Treatment, Type XX:							
Assume subgrade extends 2-feet beyond curb and gutter.							
Area = 8365 SYS						\$ 12.00	\$ 100,380
Excavation, Common:							
Assume 8 inches of cut needed in the area of the subgrade treatment.							
Excavation = 1859 CYS						\$ 20.00	\$ 37,180
HMA:							
Surface:	1.5 inches	Area:	5625	SYS	=	464.1 TON	\$ 75.00 \$ 34,808
Intermediate:	5.5 inches	Area:	5793	SYS	=	1752.4 TON	\$ 65.00 \$ 113,906
Base:	7.0 inches	Area:	5906	SYS	=	2273.9 TON	\$ 60.00 \$ 136,434

CONSTRUCTION COST ESTIMATE
Alternative 3 - Poplar Roundabout
 Prepared By: Jeromy Grenard Date: 09/17/10

PCCP, 9 inches:							
	Truck Apron:	384 SYS			\$	75.00	\$ 28,800
Curb & Gutter:							
	Length =	1846 LFT			\$	25.00	\$ 46,150
Drainage:							
Assume the drainage cost will be equal in a standard intersection and a roundabout.							\$ 40,000
Includes: 6-8 inlets, 1-2 manholes, and 150-ft of pipe.							
Assume underdrain needed is equal to curb & gutter length:				1846 LFT	\$	7.50	\$ 13,845
Geotextiles for Underdrain (1.10 SYS/LFT):				2031 SYS	\$	1.00	\$ 2,031
Aggregate for Underdrain (0.09 CYS/LFT):				167 SYS	\$	32.00	\$ 5,344
Island Curbs:							
	North Island:	130 LFT	East Island:	495 LFT			
	South Island:	130 LFT	West Island:	430 LFT			
	Center:	315 LFT			TOTAL:	1500 LFT	\$ 28.00 \$ 42,000
	Roll Curb:	377 LFT			TOTAL:	377 LFT	\$ 20.00 \$ 7,540
Lighting (poles, luminaires, wires, etc.):						1 LS	\$ 36,000
Construction Engineering						3%	\$ 19,333
Mobilization and Demobilization						5%	\$ 32,221
Clearing Right-of-Way						10%	\$ 64,442
Maintaining Traffic						8%	\$ 51,553
TOTAL:							\$ 811,966
Contingency:						30%	\$ 243,590
CONSTRUCTION COST ESTIMATE:							\$ 1,055,556

CONSTRUCTION COST ESTIMATE
Alternative 3 - Union Intersection
 Prepared By: Jeromy Grenard Date: 09/17/10

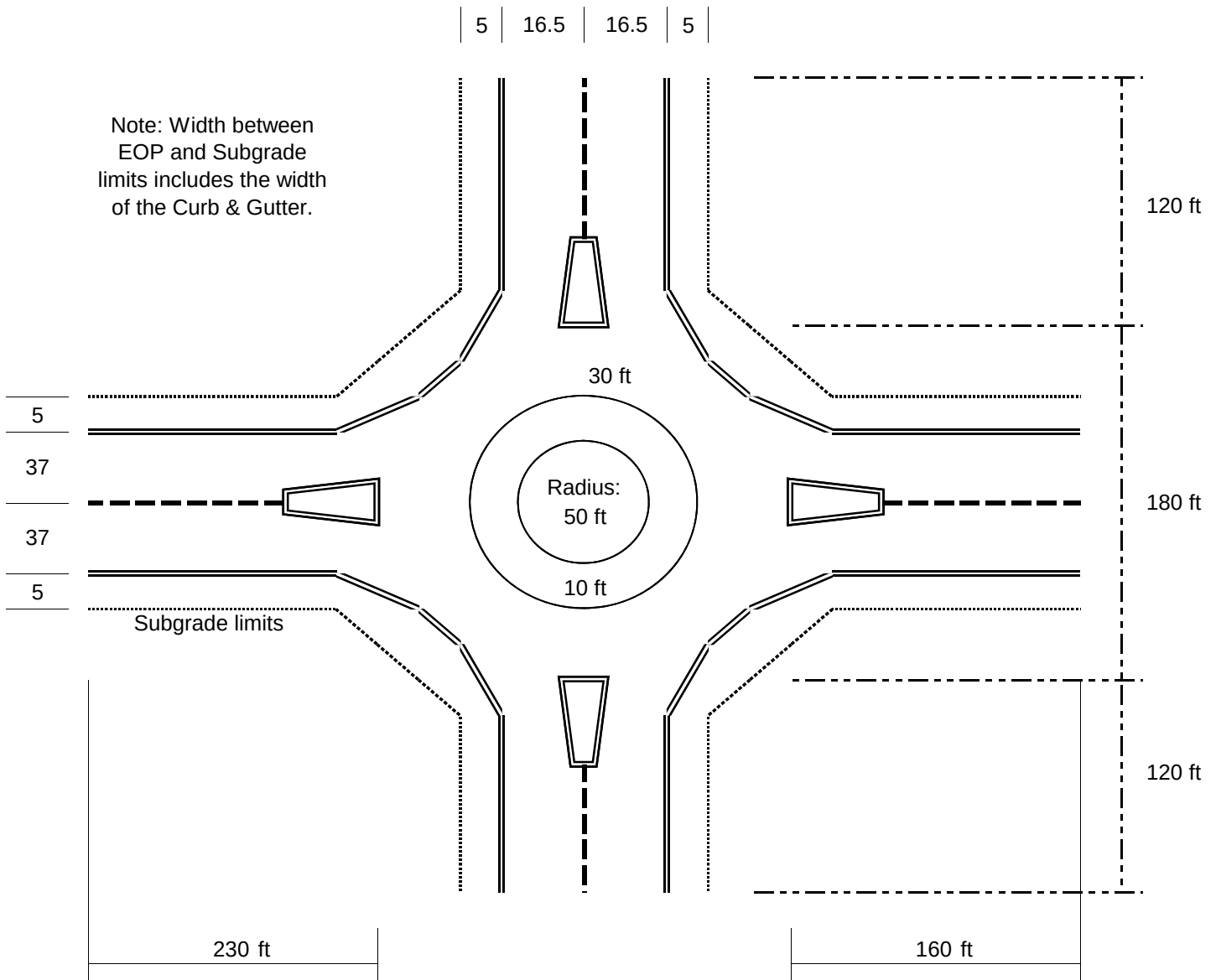


						Unit Price	Subtotal
Subgrade Treatment, Type XX:							
<i>Assume subgrade extends 2-feet beyond curb and gutter.</i>							
Area = 3090 SYS						\$ 12.00	\$ 37,080
Excavation, Common:							
<i>Assume 8 inches of cut needed in the area of the subgrade treatment.</i>							
Excavation = 687 CYS						\$ 20.00	\$ 13,740
HMA:							
Surface:	1.5 inches	Area:	2656	SYS	=	219.2 TON	\$ 75.00 \$ 16,440
Intermediate:	5.5 inches	Area:	2736	SYS	=	827.7 TON	\$ 65.00 \$ 53,801
Base:	8.0 inches	Area:	2789	SYS	=	1227.2 TON	\$ 60.00 \$ 73,632

CONSTRUCTION COST ESTIMATE
Alternative 3 - Union Intersection
 Prepared By: Jeromy Grenard Date: 09/17/10

Curb & Gutter:			
Length =	989 LFT	\$ 25.00	\$ 24,725
Drainage:			
Assume the drainage cost will be equal in a standard intersection and a roundabout.			\$ 50,000
Includes: 6-8 inlets, 1-2 manholes, and 150-ft of pipe.			
Assume underdrain needed is equal to curb & gutter length:	989 LFT	\$ 7.50	\$ 7,418
Geotextiles for Underdrain (1.10 SYS/LFT):	1088 SYS	\$ 1.00	\$ 1,088
Aggregate for Underdrain (0.09 CYS/LFT):	90 SYS	\$ 32.00	\$ 2,880
Signals and Components (poles, heads, cables, wires, etc.):		1 LS	\$ 125,000
Construction Engineering		3%	\$ 12,174
Mobilization and Demobilization		5%	\$ 20,290
Clearing Right-of-Way		10%	\$ 40,580
Maintaining Traffic		10%	\$ 40,580
TOTAL:			\$ 519,428
Contingency:		30%	\$ 155,828
CONSTRUCTION COST ESTIMATE:			\$ 675,256

CONSTRUCTION COST ESTIMATE
Alternative 3 - East Roundabout
 Prepared By: Jeromy Grenard Date: 09/17/10

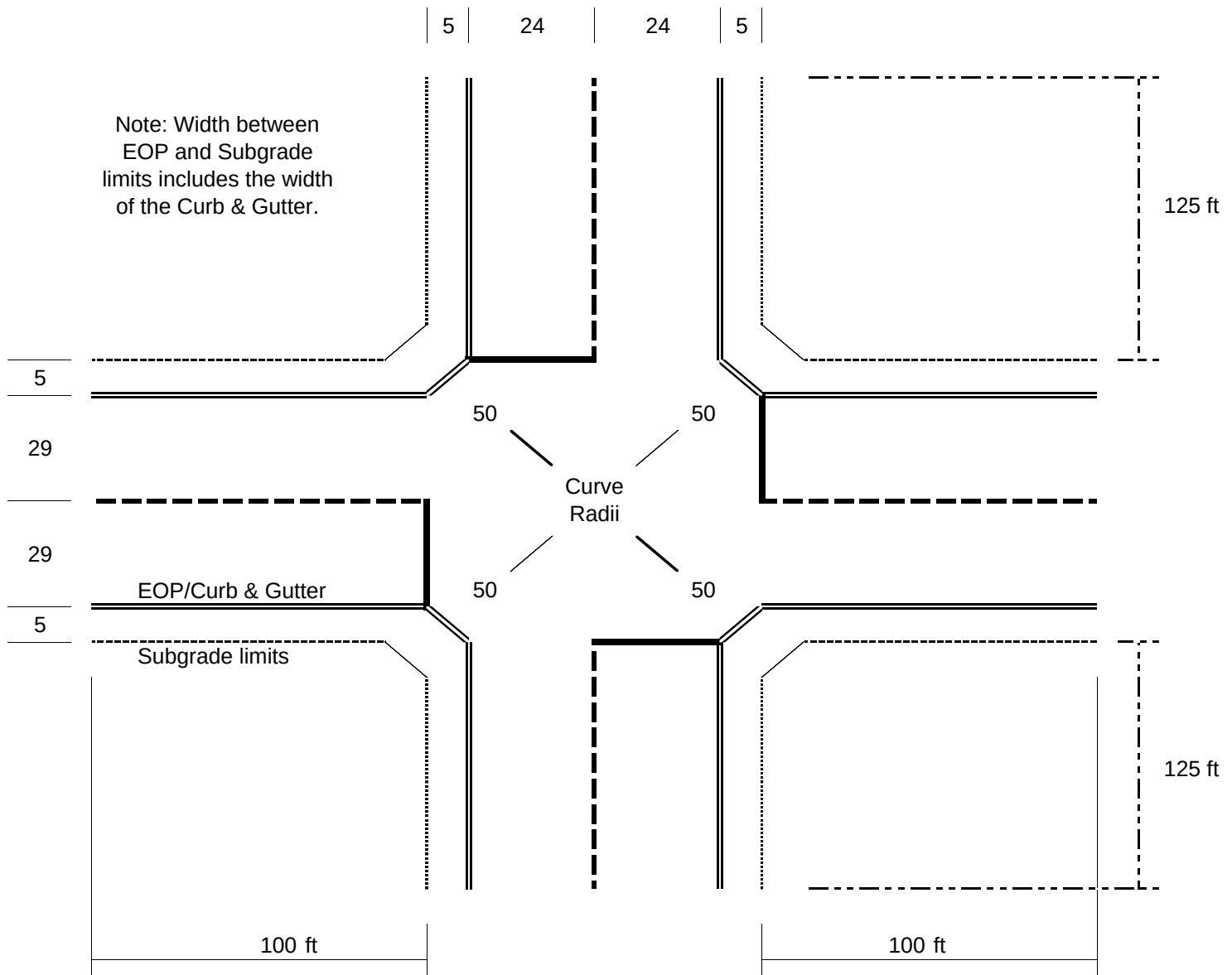


					Unit Price	Subtotal
Subgrade Treatment, Type XX:						
<i>Assume subgrade extends 2-feet beyond curb and gutter.</i>						
Area =	8387	SYS			\$ 12.00	\$ 100,644
Excavation, Common:						
<i>Assume 8 inches of cut needed in the area of the subgrade treatment.</i>						
Excavation =	1864	CYS			\$ 20.00	\$ 37,280
HMA:						
Surface:	1.5 inches	Area: 5658	SYS	=	466.8 TON	\$ 75.00 \$ 35,010
Intermediate:	5.5 inches	Area: 5828	SYS	=	1763.0 TON	\$ 65.00 \$ 114,595
Base:	7.0 inches	Area: 5941	SYS	=	2287.3 TON	\$ 60.00 \$ 137,238

CONSTRUCTION COST ESTIMATE
Alternative 3 - East Roundabout
Prepared By: Jeromy Grenard Date: 09/17/10

