



Appendix C

Synchro Model Calibration / Validation & Synchro Base Year LOS Reports

Contents:

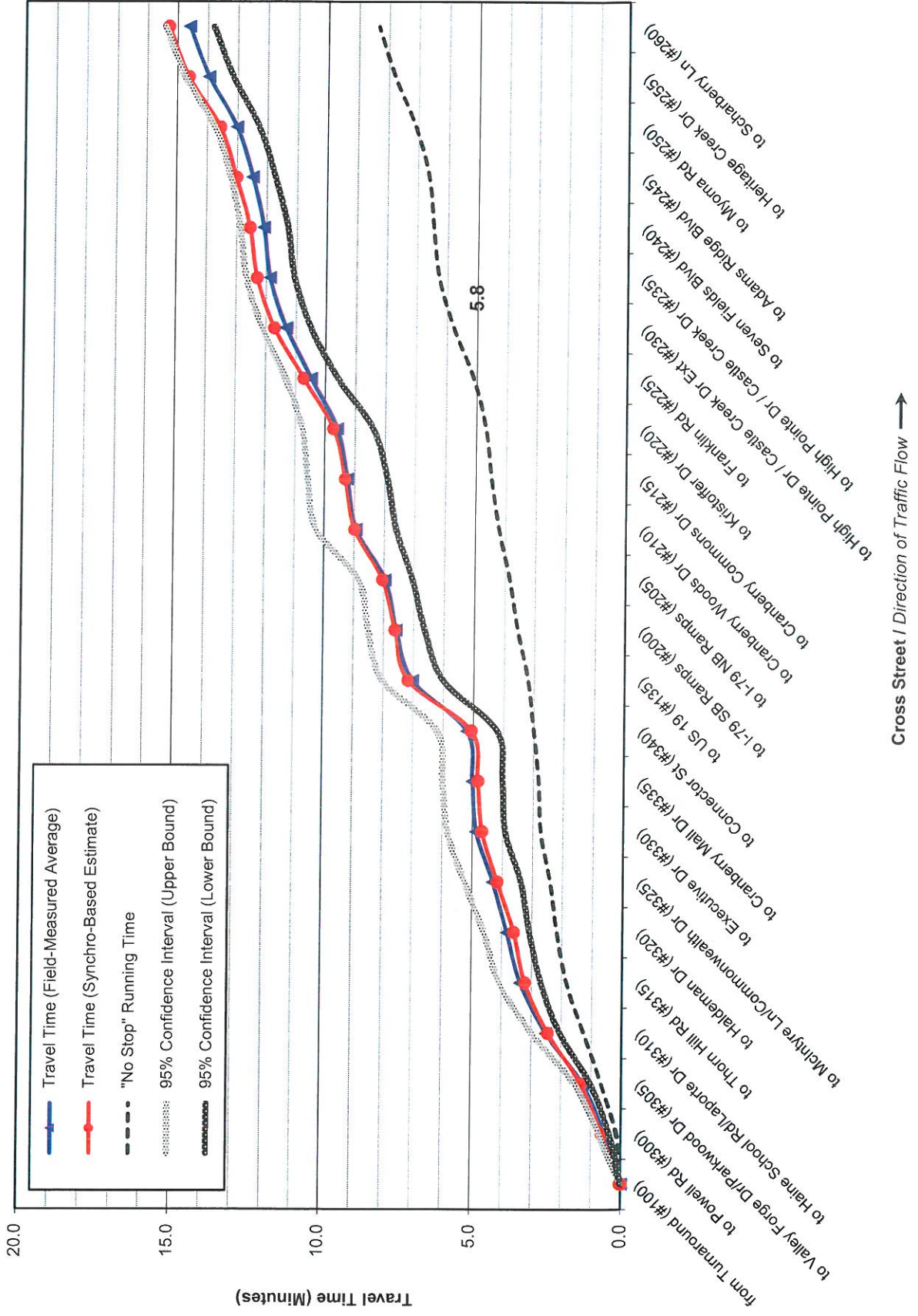
- Field Travel Time Runs vs. Synchro Model Runs
- Detailed Base Year LOS Tables
- Base Year Synchro HCM Reports
- Base Year Synchro Queuing Reports



SPC Cycle 3 WO #06

SR 228 Cranberry

Raw Travel Time Data for: 2017 Weekday Peaks by Run / AM Peak Eastbound





Notes / Definitions / Abbreviations

- * Units vary as indicated in tables below
- * Summary Table 1 indicates feet, seconds
- * Summary Table 2 indicates miles, minutes
- * BLUE = Input Data via manual direct entry
- * RED = Input Data via formula or worksheet reference updates
- * BLACK = Data automatically calculated

NID = Node ID Number
TL = Travel Distance (from Previous Node)
CTL = Travel Distance (Cumulative)

DS = Design Speed (or assumed Free-Flow Speed)
RT₀₅ = "No Stop" Running Time @ Design Speed (from Previous Node)
CRT₀₅ = "No Stop" Running Time @ Design Speed (Cumulative)
Delay = Travel Delay (from Previous Node) = TT - RT₀₅
CD = Travel Delay (Cumulative)
TT_{avg} = Average Field-measured Travel Time (from Previous Node)
CTT_{avg} = Average Field-measured Travel Time (Cumulative)

LS = Link Speed (as coded in Synchro Model)
RT_{L3} = "No Stop" Running Time @ Link Speed (from Previous Node)
CRT_{L3} = "No Stop" Running Time @ Link Speed (Cumulative)
Delay_{L3} = Synchro Signal Delay (or other appropriate delay estimate)
CD_{L3} = Synchro Signal Delay (Cumulative)
TT_{L3} = Synchro-estimated Travel Time (from Previous Node)
CTT_{L3} = Synchro-estimated Travel Time (Cumulative)
%Δ = % Error in Synchro-estimated Travel Times = (TT_{avg} - TT_{L3}) / TT_{avg}
FIX/OK = Status of Synchro-estimated Travel Times vs specified thresholds

Summary Table: Synchro Calibration Data / Calculations (feet, seconds, mph)

Node	Intersection / Link Data		FIELD TRAVEL TIME DATA					
	Travel Length (feet)	Speed (mph)	Running Time (sec @ DS)	Travel Delay (sec)	Travel Time (sec)			
	TL	CTL	DS	RT ₀₅	CRT ₀₅	Delay	CD	TT _{avg}
from Turnaround (#100)	0	0	-	0	0	0	0	0
to Heritage Creek Dr (#255)	2,573	2,573	50	35	35	18	18	53
to Myoma Rd (#250)	3,138	5,711	50	43	78	2	20	98
to Adams Ridge Blvd (#245)	1,761	7,473	50	24	102	31	51	153
to Seven Fields Blvd (#240)	682	8,155	40	10	112	13	63	175
to High Pointe Dr / Castle Creek Dr (#235)	780	8,935	40	12	124	5	68	192
to High Pointe Dr / Castle Creek Dr Ext (#230)	2,031	10,966	40	31	155	27	96	251
to Franklin Rd (#225)	2,604	13,569	40	39	194	36	132	326
to Kristoffer Dr (#220)	1,663	15,232	40	25	219	2	134	353
to Cranberry Commons Dr (#215)	768	16,000	40	17	248	12	154	402
to Cranberry Woods Dr (#210)	1,112	17,112	40	21	269	8	162	431
to I-79 NB Ramps (#205)	1,367	18,479	45	20	289	9	171	460
to I-79 SB Ramps (#200)	1,348	19,828	45	16	305	50	221	526
to US 19 (#135)	1,069	20,896	45	10	315	6	227	542
to Connector St (#340)	665	21,562	40	10	325	4	231	556
to Cranberry Mall Dr (#335)	335	580	22,141	6	331	14	244	575
to Executive Dr (#330)	346	22,488	40	20	351	23	267	618
to Melihya Ln/Commonwealth Dr (#325)	1,172	23,659	40	14	365	5	272	637
to Haldeman Dr (#320)	827	24,487	40	20	385	2	275	660
to Thorn Hill Rd (#315)	1,158	25,645	40	35	420	8	283	703
to Haine School Roll-aporte Dr (#310)	2,041	27,686	40	36	456	16	299	755
to Valley Forge Dr/Parkwood Dr (#305)	2,091	29,777	40	32	488	24	324	812
to Powell Rd (#300)	1,851	31,628	40	4	492	1	325	817
to Turnaround (#299)	239	31,867	50	4	492	1	325	817
Corridor Average	31,867	-	-	492	325	-	-	817

Specified Threshold for Synchro link-to-link travel times:
Specified Threshold for Synchro end-to-end travel time:

SYNCHRO DATA									
Speed (mph)	Running Time (sec @ LS)	Delay _{L3}	CRT _{L3}	CD _{L3}	TT _{L3}	Travel Time (sec)	Synchro Error		
LS	RT _{L3}	CRT _{L3}	Delay _{L3}	CD _{L3}	TT _{L3}	CTT _{L3}	%Δ	FIX/OK	
-	0	0	0	0	0	0	-	-	-
50	35	35	23	23	58	58	-10%	OK	
55	42	77	2	25	44	102	3%	OK	
58	32	109	26	51	58	160	-5%	OK	
60	12	120	12	63	23	183	-2%	OK	
65	13	133	7	70	19	202	-15%	OK	
70	45	178	11	80	55	258	5%	OK	
75	44	222	45	126	90	347	-18%	OK	
80	25	247	5	130	30	377	-9%	OK	
85	12	260	4	134	17	394	16%	OK	
90	15	275	17	152	32	426	-13%	OK	
95	23	298	10	161	33	459	-13%	OK	
100	23	321	9	170	31	491	-9%	OK	
105	18	339	54	224	72	563	-8%	OK	
110	13	352	1	224	14	576	13%	OK	
115	10	362	1	228	11	587	19%	OK	
120	5	367	15	240	20	608	-2%	OK	
125	29	396	7	247	35	643	17%	OK	
130	13	409	10	257	23	666	-19%	OK	
135	20	428	1	258	21	687	6%	OK	
140	35	463	14	272	48	735	-12%	OK	
145	36	499	8	280	44	779	16%	OK	
150	32	530	22	303	54	833	4%	OK	
155	4	534	2	305	5	839	0%	OK	
-	534	305	839	-3%	OK				



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SPC CYCLE 3 WO #06
Travel Time Summary (Synchro Calibration Check)

Corridor: SR 228: Cranberry
Direction: Westbound
Scenario: AM Peak

Notes / Definitions / Abbreviations

- Units vary as indicated in tables below
- Summary Table 1 indicates feet, seconds
- Summary Table 2 indicates miles, minutes

- BLUE = Input Data via manual direct entry
- RED = Input Data via formula or worksheet reference updates
- BLACK = Data automatically calculated

NID = Node ID Number
TL = Travel Distance (from Previous Node)
CTL = Travel Distance (Cumulative)

DS = Design Speed (or assumed Free-Flow Speed)

RT_{DS} = "No Stop" Running Time @ Design Speed (from Previous Node)
CRT_{DS} = "No Stop" Running Time @ Design Speed (Cumulative)

Delay = Travel Delay (from Previous Node) = TT - RT_{DS}
CD = Travel Delay (Cumulative)

TT_{avg} = Average Field-measured Travel Time (from Previous Node)
CTT_{avg} = Average Field-measured Travel Time (Cumulative)

LS = Link Speed (as coded in Synchro Model)

RT_{LS} = "No Stop" Running Time @ Link Speed (from Previous Node)
CRT_{LS} = "No Stop" Running Time @ Link Speed (Cumulative)

Delay_{LS} = Synchro Signal Delay (or other appropriate delay estimate)
CD_{LS} = Synchro Signal Delay (Cumulative)

TT_{LS} = Synchro-estimated Travel Time (from Previous Node)
CTT_{LS} = Synchro-estimated Travel Time (Cumulative)

%Δ = % Error in Synchro-estimated Travel Times = $(TT_{avg} - TT_{LS}) / TT_{avg}$
FIXOK = Status of Synchro-estimated Travel Times vs specified thresholds

Summary Table: Synchro Calibration Data / Calculations (miles, minutes, mph)

FIELD TRAVEL TIME DATA										
Intersection / Link Data		Travel Length (mile)			Speed (mph)	Running Time (min @ DS)		Travel Delay (min)		Travel Time (min)
Node	NID	TL	CTL	DS	RT _{DS}	CRT _{DS}	Delay	CD	TT _{avg}	CTT _{avg}
from Turnaround (#100)	100	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0
to Heritage Creek Dr (#255)	255	0.5	0.5	50	0.6	0.0	0.3	0.3	0.9	0.9
to Myoma Rd (#250)	250	0.6	1.1	50	0.7	0.0	0.0	0.3	0.8	1.6
to Adams Ridge Blvd (#245)	245	0.3	1.4	50	0.4	0.0	0.5	0.8	0.9	2.5
to Seven Fields Blvd (#240)	240	0.1	1.5	45	0.2	0.0	0.2	1.1	0.4	2.9
to High Pointe Dr / Castle Creek Dr (#235)	235	0.1	1.7	45	0.2	0.0	0.1	1.1	0.3	3.2
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	0.4	2.1	45	0.5	0.0	0.5	1.6	1.0	4.2
to Franklin Rd (#225)	225	0.5	2.6	45	0.7	0.0	0.6	2.2	1.3	5.4
to Kristoffer Dr (#220)	220	0.3	2.9	45	0.4	0.0	0.0	2.2	0.5	5.9
to Cranberry Commons Dr (#215)	215	0.1	3.0	45	0.2	0.0	0.1	2.4	0.3	6.2
to Cranberry Woods Dr (#210)	210	0.2	3.2	45	0.3	0.0	0.2	2.6	0.5	6.7
to L-79 NB Ramps (#205)	205	0.3	3.5	45	0.4	0.0	0.1	2.7	0.5	7.2
to L-79 SB Ramps (#200)	200	0.3	3.8	45	0.3	0.0	0.1	2.8	0.5	7.7
to US 19 (#135)	135	0.2	4.0	45	0.3	0.0	0.8	3.7	1.1	8.8
to Connector St (#340)	340	0.1	4.1	45	0.2	0.0	0.1	3.8	0.3	9.0
to Cranberry Mall Dr (#335)	335	0.1	4.2	40	0.2	0.0	0.1	3.8	0.2	9.3
to Executive Dr (#330)	330	0.1	4.3	40	0.1	0.0	0.2	4.1	0.3	9.6
to McIntyre Ln/Commonwealth Dr (#325)	325	0.2	4.5	40	0.3	0.0	0.4	4.4	0.7	10.3
to Haldeman Dr (#320)	320	0.2	4.6	40	0.2	0.0	0.1	4.5	0.3	10.6
to Thom Hill Rd (#315)	315	0.2	4.9	40	0.3	0.0	0.0	4.6	0.4	11.0
to Haine School Rd/Laporte Dr (#310)	310	0.4	5.2	40	0.6	0.0	0.1	4.7	0.7	11.7
to Valley Forge Dr/Parkwood Dr (#305)	305	0.4	5.6	40	0.6	0.0	0.3	5.0	0.9	12.6
to Powell Rd (#300)	300	0.4	6.0	40	0.5	0.0	0.4	5.4	0.9	13.5
to Turnaround (#295)	299	0.0	6.0	40	0.1	0.0	0.0	5.4	0.1	13.6
Corridor Average		6.0	-	-	0.0	5				13.6

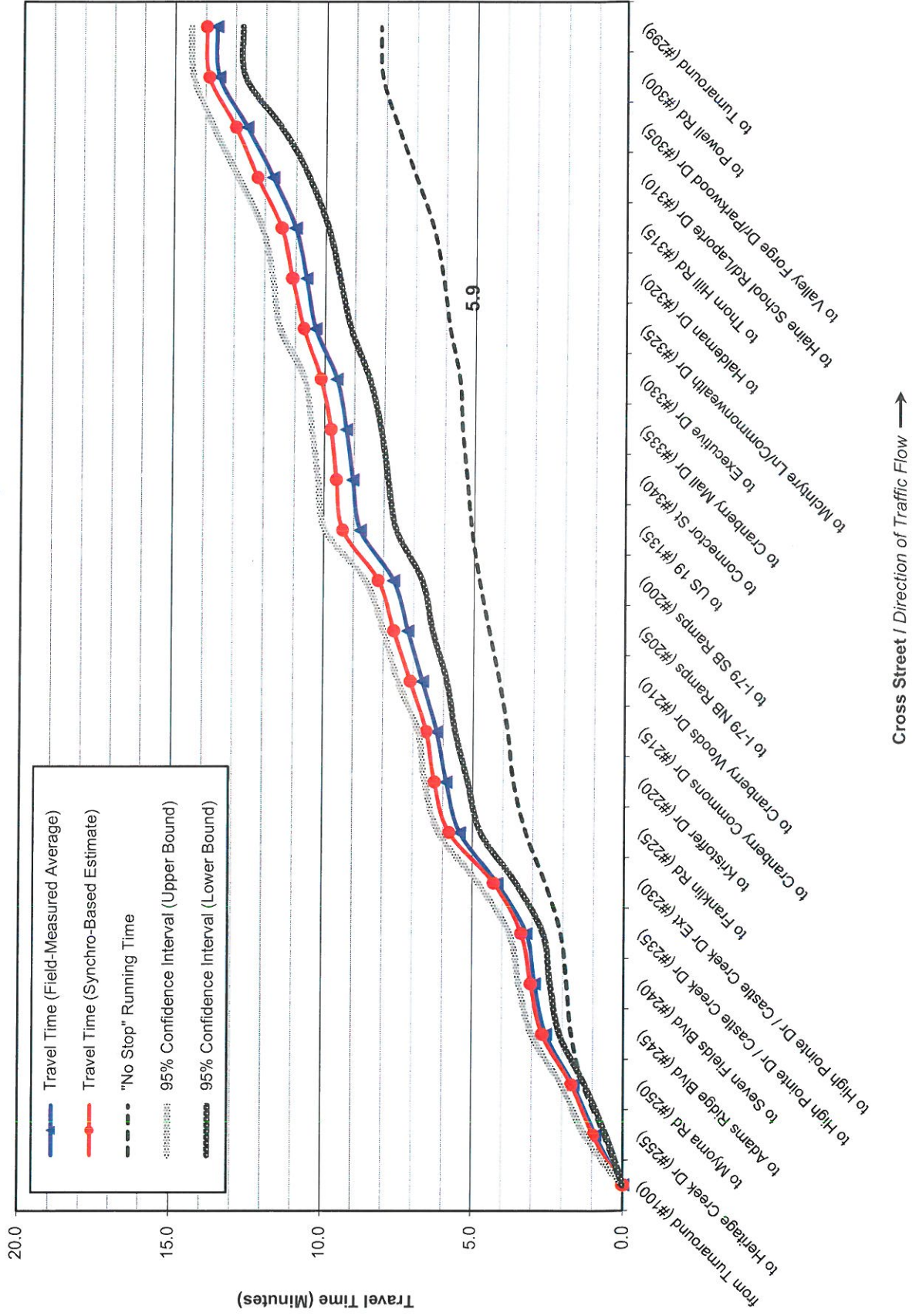
Specified Threshold for Synchro link-to-link travel times:
Specified Threshold for Synchro end-to-end travel time:

SYNCHRO DATA							
Speed (mph)	Running Time (min @ LS)	CRT _{LS}	Delay _{LS}	CD _{LS}	TT _{LS}	Synchro Error	FIXOK
-	0.0	0.0	0.0	0.0	0.0	-	-
50	0.6	0.6	0.4	1.0	1.0	-10%	OK
51	0.7	1.3	0.0	0.4	0.7	1.7	3%
38	0.5	1.8	0.4	0.9	1.0	2.7	-5%
40	0.2	2.0	0.2	1.0	0.4	3.1	-2%
42	0.2	2.2	0.1	1.2	0.3	3.4	-15%
31	0.7	3.0	0.2	1.3	0.9	4.3	5%
40	0.7	3.7	0.8	2.1	1.5	5.8	-19%
45	0.4	4.1	0.1	2.2	0.5	6.3	-9%
42	0.2	4.3	0.1	2.2	0.3	6.6	16%
51	0.2	4.6	0.3	2.5	0.5	7.1	-13%
40	0.4	5.0	0.2	2.7	0.5	7.7	-13%
40	0.4	5.3	0.1	2.8	0.5	8.2	-9%
40	0.3	5.7	0.9	3.7	1.2	9.4	-8%
35	0.2	5.9	0.0	3.7	0.2	9.6	13%
40	0.2	6.0	0.0	3.8	0.2	9.8	19%
45	0.1	6.1	0.2	4.0	0.3	10.1	-2%
28	0.5	6.6	0.1	4.1	0.6	10.7	17%
43	0.2	6.8	0.2	4.3	0.4	11.1	-19%
40	0.3	7.1	0.0	4.3	0.3	11.4	6%
40	0.6	7.7	0.2	4.5	0.8	12.3	-12%
40	0.6	8.3	0.1	4.7	0.7	13.0	16%
40	0.5	8.8	0.4	5.0	0.9	13.9	4%
45	0.1	8.9	0.0	5.1	0.1	14.0	0%
-	8.9	5.1	14.0	-	-	-3%	OK

SPC Cycle 3 WO #06

SR 228 Cranberry

Raw Travel Time Data for: 2017 Weekday Peaks by Run / AM Peak Westbound



Notes / Definitions / Abbreviations

- Units vary as indicated in tables below
- Summary Table 1 indicates feet, seconds
- Summary Table 2 indicates miles, minutes
- BLUE = Input Data via manual direct entry
- RED = Input Data via formula or worksheet reference updates
- BLACK = Data automatically calculated
- DS = Design Speed (or assumed Free-Flow Speed)
- RT₀₅ = "No Stop" Running Time @ Design Speed (from Previous Node)
- CRT₀₅ = "No Stop" Running Time @ Design Speed (Cumulative)
- Delay = Travel Delay (from Previous Node) = TT - RT₀₅
- CD = Travel Delay (Cumulative)
- TT_{avg} = Average Field-measured Travel Time (from Previous Node)
- CTT_{avg} = Average Field-measured Travel Time (Cumulative)
- NID = Node ID Number
- TL = Travel Distance (from Previous Node)
- CTL = Travel Distance (Cumulative)
- LS = Link Speed (as coded in Synchro Model)
- RT_{LS} = "No Stop" Running Time @ Link Speed (from Previous Node)
- CRT_{LS} = "No Stop" Running Time @ Link Speed (Cumulative)
- Delay_{LS} = Synchro Signal Delay (or other appropriate delay estimate)
- CD_{LS} = Synchro Signal Delay (Cumulative)
- TT_S = Synchro-estimated Travel Time (from Previous Node)
- CTT_S = Synchro-estimated Travel Time (Cumulative)
- %Δ = % Error in Synchro-estimated Travel Times = (TT_{avg} - TT_S) / TT_{avg}
- FIXOK = Status of Synchro-estimated Travel Times vs specified thresholds

