APPENDIX 2:TRAFFIC ANALYSES

APPENDIX 2A: SUPPORTING TRAFFIC ANALYSES AND TECHNICAL DOCUMENTATION

SOUTHERN CONNECTOR/CHAMPLAIN PARKWAY PROJECT CHITTENDEN COUNTY, VERMONT

LIMITED SCOPE DRAFT SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT BURLINGTON, VERMONT MEGC-M5000 (1)

APPENDIX – TRAFFIC

DESIGN YEAR TRAFFIC VOLUMES

Vehicle traffic volumes were originally developed for the Project's NEPA evaluation and Project design in 2004, for the Draft Supplemental Environmental Impact Statement (DSEIS) published in 2006 and FSEIS in 2009, based on the regional travel demand model that was developed for the Chittenden County Regional Planning Commission (CCRPC, which at the time was named the Chittenden County Metropolitan Planning Organization, CCMPO). The regional model captures the interaction of transportation demand and supply and is used by the CCRPC as a basis for performing comprehensive regional planning and developing the Metropolitan Transportation Plan (MTP) to address short-and long-range transportation needs. The model that was current at the time of the Supplemental Environmental Impact Statement (SEIS) was calibrated to a base year 1998, and provided model runs for the year 2002, 2012 and 2022 planning horizons. These model outputs were then used to develop the weekday AM and PM peak hours for the Project's Estimated Time of Completion (ETC) and ETC+20 design horizon years which were the basis for the SEIS transportation analysis.

While regional travel demand models are used to identify future trends, it is common to perform post-model refinements at the intersection level to enhance the model accuracy for application to a specific project. These refinements involve an adjustment process to correlate the model's base year conditions to the project's base year and design horizon years. Essentially, this process uses the model to forecast the changes that will occur between the model's base and future years and then applies those changes to actual contemporaneous traffic counts for the project's base year. See the Transportation Modeling Methodology Documentation (2009 FSEIS Volume II, Appendix 3B) for more information about the modeling and forecasting methodology.

The design horizons considered in the 2009 FSEIS were 2008 (ETC) and 2028 (ETC+20). The traffic volumes for these design horizons were reviewed and approved by the City, VTrans, and FHWA for use as the basis of the traffic analyses for the Project. In early 2005, the design team learned that the regional model had been updated by CCRPC and that they were in the process of having this new model validated by FHWA. CCRPC staff identified that there were no substantive changes in volume trends associated with this updated model, and that the forecasted volumes as developed for the SEIS were applicable.

The path to construction did not follow the Project schedule anticipated in the 2009 FSEIS. However, the design volumes for the Project were independently checked by Resource Systems Group, Inc. (RSG) in 2011 as part of the State's Act 250 review of the Project. Act 250 is Vermont's land use and development law which provides a public process for reviewing the environmental, social and fiscal consequences of major developments and construction projects. In their review, RSG concluded that the ETC and ETC+20

traffic volumes from the FSEIS were still appropriate to be used for the analysis and design of the Project even though the construction schedule had been delayed.¹ This conclusion was also later affirmed in 2013 in Pre-filed Testimony prepared by Clough, Harbour & Associates, LLP as part of a Vermont Environmental Court Appeal of the Act 250 Permit.²

There have been numerous other occasions between 2011 and 2016 where traffic counts have been collected at key Project intersections and reviewed by the City and the Champlain Parkway design team for consistency with the ETC and ETC+20 design volumes. This data was collected as part of various land development impact studies, community planning studies, and Burlington Department of Public Works (DPW) projects. They are listed below (the dates noted in parentheses are the year(s) of the count data in the respective report):

- Pine Street/Howard Street Intersection Signal Warrant Analysis: 2011 (2011 data)
- Pine Street/Lakeside Avenue Interim Signal Replacement project: 2015 (2013 data)
- Maple-King Neighborhood Traffic Counts: (2013 data)
- Plan BTV South Planning Study Phase 1 Existing Conditions Report: 2015 (2014 data)
- Burlington City Place Redevelopment (Burlington CCD) Traffic Impact Study: 2016 (2014 & 2016 data)
- City Market Development (Flynn Avenue) Traffic Impact Study: 2016 (2014 & 2016 data)
- Rail Enterprise Project Phase I: Scoping/Planning and Environmental Linkages (PEL) Study: 2016³
- Petra Cliffs Climbing Center (Briggs Street) Traffic Impact Study: 2018 (2018 data)
- 44-50 Lakeside Avenue Redevelopment Traffic Impact Study: 2018 (2018 data)

In each of these cases, the traffic counts confirmed that the existing volumes were consistent with the anticipated growth (such as in the areas of Pine Street and Lakeside Avenue where redevelopment has occurred), but that the projected future design volumes were still conservatively higher.

Most recently, traffic volumes in the Project study area were reviewed as part of a Project Reevaluation prepared in May 2019.⁴ The Reevaluation included a comprehensive compilation of historic volume data for the period 2003-2016. The reevaluation of traffic conditions concluded that, although the Project's construction schedule has been pushed out, the traffic data and forecasts utilized for the Project from the 2009 FSEIS are still relevant. This is because actual traffic data collected in the Project area in recent years shows that the modeling for the 2009 FSEIS used conservative growth assumptions, resulting in a higher forecast of traffic volumes than has actually occurred to date. Thus, traffic volumes have not yet reached the levels forecast for the 2008 ETC, making it appropriate to continue to use the 2008 forecast traffic

¹ Champlain Parkway Traffic and Safety Analysis: Section 3.2.1 – Traffic Forecast Review, Resource Systems Group, Inc., February 18, 2011 (Vermont Agency of Natural Resources ANR Act 250 Exhibit 14).

² Champlain Parkway Traffic and Safety Analysis for Vermont Environmental Court Appeal: Section 3.3 – Traffic Forecast Review, Clough, Harbour & Associates, LLP, April 5, 2013.

³ The REP study used the Champlain Parkway volume forecasts (2009 FSEIS) and CCRPC regional model forecasts as the basis of the analysis.

⁴ Southern Connector/Champlain Parkway Project MEGC-M5000(1) – Reevaluation of 2009 Final Supplemental Environmental Impact Statement, Clough Harbour & Associates in association with Stantec Consulting Services, Inc., March 2019

volumes for the ETC of the Project. However, these design volumes are not so conservatively high as to affect the overall objectives of the Project or the elements of the design.

The May 2019 Reevaluation also reviewed and documented traffic forecasts in the Maple and King Street Neighborhood from the Railyard Enterprise Project (REP) Scoping/PEL study. The REP project is located in the Waterfront South area of Burlington. The study explored alternatives to enhance multimodal transportation safety and mobility and advance economic development opportunities through the creation of new urban streets. The REP study used the projected ETC and ETC+20 Build volumes from the 2009 FSEIS for the Champlain Parkway as the base condition for its traffic analyses. However, the REP study also included a sensitivity analysis using CCRPC's current regional travel demand model for the 2015 and 2035 planning horizon years. The CCRPC model used for the REP study was a model developed in 2013 calibrated to 2010 base year traffic volumes. The travel demand model forecasts for years 2015 and 2035 included current socio-economic and land use projections and information provided by the City. These models also reflect the effects of other reasonably foreseeable transportation improvements that are programmed on the Transportation Improvement Program (TIP). The TIP includes the Project as well as a variety of spot safety/operations improvement projects, pedestrian and bicycle facility enhancements, and the intersection and interchange improvements comprising the alternatives to the Chittenden County Circumferential Highway project.

As described in the May 2019 Reevaluation Report the CCRPC model forecasts along Pine Street for the 2015 and 2035 planning horizon years are lower than the design volumes used for the Project. However, these more recently modeled results further confirm that the Parkway's design volumes are still appropriate to be used for the analysis and design of the Project. Figure 1 shows the traffic volumes for key Project intersections along Pine Street from Lakeside Avenue to Main Street for the ETC and ETC+20 design horizons from the 2009 FSEIS in the context of the 2003-2016 volume trends. These exhibits also show the CCRPC model-based volumes from the REP Scoping/PEL report for the 2015 and 2035 years, where available (note that the REP study did not evaluate the AM peak hour condition).

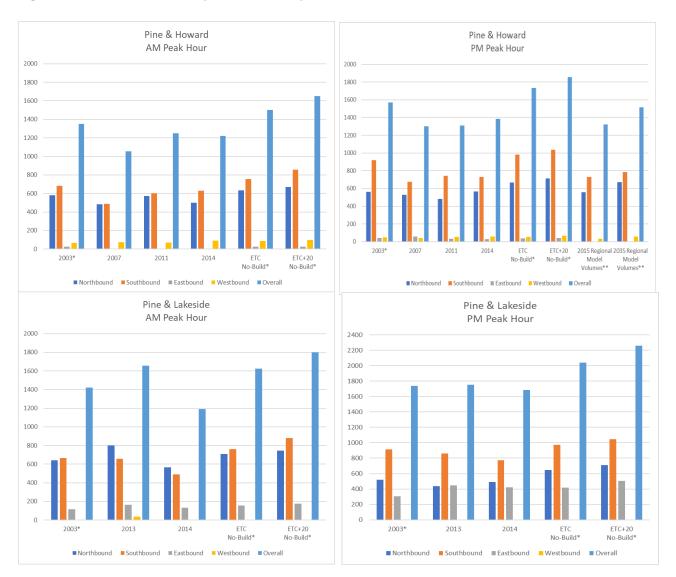
The fact that traffic volumes have increased at a slower rate makes it appropriate to continue to use the previous ETC and ETC+20 volumes from the 2009 FSEIS as the ETC and ETC+20 traffic forecasts for the Project. Further, the fact that traffic increased at a slower rate than forecasted does not invalidate the results of the traffic analysis, it simply makes the traffic analysis a more conservative forecast of future conditions. One conclusion from the slower traffic growth is that if traffic continues to grow at a slower pace, the design life of the Project will effectively be extended.