PCCP, 9 inches:				
Truck Apron:	384 SYS		\$ 75.00	\$ 28,800
Curb & Gutter:				
Length =	1826 LFT		\$ 25.00	\$ 45,650
Drainage:				
Assume the drainage cost will be equal in a standard intersection and a roundabout.				\$ 30,000
Includes: 6-8 inlets, 1-2 manholes, and 150-ft of pipe.				
Assume underdrain needed is equal to curb & gutter length:	1826 LFT		\$ 7.50	\$ 13,695
Geotextiles for Underdrain (1.10 SYS/LFT):	2009 SYS		\$ 1.00	\$ 2,009
Aggregate for Underdrain (0.09 CYS/LFT):	165 SYS		\$ 32.00	\$ 5,280
Island Curbs:				
North Island:	130 LFT	East Island:	385 LFT	
South Island:	135 LFT	West Island:	505 LFT	
Center:	315 LFT			
		TOTAL:	1470 LFT	\$ 28.00 \$ 41,160
Roll Curb:	377 LFT			
		TOTAL:	377 LFT	\$ 20.00 \$ 7,540
Lighting (poles, luminaires, wires, etc.):			1 LS	\$ 36,000
Construction Engineering			3%	\$ 19,047
Mobilization and Demobilization			5%	\$ 31,745
Clearing Right-of-Way			10%	\$ 63,490
Maintaining Traffic			8%	\$ 50,792
TOTAL:				\$ 799,975
Contingency:			30%	\$ 239,993
CONSTRUCTION COST ESTIMATE:				\$ 1,039,968

CONSTRUCTION COST ESTIMATE
Alternative 3 - Carey Intersection
 Prepared By: Jeromy Grenard Date: 09/17/10

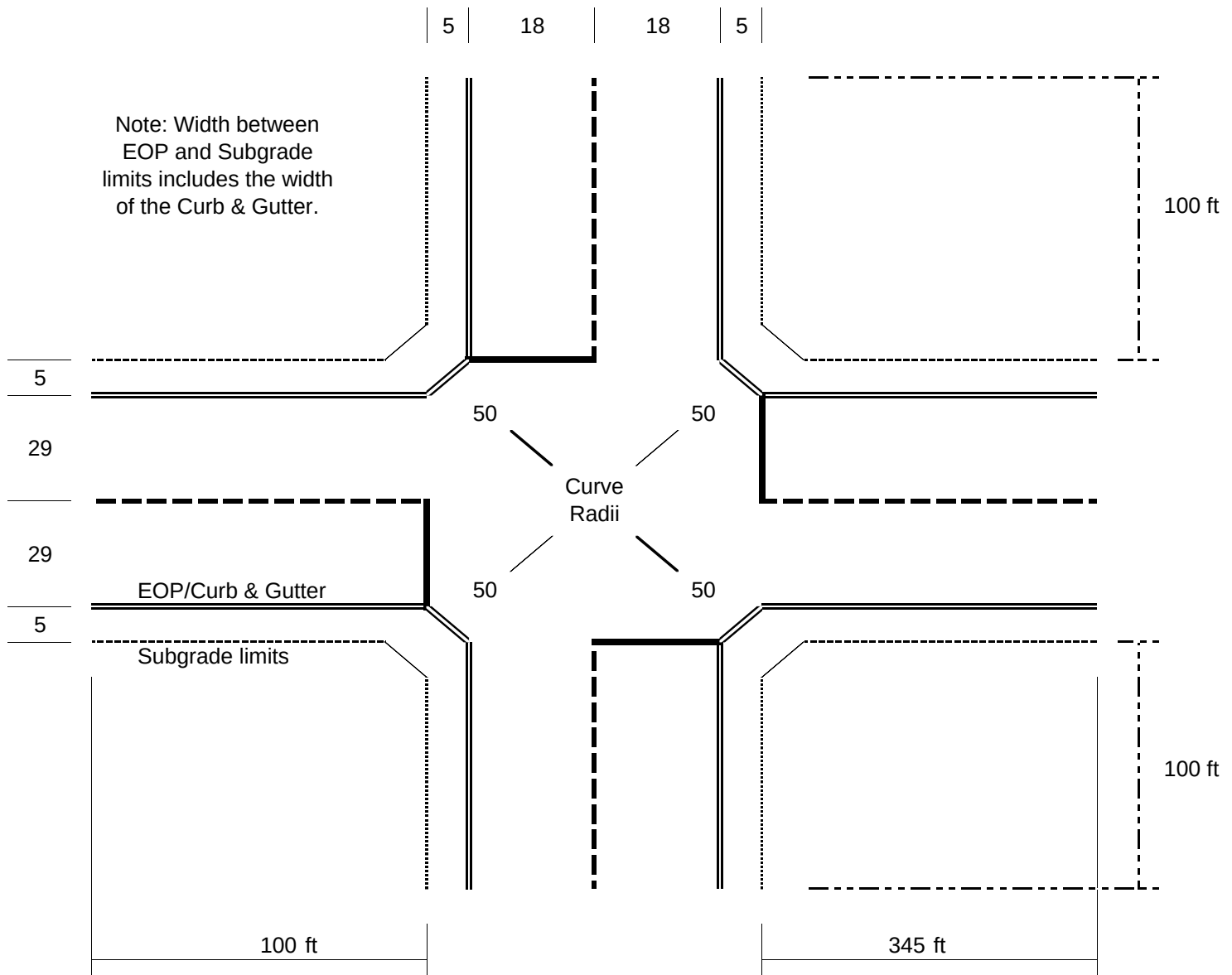


						Unit Price	Subtotal
Subgrade Treatment, Type XX:							
<i>Assume subgrade extends 2-feet beyond curb and gutter.</i>							
Area = 3398 SYS						\$ 12.00	\$ 40,776
Excavation, Common:							
<i>Assume 8 inches of cut needed in the area of the subgrade treatment.</i>							
Excavation = 756 CYS						\$ 20.00	\$ 15,120
HMA:							
Surface:	1.5 inches	Area:	2909	SYS	=	240.0 TON	\$ 75.00 \$ 18,000
Intermediate:	5.5 inches	Area:	2996	SYS	=	906.3 TON	\$ 65.00 \$ 58,910
Base:	8.0 inches	Area:	3054	SYS	=	1343.8 TON	\$ 60.00 \$ 80,628

CONSTRUCTION COST ESTIMATE
Alternative 3 - Carey Intersection
 Prepared By: Jeromy Grenard Date: 09/17/10

Curb & Gutter:			
Length =	1215 LFT	\$ 25.00	\$ 30,375
Drainage:			
Assume the drainage cost will be equal in a standard intersection and a roundabout.			\$ 40,000
Includes: 6-8 inlets, 1-2 manholes, and 150-ft of pipe.			
Assume underdrain needed is equal to curb & gutter length:	1215 LFT	\$ 7.50	\$ 9,113
Geotextiles for Underdrain (1.10 SYS/LFT):	1337 SYS	\$ 1.00	\$ 1,337
Aggregate for Underdrain (0.09 CYS/LFT):	110 SYS	\$ 32.00	\$ 3,520
Signals and Components (poles, heads, cables, wires, etc.):		1 LS	\$ 125,000
Construction Engineering		3%	\$ 12,683
Mobilization and Demobilization		5%	\$ 21,139
Clearing Right-of-Way		10%	\$ 42,278
Maintaining Traffic		10%	\$ 42,278
TOTAL:			\$ 541,156
Contingency:		30%	\$ 162,347
CONSTRUCTION COST ESTIMATE:			\$ 703,503

CONSTRUCTION COST ESTIMATE
Alternative 3 - Moontown Intersection
 Prepared By: Jeromy Grenard Date: 09/17/10



						Unit Price	Subtotal
Subgrade Treatment, Type XX:							
Assume subgrade extends 2-feet beyond curb and gutter.							
Area = 4588 SYS						\$ 12.00	\$ 55,056
Excavation, Common:							
Assume 8 inches of cut needed in the area of the subgrade treatment.							
Excavation = 1020 CYS						\$ 20.00	\$ 20,400
HMA:							
Surface:	1.5 inches	Area:	3883 SYS	=	320.4 TON	\$ 75.00	\$ 24,030
Intermediate:	5.5 inches	Area:	3999 SYS	=	1209.7 TON	\$ 65.00	\$ 78,631
Base:	8.0 inches	Area:	4077 SYS	=	1793.9 TON	\$ 60.00	\$ 107,634

CONSTRUCTION COST ESTIMATE
Alternative 3 - Moontown Intersection
 Prepared By: Jeromy Grenard Date: 09/17/10

Curb & Gutter:			
Length = 1605 LFT		\$ 25.00	\$ 40,125
Drainage:			
Assume the drainage cost will be equal in a standard intersection and a roundabout.			\$ 40,000
Includes: 6-8 inlets, 1-2 manholes, and 150-ft of pipe.			
Assume underdrain needed is equal to curb & gutter length:	1605 LFT	\$ 7.50	\$ 12,038
Geotextiles for Underdrain (1.10 SYS/LFT):	1766 SYS	\$ 1.00	\$ 1,766
Aggregate for Underdrain (0.09 CYS/LFT):	145 SYS	\$ 32.00	\$ 4,640
Signals and Components (poles, heads, cables, wires, etc.):		1 LS	\$ 125,000
Construction Engineering		3%	\$ 15,280
Mobilization and Demobilization		5%	\$ 25,466
Clearing Right-of-Way		5%	\$ 25,466
Maintaining Traffic		10%	\$ 50,932
TOTAL:			\$ 626,462
Contingency:		30%	\$ 187,939
CONSTRUCTION COST ESTIMATE:			\$ 814,401

CONSTRUCTION COST ESTIMATE
Alternative 3 - Mainline from Poplar St to East St
Prepared By: Jeromy Grenard Date: 09/17/10

Preliminary Cost Estimate

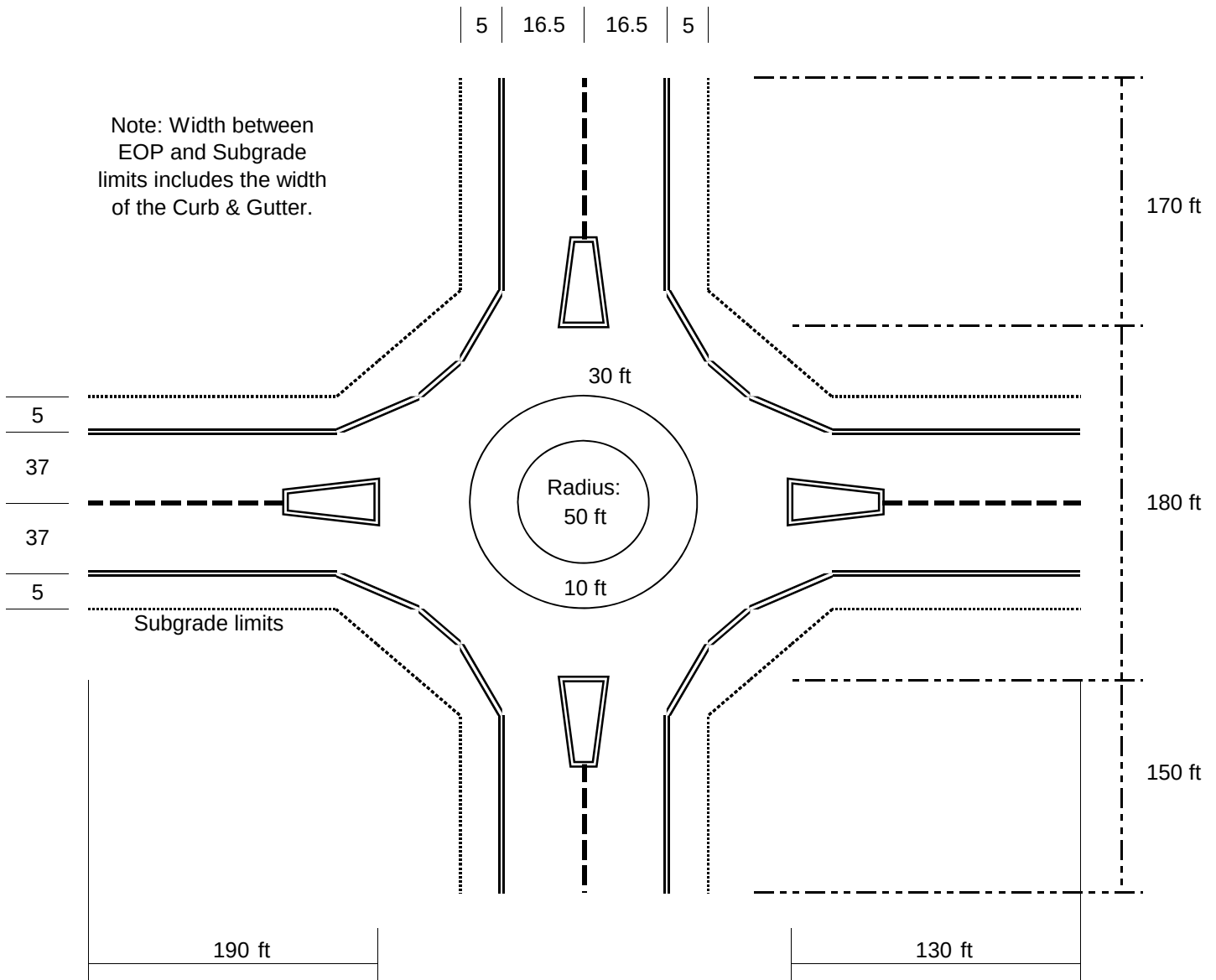
Project: SR 32 From Poplar Street St to East Street

