

SUMMARY OF ANALYSIS CRANE ROAD AND ROUTE 6

Existing Conditions:

The existing intersection has four approaches, with southbound Crane Rd and northbound Frances Kiernan Place being stop sign controlled and eastbound and westbound Route 6 being uncontrolled. There are no pedestrian accommodations at the intersection. Sight distance is extremely limited for the Crane St approach at about 320'-360'. With the speed limit on Route 6 being 45 mph, a stopping sight distance of 360' and an intersection sight distance of 500' is recommended by AASHTO publications. The sight distance from Frances Kiernan Place is approximately 650' and should not pose an issue. Operationally, Crane St performs at a LOS E in the AM peak hour and LOS F in the PM peak hour, but in neither case is the volume over capacity. The v/c ratios are 0.76 and 0.82 respectively for those periods. For Frances Kiernan Place, the approach operates at LOS D in the AM peak and LOS E in the PM peak, which are marginally acceptable.

Signal Warrant Analysis:

A review of the hourly traffic volumes between 7:00 AM and 8:00 PM show that Warrant 1 (8-hour warrant) is satisfied with 11 of the 13 hours reviewed meeting criteria, and Warrant 2 (4-hour warrant) is satisfied with 8 hours meeting criteria. Warrant 3 (peak hour warrant) criteria is met in 4 separate hours, but none of the hours meet the delay requirements necessary to satisfy the warrant. Warrant 7 (crash experience) is not satisfied, as there were not 5 accidents per year susceptible to correction by signalization (left or right turn, or right angle accidents). The satisfaction of Warrants 1 & 2 combined with the existing failing operations and limited sight distance on the side street justifies the installation of a traffic signal, or similar treatment such as a roundabout.

Accident Analysis:

Accident data noted 6 accidents at this location in the 3-year period reviewed, with only 2 of those accident being susceptible to correction by traffic signal. The accident rate calculated for this intersection is 0.25 accidents per million entering vehicles (acc/MEV), which is below the state-wide average for similar intersections of 0.35 acc/MEV. As such, even with sight distance concerns, there appears to be no significant safety issues at this location. A summary of the accident types and severity are shown in the table below:

ACCIDENT SUMMARY

Accident Type	Number of Occurrences	Accident Severity	Number of Occurrences
Right Angle	1	Fatality	0
Left Turn	1	Personal Injury	1
Rear End	2	Property Damage Only	4
Backing	1	Non-Reportable	0
	5		5

Field Condition and Right of Way Review:

There appears to be sufficient room within the existing right of way to accommodate a single lane roundabout at this location. Construction would require the removal of a wooden street light pole and relocation of a historic marker. The main issue of concern at this location is that the intersection sits atop an unnamed stream which flows directly into the West Branch Reservoir, part of New York City's water supply system. Wetland areas are located at the northwest and southeast corners of the intersection and the NYC DEP owns the parcels to the northwest and southwest. As the stream and wetlands flow directly under the intersection, environmental issues are of concern.

Design Alternative Consideration:

Two design alternatives were considered to improve traffic operations at this intersection; the installation of a traffic signal and the construction of a roundabout. For the traffic signal, a LOS A with overall intersection delay of 9.0s or less could be achieved for both the AM and PM peak hours. Roundabout operations would yield the same LOS with similar delays. A concept sketch showing the roundabout alternative is included later under this tab.

Conceptual Cost Estimate:

Based on our past experience with similar projects, knowledge of construction pricing in this region of New York State and our understanding of the issues, it is estimated that a traffic signal would cost approximately \$250,000 and a roundabout, would cost approximately \$1,595,000. These costs include construction of all improvements, and costs for design and inspection. A breakdown of the big picture cost items is included later under this tab.

Summary & Conclusion:

The analyses show that there is an operational need for improved traffic control. Either a traffic signal or roundabout is warranted and both would provide similar and acceptable levels of service. While a roundabout is feasible and would provide a traffic calming effect, which will better address some of the sight distance concerns, the potential effect to the surrounding wetland areas and to New York City's water supply system, in combination with the substantially cheaper cost of a traffic signal installation, it is recommended that a traffic signal be installed at this location.

The intersection evaluation worksheet summarizing the lane geometry and traffic operations, traffic volume data sheets, traffic signal warrant analysis sheets, accident summary sheets, capacity analysis worksheets, cost estimate breakdown and roundabout concept sketch for this intersection can be found on the following pages under this tab.

INTERSECTION EVALUATION WORKSHEET

Project:	Putnam County Roundabout Evaluation
Location:	Putnam County (Various Locations)
Intersection:	Route 6 & Crane Rd
GPS Coord.:	41°23'54.94"N, 73°42'54.14"W
Traffic Control:	Stop Sign (NW & SE)
Traffic Control Notes (if applicable):	TWSC. No Pedestrian Crossings.
Other Intersection Notes (if applicable):	NW Sight Distance - 360' to east/320' to west, limited by vegetation. SE Sight Distance - 650' both ways.



APPROACH DATA

	Francis Kiernan Pl			Crane Rd			Route 6			Route 6		
	Northbound (NW)			Southbound (SE)			Eastbound (NE)			Westbound (SW)		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
Lane Assignments:		<-1->		1	1->		1	1->		1	1->	
Lane Widths:		12'		11'	12'		11'	12'		11'	12'	
Turn Bay Lengths:		-		90'	-		100'	-		100'	-	
Speed Limits:	30 mph			30 mph			45 mph			45 mph		

TRAFFIC COUNT DATA

(traffic volumes below represent counted traffic adjusted by 1.05 to account for seasonal variation and annual growth)

AM Peak Hour	Time Period: 7:15 to 8:15						Date Counted: 5/1/2018					
Volume:	1	0	1	98	0	159	69	318	0	0	554	30
Truck %:	1%	1%	1%	3%	1%	2%	13%	7%	1%	1%	8%	14%
Peds (Bikes):	0 (0)			0 (0)			0 (0)			0 (0)		
PHF = 0.86												
PM Peak Hour	Time Period: 5:15 to 6:15						Date Counted: 5/1/2018					
Volume:	5	1	4	69	0	120	217	517	4	5	461	92
Truck %:	1%	1%	1%	2%	1%	5%	1%	1%	1%	1%	1%	1%
Peds (Bikes):	0 (0)			0 (0)			0 (0)			0 (0)		
PHF = 0.95												

EXISTING CONDITION LEVEL OF SERVICE

AM Peak Delay (s):	30.8	79.2	17.9	9.6			0.0		
LOS:	D	F	C	A			A		
v/c:	0.02	0.76	0.40	0.09			0.00		
95% Queue:	< 25'	115'	50'	< 25'			0		
A (9.2) Overall	D (30.8)		E (41.3)		A (1.7)		A (0.0)		
PM Peak Delay (s):	44.7	137.7	13.2	9.5			8.4		
LOS:	E	F	B	A			A		
v/c:	0.10	0.82	0.22	0.21			0.01		
95% Queue:	< 25'	105'	< 25'	< 25'			< 25'		
A (9.2) Overall	E (44.7)		F (58.9)		A (2.8)		A (0.1)		

Note: LOS calculated using HCM 6 methodologies. For unsignalized intersections, only side street approach delay and mainline left turn delay is shown. The HCM 6 methodology assumes zero delay for all other movements.

