



pennsylvania
DEPARTMENT OF TRANSPORTATION

Traffic Design Report (ADDENDUM 1)
Route 228 Mars RR Bridge West Expansion
ECMS Project #E03625

06.05.2020

PennDOT Engineering District 10, Butler County

Cranberry Township, Adams Township, and Seven Fields Borough



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¹ **Note:** List continues from the original set of Appendices A-I, which are included in the previously-approved 2018 Traffic Design Report.

Introduction

The Route 228 Mars Railroad (RR) Bridge West Expansion project is a design effort for Pennsylvania Department of Transportation (PennDOT) District 10-0 to implement widening, capacity, and safety improvements along the SR 228 corridor from Franklin Road in Cranberry Township, to just east of Beaver Street Extension in Adams Township, Butler County, Pennsylvania (**Exhibit 1**).

Previous tasks on this project completed a project-specific Traffic Design Report² and related Safety Study that documented a comprehensive evaluation of existing and projected traffic operations, capacity, mobility, and safety conditions to support the overall infrastructure design. As the preliminary engineering and design efforts have continued to evolve since those submittals, a limited number of geometric design and development-related refinements have subsequently influenced some of the project's final intersection and turn lane configurations.

This document serves as Addendum 1 to supplement the 2018 Traffic Design Report and compile/validate changes to intersection configurations in the current Design Field View package.

Exhibit 1: Project Location Map



² Reference: WRA for PennDOT District 10-0, *Traffic Design Report, Route 228 Mars RR Bridge West Expansion*, February 13, 2018.

Design Refinement Influences

This Addendum specifically updates and summarizes the following influences on the project:

Enclave at High Pointe Development

This development area is located adjacent to SR 228 along High Pointe Drive. The site's potential influence was previously accounted for as "Site J" in the supplemental growth scenario and related long-term traffic projections as detailed in the 2018 Traffic Design Report (pp. 12-21). Since then, a development-specific traffic impact study³ was subsequently released, and new/active construction has commenced. The development activity influences proposed turn-lane configurations at two signals on SR 228, including Castle Creek Drive / High Pointe Drive (West) and Castle Creek Drive / High Pointe Drive (East).

Hespenheide Master Plan / Whitetail Meadows Development

This development area is located adjacent to SR 228 across from Myoma Road. The site's potential influence was previously accounted for as "Site E" in the supplemental growth scenario and related long-term traffic projections as detailed in the 2018 Traffic Design Report (pp. 12-21). While the planned development had been dormant for several years, new/active construction has now commenced. The development activity influences proposed intersection configurations and signal operations at the SR 228 / Myoma Road intersection, as well as SR 228 turnaround access in the vicinity.

Beaver Street Intersection Refinements

In balancing right-of-way, alignment, geometric, and related design issues, numerous alternatives for the SR 228 / Beaver Street Extension intersection were refined since completion of the 2018 Traffic Design Report. The final intersection location and configuration influence the related turn lanes and traffic signal operations.

Miscellaneous Design Field View Refinements

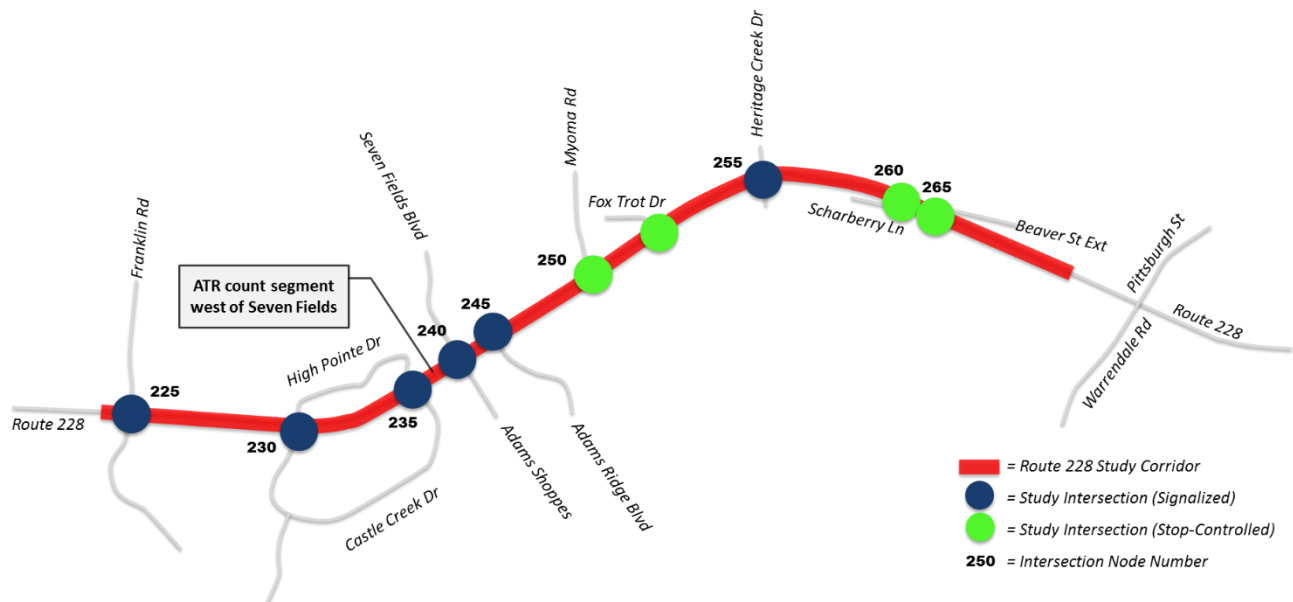
As the overall design has evolved, ongoing design refinements and/or constraints have required minor modifications to turn lane configurations, storage lengths, or related traffic signal operations at several intersections. Subsequent sections of this addendum summarize intersection-specific changes to confirm acceptable traffic operations and/or document corresponding refinements.