Item No.	Description	Unit	Qty.	Unit Cost	Item Cost
	Mobilization / Demobilization	LSUM	1	\$ 94,718.28	\$ 94,718.28
	Clearing Right of Way	LSUM	1	\$ 75,774.62	\$ 75,774.62
	Maintenance of Traffic	LSUM	1	\$ 37,887.31	\$ 37,887.31
	Common Excavation	CYS	4,681	\$ 33.00	\$ 154,474.02
	HMA Surface, 9.5mm	TON	1,078	\$ 85.00	\$ 91,619.09
	HMA Intermediate, 19.0mm	TON	1,796	\$ 75.00	\$ 134,733.96
	HMA Base, 25.0mm	TON	7,099	\$ 70.00	\$ 496,944.31
	Subgrade Treatment, Type A	SYS	14,240	\$ 12.00	\$ 170,879.11
	Subgrade Treatment, Type IIIA	SYS	569	\$ 12.00	\$ 6,830.67
	Curb & Gutter	LFT	5,534	\$ 25.00	\$ 138,350.00
	PCCP for Driveways, 6in	SYS	569	\$ 60.00	\$ 34,153.33
	6" Underdrain Pipe	LFT	3,250	\$ 13.00	\$ 42,250.00
	Aggregate for Underdrains	CYS	281	\$ 50.00	\$ 14,047.22
	Geotextile for Underdrains	SYS	2,588	\$ 2.50	\$ 6,470.21
	Inlet	EACH	34	\$ 2,000.00	\$ 68,800.00
	12" Pipe	LFT	1,889	\$ 40.00	\$ 75,576.59
	18" Pipe	LFT	488	\$ 45.00	\$ 21,937.50
	24" Pipe	LFT	2,275	\$ 55.00	\$ 125,125.00
	Structure Backfill	CYS	1,575	\$ 32.00	\$ 50,395.51
	Manhole	EACH	26	\$ 2,500.00	\$ 65,000.00
	Pavement Markings & Signing	LSUM	1	\$ 47,359.14	\$ 47,359.14
	Mulched Seeding	SYS	0	\$ 5.00	\$ -
	Construction Engineering	LSUM	1	\$ 37,887.31	\$ 37,887.31
	Contingencies (30%)	LSUM	1	\$ 89,685.95	\$ 89,685.95

TOTAL OF ROAD ITEMS = \$ 2,277,678.14

PROJECT TOTAL = \$ 2,277,678.14

CONSTRUCTION COST ESTIMATE
Downtown Preferred Alternative - Poplar Roundabout
 Prepared By: Jeromy Grenard Date: 04/17/11

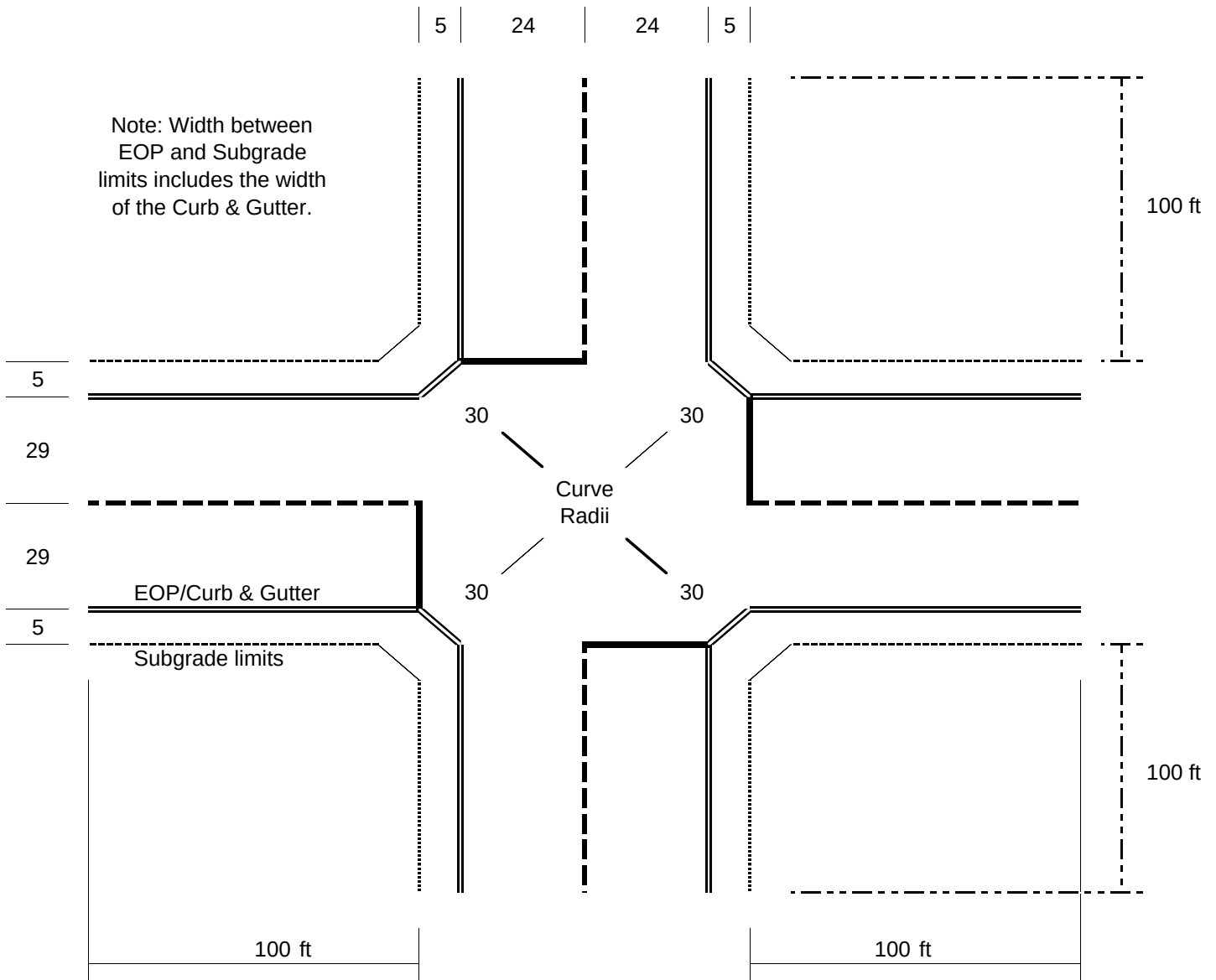


						Unit Price	Subtotal
Subgrade Treatment, Type XX:							
Assume subgrade extends 2-feet beyond curb and gutter.							
Area = 8116 SYS						\$ 12.00	\$ 97,392
Excavation, Common:							
Assume 15 inches of cut needed in the area of the subgrade treatment.							
Excavation = 3382 CYS						\$ 20.00	\$ 67,640
HMA:							
Surface:	1.5 inches	Area:	5376	SYS	=	443.6 TON	\$ 75.00 \$ 33,270
Intermediate:	5.5 inches	Area:	5537	SYS	=	1675.0 TON	\$ 65.00 \$ 108,875
Base:	8.0 inches	Area:	5645	SYS	=	2483.8 TON	\$ 60.00 \$ 149,028

CONSTRUCTION COST ESTIMATE
Downtown Preferred Alternative - Poplar Roundabout
 Prepared By: Jeromy Grenard Date: 04/17/11

PCCP, 9 inches:							
Truck Apron:	384 SYS				\$	75.00	\$ 28,800
Curb & Gutter:							
Length =	1846 LFT				\$	25.00	\$ 46,150
Drainage:							
Assume the drainage cost will be equal in a standard intersection and a roundabout.							\$ 40,000
Includes: 6-8 inlets, 1-2 manholes, and 150-ft of pipe.							
Assume underdrain needed is equal to curb & gutter length:	1846 LFT				\$	7.50	\$ 13,845
Geotextiles for Underdrain (1.10 SYS/LFT):	2031 SYS				\$	1.00	\$ 2,031
Aggregate for Underdrain (0.09 CYS/LFT):	167 SYS				\$	32.00	\$ 5,344
Island Curbs:							
North Island:	130 LFT	East Island:	495 LFT				
South Island:	130 LFT	West Island:	430 LFT				
Center:	315 LFT			TOTAL:			
				1500 LFT	\$	28.00	\$ 42,000
Roll Curb:	377 LFT			TOTAL:			
				377 LFT	\$	20.00	\$ 7,540
Lighting (poles, luminaires, wires, etc.):						1 LS	\$ 36,000
Construction Engineering						3%	\$ 20,337
Mobilization and Demobilization						5%	\$ 33,896
Clearing Right-of-Way						10%	\$ 67,792
Maintaining Traffic						8%	\$ 54,233
TOTAL:							\$ 854,173
Contingency:						30%	\$ 256,252
CONSTRUCTION COST ESTIMATE:							\$ 1,110,425

CONSTRUCTION COST ESTIMATE
Downtown Preferred Alternative - Union Intersection
 Prepared By: Jeromy Grenard Date: 04/17/11

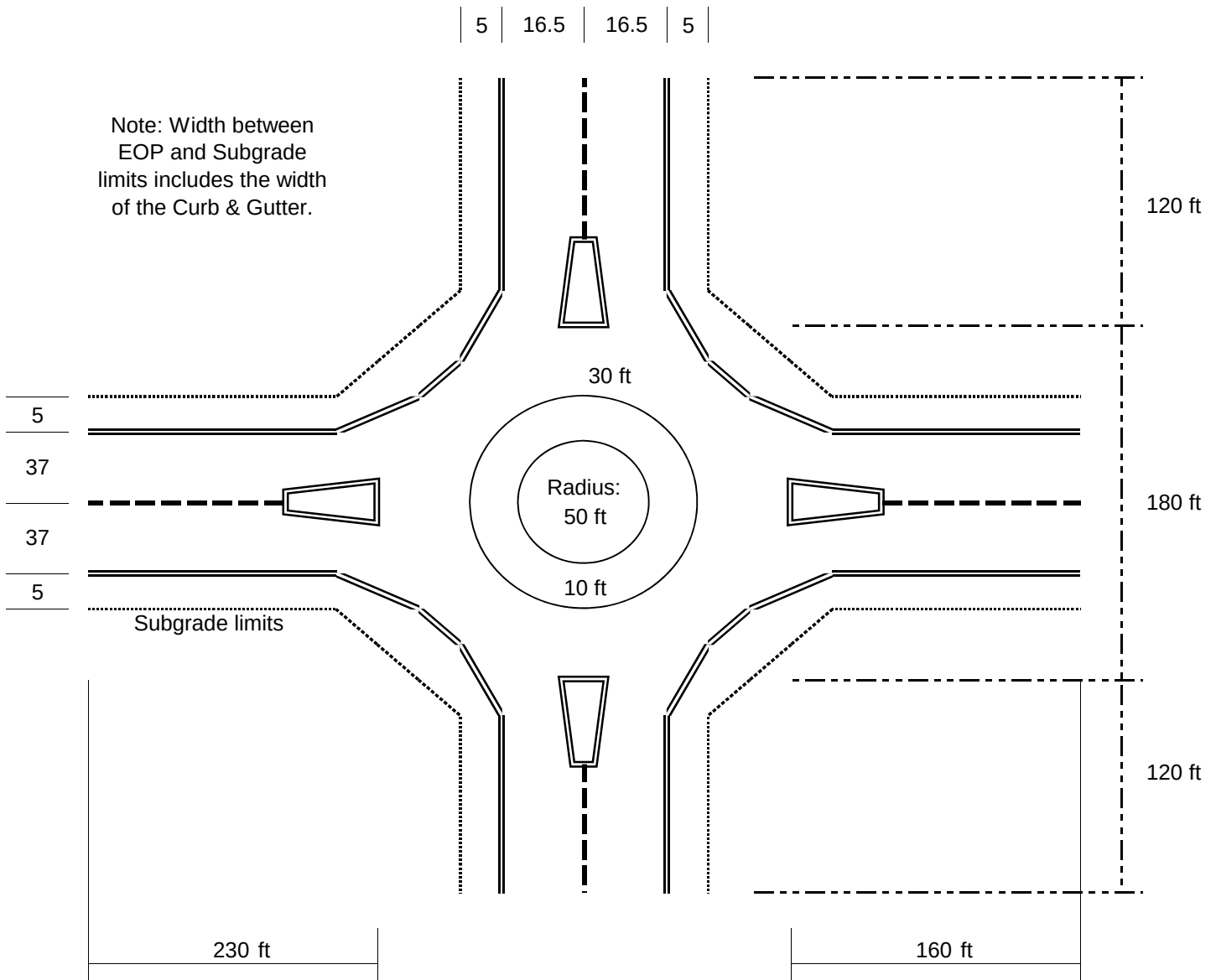


					Unit Price	Subtotal
Subgrade Treatment, Type XX:						
<i>Assume subgrade extends 2-feet beyond curb and gutter.</i>						
Area =	3105	SYS			\$ 12.00	\$ 37,260
Excavation, Common:						
<i>Assume 15 inches of cut needed in the area of the subgrade treatment.</i>						
Excavation =	1294	CYS			\$ 20.00	\$ 25,880
HMA:						
Surface:	1.5 inches	Area: 2672	SYS	=	220.5 TON	\$ 75.00 \$ 16,538
Intermediate:	5.5 inches	Area: 2752	SYS	=	832.5 TON	\$ 65.00 \$ 54,113
Base:	8.0 inches	Area: 2806	SYS	=	1234.7 TON	\$ 60.00 \$ 74,082

CONSTRUCTION COST ESTIMATE
Downtown Preferred Alternative - Union Intersection
 Prepared By: Jeromy Grenard Date: 04/17/11

Curb & Gutter:			
Length =	989 LFT	\$ 25.00	\$ 24,725
Drainage:			
Assume the drainage cost will be equal in a standard intersection and a roundabout.			\$ 50,000
Includes: 6-8 inlets, 1-2 manholes, and 150-ft of pipe.			
Assume underdrain needed is equal to curb & gutter length:	989 LFT	\$ 7.50	\$ 7,418
Geotextiles for Underdrain (1.10 SYS/LFT):	1088 SYS	\$ 1.00	\$ 1,088
Aggregate for Underdrain (0.09 CYS/LFT):	90 SYS	\$ 32.00	\$ 2,880
Signals and Components (poles, heads, cables, wires, etc.):	1 LS		\$ 125,000
Construction Engineering	3%		\$ 12,569
Mobilization and Demobilization	5%		\$ 20,949
Clearing Right-of-Way	10%		\$ 41,898
Maintaining Traffic	10%		\$ 41,898
TOTAL:			\$ 536,298
Contingency:	30%		\$ 160,889
CONSTRUCTION COST ESTIMATE:			\$ 697,187