INTERSECTION EVALUATION WORKSHEET												
	Francis Kiernan Pl			Crane Rd			Route 6			Route 6		
	Northbound (NW)			Southbound (SE)			Eastbound (NE)			Westbound (SW)		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
BUILD ALTERNATIVE #1 - LEVEL OF SERVICE												
Description of Improvements: Actuated Traffic Signal with No Geometric Improvements												
AM Peak Delay (s):	11.7		12.6		14.6		12.9		5.6		0.0	8.0
LOS:	B		B		B		B		A		A	A
v/c:	0.01		0.22		0.56		0.23		0.39		0.00	0.74
95% Queue:	< 25'		70'		< 25'		35'		100'		< 25'	225'
A (8.9) Overall	B (11.7)			B (13.8)			A (6.9)			A (8.0)		
PM Peak Delay (s):	13.1		13.7		15.0		10.9		5.5		7.2	5.8
LOS:	B		B		B		B		A		A	A
v/c:	0.03		0.15		0.41		0.43		0.49		0.01	0.54
95% Queue:	< 25'		50'		< 25'		80'		130'		< 25'	140'
A (7.6) Overall	B (13.1)			B (14.5)			A (7.1)			A (5.8)		
BUILD ALTERNATIVE #2 - LEVEL OF SERVICE												
Description of Improvements: Single Lane Roundabout (120 ft. Diameter)												
AM Peak Delay (s):	4.9		12.1				7.2				10.3	
LOS:	A		B				A				B	
v/c:	0.00		0.45				0.40				0.59	
95% Queue:	< 25'		50'				50'				100'	
A (9.7) Overall	A (4.9)		B (12.1)			A (7.2)			B (10.3)			
PM Peak Delay (s):	6.2		6.9				9.7				9.4	
LOS:	A		A				A				A	
v/c:	0.02		0.23				0.58				0.52	
95% Queue:	< 25'		25'				100'				75'	
A (9.2) Overall	A (6.2)		A (6.9)			A (9.7)			A (9.4)			
BUILD ALTERNATIVE #3 - LEVEL OF SERVICE												
Description of Improvements:												
AM Peak Delay (s):												
LOS:												
v/c:												
95% Queue:												
Overall												
PM Peak Delay (s):												
LOS:												
v/c:												
95% Queue:												
Overall												

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Groups Printed- Cars - Trucks

Start Time	Crane Rd From North					Route 6 From East					Frances Kieman Pl From South					Route 6 From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
07:00 AM	30	0	25	0	55	6	104	0	0	110	0	0	0	0	0	0	54	5	0	59	224
07:15 AM	29	0	19	0	48	4	130	0	0	134	0	0	0	0	0	0	52	13	0	65	247
07:30 AM	40	0	24	0	64	5	130	0	0	135	0	0	0	0	0	0	94	10	0	104	303
07:45 AM	34	0	29	0	63	13	146	0	0	159	1	0	1	0	2	0	85	31	0	116	340
Total	133	0	97	0	230	28	510	0	0	538	1	0	1	0	2	0	285	59	0	344	1114
08:00 AM	48	0	21	0	69	7	122	0	0	129	0	0	0	0	0	0	72	12	0	84	282
08:15 AM	31	0	19	0	50	9	100	0	0	109	1	0	0	0	1	0	72	11	0	83	243
08:30 AM	32	0	16	0	48	11	110	0	0	121	0	0	0	0	0	0	92	13	0	105	274
08:45 AM	42	0	33	0	75	13	108	0	0	121	0	0	0	0	0	0	96	12	0	108	304
Total	153	0	89	0	242	40	440	0	0	480	1	0	0	0	1	0	332	48	0	380	1103
09:00 AM	30	0	22	0	52	16	105	0	0	121	0	0	0	0	0	0	85	8	0	93	266
09:15 AM	16	0	11	0	27	12	101	0	0	113	0	0	0	0	0	0	83	15	0	98	238
09:30 AM	30	0	13	0	43	3	94	0	0	97	0	0	0	0	0	0	95	12	0	107	247
09:45 AM	29	0	14	0	43	6	92	0	0	98	0	0	2	0	2	1	98	29	0	128	271
Total	105	0	60	0	165	37	392	0	0	429	0	0	2	0	2	1	361	64	0	426	1022
10:00 AM	21	0	15	0	36	7	86	0	0	93	0	0	2	0	2	1	89	15	0	105	236
10:15 AM	19	0	14	0	33	12	85	0	0	97	0	0	0	0	0	0	114	22	0	136	266
10:30 AM	15	0	20	0	35	16	81	0	0	97	0	0	0	0	0	0	93	13	0	106	238
10:45 AM	20	0	10	0	30	18	110	2	0	130	0	0	0	0	0	0	74	16	0	90	250
Total	75	0	59	0	134	53	362	2	0	417	0	0	2	0	2	1	370	66	0	437	990
11:00 AM	13	0	12	0	25	5	77	0	0	82	0	0	0	0	0	0	85	26	0	111	218
11:15 AM	16	0	16	0	32	12	89	0	0	101	0	0	2	0	2	1	112	15	0	128	263
11:30 AM	25	0	12	0	37	4	99	0	0	103	0	1	0	0	1	1	113	20	0	134	275
11:45 AM	17	0	7	0	24	5	100	0	0	105	1	0	0	0	1	0	93	11	0	104	234
Total	71	0	47	0	118	26	365	0	0	391	1	1	2	0	4	2	403	72	0	477	990
12:00 PM	16	0	18	0	34	10	105	0	0	115	1	0	0	0	1	3	76	25	0	104	254
12:15 PM	34	6	13	0	53	11	105	1	0	117	0	0	0	0	0	0	92	22	0	114	284
12:30 PM	17	0	13	0	30	11	101	1	0	113	0	0	0	0	0	0	96	23	0	119	262
12:45 PM	23	0	11	0	34	14	107	2	0	123	0	0	2	0	2	1	93	25	0	119	278
Total	90	6	55	0	151	46	418	4	0	468	1	0	2	0	3	4	357	95	0	456	1078
01:00 PM	15	0	12	0	27	17	94	0	0	111	1	0	0	0	1	0	102	10	0	112	251
01:15 PM	20	0	10	0	30	14	91	0	0	105	0	0	1	0	1	0	97	23	0	120	256
01:30 PM	24	1	19	0	44	10	91	1	0	102	0	0	2	0	2	0	107	24	0	131	279
01:45 PM	24	0	17	0	41	17	102	0	0	119	1	1	0	0	2	0	103	22	0	125	287
Total	83	1	58	0	142	58	378	1	0	437	2	1	3	0	6	0	409	79	0	488	1073
02:00 PM	19	0	7	0	26	14	95	0	0	109	0	0	1	0	1	0	109	15	0	124	260
02:15 PM	33	0	12	0	45	12	92	1	0	105	0	0	1	0	1	0	123	16	0	139	290
02:30 PM	16	0	19	0	35	15	77	1	0	93	1	0	0	0	1	0	100	25	0	125	254
02:45 PM	20	0	18	0	38	16	108	3	0	127	0	0	2	0	2	0	114	28	0	142	309
Total	88	0	56	0	144	57	372	5	0	434	1	0	4	0	5	0	446	84	0	530	1113
03:00 PM	16	0	12	0	28	18	102	1	0	121	0	0	1	0	1	1	132	22	0	155	305
03:15 PM	18	0	21	0	39	26	86	0	0	112	0	0	0	0	0	1	116	30	0	147	298
03:30 PM	37	2	26	0	65	23	91	0	0	114	1	0	3	0	4	3	132	37	0	172	355