* volumes from the Champlain Parkway 2009 FSEIS

** volumes from the REP Scoping/PEL Report





* volumes from the Champlain Parkway 2009 FSEIS

** volumes from the REP Scoping/PEL Report

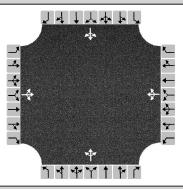
TRAFFIC OPERATIONS METHODOLOGY

There have been two updates to the HCM following the completion of the 2009 FSEIS: HCM 2010, and HCM 6 (released in 2016). Each of these editions of the HCM have included new or enhanced tools and methodologies for analyzing a variety of urban and rural roadway networks incorporating the findings of ongoing research. Many of the changes in these HCM updates pertain to aspects of transportation system performance on freeway facilities, managed-lane facilities (HOV lanes), alternative interchange/ intersection forms,⁵ and off-road pedestrian and bicycle facilities. The methodologies for analysis of vehicle traffic operations at conventional intersection types with signal or stop-sign control have not changed appreciably from the HCM 2000 edition. Also, the HCM 2010 and HCM 6 versions of the manual do not provide methodologies for calculating intersections with exclusive pedestrian phases that operate in a coordinated signal system and complex signalized intersections that function with clustered phasing to accommodate more than 4 approaches (also in a coordinated signal system). Because of these project elements, the HCM 2000 methodologies as used in the 2009 FSEIS continue to be applicable for the analysis of the Project.

⁵ Groups of two or more closely spaced intersections that are operationally interdependent and function as a single unit and where one or more traffic movements are rerouted to nearby secondary junctions. Examples include diverging-diamond interchanges, restricted crossing U-turn intersections, and median U-turn intersections.

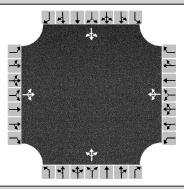
APPENDIX 2B: 2020 LS DSEIS UPDATED TRAFFIC CAPACITY ANALYSIS

HCS7 All-Way Stop Control Report													
General Information		Site Information											
Analyst	СНА	Intersection	Pine St & Maple St										
Agency/Co.		Jurisdiction	City of Burlington, VT										
Date Performed	1/7/2020	East/West Street	Maple St										
Analysis Year		North/South Street	Pine St										
Analysis Time Period (hrs)	0.25	Peak Hour Factor	0.90										
Time Analyzed	ETC AM Peak Hour NO-BUILD	CONDITION											
Project Description Champlain Parkway CHA File 008659.000													
Lanes		· · · · · · · · · · · · · · · · · · ·											



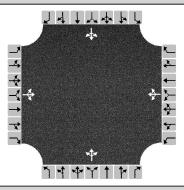
Volume555310701001001203705555310% Thrus in Shared LaneI.1I.2I.3I.1I.2I.3I.1I.2I.3I.1I	venicie volume and Adjust	ments											
VolumeSS53107010010012037055555% Thrus in Shared LaneI.II.2I.3I.1I.2I.3I.1I.2I.3I.1I.2I.3I.1I.2I.3I.1I.2I.3I.1I.2I.3I.1I.2I.3I.1I.2I.3I.1I.2I.3I.1I.2I.3I.1I.2I.3I.1I.2I.3I.1I.2I.3I.1I.2I.3I.1I.2I.3I.1I.2I.3I.1I.2I.3I.1I.2I.3I.1I.3I.1I.3I.1I.3I.1I.3I.1I.3I.1I.1I.3I.1I.1I.3I.1I.1I.3I.1I.1I.3I.1I.3I.3I.1I.3 <th>Approach</th> <th></th> <th>Eastbound</th> <th></th> <th></th> <th>Westbound</th> <th>ł</th> <th>1</th> <th>Northboun</th> <th>d</th> <th>9</th> <th>Southboun</th> <th>b</th>	Approach		Eastbound			Westbound	ł	1	Northboun	d	9	Southboun	b
% Thrus in Shared LaneImage<	Movement	L	Т	R	L	Т	R	L	Т	R	L	Т	R
LaneL1L2L3L1L2L3L1L2L3L1L3L1ConfigurationLTR <td>Volume</td> <td>5</td> <td>55</td> <td>310</td> <td>70</td> <td>100</td> <td>10</td> <td>120</td> <td>370</td> <td>55</td> <td>5</td> <td>325</td> <td>5</td>	Volume	5	55	310	70	100	10	120	370	55	5	325	5
ConfigurationLTRIIIIIIIIFlow Rate, v (veh/h)411III	% Thrus in Shared Lane												
Flow Rate, v (veh/h)411Image: selection of the selection	Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Percent Heavy Vehicles2Image: solution of the state of the sta	Configuration	LTR			LTR			LTR			LTR		
Departure Headway and Service TimeInitial Departure Headway, hd (s)3.20Image of Mullization, x3.20Image of Mullization, x0.850Image of Mullization, xImage of Mullization, xImag	Flow Rate, v (veh/h)	411			200			606			372		
Initial Departure Headway, hd (s) 3.20 Image: Sigma (Sigma	Percent Heavy Vehicles	2			2			2			2		
Initial Degree of Utilization, x 0.365 Image of Quant of Control Delay (s/veh) Image of Control Delay (s/veh) <t< td=""><td>Departure Headway and Se</td><td>ervice Ti</td><td>me</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	Departure Headway and Se	ervice Ti	me										
Final Departure Headway, hd (s) 7.44 Image of the structure function of the structure functing function of the structure function of the s	Initial Departure Headway, hd (s)	3.20			3.20			3.20			3.20		
Final Degree of Utilization, x 0.850 Image 0.491 Image 1.301 Image 0.820 Image	Initial Degree of Utilization, x	0.365			0.178			0.538			0.331		
Move-Up Time, m (s)2.0Image: Mode of the matrix of	Final Departure Headway, hd (s)	7.44			8.83			7.73			7.93		
Service Time, ts (s)5.446.406.836.835.736.835.936.83Capacity, Delay and Level of ServiceFlow Rate, v (veh/h)41102006066063723729Capacity4849407407466466466454454100995% Queue Length, Q ₉₅ (veh)8.76.72.66.8173.96.87.810.911	Final Degree of Utilization, x	0.850			0.491			1.301			0.820		
Capacity, Delay and Level of ServiceAllII<	Move-Up Time, m (s)	2.0			2.0			2.0			2.0		
Flow Rate, v (veh/h) 411 Image: selected	Service Time, ts (s)	5.44			6.83			5.73			5.93		
Capacity 484 Image: Normal Sector Sect	Capacity, Delay and Level o	f Servic	e										
And And Angle And Angle And Angle And Angle An	Flow Rate, v (veh/h)	411			200			606			372		
Control Delay (s/veh) 39.7 Image: Normal system in the system in t	Capacity	484			407			466			454		
Level of Service, LOSEICIFIEIApproach LOS $\mathbb{E}^{-39.7}$ $$	95% Queue Length, Q ₉₅ (veh)	8.7			2.6			26.2			7.8		
Approach Delay (s/veh)39.720.1173.938.0Approach LOSECFE	Control Delay (s/veh)	39.7			20.1			173.9			38.0		
Approach LOS E C F E	Level of Service, LOS	E			С			F			E		
	Approach Delay (s/veh)		39.7			20.1			173.9			38.0	
	Approach LOS		E			С			F			E	
Intersection Delay, s/veh LOS 88.0 F	Intersection Delay, s/veh LOS			88	3.0					I	F		

HCS7 All-Way Stop Control Report											
General Information		Site Information									
Analyst	СНА	Intersection	Pine St & Maple St								
Agency/Co.		Jurisdiction	City of Burlington, VT								
Date Performed	1/7/2020	East/West Street	Maple St								
Analysis Year		North/South Street	Pine St								
Analysis Time Period (hrs)	0.25	Peak Hour Factor	0.90								
Time Analyzed	ETC PM Peak Hour NO-BUILD	CONDITION									
Project Description Champlain Parkway CHA File 008659.000											
Lanes	·										