Summary Table: Synchro Calibration Data / Calculations (feet, seconds, mph)

Intersection / Link Data		FIELD TRAVEL TIME DATA					
Node	NID	TL	CTL	DS	RT ₀₅	CRT ₀₅	Travel Time (sec)
from Turnaround (#100)	100	0	0	-	0	0	0
to Powell Rd (#300)	300	287	287	40	5	12	17
to Valley Forge Dr/Parkwood Dr (#305)	305	1,765	2,052	40	30	35	40
to Haine School Rd/Laporte Dr (#310)	310	2,187	4,239	40	37	72	62
to Thorn Hill Rd (#315)	315	2,078	6,317	40	35	107	72
to Haldeman Dr (#320)	320	1,128	7,444	40	18	125	88
to McIntyre Ln/Commonwealth Dr (#325)	325	833	8,277	40	14	139	133
to Executive Dr (#330)	330	1,131	9,408	40	19	158	142
to Cranberry Mall Dr (#335)	335	342	9,751	40	6	164	12
to Connector St (#340)	340	688	10,438	40	11	175	34
to US 19 (#135)	135	756	11,194	40	13	188	58
to I-79 SB Ramps (#200)	200	1,108	12,302	40	19	207	0
to I-79 NB Ramps (#205)	205	1,309	13,612	40	20	227	18
to Cranberry Woods Dr (#210)	210	1,396	15,008	40	21	248	30
to Cranberry Commons Dr (#215)	215	957	15,965	40	14	262	2
to Kristoffer Dr (#220)	220	860	16,825	40	13	275	11
to Franklin Rd (#225)	225	1,587	18,411	40	24	299	36
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	2,671	21,082	40	40	339	12
to High Pointe Dr / Castle Creek Dr (#235)	235	1,959	23,040	40	29	368	11
to Seven Fields Blvd (#240)	240	767	23,807	40	12	380	3
to Adams Ridge Blvd (#245)	245	667	24,474	40	10	390	9
to Myoma Rd (#250)	250	1,778	26,253	40	27	417	2
to Heritage Creek Dr (#255)	255	3,094	29,346	50	42	459	22
to Scharberry Ln (#260)	260	2,360	31,706	50	32	491	4
Corridor Average		31,706		-	491	454	945

SYNCHRO DATA									
Speed (mph)	Running Time (sec @ LS)	CRT _{LS}	Delay _{LS}	CD _{LS}	TT _S	Travel Time (sec)	Synchro Error		
LS	RT _{LS}	CRT _{LS}	Delay _{LS}	CD _{LS}	TT _S	Travel Time (sec)	%Δ	FIXOK	
40	0	0	0	0	0	0	-	-	
40	4	4	13	13	17	17	-4%	OK	
40	40	44	18	31	58	78	-1%	OK	
40	48	93	8	39	56	132	5%	OK	
40	35	128	10	49	48	177	-1%	OK	
40	22	150	23	72	45	222	-3%	OK	
40	19	169	27	100	46	269	5%	OK	
40	26	195	31	131	57	325	11%	OK	
40	6	200	13	144	19	344	-2%	OK	
40	17	218	19	163	36	381	20%	OK	
40	17	235	61	224	78	459	4%	OK	
40	17	251	2	226	19	478	2%	OK	
40	20	271	10	237	30	508	20%	OK	
40	27	289	15	252	42	550	17%	OK	
40	16	315	0	252	17	587	-3%	OK	
40	12	327	16	268	28	595	-13%	OK	
40	34	360	16	284	49	644	18%	OK	
40	47	407	5	289	52	733	8%	OK	
40	33	440	3	292	37	733	8%	OK	
40	13	453	4	297	17	750	-15%	OK	
40	10	464	10	307	20	771	-6%	OK	
40	24	488	5	312	29	800	-1%	OK	
40	53	541	10	322	63	862	3%	OK	
40	32	573	3	325	35	898	2%	OK	
-	573	325	898	5%	OK				

Specified Threshold for Synchro link-to-link travel times:
Specified Threshold for Synchro end-to-end travel time:

20%
10%



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SPC CYCLE 3 WO #06
Travel Time Summary (Synchro Calibration Check)

Corridor: SR 228: Cranberry
Direction: Eastbound
Scenario: MD Peak

Notes / Definitions / Abbreviations

- Units vary as indicated in tables below
- Summary Table 1 indicates feet, seconds
- Summary Table 2 indicates miles, minutes
- BLUE = Input Data via manual direct entry
- RED = Input Data via formula or worksheet reference updates
- BLACK = Data automatically calculated
- DS = Design Speed (or assumed Free-Flow Speed)
- RT_{DS} = "No Stop" Running Time @ Design Speed (from Previous Node)
- CRT_{DS} = "No Stop" Running Time @ Design Speed (Cumulative)
- Delay = Travel Delay (from Previous Node) = TT - RT_{DS}
- CD = Travel Delay (Cumulative)
- TT_{avg} = Average Field-measured Travel Time (from Previous Node)
- CTT_{avg} = Average Field-measured Travel Time (Cumulative)
- NID = Node ID Number
- TL = Travel Distance (from Previous Node)
- CTL = Travel Distance (Cumulative)
- LS = Link Speed (as coded in Synchro Model)
- RT_{LS} = "No Stop" Running Time @ Link Speed (from Previous Node)
- CRT_{LS} = "No Stop" Running Time @ Link Speed (Cumulative)
- Delay_s = Synchro Signal Delay (or other appropriate delay estimate)
- CD_s = Synchro Signal Delay (Cumulative)
- TT_s = Synchro-estimated Travel Time (from Previous Node)
- CTT_s = Synchro-estimated Travel Time (Cumulative)
- %Δ = % Error in Synchro-estimated Travel Times = (TT_{avg} - TT_s) / TT_{avg}
- FIXOK = Status of Synchro-estimated Travel Times vs specified thresholds

Summary Table: Synchro Calibration Data / Calculations (miles, minutes, mph)

Intersection / Link Data		FIELD TRAVEL TIME DATA							
Node	NID	Travel Length (miles)		Speed (mph)	Running Time (min @ DS)		Travel Delay (min)		Travel Time (min)
		TL	CTL	DS	RT _{DS}	CRT _{DS}	Delay	CD	TT _{avg}
from Turnaround (#100)	100	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
to Powell Rd (#300)	300	0.1	0.1	40	0.1	0.0	0.2	0.2	0.3
to Valley Forge Dr/Parkwood Dr (#305)	305	0.3	0.4	40	0.5	0.0	0.5	0.7	1.0
to Haine School Rd/Laporte Dr (#310)	310	0.4	0.8	40	0.6	0.0	0.4	1.0	2.0
to Thorn Hill Rd (#315)	315	0.4	1.2	40	0.6	0.0	0.2	1.2	3.0
to Haldeman Dr (#320)	320	0.2	1.4	40	0.3	0.0	0.4	1.6	0.7
to McIntyre Ln/Commonwealth Dr (#325)	325	0.2	1.6	40	0.2	0.0	0.6	2.2	0.8
to Executive Dr (#330)	330	0.2	1.8	40	0.3	0.0	0.8	3.0	1.1
to Cranberry Mall Dr (#335)	335	0.1	1.8	40	0.1	0.0	0.2	3.2	0.5
to Connector St (#340)	340	0.1	2.0	40	0.2	0.0	0.6	3.7	0.8
to US 19 (#135)	135	0.1	2.1	40	0.2	0.0	1.1	4.9	1.4
to I-79 SB Ramps (#200)	200	0.2	2.3	40	0.3	0.0	0.0	4.9	0.3
to I-79 NB Ramps (#205)	205	0.2	2.6	45	0.3	0.0	0.3	5.2	0.6
to Cranberry Woods Dr (#210)	210	0.3	2.8	45	0.4	0.0	0.5	5.7	0.9
to Cranberry Commons Dr (#215)	215	0.2	3.0	45	0.2	0.0	0.0	5.7	0.3
to Kristoffer Dr (#220)	220	0.2	3.2	45	0.2	0.0	0.2	5.9	0.4
to Franklin Rd (#225)	225	0.3	3.5	45	0.4	0.0	0.6	6.5	1.0
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	0.5	4.0	45	0.7	0.0	0.2	6.7	0.9
to High Pointe Dr / Castle Creek Dr (#235)	235	0.4	4.4	45	0.5	0.0	0.2	6.9	0.7
to Seven Fields Blvd (#240)	240	0.1	4.5	45	0.2	0.0	0.1	6.9	0.3
to Adams Ridge Blvd (#245)	245	0.1	4.6	45	0.2	0.0	0.2	7.1	0.3
to Myoma Rd (#250)	250	0.3	5.0	45	0.5	0.0	0.0	7.1	0.5
to Heritage Creek Dr (#255)	255	0.6	5.6	50	0.7	0.0	0.4	7.5	1.1
to Scharberry Ln (#260)	260	0.4	6.0	50	0.5	0.0	0.1	7.6	0.6
Corridor Average		6.0		-	0.0		7.6		15.3

Specified Threshold for Synchro link-to-link travel times:

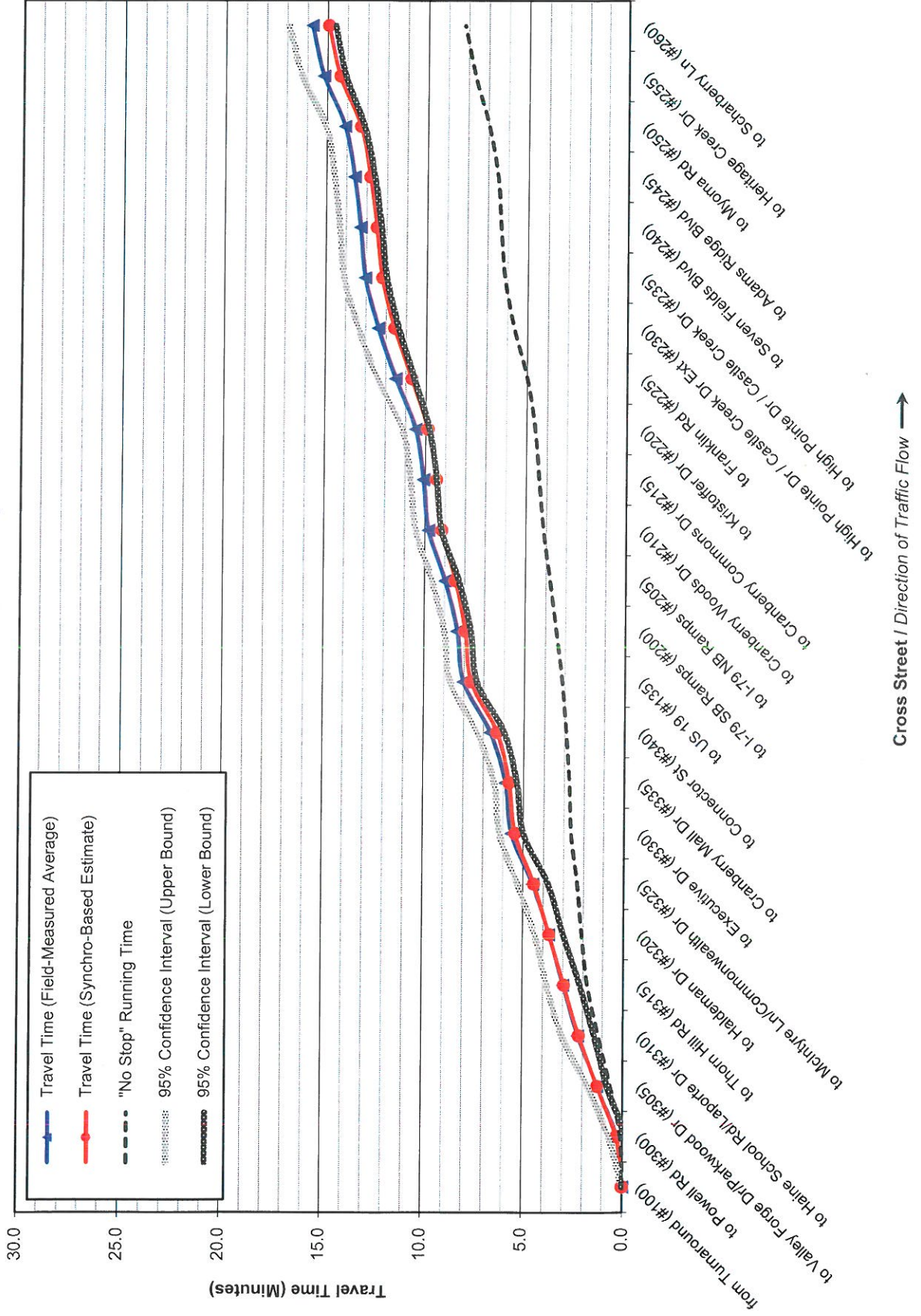
Specified Threshold for Synchro end-to-end travel time:	20%	10%
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SYNCHRO DATA							
Speed (mph)	Running Time (min @ LS)	Synchro Delay (min)	Travel Time (min)	Synchro Error	CTT _s	TT _s	%Δ
LS	RT _{LS}	Delay _s	CD _s	CTT _s	TT _s	TT _s	FIXOK
-	0.0	0.0	0.0	0.0	0.0	0.0	-
45	0.1	0.1	0.2	0.2	0.3	0.3	-4%
30	0.7	0.7	0.3	0.5	1.0	1.3	-1%
31	0.8	1.5	0.1	0.7	0.9	2.2	5%
40	0.6	2.1	0.2	0.8	0.8	3.0	-1%
35	0.4	2.5	0.4	1.2	0.8	3.7	-3%
30	0.3	2.8	0.5	1.7	0.8	4.5	5%
30	0.4	3.2	0.5	2.2	0.9	5.4	11%
42	0.1	3.3	0.2	2.4	0.3	5.7	-2%
27	0.3	3.6	0.3	2.7	0.6	6.3	20%
30	0.3	3.9	1.0	3.7	1.3	7.6	4%
45	0.3	4.2	0.0	3.8	0.3	8.0	2%
45	0.3	4.5	0.2	3.9	0.5	8.5	20%
35	0.5	5.0	0.3	4.2	0.7	9.2	17%
40	0.3	5.2	0.0	4.2	0.3	9.5	-3%
50	0.2	5.4	0.3	4.5	0.5	9.9	-13%
32	0.6	6.0	0.3	4.7	0.8	10.7	18%
39	0.8	6.8	0.1	4.8	0.9	11.6	0%
40	0.6	7.3	0.1	4.9	0.6	12.2	8%
40	0.2	7.6	0.1	4.9	0.3	12.5	-15%
45	0.2	7.7	0.2	5.1	0.3	12.8	-6%
50	0.4	8.1	0.1	5.2	0.5	13.3	-1%
40	0.9	9.0	0.2	5.4	1.0	14.4	3%
50	0.5	9.5	0.1	5.4	0.6	15.0	2%
-	9.5	5.4	15.0	5%	OK	OK	OK

SPC Cycle 3 WO #06

SR 228 Cranberry

Raw Travel Time Data for: 2017 Weekday Peaks by Run / MD Peak Eastbound



Notes / Definitions / Abbreviations

- Units vary as indicated in tables below
- Summary Table 1 indicates feet, seconds
- Summary Table 2 indicates miles, minutes
- BLUE = Input Data via manual direct entry
- RED = Input Data via formula or worksheet reference updates
- BLACK = Data automatically calculated

NID = Node ID Number
TL = Travel Distance (from Previous Node)
CTL = Travel Distance (Cumulative)

DS = Design Speed (or assumed Free-Flow Speed)

RT_{DS} = "No Stop" Running Time @ Design Speed (from Previous Node)
CRT_{DS} = "No Stop" Running Time @ Design Speed (Cumulative)

Delay = Travel Delay (from Previous Node) = TT - RT_{DS}
CD = Travel Delay (Cumulative)

TT_{avg} = Average Field-measured Travel Time (from Previous Node)
CTT_{avg} = Average Field-measured Travel Time (Cumulative)

LS = Link Speed (as coded in Synchro Model)

RT_{LS} = "No Stop" Running Time @ Link Speed (from Previous Node)
CRT_{LS} = "No Stop" Running Time @ Link Speed (Cumulative)

Delays = Synchro Signal Delay (or other appropriate delay estimate)
CD_s = Synchro Signal Delay (Cumulative)

TT_s = Synchro-estimated Travel Time (from Previous Node)
CTT_s = Synchro-estimated Travel Time (Cumulative)

%Δ = % Error in Synchro-estimated Travel Times = (TT_{avg} - TT_s) / TT_{avg}
FIXOK = Status of Synchro-estimated Travel Times vs specified thresholds

Summary Table: Synchro Calibration Data / Calculations (feet, seconds, mph)

Node	Intersection / Link Data		FIELD TRAVEL TIME DATA				FIELD TRAVEL TIME DATA			
	TL	CTL	DS	RT _{DS}	CRT _{DS}	Delay	CD	TT _{avg}	CTT _{avg}	Travel Time (sec)
from Turnaround (#100)	0	0	-	0	0	0	0	0	0	0
to Heritage Creek Dr (#255)	2,450	2,450	50	33	33	13	13	46	46	46
to Myoma Rd (#250)	3,064	5,514	50	42	75	3	17	45	92	92
to Adams Ridge Blvd (#245)	1,813	7,347	50	25	100	13	28	36	128	128
to Seven Fields Blvd (#240)	880	8,027	45	10	110	8	36	18	146	146
to High Pointe Dr / Castle Creek Dr (#235)	775	8,802	45	12	122	6	41	17	163	163
to High Pointe Dr / Castle Creek Dr Ext (#230)	1,957	10,759	45	30	152	1	42	31	194	194
to Franklin Rd (#225)	2,671	13,430	45	40	192	32	74	72	266	266
to Kristoffer Dr (#220)	1,658	15,088	45	25	217	4	77	29	294	294
to Cranberry Commons Dr (#215)	799	15,887	45	12	229	4	81	16	310	310
to Cranberry Woods Dr (#210)	1,040	16,927	45	16	245	3	84	19	329	329
to L-79 NB Ramps (#205)	1,449	18,375	45	22	267	10	94	32	361	361
to L-79 SB Ramps (#200)	1,119	19,494	45	17	284	8	102	25	386	386
to US 19 (#135)	1,292	20,787	45	20	304	58	160	78	464	464
to Connector St (#140)	675	21,462	45	11	315	5	165	16	480	480
to Cranberry Mall Dr (#335)	335	22,122	40	11	326	8	172	19	498	498
to Executive Dr (#330)	310	22,432	40	5	331	16	188	21	519	519
to McIntyre Ln/Commonwealth Dr (#325)	325	23,607	40	20	351	3	191	23	542	542
to Haldeman Dr (#320)	320	24,453	40	14	365	0	191	14	556	556
to Thorn Hill Rd (#315)	315	25,594	40	20	385	0	191	20	576	576
to Haine School Rd/Laporte Dr (#310)	310	27,053	40	35	420	37	228	72	648	648
to Valley Forge Dr/Parkwood Dr (#305)	305	28,773	40	36	456	30	258	66	714	714
to Powell Rd (#300)	300	31,597	40	31	487	5	263	36	750	750
to Turnaround (#299)	490	32,087	40	8	495	0	264	8	759	759
Corridor Average	22,122			326		172		498		

Specified Threshold for Synchro link-to-link travel times

Specified Threshold for Synchro end-to-end travel time

SYNCHRO DATA									
Speed (mph)	Running Time (sec @ LS)	CRT _{LS}	Delays	CD _s	TT _s	Travel Time (sec)	Synchro Error		
LS	0	0	0	0	0	0	%Δ	FIXOK	
17	35	35	10	10	44	44	4%	OK	
45	44	79	2	11	45	90	0%	OK	
40	31	110	3	15	34	124	6%	OK	
45	10	120	11	26	21	145	-17%	OK	
40	13	133	5	30	18	163	-8%	OK	
45	28	161	7	37	35	198	-14%	OK	
40	46	207	21	58	66	264	8%	OK	
45	28	234	6	64	34	298	-17%	OK	
40	11	245	7	71	18	316	-15%	OK	
45	14	259	8	79	22	338	-16%	OK	
40	28	288	2	81	30	368	6%	OK	
45	21	309	4	85	25	393	1%	OK	
40	25	334	42	127	67	461	13%	OK	
45	13	347	3	130	16	477	-4%	OK	
40	10	358	9	139	20	497	-6%	OK	
45	5	362	22	161	26	523	-28%	FIX	
40	20	382	7	168	27	550	-20%	OK	
45	13	396	6	174	20	570	-38%	FIX	
40	17	413	3	177	20	590	2%	OK	
45	40	453	18	195	58	648	20%	OK	
40	54	507	7	202	60	708	9%	OK	
45	33	539	10	211	42	750	-18%	OK	
40	8	548	0	211	8	759	1%	OK	
-	358		139		497		0%	OK	



Notes / Definitions / Abbreviations

- Units vary as indicated in tables below
- Summary Table 1 indicates feet, seconds
- Summary Table 2 indicates miles, minutes
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- RED = Input Data via formula or worksheet reference updates
- BLACK = Data automatically calculated

NID = Node ID Number
TL = Travel Distance (from Previous Node)
CTL = Travel Distance (Cumulative)

DS = Design Speed (or assumed Free-Flow Speed)

RT_{DS} = "No Stop" Running Time @ Design Speed (from Previous Node)
CRT_{DS} = "No Stop" Running Time @ Design Speed (Cumulative)