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	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
03:45 PM	25	1	18	0	44	17	119	0	0	136	2	1	3	0	6	0	129	41	0	170	356
Total	96	3	77	0	176	84	398	1	0	483	3	1	7	0	11	5	509	130	0	644	1314
04:00 PM	21	1	7	0	29	16	91	2	0	109	0	1	0	0	1	1	135	44	0	180	319
04:15 PM	27	0	19	0	46	24	105	2	0	131	1	0	2	0	3	0	134	32	0	166	346
04:30 PM	37	0	21	0	58	25	108	3	0	136	0	0	1	0	1	1	113	31	0	145	340
04:45 PM	38	0	17	0	55	19	116	0	0	135	0	0	1	0	1	1	130	46	0	177	368
Total	123	1	64	0	188	84	420	7	0	511	1	1	4	0	6	3	512	153	0	668	1373
05:00 PM	26	0	13	0	39	21	99	0	0	120	0	1	0	0	1	2	135	42	0	179	339
05:15 PM	27	0	15	0	42	25	120	1	0	146	2	1	0	0	3	1	119	56	0	176	367
05:30 PM	28	0	14	0	42	20	100	2	0	122	1	0	2	0	3	2	115	50	0	167	334
05:45 PM	25	0	18	0	43	25	114	0	0	139	1	0	3	0	4	1	131	58	0	190	376
Total	106	0	60	0	166	91	433	3	0	527	4	2	5	0	11	6	500	206	0	712	1416
06:00 PM	34	0	19	0	53	18	105	2	0	125	0	0	0	0	0	0	127	43	0	170	348
06:15 PM	33	0	22	0	55	24	86	0	0	110	2	0	2	0	4	1	115	54	0	170	339
06:30 PM	33	0	19	0	52	17	96	0	0	113	0	0	0	0	0	0	97	32	0	129	294
06:45 PM	34	0	25	0	59	21	77	0	0	98	1	0	2	0	3	1	119	45	0	165	325
Total	134	0	85	0	219	80	364	2	0	446	3	0	4	0	7	2	458	174	0	634	1306
07:00 PM	29	0	14	0	43	16	98	0	0	114	0	0	0	0	0	3	96	26	0	125	282
07:15 PM	28	0	9	0	37	11	68	0	0	79	1	0	0	0	1	1	89	36	0	126	243
07:30 PM	25	0	16	0	41	18	64	1	0	83	1	0	2	0	3	3	85	33	0	121	248
07:45 PM	23	0	8	0	31	11	57	1	0	69	1	0	0	0	1	2	79	35	0	116	217
Total	105	0	47	0	152	56	287	2	0	345	3	0	2	0	5	9	349	130	0	488	990
Grand Total	1362	11	854	0	2227	740	5139	27	0	5906	21	6	38	0	65	33	5291	1360	0	6684	14882
Apprch %	61.2	0.5	38.3	0		12.5	87	0.5	0		32.3	9.2	58.5	0		0.5	79.2	20.3	0		
Total %	9.2	0.1	5.7	0	15	5	34.5	0.2	0	39.7	0.1	0	0.3	0	0.4	0.2	35.6	9.1	0	44.9	
Cars	1313					4854										4966	1333				14116
% Cars	96.4	100	95.4	0	96	95.3	94.5	92.6	0	94.5	90.5	100	97.4	0	95.4	97	93.9	98	0	94.7	94.9
Trucks	49	0	39	0	88	35	285	2	0	322	2	0	1	0	3	1	325	27	0	353	766
% Trucks	3.6	0	4.6	0	4	4.7	5.5	7.4	0	5.5	9.5	0	2.6	0	4.6	3	6.1	2	0	5.3	5.1

Start Time	Crane Rd From North					Route 6 From East					Frances Kiernan Pl From South					Route 6 From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:15 AM																					
07:15 AM	29	0	19	0	48	4	130	0	0	134	0	0	0	0	0	0	52	13	0	65	247
07:30 AM	40	0	24	0	64	5	130	0	0	135	0	0	0	0	0	0	94	10	0	104	303
07:45 AM	34	0	29	0	63	13	146	0	0	159	1	0	1	0	2	0	85	31	0	116	340
08:00 AM	48	0	21	0	69	7	122	0	0	129	0	0	0	0	0	0	72	12	0	84	282
Total Volume	151	0	93	0	244	29	528	0	0	557	1	0	1	0	2	0	303	66	0	369	1172
% App. Total	61.9	0	38.1	0		5.2	94.8	0	0		50	0	50	0		0	82.1	17.9	0		
PHF	.786	.000	.802	.000	.884	.558	.904	.000	.000	.876	.250	.000	.250	.000	.250	.000	.806	.532	.000	.795	.862

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Start Time	Crane Rd From North					Route 6 From East					Frances Kiernan Pl From South					Route 6 From West					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 12:00 PM to 07:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 05:15 PM																					
05:15 PM	27	0	15	0	42	25	120	1	0	146	2	1	0	0	3	1	119	56	0	176	367
05:30 PM	28	0	14	0	42	20	100	2	0	122	1	0	2	0	3	2	115	50	0	167	334
05:45 PM	25	0	18	0	43	25	114	0	0	139	1	0	3	0	4	1	131	58	0	190	376
06:00 PM	34	0	19	0	53	18	105	2	0	125	0	0	0	0	0	0	127	43	0	170	348
Total Volume	114	0	66	0	180	88	439	5	0	532	4	1	5	0	10	4	492	207	0	703	1425
% App. Total	63.3	0	36.7	0		16.5	82.5	0.9	0		40	10	50	0		0.6	70	29.4	0		
PHF	.838	.000	.868	.000	.849	.880	.915	.625	.000	.911	.500	.250	.417	.000	.625	.500	.939	.892	.000	.925	.947

TRAFFIC SIGNAL WARRANT SUMMARY

Project: Putnam County Roundabout Evaluation Condition: 2019 Existing Condition
 Location: Route 6 and Crane Rd Date: April 29, 2019
 Major Street: Route 6 Lanes: 1 Critical Approach Speed: 45 mph
 Minor Street: Crane Rd Lanes: 1

Volume Level Criteria

1. Is the critical speed of major street traffic greater than 40 mph? Yes
 2. Is the intersection in a built-up area of an isolated community with population less than 10,000? No

If either Question 1 or Question 2 is answered "Yes", then use the 70% volume level. Criteria used: 70%

WARRANT 1 - EIGHT HOUR VEHICULAR VOLUME

Warrant 1 Satisfied: YES

Warrant 1 is satisfied if EITHER Condition A OR Condition B is 100% satisfied.

Warrant 1 is also satisfied if BOTH Condition A AND Condition B are satisfied to the 80% volume level.