³ **Reference:** Wooster, *Transportation Impact Study for the Proposed Enclave at High Pointe Development*, March 16, 2018.

Design Field View Refinements by Intersection

As documented in the 2018 Traffic Design Report, existing focal points along the approximately three-mile project corridor included six signalized and four side-street stop-controlled intersections per **Exhibit 2**. An intersection-by-intersection review of the current design⁴, applicable intersection refinements, and any changes in anticipated operations (**Appendix J**) is summarized in the sections that follow.

Exhibit 2: SR 228 Study Intersections



SR 228 at Franklin Rd (SR 3021)

No substantial modifications from the initial 2018 design were made at this intersection. Previous analyses noted that a third continuous eastbound lane along SR 228 (west of Franklin Road and dropping as a right-turn lane at Franklin Road) may be added/constructed by others as part of a separate project. The status of that concept is unknown; however, the current SR 228 design includes a dedicated eastbound right-turn lane with a proposed storage length of approximately 330', which satisfies the 250' suggested for design per the 2018 Traffic Design Report (previous Appendix G1). Modifying the configuration from a full right-turn drop-lane to a separate right-turn lane with storage length had minimal influence on intersection operations (**Exhibit 3**).

SR 228 at Castle Creek Dr and High Pointe Dr (West)

Due to new/active construction for the *Enclave at High Pointe Development*, turn lane design and storage lengths were modified to accommodate the proposed development traffic. Revised turn lane warrant and length analyses are documented in the attached **Appendix J1**. The proposed eastbound left turn storage lane was extended from 175' to 250'. A new westbound right turn lane was also warranted with a proposed storage length of 175'. Turn lane and storage length additions showed a nominal improvement on intersection operations, mostly during the weekday PM peak (**Exhibit 3**).

⁴ Refer to the latest Design Field View plan submittals for details, including construction, traffic signal, and pavement marking plans.

SR 228 at Castle Creek Dr and High Point Dr (East)

Due to new/active construction for the *Enclave at High Pointe Development*, turn lane design and storage lengths were modified to accommodate the proposed development traffic. Revised turn lane warrant and length analyses are documented in the attached **Appendix J1**. The proposed eastbound left turn storage lane was extended from 250' to 275'. A new westbound right turn lane was also warranted with a proposed storage length of 250'. Turn lane and storage length additions showed a nominal improvement on intersection operations, mostly during the weekday PM peak (**Exhibit 3**).

SR 228 at Seven Fields Blvd and Adams Ridge Shoppes

No substantial modifications from the initial 2018 design were made at this intersection. Based on geometric design refinements, the proposed eastbound left and right turn lanes were refined to approximately 330', which satisfies the 275' suggested for design per the 2018 Traffic Design Report (previous Appendix G1). Storage length extensions had minimal influence on intersection operations (**Exhibit 3**).

SR 228 at Adams Ridge Blvd

No substantial modifications from the initial 2018 design were made at this intersection. Based on geometric design constraints, the eastbound right turn lane was included with 400' of storage length, which satisfies the 250' to 500' range suggested for design per the 2018 Traffic Design Report (previous Appendix G1). Storage length modifications had minimal influence on intersection operations (**Exhibit 3**).

The potential influence of future development on the north side of SR 228 at this location was previously accounted for as "Site K" in the supplemental growth scenario and related long-term traffic projections as detailed in the 2018 Traffic Design Report (pp. 12-21). That development was noted as having the potential to add a new fourth (southbound) leg to the existing intersection. At this time, however, no imminent development or active construction is anticipated. As such, the fourth leg and any related improvements are not included in the current SR 228 design, and it would be the responsibility of a future developer to re-analyze, design, and construct the intersection expansion in conjunction with potential future development plans by others.

SR 228 at Myoma Rd

Due to new/active construction for the *Hespenheide Master Plan / Whitetail Meadows Development*, a new fourth (northbound) leg and traffic signal operations have been implemented at this intersection. While previously expected only under the long-term supplemental growth scenario, the SR 228 design has been updated to reflect current development activity, including signalization and a new westbound left turn lane with 300' of storage. The implementation of traffic signal operations (versus prior stop-controlled assumptions) yields a significant change in levels-of-service (**Exhibit 3**).

SR 228 at Fox Trot Drive

This intersection is unchanged from the initial 2018 design assumptions. It will be restricted to right-in/right-out movements with the installation of median islands along SR 228.

Motorists intending to turn left into Fox Trot Drive (from SR 228 East) will, instead, continue along SR 228 East to Heritage Creek Drive, turn right to access the newly-proposed roundabout at Heritage Creek Drive and Scharberry Lane, and then use the roundabout to turnaround and return to Fox Trot Drive via SR 228 West.

Motorists intending to turn left out of Fox Trot Drive (to SR 228 East) will, instead, turn right out of Fox Trot Drive and continue along SR 228 West to Myoma Road, turn left at the new traffic signal at Myoma Road, and then use internal circulation roads that are currently being constructed as part of the *Hespenheide Master Plan Whitetail Meadows Development* to turnaround and re-access SR 228 East directly from the development site.

SR 228 at Heritage Creek Dr (SR 3017)

Based on geometric refinements and to enhance intersection lane alignment, a second left turn lane was added to the northbound approach to mirror the previously-proposed dual left-turn lanes on the southbound approach. Turn lane additions and related traffic signal timing/phasing modifications had minimal influence on proposed operations (**Exhibit 3**).