Delay = Travel Delay (from Previous Node) = TT - RT_{DS}
CD = Travel Delay (Cumulative)

TT_{avg} = Average Field-measured Travel Time (from Previous Node)
CTT_{avg} = Average Field-measured Travel Time (Cumulative)

LS = Link Speed (as coded in Synchro Model)

RT_{LS} = "No Stop" Running Time @ Link Speed (from Previous Node)
CRT_{LS} = "No Stop" Running Time @ Link Speed (Cumulative)

Delays_s = Synchro Signal Delay (or other appropriate delay estimate)
CD_s = Synchro Signal Delay (Cumulative)

TT_s = Synchro-estimated Travel Time (from Previous Node)
CTT_s = Synchro-estimated Travel Time (Cumulative)

%Δ = % Error in Synchro-estimated Travel Times = $(TT_{avg} - TT_s) / TT_{avg}$
FIX/OK = Status of Synchro-estimated Travel Times vs specified thresholds

Summary Table: Synchro Calibration Data / Calculations (miles, minutes, mph)

FIELD TRAVEL TIME DATA									
Intersection / Link Data		Travel Length (miles)		Speed (mph)	Running Time (min @ DS)		Travel Delay (min)		Travel Time (min)
Node	NID	TL	CTL	DS	RT _{DS}	CRT _{DS}	Delay	CD	TT _{avg}
from Turnaround (#100)	100	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
to Heritage Creek Dr (#255)	255	0.5	0.5	50	0.6	0.0	0.2	0.2	0.8
to Myoma Rd (#250)	250	0.6	1.0	50	0.7	0.0	0.1	0.3	0.8
to Adams Ridge Blvd (#245)	245	0.3	1.4	50	0.4	0.0	0.2	0.5	0.6
to Seven Fields Blvd (#240)	240	0.1	1.5	45	0.2	0.0	0.1	0.6	0.3
to High Pointe Dr / Castle Creek Dr (#235)	235	0.1	1.7	45	0.2	0.0	0.1	0.7	0.3
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	0.4	2.0	45	0.5	0.0	0.0	0.7	0.5
to Franklin Rd (#225)	225	0.5	2.5	45	0.7	0.0	0.5	1.2	1.2
to Kristoffer Dr (#220)	220	0.3	2.9	45	0.4	0.0	0.1	1.3	0.5
to Cranberry Commons Dr (#215)	215	0.2	3.0	45	0.2	0.0	0.1	1.4	0.3
to Cranberry Woods Dr (#210)	210	0.2	3.2	45	0.3	0.0	0.0	1.4	0.3
to I-79 NB Ramps (#205)	205	0.3	3.5	45	0.4	0.0	0.2	1.6	0.5
to I-79 SB Ramps (#200)	200	0.2	3.7	45	0.3	0.0	0.1	1.7	0.4
to US 19 (#135)	135	0.2	3.9	45	0.3	0.0	1.0	2.7	1.3
to Connector St (#340)	340	0.1	4.1	45	0.2	0.0	0.1	2.7	0.3
to Cranberry Mall Dr (#335)	335	0.1	4.2	40	0.2	0.0	0.1	2.9	0.3
to Executive Dr (#330)	330	0.1	4.2	40	0.1	0.0	0.3	3.1	0.3
to McIntyre Ln/Commonwealth Dr (#325)	325	0.2	4.5	40	0.3	0.0	0.0	3.2	0.4
to Haldeman Dr (#320)	320	0.2	4.6	40	0.2	0.0	0.0	3.2	0.2
to Thom Hill Rd (#315)	315	0.2	4.8	40	0.3	0.0	0.0	3.2	0.3
to Haine School Rd/Laporte Dr (#310)	310	0.4	5.2	40	0.6	0.0	0.6	3.8	1.2
to Valley Forge Dr/Parkwood Dr (#305)	305	0.4	5.6	40	0.6	0.0	0.5	4.3	1.1
to Powell Rd (#300)	300	0.3	6.0	40	0.5	0.0	0.1	4.4	0.6
to Turnaround (#299)	299	0.1	6.1	40	0.1	0.0	0.0	4.4	0.1
Corridor Average		4.2	-	-	0.0		2.9		8.3

SYNCHRO DATA									
Speed (mph)	Running Time (min @ LS)	CRT _{LS}	Delays _s	CD _s	TT _s	Travel Time (min)	Synchro Error	%Δ	FIX/OK
-	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-
48	0.6	0.6	0.2	0.2	0.7	0.7	4%	0%	OK
48	0.7	1.3	0.0	0.2	0.8	1.5	0%	0%	OK
40	0.5	1.8	0.1	0.2	0.6	2.1	6%	0%	OK
46	0.2	2.0	0.2	0.4	0.4	2.4	-17%	0%	OK
40	0.2	2.2	0.1	0.5	0.3	2.7	-8%	0%	OK
47	0.5	2.7	0.1	0.6	0.6	3.3	-14%	0%	OK
40	0.8	3.4	0.3	1.0	1.1	4.4	8%	0%	OK
41	0.5	3.9	0.1	1.1	0.6	5.0	-17%	0%	OK
50	0.2	4.1	0.1	1.2	0.3	5.3	-15%	0%	OK
50	0.2	4.3	0.1	1.3	0.4	5.6	-15%	0%	OK
35	0.5	4.8	0.0	1.3	0.5	6.1	9%	0%	OK
36	0.4	5.1	0.1	1.4	0.4	6.6	1%	0%	OK
35	0.4	5.6	0.7	2.1	1.1	7.7	13%	0%	OK
35	0.2	5.8	0.1	2.2	0.3	8.0	-4%	0%	OK
43	0.2	6.0	0.2	2.3	0.3	8.3	-6%	0%	OK
46	0.1	6.0	0.4	2.7	0.4	8.7	-28%	0%	FIX
40	0.3	6.4	0.1	2.8	0.5	9.2	-20%	0%	OK
43	0.2	6.6	0.1	2.9	0.3	9.5	-38%	0%	FIX
45	0.3	6.9	0.0	3.0	0.3	9.8	2%	0%	OK
35	0.7	7.5	0.3	3.2	1.0	10.8	20%	0%	OK
27	0.9	8.4	0.1	3.4	1.0	11.8	9%	0%	OK
38	0.5	9.0	0.2	3.5	0.7	12.5	-18%	0%	OK
40	0.1	9.1	0.0	3.5	0.1	12.6	1%	0%	OK
-	6.0	-	2.3	-	8.3	-	0%	0%	OK

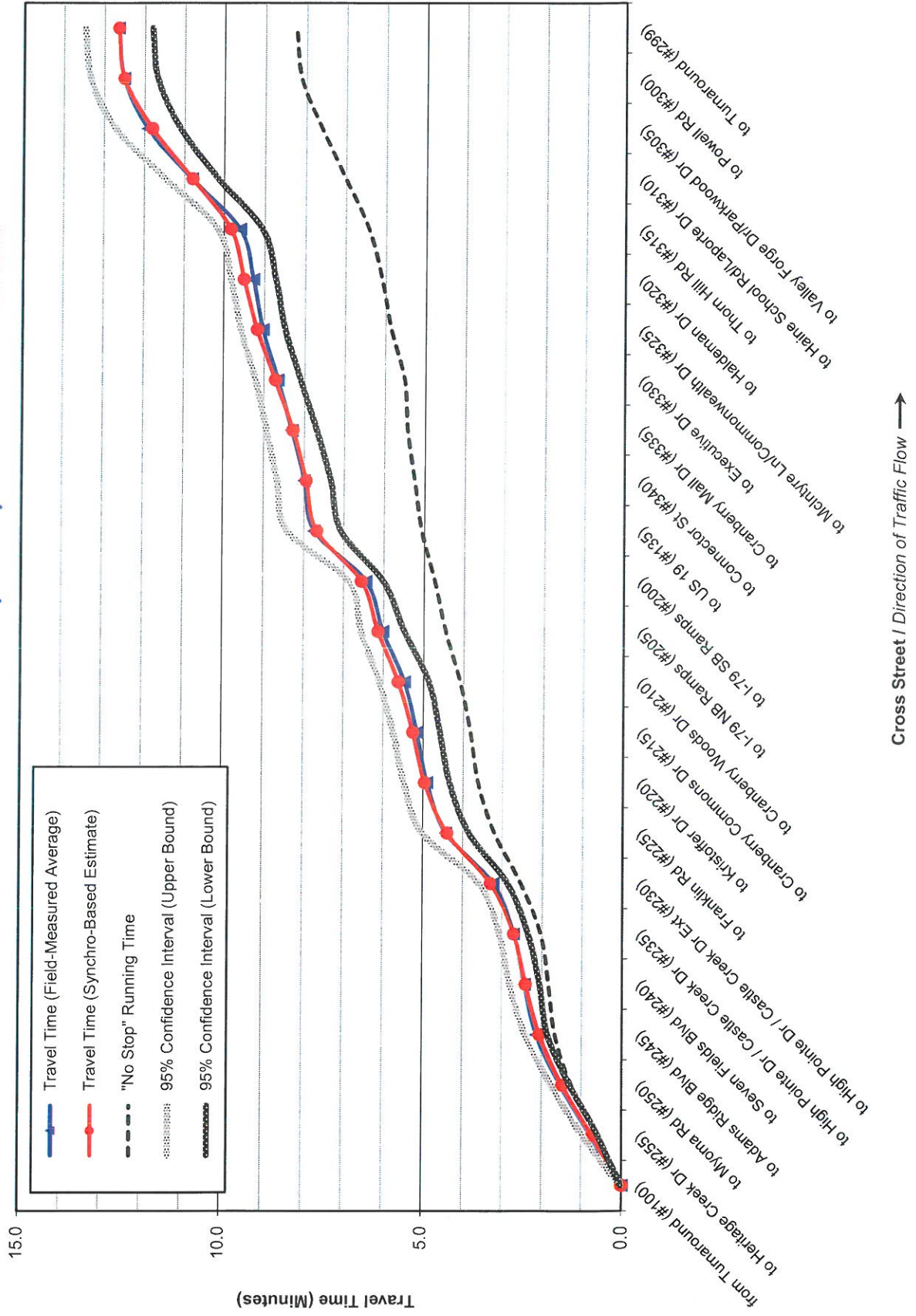
Specified Threshold for Synchro link-to-link travel times:
Specified Threshold for Synchro end-to-end travel time:

20%
10%

SPC Cycle 3 WO #06

SR 228 Cranberry

Raw Travel Time Data for: 2017 Weekday Peaks by Run / MD Peak Westbound





Whitman, Requaert & Associates, LLP
2003 Main Street, Suite 200, Cranberry Township, PA 15006

SPC CYCLE 3 WO #06
Travel Time Summary (Synchro Calibration Check)

Corridor: SR 228: Cranberry
Direction: Eastbound
Scenario: PM Peak

Notes / Definitions / Abbreviations

- Units vary as indicated in tables below
- Summary Table 1 indicates feet, seconds
- Summary Table 2 indicates miles, minutes
- BLUE = Input Data via manual direct entry
- RED = Input Data via formula or worksheet reference updates
- BLACK = Data automatically calculated
- DS = Design Speed (or assumed Free-Flow Speed)
- RT_{0.5} = "No Stop" Running Time @ Design Speed (from Previous Node)
- CRT_{0.5} = "No Stop" Running Time @ Design Speed (Cumulative)
- Delay = Travel Delay (from Previous Node) = TT - RT_{0.5}
- CD = Travel Delay (Cumulative)
- TT_{avg} = Average Field-measured Travel Time (from Previous Node)
- CTT_{avg} = Average Field-measured Travel Time (Cumulative)
- NID = Node ID Number
- TL = Travel Distance (from Previous Node)
- CTL = Travel Distance (Cumulative)
- LS = Link Speed (as coded in Synchro Model)
- RT_{LS} = "No Stop" Running Time @ Link Speed (from Previous Node)
- CRT_{LS} = "No Stop" Running Time @ Link Speed (Cumulative)
- Delays = Synchro Signal Delay (or other appropriate delay estimate)
- CD_s = Synchro Signal Delay (Cumulative)
- TT_s = Synchro-estimated Travel Time (from Previous Node)
- CTT_s = Synchro-estimated Travel Time (Cumulative)
- %Δ = % Error in Synchro-estimated Travel Times = (TT_{avg} - TT_s) / TT_{avg}
- FIXOK = Status of Synchro-estimated Travel Times vs specified thresholds

Summary Table: Synchro Calibration Data / Calculations (feet, seconds, mph)

Node	Intersection / Link Data				FIELD TRAVEL TIME DATA				
	NID	TL	CTL	Speed (mph)	Running Time (sec @ DS)	Travel Delay (sec)	Travel Time (sec)	Travel Time (sec)	Travel Time (sec)
from Turnaround (#100)	100	0	0	-	0	0	0	0	0
to Powell Rd (#200)	300	491	491	40	8	15	23	23	23
to Valley Forge Dr/Parkwood Dr (#305)	305	1,824	2,315	40	31	39	8	23	62
to Haine School Rd/Laporte Dr (#310)	310	2,128	4,441	40	36	75	16	39	52
to Thorn Hill Rd (#315)	315	2,050	6,491	40	35	110	20	68	64
to Haldeman Dr (#320)	320	1,164	7,654	40	20	130	49	117	69
to McIntyre Ln/Commonwealth Dr (#325)	325	839	8,494	40	14	144	45	162	59
to Executive Dr (#330)	330	1,165	9,659	40	20	164	21	184	41
to Cranberry Mall Dr (#335)	335	307	9,966	40	5	169	16	200	21
to Connector St (#340)	340	864	10,630	40	11	180	30	230	41
to US 19 (#35)	135	884	11,314	40	12	192	47	277	58
to I-79 SB Ramps (#200)	200	1,283	12,597	40	22	214	1	278	23
to I-79 NB Ramps (#205)	205	1,106	13,703	45	17	231	0	278	17
to Cranberry Woods Dr (#210)	210	1,442	15,145	45	22	253	24	302	46
to Cranberry Commons Dr (#215)	215	1,040	16,185	45	16	269	3	306	19
to Kristoffer Dr (#220)	220	799	16,984	45	12	281	1	307	13
to Franklin Rd (#225)	225	1,674	18,658	45	25	306	63	370	88
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	2,632	21,290	45	40	346	24	394	64
to High Pointe Dr / Castle Creek Dr (#235)	235	1,972	23,262	45	30	376	13	407	43
to Seven Fields Blvd (#240)	240	775	24,037	45	12	388	5	412	17
to Adams Ridge Blvd (#245)	245	880	24,717	45	10	398	2	414	12
to Myoma Rd (#250)	250	1,817	26,534	45	27	425	14	428	41
to Heritage Creek Dr (#255)	255	3,070	29,604	50	42	467	8	435	50
to Scherberry Ln (#260)	260	2,440	32,044	50	33	500	44	479	77
Corridor Average		32,044		-	500	479		979	

Speed (mph)	Running Time (sec @ LS)				Synchro Delay (sec)				Travel Time (sec)		Synchro Error	
	RT _{LS}	CD _s	TT _s	%Δ	RT _{LS}	CD _s	TT _s	%Δ	FIXOK	FIXOK	FIXOK	FIXOK
0	0	0	0	0	0	0	0	0	0	0	-	-
10	10	16	26	26	16	26	26	-12%	OK	OK	OK	OK
35	35	44	4	20	38	64	1%	OK	OK	OK	OK	OK
41	86	8	28	49	114	5%	OK	OK	OK	OK	OK	OK
40	125	21	48	61	175	4%	OK	OK	OK	OK	OK	OK
28	152	4	53	30	205	57%	FIX	FIX	FIX	FIX	FIX	FIX
16	168	18	71	35	239	42%	FIX	FIX	FIX	FIX	FIX	FIX
23	191	14	85	37	276	10%	OK	OK	OK	OK	OK	OK
6	197	13	98	19	295	12%	OK	OK	OK	OK	OK	OK
13	210	13	111	26	321	36%	FIX	FIX	FIX	FIX	FIX	FIX
13	223	107	218	120	441	-103%	FIX	FIX	FIX	FIX	FIX	FIX
22	245	3	221	25	466	-7%	OK	OK	OK	OK	OK	OK
17	262	13	234	30	496	-72%	FIX	FIX	FIX	FIX	FIX	FIX
25	286	30	264	54	550	-18%	OK	OK	OK	OK	OK	OK
18	304	0	264	18	568	7%	OK	OK	OK	OK	OK	OK
12	316	5	269	17	585	-34%	FIX	FIX	FIX	FIX	FIX	FIX
29	345	17	286	46	631	48%	FIX	FIX	FIX	FIX	FIX	FIX
45	390	17	303	61	692	4%	OK	OK	OK	OK	OK	OK
34	423	9	312	42	735	1%	OK	OK	OK	OK	OK	OK
11	436	13	324	26	761	-52%	FIX	FIX	FIX	FIX	FIX	FIX
47	447	14	338	25	785	-110%	FIX	FIX	FIX	FIX	FIX	FIX
29	477	13	351	42	828	-4%	OK	OK	OK	OK	OK	OK
47	523	14	365	61	889	-22%	FIX	FIX	FIX	FIX	FIX	FIX
37	560	44	409	81	969	-5%	OK	OK	OK	OK	OK	OK
-	560	409	969	1%	OK	OK	OK	OK	OK	OK	OK	OK

Specified Threshold for Synchro link-to-link travel times:
Specified Threshold for Synchro end-to-end travel time:
20%
10%

SYNCHRO DATA

Notes / Definitions / Abbreviations

- Units vary as indicated in tables below
 - Summary Table 1 indicates feet, seconds
 - Summary Table 2 indicates miles, minutes
 - BLUE = Input Data via manual direct entry
 - RED = Input Data via formula or worksheet reference updates
 - BLACK = Data automatically calculated
- DS = Design Speed (or assumed Free-Flow Speed)
 RT_{os} = "No Stop" Running Time @ Design Speed (from Previous Node)
 CRT_{os} = "No Stop" Running Time @ Design Speed (Cumulative)
 Delay = Travel Delay (from Previous Node) = TT - RT_{os}
 CD = Travel Delay (Cumulative)
 TT_{avg} = Average Field-measured Travel Time (from Previous Node)
 CTT_{avg} = Average Field-measured Travel Time (Cumulative)
- NID = Node ID Number
 TL = Travel Distance (from Previous Node)
 CTL = Travel Distance (Cumulative)
- LS = Link Speed (as coded in Synchro Model)
 RT_{LS} = "No Stop" Running Time @ Link Speed (from Previous Node)
 CRT_{LS} = "No Stop" Running Time @ Link Speed (Cumulative)
 Delays = Synchro Signal Delay (or other appropriate delay estimate)
 CD_s = Synchro Signal Delay (Cumulative)
 TT_s = Synchro-estimated Travel Time (from Previous Node)
 CTT_s = Synchro-estimated Travel Time (Cumulative)
 %Δ = % Error in Synchro-estimated Travel Times = $(TT_{avg} - TT_s) / TT_{avg}$
 FIX/OK = Status of Synchro-estimated Travel Times vs specified thresholds

Summary Table: Synchro Calibration Data / Calculations (miles, minutes, mph)