Minimum Volume Criteria:			Condition 1A - Minimum Vehicular Volume (X indicates that criteria is met for specified condition)				Condition 1B - Interruption of Continuous Traffic (X indicates that criteria is met for specified condition)				Total Satisfied Hours (8 required)		
			350	105	280	84	525	53	420	42	0	11	4
Start Time	Major St. Volume ¹	Minor St. Volume ²	Major St. 100%	Minor St. 100%	Major St. 80%	Minor St. 80%	Major St. 100%	Minor St. 100%	Major St. 80%	Minor St. 80%	Condition 1A Satisfied	Condition 1B Satisfied	80% for Both Satisfied
12:00 AM			-	-	-	-	-	-	-	-	-	-	-
1:00 AM			-	-	-	-	-	-	-	-	-	-	-
2:00 AM			-	-	-	-	-	-	-	-	-	-	-
3:00 AM			-	-	-	-	-	-	-	-	-	-	-
4:00 AM			-	-	-	-	-	-	-	-	-	-	-
5:00 AM			-	-	-	-	-	-	-	-	-	-	-
6:00 AM			-	-	-	-	-	-	-	-	-	-	-
7:00 AM	926	102	X	-	X	X	X	X	X	X	-	1	1
8:00 AM	903	93	X	-	X	X	X	X	X	X	-	1	1
9:00 AM	898	63	X	-	X	-	X	X	X	X	-	1	-
10:00 AM	897	62	X	-	X	-	X	X	X	X	-	1	-
11:00 AM	911	49	X	-	X	-	X	-	X	X	-	-	-
12:00 PM	970	58	X	-	X	-	X	X	X	X	-	1	-
1:00 PM	971	61	X	-	X	-	X	X	X	X	-	1	-
2:00 PM	1012	59	X	-	X	-	X	X	X	X	-	1	-
3:00 PM	1183	84	X	-	X	X	X	X	X	X	-	1	1
4:00 PM	1238	68	X	-	X	-	X	X	X	X	-	1	-
5:00 PM	1301	63	X	-	X	-	X	X	X	X	-	1	-
6:00 PM	1134	89	X	-	X	X	X	X	X	X	-	1	1
7:00 PM	875	49	X	-	X	-	X	-	X	X	-	-	-
8:00 PM			-	-	-	-	-	-	-	-	-	-	-
9:00 PM			-	-	-	-	-	-	-	-	-	-	-
10:00 PM			-	-	-	-	-	-	-	-	-	-	-
11:00 PM			-	-	-	-	-	-	-	-	-	-	-

¹ Major Street Volume is the total combined volume of both mainline approaches.

² Minor Street volumes is the highest single side street approach volume.

Note: Right turn traffic was removed from Crane Rd traffic volume and only one of the two available lanes was considered in the Warrant analysis.

WARRANT 2 - FOUR HOUR VEHICULAR VOLUME

Warrant 2 Satisfied: YES

Warrant is satisfied if four (4) or more hours satisfy the volume requirements depicted on the four hour warranting graph (see page 2).

No. of Points Above Criteria Curve: 8

WARRANT 3 - PEAK HOUR VEHICULAR VOLUME

Warrant 3 Satisfied: NO

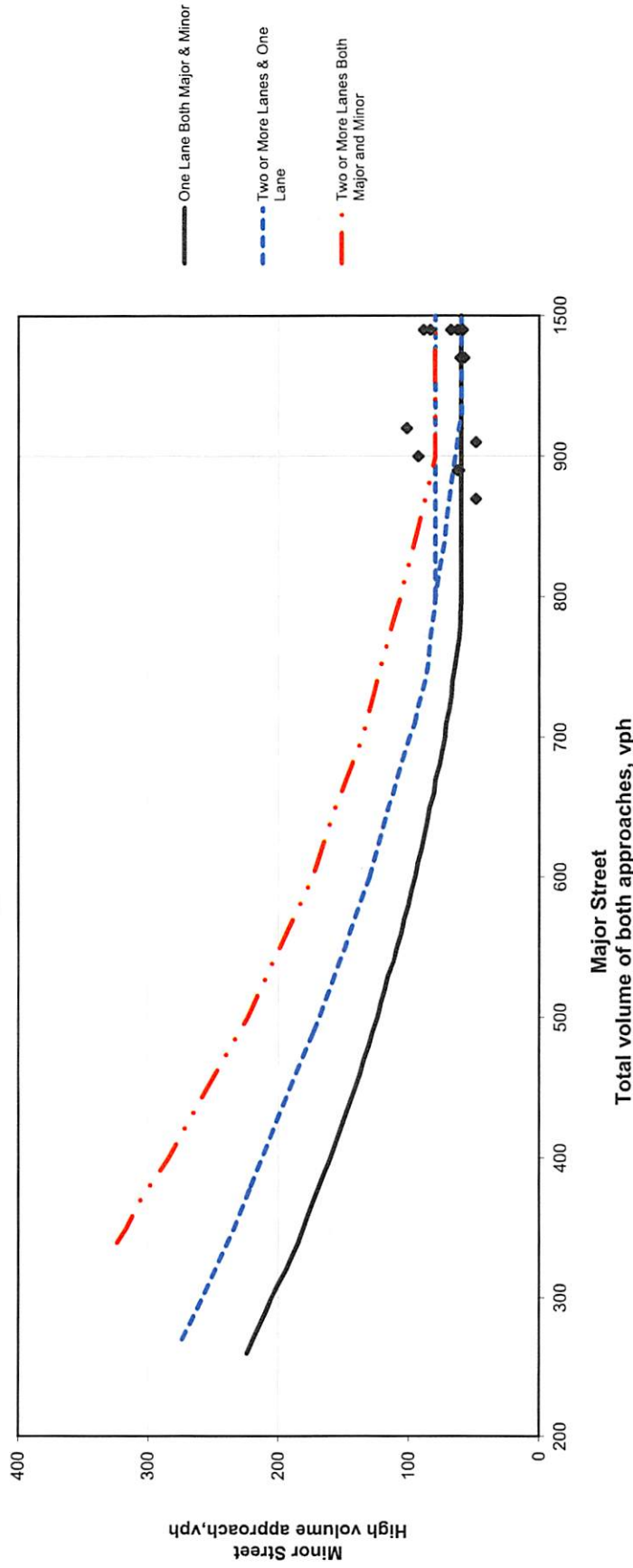
Warrant is satisfied if any hour satisfy the volume requirements depicted on the peak hour warranting graph (see page 3), and ALL three of the following requirement are met.

No. of Points Above Criteria Curve: 4

1. Total stopped time delay on Minor Street equals or exceeds 4 VHD (single lane) or 5 VHD (two lanes): 1.8* VHD Max. No
 2. Volume on Minor Street equals or exceeds 100 vehicles (single lane) or 150 vehicles (two lanes): Yes
 3. Total intersection volume serviced during the hour equals or exceeds 650 veh. (3-leg) or 800 veh. (4-leg or more): Yes

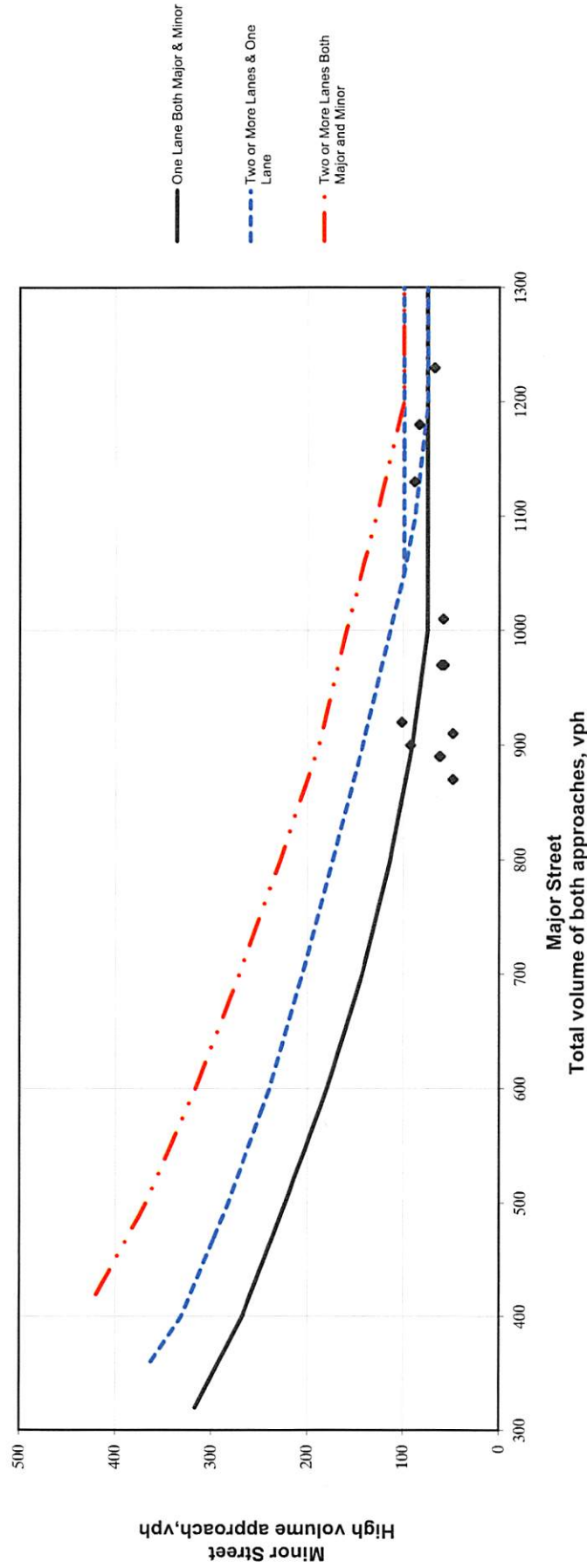
** Delay during the only hour that meets criteria 2 & 3., the AM peak hour.*