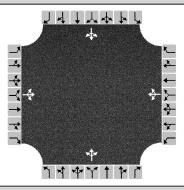
venicie volume and Adjust	ments											
Approach		Eastbound			Westbound	k	I I	Northboun	d	9	Southboun	b
Movement	L	Т	R	L	Т	R	L	Т	R	L	Т	R
Volume	5	140	205	60	105	110	300	205	60	60	415	5
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	LTR			LTR			LTR			LTR		
Flow Rate, v (veh/h)	389			306			628			533		
Percent Heavy Vehicles	2			2			2			2		
Departure Headway and S	ervice Ti	me										
Initial Departure Headway, hd (s)	3.20			3.20			3.20			3.20		
Initial Degree of Utilization, x	0.346			0.272			0.558			0.474		
Final Departure Headway, hd (s)	8.69			9.24			8.95			8.93		
Final Degree of Utilization, x	0.938			0.784			1.561			1.322		
Move-Up Time, m (s)	2.0			2.0			2.0			2.0		
Service Time, ts (s)	6.69			7.24			6.95			6.93		
Capacity, Delay and Level of	of Servic	e	<u>.</u>		<u>.</u>							
Flow Rate, v (veh/h)	389			306			628			533		
Capacity	414			390			402			403		
95% Queue Length, Q₀₅ (veh)	10.6			6.7			34.9			24.4		
Control Delay (s/veh)	59.9			38.6			287.2			187.3		
Level of Service, LOS	F			E			F			F		
Approach Delay (s/veh)		59.9			38.6			287.2			187.3	
Approach LOS		F			E			F			F	
Intersection Delay, s/veh LOS			16	9.9						F		
							-					

	HCS7 All-Way Stop Control Report											
General Information		Site Information										
Analyst	СНА	Intersection	Pine St & Maple St									
Agency/Co.		Jurisdiction	City of Burlington, VT									
Date Performed	1/7/2020	East/West Street	Maple St									
Analysis Year		North/South Street	Pine St									
Analysis Time Period (hrs)	0.25	Peak Hour Factor	0.90									
Time Analyzed	ETC+20 AM Peak Hour NC)-BUILD CONDITION										
Project Description Champlain Parkway CHA File 008659.000												
Lanes	-											



venicie volume and Adjust	ments											
Approach		Eastbound			Westbound	k	1	Northboun	d	9	Southboun	b
Movement	L	Т	R	L	Т	R	L	Т	R	L	Т	R
Volume	5	55	365	75	100	10	105	395	55	5	365	5
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	LTR			LTR			LTR			LTR		
Flow Rate, v (veh/h)	472			206			617			417		
Percent Heavy Vehicles	2			2			2			2		
Departure Headway and Se	ervice Ti	me										
Initial Departure Headway, hd (s)	3.20			3.20			3.20			3.20		
Initial Degree of Utilization, x	0.420			0.183			0.548			0.370		
Final Departure Headway, hd (s)	7.87			9.58			8.36			8.42		
Final Degree of Utilization, x	1.033			0.547			1.433			0.975		
Move-Up Time, m (s)	2.0			2.0			2.0			2.0		
Service Time, ts (s)	5.87			7.58			6.36			6.42		
Capacity, Delay and Level of	of Servic	e	<u>.</u>									
Flow Rate, v (veh/h)	472			206			617			417		
Capacity	457			376			430			427		
95% Queue Length, Q ₉₅ (veh)	14.3			3.2			30.8			11.8		
Control Delay (s/veh)	79.2			23.6			230.7			66.8		
Level of Service, LOS	F			С			F			F		
Approach Delay (s/veh)		79.2			23.6			230.7			66.8	
Approach LOS		F			C			F			F	
Intersection Delay, s/veh LOS			12	4.1					l	F		

HCS7 All-Way Stop Control Report											
General Information		Site Information									
Analyst	СНА	Intersection	Pine St & Maple St								
Agency/Co.		Jurisdiction	City of Burlington, VT								
Date Performed	1/7/2020	East/West Street	Maple St								
Analysis Year	2020	North/South Street	Pine St								
Analysis Time Period (hrs)	0.25	Peak Hour Factor	0.90								
Time Analyzed	ETC+20 PM Peak Hour NO-BUI	LD CONDITION	*								
Project Description Champlain Parkway CHA File 008659.000											
Lanes											



venicie volume and Aujus	ments											
Approach		Eastbound	l		Westbound	ł	ſ	Northboun	d	9	Southboun	d
Movement	L	Т	R	L	Т	R	L	Т	R	L	Т	R
Volume	5	145	215	65	100	120	320	220	60	60	420	5
% Thrus in Shared Lane												
Lane	L1	L2	L3	L1	L2	L3	L1	L2	L3	L1	L2	L3
Configuration	LTR			LTR			LTR			LTR		
Flow Rate, v (veh/h)	406			317			667			539		
Percent Heavy Vehicles	2			2			2			2		
Departure Headway and S	ervice Ti	me										
Initial Departure Headway, hd (s)	3.20			3.20			3.20			3.20		
Initial Degree of Utilization, x	0.360			0.281			0.593			0.479		
Final Departure Headway, hd (s)	8.78			9.35			9.18			9.15		
Final Degree of Utilization, x	0.989			0.823			1.700			1.370		
Move-Up Time, m (s)	2.0			2.0			2.0			2.0		
Service Time, ts (s)	6.78			7.35			7.18			7.15		
Capacity, Delay and Level	of Servic	e										
Flow Rate, v (veh/h)	406			317			667			539		
Capacity	410			385			392			393		
95% Queue Length, Q ₉₅ (veh)	12.1			7.4			40.5			26.0		
Control Delay (s/veh)	71.9			43.6			348.1			207.5		
Level of Service, LOS	F			E			F			F		
Approach Delay (s/veh)		71.9			43.6			348.1	·		207.5	
Approach LOS		F			E			F			F	
Intersection Delay, s/veh LOS			20	0.7						F		

HCM Signalized Intersection Capacity Analysis 11: Pine Street & Maple Street

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			- 4 >			ф —			ф –	
Traffic Volume (vph)	5	50	300	80	100	10	85	470	55	10	600	5
Future Volume (vph)	5	50	300	80	100	10	85	470	55	10	600	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	11	11	11	11	11	11	11	11	11
Grade (%)		3%			-3%			4%			-3%	
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.89			0.99			0.99			1.00	
Flt Protected		1.00			0.98			0.99			1.00	
Satd. Flow (prot)		1516			1777			1731			1824	
Flt Permitted		1.00			0.50			0.83			0.99	
Satd. Flow (perm)		1511			899			1450			1806	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	56	333	89	111	11	94	522	61	11	667	6
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	395	0	0	211	0	0	677	0	0	684	0
Parking (#/hr)			5			5						
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		25.1			25.1			51.1			51.1	
Effective Green, g (s)		25.1			25.1			51.1			51.1	
Actuated g/C Ratio		0.28			0.28			0.57			0.57	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		2.0			2.0			3.0			3.0	
Lane Grp Cap (vph)		421			250			823			1025	
v/s Ratio Prot												
v/s Ratio Perm		c0.26			0.23			c0.47			0.38	
v/c Ratio		0.94			0.84			0.82			0.67	
Uniform Delay, d1		31.7			30.6			15.8			13.5	
Progression Factor		1.00			1.00			1.00			1.16	
Incremental Delay, d2		28.2			21.3			9.1			3.0	
Delay (s)		59.9			51.9			24.9			18.6	
Level of Service		E			D			C			В	
Approach Delay (s)		59.9			51.9			24.9			18.6	
Approach LOS		E			D			С			В	
Intersection Summary												
HCM 2000 Control Delay			32.6	Н	CM 2000	Level of	Service		С			
HCM 2000 Volume to Capacity	/ ratio		0.83									
Actuated Cycle Length (s)			90.0	S	um of los	t time (s)			11.0			
Intersection Capacity Utilization	n		110.2%		U Level		:		Н			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 12: Pine Street & King Street

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			\$			4			4	
Traffic Volume (vph)	10	105	185	35	105	25	60	365	55	20	395	5
Future Volume (vph)	10	105	185	35	105	25	60	365	55	20	395	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Grade (%)		3%			-5%			3%			-4%	
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.92			0.98			0.98			1.00	
Flt Protected		1.00			0.99			0.99			1.00	
Satd. Flow (prot)		1567			1727			1735			1829	
Flt Permitted		0.99			0.79			0.90			0.97	
Satd. Flow (perm)		1553			1382			1567			1775	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	11	117	206	39	117	28	67	406	61	22	439	6
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	334	0	0	184	0	0	534	0	0	467	0
Parking (#/hr)			5			5			5			
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		22.8			22.8			53.4			53.4	
Effective Green, g (s)		22.8			22.8			53.4			53.4	
Actuated g/C Ratio		0.25			0.25			0.59			0.59	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		2.0			2.0			3.0			3.0	
Lane Grp Cap (vph)		393			350			929			1053	
v/s Ratio Prot												
v/s Ratio Perm		c0.22			0.13			c0.34			0.26	
v/c Ratio		0.85			0.53			0.57			0.44	
Uniform Delay, d1		32.0			28.9			11.3			10.1	
Progression Factor		1.00			1.00			0.73			0.82	
Incremental Delay, d2		15.1			0.7			1.5			1.1	
Delay (s)		47.1			29.6			9.8			9.4	
Level of Service		D			С			А			Α	
Approach Delay (s)		47.1			29.6			9.8			9.4	
Approach LOS		D			С			А			А	
Intersection Summary												
HCM 2000 Control Delay			20.3	H	CM 2000	Level of	Service		С			
HCM 2000 Volume to Capac	ity ratio		0.63									
Actuated Cycle Length (s)			90.0		um of los				11.0			
Intersection Capacity Utilizat	ion		75.9%	IC	CU Level	of Service	;		D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 13: Pine Street & Main Street