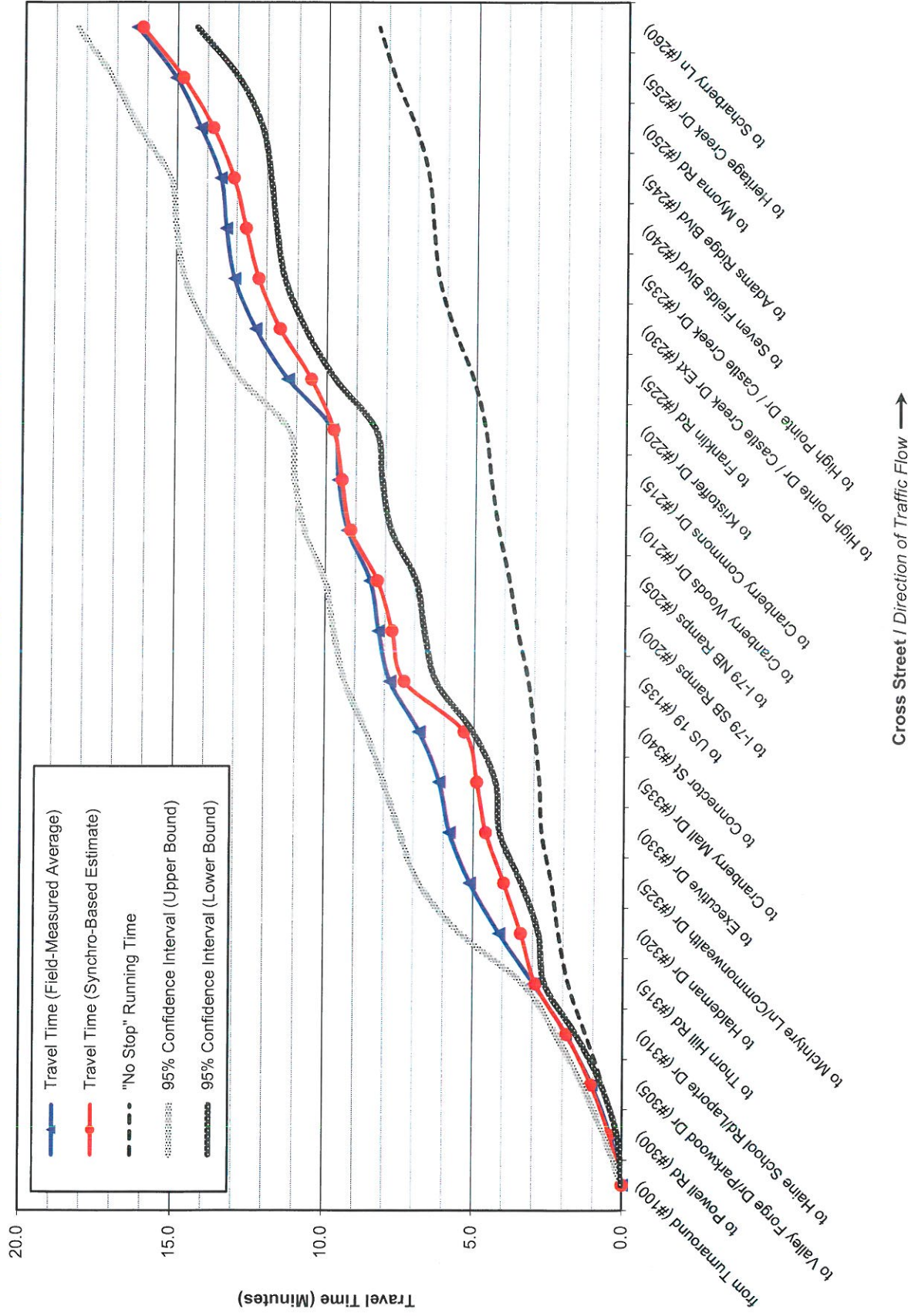
FIELD TRAVEL TIME DATA										
Intersection / Link Data		Travel Length (mile)			Speed (mph)	Running Time (min @ DS)		Travel Delay (min)		Travel Time (min)
Node	NID	TL	CTL	DS	RT _{DS}	CRT _{DS}	Delay	CD	TT _{avg}	CTT _{avg}
from Turnaround (#100)	100	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0
to Powell Rd (#300)	300	0.1	0.1	40	0.1	0.0	0.3	0.3	0.4	0.4
to Valley Forge Dr/Parkwood Dr (#305)	305	0.3	0.4	40	0.5	0.0	0.1	0.4	0.7	1.0
to Haine School Rd/Laporte Dr (#310)	310	0.4	0.8	40	0.6	0.0	0.3	0.7	0.9	1.9
to Thorn Hill Rd (#315)	315	0.4	1.2	40	0.6	0.0	0.5	1.1	1.1	3.0
to Haldeman Dr (#320)	320	0.2	1.4	40	0.3	0.0	0.8	2.0	1.2	4.1
to McIntyre Ln/Commonwealth Dr (#325)	325	0.2	1.6	40	0.2	0.0	0.8	2.7	1.0	5.1
to Executive Dr (#330)	330	0.2	1.8	40	0.3	0.0	0.4	3.1	0.7	5.8
to Cranberry Mall Dr (#335)	335	0.1	1.9	40	0.1	0.0	0.3	3.3	0.4	6.1
to Connector St (#340)	340	0.1	2.0	40	0.2	0.0	0.5	3.8	0.7	6.8
to US 19 (#135)	135	0.1	2.1	40	0.2	0.0	0.8	4.6	1.0	7.8
to I-79 SB Ramps (#200)	200	0.2	2.4	40	0.4	0.0	0.0	4.6	0.4	8.2
to I-79 NB Ramps (#205)	205	0.2	2.6	45	0.3	0.0	0.0	4.6	0.3	8.5
to Cranberry Woods Dr (#210)	210	0.3	2.9	45	0.4	0.0	0.4	5.0	0.8	9.3
to Cranberry Commons Dr (#215)	215	0.2	3.1	45	0.3	0.0	0.1	5.1	0.3	9.6
to Kristoffer Dr (#220)	220	0.2	3.2	45	0.2	0.0	0.0	5.1	0.2	9.8
to Franklin Rd (#225)	225	0.3	3.5	45	0.4	0.0	1.1	6.2	1.5	11.3
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	0.5	4.0	45	0.7	0.0	0.4	6.6	1.1	12.3
to High Pointe Dr / Castle Creek Dr (#235)	235	0.4	4.4	45	0.5	0.0	0.2	6.8	0.7	13.1
to Seven Fields Blvd (#240)	240	0.1	4.6	45	0.2	0.0	0.1	6.9	0.3	13.3
to Adams Ridge Blvd (#245)	245	0.1	4.7	45	0.2	0.0	0.0	6.9	0.2	13.5
to Myoma Rd (#250)	250	0.3	5.0	45	0.5	0.0	0.2	7.1	0.7	14.2
to Heritage Creek Dr (#255)	255	0.6	5.6	50	0.7	0.0	0.1	7.3	0.8	15.0
to Scharberry Ln (#260)	260	0.5	6.1	50	0.6	0.0	0.7	8.0	1.3	16.3
Corridor Average		6.1		-	0.0		8.0			16.3

SYNCHRO DATA										20%	10%
Specified Threshold for Synchro link-to-link travel times:											
Specified Threshold for Synchro end-to-end travel time:											
Speed (mph)	Running Time (min @ LS)	RT _{LS}	CRT _{LS}	Delays	CD _s	TT _s	CTT _s	Synchro Error	%Δ		
-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-		
35	0.2	0.2	0.3	0.3	0.4	0.4	0.4	-12%	OK		
36	0.6	0.7	0.1	0.3	0.6	1.1	1.1	1%	OK		
35	0.7	1.4	0.1	0.5	0.8	1.9	1.9	5%	OK		
35	0.7	2.1	0.4	0.8	1.0	2.9	2.9	4%	OK		
30	0.4	2.5	0.1	0.9	0.5	3.4	3.4	57%	FIX		
35	0.3	2.8	0.3	1.2	0.6	4.0	4.0	42%	FIX		
35	0.4	3.2	0.2	1.4	0.6	4.6	4.6	10%	OK		
35	0.1	3.3	0.2	1.6	0.3	4.9	4.9	12%	OK		
35	0.2	3.5	0.2	1.9	0.4	5.3	5.3	36%	FIX		
35	0.2	3.7	1.8	3.6	2.0	7.4	7.4	-103%	FIX		
40	0.4	4.1	0.0	3.7	0.4	7.8	7.8	-7%	OK		
45	0.3	4.4	0.2	3.9	0.5	8.3	8.3	-72%	FIX		
40	0.4	4.8	0.5	4.4	0.9	9.2	9.2	-16%	OK		
40	0.3	5.1	0.0	4.4	0.3	9.5	9.5	7%	OK		
45	0.2	5.3	0.1	4.5	0.3	9.8	9.8	-34%	FIX		
40	0.5	5.7	0.3	4.8	0.8	10.5	10.5	48%	FIX		
40	0.7	6.5	0.3	5.0	1.0	11.5	11.5	4%	OK		
40	0.6	7.1	0.1	5.2	0.7	12.2	12.2	1%	OK		
40	0.2	7.3	0.2	5.4	0.4	12.7	12.7	-52%	FIX		
42	0.2	7.5	0.2	5.6	0.4	13.1	13.1	-110%	FIX		
42	0.5	7.9	0.2	5.8	0.7	13.8	13.8	-4%	OK		
45	0.8	8.7	0.2	6.1	1.0	14.8	14.8	-22%	FIX		
45	0.6	9.3	0.7	6.8	1.3	16.2	16.2	-5%	OK		
-	9.3			6.8		16.2		1%	OK		

SPC Cycle 3 WO #06

SR 228 Cranberry

Raw Travel Time Data for: 2017 Weekday Peaks by Run / PM Peak Eastbound





Notes / Definitions / Abbreviations

- Units vary as indicated in tables below
- Summary Table 1 indicates feet, seconds
- Summary Table 2 indicates miles, minutes
- BLUE = Input Data via manual direct entry
- RED = Input Data via formula or worksheet reference updates
- BLACK = Data automatically calculated
- DS = Design Speed (or assumed Free-Flow Speed)
- RT_{0.5} = "No Stop" Running Time @ Design Speed (from Previous Node)
- CRT_{0.5} = "No Stop" Running Time @ Design Speed (Cumulative)
- Delay = Travel Delay (from Previous Node) = RT_{0.5}
- CD = Travel Delay (Cumulative)
- TT_{avg} = Average Field-measured Travel Time (from Previous Node)
- CTT_{avg} = Average Field-measured Travel Time (Cumulative)
- NID = Node ID Number
- TL = Travel Distance (from Previous Node)
- CTL = Travel Distance (Cumulative)
- LS = Link Speed (as coded in Synchro Model)
- RT_{LS} = "No Stop" Running Time @ Link Speed (from Previous Node)
- CRT_{LS} = "No Stop" Running Time @ Link Speed (Cumulative)
- Delays = Synchro Signal Delay (or other appropriate delay estimate)
- CD_s = Synchro Signal Delay (Cumulative)
- TT_s = Synchro-estimated Travel Time (from Previous Node)
- CTT_s = Synchro-estimated Travel Time (Cumulative)
- %ΔΔ = % Error in Synchro-estimated Travel Times = $(TT_{avg} - TT_s) / TT_{avg}$
- FIXOK = Status of Synchro-estimated Travel Times vs specified thresholds

Summary Table: Synchro Calibration Data / Calculations (feet, seconds, mph)

FIELD TRAVEL TIME DATA									
Intersection / Link Data		Travel Length (feet)		Speed (mph)	Running Time (sec @ DS)		Travel Delay (sec)		Travel Time
Node	NID	TL	CTL	DS	RT _{DS}	CRT _{DS}	Delay	CD	TT _{avg} CTT _{avg}
from Turnaround (#100)	100	0	0	-	0	0	0	0	0
to Heritage Creek Dr. (#255)	255	2,450	2,450	50	33	33	30	30	63
to Myoma Rd. (#250)	250	3,081	5,531	50	42	75	3	33	108
to Adams Ridge Blvd. (#245)	245	1,813	7,345	50	25	100	14	48	148
to Seven Fields Blvd. (#240)	240	683	8,028	45	10	110	13	60	170
to High Pointe Dr / Castle Creek Dr. (#235)	235	775	8,803	45	12	122	2	62	184
to High Pointe Dr / Castle Creek Dr Ext. (#230)	230	1,960	10,763	45	30	152	20	82	234
to Franklin Rd. (#225)	225	2,634	13,397	45	40	192	32	114	306
to Kristoffer Dr. (#220)	220	1,658	15,055	45	25	217	6	120	337
to Cranberry Commons Dr. (#215)	215	799	15,854	45	12	229	2	122	351
to Cranberry Woods Dr. (#210)	210	1,040	16,894	45	16	245	20	142	387
to I-79 NB Ramps (#205)	205	1,446	18,340	45	22	267	9	151	418
to I-79 SB Ramps (#200)	200	1,107	19,447	45	17	284	7	158	442
to US 19 (#135)	135	1,312	20,759	45	20	304	70	229	533
to Connector St. (#340)	340	676	21,434	45	11	315	13	241	556
to Cranberry Mall Dr. (#335)	335	680	22,094	40	11	326	12	253	579
to Executive Dr. (#330)	330	307	22,402	40	5	331	14	267	598
to McIntyre Ln/Commonwealth Dr. (#325)	325	1,174	23,576	40	20	351	13	280	631
to Haldeman Dr. (#320)	320	847	24,423	40	14	365	15	296	651
to Thorn Hill Rd. (#315)	315	1,146	25,569	40	20	385	49	344	729
to Haine School Rd./Laporte Dr. (#310)	310	2,049	27,618	40	35	420	29	373	793
to Valley Forge Dr/Parkwood Dr. (#305)	305	2,123	29,741	40	36	456	24	398	850
to Powell Rd. (#300)	300	1,829	31,570	40	31	487	26	423	910
to Turnaround (#299)	299	490	32,060	40	8	495	2	426	921
Corridor Average		32,060		-	495		426		921

Specified Threshold for Synchro link-to-link travel times:
Specified Threshold for Synchro end-to-end travel time:

SYNCHRO DATA							20%	10%
Speed (mph)	Running Time (sec @ LS)	Synchro Delay (sec)	Travel Time (sec)	Synchro Error	CTT _s	%ΔΔ	FIXOK	
LS	RT _{LS}	Delays _s	TT _s					
0	0	0	0	0	0	-	-	-
33	44	19	63	-1%	63	-1%	OK	
50	42	3	45	0%	108	0%	OK	
40	31	9	40	0%	148	0%	OK	
45	10	127	137	-19%	175	-19%	OK	
47	11	138	149	-10%	191	-10%	OK	
45	33	171	204	-16%	233	-16%	OK	
40	45	216	261	-19%	318	-19%	OK	
45	28	244	272	-5%	350	-5%	OK	
45	11	255	266	-13%	366	-13%	OK	
45	14	269	283	-2%	403	-2%	OK	
45	21	290	311	-12%	437	-12%	OK	
40	19	309	328	1%	461	1%	OK	
35	26	334	360	17%	536	17%	OK	
30	13	348	361	19%	555	19%	OK	
25	18	366	384	3%	577	3%	OK	
35	6	372	378	-10%	598	-10%	OK	
35	23	394	417	6%	629	6%	OK	
30	23	418	441	1%	658	1%	OK	
27	29	447	476	39%	700	39%	FIX	
30	40	486	516	12%	756	12%	OK	
30	48	535	583	13%	809	13%	OK	
30	36	570	606	20%	854	20%	OK	
30	9	580	610	-6%	865	-6%	OK	
-	580	286	865	6%	865	6%	OK	



Whitman, Requaardt & Associates, LLP
2009 Main Street, Suite 200, Cranberry Township, PA 15066

SPC CYCLE 3 WO #06
Travel Time Summary (Synchro Calibration Check)

Corridor: SR 228, Cranberry
Direction: Westbound
Scenario: PM Peak

Notes / Definitions / Abbreviations

- Units vary as indicated in tables below
- Summary Table 1 indicates feet, seconds
- Summary Table 2 indicates miles, minutes
- BLUE = Input Data via manual direct entry
- RED = Input Data via formula or worksheet reference updates
- BLACK = Data automatically calculated

NID = Node ID Number
TL = Travel Distance (from Previous Node)
CTL = Travel Distance (Cumulative)

DS = Design Speed (or assumed Free-Flow Speed)

RT_{0s} = "No Stop" Running Time @ Design Speed (from Previous Node)
CRT_{0s} = "No Stop" Running Time @ Design Speed (Cumulative)

Delay = Travel Delay (from Previous Node) = TT - RT_{0s}
CD = Travel Delay (Cumulative)

TT_{avg} = Average Field-measured Travel Time (from Previous Node)
CTT_{avg} = Average Field-measured Travel Time (Cumulative)

LS = Link Speed (as coded in Synchro Model)

RT_{LS} = "No Stop" Running Time @ Link Speed (from Previous Node)
CRT_{LS} = "No Stop" Running Time @ Link Speed (Cumulative)

Delay_{LS} = Synchro Signal Delay (or other appropriate delay estimate)
CD_{LS} = Synchro Signal Delay (Cumulative)

TT_{LS} = Synchro-estimated Travel Time (from Previous Node)
CTT_{LS} = Synchro-estimated Travel Time (Cumulative)

%Δ = % Error in Synchro-estimated Travel Times = $(TT_{avg} - TT_{LS}) / TT_{avg}$
FIXOK = Status of Synchro-estimated Travel Times vs specified thresholds

Summary Table: Synchro Calibration Data / Calculations (miles, minutes, mph)

FIELD TRAVEL TIME DATA									
Intersection / Link Data		Travel Length (mile)		Speed (mph)	Running Time (min @ DS)		Travel Delay (min)		Travel Time (min)
Node	NID	TL	CTL	DS	RT _{DS}	CRT _{DS}	Delay	CD	TT _{avg}
from Turnaround (#100)	100	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0
to Heritage Creek Dr (#255)	255	0.5	0.5	50	0.6	0.0	0.5	0.5	1.0
to Myoma Rd (#250)	250	0.6	1.0	50	0.7	0.0	0.1	0.6	0.8
to Adams Ridge Blvd (#245)	245	0.3	1.4	50	0.4	0.0	0.2	0.8	0.7
to Seven Fields Blvd (#240)	240	0.1	1.5	45	0.2	0.0	0.2	1.0	0.4
to High Pointe Dr / Castle Creek Dr (#235)	235	0.1	1.7	45	0.2	0.0	0.0	1.0	0.2
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	0.4	2.0	45	0.5	0.0	0.3	1.4	0.8
to Franklin Rd (#225)	225	0.5	2.5	45	0.7	0.0	0.5	1.9	1.2
to Kristoffer Dr (#220)	220	0.3	2.9	45	0.4	0.0	0.1	2.0	0.5
to Cranberry Commons Dr (#215)	215	0.2	3.0	45	0.2	0.0	0.0	2.0	0.2
to Cranberry Woods Dr (#210)	210	0.2	3.2	45	0.3	0.0	0.3	2.4	0.6
to L-79 NB Ramps (#205)	205	0.3	3.5	45	0.4	0.0	0.1	2.5	0.5
to L-79 SB Ramps (#200)	200	0.2	3.7	45	0.3	0.0	0.1	2.6	0.4
to US 19 (#135)	135	0.2	3.9	45	0.3	0.0	0.2	3.8	1.5
to Connector St (#340)	340	0.1	4.1	45	0.2	0.0	0.2	4.0	0.4
to Cranberry Mall Dr (#335)	335	0.1	4.2	40	0.2	0.0	0.2	4.2	0.4
to Executive Dr (#330)	330	0.1	4.2	40	0.1	0.0	0.2	4.5	0.3
to McIntyre Ln/Commonwealth Dr (#325)	325	0.2	4.5	40	0.3	0.0	0.2	4.7	0.6
to Haldeman Dr (#320)	320	0.2	4.6	40	0.2	0.0	0.3	4.9	0.5
to Thorn Hill Rd (#315)	315	0.2	4.8	40	0.3	0.0	0.8	5.7	1.1
to Haine School Rd/Laporte Dr (#310)	310	0.4	5.2	40	0.6	0.0	0.5	6.2	1.1
to Valley Forge Dr/Parkwood Dr (#305)	305	0.4	5.6	40	0.6	0.0	0.4	6.6	1.0
to Powell Rd (#300)	300	0.3	6.0	40	0.5	0.0	0.4	7.1	0.9
to Turnaround (#295)	299	0.1	6.1	40	0.1	0.0	0.0	7.1	0.2
Corridor Average		6.1		-	0.0		7.1		15.3

SYNCHRO DATA									
Speed (mph)	Running Time (min @ LS)	Synchro Delay (min)	Travel Time (min)	Synchro Error	TT _s	CTT _s	%Δ	FIXOK	
LS	RT _{LS}	CD _{LS}	TT _s						
-	0.0	0.0	0.0	0.0	0.0	0.0	-	-	-
38	0.7	0.3	0.3	1.1	1.1	1.1	-1%	OK	
50	0.7	1.4	0.1	0.4	0.8	1.8	0%	OK	
40	0.5	1.9	0.1	0.5	0.7	2.5	0%	OK	
48	0.2	2.1	0.3	0.8	0.5	2.9	-19%	OK	
47	0.2	2.3	0.1	0.9	0.3	3.2	-10%	OK	
40	0.6	2.9	0.1	1.0	0.7	3.9	16%	OK	
40	0.7	3.6	0.7	1.7	1.4	5.3	-19%	OK	
40	0.5	4.1	0.1	1.8	0.5	5.8	-5%	OK	
50	0.2	4.3	0.1	1.9	0.3	6.1	-13%	OK	
50	0.2	4.5	0.4	2.2	0.6	6.7	-2%	OK	
48	0.3	4.8	0.2	2.4	0.6	7.3	-12%	OK	
40	0.3	5.1	0.1	2.5	0.4	7.7	1%	OK	
35	0.4	5.6	0.8	3.4	1.2	8.9	17%	OK	
35	0.2	5.8	0.1	3.5	0.3	9.3	19%	OK	
25	0.3	6.1	0.1	3.5	0.4	9.6	3%	OK	
35	0.1	6.2	0.2	3.8	0.3	10.0	-10%	OK	
35	0.4	6.6	0.1	3.9	0.5	10.5	6%	OK	
25	0.4	7.0	0.1	4.0	0.5	11.0	1%	OK	
27	0.5	7.4	0.2	4.2	0.7	11.7	39%	FIX	
35	0.7	8.1	0.3	4.5	0.9	12.6	12%	OK	
30	0.8	8.9	0.1	4.6	0.9	13.5	13%	OK	
35	0.6	9.5	0.2	4.7	0.8	14.2	20%	OK	
36	0.2	9.7	0.0	4.8	0.2	14.4	-6%	OK	
-	9.7	4.8	14.4	6%	OK				

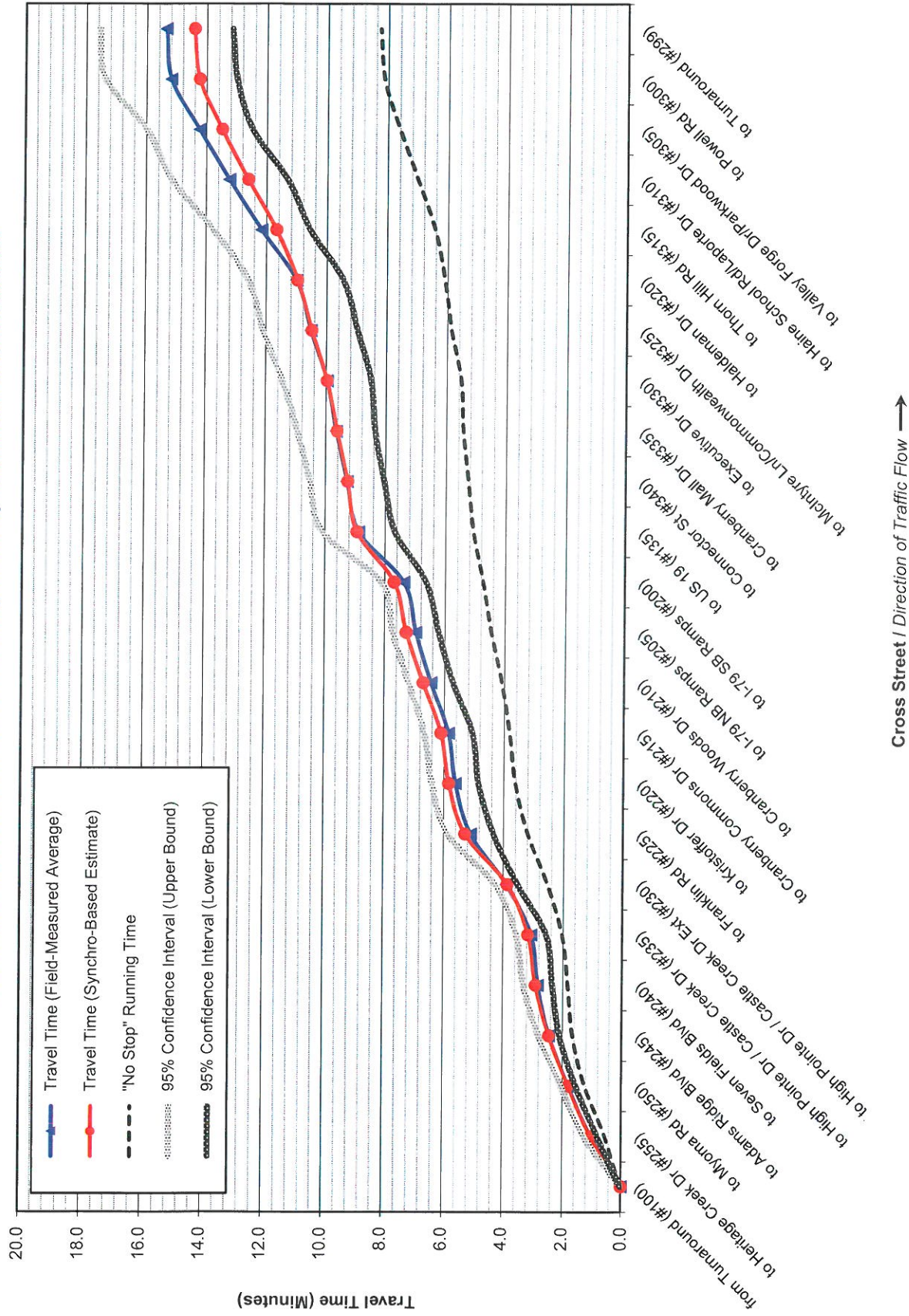
Specified Threshold for Synchro link-to-link travel times:
Specified Threshold for Synchro end-to-end travel time:

20%
10%

SPC Cycle 3 WO #06

SR 228 Cranberry

Raw Travel Time Data for: 2017 Weekday Peaks by Run / PM Peak Westbound



Notes / Definitions / Abbreviations

- * Units vary as indicated in tables below
- * Summary Table 1 indicates feet, seconds
- * Summary Table 2 indicates miles, minutes
- * BLUE = Input Data via manual direct entry
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- RT_{os} = "No Stop" Running Time @ Design Speed (from Previous Node)
- CR_{os} = "No Stop" Running Time @ Design Speed (Cumulative)
- Delay = Travel Delay (from Previous Node) = TT - RT_{os}
- CD = Travel Delay (Cumulative)
- TT_{avg} = Average Field-measured Travel Time (from Previous Node)
- CTT_{avg} = Average Field-measured Travel Time (Cumulative)
- NID = Node ID Number
- TL = Travel Distance (from Previous Node)
- CTL = Travel Distance (Cumulative)
- LS = Link Speed (as coded in Synchro Model)
- RT_{LS} = "No Stop" Running Time @ Link Speed (from Previous Node)
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- Delays = Synchro Signal Delay (or other appropriate delay estimate)
- CD_s = Synchro Signal Delay (Cumulative)
- TT_s = Synchro-estimated Travel Time (from Previous Node)
- CTT_s = Synchro-estimated Travel Time (Cumulative)
- %ΔΔ = % Error in Synchro-estimated Travel Times = (TT_{avg} - TT_s) / TT_{avg}
- FIXOK = Status of Synchro-estimated Travel Times vs specified thresholds

Summary Table: Synchro Calibration Data / Calculations (feet, seconds, mph)

FIELD TRAVEL TIME DATA										
Intersection / Link Data		Travel Length (feet)			Speed (mph)	Running Time (sec @ DS)		Travel Delay (sec)		Travel Time (sec)
Node	NID	TL	CTL	DS	RT _{DS}	CRT _{DS}	Delay	CD	TT _{avg}	CTT _{avg}
from Turnaround (#100)	100	0	0	0	0	0	0	0	0	0
to Powell Rd (#300)	300	453	493	40	8	8	26	26	34	34
to Valley Forge Dr/Parkwood Dr (#305)	305	1,824	2,317	40	31	39	1	27	32	66
to Haine School Rd/Laporte Dr (#310)	310	2,124	4,441	40	36	75	18	45	54	120
to Thorn Hill Rd (#315)	315	2,047	6,488	40	35	110	4	49	39	159
to Haldeman Dr (#320)	320	1,162	7,649	40	20	130	6	55	26	185
to McIntyre Ln/Commonwealth Dr (#325)	325	835	8,485	40	14	144	15	70	29	214
to Executive Dr (#330)	330	1,168	9,653	40	20	164	33	103	53	267
to Cranberry Mall Dr (#335)	335	307	9,960	40	5	169	17	120	22	289
to Connector St (#340)	340	675	10,635	40	11	180	19	139	30	319
to US 19 (#135)	135	682	11,317	40	12	192	87	226	99	418
to I-79 SB Ramps (#200)	200	1,283	12,600	40	22	214	0	226	22	440
to I-79 NB Ramps (#205)	205	1,106	13,706	45	17	231	0	226	17	457
to Cranberry Woods Dr (#210)	210	1,441	15,147	45	22	253	15	241	37	494
to Cranberry Commons Dr (#215)	215	1,040	16,188	45	16	269	4	245	20	514
to Kistler Dr (#220)	220	799	16,987	45	12	281	2	247	14	528
to Franklin Rd (#225)	225	1,661	18,648	45	25	306	10	258	35	564
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	2,629	21,277	45	40	346	6	263	46	609
to High Pointe Dr / Castle Creek Dr (#235)	235	1,972	23,248	45	30	376	0	264	30	640
to Seven Fields Blvd (#240)	240	783	24,031	45	12	388	16	279	28	667
to Adams Ridge Blvd (#245)	245	680	24,711	45	10	398	18	298	28	696
to Myoma Rd (#250)	250	1,814	26,525	45	27	425	4	301	31	726
to Heritage Creek Dr (#255)	255	3,071	29,596	50	42	467	7	309	49	776
to Schaberry Ln (#260)	260	2,444	32,040	50	33	500	7	316	40	816
Corridor Average		32,040		-	500		316		816	

SYNCHRO DATA										
Speed (mph)	Running Time (sec @ LS)	Delays	CD _s	TT _s	CTT _s	%ΔΔ	FIXOK	Travel Time (sec)	Synchro Error	
LS	RT _{LS}	CR _{LS}	CD _s	TT _s	CTT _s	%ΔΔ	FIXOK			
0	0	0	0	0	0	-	-			
35	10	10	22	32	32	7%	OK			
40	31	41	6	29	37	-16%	OK			
45	41	82	17	45	58	-9%	OK			
50	37	119	10	55	46	-17%	OK			
55	22	141	9	64	31	205	-19%	OK		
60	14	155	20	84	34	239	-17%	OK		
65	30	184	16	100	45	284	15%	OK		
70	6	190	14	114	20	304	8%	OK		
75	12	201	21	135	32	336	-8%	OK		
80	13	215	106	241	119	456	-21%	FIX		
85	20	235	1	243	21	477	4%	OK		
90	15	249	4	246	18	495	-7%	OK		
95	23	272	20	267	43	538	-17%	OK		
100	18	290	1	268	19	558	6%	OK		
105	12	301	16	284	27	585	-96%	FIX		
110	28	329	12	296	40	625	-12%	OK		
115	44	373	5	301	49	673	-7%	OK		
120	32	405	4	305	36	709	-19%	OK		
125	20	424	6	310	25	735	8%	OK		
130	12	436	14	324	25	760	12%	OK		
135	31	467	5	329	36	796	-17%	OK		
140	47	513	4	333	51	847	-3%	OK		
145	33	546	7	340	40	887	0%	OK		
-	546	340	887	-9%	OK					

Specified Threshold for Synchro link-to-link travel times:
Specified Threshold for Synchro end-to-end travel times:

20%
10%

Notes / Definitions / Abbreviations

- Units vary as indicated in tables below
 - Summary Table 1 indicates feet, seconds
 - Summary Table 2 indicates miles, minutes
 - BLUE = Input Data via manual direct entry
 - RED = Input Data via formula or worksheet reference updates
 - BLACK = Data automatically calculated
- DS** = Design Speed (or assumed Free-Flow Speed)
RT_{0.5} = "No Stop" Running Time @ Design Speed (from Previous Node)
CRT_{0.5} = "No Stop" Running Time @ Design Speed (Cumulative)
Delay = Travel Delay (from Previous Node) = $TT - RT_{0.5}$
CD = Travel Delay (Cumulative)
TT_{avg} = Average Field-measured Travel Time (from Previous Node)
CTT_{avg} = Average Field-measured Travel Time (Cumulative)
NID = Node ID Number
TL = Travel Distance (from Previous Node)
CTL = Travel Distance (Cumulative)
- LS** = Link Speed (as coded in Synchro Model)
RT_{LS} = "No Stop" Running Time @ Link Speed (from Previous Node)
CRT_{LS} = "No Stop" Running Time @ Link Speed (Cumulative)
Delays = Synchro Signal Delay (or other appropriate delay estimate)
CD_s = Synchro Signal Delay (Cumulative)
TT_s = Synchro-estimated Travel Time (from Previous Node)
CTT_s = Synchro-estimated Travel Time (Cumulative)
%Δ = % Error in Synchro-estimated Travel Times = $(TT_{avg} - TT_s) / TT_{avg}$
FIXOK = Status of Synchro-estimated Travel Times vs specified thresholds

Summary Table: Synchro Calibration Data / Calculations (miles, minutes, mph)

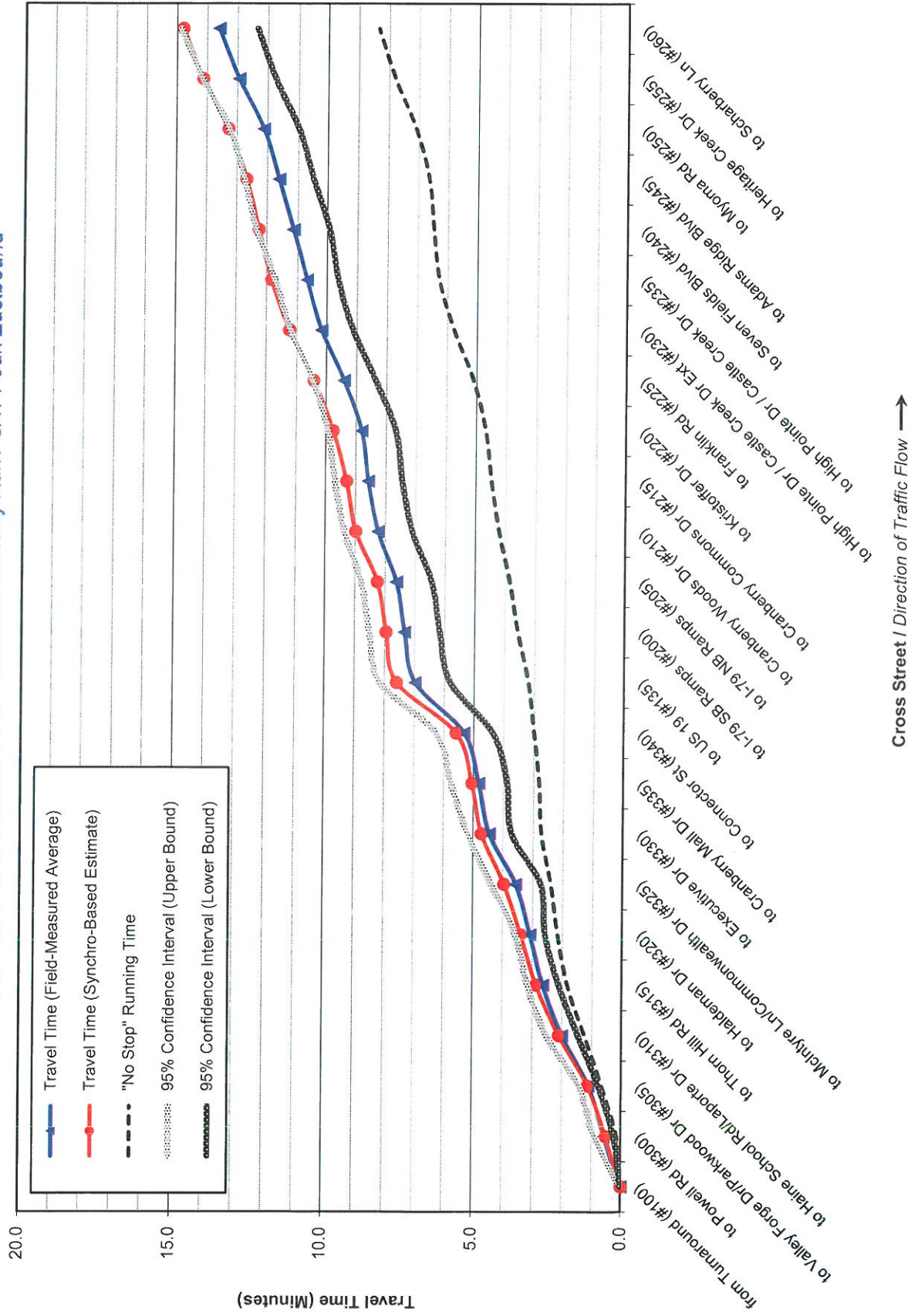
FIELD TRAVEL TIME DATA								
Intersection / Link Data		Travel Length (mile)		Speed (mph)	Running Time (min @ DS)		Travel Delay (min)	Travel Time (min)
Node	NID	TL	CTL	DS	RT _{DS}	CRT _{DS}	CD	TT _{exp} = CRT _{exp}
from Turnaround (#100)	100	0.0	0.0	-	0.0	0.0	0.0	0.0
to Powell Rd (#300)	300	0.1	0.1	40	0.1	0.0	0.4	0.6
to Valley Forge Dr/Parkwood Dr (#305)	305	0.3	0.4	40	0.5	0.0	0.5	0.5
to Haine School Rd/Laporte Dr (#310)	310	0.4	0.8	40	0.6	0.0	0.3	0.9
to Thorn Hill Rd (#315)	315	0.4	1.2	40	0.6	0.0	0.1	0.8
to Haldeman Dr (#320)	320	0.2	1.4	40	0.3	0.0	0.1	0.9
to McIntyre Ln/Commonwealth Dr (#325)	325	0.2	1.6	40	0.2	0.0	0.2	1.2
to Executive Dr (#330)	330	0.2	1.8	40	0.3	0.0	0.6	1.7
to Cranberry Mall Dr (#335)	335	0.1	1.9	40	0.1	0.0	0.3	2.0
to Connector St (#340)	340	0.1	2.0	40	0.2	0.0	0.3	2.3
to US 19 (#135)	135	0.1	2.1	40	0.2	0.0	1.5	3.8
to I-79 SB Ramps (#200)	200	0.2	2.4	40	0.4	0.0	0.0	3.8
to I-79 NB Ramps (#205)	205	0.2	2.6	45	0.3	0.0	0.0	3.8
to Cranberry Woods Dr (#210)	210	0.3	2.9	45	0.4	0.0	0.2	4.0
to Cranberry Commons Dr (#215)	215	0.2	3.1	45	0.3	0.0	0.1	4.1
to Kristoffer Dr (#220)	220	0.2	3.2	45	0.2	0.0	0.0	4.1
to Franklin Rd (#225)	225	0.3	3.5	45	0.4	0.0	0.2	4.3
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	0.5	4.0	45	0.7	0.0	0.1	4.4
to High Pointe Dr / Castle Creek Dr (#235)	235	0.4	4.4	45	0.5	0.0	0.0	4.4
to Seven Fields Blvd (#240)	240	0.1	4.6	45	0.2	0.0	0.3	4.7
to Adams Ridge Blvd (#245)	245	0.1	4.7	45	0.2	0.0	0.3	5.0
to Myoma Rd (#250)	250	0.3	5.0	45	0.5	0.0	0.1	5.0
to Heritage Creek Dr (#255)	255	0.6	5.6	50	0.7	0.0	0.1	5.1
to Scharberry Ln (#260)	260	0.5	6.1	50	0.6	0.0	0.1	5.3
Corridor Average		6.1		-	0.0		5.3	13.6

		SYNCHRO DATA							Synchro Error
Speed (mph)	Running Time (min @ LS)	RT _{LS}	CRT _{LS}	Delay _s	CD _s	TT _s	CTT _s		
-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	
35	0.2	0.2	0.4	0.4	0.5	0.5	0.5	7% OK	
40	0.5	0.7	0.1	0.5	0.6	1.2	-16%	OK	
35	0.7	1.4	0.3	0.8	1.0	2.1	-9%	OK	
38	0.6	2.0	0.2	0.9	0.8	2.9	-19%	OK	
36	0.4	2.3	0.2	1.1	0.5	3.4	-19%	OK	
41	0.2	2.6	0.3	1.4	0.6	4.0	-17%	OK	
27	0.5	3.1	0.3	1.7	0.8	4.7	15%	OK	
37	0.1	3.2	0.2	1.9	0.3	5.1	8%	OK	
40	0.2	3.4	0.3	2.3	0.5	5.6	-8%	OK	
35	0.2	3.6	1.8	4.0	2.0	7.6	-21%	FIX	
44	0.3	3.9	0.0	4.0	0.4	8.0	4%	OK	
52	0.2	4.2	0.1	4.1	0.3	8.3	-7%	OK	
43	0.4	4.5	0.3	4.4	0.7	9.0	-17%	OK	
40	0.3	4.8	0.0	4.5	0.3	9.3	6%	OK	
47	0.2	5.0	0.3	4.7	0.5	9.7	-96%	FIX	
41	0.5	5.5	0.2	4.9	0.7	10.4	-12%	OK	
41	0.7	6.2	0.1	5.0	0.8	11.2	-7%	OK	
42	0.5	6.7	0.1	5.1	0.6	11.8	-19%	OK	
27	0.3	7.1	0.1	5.2	0.4	12.2	8%	OK	
40	0.2	7.3	0.2	5.4	0.4	12.7	12%	OK	
40	0.5	7.8	0.1	5.5	0.6	13.3	-17%	OK	
45	0.8	8.6	0.1	5.6	0.8	14.1	-3%	OK	
50	0.6	9.1	0.1	5.7	0.7	14.8	0%	OK	
-	9.1		5.7		14.8		9%	OK	

SPC Cycle 3 WO #06

SR 228 Cranberry

Raw Travel Time Data for: 2017 Weekend Peaks by Run / SAT Peak Eastbound





Whitman, Requaardt & Associates, LLP
2009 Main Street, Suite 200, Cranberry Township, PA 15006

SPC CYCLE 3 WO #06
Travel Time Summary (Synchro Calibration Check)

Corridor: SR 228, Cranberry
Direction: Westbound
Scenario: SAT Peak

Notes / Definitions / Abbreviations

- Units vary as indicated in tables below
- Summary Table 1 indicates feet, seconds
- Summary Table 2 indicates miles, minutes
- BLUE = Input Data via manual direct entry
- RED = Input Data via formula or worksheet reference updates
- BLACK = Data automatically calculated

NID = Node ID Number

TL = Travel Distance (from Previous Node)

CTL = Travel Distance (Cumulative)

DS = Design Speed (or assumed Free-Flow Speed)

RT_{DS} = "No Stop" Running Time @ Design Speed (from Previous Node)

CRT_{DS} = "No Stop" Running Time @ Design Speed (Cumulative)

Delay = Travel Delay (from Previous Node) = TT - RT_{DS}

CD = Travel Delay (Cumulative)

TT_{avg} = Average Field-measured Travel Time (from Previous Node)

CTT_{avg} = Average Field-measured Travel Time (Cumulative)

LS = Link Speed (as coded in Synchro Model)

RT_{LS} = "No Stop" Running Time @ Link Speed (from Previous Node)

CRT_{LS} = "No Stop" Running Time @ Link Speed (Cumulative)

Delays = Synchro Signal Delay (or other appropriate delay estimate)

CD_s = Synchro Signal Delay (Cumulative)

TT_s = Synchro-estimated Travel Time (from Previous Node)

CTT_s = Synchro-estimated Travel Time (Cumulative)

%ΔΔ = % Error in Synchro-estimated Travel Times = $(TT_{avg} - TT_s) / TT_{avg}$

FIXOK = Status of Synchro-estimated Travel Times vs specified thresholds

Summary Table: Synchro Calibration Data / Calculations (feet, seconds, mph)

Intersection / Link Data		FIELD TRAVEL TIME DATA								
Node	NID	Travel Length (feet)		Speed (mph)	Running Time (sec @ DS)		Travel Delay (sec)		Travel Time	
		TL	CTL		RT _{DS}	CRT _{DS}	Delay	CD	TT _{avg}	CTT _{avg}
from Turnaround (#100)	100	0	0	-	0	0	0	0	0	0
to Heritage Creek Dr (#255)	255	2,572	2,572	45	57	57	7	7	46	46
to Myoma Rd (#250)	250	3,138	5,710	45	70	127	12	19	51	96
to Adams Ridge Blvd (#245)	245	1,763	7,473	45	39	166	21	40	50	146
to Seven Fields Blvd (#240)	240	682	8,155	45	15	181	8	48	19	165
to High Pointe Dr / Castle Creek Dr (#235)	235	780	8,935	45	17	198	3	51	14	179
to High Pointe Dr / Castle Creek Dr Ext (#230)	230	2,028	10,963	45	45	244	8	59	33	212
to Franklin Rd (#225)	225	2,600	13,563	45	58	301	11	70	47	258
to Kristoffer Dr (#220)	220	1,663	15,226	45	37	338	8	78	28	287
to Cranberry Commons Dr (#215)	215	768	15,994	45	17	355	5	83	12	299
to Cranberry Woods Dr (#210)	210	1,111	17,105	45	25	380	7	91	18	316
to 1079 NB Ramps (#205)	205	1,363	18,468	45	30	410	10	101	22	338
to 1079 SB Ramps (#200)	200	1,346	19,814	45	30	440	7	108	24	362
to US 19 (#135)	135	1,094	20,908	45	25	465	81	189	103	465
to Connector St (#340)	340	663	21,571	45	15	480	2	191	16	480
to Cranberry Hall Dr (#335)	335	582	22,153	45	13	492	3	194	14	495
to Executive Dr (#330)	330	347	22,500	45	8	500	1	195	9	503
to McIntyre Ln/Commonwealth Dr (#325)	325	1,171	23,671	45	26	526	2	197	25	528
to Haldeman Dr (#320)	320	828	24,499	45	18	544	2	200	16	544
to Thom Hill Rd (#315)	315	1,154	25,654	45	26	570	2	202	23	568
to Haine School Rd/Laporte Dr (#310)	310	2,057	27,710	45	45	616	35	237	76	644
to Valley Forge Dr/Parkwood Dr (#305)	305	2,080	29,800	45	46	662	4	240	45	689
to Powell Rd (#300)	300	1,846	31,646	45	41	703	2	243	37	726
to Turnaround (#299)	299	239	31,886	45	5	708	0	243	5	730
Corridor Average		31,886		-	708		243		730	