Figure 4C-2. Warrant 2, Four-Hour Vehicular Volume (70% Factor)
 (COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 70 km/h (40 mph) ON MAJOR STREET)



Note: Points on graph represent hourly volumes. Points above the respective curve satisfy warrant, points below do not satisfy warrant.

Figure 4C-4. Warrant 3, Peak Hour (70% Factor)
 (COMMUNITY LESS THAN 10,000 POPULATION OR ABOVE 70 km/h (40 mph) ON MAJOR STREET)



Note: Points on graph represent hourly volumes. Points above the respective curve satisfy warrant, points below do not satisfy warrant.

Intersection

Int Delay, s/veh 9.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↕		↖	↗	
Traffic Vol, veh/h	69	318	0	0	554	30	1	0	1	98	0	159
Future Vol, veh/h	69	318	0	0	554	30	1	0	1	98	0	159
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	90	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	86	86	86	86	86	86	86	86	86	86	86	86
Heavy Vehicles, %	13	7	1	1	8	14	1	1	1	3	1	2
Mvmt Flow	80	370	0	0	644	35	1	0	1	114	0	185

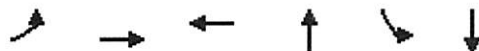
Major/Minor	Major1	Major2	Minor1	Minor2
Conflicting Flow All	679	0	0	370
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Critical Hdwy	4.23	-	-	4.11
Critical Hdwy Stg 1	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-
Follow-up Hdwy	2.317	-	-	2.209
Pot Cap-1 Maneuver	864	-	-	1194
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Platoon blocked, %	-	-	-	-
Mov Cap-1 Maneuver	864	-	-	1194
Mov Cap-2 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1.7	0	30.8	41.3
HCM LOS			D	E

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	142	864	-	-	1194	-	-	151	462
HCM Lane V/C Ratio	0.016	0.093	-	-	-	-	-	0.755	0.4
HCM Control Delay (s)	30.8	9.6	-	-	0	-	-	79.2	17.9
HCM Lane LOS	D	A	-	-	A	-	-	F	C
HCM 95th %tile Q(veh)	0.1	0.3	-	-	0	-	-	4.6	1.9

Queues
6: Francis Kiernan Pl/Crane Rd & Route 6

AM Peak Hour
Build Alt. 1 - Traffic Signal

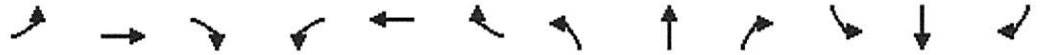


Lane Group	EBL	EBT	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	80	370	679	2	114	185
v/c Ratio	0.25	0.33	0.62	0.01	0.36	0.33
Control Delay	8.4	6.7	10.3	0.0	19.7	2.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.4	6.7	10.3	0.0	19.7	2.7
Queue Length 50th (ft)	8	42	97	0	21	0
Queue Length 95th (ft)	33	100	227	0	69	14
Internal Link Dist (ft)		544	507	309		382
Turn Bay Length (ft)	100				90	
Base Capacity (vph)	428	1491	1462	550	487	737
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.25	0.46	0.00	0.23	0.25

Intersection Summary

HCM 6th Signalized Intersection Summary
6: Francis Kiernan Pl/Crane Rd & Route 6

AM Peak Hour
Build Alt. 1 - Traffic Signal



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↵	➡		↵	➡			↕		↵	➡	
Traffic Volume (veh/h)	69	318	0	0	554	30	1	0	1	98	0	159
Future Volume (veh/h)	69	318	0	0	554	30	1	0	1	98	0	159
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1707	1796	1796	1885	1781	1781	1885	1885	1885	1856	1885	1885
Adj Flow Rate, veh/h	80	370	0	0	644	35	1	0	1	114	0	185
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Percent Heavy Veh, %	13	7	7	1	8	8	1	1	1	3	1	1
Cap, veh/h	350	937	0	195	873	47	217	44	115	524	0	331
Arrive On Green	0.52	0.52	0.00	0.00	0.52	0.52	0.21	0.00	0.21	0.21	0.00	0.21
Sat Flow, veh/h	695	1796	0	1020	1674	91	343	211	553	1405	0	1598
Grp Volume(v), veh/h	80	370	0	0	0	679	2	0	0	114	0	185
Grp Sat Flow(s),veh/h/ln	695	1796	0	1020	0	1765	1107	0	0	1405	0	1598
Q Serve(g_s), s	3.7	4.6	0.0	0.0	0.0	11.0	0.0	0.0	0.0	0.0	0.0	3.8
Cycle Q Clear(g_c), s	14.8	4.6	0.0	0.0	0.0	11.0	3.8	0.0	0.0	2.0	0.0	3.8
Prop In Lane	1.00		0.00	1.00		0.05	0.50		0.50	1.00		1.00
Lane Grp Cap(c), veh/h	350	937	0	195	0	921	376	0	0	524	0	331
V/C Ratio(X)	0.23	0.39	0.00	0.00	0.00	0.74	0.01	0.00	0.00	0.22	0.00	0.56
Avail Cap(c_a), veh/h	647	1705	0	631	0	1675	650	0	0	804	0	650
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	0.00	0.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	12.6	5.3	0.0	0.0	0.0	6.9	11.7	0.0	0.0	12.4	0.0	13.1
Incr Delay (d2), s/veh	0.3	0.3	0.0	0.0	0.0	1.2	0.0	0.0	0.0	0.2	0.0	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	0.7	0.0	0.0	0.0	1.8	0.0	0.0	0.0	0.7	0.0	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.9	5.6	0.0	0.0	0.0	8.0	11.7	0.0	0.0	12.6	0.0	14.6
LnGrp LOS	B	A	A	A	A	A	B	A	A	B	A	B
Approach Vol, veh/h		450			679			2				299
Approach Delay, s/veh		6.9			8.0			11.7				13.8
Approach LOS		A			A			B				B
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		24.2		12.6		24.2		12.6				
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s		35.0		15.0		35.0		15.0				
Max Q Clear Time (g_c+I1), s		16.8		5.8		13.0		5.8				
Green Ext Time (p_c), s		2.5		1.0		4.3		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				8.9								
HCM 6th LOS				A								