Just south of SR 228, the intersection of Heritage Creek Drive and Scharberry Lane has also been updated to a new single-lane roundabout configuration. The roundabout is anticipated to serve local traffic only for the few existing and planned developments in the immediate vicinity. It will also accommodate turnaround access for nominal eastbound traffic to Fox Trot Drive (see description above).

SR 228 at Scharberry Lane

This intersection is essentially unchanged from the initial 2018 design assumptions and from existing conditions. It will continue to be restricted to right-in/right-out movements only, with alternate access available at the opposite end of Scharberry Lane via the SR 228 / Heritage Creek Drive traffic signal. The geometric design will vary slightly from prior assumptions with the relocation of Beaver Street Extension (see description below); however, modifications had minimal influence on intersection operations (**Exhibit 3**).

SR 228 at Beaver Street Extension

The current design relocates the junction of Beaver Street Extension and SR 228 approximately 1000' to the east. The layout incorporates a jughandle configuration to further accommodate SR 228 turnaround needs, and it includes adequate storage length per the 2018 Traffic Design Report (previous Appendix G1), including a 345' eastbound left-turn lane, 295' westbound right-turn lane, and a 75' southbound left-turn lane. Overall modifications from prior assumptions had minimal influence on intersection operations (**Exhibit 3**).

Exhibit 3: LOS Summary with Design Field View Refinements

#	SR 228 at:	Overall Intersection LOS (AM / PM / SAT)														
		2045 No-Build			2045 Build			2045 Build w/ Supplemental Growth								
					Initial Study		Addendum	Initial Study		Addendum						
225	Franklin Rd	E**	F**	D**	D**	D**	C**	D**	D**	C**	E**	D**	D**	E**	D**	D**
230	Castle Creek Dr (West)	E**	F**	D**	B	C	B	B	C	C	B	D**	C*	B	C*	C*
235	Castle Creek Dr (East)	D**	D**	C**	A	A**	A	A	B*	B	B	B**	B	B	B*	B
240	Seven Fields Blvd	D**	E**	D**	B	B	B	A	B	B	A	C*	B	A	B*	B
245	Adams Ridge Blvd	D**	D**	D**	B	B	B	C	B	B	D**	C**	C**	B	C*	B
250	Myoma Rd	F^	F^	F^	C^	F^	E^	C*	C**	C	B*	C**	C**	C*	C**	C*
255	Heritage Creek Dr	C**	E**	C**	B	B	B	B	C	B	B	D**	B	B	C*	B
260	Scharberry Ln	A^	E^	C^	A^	B^	B^	A^	C^	B^	A^	C^	C^	A^	C^	B^
265	Beaver St Ext	F^	F^	F^	B*	C	B	B	B	B	B*	C	B	B	B	B

Table Notes:

- * Single asterisk denotes that one or more individual movements fail (LOS E/F).
- ** Double asterisk denotes that one or more overall approaches fail (LOS E/F).
- ^ Caret denotes that LOS represents stop-controlled side-street movement only.

Summary

Based on the refined analyses summarized above, it was determined that the latest Design Field View modifications will have only nominal influence on proposed intersection operations. Notable changes include:

- Minor adjustments to turn lane storage lengths at multiple intersections, all within a range that satisfies previous storage lengths suggested for design.
- Additional right-turn lanes westbound on SR 228 at the Castle Creek Drive / High Pointe Drive (West) and Castle Creek Drive / High Pointe Drive (East) intersections to account for the *Enclave at High Pointe Development*.
- Traffic signalization and intersection expansion at the SR 228 and Myoma Road intersection to account for the *Hespenheide Master Plan / Whitetail Meadows Development*, as well as coordination with the onsite circulation roads to support turnaround access for Fox Trot Drive (or similar travel needs).
- Incorporation of a single-lane roundabout at the intersection of Heritage Creek Drive and Scharberry Lane, which will carry localized onsite development traffic while also supporting turnaround access for Fox Trot Drive (or similar travel needs).
- Relocation of the Beaver Street Extension intersection with SR 228 and incorporation of jughandle operations to further support existing or future turnaround access needs for travel along SR 228.

Appropriate design refinements have been incorporated into the latest Design Field View plan submission for the project, including construction, traffic signal, and pavement marking plans. Moving toward final design, it should also be noted that appropriate U-turn signage and trailblazing for access to SR 228 East and/or West via turnaround opportunities at Myoma Road, Heritage Creek Drive, and Beaver Street Extension will likewise be incorporated as part of final design efforts.

Appendix J

Addendum 1 Traffic Analysis Revisions

Contents:

- Revised Turn Lane Warrant and Length Analyses
- Revised Synchro Traffic Analyses (2045 Design Field View Assumptions with Approved Growth)
- Revised Synchro Traffic Analyses (2045 Design Field View Assumptions with Supplemental Growth)

Appendix J1:

Revised Turn Lane Warrant and Length Analyses



MEMORANDUM

Date: 08.21.2019

To: Eric Meyer, PE; Brent Barrett, PE
From: Chad D. Reese, PE
Subject: SR 228 Turn Lane Modifications
CC: File

Work Order Number: WRA #35004
Contract Number: ECMS #E02625
Project: Route 228 Mars RR Bridge West Expansion

This memo documents proposed modifications to turn lane warrants and storage length requirements along SR 228 at the intersections of Castle Creek Drive / High Pointe Drive (West) and Castle Creek Drive / High Pointe Drive (East). These modifications are required as a result of new/active construction for the *Enclave at High Pointe Development* with reference to Traffic Impact Study (TIS) documentation and volume projections reported by David E. Wooster and Associates, Inc.¹ in comparison to WRA's previously-assumed Route 228 data.²

Summary before/after comparisons of relevant intersection turning movement volumes and corresponding turn lane warrant and storage length revisions are included in the table below. All findings are based on modification of prior worksheets from Appendix G of the SR 228 Traffic Design Report, with changes limited to modification of the subject turning movement volumes within PennDOT's Turn Lane Warrant and Length Analysis Workbook spreadsheets.