CONSTRUCTION COST ESTIMATE
Downtown Preferred Alternative - East Roundabout
 Prepared By: Jeromy Grenard Date: 04/17/11

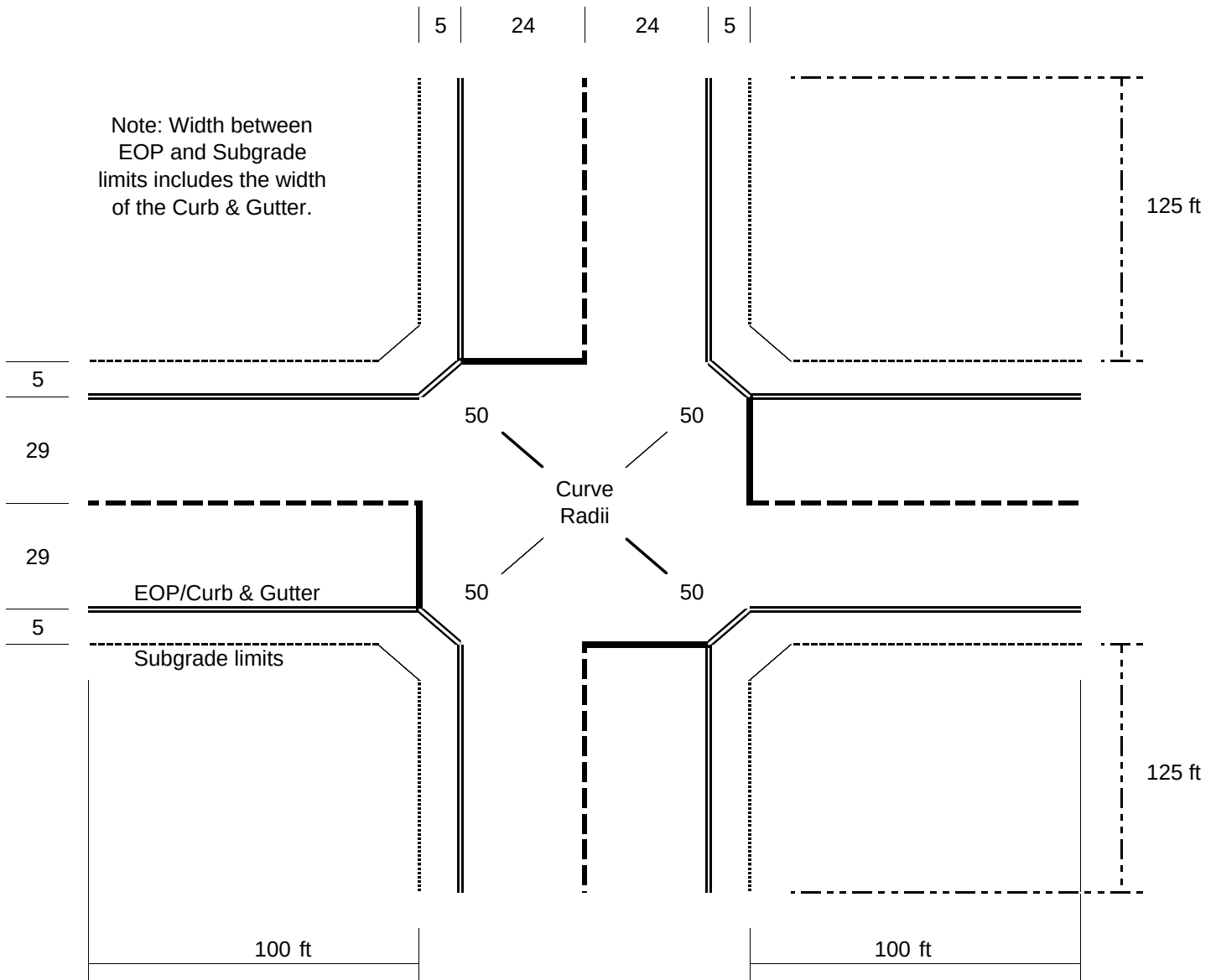


						Unit Price	Subtotal
Subgrade Treatment, Type XX:							
Assume subgrade extends 2-feet beyond curb and gutter.							
Area = 8387 SYS						\$ 12.00	\$ 100,644
Excavation, Common:							
Assume 15 inches of cut needed in the area of the subgrade treatment.							
Excavation = 3495 CYS						\$ 20.00	\$ 69,900
HMA:							
Surface:	1.5 inches	Area:	5658	SYS	=	466.8 TON	\$ 75.00 \$ 35,010
Intermediate:	5.5 inches	Area:	5828	SYS	=	1763.0 TON	\$ 65.00 \$ 114,595
Base:	8.0 inches	Area:	5941	SYS	=	2614.1 TON	\$ 60.00 \$ 156,846

CONSTRUCTION COST ESTIMATE
Downtown Preferred Alternative - East Roundabout
 Prepared By: Jeromy Grenard Date: 04/17/11

PCCP, 9 inches:							
	Truck Apron:	384 SYS			\$ 75.00	\$ 28,800	
Curb & Gutter:							
	Length =	1826 LFT			\$ 25.00	\$ 45,650	
Drainage:							
Assume the drainage cost will be equal in a standard intersection and a roundabout.						\$ 30,000	
Includes: 6-8 inlets, 1-2 manholes, and 150-ft of pipe.							
Assume underdrain needed is equal to curb & gutter length:				1826 LFT	\$ 7.50	\$ 13,695	
Geotextiles for Underdrain (1.10 SYS/LFT):				2009 SYS	\$ 1.00	\$ 2,009	
Aggregate for Underdrain (0.09 CYS/LFT):				165 SYS	\$ 32.00	\$ 5,280	
Island Curbs:							
	North Island:	130 LFT	East Island:	385 LFT			
	South Island:	135 LFT	West Island:	505 LFT			
	Center:	315 LFT					
			TOTAL:	1470 LFT	\$ 28.00	\$ 41,160	
	Roll Curb:	377 LFT					
			TOTAL:	377 LFT	\$ 20.00	\$ 7,540	
Lighting (poles, luminaires, wires, etc.):					1 LS	\$ 36,000	
Construction Engineering					3%	\$ 20,614	
Mobilization and Demobilization					5%	\$ 34,356	
Clearing Right-of-Way					10%	\$ 68,713	
Maintaining Traffic					8%	\$ 54,970	
TOTAL:						\$ 865,783	
Contingency:					30%	\$ 259,735	
CONSTRUCTION COST ESTIMATE:						\$ 1,125,517	

CONSTRUCTION COST ESTIMATE
Downtown Preferred Alternative - Carey Intersection
 Prepared By: Jeromy Grenard Date: 04/17/11

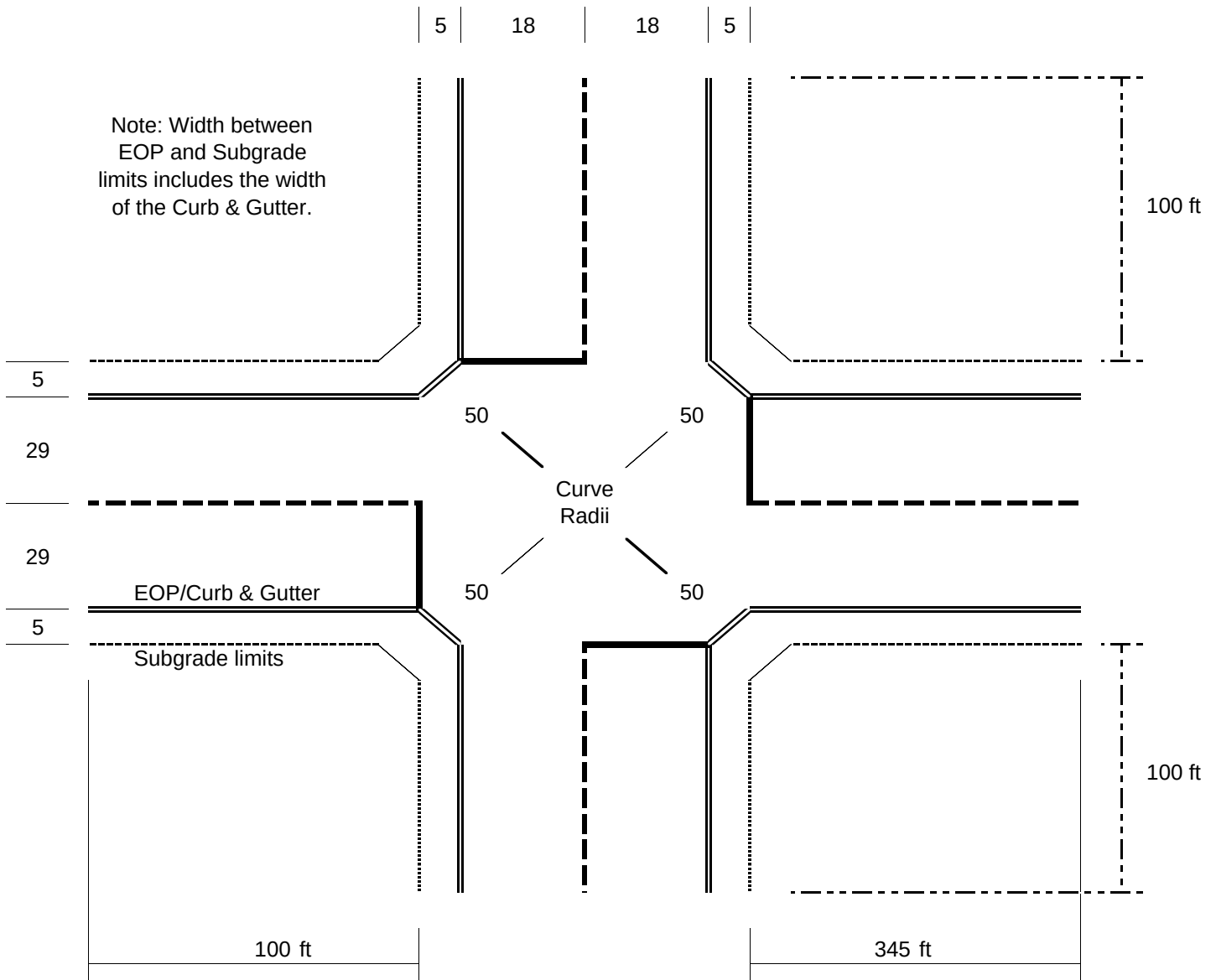


					Unit Price	Subtotal
Subgrade Treatment, Type XX:						
<i>Assume subgrade extends 2-feet beyond curb and gutter.</i>						
Area =	3398 SYS				\$ 12.00	\$ 40,776
Excavation, Common:						
<i>Assume 8 inches of cut needed in the area of the subgrade treatment.</i>						
Excavation =	756 CYS				\$ 20.00	\$ 15,120
HMA:						
Surface:	1.5 inches	Area:	2909 SYS	=	240.0 TON	\$ 75.00 \$ 18,000
Intermediate:	5.5 inches	Area:	2996 SYS	=	906.3 TON	\$ 65.00 \$ 58,910
Base:	8.0 inches	Area:	3054 SYS	=	1343.8 TON	\$ 60.00 \$ 80,628

CONSTRUCTION COST ESTIMATE
Downtown Preferred Alternative - Carey Intersection
 Prepared By: Jeromy Grenard Date: 04/17/11

Curb & Gutter:			
Length =	1215 LFT	\$ 25.00	\$ 30,375
Drainage:			
Assume the drainage cost will be equal in a standard intersection and a roundabout.			\$ 40,000
Includes: 6-8 inlets, 1-2 manholes, and 150-ft of pipe.			
Assume underdrain needed is equal to curb & gutter length:	1215 LFT	\$ 7.50	\$ 9,113
Geotextiles for Underdrain (1.10 SYS/LFT):	1337 SYS	\$ 1.00	\$ 1,337
Aggregate for Underdrain (0.09 CYS/LFT):	110 SYS	\$ 32.00	\$ 3,520
Signals and Components (poles, heads, cables, wires, etc.):	1 LS		\$ 125,000
Construction Engineering	3%		\$ 12,683
Mobilization and Demobilization	5%		\$ 21,139
Clearing Right-of-Way	10%		\$ 42,278
Maintaining Traffic	10%		\$ 42,278
TOTAL:			\$ 541,156
Contingency:	30%		\$ 162,347
CONSTRUCTION COST ESTIMATE:			\$ 703,503

CONSTRUCTION COST ESTIMATE
Downtown Preferred Alternative - Moontown Intersection
 Prepared By: Jeromy Grenard Date: 04/17/11



					Unit Price	Subtotal
Subgrade Treatment, Type XX:						
<i>Assume subgrade extends 2-feet beyond curb and gutter.</i>						
Area =	4588	SYS			\$ 12.00	\$ 55,056
Excavation, Common:						
<i>Assume 8 inches of cut needed in the area of the subgrade treatment.</i>						
Excavation =	1020	CYS			\$ 20.00	\$ 20,400
HMA:						
Surface:	1.5 inches	Area: 3883	SYS	=	320.4 TON	\$ 75.00 \$ 24,030
Intermediate:	5.5 inches	Area: 3999	SYS	=	1209.7 TON	\$ 65.00 \$ 78,631
Base:	8.0 inches	Area: 4077	SYS	=	1793.9 TON	\$ 60.00 \$ 107,634

CONSTRUCTION COST ESTIMATE
Downtown Preferred Alternative - Moontown Intersection
 Prepared By: Jeromy Grenard Date: 04/17/11