Intersection				
Intersection Delay, s/veh	9.7			
Intersection LOS	A			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	450	679	2	299
Demand Flow Rate, veh/h	486	736	2	306
Vehicles Circulating, veh/h	117	91	603	697
Vehicles Exiting, veh/h	886	514	0	130
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	7.2	10.3	4.9	12.1
Approach LOS	A	B	A	B
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	486	736	2	306
Cap Entry Lane, veh/h	1225	1258	746	678
Entry HV Adj Factor	0.926	0.923	1.000	0.977
Flow Entry, veh/h	450	679	2	299
Cap Entry, veh/h	1134	1161	746	662
V/C Ratio	0.397	0.585	0.003	0.451
Control Delay, s/veh	7.2	10.3	4.9	12.1
LOS	A	B	A	B
95th %tile Queue, veh	2	4	0	2

Intersection												
Int Delay, s/veh	9.2											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗			↕		↖	↗	
Traffic Vol, veh/h	207	492	4	5	439	88	5	1	4	66	0	114
Future Vol, veh/h	207	492	4	5	439	88	5	1	4	66	0	114
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	100	-	-	100	-	-	-	-	-	90	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	95	95	95	95	95	95	95	95	95	95	95	95
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	2	1	5
Mvmt Flow	218	518	4	5	462	93	5	1	4	69	0	120

Major/Minor	Major1		Major2		Minor1			Minor2				
Conflicting Flow All	555	0	0	522	0	0	1535	1521	520	1478	1477	509
Stage 1	-	-	-	-	-	-	956	956	-	519	519	-
Stage 2	-	-	-	-	-	-	579	565	-	959	958	-
Critical Hdwy	4.11	-	-	4.11	-	-	7.11	6.51	6.21	7.12	6.51	6.25
Critical Hdwy Stg 1	-	-	-	-	-	-	6.11	5.51	-	6.12	5.51	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.11	5.51	-	6.12	5.51	-
Follow-up Hdwy	2.209	-	-	2.209	-	-	3.509	4.009	3.309	3.518	4.009	3.345
Pot Cap-1 Maneuver	1020	-	-	1050	-	-	95	119	558	104	127	558
Stage 1	-	-	-	-	-	-	311	338	-	540	534	-
Stage 2	-	-	-	-	-	-	503	510	-	309	337	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1020	-	-	1050	-	-	62	93	558	85	99	558
Mov Cap-2 Maneuver	-	-	-	-	-	-	62	93	-	85	99	-
Stage 1	-	-	-	-	-	-	244	266	-	424	531	-
Stage 2	-	-	-	-	-	-	393	507	-	240	265	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	2.8	0.1	44.7	58.9
HCM LOS			E	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1	SBLn2
Capacity (veh/h)	101	1020	-	-	1050	-	-	85	558
HCM Lane V/C Ratio	0.104	0.214	-	-	0.005	-	-	0.817	0.215
HCM Control Delay (s)	44.7	9.5	-	-	8.4	-	-	137.7	13.2
HCM Lane LOS		E	A	-	A	-	-	F	B
HCM 95th %tile Q(veh)	0.3	0.8	-	-	0	-	-	4.2	0.8

Queues
6: Francis Kiernan PI/Crane Rd & Route 6

PM Peak Hour
Build Alt. 1 - Traffic Signal



Lane Group	EBL	EBT	WBL	WBT	NBT	SBL	SBT
Lane Group Flow (vph)	218	522	5	555	10	69	120
v/c Ratio	0.48	0.45	0.01	0.48	0.03	0.23	0.19
Control Delay	10.5	7.1	4.4	7.2	13.6	17.4	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.5	7.1	4.4	7.2	13.6	17.4	0.6
Queue Length 50th (ft)	26	60	0	62	1	10	0
Queue Length 95th (ft)	80	131	3	138	12	49	0
Internal Link Dist (ft)		544		507	309		382
Turn Bay Length (ft)	100		100			90	
Base Capacity (vph)	660	1681	701	1644	568	526	837
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.31	0.01	0.34	0.02	0.13	0.14

Intersection Summary

HCM 6th Signalized Intersection Summary
6: Francis Kiernan PI/Crane Rd & Route 6

PM Peak Hour
Build Alt. 1 - Traffic Signal



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	207	492	4	5	439	88	5	1	4	66	0	114
Future Volume (veh/h)	207	492	4	5	439	88	5	1	4	66	0	114
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1870	1885	1885
Adj Flow Rate, veh/h	218	518	4	5	462	93	5	1	4	69	0	120
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
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	2	1	1
Cap, veh/h	504	1048	8	534	855	172	222	66	100	466	0	290
Arrive On Green	0.56	0.56	0.56	0.56	0.56	0.56	0.18	0.18	0.18	0.18	0.00	0.18
Sat Flow, veh/h	860	1868	14	887	1523	307	457	364	548	1411	0	1598
Grp Volume(v), veh/h	218	0	522	5	0	555	10	0	0	69	0	120
Grp Sat Flow(s),veh/h/ln	860	0	1883	887	0	1830	1369	0	0	1411	0	1598
Q Serve(g_s), s	8.3	0.0	6.5	0.1	0.0	7.4	0.0	0.0	0.0	0.0	0.0	2.6
Cycle Q Clear(g_c), s	15.7	0.0	6.5	6.7	0.0	7.4	2.6	0.0	0.0	1.3	0.0	2.6
Prop In Lane	1.00		0.01	1.00		0.17	0.50		0.40	1.00		1.00
Lane Grp Cap(c), veh/h	504	0	1056	534	0	1027	388	0	0	466	0	290
V/C Ratio(X)	0.43	0.00	0.49	0.01	0.00	0.54	0.03	0.00	0.00	0.15	0.00	0.41
Avail Cap(c_a), veh/h	795	0	1694	834	0	1647	682	0	0	754	0	616
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	10.3	0.0	5.2	7.2	0.0	5.4	13.1	0.0	0.0	13.5	0.0	14.1
Incr Delay (d2), s/veh	0.6	0.0	0.4	0.0	0.0	0.4	0.0	0.0	0.0	0.1	0.0	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	0.0	1.0	0.0	0.0	1.1	0.1	0.0	0.0	0.4	0.0	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	10.9	0.0	5.5	7.2	0.0	5.8	13.1	0.0	0.0	13.7	0.0	15.0
LnGrp LOS	B	A	A	A	A	A	B	A	A	B	A	B
Approach Vol, veh/h		740			560			10				189
Approach Delay, s/veh		7.1			5.8			13.1				14.5
Approach LOS		A			A			B				B
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		26.8		12.1		26.8		12.1				
Change Period (Y+Rc), s		5.0		5.0		5.0		5.0				
Max Green Setting (Gmax), s		35.0		15.0		35.0		15.0				
Max Q Clear Time (g_c+I1), s		17.7		4.6		9.4		4.6				
Green Ext Time (p_c), s		4.1		0.6		3.5		0.0				
Intersection Summary												
HCM 6th Ctrl Delay				7.6								
HCM 6th LOS				A								