Intersection, Movement	Peak Hour Volumes, AM (PM)		Turn Lane and Storage Length Requirements	
	Route 228 Data ²	Enclave Data ¹	Original Design ²	Revised Design
Castle Creek Dr / High Pointe Dr (West)				
EB Left-Turn	15 (50)	94 (85)	Warranted w/ 175' storage	Warranted w/ 250' storage
WB Right-Turn	0 (0)	56 (28)	Not Warranted	Warranted w/ 175' storage
Castle Creek Dr / High Pointe Dr (East)				
EB Left-Turn	30 (120)	65 (132)	Warranted w/ 250' storage	Warranted w/ 275' storage
WB Right-Turn	30 (25)	99 (43)	Not Warranted	Warranted w/ 250' storage

Summary data above suggests design changes as follows:

- EB left-turn lane storage lengths at both intersections should increase compared to previous findings.
- WB right-turn lanes at both intersections are newly warranted with storage length suggestions as noted.

Ongoing design refinements for the SR 228 corridor should incorporate the above changes with final conditions adjusted based on a review of potential design, right-of-way, or other field constraints at each location.

¹ Reference: Wooster, *Transportation Impact Study for the Proposed Enclave at High Pointe Development*, March 16, 2018.

² Reference: WRA, *Traffic Design Report, Route 228 Mars RR Bridge West Expansion*, February 13, 2018

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: <input type="text" value="Seven Fields"/> County: <input type="text" value="Butler County"/> PennDOT Engineering District: <input type="text" value="10"/>	Analysis Date: <input type="text" value="8/21/2019"/> Conducted By: <input type="text" value="CR"/> Checked By: <input type="text" value="XW"/> Agency/Company Name: <input type="text" value="WRA"/>
Intersection & Approach Description: <input type="text" value="SR 228 @ Castle Creek Dr West EB LT Turn Lane Warrant and Length Analysis Workbook WITH ENCLAVE TRAFFIC"/>	
Analysis Period: <input type="text" value="2045 Build"/> Design Hour: <input type="text" value="AM Peak Hour"/> Intersection Control: <input type="text" value="Signalized"/> Posted Speed Limit (MPH): <input type="text" value="40"/> Type of Terrain: <input type="text" value="Rolling"/>	Number of Approach Lanes: <input type="text" value="2"/> Undivided or Divided Highway: <input type="text" value="Divided"/> Type of Analysis: <input style="border: 2px solid red;" type="text" value="Left Turn Lane"/> Left or Right-Turn Lane Analysis?: <input type="text" value="Left Turn Lane"/>

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	94	11.1%	110
	Through	-	935	10.5%	1083
	Right	Yes	190	6.7%	210
Opposing	Left	Yes	115	2.0%	119
	Through	-	1495	5.5%	1619
	Right	Yes	56	0.0%	56

Advancing Volume:	<input type="text" value="1403"/>	
Opposing Volume:	<input type="text" value="1794"/>	
Left Turn Volume:	<input type="text" value="110"/>	
% Left Turns in Advancing Volume:		<input type="text" value="7.84%"/>

Right Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes			N/A
	Through	-			N/A
	Right	-			N/A

Advancing Volume:	<input type="text" value="N/A"/>
Right Turn Volume:	<input type="text" value="N/A"/>

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: <input style="border: 1px solid black;" type="text" value="Figure 8"/>	Applicable Warrant Figure: <input style="border: 1px solid black;" type="text" value="N/A"/>
Warrant Met?: <input style="border: 1px solid black;" type="text" value="Yes"/>	Warrant Met?: <input style="border: 1px solid black;" type="text" value="N/A"/>

TURN LANE LENGTH CALCULATIONS

Intersection Control: <input type="text" value="Signalized"/> Design Hour Volume of Turning Lane: <input type="text" value="110"/> Cycles Per Hour (Assumed): <input type="text" value="Known"/> Cycles Per Hour (If Known): <input type="text" value="28"/>	Average # of Vehicles/Cycle: <input type="text" value="4.0"/>
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Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Left Turn Lane Storage Length, Condition A:	<input type="text" value="N/A"/>	Feet
Condition B:	<input type="text" value="75"/>	Feet
Condition C:	<input type="text" value="236"/>	Feet
Required Left Turn Lane Storage Length:	<input type="text" value="250"/>	Feet

Additional Findings:

Additional Comments / Justifications:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: <input type="text" value="Seven Fields"/> County: <input type="text" value="Butler County"/> PennDOT Engineering District: <input type="text" value="10"/>	Analysis Date: <input type="text" value="8/21/2019"/> Conducted By: <input type="text" value="CR"/> Checked By: <input type="text" value="XW"/> Agency/Company Name: <input type="text" value="WRA"/>
Intersection & Approach Description: <input type="text" value="SR 228 @ Castle Creek Dr West EB LT Turn Lane Warrant and Length Analysis Workbook WITH ENCLAVE TRAFFIC"/>	
Analysis Period: <input type="text" value="2045 Build"/> Design Hour: <input type="text" value="PM Peak Hour"/> Intersection Control: <input type="text" value="Signalized"/> Posted Speed Limit (MPH): <input type="text" value="40"/> Type of Terrain: <input type="text" value="Rolling"/>	Number of Approach Lanes: <input type="text" value="2"/> Undivided or Divided Highway: <input type="text" value="Divided"/> Type of Analysis: <input style="border: 2px solid red;" type="text" value="Left Turn Lane"/> Left or Right-Turn Lane Analysis?: <input type="text" value="Left Turn Lane"/>