Specified Threshold for Synchro link-to-link travel times:

Specified Threshold for Synchro end-to-end travel time	20%	10%
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SYNCHRO DATA

Speed (mph)	Running Time (sec @ LS)	Synchro Delay (sec)	Travel Time (sec)	Synchro Error
LS	RT _{LS}	Delay	TT _s	%ΔΔ
0	0	0	0	-
32	32	16	48	-5%
44	44	2	46	9%
32	107	18	125	0%
10	118	14	132	-30%
13	130	7	137	-37%
30	160	9	169	-20%
38	198	25	223	-34%
24	222	5	227	-3%
10	231	9	240	-55%
14	245	5	250	-5%
17	262	8	270	-14%
18	280	2	282	14%
21	301	65	366	16%
13	314	11	325	-48%
11	326	5	331	-14%
6	331	16	347	-15%
22	354	7	361	-17%
13	387	5	392	-14%
40	427	20	447	3%
36	462	17	479	20%
29	492	16	508	-15%
4	496	1	500	-23%
-	496	286	782	-7%



Whitman, Reardon & Associates, LLP
2020 Mainline Way, Suite 200, Cranberry Township, PA 15066

SPC CYCLE 3 WO #06
Travel Time Summary (Synchro Calibration Check)

Corridor: SR 228, Cranberry
Direction: Westbound
Scenario: SAT Peak

Notes / Definitions / Abbreviations

- Units vary as indicated in tables below
- Summary Table 1 indicates feet, seconds
- Summary Table 2 indicates miles, minutes
- BLUE = Input Data via manual direct entry
- RED = Input Data via formula or worksheet reference updates
- BLACK = Data automatically calculated

NID = Node ID Number

TL = Travel Distance (from Previous Node)

CTL = Travel Distance (Cumulative)

DS = Design Speed (or assumed Free-Flow Speed)

RT_{DS} = "No Stop" Running Time @ Design Speed (from Previous Node)

CRT_{DS} = "No Stop" Running Time @ Design Speed (Cumulative)

Delay = Travel Delay (from Previous Node) = TT - RT_{DS}

CD = Travel Delay (Cumulative)

TT_{avg} = Average Field-measured Travel Time (from Previous Node)

CTT_{avg} = Average Field-measured Travel Time (Cumulative)

LS = Link Speed (as coded in Synchro Model)

RT_{LS} = "No Stop" Running Time @ Link Speed (from Previous Node)

CRT_{LS} = "No Stop" Running Time @ Link Speed (Cumulative)

Delay_s = Synchro Signal Delay (or other appropriate delay estimate)

CD_s = Synchro Signal Delay (Cumulative)

TT_s = Synchro-estimated Travel Time (from Previous Node)

CTT_s = Synchro-estimated Travel Time (Cumulative)

%Δ = % Error in Synchro-estimated Travel Times = $(TT_{avg} - TT_s) / TT_{avg}$

FIXOK = Status of Synchro-estimated Travel Times vs specified thresholds

Summary Table: Synchro Calibration Data / Calculations (miles, minutes, mph)

FIELD TRAVEL TIME DATA										
Intersection / Link Data		Travel Length (mile)			Speed (mph)	Running Time (min @ DS)		Travel Delay (min)		Travel Time (min)
Node	NID	TL	CTL	DS	RT _{DS}	CRT _{DS}	Delay	CD	TT _{avg}	CTT _{avg}
from Turnaround (#100)	100	0.0	0.0	-	0.0	0.0	0.0	0.0	0.0	0.0
to Heritage Creek Dr. (#255)	255	0.5	0.5	45	1.0	0.0	0.1	0.1	0.8	0.8
to Myoma Rd. (#250)	250	0.6	1.1	45	1.2	0.0	0.2	0.3	0.8	1.6
to Adams Ridge Blvd. (#245)	245	0.3	1.4	45	0.7	0.0	0.4	0.7	0.8	2.4
to Seven Fields Blvd. (#240)	240	0.1	1.5	45	0.3	0.0	0.1	0.8	0.3	2.8
to High Pointe Dr / Castle Creek Dr. (#235)	235	0.1	1.7	45	0.3	0.0	0.0	0.8	0.2	3.0
to High Pointe Dr / Castle Creek Dr Ext. (#230)	230	0.4	2.1	45	0.8	0.0	0.1	1.0	0.5	3.5
to Franklin Rd. (#225)	225	0.5	2.6	45	1.0	0.0	0.2	1.2	0.8	4.3
to Kristoffer Dr. (#220)	220	0.3	2.9	45	0.6	0.0	0.1	1.3	0.5	4.8
to Cranberry Commons Dr. (#215)	215	0.1	3.0	45	0.3	0.0	0.1	1.4	0.2	5.0
to Cranberry Woods Dr. (#210)	210	0.2	3.2	45	0.4	0.0	0.1	1.5	0.3	5.3
to 1079 NB Ramps (#205)	205	0.3	3.5	45	0.5	0.0	0.2	1.7	0.4	5.6
to 1079 SB Ramps (#200)	200	0.3	3.8	45	0.5	0.0	0.1	1.8	0.4	6.0
to US 19 (#135)	135	0.2	4.0	45	0.4	0.0	1.3	3.1	1.7	7.7
to Connector St. (#340)	340	0.1	4.1	45	0.2	0.0	0.0	3.2	0.3	8.0
to Cranberry Mall Dr. (#335)	335	0.1	4.2	45	0.2	0.0	0.0	3.2	0.2	8.2
to Executive Dr. (#330)	330	0.1	4.3	45	0.1	0.0	0.0	3.3	0.1	8.4
to McIntyre Ln/Commonwealth Dr. (#325)	325	0.2	4.5	45	0.4	0.0	0.0	3.3	0.4	8.8
to Haldeman Dr. (#320)	320	0.2	4.6	45	0.3	0.0	0.0	3.3	0.3	9.1
to Thorn Hill Rd. (#315)	315	0.2	4.9	45	0.4	0.0	0.0	3.4	0.4	9.5
to Haine School Rd/Laporte Dr. (#310)	310	0.4	5.2	45	0.8	0.0	0.6	3.9	1.3	10.7
to Valley Forge Dr/Parkwood Dr. (#305)	305	0.4	5.6	45	0.8	0.0	0.1	4.0	0.8	11.5
to Powell Rd. (#300)	300	0.3	6.0	45	0.7	0.0	0.0	4.0	0.6	12.1
to Turnaround (#299)	299	0.0	6.0	45	0.1	0.0	0.0	4.1	0.1	12.2
Corridor Average		6.0		-	0.0		4			12.2

Specified Threshold for Synchro link-to-link travel times:

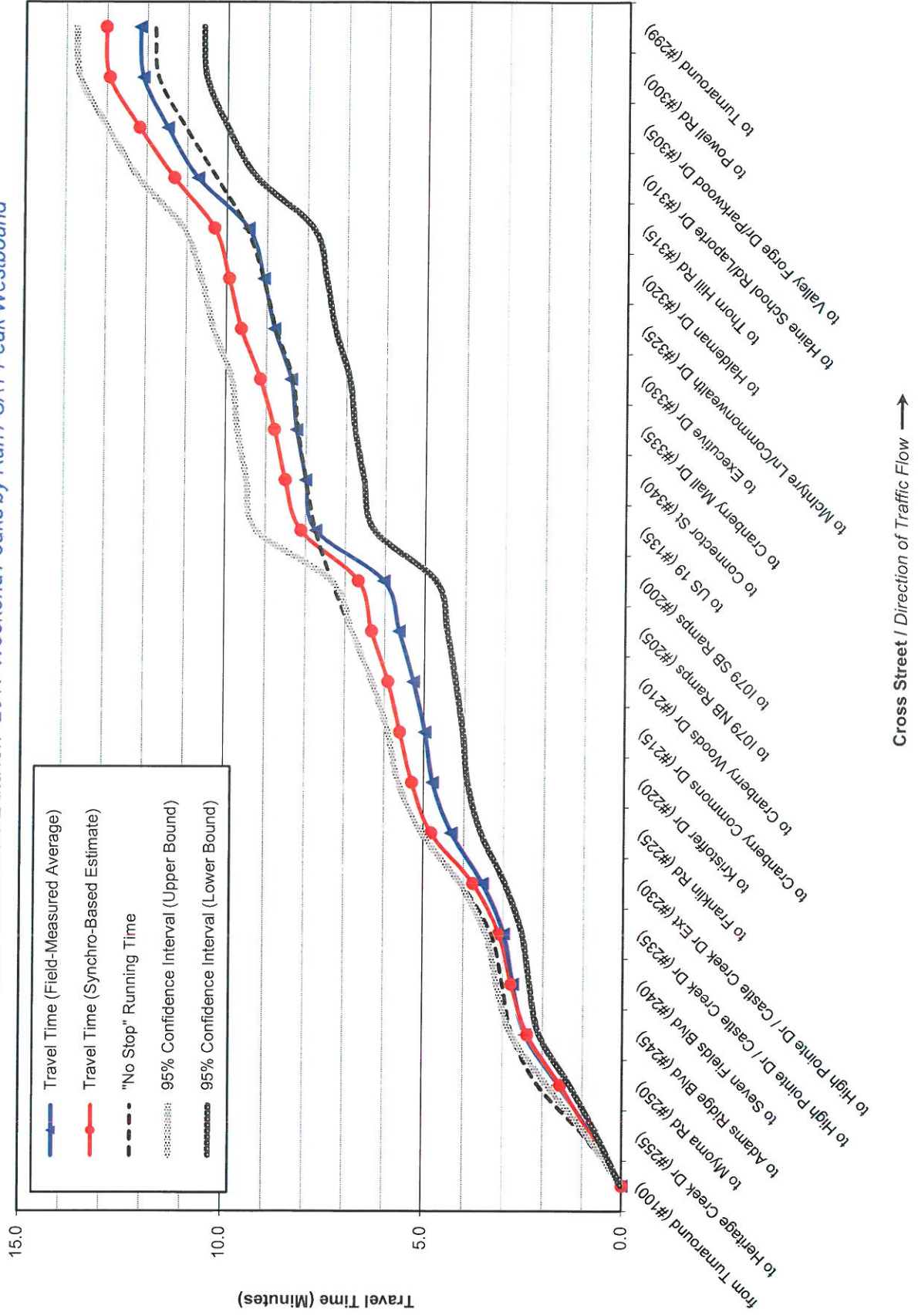
Specified Threshold for Synchro end-to-end travel times:

SYNCHRO DATA									
Speed (mph)	Running Time (min @ LS)	CRT _{LS}	Delay _s	CD _s	TT _s	Travel Time (min)	Synchro Error		
-	0.0	0.0	0.0	0.0	0.0	0.0	%Δ	FIXOK	
55	0.5	0.5	0.3	0.3	0.8	0.8	-5%	OK	
49	0.7	1.3	0.0	0.3	0.8	1.6	9%	OK	
38	0.5	1.8	0.3	0.6	0.8	2.4	0%	OK	
45	0.2	2.0	0.2	0.9	0.4	2.8	-30%	FIX	
42	0.2	2.2	0.1	1.0	0.3	3.1	-37%	FIX	
46	0.5	2.7	0.2	1.1	0.7	3.8	-20%	FIX	
47	0.6	3.3	0.4	1.5	1.0	4.8	-34%	FIX	
48	0.4	3.7	0.1	1.6	0.5	5.3	-3%	OK	
54	0.2	3.9	0.1	1.8	0.3	5.6	-55%	FIX	
55	0.2	4.1	0.1	1.8	0.3	5.9	-5%	OK	
56	0.3	4.4	0.1	2.0	0.4	6.3	-14%	OK	
50	0.3	4.7	0.0	2.0	0.3	6.7	14%	OK	
35	0.4	5.0	1.1	3.1	1.4	8.1	16%	OK	
35	0.2	5.2	0.2	3.3	0.4	8.5	-49%	FIX	
35	0.2	5.4	0.1	3.4	0.3	8.8	-14%	OK	
40	0.1	5.5	0.3	3.6	0.4	9.1	-15%	FIX	
36	0.4	5.9	0.1	3.7	0.5	9.6	-17%	OK	
42	0.2	6.1	0.1	3.8	0.3	9.9	-14%	OK	
40	0.3	6.4	0.0	3.9	0.4	10.3	3%	OK	
35	0.7	7.1	0.3	4.2	1.0	11.3	20%	FIX	
40	0.6	7.7	0.3	4.5	0.9	12.2	-15%	OK	
43	0.5	8.2	0.3	4.7	0.8	12.9	-23%	FIX	
38	0.1	8.3	0.0	4.8	0.1	13.0	-9%	OK	
-	8.3		4.8		13.0		-7%	OK	

SPC Cycle 3 WO #06

SR 228 Cranberry

Raw Travel Time Data for: 2017 Weekend Peaks by Run / SAT Peak Westbound



AM Peak

Node Number	Intersection	Delay (veh/s)	LOS	Approach Direction	Delay (veh/s)	LOS	Movement	Delay (veh/s)	LOS
310	Laporte Drive/ Haine School Road & Freedom Road	27.2	C	Freedom Road Eastbound	16.0	B	Left	8.0	A
							Through	16.5	B
							Right	16.5	B
				Freedom Road Westbound	13.0	B	Left	7.0	A
							Through	12.4	B
							Right	17.1	B
				Laporte Drive Northbound	45.6	D	Left	45.6	D
							Through	45.6	D
							Right	45.6	D
				Haine School Road Southbound	72.8	E	Left	83.2	F
							Through	45.6	D
							Right	45.6	D
315	Thorn Hill Road/ Office Parking Lot & Freedom Road	16.7	B	Freedom Road Eastbound	9.3	A	Left	4.8	A
							Through	10.9	B
							Right	4.6	A
				Freedom Road Westbound	17.3	B	Left	60.2	E
							Through	1.1	A
							Right	1.1	A
				Thorn Hill Road Northbound	64.5	E	Left	69.7	E
							Through	61.7	E
							Right	61.7	E
				Thorn Hill Southbound	62.3	E	Left	62.3	E
							Through	62.3	E
							Right	62.3	E
320	Freedom Road & Haldeman Drive	9.6	A	Freedom Road Eastbound	2.9	A	Left	1.0	A
							Through	2.9	A
							Right		A
				Freedom Road Westbound	10.5	B	Left		A
							Through	11.0	B
							Right	5.3	A
				Northbound		A	Left		A
							Through		A
							Right		A
				Haldeman Drive Southbound	70.7	E	Left	70.7	E
							Through		A
							Right	70.7	E
325	Commonwealth Drive/ McIntyre Lane & Freedom Road	29.6	C	Freedom Road Eastbound	17.5	B	Left	68.7	E
							Through	18.5	B
							Right	11.1	B
				Freedom Road Westbound	32.8	C	Left	70.1	E
							Through	7.0	A
							Right	7.0	A
				Hansen Ave Northbound	58.8	E	Left	85.5	F
							Through	85.5	F
							Right	37.0	D
				Commonwealth Drive Southbound	62.0	E	Left	58.6	E
							Through	63.1	E
							Right	63.1	E

MD Peak

Node Number	Intersection	Delay (veh/s)	LOS	Approach Direction	Delay (veh/s)	LOS	Movement	Delay (veh/s)	LOS
310	Laporte Drive/ Haine School Road & Freedom Road	24.8	C	Freedom Road Eastbound	9.9	A	Left	8.5	A
							Through	10.2	B
							Right	10.2	B
				Freedom Road Westbound	18.1	B	Left	10.9	B
							Through	18.2	B
							Right	19.0	B
				Laporte Drive Northbound	51.4	D	Left	51.4	D
							Through	51.4	D
							Right	51.4	D
				Haine School Road Southbound	69.3	E	Left	77.6	E
							Through	51.4	D
							Right	51.4	D
315	Thorn Hill Road/ Office Parking Lot & Freedom Road	16.0	B	Freedom Road Eastbound	11.7	B	Left	8.2	A
							Through	12.2	B
							Right	9.6	A
				Freedom Road Westbound	2.6	A	Left	2.5	A
							Through	2.6	A
							Right	2.6	A
				Thorn Hill Road Northbound	64.1	E	Left	74.1	E
							Through	54.6	D
							Right	54.6	D
				Thorn Hill Southbound	54.6	D	Left	54.6	D
							Through	54.6	D
							Right	54.6	D
320	Freedom Road & Haldeman Drive	13.8	B	Freedom Road Eastbound	19.9	B	Left	3.6	A
							Through	20.0	C
							Right		A
				Freedom Road Westbound	6.1	A	Left		A
							Through	6.4	A
							Right	2.5	A
				Northbound		A	Left		A
							Through		A
							Right		A
				Haldeman Drive Southbound	70.5	E	Left	70.5	E
							Through		A
							Right	70.5	E
325	Commonwealth Drive/ McIntyre Lane & Freedom Road	29.8	C	Freedom Road Eastbound	23.6	C	Left	77.6	E
							Through	24.5	C
							Right	14.3	B
				Freedom Road Westbound	24.2	C	Left	74.3	E
							Through	7.0	A
							Right	7.0	A
				Hansen Ave Northbound	48.7	D	Left	61.3	E
							Through	61.3	E
							Right	46.1	D
				Commonwealth Drive Southbound	55.8	E	Left	56.0	E
							Through	55.7	E
							Right	55.7	E

PM Peak

Node Number	Intersection	Delay (veh/s)	LOS	Approach Direction	Delay (veh/s)	LOS	Movement	Delay (veh/s)	LOS
310	Laporte Drive/ Haine School Road & Freedom Road	26.2	C	Freedom Road Eastbound	9.2	A	Left	16.2	B
							Through	8.0	A
							Right	8.0	A
				Freedom Road Westbound	14.8	B	Left	8.4	A
							Through	16.4	B
							Right	10.4	B
				Laporte Drive Northbound	70.1	E	Left	70.1	E
							Through	70.1	E
							Right	70.1	E
				Haine School Road Southbound	97.5	F	Left	133.1	F
							Through	60.0	E
							Right	60.0	E
315	Thorn Hill Road/ Office Parking Lot & Freedom Road	35.0	D	Freedom Road Eastbound	20.1	C	Left	15.5	B
							Through	21.1	C
							Right	14.8	B
				Freedom Road Westbound	12.1	B	Left	5.4	A
							Through	12.8	B
							Right	125.2	F
				Thorn Hill Road Northbound	99.3	F	Left	125.2	F
							Through	44.4	D
							Right	44.4	D
				Thorn Hill Southbound	43.5	D	Left	43.5	D
							Through	43.5	D
							Right	43.5	D
320	Freedom Road & Haldeman Drive	7.1	A	Freedom Road Eastbound	3.5	A	Left	3.7	A
							Through	3.5	A
							Right		A
				Freedom Road Westbound	5.6	A	Left		A
							Through	6.0	A
							Right	2.0	A
				Northbound		A	Left		A
							Through		A
							Right		A
				Haldeman Drive Southbound	76.3	E	Left	76.3	E
							Through		A
							Right	76.3	E
325	Commonwealth Drive/ McIntyre Lane & Freedom Road	29.8	C	Freedom Road Eastbound	18.0	B	Left	86.2	F
							Through	18.2	B
							Right	15.7	B
				Freedom Road Westbound	20.2	C	Left	92.0	F
							Through	8.3	A
							Right	8.3	A
				Hansen Ave Northbound	59.7	E	Left	67.7	E
							Through	67.7	E
							Right	56.8	E
				Commonwealth Drive Southbound	53.5	D	Left	53.9	D
							Through	53.2	D
							Right	53.2	D

SAT Peak

Node Number	Intersection	Delay (veh/s)	LOS	Approach Direction	Delay (veh/s)	LOS	Movement	Delay (veh/s)	LOS
310	Laporte Drive/ Haine School Road & Freedom Road	29.4	C	Freedom Road Eastbound	16.4	B	Left	13.3	B
							Through	16.9	B
							Right	16.9	B
				Freedom Road Westbound	19.0	B	Left	17.5	B
							Through	20.2	C
							Right	13.7	B
				Laporte Drive Northbound	48.8	D	Left	13.7	B
							Through	48.8	D
							Right	48.8	D
				Haine School Road Southbound	87.6	F	Left	104.3	F
							Through	48.8	D
							Right	48.8	D
315	Thorn Hill Road/ Office Parking Lot & Freedom Road	13.8	B	Freedom Road Eastbound	9.2	A	Left	6.3	A
							Through	9.6	A
							Right	5.6	A
				Freedom Road Westbound	2.8	A	Left	2.3	A
							Through	2.9	A
							Right	2.9	A
				Thorn Hill Road Northbound	78.8	E	Left	97.3	F
							Through	60.2	E
							Right	60.2	E
				Thorn Hill Southbound	62.0	E	Left	62.0	E
							Through	62.0	E
							Right	62.0	E
320	Freedom Road & Haldeman Drive	9.3	A	Freedom Road Eastbound	9.4	A	Left	11.7	B
							Through	9.3	A
							Right		A
				Freedom Road Westbound	4.9	A	Left		A
							Through	5.1	A
							Right	0.3	A
				Northbound		A	Left		A
							Through		A
							Right		A
				Haldeman Drive Southbound	75.1	E	Left	75.1	E
							Through		A
							Right	75.1	E
325	Commonwealth Drive/ McIntyre Lane & Freedom Road	23.1	C	Freedom Road Eastbound	18.9	B	Left	64.7	E
							Through	19.8	B
							Right	5.8	A
				Freedom Road Westbound	16.3	B	Left	68.1	E
							Through	7.0	A
							Right	7.0	A
				Hansen Ave Northbound	57.7	E	Left	74.1	E
							Through	74.1	E
							Right	47.5	D
				Commonwealth Drive Southbound	61.7	E	Left	63.7	E
							Through	59.6	E
							Right	59.6	E