Intersection				
Intersection Delay, s/veh	9.2			
Intersection LOS	A			
Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	740	560	10	189
Demand Flow Rate, veh/h	747	566	10	196
Vehicles Circulating, veh/h	75	226	813	477
Vehicles Exiting, veh/h	598	597	9	315
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	9.7	9.4	6.2	6.9
Approach LOS	A	A	A	A
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	747	566	10	196
Cap Entry Lane, veh/h	1278	1096	602	848
Entry HV Adj Factor	0.990	0.990	0.999	0.964
Flow Entry, veh/h	740	560	10	189
Cap Entry, veh/h	1266	1085	602	818
V/C Ratio	0.584	0.517	0.017	0.231
Control Delay, s/veh	9.7	9.4	6.2	6.9
LOS	A	A	A	A
95th %tile Queue, veh	4	3	0	1

NYS DOT QRA ACCIDENT VERBAL DESCRIPTION

Print Date 4/24/2019 Print Time 10:54:38AM

<u>Query Number/Name</u>	<u>Query Type</u>	<u>Query SubType</u>	<u>Accident Date Range</u>
456816 at crane	AttributeQuery	None	1/1/2016 12:00:00AM To 12/31/2018 12:00:00AM

<u>Case Number</u>	<u>Accident Date</u>	<u>Region/County</u>	<u>Municipality/Type</u>	<u>Street</u>	<u>Reference Marker</u>
36116565	31-January-2016	PUTNAM	Carmel Town	[Route] 6	

<u>Road Surface</u>	<u>Road Cond</u>	<u>Weather</u>	<u>TrafficControls</u>	<u>Location Ped/Bike</u>	<u>Action of Ped/Bike</u>
DRY	STRAIGHT AND LEVEL	CLOUDY	UNKNOWN	NOT APPLICABLE	NOT APPLICABLE

<u>Number of Vehicles</u>	<u>Accident Class</u>	<u>Type of Accident</u>	<u>Manner of Collision</u>	<u>Fatality</u>	<u>Injury</u>	<u>Ext of Injuries</u>
2	PROPERTY DAMAGE	COLLISION WITH MOTOR VEHICLE	UNKNOWN	0	0	

<u>Vehicle Number</u>	<u>Number of Occupants</u>	<u>Dir of Travel</u>	<u>Pre-Accd Action</u>	<u>Registered Weight</u>	<u>Drivers Age</u>	<u>Sex</u>
1	2	WEST	BACKING	3041	49	M

<u>Vehicle Type</u>	<u>State of Registration</u>	<u>Citation Issued</u>	<u>School Bus Involved</u>	<u>Property Damage</u>
CAR/VAN/PICKUP	NY	N	N	N

<u>Apparent Factor Sequence Number</u>	<u>Apparent Factor</u>
1	BACKING UNSAFELY
2	NOT APPLICABLE

<u>Vehicle Number</u>	<u>Number of Occupants</u>	<u>Dir of Travel</u>	<u>Pre-Accd Action</u>	<u>Registered Weight</u>	<u>Drivers Age</u>	<u>Sex</u>
2	1	SOUTH-EAST	GOING STRAIGHT AHEAD	3025	77	F
<u>Vehicle Type</u>	<u>State of Registration</u>	<u>Citation Issued</u>	<u>School Bus Involved</u>	<u>Property Damage</u>		
CAR/VAN/PICKUP	NY	N	N	N		
<u>Apparent Factor Sequence Number</u>	<u>Apparent Factor</u>					
1	NOT APPLICABLE					
2	NOT APPLICABLE					

<u>Case Number</u>	<u>Accident Date</u>	<u>Region/County</u>	<u>Municipality/Type</u>	<u>Street</u>	<u>Reference Marker</u>
36165075	31-March-2016	PUTNAM	Carmel Town	[Route] 6	6 84041047

<u>Road Surface</u>	<u>Road Cond</u>	<u>Weather</u>	<u>TrafficControls</u>	<u>Location Ped/Bike</u>	<u>Action of Ped/Bike</u>
DRY	STRAIGHT AND LEVEL	CLEAR	STOP SIGN	NOT APPLICABLE	NOT APPLICABLE

<u>Number of Vehicles</u>	<u>Accident Class</u>	<u>Type of Accident</u>	<u>Manner of Collision</u>	<u>Fatality</u>	<u>Injury</u>	<u>Ext of Injuries</u>
2	PROPERTY DAMAGE	COLLISION WITH MOTOR VEHICLE	RIGHT ANGLE	0	0	

<u>Vehicle Number</u>	<u>Number of Occupants</u>	<u>Dir of Travel</u>	<u>Pre-Accd Action</u>	<u>Registered Weight</u>	<u>Drivers Age</u>	<u>Sex</u>
1	1	SOUTH	GOING STRAIGHT AHEAD	0	40	M
<u>Vehicle Type</u>	<u>State of Registration</u>	<u>Citation Issued</u>	<u>School Bus Involved</u>	<u>Property Damage</u>		
CAR/VAN/PICKUP	NY	Y	N	N		
<u>Apparent Factor Sequence Number</u>	<u>Apparent Factor</u>					
1	NOT ENTERED					
2	NOT ENTERED					

<u>Vehicle Number</u>	<u>Number of Occupants</u>	<u>Dir of Travel</u>	<u>Pre-Accd Action</u>	<u>Registered Weight</u>	<u>Drivers Age</u>	<u>Sex</u>
2	1	SOUTH-EAST	MAKING LEFT TURN	3366	24	F
<u>Vehicle Type</u>	<u>State of Registration</u>	<u>Citation Issued</u>	<u>School Bus Involved</u>	<u>Property Damage</u>		
CAR/VAN/PICKUP	NY	N	N	N		
<u>Apparent Factor Sequence Number</u>	<u>Apparent Factor</u>					
1	DRIVER INATTENTION					
2	FAILURE TO YIELD RIGHT OF WAY					

<u>Case Number</u>	<u>Accident Date</u>	<u>Region/County</u>	<u>Municipality/Type</u>	<u>Street</u>	<u>Reference Marker</u>
37025438	15-November-2017	PUTNAM	Carmel Town	[Route] 6	6 84041048
<u>Road Surface</u>	<u>Road Cond</u>	<u>Weather</u>	<u>TrafficControls</u>	<u>Location Ped/Bike</u>	<u>Action of Ped/Bike</u>
DRY	STRAIGHT AND LEVEL	CLEAR	STOP SIGN	NOT APPLICABLE	NOT APPLICABLE

<u>Number of Vehicles</u>	<u>Accident Class</u>	<u>Type of Accident</u>	<u>Manner of Collision</u>	<u>Fatality</u>	<u>Injury</u>	<u>Ext of Injuries</u>
2	PROPERTY DAMAGE AND INJURY	COLLISION WITH MOTOR VEHICLE	RIGHT ANGLE	0	1	POSSIBL

<u>Vehicle Number</u>	<u>Number of Occupants</u>	<u>Dir of Travel</u>	<u>Pre-Accd Action</u>	<u>Registered Weight</u>	<u>Drivers Age</u>	<u>Sex</u>
1	1	NORTH	GOING STRAIGHT AHEAD	5941	46	M
<u>Vehicle Type</u>	<u>State of Registration</u>	<u>Citation Issued</u>	<u>School Bus Involved</u>	<u>Property Damage</u>		
CAR/VAN/PICKUP	NY	N	N	N		
<u>Apparent Factor Sequence Number</u>	<u>Apparent Factor</u>					
1	GLARE					