Curb & Gutter:			
Length =	1605 LFT	\$ 25.00	\$ 40,125
Drainage:			
Assume the drainage cost will be equal in a standard intersection and a roundabout.			\$ 40,000
Includes: 6-8 inlets, 1-2 manholes, and 150-ft of pipe.			
Assume underdrain needed is equal to curb & gutter length:	1605 LFT	\$ 7.50	\$ 12,038
Geotextiles for Underdrain (1.10 SYS/LFT):	1766 SYS	\$ 1.00	\$ 1,766
Aggregate for Underdrain (0.09 CYS/LFT):	145 SYS	\$ 32.00	\$ 4,640
Signals and Components (poles, heads, cables, wires, etc.):	1 LS		\$ 125,000
Construction Engineering	3%		\$ 15,280
Mobilization and Demobilization	5%		\$ 25,466
Clearing Right-of-Way	5%		\$ 25,466
Maintaining Traffic	10%		\$ 50,932
TOTAL:			\$ 626,462
Contingency:	30%		\$ 187,939
CONSTRUCTION COST ESTIMATE:			\$ 814,401

CONSTRUCTION COST ESTIMATE
Preferred Alternative - Mainline from Poplar St to East St
 Prepared By: Jeromy Grenard Date: 04/17/11

Preliminary Cost Estimate

Project: SR 32 From Poplar Street St to East Street

Item No.	Description	Unit	Qty.	Unit Cost	Item Cost
	Mobilization / Demobilization	LSUM	1	\$ 84,856.52	\$ 84,856.52
	Clearing Right of Way	LSUM	1	\$ 67,885.22	\$ 67,885.22
	Maintenance of Traffic	LSUM	1	\$ 33,942.61	\$ 33,942.61
	Common Excavation	CYS	4,574	\$ 33.00	\$ 150,939.35
	HMA Surface, 9.5mm	TON	963	\$ 85.00	\$ 81,817.18
	HMA Intermediate, 19.0mm	TON	1,604	\$ 75.00	\$ 120,319.38
	HMA Base, 25.0mm	TON	6,330	\$ 70.00	\$ 443,129.87
	Subgrade Treatment, Type A	SYS	12,768	\$ 12.00	\$ 153,214.76
	Subgrade Treatment, Type IIIA	SYS	569	\$ 12.00	\$ 6,830.67
	Curb & Gutter	LFT	3,994	\$ 25.00	\$ 99,850.00
	PCCP for Driveways, 6in	SYS	569	\$ 60.00	\$ 34,153.33
	6" Underdrain Pipe	LFT	3,440	\$ 13.00	\$ 44,720.00
	Aggregate for Underdrains	CYS	297	\$ 50.00	\$ 14,868.44
	Geotextile for Underdrains	SYS	2,739	\$ 2.50	\$ 6,848.47
	Inlet	EACH	36	\$ 2,000.00	\$ 72,800.00
	12" Pipe	LFT	1,818	\$ 40.00	\$ 72,702.13
	18" Pipe	LFT	516	\$ 45.00	\$ 23,220.00
	24" Pipe	LFT	2,408	\$ 55.00	\$ 132,440.00
	Structure Backfill	CYS	1,667	\$ 32.00	\$ 53,341.71
	Manhole	EACH	28	\$ 2,500.00	\$ 69,000.00
	Pavement Markings & Signing	LSUM	1	\$ 42,428.26	\$ 42,428.26
	Mulched Seeding	SYS	0	\$ 5.00	\$ -
	Construction Engineering	LSUM	1	\$ 33,942.61	\$ 33,942.61
	Contingencies (30%)	LSUM	1	\$ 80,514.52	\$ 80,514.52

TOTAL OF ROAD ITEMS = \$ 2,040,700.23

PROJECT TOTAL = \$ 2,040,700.23

CONSTRUCTION COST ESTIMATE
Alternative 1-3 - Mainline from East St to Moontown Rd
 Prepared By: Jeromy Grenard Date: 09/17/10

Preliminary Cost Estimate

Project: SR 32 From East Street St to Moontown Road

Item No.	Description	Unit	Qty.	Unit Cost	Item Cost
	Mobilization / Demobilization	LSUM	1	\$ 398,321.28	\$ 398,321.28
	Clearing Right of Way	LSUM	1	\$ 318,657.02	\$ 318,657.02
	Maintenance of Traffic	LSUM	1	\$ 159,328.51	\$ 159,328.51
	Common Excavation	CYS	20,471	\$ 33.00	\$ 675,532.41
	HMA Surface, 9.5mm	TON	4,652	\$ 85.00	\$ 395,427.08
	HMA Intermediate, 19.0mm	TON	7,753	\$ 75.00	\$ 581,510.42
	HMA Base, 25.0mm	TON	31,014	\$ 70.00	\$ 2,170,972.22
	Subgrade Treatment, Type A	SYS	61,412	\$ 12.00	\$ 736,944.44
	Subgrade Treatment, Type IIIA	SYS	1,708	\$ 12.00	\$ 20,492.00
	Curb & Gutter	LFT	16,150	\$ 25.00	\$ 403,750.00
	PCCP for Driveways, 6in	SYS	1,708	\$ 60.00	\$ 102,460.00
	6" Underdrain Pipe	LFT	17,500	\$ 13.00	\$ 227,500.00
	Aggregate for Underdrains	CYS	1,513	\$ 50.00	\$ 75,638.89
	Geotextile for Underdrains	SYS	13,936	\$ 2.50	\$ 34,839.58
	Inlet	EACH	159	\$ 2,000.00	\$ 318,400.00
	12" Pipe	LFT	8,528	\$ 40.00	\$ 341,122.67
	18" Pipe	LFT	3,500	\$ 45.00	\$ 157,500.00
	24" Pipe	LFT	10,500	\$ 55.00	\$ 577,500.00
	Structure Backfill	CYS	8,069	\$ 32.00	\$ 258,213.93
	Manhole	EACH	140	\$ 2,500.00	\$ 350,000.00
	Pavement Markings & Signing	LSUM	1	\$ 159,328.51	\$ 159,328.51
	Mulched Seeding	SYS	0	\$ 5.00	\$ -
	Construction Engineering	LSUM	1	\$ 159,328.51	\$ 159,328.51
	Contingencies (30%)	LSUM	1	\$ 360,087.10	\$ 360,087.10