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	58	909	10	18	374	84	10	62	22	253	61	36
Future Volume (vph)	58	909	10	18	374	84	10	62	22	253	61	36
Ideal Flow (vphpl)	1924	1924	1924	1924	1924	1924	1924	1924	1924	1924	1924	1924
Grade (%)		-3%			4%			0%			0%	
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0		6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85		0.97		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99		0.95	1.00	
Satd. Flow (prot)	1801	1876		1791	1654	1556		1799		1792	1678	
Flt Permitted	0.47	1.00		0.13	1.00	1.00		0.97		0.67	1.00	
Satd. Flow (perm)	900	1876		250	1654	1556		1755		1257	1678	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	59	928	10	18	382	86	10	63	22	258	62	37
RTOR Reduction (vph)	0	0	0	0	0	33	0	8	0	0	16	0
Lane Group Flow (vph)	59	938	0	18	382	53	0	87	0	258	83	0
Heavy Vehicles (%)	3%	4%	0%	0%	14%	3%	10%	3%	0%	2%	0%	22%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6			2		2	4			8		
Actuated Green, G (s)	95.2	90.4		92.8	89.2	89.2		33.0		33.0	33.0	
Effective Green, g (s)	95.2	90.4		92.8	89.2	89.2		33.0		33.0	33.0	
Actuated g/C Ratio	0.66	0.62		0.64	0.62	0.62		0.23		0.23	0.23	
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0		6.0		6.0	6.0	
Vehicle Extension (s)	3.0	5.0		3.0	5.0	5.0		2.0		2.0	2.0	
Lane Grp Cap (vph)	620	1169		198	1017	957		399		286	381	
v/s Ratio Prot	c0.00	c0.50		0.00	0.23						0.05	
v/s Ratio Perm	0.06			0.06		0.03		0.05		c0.21		
v/c Ratio	0.10	0.80		0.09	0.38	0.06		0.22		0.90	0.22	
Uniform Delay, d1	9.2	20.6		19.2	14.0	11.1		45.5		54.4	45.5	
Progression Factor	0.87	0.58		0.35	0.82	1.53		1.00		1.00	1.00	
Incremental Delay, d2	0.1	4.5		0.2	1.0	0.1		0.1		28.8	0.1	
Delay (s)	8.0	16.5		7.0	12.4	17.1		45.6		83.2	45.6	
Level of Service	A	B		A	B	B		D		F	D	
Approach Delay (s)		16.0			13.0			45.6			72.8	
Approach LOS		B			B			D			E	
Intersection Summary												
HCM 2000 Control Delay		27.2										
HCM 2000 Volume to Capacity ratio		0.81										
Actuated Cycle Length (s)		145.0								18.0		
Intersection Capacity Utilization		78.4%								D		
Analysis Period (min)		15										
Description: Signal Permit No. TS-065-10												
Date Issued: 9/23/88												
c Critical Lane Group												

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	876	303	165	417	20	57	4	102	7	5	2
Future Volume (vph)	5	876	303	165	417	20	57	4	102	7	5	2
Ideal Flow (vphpl)	1924	1924	1924	1924	1924	1924	1924	1924	1924	1924	1924	1924
Lane Width	12	12	12	12	12	12	11	11	12	12	12	12
Grade (%)		-2%			2%			1%			-1%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		7.0	7.0				7.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.86			0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			0.97	
Satd. Flow (prot)	1538	1868	1588	1740	1693		1674	1469			1387	
Flt Permitted	0.49	1.00	1.00	0.19	1.00		0.75	1.00			0.73	
Satd. Flow (perm)	796	1868	1588	343	1693		1318	1469			1039	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	952	329	179	453	22	62	4	111	8	5	2
RTOR Reduction (vph)	0	0	70	0	1	0	0	102	0	0	2	0
Lane Group Flow (vph)	5	952	259	179	474	0	62	13	0	0	13	0
Heavy Vehicles (%)	20%	4%	4%	4%	12%	6%	5%	0%	8%	50%	0%	50%
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		6		5	2			4			8	
Permitted Phases	6		6	2			4			8		
Actuated Green, G (s)	104.9	104.9	104.9	119.7	119.7		12.3	12.3			12.3	
Effective Green, g (s)	104.9	104.9	104.9	119.7	119.7		12.3	12.3			12.3	
Actuated g/C Ratio	0.72	0.72	0.72	0.83	0.83		0.08	0.08			0.08	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		7.0	7.0			7.0	
Vehicle Extension (s)	6.0	6.0	6.0	3.0	6.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	575	1351	1148	367	1397		111	124			88	
v/s Ratio Prot		c0.51		c0.03	0.28			0.01				
v/s Ratio Perm	0.01		0.16	0.37			c0.05				0.01	
v/c Ratio	0.01	0.70	0.23	0.49	0.34		0.56	0.11			0.15	
Uniform Delay, d1	5.6	11.3	6.6	12.6	3.1		63.7	61.3			61.5	
Progression Factor	0.85	0.78	0.65	4.70	0.17		1.00	1.00			1.00	
Incremental Delay, d2	0.0	2.2	0.3	1.0	0.6		6.0	0.4			0.8	
Delay (s)	4.8	10.9	4.6	60.2	1.1		69.7	61.7			62.3	
Level of Service	A	B	A	E	A		E	E			E	
Approach Delay (s)		9.3			17.3			64.5			62.3	
Approach LOS		A			B			E			E	
Intersection Summary												
HCM 2000 Control Delay			16.7			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			145.0			Sum of lost time (s)			19.0			
Intersection Capacity Utilization			77.1%			ICU Level of Service			D			
Analysis Period (min)			15									
Description: Signal Permit No. TS-176-10												
Date Issued: 6-2-03												
c Critical Lane Group												

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	4	981	596	67	93	6
Future Volume (vph)	4	981	596	67	93	6
Ideal Flow (vphpl)	1924	1924	1924	1924	1924	1924
Grade (%)		1%	0%		0%	
Total Lost time (s)	6.0	6.0	6.0	8.0	8.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	1.00	0.85	0.99	
Flt Protected	0.95	1.00	1.00	1.00	0.96	
Satd. Flow (prot)	1819	1823	1815	1460	1823	
Flt Permitted	0.36	1.00	1.00	1.00	0.96	
Satd. Flow (perm)	698	1823	1815	1460	1823	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	4	1022	621	70	97	6
RTOR Reduction (vph)	0	0	0	10	2	0
Lane Group Flow (vph)	4	1022	621	60	101	0
Heavy Vehicles (%)	0%	5%	6%	12%	0%	0%
Turn Type	pm+pt	NA	NA	pm+ov	Prot	
Protected Phases	5	2	6	4	4	
Permitted Phases	2			6		
Actuated Green, G (s)	118.5	118.5	111.5	124.0	12.5	
Effective Green, g (s)	118.5	118.5	111.5	124.0	12.5	
Actuated g/C Ratio	0.82	0.82	0.77	0.86	0.09	
Clearance Time (s)	6.0	6.0	6.0	8.0	8.0	
Vehicle Extension (s)	2.0	6.0	6.0	2.0	2.0	
Lane Grp Cap (vph)	578	1489	1395	1248	157	
v/s Ratio Prot	0.00	c0.56	0.34	0.00	c0.06	
v/s Ratio Perm	0.01			0.04		
v/c Ratio	0.01	0.69	0.45	0.05	0.64	
Uniform Delay, d1	3.5	5.5	5.9	1.6	64.1	
Progression Factor	0.30	0.18	1.72	3.34	1.00	
Incremental Delay, d2	0.0	1.9	0.9	0.0	6.6	
Delay (s)	1.0	2.9	11.0	5.3	70.7	
Level of Service	A	A	B	A	E	
Approach Delay (s)		2.9	10.5		70.7	
Approach LOS		A	B		E	
Intersection Summary						
HCM 2000 Control Delay		9.6		HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio		0.71				
Actuated Cycle Length (s)		145.0		Sum of lost time (s)	20.0	
Intersection Capacity Utilization		68.1%		ICU Level of Service	C	
Analysis Period (min)		15				
Description: Signal Permit No. TS-009-10						
Date Issued: 08/12/69						
Date Revised: 11/30/05						
c Critical Lane Group						

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	890	180	412	594	3	63	5	83	44	120	6
Future Volume (vph)	4	890	180	412	594	3	63	5	83	44	120	6
Ideal Flow (vphpl)	1924	1924	1924	1924	1924	1924	1924	1924	1924	1924	1924	1924
Lane Width	11	12	11	11	12	12	12	11	11	11	11	12
Grade (%)		1%			1%			1%			3%	
Total Lost time (s)	3.5	3.5	3.5	3.5	3.5			4.0	3.5	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00			1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1758	1823	1557	3377	1805			1690	1344	1740	1819	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.44	1.00	0.66	1.00	
Satd. Flow (perm)	1758	1823	1557	3377	1805			770	1344	1217	1819	
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)	4	937	189	434	625	3	66	5	87	46	126	6
RTOR Reduction (vph)	0	0	51	0	0	0	0	0	62	0	1	0
Lane Group Flow (vph)	4	937	138	434	628	0	0	71	25	46	131	0
Heavy Vehicles (%)	0%	5%	1%	1%	6%	0%	5%	0%	17%	0%	0%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	1	6		5	2			4	5		8	
Permitted Phases			6				4		4	8		
Actuated Green, G (s)	2.4	89.6	89.6	21.1	108.3			16.3	37.4	16.3	16.3	
Effective Green, g (s)	4.9	92.1	92.1	23.6	110.8			18.3	42.4	18.3	18.3	
Actuated g/C Ratio	0.03	0.64	0.64	0.16	0.76			0.13	0.29	0.13	0.13	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	59	1157	988	549	1379			97	425	153	229	
v/s Ratio Prot	0.00	c0.51		c0.13	0.35				0.01		0.07	
v/s Ratio Perm			0.09					c0.09	0.01	0.04		
v/c Ratio	0.07	0.81	0.14	0.79	0.46			0.73	0.06	0.30	0.57	
Uniform Delay, d1	67.8	19.9	10.6	58.3	6.2			61.0	36.9	57.5	59.7	
Progression Factor	1.01	0.69	1.03	1.10	1.00			1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.4	4.7	0.2	6.0	0.8			24.5	0.1	1.1	3.4	
Delay (s)	68.7	18.5	11.1	70.1	7.0			85.5	37.0	58.6	63.1	
Level of Service	E	B	B	E	A			F	D	E	E	
Approach Delay (s)		17.5			32.8			58.8			62.0	
Approach LOS		B			C			E			E	
Intersection Summary												
HCM 2000 Control Delay			29.6			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.80									
Actuated Cycle Length (s)			145.0			Sum of lost time (s)				11.0		
Intersection Capacity Utilization			83.6%			ICU Level of Service				E		
Analysis Period (min)			15									
Description: Signal Permit No. TS-094-10												
Date Issued: 01/11/94												
Date Revised: 11/30/05												
c Critical Lane Group												

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	495	6	25	600	164	9	40	10	190	36	51
Future Volume (vph)	85	495	6	25	600	164	9	40	10	190	36	51
Ideal Flow (vphpl)	1924	1924	1924	1924	1924	1924	1924	1924	1924	1924	1924	1924
Grade (%)		-3%			4%			0%			0%	
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0		6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85		0.98		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99		0.95	1.00	
Satd. Flow (prot)	1837	1858		1791	1779	1571		1864		1810	1695	
Flt Permitted	0.32	1.00		0.42	1.00	1.00		0.96		0.74	1.00	
Satd. Flow (perm)	613	1858		791	1779	1571		1799		1402	1695	
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	521	6	26	632	173	9	42	11	200	38	54
RTOR Reduction (vph)	0	0	0	0	0	49	0	6	0	0	39	0
Lane Group Flow (vph)	89	527	0	26	632	124	0	56	0	200	53	0
Heavy Vehicles (%)	1%	5%	0%	0%	6%	2%	0%	0%	0%	1%	0%	6%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6			2		2	4			8		
Actuated Green, G (s)	105.6	98.1		98.4	94.5	94.5		25.0		25.0	25.0	
Effective Green, g (s)	105.6	98.1		98.4	94.5	94.5		25.0		25.0	25.0	
Actuated g/C Ratio	0.73	0.68		0.68	0.65	0.65		0.17		0.17	0.17	
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0		6.0		6.0	6.0	
Vehicle Extension (s)	3.0	5.0		3.0	5.0	5.0		2.0		2.0	2.0	
Lane Grp Cap (vph)	509	1257		563	1159	1023		310		241	292	
v/s Ratio Prot	c0.01	c0.28		0.00	c0.36						0.03	
v/s Ratio Perm	0.12			0.03		0.08		0.03		c0.14		
v/c Ratio	0.17	0.42		0.05	0.55	0.12		0.18		0.83	0.18	
Uniform Delay, d1	8.0	10.6		7.9	13.6	9.5		51.3		57.9	51.3	
Progression Factor	1.05	0.89		1.37	1.21	1.96		1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.7		0.0	1.7	0.2		0.1		19.6	0.1	
Delay (s)	8.5	10.2		10.9	18.2	19.0		51.4		77.6	51.4	
Level of Service	A	B		B	B	B		D		E	D	
Approach Delay (s)		9.9			18.1			51.4			69.3	
Approach LOS		A			B			D			E	
Intersection Summary												
HCM 2000 Control Delay		24.8										
HCM 2000 Volume to Capacity ratio		0.58										
Actuated Cycle Length (s)		145.0								18.0		
Intersection Capacity Utilization		67.9%								C		
Analysis Period (min)		15										
Description: Signal Permit No. TS-065-10												
Date Issued: 9/23/88												
c Critical Lane Group												

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	583	107	171	654	6	133	4	138	16	3	2
Future Volume (vph)	5	583	107	171	654	6	133	4	138	16	3	2
Ideal Flow (vphpl)	1924	1924	1924	1924	1924	1924	1924	1924	1924	1924	1924	1924
Lane Width	12	12	12	12	12	12	11	11	12	12	12	12
Grade (%)		-2%			2%			1%			-1%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		7.0	7.0			7.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.85			0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			0.96	
Satd. Flow (prot)	1538	1868	1573	1660	1810		1674	1521			1697	
Flt Permitted	0.41	1.00	1.00	0.34	1.00		0.74	1.00			0.73	
Satd. Flow (perm)	662	1868	1573	590	1810		1311	1521			1288	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	5	595	109	174	667	6	136	4	141	16	3	2
RTOR Reduction (vph)	0	0	36	0	0	0	0	121	0	0	2	0
Lane Group Flow (vph)	5	595	73	174	673	0	136	24	0	0	19	0
Heavy Vehicles (%)	20%	4%	5%	9%	5%	17%	5%	0%	4%	11%	0%	0%
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		6		5	2			4			8	
Permitted Phases	6		6	2			4			8		
Actuated Green, G (s)	96.6	96.6	96.6	111.6	111.6		20.4	20.4			20.4	
Effective Green, g (s)	96.6	96.6	96.6	111.6	111.6		20.4	20.4			20.4	
Actuated g/C Ratio	0.67	0.67	0.67	0.77	0.77		0.14	0.14			0.14	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		7.0	7.0			7.0	
Vehicle Extension (s)	6.0	6.0	6.0	3.0	6.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	441	1244	1047	520	1393		184	213			181	
v/s Ratio Prot		0.32		0.02	c0.37			0.02				
v/s Ratio Perm	0.01		0.05	0.24			c0.10				0.01	
v/c Ratio	0.01	0.48	0.07	0.33	0.48		0.74	0.11			0.11	
Uniform Delay, d1	8.1	11.9	8.5	6.8	6.1		59.7	54.4			54.3	
Progression Factor	1.00	0.92	1.12	0.32	0.26		1.00	1.00			1.00	
Incremental Delay, d2	0.0	1.2	0.1	0.3	1.0		14.4	0.2			0.3	
Delay (s)	8.2	12.2	9.6	2.5	2.6		74.1	54.6			54.6	
Level of Service	A	B	A	A	A		E	D			D	
Approach Delay (s)		11.7			2.6			64.1			54.6	
Approach LOS		B			A			E			D	
Intersection Summary												
HCM 2000 Control Delay			16.0			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.55									
Actuated Cycle Length (s)			145.0			Sum of lost time (s)			19.0			
Intersection Capacity Utilization			72.8%			ICU Level of Service			C			
Analysis Period (min)			15									
Description: Signal Permit No. TS-176-10												
Date Issued: 6-2-03												
c Critical Lane Group												

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	3	734	828	72	39	3
Future Volume (vph)	3	734	828	72	39	3
Ideal Flow (vphpl)	1924	1924	1924	1924	1924	1924
Grade (%)		1%	0%		0%	
Total Lost time (s)	6.0	6.0	6.0	8.0	8.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	1.00	0.85	0.99	
Flt Protected	0.95	1.00	1.00	1.00	0.96	
Satd. Flow (prot)	889	1094	1832	1588	1530	
Flt Permitted	0.27	1.00	1.00	1.00	0.96	
Satd. Flow (perm)	248	1094	1832	1588	1530	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	3	773	872	76	41	3
RTOR Reduction (vph)	0	0	0	11	2	0
Lane Group Flow (vph)	3	773	872	65	42	0
Heavy Vehicles (%)	33%	5%	5%	3%	18%	33%
Parking (#/hr)	50	60				
Turn Type	pm+pt	NA	NA	pm+ov	Prot	
Protected Phases	5	2	6	4	4	
Permitted Phases	2			6		
Actuated Green, G (s)	123.5	123.5	116.5	124.0	7.5	
Effective Green, g (s)	123.5	123.5	116.5	124.0	7.5	
Actuated g/C Ratio	0.85	0.85	0.80	0.86	0.05	
Clearance Time (s)	6.0	6.0	6.0	8.0	8.0	
Vehicle Extension (s)	2.0	6.0	6.0	2.0	2.0	
Lane Grp Cap (vph)	215	931	1471	1358	79	
v/s Ratio Prot	0.00	c0.71	0.48	0.00	c0.03	
v/s Ratio Perm	0.01			0.04		
v/c Ratio	0.01	0.83	0.59	0.05	0.53	
Uniform Delay, d1	4.1	5.4	5.3	1.6	67.0	
Progression Factor	0.89	2.23	0.92	1.55	1.00	
Incremental Delay, d2	0.0	7.9	1.4	0.0	3.4	
Delay (s)	3.6	20.0	6.4	2.5	70.5	
Level of Service	A	C	A	A	E	
Approach Delay (s)		19.9	6.1		70.5	
Approach LOS		B	A		E	
Intersection Summary						
HCM 2000 Control Delay		13.8		HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio		0.85				
Actuated Cycle Length (s)		145.0		Sum of lost time (s)	20.0	
Intersection Capacity Utilization		58.9%		ICU Level of Service	B	
Analysis Period (min)		15				
Description: Signal Permit No. TS-009-10						
Date Issued: 08/12/69						
Date Revised: 11/30/05						
c Critical Lane Group						

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	698	74	278	812	0	82	2	400	26	35	6
Future Volume (vph)	1	698	74	278	812	0	82	2	400	26	35	6
Ideal Flow (vphpl)	1924	1924	1924	1924	1924	1924	1924	1924	1924	1924	1924	1924
Lane Width	11	12	11	11	12	12	12	11	11	11	11	12
Grade (%)		1%			1%			1%			3%	
Total Lost time (s)	3.5	3.5	3.5	3.5	3.5			4.0	3.5	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00			1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1319	1367	1103	3344	1823			1682	1542	1740	1752	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.70	1.00	0.61	1.00	
Satd. Flow (perm)	1319	1367	1103	3344	1823			1234	1542	1123	1752	
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)	1	735	78	293	855	0	86	2	421	27	37	6
RTOR Reduction (vph)	0	0	27	0	0	0	0	0	166	0	4	0
Lane Group Flow (vph)	1	735	51	293	855	0	0	88	255	27	39	0
Heavy Vehicles (%)	0%	5%	7%	2%	5%	0%	5%	0%	2%	0%	0%	17%
Parking (#/hr)	30	30	30									
Turn Type	Prot	NA	Perm	Prot	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	1	6		5	2			4	5		8	
Permitted Phases			6				4		4	8		
Actuated Green, G (s)	2.8	91.9	91.9	17.4	106.5			17.7	35.1	17.7	17.7	
Effective Green, g (s)	5.3	94.4	94.4	19.9	109.0			19.7	40.1	19.7	19.7	
Actuated g/C Ratio	0.04	0.65	0.65	0.14	0.75			0.14	0.28	0.14	0.14	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	48	889	718	458	1370			167	463	152	238	
v/s Ratio Prot	0.00	c0.54		0.09	c0.47				c0.08		0.02	
v/s Ratio Perm			0.05					0.07	0.09	0.02		
v/c Ratio	0.02	0.83	0.07	0.64	0.62			0.53	0.55	0.18	0.16	
Uniform Delay, d1	67.3	19.1	9.3	59.2	8.4			58.3	44.8	55.5	55.4	
Progression Factor	1.15	1.00	1.53	1.22	0.64			1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	5.3	0.1	2.2	1.6			3.0	1.3	0.6	0.3	
Delay (s)	77.6	24.5	14.3	74.3	7.0			61.3	46.1	56.0	55.7	
Level of Service	E	C	B	E	A			E	D	E	E	
Approach Delay (s)		23.6			24.2			48.7			55.8	
Approach LOS		C			C			D			E	
Intersection Summary												
HCM 2000 Control Delay			29.8			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.77									
Actuated Cycle Length (s)			145.0			Sum of lost time (s)				11.0		
Intersection Capacity Utilization			76.6%			ICU Level of Service				D		
Analysis Period (min)			15									
Description: Signal Permit No. TS-094-10												
Date Issued: 01/11/94												
Date Revised: 11/30/05												
c Critical Lane Group												