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4		<u>۲</u>	ef 👘			र्भ	1		4	
Traffic Volume (vph)	40	185	225	10	235	60	215	165	20	45	190	40
Future Volume (vph)	40	185	225	10	235	60	215	165	20	45	190	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	10	11	11	11	11	10	12	12	12
Grade (%)		5%			-5%			4%			-4%	
Total Lost time (s)		5.0		5.0	5.0			6.0	6.0		6.0	
Lane Util. Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Frt		0.93		1.00	0.97			1.00	0.85		0.98	
Flt Protected		1.00		0.95	1.00			0.97	1.00		0.99	
Satd. Flow (prot)		1686		1693	1789			1716	1448		1848	
Flt Permitted		0.93		0.32	1.00			0.64	1.00		0.87	
Satd. Flow (perm)		1583		567	1789			1129	1448		1617	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	44	206	250	11	261	67	239	183	22	50	211	44
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	500	0	11	328	0	0	422	22	0	305	0
Parking (#/hr)			5			8						3
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		31.7		31.7	31.7			39.9	39.9		39.9	
Effective Green, g (s)		31.7		31.7	31.7			39.9	39.9		39.9	
Actuated g/C Ratio		0.35		0.35	0.35			0.44	0.44		0.44	
Clearance Time (s)		5.0		5.0	5.0			6.0	6.0		6.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		557		199	630			500	641		716	
v/s Ratio Prot					0.18							
v/s Ratio Perm		c0.32		0.02				c0.37	0.02		0.19	
v/c Ratio		0.90		0.06	0.52			0.84	0.03		0.43	
Uniform Delay, d1		27.6		19.3	23.1			22.3	14.2		17.2	
Progression Factor		1.00		1.00	1.00			0.72	0.94		1.00	
Incremental Delay, d2		17.0		0.1	0.8			13.7	0.1		1.9	
Delay (s)		44.7		19.4	23.9			29.8	13.4		19.0	
Level of Service		D		В	С			C	В		В	
Approach Delay (s)		44.7			23.8			29.0			19.0	
Approach LOS		D			C			C			В	
Intersection Summary												
HCM 2000 Control Delay			30.9	Н	CM 2000	Level of	Service		С			
HCM 2000 Volume to Capacit	y ratio		0.82									
Actuated Cycle Length (s)			90.0	S	um of los	t time (s)			14.0			
Intersection Capacity Utilization	on		95.6%			of Service	;		F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 11: Pine Street & Maple Street

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		.			- 4 >			4			ф —	
Traffic Volume (vph)	10	145	245	80	85	90	110	495	60	55	475	10
Future Volume (vph)	10	145	245	80	85	90	110	495	60	55	475	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	11	11	11	11	11	11	11	11	11
Grade (%)		3%			-3%			4%			-3%	
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.92			0.95			0.99			1.00	
Flt Protected		1.00			0.98			0.99			0.99	
Satd. Flow (prot)		1569			1714			1729			1814	
Flt Permitted		0.99			0.55			0.80			0.88	
Satd. Flow (perm)		1556			959			1399			1613	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	11	161	272	89	94	100	122	550	67	61	528	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	444	0	0	283	0	0	739	0	0	600	0
Parking (#/hr)			5			5						
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		27.0			27.0			49.2			49.2	
Effective Green, g (s)		27.0			27.0			49.2			49.2	
Actuated g/C Ratio		0.30			0.30			0.55			0.55	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		466			287			764			881	
v/s Ratio Prot												
v/s Ratio Perm		0.29			c0.30			c0.53			0.37	
v/c Ratio		0.95			0.99			0.97			0.68	
Uniform Delay, d1		30.9			31.3			19.6			14.7	
Progression Factor		1.00			1.00			1.00			0.89	
Incremental Delay, d2		30.0			49.0			25.5			3.5	
Delay (s)		60.9			80.3			45.1			16.6	
Level of Service		E			F			D			В	
Approach Delay (s)		60.9			80.3			45.1			16.6	
Approach LOS		E			F			D			В	
Intersection Summary												
HCM 2000 Control Delay			45.0	H	CM 2000	Level of	Service		D			
HCM 2000 Volume to Capa	city ratio		0.94									
Actuated Cycle Length (s)			90.0	S	um of los	t time (s)			11.0			
Intersection Capacity Utiliza	ntion		103.7%	IC	CU Level	of Service	;		G			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 12: Pine Street & King Street

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		- 4 >			- 4 >			4				
Traffic Volume (vph)	5	130	200	50	160	30	185	390	25	30	290	10
Future Volume (vph)	5	130	200	50	160	30	185	390	25	30	290	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	11	11	11
Grade (%)		4%			-5%			3%			-4%	
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.92			0.98			0.99			1.00	
Flt Protected		1.00			0.99			0.98			1.00	
Satd. Flow (prot)		1565			1734			1737			1821	
Flt Permitted		0.99			0.73			0.75			0.92	
Satd. Flow (perm)		1558			1272			1324			1680	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	144	222	56	178	33	206	433	28	33	322	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	372	0	0	267	0	0	667	0	0	366	0
Parking (#/hr)			5			5			5			
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		24.5			24.5			51.7			51.7	
Effective Green, g (s)		24.5			24.5			51.7			51.7	
Actuated g/C Ratio		0.27			0.27			0.57			0.57	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Vehicle Extension (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		424			346			760			965	
v/s Ratio Prot												
v/s Ratio Perm		c0.24			0.21			c0.50			0.22	
v/c Ratio		0.88			0.77			0.88			0.38	
Uniform Delay, d1		31.3			30.2			16.4			10.4	
Progression Factor		1.00			1.00			0.48			1.24	
Incremental Delay, d2		18.6			10.8			5.7			1.0	
Delay (s)		49.9			41.0			13.6			13.9	
Level of Service		D			D			В			В	
Approach Delay (s)		49.9			41.0			13.6			13.9	
Approach LOS		D			D			В			В	
Intersection Summary												
HCM 2000 Control Delay			26.1	Н	CM 2000	Level of	Service		С			
HCM 2000 Volume to Capac	ity ratio		0.85									
Actuated Cycle Length (s)			90.0		um of los				11.0			
Intersection Capacity Utilizat	ion		9 5.5%	IC	CU Level	of Service	;		F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 13: Pine Street & Main Street

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4		<u> </u>	ef 👘			स ी	1		4	
Traffic Volume (vph)	10	255	95	65	290	40	260	105	60	65	170	15
Future Volume (vph)	10	255	95	65	290	40	260	105	60	65	170	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	10	11	11	11	11	10	12	12	12
Grade (%)		5%			-5%			4%			-4%	
Total Lost time (s)		5.0		5.0	5.0			6.0	6.0		6.0	
Lane Util. Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Frt		0.96		1.00	0.98			1.00	0.85		0.99	
Flt Protected		1.00		0.95	1.00			0.97	1.00		0.99	
Satd. Flow (prot)		1749		1693	1812			1704	1448		1860	
Flt Permitted		0.98		0.28	1.00			0.63	1.00		0.81	
Satd. Flow (perm)		1714		502	1812			1111	1448		1535	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	11	283	106	72	322	44	289	117	67	72	189	17
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	400	0	72	366	0	0	406	67	0	278	0
Parking (#/hr)			5			8						3
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		24.3		24.3	24.3			47.3	47.3		47.3	
Effective Green, g (s)		24.3		24.3	24.3			47.3	47.3		47.3	
Actuated g/C Ratio		0.27		0.27	0.27			0.53	0.53		0.53	
Clearance Time (s)		5.0		5.0	5.0			6.0	6.0		6.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)		462		135	489			583	761		806	
v/s Ratio Prot					0.20						000	
v/s Ratio Perm		c0.23		0.14	0.20			c0.37	0.05		0.18	
v/c Ratio		0.87		0.53	0.75			0.70	0.09		0.34	
Uniform Delay, d1		31.3		28.0	30.1			16.0	10.6		12.4	
Progression Factor		1.00		1.00	1.00			0.92	1.19		1.00	
Incremental Delay, d2		15.5		4.0	6.2			3.7	0.1		1.2	
Delay (s)		46.8		32.0	36.2			18.4	12.7		13.5	
Level of Service		D		C	D			B	B		B	
Approach Delay (s)		46.8		Ű	35.5			17.6	D		13.5	
Approach LOS		D			D			В			В	
Intersection Summary												
HCM 2000 Control Delay			29.2	Н	CM 2000	Level of	Service		С			
HCM 2000 Volume to Capac	city ratio		0.71									
Actuated Cycle Length (s)			90.0	S	um of los	t time (s)			14.0			
Intersection Capacity Utiliza	tion		85.7%			of Service)		E			
Analysis Period (min)			15									
c Critical Lane Group												

Queues 11: Pine Street & Maple Street

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Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	395	211	677	684
v/c Ratio	0.94	0.84	0.79	0.64
Control Delay	64.4	60.6	24.7	19.5
Queue Delay	0.0	0.0	0.0	0.8
Total Delay	64.4	60.6	24.7	20.3
Queue Length 50th (ft)	216	111	247	310
Queue Length 95th (ft)	#387	#235	#644	#555
Internal Link Dist (ft)	745	331	2283	316
Turn Bay Length (ft)				
Base Capacity (vph)	436	259	862	1074
Starvation Cap Reductn	0	0	0	159
Spillback Cap Reductn	0	0	0	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.91	0.81	0.79	0.75
Intersection Summary				