TOTAL OF ROAD ITEMS = \$ 9,521,476.49

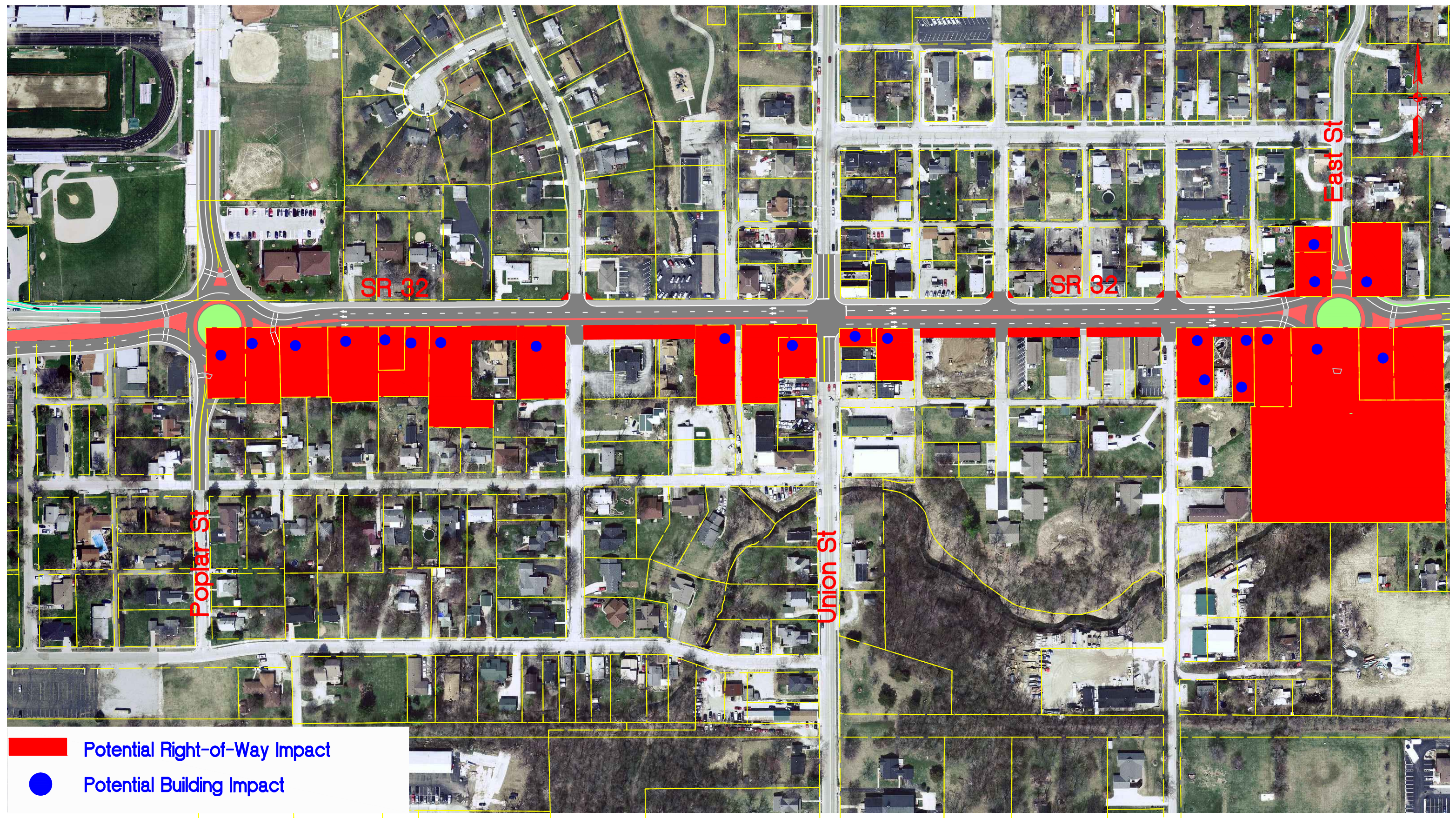
PROJECT TOTAL = \$ 9,521,476.49

APPENDIX C

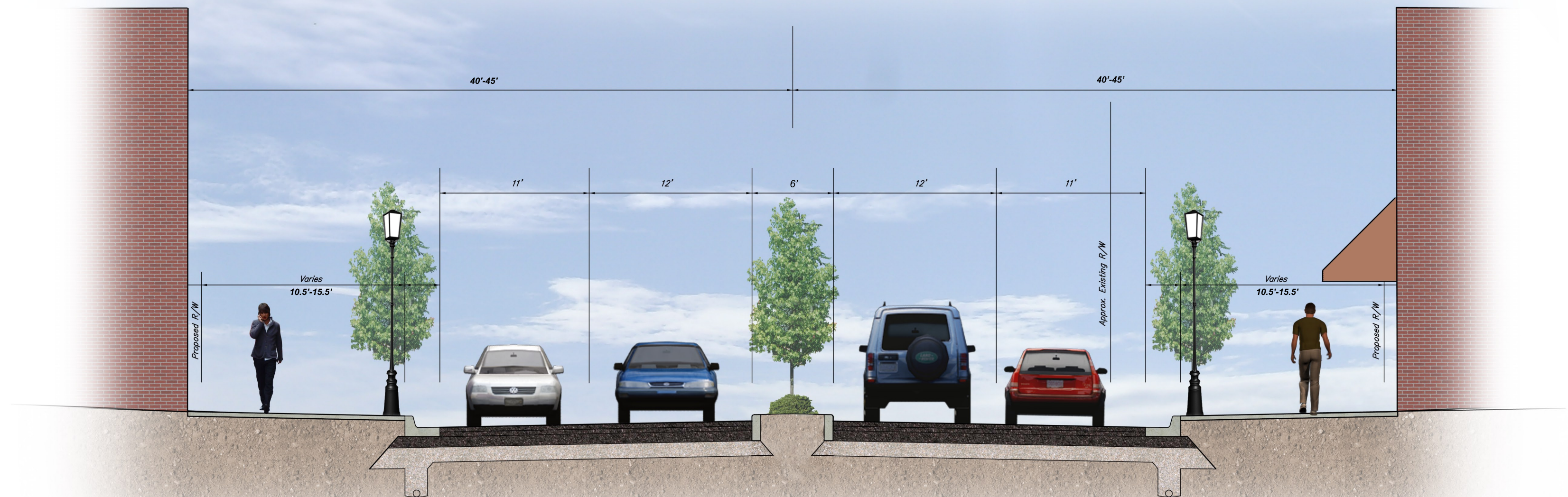
ALTERNATIVE SCHEMATIC LAYOUTS



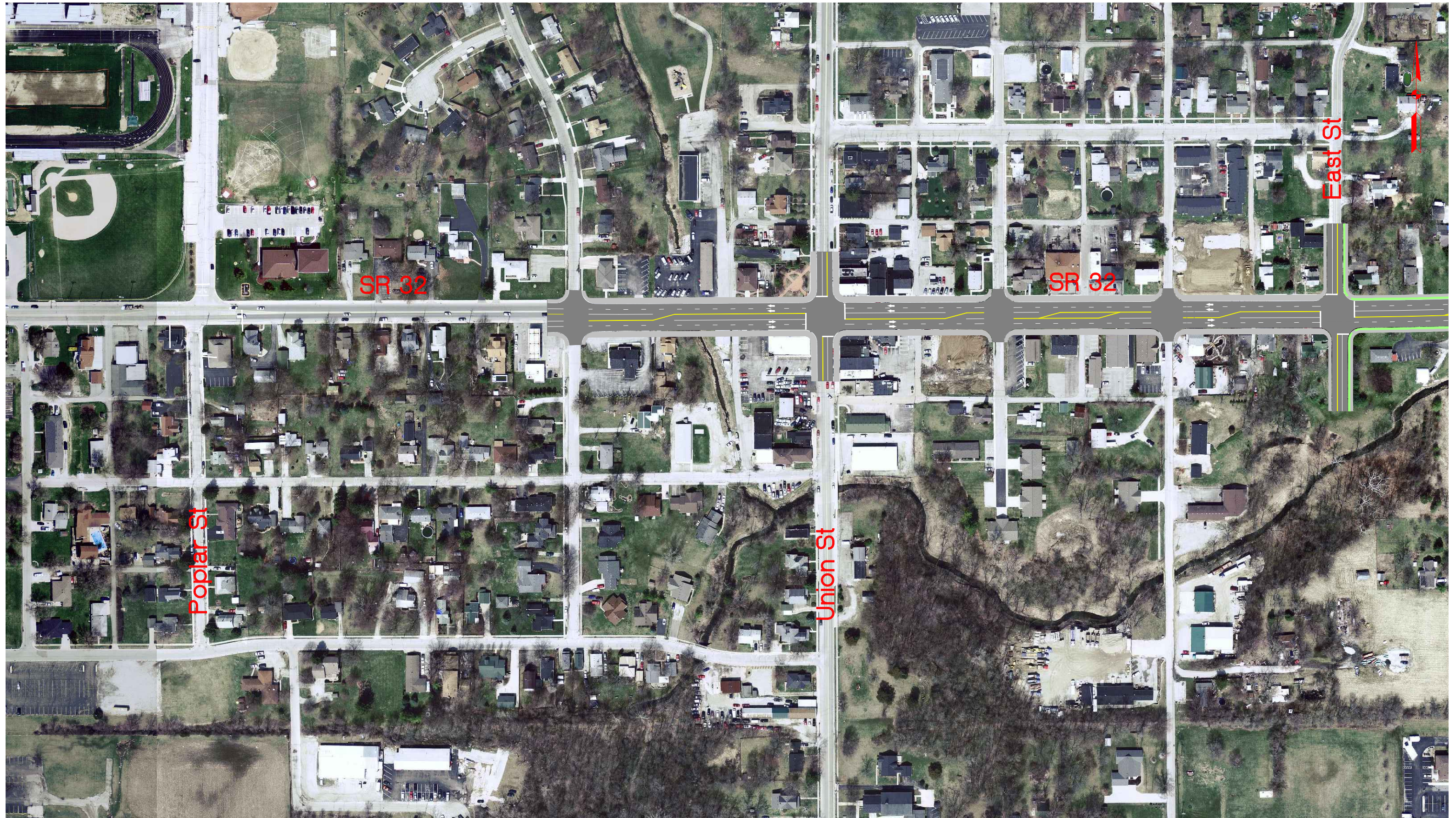
SR 32 Corridor Analysis – Downtown Alternative 1 (Scale 1" = 200')



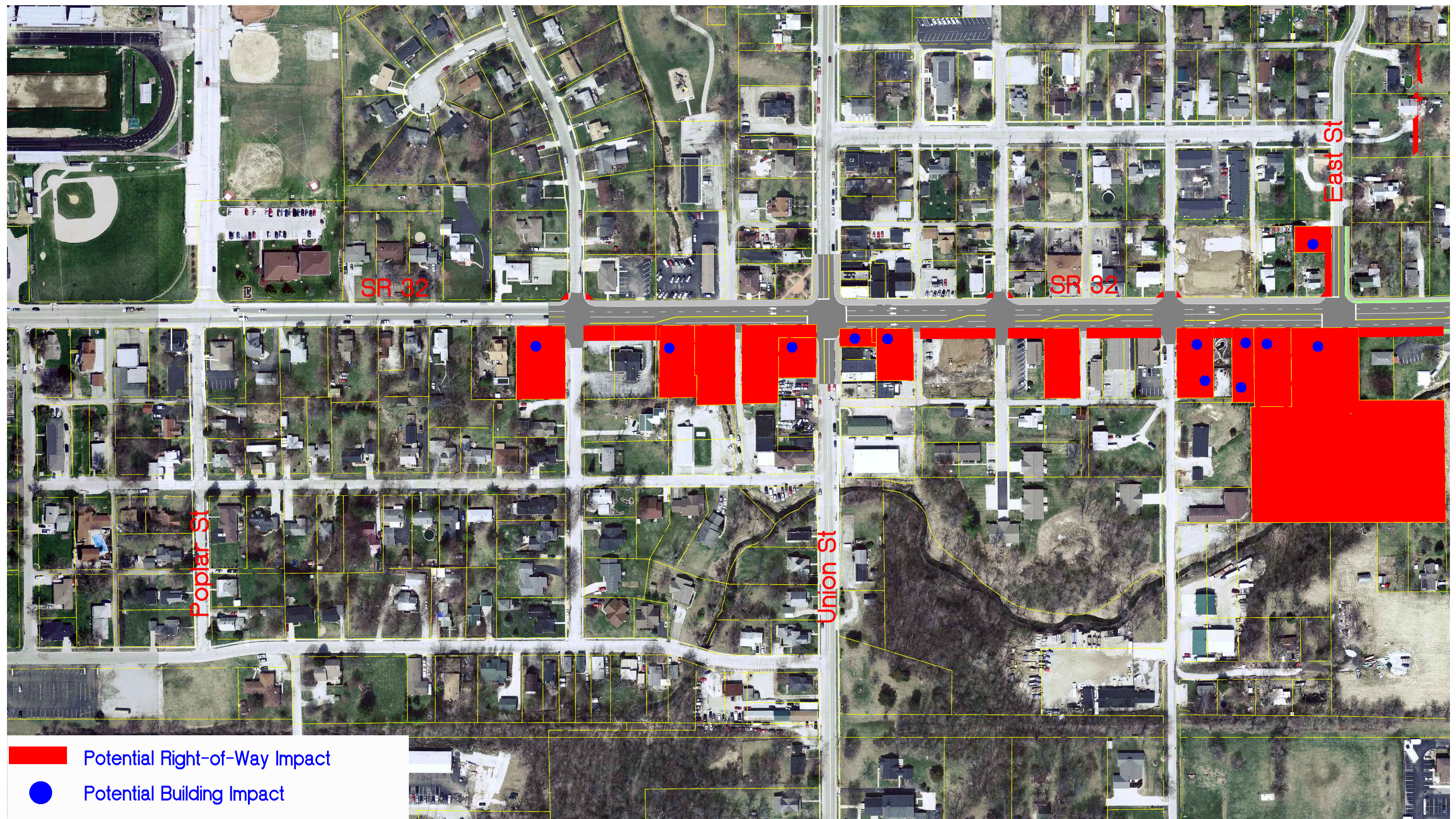
SR 32 Corridor Analysis – Downtown Alternative 1 With Potential Right-of-Way Impact (Scale 1" = 200')



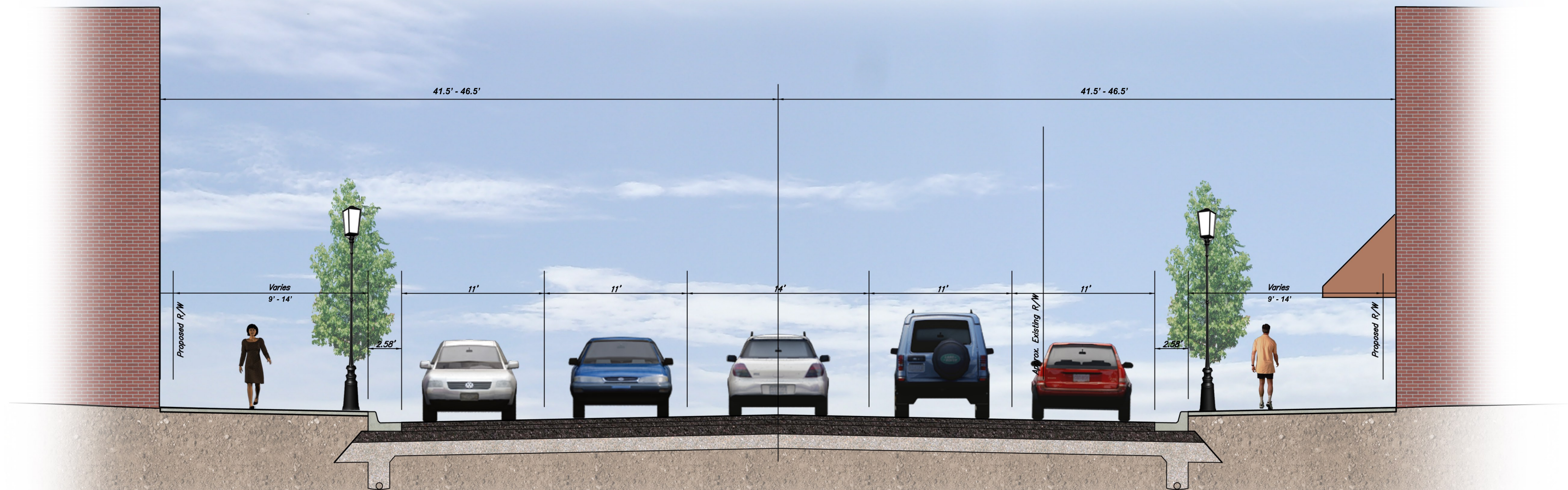
*Typical Section: 4-lane Section
Downtown Alternative 1*



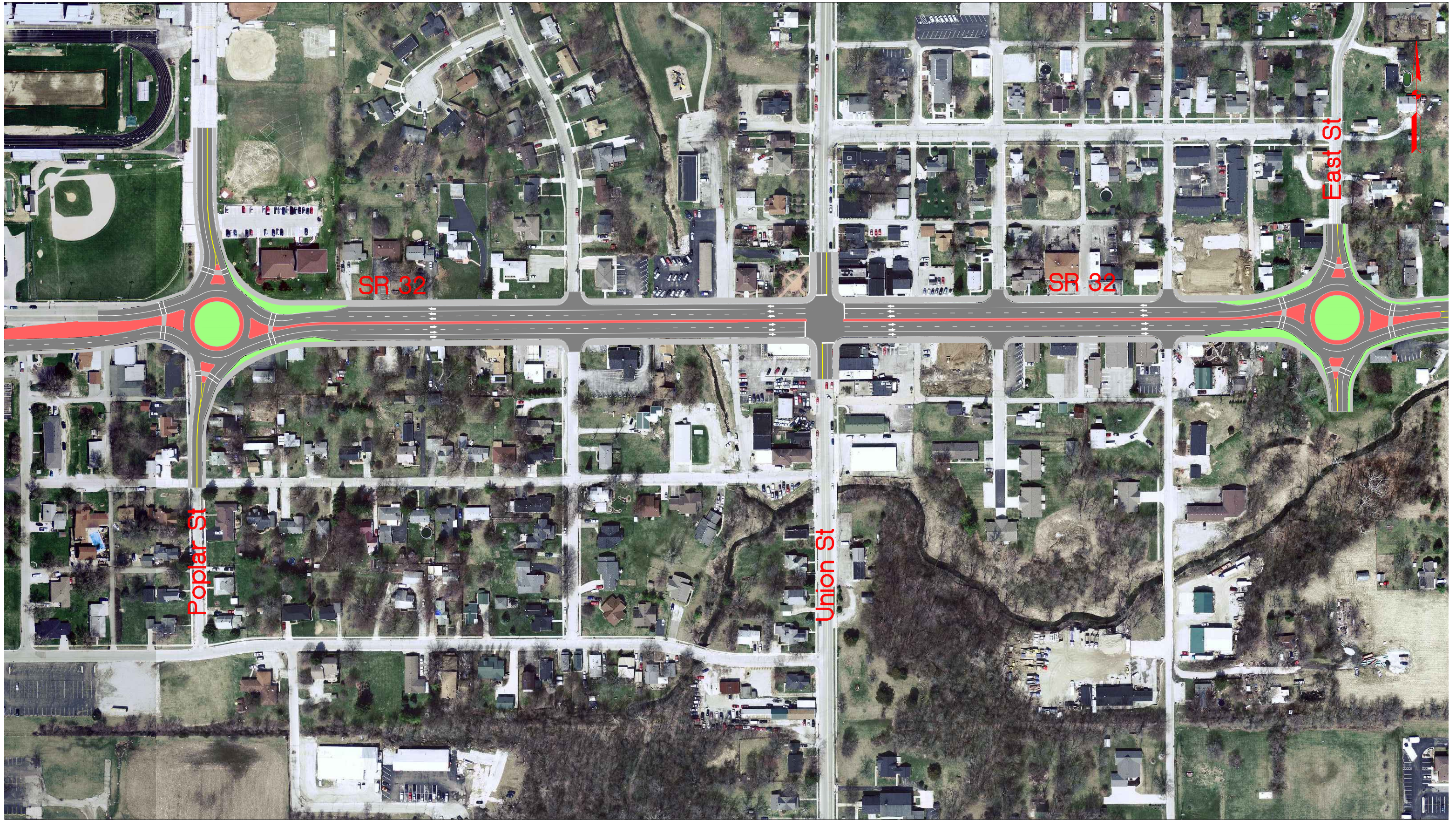
SR 32 Corridor Analysis – Downtown Alternative 2 (Scale 1" = 200')