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	90	544	11	39	951	298	37	110	11	135	46	82
Future Volume (vph)	90	544	11	39	951	298	37	110	11	135	46	82
Ideal Flow (vphpl)	1924	1924	1924	1924	1924	1924	1924	1924	1924	1924	1924	1924
Grade (%)		-3%			4%			0%			0%	
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0		6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85		0.99		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99		0.95	1.00	
Satd. Flow (prot)	1819	1892		1791	1867	1603		1871		1828	1738	
Flt Permitted	0.15	1.00		0.39	1.00	1.00		0.78		0.47	1.00	
Satd. Flow (perm)	293	1892		734	1867	1603		1482		910	1738	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	93	561	11	40	980	307	38	113	11	139	47	85
RTOR Reduction (vph)	0	0	0	0	0	56	0	2	0	0	43	0
Lane Group Flow (vph)	93	572	0	40	980	251	0	160	0	139	89	0
Heavy Vehicles (%)	2%	3%	0%	0%	1%	0%	3%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6			2		2	4			8		
Actuated Green, G (s)	118.6	111.6		114.8	109.7	109.7		25.3		25.3	25.3	
Effective Green, g (s)	118.6	111.6		114.8	109.7	109.7		25.3		25.3	25.3	
Actuated g/C Ratio	0.74	0.70		0.72	0.69	0.69		0.16		0.16	0.16	
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0		6.0		6.0	6.0	
Vehicle Extension (s)	3.0	5.0		3.0	5.0	5.0		2.0		2.0	2.0	
Lane Grp Cap (vph)	283	1319		560	1280	1099		234		143	274	
v/s Ratio Prot	c0.01	0.30		0.00	c0.52						0.05	
v/s Ratio Perm	0.23			0.05		0.16		0.11		c0.15		
v/c Ratio	0.33	0.43		0.07	0.77	0.23		0.69		0.97	0.33	
Uniform Delay, d1	17.3	10.5		7.2	16.6	9.4		63.6		67.0	59.8	
Progression Factor	0.90	0.67		1.16	0.86	1.09		1.00		1.00	1.00	
Incremental Delay, d2	0.6	1.0		0.0	2.0	0.2		6.5		66.2	0.3	
Delay (s)	16.2	8.0		8.4	16.4	10.4		70.1		133.1	60.0	
Level of Service	B	A		A	B	B		E		F	E	
Approach Delay (s)		9.2			14.8			70.1			97.5	
Approach LOS		A			B			E			F	
Intersection Summary												
HCM 2000 Control Delay		26.2										
HCM 2000 Volume to Capacity ratio		0.78										
Actuated Cycle Length (s)		160.0										
Intersection Capacity Utilization		90.1%										
Analysis Period (min)		15										
Description: Signal Permit No. TS-065-10												
Date Issued: 9/23/88												
c Critical Lane Group												

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	3	586	101	94	927	3	353	2	165	14	5	8
Future Volume (vph)	3	586	101	94	927	3	353	2	165	14	5	8
Ideal Flow (vphpl)	1924	1924	1924	1924	1924	1924	1924	1924	1924	1924	1924	1924
Lane Width	12	12	12	12	12	12	11	11	12	12	12	12
Grade (%)		-2%			2%			1%			-1%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		7.0	7.0			7.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.85			0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			0.97	
Satd. Flow (prot)	1388	1905	1529	1757	1883		1707	1516			1677	
Flt Permitted	0.13	1.00	1.00	0.27	1.00		0.74	1.00			0.83	
Satd. Flow (perm)	191	1905	1529	493	1883		1326	1516			1436	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	3	630	109	101	997	3	380	2	177	15	5	9
RTOR Reduction (vph)	0	0	43	0	0	0	0	129	0	0	7	0
Lane Group Flow (vph)	3	630	66	101	1000	0	380	50	0	0	22	0
Heavy Vehicles (%)	33%	2%	8%	3%	1%	33%	3%	0%	4%	7%	0%	13%
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		6		5	2			4			8	
Permitted Phases	6		6	2			4			8		
Actuated Green, G (s)	92.0	92.0	92.0	104.0	104.0		43.0	43.0			43.0	
Effective Green, g (s)	92.0	92.0	92.0	104.0	104.0		43.0	43.0			43.0	
Actuated g/C Ratio	0.58	0.58	0.58	0.65	0.65		0.27	0.27			0.27	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		7.0	7.0			7.0	
Vehicle Extension (s)	6.0	6.0	6.0	3.0	6.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	109	1095	879	367	1223		356	407			385	
v/s Ratio Prot		0.33		0.01	c0.53			0.03				
v/s Ratio Perm	0.02		0.04	0.17			c0.29				0.02	
v/c Ratio	0.03	0.58	0.08	0.28	0.82		1.07	0.12			0.06	
Uniform Delay, d1	14.7	21.6	15.1	15.2	20.9		58.5	44.2			43.5	
Progression Factor	1.03	0.89	0.97	0.34	0.41		1.00	1.00			1.00	
Incremental Delay, d2	0.4	2.0	0.1	0.3	4.3		66.7	0.1			0.1	
Delay (s)	15.5	21.1	14.8	5.4	12.8		125.2	44.4			43.5	
Level of Service	B	C	B	A	B		F	D			D	
Approach Delay (s)		20.1			12.1			99.3			43.5	
Approach LOS		C			B			F			D	
Intersection Summary												
HCM 2000 Control Delay			35.0			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.93									
Actuated Cycle Length (s)			160.0			Sum of lost time (s)			19.0			
Intersection Capacity Utilization			98.5%			ICU Level of Service			F			
Analysis Period (min)			15									
Description: Signal Permit No. TS-176-10												
Date Issued: 6-2-03												
c Critical Lane Group												

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	3	762	1016	124	56	8
Future Volume (vph)	3	762	1016	124	56	8
Ideal Flow (vphpl)	1924	1924	1924	1924	1924	1924
Grade (%)		1%	0%		0%	
Total Lost time (s)	6.0	6.0	6.0	8.0	8.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	1.00	0.85	0.98	
Flt Protected	0.95	1.00	1.00	1.00	0.96	
Satd. Flow (prot)	1819	1877	1905	1635	1805	
Flt Permitted	0.17	1.00	1.00	1.00	0.96	
Satd. Flow (perm)	317	1877	1905	1635	1805	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	3	811	1081	132	60	9
RTOR Reduction (vph)	0	0	0	21	4	0
Lane Group Flow (vph)	3	811	1081	111	65	0
Confl. Peds. (#/hr)						1
Heavy Vehicles (%)	0%	2%	1%	0%	0%	0%
Turn Type	pm+pt	NA	NA	pm+ov	Prot	
Protected Phases	5	2	6	4	4	
Permitted Phases	2			6		
Actuated Green, G (s)	135.7	135.7	124.7	135.0	10.3	
Effective Green, g (s)	135.7	135.7	124.7	135.0	10.3	
Actuated g/C Ratio	0.85	0.85	0.78	0.84	0.06	
Clearance Time (s)	6.0	6.0	6.0	8.0	8.0	
Vehicle Extension (s)	2.0	6.0	6.0	2.0	2.0	
Lane Grp Cap (vph)	315	1591	1484	1379	116	
v/s Ratio Prot	0.00	c0.43	c0.57	0.01	c0.04	
v/s Ratio Perm	0.01			0.06		
v/c Ratio	0.01	0.51	0.73	0.08	0.56	
Uniform Delay, d1	10.7	3.3	9.0	2.1	72.7	
Progression Factor	0.34	0.77	0.43	0.96	1.00	
Incremental Delay, d2	0.0	1.0	2.2	0.0	3.7	
Delay (s)	3.7	3.5	6.0	2.0	76.3	
Level of Service	A	A	A	A	E	
Approach Delay (s)		3.5	5.6		76.3	
Approach LOS		A	A		E	
Intersection Summary						
HCM 2000 Control Delay			7.1	HCM 2000 Level of Service		A
HCM 2000 Volume to Capacity ratio			0.72			
Actuated Cycle Length (s)			160.0	Sum of lost time (s)		20.0
Intersection Capacity Utilization			68.6%	ICU Level of Service		C
Analysis Period (min)			15			
Description: Signal Permit No. TS-009-10						
Date Issued: 08/12/69						
Date Revised: 11/30/05						
c Critical Lane Group						

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	747	70	159	962	0	165	0	466	22	33	13
Future Volume (vph)	1	747	70	159	962	0	165	0	466	22	33	13
Ideal Flow (vphpl)	1924	1924	1924	1924	1924	1924	1924	1924	1924	1924	1924	1924
Lane Width	11	12	11	11	12	12	12	11	11	11	11	12
Grade (%)		1%			1%			1%			3%	
Total Lost time (s)	3.5	3.5	3.5	3.5	3.5			4.0	3.5	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00			1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1758	1877	1542	3279	1877			1719	1557	1657	1742	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.73	1.00	0.44	1.00	
Satd. Flow (perm)	1758	1877	1542	3279	1877			1312	1557	768	1742	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	1	795	74	169	1023	0	176	0	496	23	35	14
RTOR Reduction (vph)	0	0	22	0	0	0	0	0	148	0	9	0
Lane Group Flow (vph)	1	795	52	169	1023	0	0	176	348	23	40	0
Confl. Peds. (#/hr)							1					1
Heavy Vehicles (%)	0%	2%	2%	4%	2%	0%	2%	0%	1%	5%	0%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	1	6		5	2			4	5		8	
Permitted Phases			6				4		4	8		
Actuated Green, G (s)	2.2	101.2	101.2	11.6	110.6			29.2	40.8	29.2	29.2	
Effective Green, g (s)	4.7	103.7	103.7	14.1	113.1			31.2	45.8	31.2	31.2	
Actuated g/C Ratio	0.03	0.65	0.65	0.09	0.71			0.19	0.29	0.19	0.19	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	51	1216	999	288	1326			255	479	149	339	
v/s Ratio Prot	0.00	c0.42		0.05	c0.55				c0.06		0.02	
v/s Ratio Perm			0.03					0.13	0.16	0.03		
v/c Ratio	0.02	0.65	0.05	0.59	0.77			0.69	0.73	0.15	0.12	
Uniform Delay, d1	75.4	17.2	10.3	70.1	15.1			59.9	51.4	53.5	53.1	
Progression Factor	1.14	0.91	1.52	1.28	0.33			1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	2.4	0.1	2.3	3.3			7.8	5.4	0.5	0.2	
Delay (s)	86.2	18.2	15.7	92.0	8.3			67.7	56.8	53.9	53.2	
Level of Service	F	B	B	F	A			E	E	D	D	
Approach Delay (s)		18.0			20.2			59.7			53.5	
Approach LOS		B			C			E			D	
Intersection Summary												
HCM 2000 Control Delay			29.8			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.78									
Actuated Cycle Length (s)			160.0			Sum of lost time (s)			11.0			
Intersection Capacity Utilization			83.2%			ICU Level of Service			E			
Analysis Period (min)			15									
Description: Signal Permit No. TS-094-10												
Date Issued: 01/11/94												
Date Revised: 11/30/05												
c Critical Lane Group												

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	131	802	5	54	795	177	19	43	16	258	45	66
Future Volume (vph)	131	802	5	54	795	177	19	43	16	258	45	66
Ideal Flow (vphpl)	1924	1924	1924	1924	1924	1924	1924	1924	1924	1924	1924	1924
Grade (%)		-3%			4%			0%			0%	
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0		6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00		1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85		0.97		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.99		0.95	1.00	
Satd. Flow (prot)	1837	1932		1739	1849	1603		1848		1792	1752	
Flt Permitted	0.19	1.00		0.20	1.00	1.00		0.91		0.69	1.00	
Satd. Flow (perm)	376	1932		364	1849	1603		1709		1303	1752	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	136	835	5	56	828	184	20	45	17	269	47	69
RTOR Reduction (vph)	0	0	0	0	0	48	0	6	0	0	35	0
Lane Group Flow (vph)	136	840	0	56	828	136	0	76	0	269	81	0
Heavy Vehicles (%)	1%	1%	0%	3%	2%	0%	0%	0%	0%	2%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6			2		2	4			8		
Actuated Green, G (s)	101.4	95.3		98.8	94.0	94.0		31.9		31.9	31.9	
Effective Green, g (s)	101.4	95.3		98.8	94.0	94.0		31.9		31.9	31.9	
Actuated g/C Ratio	0.68	0.64		0.66	0.63	0.63		0.21		0.21	0.21	
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0		6.0		6.0	6.0	
Vehicle Extension (s)	3.0	5.0		3.0	5.0	5.0		2.0		2.0	2.0	
Lane Grp Cap (vph)	313	1227		283	1158	1004		363		277	372	
v/s Ratio Prot	c0.02	0.43		0.01	c0.45						0.05	
v/s Ratio Perm	0.28			0.12		0.08		0.04		c0.21		
v/c Ratio	0.43	0.68		0.20	0.72	0.14		0.21		0.97	0.22	
Uniform Delay, d1	16.2	17.7		15.0	18.9	11.4		48.6		58.6	48.7	
Progression Factor	0.77	0.81		1.14	0.92	1.18		1.00		1.00	1.00	
Incremental Delay, d2	0.8	2.5		0.3	2.8	0.2		0.1		45.7	0.1	
Delay (s)	13.3	16.9		17.5	20.2	13.7		48.8		104.3	48.8	
Level of Service	B	B		B	C	B		D		F	D	
Approach Delay (s)		16.4			19.0			48.8			87.6	
Approach LOS		B			B			D			F	
Intersection Summary												
HCM 2000 Control Delay		29.4										
HCM 2000 Volume to Capacity ratio		0.76										
Actuated Cycle Length (s)		150.0										
Intersection Capacity Utilization		84.3%										
Analysis Period (min)		15										
Description: Signal Permit No. TS-065-10												
Date Issued: 9/23/88												
c Critical Lane Group												

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	972	103	82	913	19	113	3	109	27	1	0
Future Volume (vph)	1	972	103	82	913	19	113	3	109	27	1	0
Ideal Flow (vphpl)	1924	1924	1924	1924	1924	1924	1924	1924	1924	1924	1924	1924
Lane Width	12	12	12	12	12	12	11	11	12	12	12	12
Grade (%)		-2%			2%			1%			-1%	
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		7.0	7.0			7.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.85			1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00			0.95	
Satd. Flow (prot)	1846	1924	1635	1707	1881		1674	1567			1845	
Flt Permitted	0.26	1.00	1.00	0.15	1.00		0.74	1.00			0.56	
Satd. Flow (perm)	500	1924	1635	275	1881		1301	1567			1077	
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)	1	1023	108	86	961	20	119	3	115	28	1	0
RTOR Reduction (vph)	0	0	27	0	0	0	0	102	0	0	0	0
Lane Group Flow (vph)	1	1023	81	86	981	0	119	16	0	0	29	0
Heavy Vehicles (%)	0%	1%	1%	6%	1%	0%	5%	33%	0%	0%	0%	0%
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		6		5	2			4			8	
Permitted Phases	6		6	2			4			8		
Actuated Green, G (s)	108.3	108.3	108.3	120.4	120.4		16.6	16.6			16.6	
Effective Green, g (s)	108.3	108.3	108.3	120.4	120.4		16.6	16.6			16.6	
Actuated g/C Ratio	0.72	0.72	0.72	0.80	0.80		0.11	0.11			0.11	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0		7.0	7.0			7.0	
Vehicle Extension (s)	6.0	6.0	6.0	3.0	6.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	361	1389	1180	278	1509		143	173			119	
v/s Ratio Prot		c0.53		0.01	c0.52			0.01				
v/s Ratio Perm	0.00		0.05	0.23			c0.09				0.03	
v/c Ratio	0.00	0.74	0.07	0.31	0.65		0.83	0.09			0.24	
Uniform Delay, d1	5.8	12.4	6.1	15.1	6.1		65.3	59.9			61.0	
Progression Factor	1.09	0.58	0.90	0.12	0.20		1.00	1.00			1.00	
Incremental Delay, d2	0.0	2.4	0.1	0.5	1.7		31.9	0.2			1.1	
Delay (s)	6.3	9.6	5.6	2.3	2.9		97.3	60.2			62.0	
Level of Service	A	A	A	A	A		F	E			E	
Approach Delay (s)		9.2			2.8			78.8			62.0	
Approach LOS		A			A			E			E	
Intersection Summary												
HCM 2000 Control Delay			13.8			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			19.0			
Intersection Capacity Utilization			81.0%			ICU Level of Service			D			
Analysis Period (min)			15									
Description: Signal Permit No. TS-176-10												
Date Issued: 6-2-03												
c Critical Lane Group												

						
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	7	1101	1001	46	64	3
Future Volume (vph)	7	1101	1001	46	64	3
Ideal Flow (vphpl)	1924	1924	1924	1924	1924	1924
Grade (%)		1%	0%		0%	
Total Lost time (s)	6.0	6.0	6.0	8.0	8.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	1.00	0.85	0.99	
Flt Protected	0.95	1.00	1.00	1.00	0.95	
Satd. Flow (prot)	1819	1895	1905	1635	1826	
Flt Permitted	0.19	1.00	1.00	1.00	0.95	
Satd. Flow (perm)	364	1895	1905	1635	1826	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	7	1147	1043	48	67	3
RTOR Reduction (vph)	0	0	0	7	1	0
Lane Group Flow (vph)	7	1147	1043	41	69	0
Heavy Vehicles (%)	0%	1%	1%	0%	0%	0%
Turn Type	pm+pt	NA	NA	pm+ov	Prot	
Protected Phases	5	2	6	4	4	
Permitted Phases	2			6		
Actuated Green, G (s)	126.2	126.2	119.0	128.8	9.8	
Effective Green, g (s)	126.2	126.2	119.0	128.8	9.8	
Actuated g/C Ratio	0.84	0.84	0.79	0.86	0.07	
Clearance Time (s)	6.0	6.0	6.0	8.0	8.0	
Vehicle Extension (s)	3.0	6.0	6.0	3.0	3.0	
Lane Grp Cap (vph)	317	1594	1511	1403	119	
v/s Ratio Prot	0.00	c0.61	0.55	0.00	c0.04	
v/s Ratio Perm	0.02			0.02		
v/c Ratio	0.02	0.72	0.69	0.03	0.58	
Uniform Delay, d1	8.1	4.8	7.1	1.5	68.1	
Progression Factor	1.45	1.53	0.44	0.22	1.00	
Incremental Delay, d2	0.0	2.0	2.0	0.0	7.0	
Delay (s)	11.7	9.3	5.1	0.3	75.1	
Level of Service	B	A	A	A	E	
Approach Delay (s)		9.4	4.9		75.1	
Approach LOS		A	A		E	
Intersection Summary						
HCM 2000 Control Delay		9.3		HCM 2000 Level of Service	A	
HCM 2000 Volume to Capacity ratio		0.74				
Actuated Cycle Length (s)		150.0		Sum of lost time (s)	20.0	
Intersection Capacity Utilization		73.1%		ICU Level of Service	D	
Analysis Period (min)		15				
Description: Signal Permit No. TS-009-10						
Date Issued: 08/12/69						
Date Revised: 11/30/05						
c Critical Lane Group						

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	1065	95	171	949	4	94	8	164	47	29	14
Future Volume (vph)	5	1065	95	171	949	4	94	8	164	47	29	14
Ideal Flow (vphpl)	1924	1924	1924	1924	1924	1924	1924	1924	1924	1924	1924	1924
Lane Width	11	12	11	11	12	12	12	11	11	11	11	12
Grade (%)		1%			1%			1%			3%	
Total Lost time (s)	3.5	3.5	3.5	3.5	3.5			4.0	3.5	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00			1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00			1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1758	1895	1573	3279	1876			1769	1527	1740	1740	
Flt Permitted	0.95	1.00	1.00	0.95	1.00			0.71	1.00	0.53	1.00	
Satd. Flow (perm)	1758	1895	1573	3279	1876			1313	1527	963	1740	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	5	1109	99	178	989	4	98	8	171	49	30	15
RTOR Reduction (vph)	0	0	20	0	0	0	0	0	75	0	12	0
Lane Group Flow (vph)	5	1109	80	178	993	0	0	106	96	49	33	0
Heavy Vehicles (%)	0%	1%	0%	4%	2%	0%	0%	0%	3%	0%	0%	0%
Turn Type	Prot	NA	Perm	Prot	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	1	6		5	2			4	5		8	
Permitted Phases			6				4		4	8		
Actuated Green, G (s)	2.4	102.5	102.5	13.5	113.6			16.0	29.5	16.0	16.0	
Effective Green, g (s)	4.9	105.0	105.0	16.0	116.1			18.0	34.5	18.0	18.0	
Actuated g/C Ratio	0.03	0.70	0.70	0.11	0.77			0.12	0.23	0.12	0.12	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0			6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0			3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	57	1326	1101	349	1452			157	386	115	208	
v/s Ratio Prot	0.00	c0.59		0.05	c0.53				0.03		0.02	
v/s Ratio Perm			0.05					c0.08	0.04	0.05		
v/c Ratio	0.09	0.84	0.07	0.51	0.68			0.68	0.25	0.43	0.16	
Uniform Delay, d1	70.4	16.3	7.1	63.3	8.1			63.2	47.2	61.2	59.2	
Progression Factor	0.91	0.93	0.81	1.06	0.63			1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.5	4.7	0.1	0.9	1.8			10.9	0.3	2.5	0.4	
Delay (s)	64.7	19.8	5.8	68.1	7.0			74.1	47.5	63.7	59.6	
Level of Service	E	B	A	E	A			E	D	E	E	
Approach Delay (s)		18.9			16.3			57.7			61.7	
Approach LOS		B			B			E			E	
Intersection Summary												
HCM 2000 Control Delay			23.1			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.80									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)				11.0		
Intersection Capacity Utilization			82.4%			ICU Level of Service				E		
Analysis Period (min)			15									
Description: Signal Permit No. TS-094-10												
Date Issued: 01/11/94												
Date Revised: 11/30/05												
c Critical Lane Group												