95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles. #

Queues 12: Pine Street & King Street

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Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	334	184	534	467
v/c Ratio	0.85	0.53	0.55	0.42
Control Delay	52.3	34.1	10.9	10.3
Queue Delay	0.0	0.0	0.5	0.5
Total Delay	52.3	34.1	11.4	10.8
Queue Length 50th (ft)	177	88	111	61
Queue Length 95th (ft)	#317	155	m127	m235
Internal Link Dist (ft)	744	334	316	332
Turn Bay Length (ft)				
Base Capacity (vph)	431	383	971	1099
Starvation Cap Reductn	0	0	142	288
Spillback Cap Reductn	0	0	0	238
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.77	0.48	0.64	0.58
Intersection Summary				

95th percentile volume exceeds capacity, queue may be longer. #

Queues 13: Pine Street & Main Street

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Lane Group	EBT	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	500	11	328	422	22	305
v/c Ratio	0.90	0.06	0.52	0.80	0.03	0.40
Control Delay	47.8	18.4	25.8	31.4	18.8	22.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.8	18.4	25.8	31.4	18.8	22.7
Queue Length 50th (ft)	255	4	140	119	4	101
Queue Length 95th (ft)	#421	15	213	m#534	m13	#319
Internal Link Dist (ft)	746		303	332		338
Turn Bay Length (ft)		100			75	
Base Capacity (vph)	615	220	695	530	680	760
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.05	0.47	0.80	0.03	0.40
Intersection Summary						

95th percentile volume exceeds capacity, queue may be longer. #

Queues 11: Pine Street & Maple Street

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Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	444	283	739	600
v/c Ratio	0.95	0.99	0.92	0.65
Control Delay	64.3	83.9	38.2	17.4
Queue Delay	0.0	0.0	15.8	1.0
Total Delay	64.3	83.9	54.0	18.4
Queue Length 50th (ft)	246	159	316	192
Queue Length 95th (ft)	#435	#321	#747	m#497
Internal Link Dist (ft)	745	331	2283	316
Turn Bay Length (ft)				
Base Capacity (vph)	466	287	801	925
Starvation Cap Reductn	0	0	0	130
Spillback Cap Reductn	0	0	74	0
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.95	0.99	1.02	0.75
Intersection Summary				

95th percentile volume exceeds capacity, queue may be longer. #

Queues 12: Pine Street & King Street

	-	←	Ť	Ŧ
Lane Group	EBT	WBT	NBT	SBT
Lane Group Flow (vph)	372	267	667	366
v/c Ratio	0.88	0.77	0.84	0.36
Control Delay	53.9	46.2	15.8	15.0
Queue Delay	0.3	0.1	2.5	0.3
Total Delay	54.2	46.4	18.4	15.4
Queue Length 50th (ft)	197	136	93	114
Queue Length 95th (ft)	#348	#250	m#502	m152
Internal Link Dist (ft)	744	334	316	332
Turn Bay Length (ft)				
Base Capacity (vph)	450	367	795	1008
Starvation Cap Reductn	0	0	55	243
Spillback Cap Reductn	4	3	0	91
Storage Cap Reductn	0	0	0	0
Reduced v/c Ratio	0.83	0.73	0.90	0.48
Intersection Summary				

95th percentile volume exceeds capacity, queue may be longer. #

Queues 13: Pine Street & Main Street

	-	4	+	1	1	Ŧ
Lane Group	EBT	WBL	WBT	NBT	NBR	SBT
Lane Group Flow (vph)	400	72	366	406	67	278
v/c Ratio	0.86	0.53	0.75	0.66	0.08	0.33
Control Delay	50.4	42.6	39.9	22.1	17.3	16.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.4	42.6	39.9	22.1	17.3	16.1
Queue Length 50th (ft)	209	34	184	90	13	74
Queue Length 95th (ft)	#346	80	281	m#376	m30	219
Internal Link Dist (ft)	746		303	332		338
Turn Bay Length (ft)		100			75	
Base Capacity (vph)	514	150	543	613	798	847
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.78	0.48	0.67	0.66	0.08	0.33
Intersection Summary						

95th percentile volume exceeds capacity, queue may be longer. #

APPENDIX 2C: 2009 FSEIS TRAFFIC CAPACITY ANALYSIS

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		.			ф.			ф.	221511111111		4	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	5	55	365	75	100	10	105	395	55	5	365	5
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	6	61	406	83	111	11	117	439	61	6	406	6
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	472	206	617	417								
Volume Left (vph)	6	83	117	6								
Volume Right (vph)	406	11	61	6						99 94 - Alexandra († 1914) 19	en felendet følmerlet.	viewan, institution (kaik).
Hadj (s)	-0,48	0.08	0.01	0.03				alah daga mangal Menangkan				
Departure Headway (s)	7.9	9.6	8.4	8.4				*******		n en	oran da Aberbado	
Degree Utilization, x	1.03	0.55	1.43	0.97								
Capacity (veh/h)	460	363	442	417				12.1949972219229487448744	or out on out who there	2004/00/00/2007/	110-000-000-000-000-00 1	999-1449-1711-62
Control Delay (s)	79.0	23.5	230.4	66.8						p lêr êr si		
Approach Delay (s)	79.0	23.5	230.4	66.8							and not dependent of the	
Approach LOS	F	C	F	F			én di Kerdin Girlan Seres					
Intersection Summary												
Delay			123.9									
HCM Level of Service			F					and a second			eresztérőszte tott telete	andread year on your
Intersection Capacity Uti	lization		98.8%	IC	CU Leve	l of Sen	vice		F			
Analysis Period (min)			15					975776777777777777777777777777777777777	elen de la starre de la de	ann ganaistin 1979)	ang dipantan sa katab	1997-1997 (NOV (NOV (NOV (NOV (NOV (NOV (NOV (NOV

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		44			4			4			¢‡,	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	5	145	215	65	100	120	320	220	60	60	420	5
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	6	161	239	72	111	133	356	244	67	67	467	6
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	406	317	667	539								
Volume Left (vph)	6	72	356	67								
Volume Right (vph)	239	133	67	6								
Hadj (s)	-0.32	-0.17	0.08	0.05								
Departure Headway (s)	8.8	9.4	9.2	9.2								
Degree Utilization, x	0.99	0.82	1.70	1.37								
Capacity (veh/h)	406	379	395	402								
Control Delay (s)	72.3	43.8	350.3	209.2								
Approach Delay (s)	72.3	43.8	350.3	209.2								
Approach LOS	F	E	F	F						ala di a dala inse General del		
Intersection Summary												
Delay			202.0									
HCM Level of Service			F								2 United	
Intersection Capacity Uti	lization	1	09.3%	10	U Leve	l of Ser	vice		H			
Analysis Period (min)			15		1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1999 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 -	ang patron training				s a meneral de la composition de la com		

	۶		7	4		×	*	1	1	1	Ļ	~
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			4			4			4	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	10	110	95	25	105	25	10	355	45	25	260	5
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	11	122	106	28	117	28	11	394	50	28	289	6
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	239	172	456	322								
Volume Left (vph)	11	28	11	28								
Volume Right (vph)	106	28	50	6	1999 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 -							ta ta kana ng ta dina na
Hadj (s)	-0.22	-0.03	-0.03	0.04		enalu és dén Si Sondan	ya an de sa Parte estado					
Departure Headway (s)	6.5	6.9	6.0	6.3								
Degree Utilization, x	0.43	0.33	0.76	0.56			534245				9. GN (9. G	
Capacity (veh/h)	481	438	579	527			~~~~~					
Control Delay (s)	14.4	13.3	25.1	17.1								
Approach Delay (s)	14.4	13.3	25.1	17.1								
Approach LOS	В	В	D	C		ologi condesi 2005 NSUSSI						
Intersection Summary												
Delay			19.1									
HCM Level of Service			С									
Intersection Capacity Uti	lization		50.1%	IC	CU Leve	l of Ser	vice		Α			
Analysis Period (min)			15									1999 (1999) - 1996 1997 - 1997 (1997) - 1996