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes	85	0.0%	85
	Through	-	1500	1.8%	1541
	Right	Yes	185	1.3%	189
Opposing	Left	Yes	70	1.9%	72
	Through	-	1280	3.2%	1342
	Right	Yes	28	0.0%	28

Advancing Volume:	<input type="text" value="1815"/>
Opposing Volume:	<input type="text" value="1442"/>
Left Turn Volume:	<input type="text" value="85"/>
% Left Turns in Advancing Volume: <input type="text" value="4.68%"/>	

Right Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes			N/A
	Through	-			N/A
	Right	-			N/A

Advancing Volume:	<input type="text" value="N/A"/>
Right Turn Volume:	<input type="text" value="N/A"/>

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: <input style="background-color: #90EE90;" type="text" value="Figure 8"/> Warrant Met?: <input style="background-color: #90EE90;" type="text" value="Yes"/>	Applicable Warrant Figure: <input style="background-color: #90EE90;" type="text" value="N/A"/> Warrant Met?: <input style="background-color: #90EE90;" type="text" value="N/A"/>

TURN LANE LENGTH CALCULATIONS

Intersection Control: <input type="text" value="Signalized"/> Design Hour Volume of Turning Lane: <input type="text" value="85"/> Cycles Per Hour (Assumed): <input type="text" value="Known"/> Cycles Per Hour (If Known): <input type="text" value="28"/>	Average # of Vehicles/Cycle: <input type="text" value="3.0"/>
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Type of Traffic Control	PennDOT Publication 46, Exhibit 11-6					
	Speed (MPH)					
	25-35		40-45		50-60	
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Left Turn Lane Storage Length, Condition A:	<input style="background-color: #90EE90;" type="text" value="N/A"/>	Feet
Condition B:	<input style="background-color: #90EE90;" type="text" value="75"/>	Feet
Condition C:	<input style="background-color: #90EE90;" type="text" value="211"/>	Feet
Required Left Turn Lane Storage Length:	<input style="background-color: #90EE90;" type="text" value="225"/>	Feet

Additional Findings:

Additional Comments / Justifications:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: <input type="text" value="Seven Fields"/> County: <input type="text" value="Butler County"/> PennDOT Engineering District: <input type="text" value="10"/>	Analysis Date: <input type="text" value="8/21/2019"/> Conducted By: <input type="text" value="CR"/> Checked By: <input type="text" value="XW"/> Agency/Company Name: <input type="text" value="WRA"/>
Intersection & Approach Description: <input type="text" value="SR 228 @ Castle Creek Dr West WB RT Turn Lane Warrant and Length Analysis Workbook WITH ENCLAVE TRAFFIC"/>	
Analysis Period: <input type="text" value="2045 Build"/> Design Hour: <input type="text" value="AM Peak Hour"/> Intersection Control: <input type="text" value="Signalized"/> Posted Speed Limit (MPH): <input type="text" value="40"/> Type of Terrain: <input type="text" value="Rolling"/>	Number of Approach Lanes: <input type="text" value="2"/> Undivided or Divided Highway: <input type="text" value="Divided"/> <div style="border: 1px solid red; padding: 2px; display: inline-block;">Type of Analysis</div> Left or Right-Turn Lane Analysis?: <input type="text" value="Right Turn Lane"/>

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes			N/A
	Through	-			N/A
	Right	Yes			N/A
Opposing	Left	Yes			N/A
	Through	-			N/A
	Right	Yes			N/A

Advancing Volume:
 Opposing Volume:
 Left Turn Volume:

% Left Turns in Advancing Volume:

Right Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	No	115	2.0%	N/A
	Through	-	1495	5.5%	1619
	Right	-	56	0.0%	56

Advancing Volume:
 Right Turn Volume:

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: <input type="text" value="N/A"/> Warrant Met?: <input type="text" value="N/A"/>	Applicable Warrant Figure: <input type="text" value="Figure 11"/> Warrant Met?: <input type="text" value="Yes"/>

TURN LANE LENGTH CALCULATIONS

Intersection Control: <input type="text" value="Signalized"/> Design Hour Volume of Turning Lane: <input type="text" value="56"/> Cycles Per Hour (Assumed): <input type="text" value="Known"/> Cycles Per Hour (If Known): <input type="text" value="28"/>	Average # of Vehicles/Cycle: <input type="text" value="2.0"/>
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Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Right Turn Lane Storage Length, Condition A: Feet
 Condition B: Feet
 Condition C: Feet
 Required Right Turn Lane Storage Length: Feet

Additional Findings:

Additional Comments / Justifications:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: <input type="text" value="Seven Fields"/> County: <input type="text" value="Butler County"/> PennDOT Engineering District: <input type="text" value="10"/>	Analysis Date: <input type="text" value="8/21/2019"/> Conducted By: <input type="text" value="CR"/> Checked By: <input type="text" value="XW"/> Agency/Company Name: <input type="text" value="WRA"/>
Intersection & Approach Description: <input type="text" value="SR 228 @ Castle Creek Dr West WB RT Turn Lane Warrant and Length Analysis Workbook WITH ENCLAVE TRAFFIC"/>	
Analysis Period: <input type="text" value="2045 Build"/> Design Hour: <input type="text" value="PM Peak Hour"/> Intersection Control: <input type="text" value="Signalized"/> Posted Speed Limit (MPH): <input type="text" value="40"/> Type of Terrain: <input type="text" value="Rolling"/>	Number of Approach Lanes: <input type="text" value="2"/> Undivided or Divided Highway: <input type="text" value="Divided"/> Left or Right-Turn Lane Analysis?: <input type="text" value="Right Turn Lane"/>