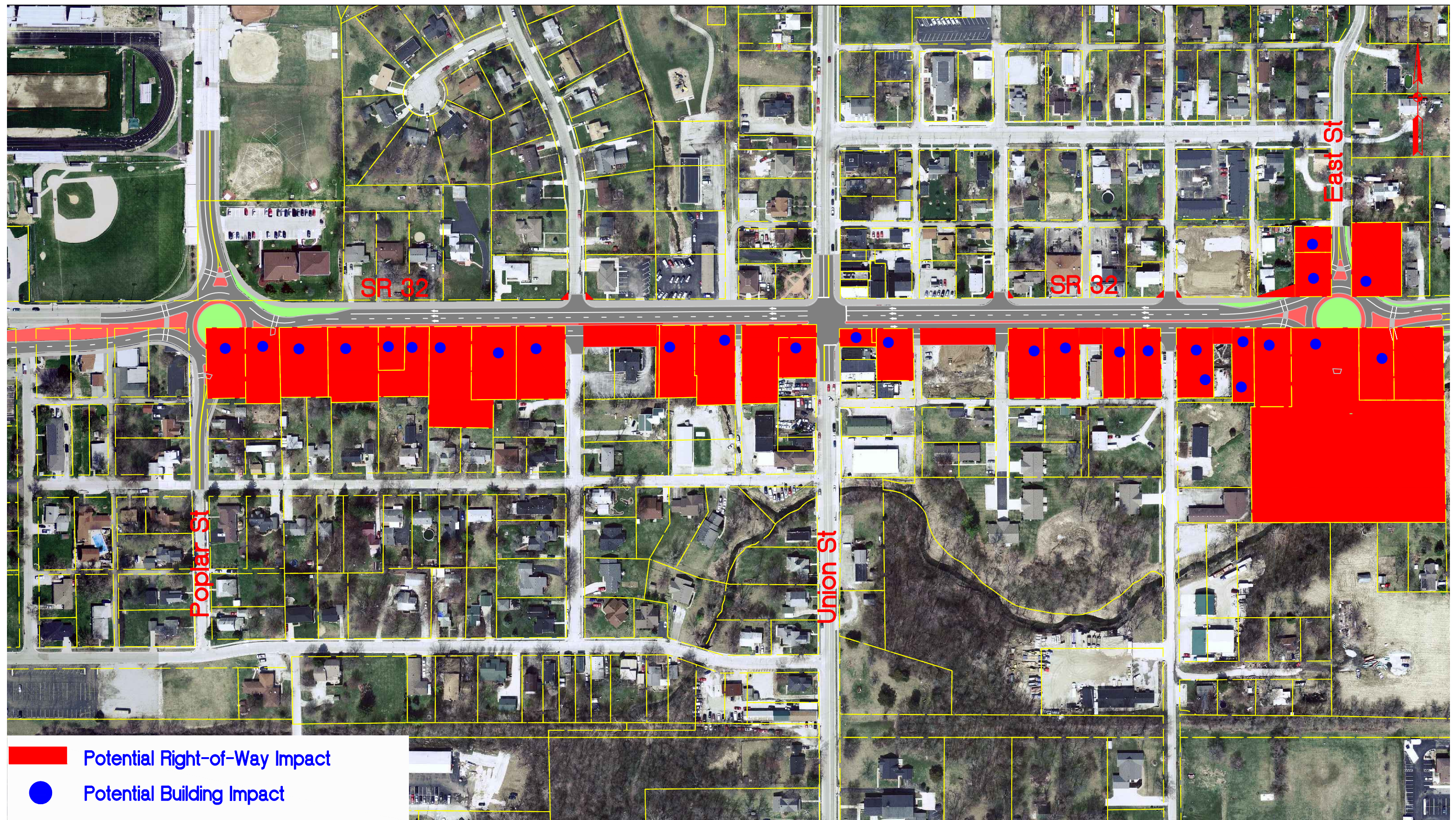
SR 32 Corridor Analysis - Downtown Alternative 2 With Potential Right-of-Way Impact (Scale 1" = 200')



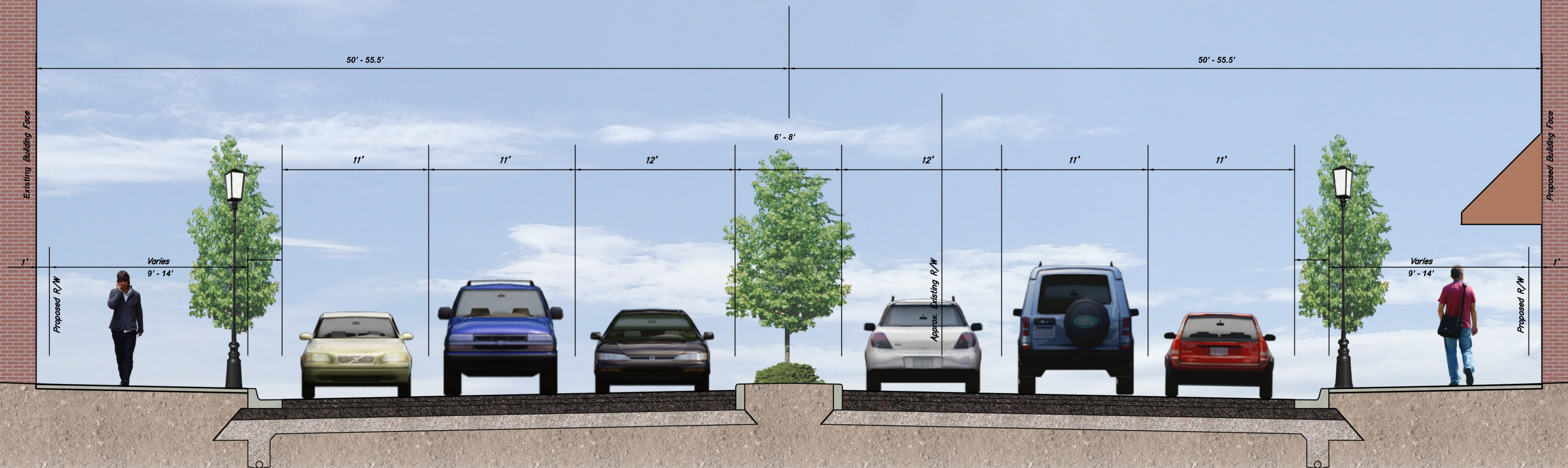
Typical Section: 5-lane Section
Downtown Alternative 2



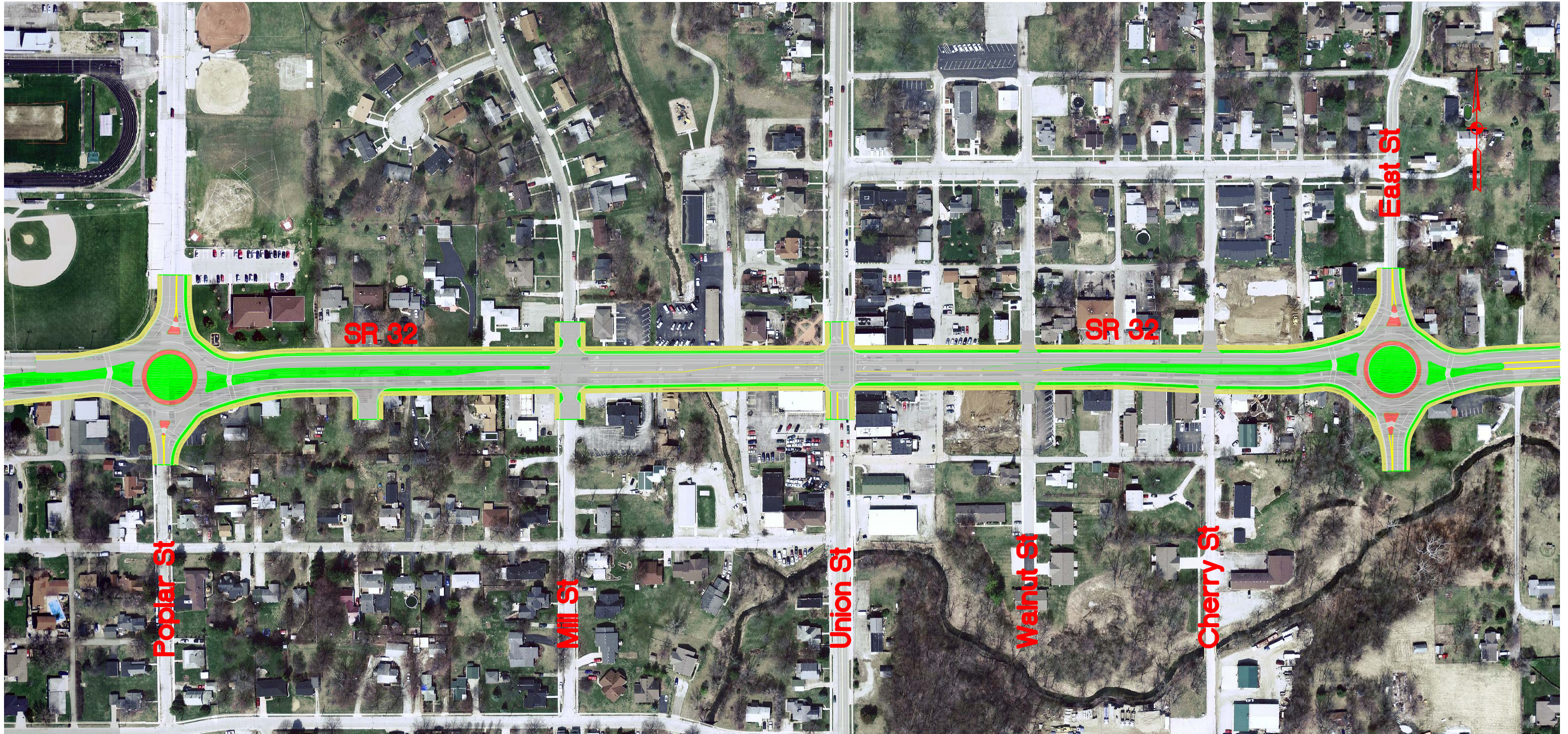
SR 32 Corridor Analysis – Downtown Alternative 3 (Scale 1" = 200')



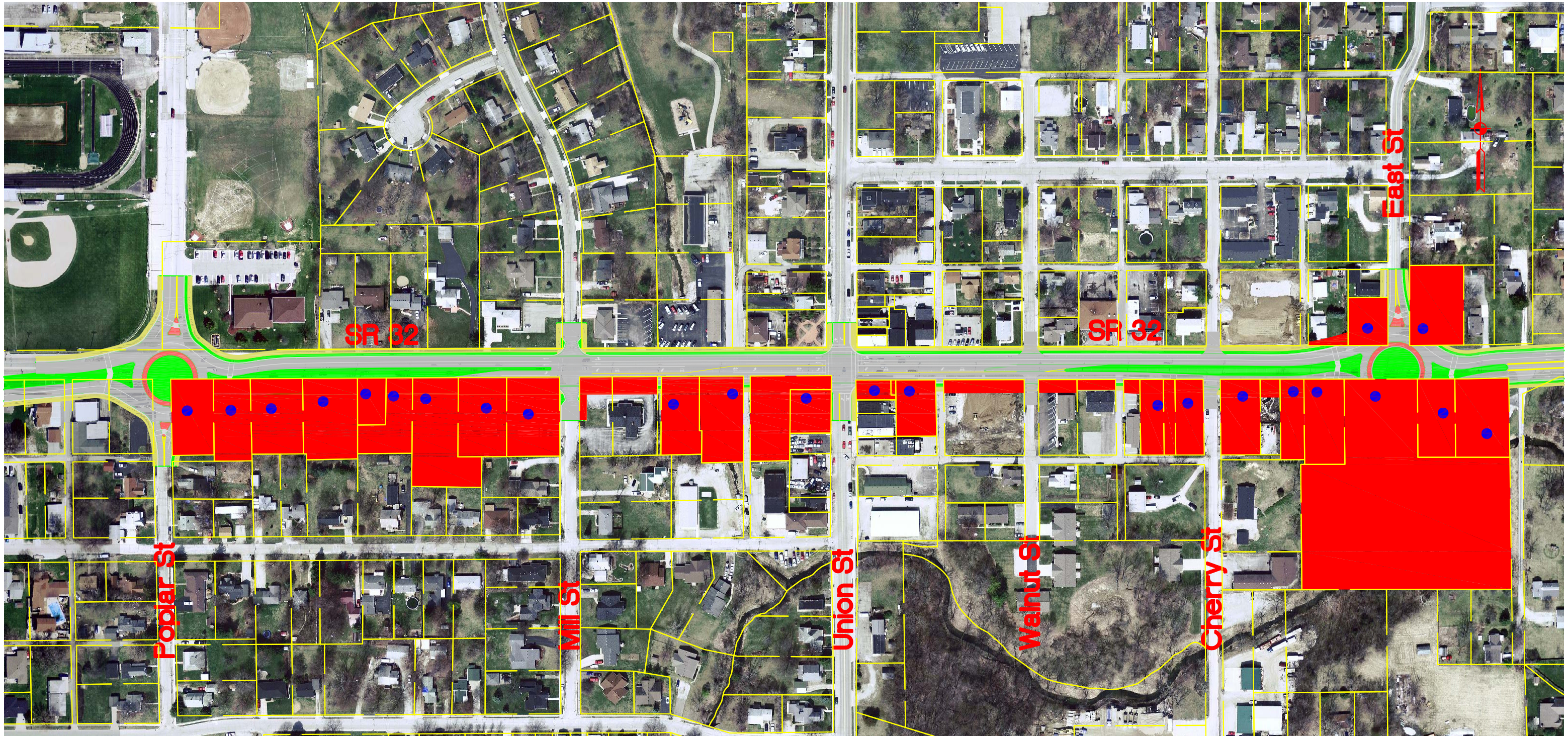
SR 32 Corridor Analysis – Downtown Alternative 3 With Potential Right-of-Way Impact (Scale 1" = 200')