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EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
	ф.	,		\$			¢.			4	
	Stop			Stop			Stop			Stop	
5	130	185	40	160	25	35	285	25	30	265	10
0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
6	144	206	44	178	28	39	317	28	33	294	11
EB 1	WB 1	NB 1	SB 1								
356	250	383	339								
6	44	39	33								
206	28	28	11								
-0.31	0.00	0.01	0.03								
7.1	7.8	7.3	7.4								
0.71	0.54	0.77	0.70								
466	401	467	448								
25.5	19.6	31.1	26.0								
25.5	19.6	31.1	26.0								
D	С	D	D								
		26.1									
		D								· · · · · · · · · · · · · · · · · · ·	
lization		65.2%	IC	U Leve	l of Sen	vice		C			
		15								e e una el a collabora	
	5 0.90 6 EB 1 356 6 206 -0.31 7.1 0.71 466 25.5 25.5 D	♣ Stop 5 130 0.90 0.90 6 144 EB 1 WB 1 356 250 6 44 206 28 -0.31 0.00 7.1 7.8 0.71 0.54 466 401 25.5 19.6 25.5 19.6 D C	Stop 130 185 0.90 0.90 0.90 6 144 206 EB 1 WB 1 NB 1 356 250 383 6 44 39 206 28 28 -0.31 0.00 0.01 7.1 7.8 7.3 0.71 0.54 0.77 466 401 467 25.5 19.6 31.1 D C D 25.5 19.6 31.1 D C D 461 401 467 25.5 19.6 31.1 D C D ID C D ID C D ID ID D ID ID D ID ID ID ID ID ID ID ID		♣ ♣ Stop Stop 5 130 185 40 160 0.90 0.90 0.90 0.90 0.90 6 144 206 44 178 EB 1 WB 1 NB 1 SB 1	♣ ♣ Stop Stop 5 130 185 40 160 25 0.90 0.90 0.90 0.90 0.90 0.90 6 144 206 44 178 28 EB 1 WB 1 NB 1 SB 1 333 356 250 383 339 33 206 28 28 11 -0.31 0.00 0.01 0.03 7.1 7.8 7.3 7.4 0.71 0.54 0.77 0.70 466 401 467 448 25.5 19.6 31.1 26.0 D C D D 25.5 19.6 31.1 26.0 D C D D	Image: Here in the stress of the stress	♣ ♣ ♣ Stop Stop Stop 5 130 185 40 160 25 35 285 0.90 <td< td=""><td>♣ ♣ ♣ Stop Stop Stop 5 130 185 40 160 25 35 285 25 0.90 0.70 1.054 0.77 0.70</td><td>♣ ♣ ♣ Stop Stop Stop 5 130 185 40 160 25 35 285 25 30 0.90</td><td>0.00 0.90</td></td<>	♣ ♣ ♣ Stop Stop Stop 5 130 185 40 160 25 35 285 25 0.90 0.70 1.054 0.77 0.70	♣ ♣ ♣ Stop Stop Stop 5 130 185 40 160 25 35 285 25 30 0.90	0.00 0.90



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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4 Þ			ŧ	7		ধ	7		4)	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0		4.0	4.0		4.0	
Lane Util. Factor		1.00			1.00	1.00		1.00	1.00		1.00	
Frt		0.96			1.00	0.85		1.00	0.85		0.98	
Fit Protected		0.99			1.00	1.00		0.97	1.00		0.99	
Satd. Flow (prot)		1772			1861	1583		1802	1583		1801	
Flt Permitted		0.94			0.99	1.00		0.63	1.00		0.88	
Satd. Flow (perm)		1668			1847	1583		1177	1583		1601	
Volume (vph)	40	220	125	5	285	65	260	125	10	45	160	45
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	44	244	139	6	317	72	289	139	11	50	178	50
RTOR Reduction (vph)	0	0	0	0	0	48	0	0	6	0	0	0
Lane Group Flow (vph)	0	427	0	0	323	24	0	428	5	0	278	0
Turn Type	Perm	1 1.5 State 10.5 State 1.5		Perm		Perm	Perm		Perm	Perm		
Protected Phases		2	2.485.35		6			8			4	
Permitted Phases	2			6		6	8		8	4		
Actuated Green, G (s)		19.5			19.5	19.5		26.9	26.9		26.9	
Effective Green, g (s)		20.5			20.5	20.5		27.9	27.9		27.9	
Actuated g/C Ratio		0.33			0.33	0.33		0.46	0.46		0.46	
Clearance Time (s)		5.0			5.0	5.0		5.0	5.0		5.0	
Vehicle Extension (s)		3.0			3.0	3.0		3.0	3.0		3.0	
Lane Grp Cap (vph)		559		Ala ka	619	530		537	722	nga pekeranganan (pinangan	730	an a
v/s Ratio Prot		-0.00										
v/s Ratio Perm		c0.26		iden of intrinc	0.17	0.02	an a	c0.36	0.00		0.17	
v/c Ratio		0.76			0.52	0.05		0.80	0.01		0.38	
Uniform Delay, d1		18.2	2343-43424-44		16.4	13.7		14.2	9.1		11.0	
Progression Factor		1.00			1.00	1.00		1.00	1.00		1.00	
Incremental Delay, d2	szalo nejemierek	6.1		n Marana da An	0.8	0.0	Madagabababag	8.1	0.0		0.3	astatista (kita
Delay (s) Level of Service		24.3 C	8		17.2 B	13.8		22.3	9,1		11.3	
Approach Delay (s)		24.3	serie de la companya	-	16.6	В	dan daga sarabi	C 22.0	A		B	
Approach LOS		24.0 C			10.0 B			22.0 C			11.3	
		v			D			U C			B	
Intersection Summary HCM Average Control D	olay		19.3	L			nico		В			
HCM Volume to Capacit	-	laineisea.	0.71				a vice		D	(analista)		
Actuated Cycle Length (N. 1991, Control (1997) 1991, 19 		61.2	C	um of lo	set time	(c)		8.0			
Intersection Capacity Uti			34.6%		CU Leve				0.0 E			
Analysis Period (min)	nzativili		مر 0%			a UI Jel	VICC		F			
c Critical Lane Group	<u> approximent</u>		U IU	<u>1998)</u>							ingalalpinegolotop	
						en de la dela de la dela dela dela dela de						46336666

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		ф			र्भ	۴		র্ন	*		4	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		1.1.1	4.0	4.0		4.0	4.0		4.0	
Lane Util. Factor		1.00			1.00	1.00		1.00	1.00		1.00	
Frt		0.97	en andre te tratatad -	an san tarihini da k	1.00	0.85	teren an terretaria	1.00	0.85		0.99	
Flt Protected		1.00			0.99	1.00		0.97	1.00		0.99	
Satd. Flow (prot)	dere berefastelen (skore	1803	Antinasia Ajerini Aleria	Alder Grand Andrikersen	1845	1583		1806	1583		1820	a da ante por de como
Flt Permitted		0.99			0.87	1.00		0.67	1.00		0.85	
Satd. Flow (perm)		1780			1629	1583		1239	1583		1561	
Volume (vph)	10	260	80	70	295	35	150	90	70	65	150	15
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	11	289	89	78	328	39	167	100	78	72	167	17
RTOR Reduction (vph)	0	0	0	0	0	24	0	0	50	0	0	0
Lane Group Flow (vph)	0	389	0	0	406	15	0	267	28	0	256	0
Turn Type	Perm			Perm		Perm	Perm	· · · · · · · · · · · · · · · · · · ·	Perm	Perm		
Protected Phases		2			6			8			4	
Permitted Phases	2	adentis de chemistra ana tut e a	den al de la companya	6		6	8		8	4		
Actuated Green, G (s)		19.4			19.4	19.4		17.2	17.2		17.2	
Effective Green, g (s)	Alexandra en la contribu	20.4	en hannelen heren		20.4	20.4	ter tret fan it en en en en en	18.2	18.2		18.2	
Actuated g/C Ratio		0.40			0.40	0.40		0.35	0.35		0.35	
Clearance Time (s)	unio de la desta	5.0	مىنى مىزىمى (يەمبىلىرىمەر يەرىمەر). مەرىكى مەرىكى مەرىكى مەرىكى مەرىكى مەرىكى مەرىكى مەرىكى مەرىكى مەرىكى مەرىك	Amerika na produktelj	5.0	5.0		5.0	5.0		5.0	
Vehicle Extension (s)		3.0			3.0	3.0		3.0	3.0		3.0	
Lane Grp Cap (vph) v/s Ratio Prot		706			647	628		439	561		553	
v/s Ratio Perm		0.22			c0.25	0.01		c0.22	0.02		0.16	
v/c Ratio		0.55			0.63	0.02		0.61	0.05		0.46	
Uniform Delay, d1		12.0			12.4	9.4		13.7	10.9		12.8	
Progression Factor		1.00			1.00	1.00	3149 3249	1.00	1.00		1.00	
Incremental Delay, d2		0.9			1.9	0.0		2.4	0.0		0.6	
Delay (s)		12.9			14.4	9.5		16.1	10.9		13.4	
Level of Service		В			В	Α		В	В		В	
Approach Delay (s)		12.9			13.9			14.9			13.4	
Approach LOS		В			В			В			В	
Intersection Summary												
HCM Average Control D			13.8	Н	ICM Lev	el of Se	ervice	and the second	В			
HCM Volume to Capacit			0.55									
Actuated Cycle Length (n gala paga ayan sala sa	51.4			ost time			8.0			
Intersection Capacity Uti	lization	1	74.8%	IC	CU Leve	l of Ser	vice		D			
Analysis Period (min)	ana sa	Wisedowie were	15	las filmas en anterioria	an a	entrite onte over over over	raden endoer men en er	ang sa kana ka sa ka	an a		de trus bacados maños fina	alata da secono de s
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis 10: Maple Street & Pine Street