Type of Analysis
Right Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes			N/A
	Through	-			N/A
	Right	Yes			N/A
Opposing	Left	Yes			N/A
	Through	-			N/A
	Right	Yes			N/A

Advancing Volume:	N/A
Opposing Volume:	N/A
Left Turn Volume:	N/A
% Left Turns in Advancing Volume:	N/A

Right Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	No	70	1.9%	N/A
	Through	-	1280	3.2%	1342
	Right	-	28	0.0%	28

Advancing Volume:	1370
Right Turn Volume:	28

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: <input style="width: 80px;" type="text" value="N/A"/> Warrant Met?: <input style="width: 80px;" type="text" value="N/A"/>	Applicable Warrant Figure: <input style="width: 80px;" type="text" value="Figure 11"/> Warrant Met?: <input style="width: 80px;" type="text" value="No"/>

TURN LANE LENGTH CALCULATIONS

Intersection Control: <input type="text" value="Signalized"/> Design Hour Volume of Turning Lane: <input type="text" value="28"/> Cycles Per Hour (Assumed): <input type="text" value="Known"/> Cycles Per Hour (If Known): <input type="text" value="28"/>	Average # of Vehicles/Cycle: <input style="width: 100px;" type="text" value="N/A"/>
--	---

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Right Turn Lane Storage Length, Condition A:	N/A	Feet
Condition B:	N/A	Feet
Condition C:	N/A	Feet
Required Right Turn Lane Storage Length:	N/A	Feet

Additional Findings:

Additional Comments / Justifications:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: <input type="text" value="Seven Fields"/> County: <input type="text" value="Butler County"/> PennDOT Engineering District: <input type="text" value="10"/>	Analysis Date: <input type="text" value="8/21/2019"/> Conducted By: <input type="text" value="CR"/> Checked By: <input type="text" value="XW"/> Agency/Company Name: <input type="text" value="WRA"/>
Intersection & Approach Description: <input type="text" value="SR 228 @ Castle Creek Dr East EB LT Turn Lane Warrant and Length Analysis Workbook WITH ENCLAVE TRAFFIC"/>	
Analysis Period: <input type="text" value="2045 Build"/> Design Hour: <input type="text" value="AM Peak Hour"/> Intersection Control: <input type="text" value="Signalized"/> Posted Speed Limit (MPH): <input type="text" value="40"/> Type of Terrain: <input type="text" value="Rolling"/>	Number of Approach Lanes: <input type="text" value="2"/> Undivided or Divided Highway: <input type="text" value="Divided"/> Type of Analysis: <input style="border: 2px solid red;" type="text" value="Left Turn Lane"/> Left or Right-Turn Lane Analysis?: <input type="text" value="Left Turn Lane"/>

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations						
Movement	Include?	Volume	% Trucks	PCEV		
Advancing	Left	Yes	65	10.0%	75	Advancing Volume: <input type="text" value="1134"/> Opposing Volume: <input type="text" value="1747"/> Left Turn Volume: <input type="text" value="75"/>
	Through	-	890	10.6%	1032	
	Right	Yes	25	5.0%	27	
Opposing	Left	Yes	35	3.3%	37	% Left Turns in Advancing Volume: <input type="text" value="6.61%"/>
	Through	-	1490	5.4%	1611	
	Right	Yes	99	0.0%	99	

Right Turn Lane Volume Calculations						
Movement	Include?	Volume	% Trucks	PCEV		
Advancing	Left	Yes			N/A	Advancing Volume: <input type="text" value="N/A"/> Right Turn Volume: <input type="text" value="N/A"/>
	Through	-			N/A	
	Right	-			N/A	

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: <input type="text" value="Figure 8"/> Warrant Met?: <input type="text" value="Yes"/>	Applicable Warrant Figure: <input type="text" value="N/A"/> Warrant Met?: <input type="text" value="N/A"/>

TURN LANE LENGTH CALCULATIONS

Intersection Control: <input type="text" value="Signalized"/> Design Hour Volume of Turning Lane: <input type="text" value="75"/> Cycles Per Hour (Assumed): <input type="text" value="Known"/> Cycles Per Hour (If Known): <input type="text" value="28"/>	Average # of Vehicles/Cycle: <input type="text" value="3.0"/>																																								
PennDOT Publication 46, Exhibit 11-6																																									
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="3">Type of Traffic Control</th> <th colspan="6">Speed (MPH)</th> </tr> <tr> <th colspan="2">25-35</th> <th colspan="2">40-45</th> <th colspan="2">50-60</th> </tr> <tr> <th colspan="6" style="text-align: center;">Turn Demand Volume</th> </tr> <tr> <th></th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> </tr> </thead> <tbody> <tr> <td>Signalized</td> <td>A</td> <td>A</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> </tr> <tr> <td>Unsignalized</td> <td>A</td> <td>A</td> <td>C</td> <td>B</td> <td>B or C</td> <td>B</td> </tr> </tbody> </table>		Type of Traffic Control	Speed (MPH)						25-35		40-45		50-60		Turn Demand Volume							High	Low	High	Low	High	Low	Signalized	A	A	B or C	B or C	B or C	B or C	Unsignalized	A	A	C	B	B or C	B
Type of Traffic Control	Speed (MPH)																																								
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	Turn Demand Volume																																								
	High	Low	High	Low	High	Low																																			
Signalized	A	A	B or C	B or C	B or C	B or C																																			
Unsignalized	A	A	C	B	B or C	B																																			
Left Turn Lane Storage Length, Condition A: <input type="text" value="N/A"/> Feet Condition B: <input type="text" value="75"/> Feet Condition C: <input type="text" value="211"/> Feet Required Left Turn Lane Storage Length: <input type="text" value="225"/> Feet																																									
Additional Findings: <input type="text" value="N/A"/>																																									
Additional Comments / Justifications: <input style="height: 40px;" type="text"/>																																									