*Typical Section: 6-lane Section
Downtown Alternative 3*

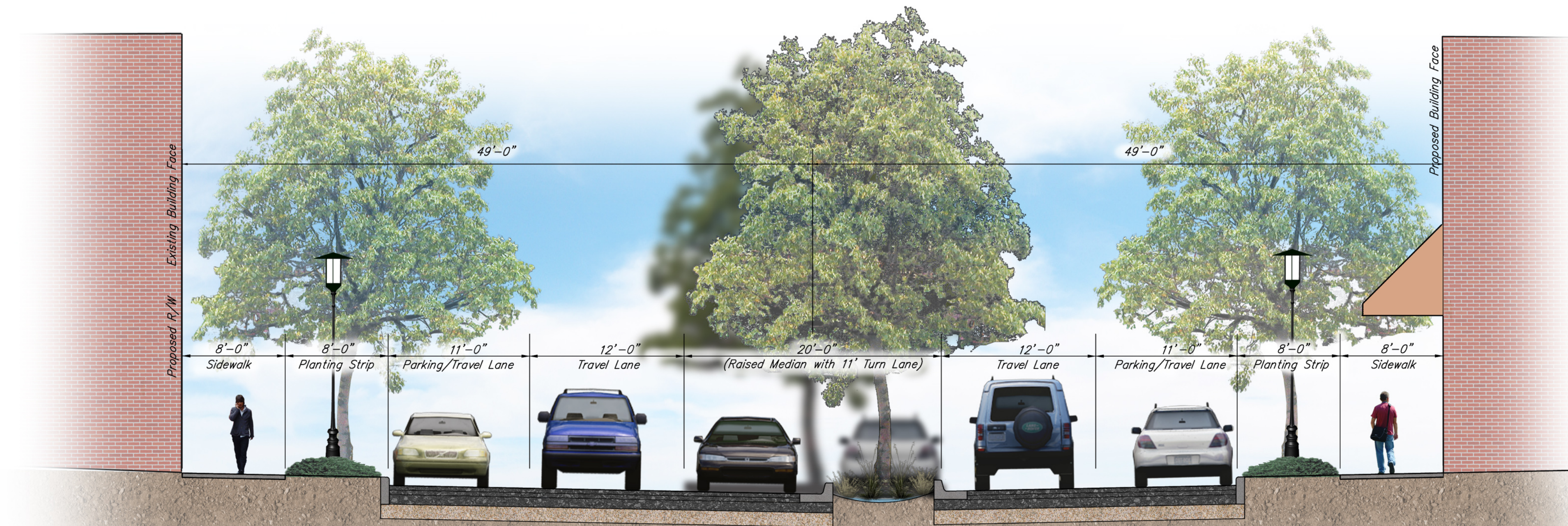


SR 32 Corridor Analysis - Downtown Preferred Alternative (Scale 1" = 200')

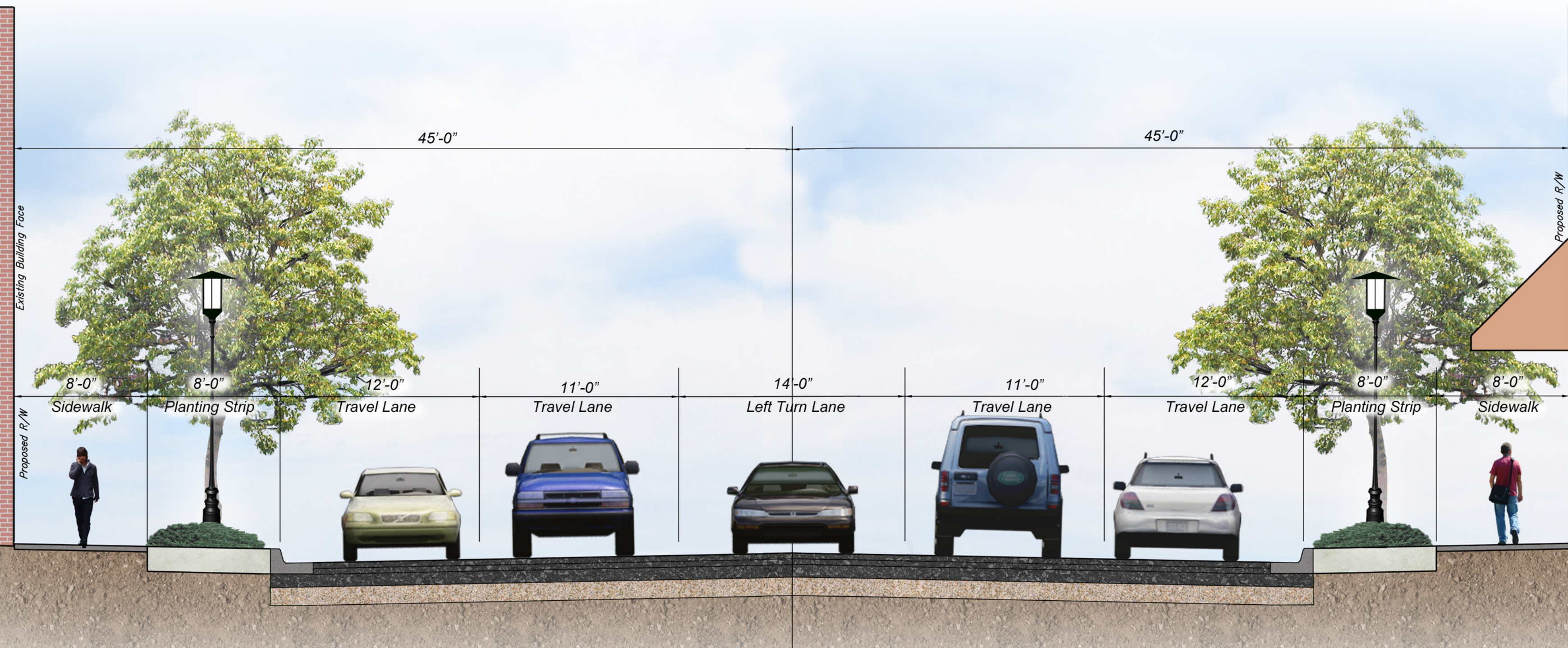


-  Potential Right-of-Way Impact
-  Potential Building Impact

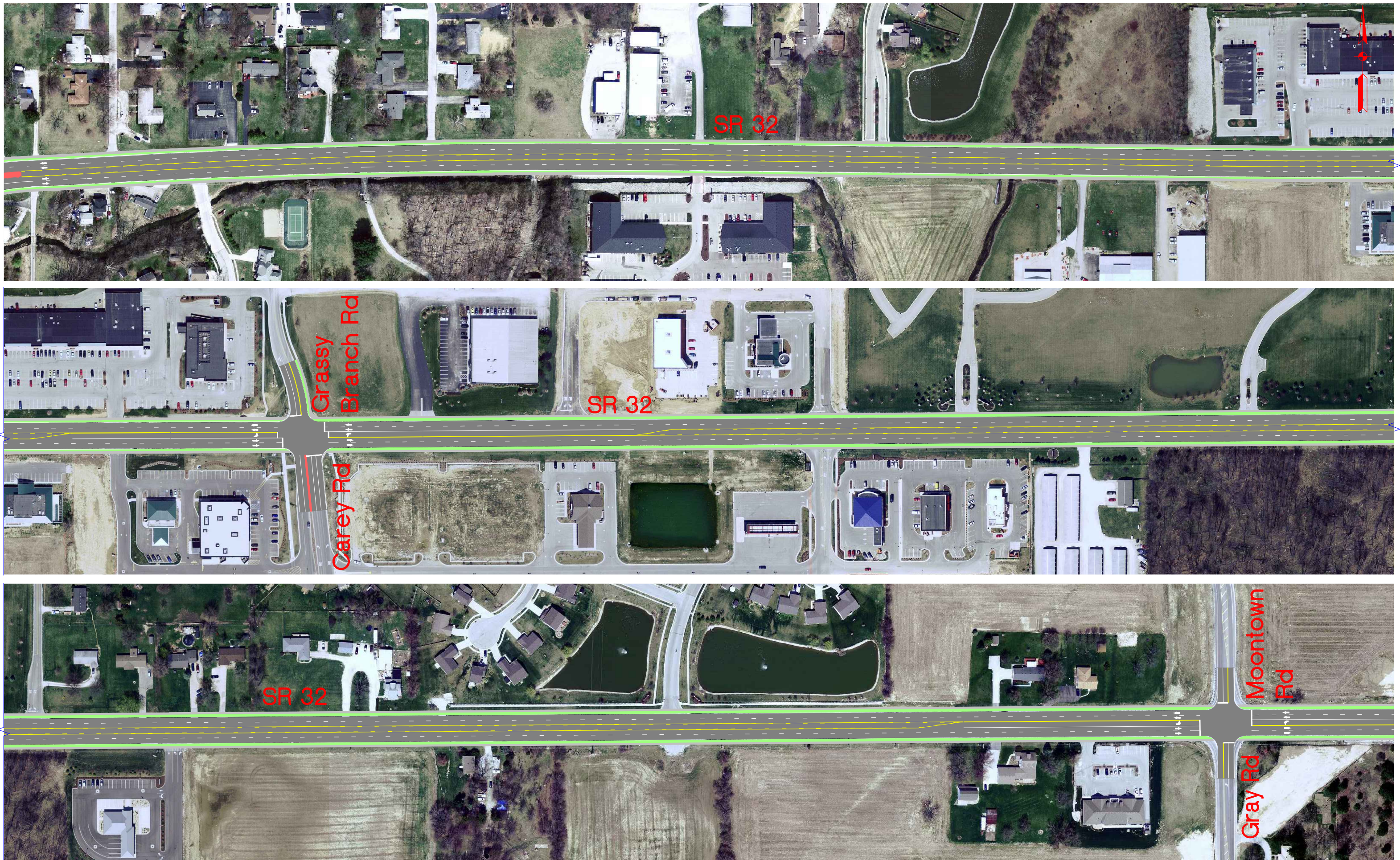
SR 32 Corridor Analysis - Preferred Alternative Right-of-Way Impact (Scale 1" = 200')



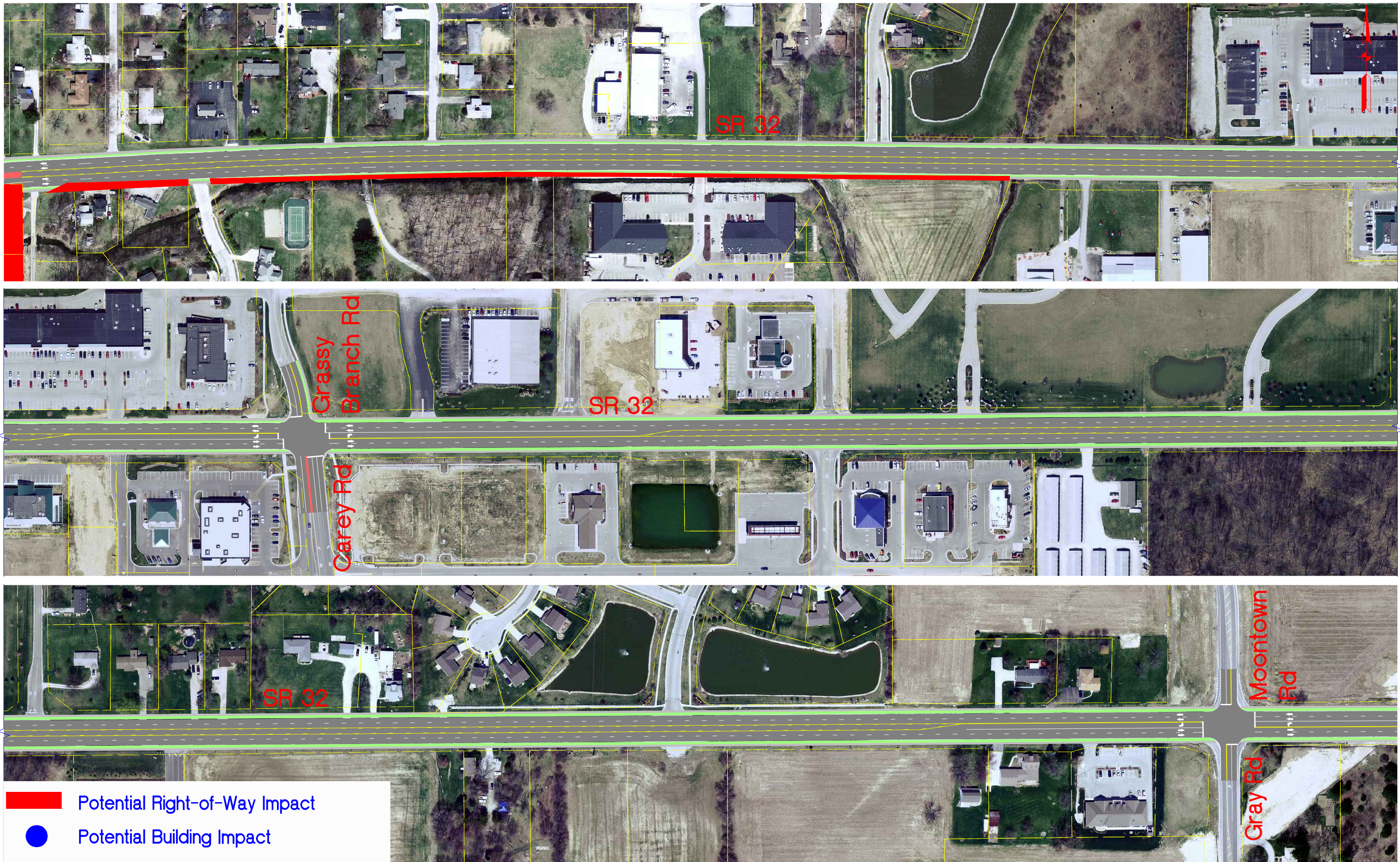
*Typical Section: 5-Lane Section with Raised Median
Downtown Preferred Alternative*



*Typical Section: 5-Lane Section without Raised Median
Downtown Preferred Alternative*



SR 32 Corridor Analysis - East Segment (Scale 1" = 200')



SR 32 Corridor Analysis – East Segment with Potential Right-of-Way Impact (Scale 1" = 200')