RSG C1 & C2 Only Sig 2028 AM

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBF
Lane Configurations	entra entra districte	4	andras and see do a					4			4	
	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	11	11	11	12	11	12	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Fn		0.89			0.99			0.99			1.00	
Flt Protected	a ana tatata tara	1.00	a arreste factor at a tracter of		0.98			0.99			1.00	
Satd. Flow (prot)		1595			1751			1766			1797	
Flt Permitted		1.00	unun un up duu.		0.47	ti ta stanta na ana ana ana		0.83			0.99	
Satd. Flow (perm)		1588			832			1479			1779	
Volume (vph)	5	50	300	80	100	10	85	470	55	10	600	5
	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	56	333	89	111	11	94	522	61	11	667	6
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	395	0	0	211	0	0	677	0	0	684	0
Furn Type F	^o erm			Perm			Perm			Perm		
Protected Phases		4			8			2		,	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		23.3			23.3			50.5			50.5	
Effective Green, g (s)		24.3			24.3			51.5			51.5	
Actuated g/C Ratio		0.27			0.27			0.57			0.57	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
ane Grp Cap (vph)		429			225			846			1018	
/s Ratio Prot	******			en des tractions and ad		1		بالمراجع والمراجع والمراجع والمراجع والمراجع	an air air an an air an ai Air an air an a		an si sa	(den de la de la de
/s Ratio Perm		0.25			c0.25			c0.46			0.38	
r∕c Ratio		0.92		1999 (MILL) - CARLON (MILL)	0.94	999-009-009-00-009-009-009-009-009-00-00		0.80		Santana sandarén	0.67	
Jniform Delay, d1		31.9			32.1			15.2			13.4	
Progression Factor		1.00			1.00			1.00			1.03	an Geolog Arenderen
ncremental Delay, d2		25.0			42.5			7.8			3.0	
Delay (s)		56.9			74.6	() (23.0	and na shi nga na shi shi s		16.7	apah kyasangat
evel of Service		E			E			C			В	
Approach Delay (s)		56.9			74.6		-9-6	23.0			16.7	unalijetiste eda
Approach LOS		E		5.6.4.5	E			С			В	
ntersection Summary								3 10 G				
ICM Average Control Del	ay		33.2	Н	CM Lev	el of Sei	rvice		С			
ICM Volume to Capacity	ratio		0.84			 A second second standard 			an an an an an an an an Arabain.		ver 40 a. e. e. e. 6000 a. [55]	na propositi (Colo
ctuated Cycle Length (s)			90.0	S	um of lo	st time (S)		14.2			
ntersection Capacity Utiliz	ation	11	10.2%		U Level				Н	nus en 1923 (1993) (1993) A	en en seren se en seren se	esterentitetik
nalysis Period (min)			15					ader angeleden og so Store i Stander				
	a saa sada sa sa sa sa sa			a construction de la construction d	a a contractor a con	exection and the second		a construction de la construcción d		ere des consections		eren en e

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis 10: Maple Street & Pine Street Build Alternative 2

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			4			4			4	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	11	11	11	12	11	12	11	11	11
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.92			0.95			0.99			1.00	
Flt Protected		1.00			0.98			0.99			0.99	en general strends of product
Satd. Flow (prot)		1650			1688			1764			1787	
Flt Permitted		0.99			0.53		n;	0.78			0.87	10.0000,000000000
Satd. Flow (perm)		1635			913			1390			1567	
Volume (vph)	10	145	245	80	85	90	110	495	60	55	475	10
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	11	161	272	89	94	100	122	550	67	61	528	11
RTOR Reduction (vph)	0	0	o	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	444	0	0	283	0	0	739	0	0	600	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4		1999/1991/1992/20194	8	sinainean an an an an Araith an Araith	an waar daal daalaa daalaa Aanaa daalaa d	2	end en el concerno	9999997949679788999 9	6	89486299999999999999
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		37.0	un an		37.0	a konstanta kanana ta 11 taan		66.8	Vertenent Französi (di	1999 - 1999 - 1997 -	66.8	delle en reckteter
Effective Green, g (s)		38.0			38.0			67.8			67.8	
Actuated g/C Ratio		0.32			0.32		-02 5% 067 70081% 080-	0.56	1999-999 (Add 469 (200	a vez (2000) (2000) (2000)	0.56	iverReithersteidigt
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		3.0	(energy and a star (free free)		3.0	: 41:1:1:4 - 1:1:490 AWD004P	())))))))))))))))))))))))))))))))))))	3.0	éreteneki etti te		3.0	ensettinistettenje
Lane Grp Cap (vph)		518			289			785			885	
v/s Ratio Prot		an sa		i i foto to constituito (che foto de foto)							~~~~	
v/s Ratio Perm		0.27			c0.31		sticici e contri Secondaria (1986)	c0.53			0.38	eren eren eren eren eren eren eren er
v/c Ratio	oriensons en estatuar	0.86	alaan ana gebelagsagaa	a forna usa giografia (1994)	0.98	entretter operet gebruike	alah karak dalam dala National dalam d	0.94	energen genergigen.		0.68	
Uniform Delay, d1		38.5			40.6			24.3			18.4	
Progression Factor	n dag har girtis transpolisi	1.00	a da faran yang gang gang gang gang gang gang ga	en e	1.00	ene (internetisi (internetis)		1.00	angda kebi eteksi	en de la seconemi	1.03	
Incremental Delay, d2		13.2			46.7			20.7			3.5	
Delay (s)		51.6			87.3	an manga ding minengkak		44.9	and and dependences of the second		22.5	
Level of Service		D	9.000		F			D	adas da da subada Sector da subada		<u> </u>	
Approach Delay (s)	nikorreiten och er	51.6	ationi i and aire	1999-1999-1999-1999 1999-1999-1999-1999	87.3			44.9			22.5	
Approach LOS		D			F			D		6 9 6 9	Č	
Intersection Summary												
HCM Average Control D	elay		45.6	H	CM Lev	el of Ser	vice		D			
HCM Volume to Capacity	y ratio		0.95		*****		(k nääre anala energy de	an a		veetets2.veetets2.se	angererengen in
Actuated Cycle Length (s			120.0	Si	um of lo	st time (:	S)		14.2	<u>ini de la composition de la composition</u>		
Intersection Capacity Uti)3.7%			l of Servi			G	ann an thailteadh.	na an an an Addina dh' an Anna an Anna an Anna an Anna Anna A	, 4498(A2020)95
Analysis Period (min)			15									
c Critical Lane Group		n an	eren an	san an a	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			v-1990-1990-19	ana ang ang ang ang ang ang ang ang ang	040730130888		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis 9: King Street & Pine Street

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			4			4			4)	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frt		0.92			0.98			0.98			1.00	
Fit Protected		1.00			0.99			0.99	0.500000		1.00	
Satd. Flow (prot)		1705			1805			1823			1854	
Flt Permitted		0.99			0.64			0.90			0.96	
Satd. Flow (perm)		1689			1175			1644			1779	
Volume (vph)	10	105	185	35	105	25	60	365	55	25	395	5
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	11	117	206	39	117	28	67	406	61	28	439	6
RTOR Reduction (vph)	0	67	0	0	7	0	0	3	0	0	0	0
Lane Group Flow (vph)	0	267	0	0	177	0	0	531	0	0	473	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		17.2			17.2			56.6			56.6	
Effective Green, g (s)		18.2			18.2			57.6			57.6	
Actuated g/C Ratio		0.20			0.20			0.64			0.64	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Vehicle Extension (s)		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		342			238			1052			1139	
v/s Ratio Prot												
v/s Ratio Perm		c0.16			0.15			c0.32			0.27	
v/c Ratio		0.78			0.74	59 (52) (52) (52) 55) (52) (52)	n an an an an an Eis a' an	0.50			0.41	
Uniform Delay, d1		34.0			33.7			8.6	587.85 No. 40 No. 40 No. 40 No.		7.9	(1) = (1) =
Progression Factor		1.00			1.00			0.31			0.72	
Incremental Delay, d2		11.0			11.8			0.4			0.8	
Delay (s)		45.0			45.5			3.1			6.5	
Level of Service		D			D			Α			Α	
Approach Delay (s)		45.0	Series (ed. 99 Strike ale de		45.5			3.1			6.5	in air a tha is Na Anna 20 air
Approach LOS		D			D			Α			Α	
Intersection Summary												
HCM Average Control D	elay		18.4	Н	CM Lev	el of Se	rvice		В			
HCM Volume to Capacit			0.57									
Actuated Cycle Length (senen utetestetti.	90.0	S	um of lo	ost time	(s)		14.2	1999 - 1999 -	wada 1969 (1979) 19	94.549.08599.95
Intersection Capacity Uti			73.3%			l of Serv			D			
Analysis Period (min)	nna an thài 1774 178		15		an a		aanta Factoria (199		an di Serand i Ta densi		->->->->->	utoren de Bartelo
c Critical Lane Group			-								An an an a	
n en			.e	nangangangkangkangkangkangkangkangkangka	ana ang kang kang kang kang kang kang ka	o se tradecia de la constante d	erenden der Köl	una hana tang sing ba	eedaalaan ah ku ku		and a second	an daa ay di Shaka

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HCM Signalized Intersection Capacity Analysis 9: King Street & Pine Street