2 NOT APPLICABLE

<u>Vehicle Number</u>	<u>Number of Occupants</u>	<u>Dir of Travel</u>	<u>Pre-Accd Action</u>	<u>Registered Weight</u>	<u>Drivers Age</u>	<u>Sex</u>
2	2	EAST	GOING STRAIGHT AHEAD	4214	59	M
<u>Vehicle Type</u>	<u>State of Registration</u>	<u>Citation Issued</u>	<u>School Bus Involved</u>	<u>Property Damage</u>		
CAR/VAN/PICKUP	NY	N	N	N		
<u>Apparent Factor Sequence Number</u>	<u>Apparent Factor</u>					
1	NOT APPLICABLE					
2	NOT APPLICABLE					

<u>Case Number</u>	<u>Accident Date</u>	<u>Region/County</u>	<u>Municipality/Type</u>	<u>Street</u>	<u>Reference Marker</u>
37292280	21-May-2018	PUTNAM	Carmel Town	CRANE RD	6 84041048

<u>Road Surface</u>	<u>Road Cond</u>	<u>Weather</u>	<u>TrafficControls</u>	<u>Location Ped/Bike</u>	<u>Action of Ped/Bike</u>
DRY	STRAIGHT AND LEVEL	CLEAR	STOP SIGN	NOT APPLICABLE	NOT APPLICABLE

<u>Number of Vehicles</u>	<u>Accident Class</u>	<u>Type of Accident</u>	<u>Manner of Collision</u>	<u>Fatality</u>	<u>Injury</u>	<u>Ext of Injuries</u>
2	PROPERTY DAMAGE	COLLISION WITH MOTOR VEHICLE	REAR END	0	0	

<u>Vehicle Number</u>	<u>Number of Occupants</u>	<u>Dir of Travel</u>	<u>Pre-Accd Action</u>	<u>Registered Weight</u>	<u>Drivers Age</u>	<u>Sex</u>
1	2	SOUTH-EAST	STOPPED IN TRAFFIC	3163	60	F
<u>Vehicle Type</u>	<u>State of Registration</u>	<u>Citation Issued</u>	<u>School Bus Involved</u>	<u>Property Damage</u>		
CAR/VAN/PICKUP	NY	N	N	N		
<u>Apparent Factor Sequence Number</u>	<u>Apparent Factor</u>					

1 NOT APPLICABLE
 2 NOT APPLICABLE

<u>Vehicle Number</u>	<u>Number of Occupants</u>	<u>Dir of Travel</u>	<u>Pre-Accd Action</u>	<u>Registered Weight</u>	<u>Drivers Age</u>	<u>Sex</u>
2	1	SOUTH-EAST	GOING STRAIGHT AHEAD	3112	83	F
	<u>Vehicle Type</u>	<u>State of Registration</u>	<u>Citation Issued</u>	<u>School Bus Involved</u>	<u>Property Damage</u>	
	CAR/VAN/PICKUP	NY	N	N	N	
	<u>Apparent Factor Sequence Number</u>	<u>Apparent Factor</u>				
	1	FOLLOWING TOO CLOSELY				
	2	NOT APPLICABLE				

<u>Case Number</u>	<u>Accident Date</u>	<u>Region/County</u>	<u>Municipality/Type</u>	<u>Street</u>	<u>Reference Marker</u>	
37492873	04-September-2018	PUTNAM	Carmel Town	CRANE RD	6 84041048	
<u>Road Surface</u>	<u>Road Cond</u>	<u>Weather</u>	<u>TrafficControls</u>	<u>Location Ped/Bike</u>	<u>Action of Ped/Bike</u>	
UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	NOT APPLICABLE	NOT APPLICABLE	
<u>Number of Vehicles</u>	<u>Accident Class</u>	<u>Type of Accident</u>	<u>Manner of Collision</u>	<u>Fatality</u>	<u>Injury</u>	<u>Ext of Injuries</u>
2	PROPERTY DAMAGE	COLLISION WITH MOTOR VEHICLE	UNKNOWN	0	0	

<u>Vehicle Number</u>	<u>Number of Occupants</u>	<u>Dir of Travel</u>	<u>Pre-Accd Action</u>	<u>Registered Weight</u>	<u>Drivers Age</u>	<u>Sex</u>
1	1	UNKNOWN	GOING STRAIGHT AHEAD	0	56	M
<u>Vehicle Type</u>	<u>State of Registration</u>	<u>Citation Issued</u>	<u>School Bus Involved</u>	<u>Property Damage</u>		
OTHER	NY	N	N	N		
<u>Apparent Factor Sequence Number</u>	<u>Apparent Factor</u>					
1	NOT ENTERED					
2	NOT ENTERED					

<u>Vehicle Number</u>	<u>Number of Occupants</u>	<u>Dir of Travel</u>	<u>Pre-Accd Action</u>	<u>Registered Weight</u>	<u>Drivers Age</u>	<u>Sex</u>
2	2	UNKNOWN	STOPPED IN TRAFFIC	0	42	M
<u>Vehicle Type</u>	<u>State of Registration</u>	<u>Citation Issued</u>	<u>School Bus Involved</u>	<u>Property Damage</u>		
OTHER	NY	N	N	N		
<u>Apparent Factor Sequence Number</u>	<u>Apparent Factor</u>					
1	NOT ENTERED					
2	NOT ENTERED					

ACTUATED TRAFFIC SIGNAL WITH NO GEOMETRIC IMPROVEMENTS

DESCRIPTION	TOTAL QUANTITY	UNIT	UNIT PRICE	TOTAL COST
ACTUATED TRAFFIC SIGNAL ¹	1	EA	\$150,000	\$150,000
WORK ZONE TRAFFIC CONTROL	1	LS	\$20,000	\$20,000
ESTIMATED CONSTRUCTION COST (CONCEPTUAL)				\$170,000
CONTINGENCY (20%)	1	LS	\$34,000	\$35,000
DESIGN AND INSPECTION (25%)	1	LS	\$42,500	\$45,000
FINAL TOTAL				\$250,000

¹ INCLUDES TYPICAL COST FOR CONTROLLER, SIGNAL POLES, LOOPS, WIRING, SIGNAL HEADS, ETC., FOR AN ACTUATED TRAFFIC SIGNAL.

SINGLE LANE ROUNDABOUT (120 FT DIAMETER)

DESCRIPTION	TOTAL QUANTITY	UNIT	UNIT PRICE	TOTAL COST
SINGLE LANE ROUNDABOUT ²	1	EA	\$750,000	\$750,000
UTILITY RELOCATION ³	0	EA	\$75,000	\$0
STORMWATER AND TREATMENT ⁴	1	LS	\$100,000	\$100,000
WETLAND MITIGATION	1	LS	\$100,000	\$100,000
WORK ZONE TRAFFIC CONTROL	1	LS	\$150,000	\$150,000
ESTIMATED CONSTRUCTION COST (CONCEPTUAL)				\$1,100,000
RIGHT OF WAY	0	ACRE	\$340,000	\$0
CONTINGENCY (20%)	1	LS	\$220,000	\$220,000
DESIGN AND INSPECTION (25%)	1	LS	\$275,000	\$275,000
FINAL TOTAL				\$1,595,000

² INCLUDES TYPICAL COST FOR PAVEMENT, CURB, EARTHWORK, DRAINAGE, LANDSCAPING, ETC., FOR A SINGLE LANE ROUNDABOUT.

³ ELECTRIC AND GAS RELOCATIONS ARE ASSUMED NO COST FOR MUNICIPAL PROJECTS. WATER AND SEWER RELOCATIONS ARE ASSUMED AT \$75,000 EACH.

⁴ IMPACTS OVER 5,000 SF WITHIN DEP WATERSHEDS REQUIRE POST STORMWATER TREATMENT. \$100,000 ALLOWANCE FOR EXTRA ROW OR WORK REQUIRED.