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: <input type="text" value="Seven Fields"/> County: <input type="text" value="Butler County"/> PennDOT Engineering District: <input type="text" value="10"/>	Analysis Date: <input type="text" value="8/21/2019"/> Conducted By: <input type="text" value="CR"/> Checked By: <input type="text" value="XW"/> Agency/Company Name: <input type="text" value="WRA"/>
Intersection & Approach Description: <input type="text" value="SR 228 @ Castle Creek Dr East EB LT Turn Lane Warrant and Length Analysis Workbook WITH ENCLAVE TRAFFIC"/>	
Analysis Period: <input type="text" value="2045 Build"/> Design Hour: <input type="text" value="PM Peak Hour"/> Intersection Control: <input type="text" value="Signalized"/> Posted Speed Limit (MPH): <input type="text" value="40"/> Type of Terrain: <input type="text" value="Rolling"/>	Number of Approach Lanes: <input type="text" value="2"/> Undivided or Divided Highway: <input type="text" value="Divided"/> Type of Analysis: <input style="border: 2px solid red;" type="text" value="Left Turn Lane"/> Left or Right-Turn Lane Analysis?: <input type="text" value="Left Turn Lane"/>

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations						
Movement	Include?	Volume	% Trucks	PCEV		
Advancing	Left	Yes	132	0.0%	132	Advancing Volume: <input type="text" value="1703"/> Opposing Volume: <input type="text" value="1446"/> Left Turn Volume: <input type="text" value="132"/>
	Through	-	1500	1.8%	1541	
	Right	Yes	30	0.0%	30	
Opposing	Left	Yes	65	1.8%	67	% Left Turns in Advancing Volume: <input type="text" value="7.75%"/>
	Through	-	1280	2.9%	1336	
	Right	Yes	43	0.0%	43	

Right Turn Lane Volume Calculations						
Movement	Include?	Volume	% Trucks	PCEV		
Advancing	Left	Yes			N/A	Advancing Volume: <input type="text" value="N/A"/> Right Turn Volume: <input type="text" value="N/A"/>
	Through	-			N/A	
	Right	-			N/A	

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: <input type="text" value="Figure 8"/> Warrant Met?: <input type="text" value="Yes"/>	Applicable Warrant Figure: <input type="text" value="N/A"/> Warrant Met?: <input type="text" value="N/A"/>

TURN LANE LENGTH CALCULATIONS

Intersection Control: <input type="text" value="Signalized"/> Design Hour Volume of Turning Lane: <input type="text" value="132"/> Cycles Per Hour (Assumed): <input type="text" value="Known"/> Cycles Per Hour (If Known): <input type="text" value="28"/>	Average # of Vehicles/Cycle: <input type="text" value="5.0"/>																																								
PennDOT Publication 46, Exhibit 11-6																																									
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="3">Type of Traffic Control</th> <th colspan="6">Speed (MPH)</th> </tr> <tr> <th colspan="2">25-35</th> <th colspan="2">40-45</th> <th colspan="2">50-60</th> </tr> <tr> <th colspan="6" style="text-align: center;">Turn Demand Volume</th> </tr> <tr> <th></th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> <th>High</th> <th>Low</th> </tr> </thead> <tbody> <tr> <td>Signalized</td> <td>A</td> <td>A</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> <td>B or C</td> </tr> <tr> <td>Unsignalized</td> <td>A</td> <td>A</td> <td>C</td> <td>B</td> <td>B or C</td> <td>B</td> </tr> </tbody> </table>		Type of Traffic Control	Speed (MPH)						25-35		40-45		50-60		Turn Demand Volume							High	Low	High	Low	High	Low	Signalized	A	A	B or C	B or C	B or C	B or C	Unsignalized	A	A	C	B	B or C	B
Type of Traffic Control	Speed (MPH)																																								
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	High	Low	High	Low	High	Low																																			
Signalized	A	A	B or C	B or C	B or C	B or C																																			
Unsignalized	A	A	C	B	B or C	B																																			
Left Turn Lane Storage Length, Condition A: <input type="text" value="N/A"/> Feet Condition B: <input type="text" value="75"/> Feet Condition C: <input type="text" value="261"/> Feet Required Left Turn Lane Storage Length: <input type="text" value="275"/> Feet																																									
Additional Findings: <input type="text" value="N/A"/>																																									
Additional Comments / Justifications: <input style="height: 40px;" type="text"/>																																									

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: <input type="text" value="Seven Fields"/> County: <input type="text" value="Butler County"/> PennDOT Engineering District: <input type="text" value="10"/>	Analysis Date: <input type="text" value="8/21/2019"/> Conducted By: <input type="text" value="CR"/> Checked By: <input type="text" value="XW"/> Agency/Company Name: <input type="text" value="WRA"/>
Intersection & Approach Description: <input type="text" value="SR 228 @ Castle Creek Dr East WB RT Turn Lane Warrant and Length Analysis Workbook WITH ENCLAVE TRAFFIC"/>	
Analysis Period: <input type="text" value="2045 Build"/> Design Hour: <input type="text" value="AM Peak Hour"/> Intersection Control: <input type="text" value="Signalized"/> Posted Speed Limit (MPH): <input type="text" value="40"/> Type of Terrain: <input type="text" value="Rolling"/>	Number of Approach Lanes: <input type="text" value="2"/> Undivided or Divided Highway: <input type="text" value="Divided"/> Left or Right-Turn Lane Analysis?: <input type="text" value="Right Turn Lane"/>