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	•		T	*)	I	Γ	-	•	
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBF
Lane Configurations	4000	4		***	4	1000		4)			4	ويفجف والا
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s) Lane Util. Factor		4.0	ana ang ang ang ang ang ang ang ang ang	usenessi (1890).	4.0		ise sures a	4.0	enii Romaniania	isa de de de de de de	4.0	Susuesees
Frt		1.00			1.00			1.00			1.00	n se nagele Neterregele
Fit Protected		0.92			0.98			0.99			1.00	Sectores de la composición de la compos
Satd. Flow (prot)		1711			0.99			0.98			1.00	1000000000
Fit Permitted		0.99			1813 0.60	data da ingina (sina).	kalentaria da	1824 0.75	guga paniada		1847	usisasian
Satd. Flow (perm)		1703	60.000000000		en e	Qui par Astronom					0.91	
			~~~		1099	00	4000	1385	<b>~</b> ~		1693	
Volume (vph)	5	130	200	50	160	30	185	390	25	30	290	1(
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	144 46	222	56	178	33	206	433	28	33	322	te st
RTOR Reduction (vph) Lane Group Flow (vph)	0		0	0	5	0	0	1	0	0	1	)
	0	326	0		262	0	0	666	0	0	365	(
Turn Type	Perm			Perm		Southers States	Perm	la succession à <u>se</u> core		Perm	un interestation	nerski desta
Protected Phases Permitted Phases		4		<b>^</b>	8			2			6	
An ended where the first sector of the sector secto	4	00.0		8	~~ ~	teleteren er	2			6		ayinaansaa.
Actuated Green, G (s) Effective Green, g (s)		28.2			28.2			75.6			75.6	
		29.2	den son genere	Aleman and a second	29.2	de estatuar estatuar	gagadigan ng magi	76.6	ongergeriger		76.6	
Actuated g/C Ratio	0.0000000000000000000000000000000000000	0.24	99.5569.510993		0.24	evez en sen sen		0.64		sacits da da	0.64	
Vehicle Extension (s)		5.0			5.0			5.0		lander fan de f	5.0	anasi daga kirj
and the second secon		3.0			3.0			3.0			3.0	
Lane Grp Cap (vph)		414			267			884	la de conjudado de la cont	ala da na serie da s	1081	14-51-5-54-5-4
v/s Ratio Prot v/s Ratio Perm		0 1 0			-0.04			-0.40			A AA	
C. And an experimental statement of the restrict of the res		0.19	ua sa		c0.24			c0.48	in heed also heed a		0.22	idatiya teteriya
v/c Ratio		0.79	8.23.124.54		0.98			0.75			0.34	ACC IN I
Uniform Delay, d1 Progression Factor		42.5 1.00			45.2			15.1			10.0	
Incremental Delay, d2		9.5			1.00 50.0			0.33			0.75	
Delay (s)		9.5 52.0			95.2			0.6			0.7	
Level of Service		52.0 D			90.2 F			5.5 A			8.2	
Approach Delay (s)		52.0	9/10/10/02		95.2	<u>alasinasia</u> i	si ingaliwal	5.5			A	9000) (1000)
Approach LOS		52.0 D			ээ.с F			э.э А		Charley sol (1993)	8.2 A	
ntersection Summary												
-ICM Average Control D	elay		30.8	Н	CM Lev	el of Se	rvice		С			
HCM Volume to Capacit			0.82				- 		0.009.000.000			
Actuated Cycle Length (		an an tha thair tha an 1887. Tha	120.0	S	um of lo	st time	(S)	enn sun scheimeilt.	14.2	ana contra c	nomestores (1977/68)	
ntersection Capacity Uti			95.5%		U Leve				F			
Analysis Period (min)			15	anatan ten 1975 ang <del>1</del> 7	e e desta ser de Sertifici	eren an earlie an			na i ser na firitation	aletterreterretter		AN PERSONAL PROPERTY OF
Critical Lane Group												



# HCM Signalized Intersection Capacity Analysis 5: Main Street & Pine Street

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			र्स	7		ર્સ	7		4	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0		4.0	4.0		4.0	
Lane Util. Factor		1.00			1.00	1.00		1.00	1.00		1.00	
Frt		0.93			1.00	0.85		1.00	0.85		0.98	
Fit Protected		1.00			1.00	1.00		0.97	1.00		0.99	
Satd. Flow (prot)		1729			1859	1583		1811	1583		1812	
Flt Permitted		0.95			0.97	1.00		0.61	1.00		0.83	
Satd. Flow (perm)		1648			1816	1583		1144	1583		1513	
Volume (vph)	40	185	225	10	235	60	215	165	20	45	190	40
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	44	206	250	11	261	67	239	183	22	50	211	44
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	500	0	0	272	67	0	422	22	0	305	0
Turn Type	Perm			Perm		Perm	Perm		Perm	Perm		
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8		8	4		
Actuated Green, G (s)		32.5			32.5	32.5		35.3	35.3		35.3	
Effective Green, g (s)		36.5			36.5	36.5		39.3	39.3		39.3	
Actuated g/C Ratio		0.41			0.41	0.41		0.44	0.44		0.44	
Clearance Time (s)		8.0			8.0	8.0		8.0	8.0		8.0	
Vehicle Extension (s)		3.0			3.0	3.0		3.0	3.0		3.0	
Lane Grp Cap (vph) v/s Ratio Prot		668			736	642		500	691		661	
v/s Ratio Perm	an an an an Angelan an Angelan an Angelan an An	c0.30	sekneren dari serek		0.15	0.04	and defined to the	c0.37	0.01	ngin yary ngiyiyaya	0.20	
v/c Ratio		0.75			0.37	0.10	ili je interstance ta Service i statema	0.84	0.03		0,46	a Andreadad Anglan angla
Uniform Delay, d1	ennegenteende	22.8	29931993199999999	1019/00/00/00/00/00/00/00/00/00/00/00/00/00	18.7	16.6	02890890789928	22.6	14.5	adire versta statistiktist	17.9	anninanna
Progression Factor		1.00			1.00	1.00		0.61	0.69		1.00	
Incremental Delay, d2		4.6	and Alder Haller Barrier	adeologica a construction	0.3	0.1		14.0	0.1	innin 1999 yr 1999 yn 1 Yn arwyn yn 1999	0.5	sirikeji Siyavjas.
Delay (s)		27.4			19.0	16.7		27.8	10.1		18.4	
Level of Service		С			В	В	n gin na shinan ang ang	С	В	ang sa	В	(analong) and
Approach Delay (s)		27.4			18.6			26.9			18.4	
Approach LOS	nd anna mbarata anna dana	С			В	**************	, , , , , , , , , , , , , , , , , , ,	С	ana wakan da karan d		В	onningerigten:
Intersection Summary												
HCM Average Control D		ul tersecuentis est la colta	23.7	H	CM Lev	el of Se	ervice		С			
HCM Volume to Capacit			0.80									
Actuated Cycle Length (			90.0			ost time		an a	14.2			
Intersection Capacity Uti	lization		37.5%	IC	CU Leve	l of Ser	vice		E			
Analysis Period (min) c Critical Lane Group			15									

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## HCM Signalized Intersection Capacity Analysis 5: Main Street & Pine Street

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			र्भ	۲		র্ণ	7		¢\$+	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0		4.0	4.0		4.0	
Lane Util. Factor		1.00			1.00	1.00		1.00	1.00		1.00	
Frt		0.96		a da antica da antica da	1.00	0.85		1.00	0.85		0.99	
Flt Protected		1.00			0.99	1.00		0.97	1.00		0.99	
Satd. Flow (prot)		1794			1846	1583		1799	1583		1824	
Fit Permitted		0.99			0.78	1.00		0.60	1.00		0.74	
Satd. Flow (perm)		1770			1457	1583		1111	1583		1375	
Volume (vph)	10	255	95	65	290	40	260	105	60	65	170	15
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	11	283	106	72	322	44	289	117	67	72	189	17
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	400	0	0	394	44	0	406	67	0	278	0
Turn Type	Perm			Perm		Perm	Perm		Perm	Perm		
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8		8	4		
Actuated Green, G (s)		42.2			42.2	42.2		55.6	55.6		55.6	
Effective Green, g (s)		46.2			46.2	46.2		59.6	59.6		59.6	
Actuated g/C Ratio		0.39			0.39	0.39		0.50	0.50		0.50	
Clearance Time (s)		8.0			8.0	8.0		8.0	8.0		8.0	
Vehicle Extension (s)		3.0			3.0	3.0		3.0	3.0		3.0	
Lane Grp Cap (vph)		681			561	609		552	786		683	
v/s Ratio Prot												
v/s Ratio Perm		0.23			c0.27	0.03		c0.37	0.04		0.20	and served redaining the
v/c Ratio		0.59			0.70	0.07		0.74	0.09		0.41	
Uniform Delay, d1		29.3			31.1	23.3		23.9	15.9	n wat da bardan ja postalan	19.1	M966991590769
Progression Factor		1.00			1.00	1.00		0.55	0.55		1.00	
Incremental Delay, d2		1.3			4.0	0.1		4.9	0.1		0.4	Constraint Constraint
Delay (s)		30.6	969.69.81		35.1	23.4		18.2	8.8		19.4	
Level of Service		С			D	С		В	Α		В	
Approach Delay (s)		30.6			33.9	6-9-19-19- 5-49-6-19		16.8			19.4	
Approach LOS		C			С			В			В	
Intersection Summary												
HCM Average Control D	elay		25.5	Н	CM Lev	el of Se	ervice		С			
HCM Volume to Capacit	y ratio		0.72			renteri son atr Statistica						
Actuated Cycle Length (s	5)		120.0	S	um of lo	ost time	(s)		14.2			5.00000.00000000000
Intersection Capacity Uti	lization	<b>(</b>	35.3%		CU Leve				Е			
Analysis Period (min)			15		-,				enen ondersteringen of Rocks	eren eta terreta militik	ana an an an an tha an tha an an tha an	ananan anang ang ang ang ang ang ang ang
c Critical Lane Group			0. 3992 mi									