Type of Analysis
 Right Turn Lane

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes			N/A
	Through	-			N/A
	Right	Yes			N/A
Opposing	Left	Yes			N/A
	Through	-			N/A
	Right	Yes			N/A

Advancing Volume:	N/A
Opposing Volume:	N/A
Left Turn Volume:	N/A
% Left Turns in Advancing Volume:	N/A

Right Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	No	35	3.3%	N/A
	Through	-	1490	5.4%	1611
	Right	-	99	0.0%	99

Advancing Volume:	1710
Right Turn Volume:	99

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: <input style="width: 80%;" type="text" value="N/A"/> Warrant Met?: <input style="width: 80%;" type="text" value="N/A"/>	Applicable Warrant Figure: <input style="width: 80%;" type="text" value="Figure 11"/> Warrant Met?: <input style="width: 80%;" type="text" value="Yes"/>

TURN LANE LENGTH CALCULATIONS

Intersection Control: <input type="text" value="Signalized"/> Design Hour Volume of Turning Lane: <input type="text" value="99"/> Cycles Per Hour (Assumed): <input type="text" value="Known"/> Cycles Per Hour (If Known): <input type="text" value="28"/>	Average # of Vehicles/Cycle: <input style="width: 80%;" type="text" value="4.0"/>
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PennDOT Publication 46, Exhibit 11-6

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B

Right Turn Lane Storage Length, Condition A:	N/A	Feet
Condition B:	75	Feet
Condition C:	236	Feet
Required Right Turn Lane Storage Length:	250	Feet

Additional Findings:

Additional Comments / Justifications:

Turn Lane Warrant and Length Analysis Workbook

STUDY LOCATION AND ANALYSIS INFORMATION

Municipality: <input type="text" value="Adams"/> County: <input type="text" value="Butler County"/> PennDOT Engineering District: <input type="text" value="10"/>	Analysis Date: <input type="text" value="8/21/2019"/> Conducted By: <input type="text" value="CR"/> Checked By: <input type="text" value="XW"/> Agency/Company Name: <input type="text" value="WRA"/>
Intersection & Approach Description: <input type="text" value="SR 228 @ Castle Creek Dr East WB RT Turn Lane Warrant and Length Analysis Workbook WITH ENCLAVE TRAFFIC"/>	
Analysis Period: <input type="text" value="2045 Build"/> Design Hour: <input type="text" value="PM Peak Hour"/> Intersection Control: <input type="text" value="Signalized"/> Posted Speed Limit (MPH): <input type="text" value="40"/> Type of Terrain: <input type="text" value="Rolling"/>	Number of Approach Lanes: <input type="text" value="2"/> Undivided or Divided Highway: <input type="text" value="Divided"/> Left or Right-Turn Lane Analysis?: <input type="text" value="Right Turn Lane"/>

VOLUME CALCULATIONS

Left Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	Yes			N/A
	Through	-			N/A
	Right	Yes			N/A
Opposing	Left	Yes			N/A
	Through	-			N/A
	Right	Yes			N/A

Advancing Volume:	<input type="text" value="N/A"/>
Opposing Volume:	<input type="text" value="N/A"/>
Left Turn Volume:	<input type="text" value="N/A"/>
% Left Turns in Advancing Volume:	<input type="text" value="N/A"/>

Right Turn Lane Volume Calculations					
Movement		Include?	Volume	% Trucks	PCEV
Advancing	Left	No	65	1.8%	N/A
	Through	-	1280	2.9%	1336
	Right	-	43	0.0%	43

Advancing Volume:	<input type="text" value="1379"/>
Right Turn Volume:	<input type="text" value="43"/>

TURN LANE WARRANT FINDINGS

Left Turn Lane Warrant Findings	Right Turn Lane Warrant Findings
Applicable Warrant Figure: <input type="text" value="N/A"/> Warrant Met?: <input type="text" value="N/A"/>	Applicable Warrant Figure: <input type="text" value="Figure 11"/> Warrant Met?: <input type="text" value="No"/>

TURN LANE LENGTH CALCULATIONS

Intersection Control: <input type="text" value="Signalized"/> Design Hour Volume of Turning Lane: <input type="text" value="43"/> Cycles Per Hour (Assumed): <input type="text" value="Known"/> Cycles Per Hour (If Known): <input type="text" value="28"/>	Average # of Vehicles/Cycle: <input type="text" value="N/A"/>
--	---

Type of Traffic Control	Speed (MPH)					
	25-35		40-45		50-60	
	Turn Demand Volume					
	High	Low	High	Low	High	Low
Signalized	A	A	B or C	B or C	B or C	B or C
Unsignalized	A	A	C	B	B or C	B













Right Turn Lane Storage Length, Condition A:	<input type="text" value="N/A"/>	Feet
Condition B:	<input type="text" value="N/A"/>	Feet
Condition C:	<input type="text" value="N/A"/>	Feet
Required Right Turn Lane Storage Length:	<input type="text" value="N/A"/>	Feet

Additional Findings:

Additional Comments / Justifications:

Appendix J2:

Revised Synchro Traffic Analyses
(2045 Design Field View Assumptions with Approved Growth)

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	115	960	75	285	1330	50	140	160	95	85	425	85
Future Volume (vph)	115	960	75	285	1330	50	140	160	95	85	425	85
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	11%	7%	4%	6%	8%	8%	6%	14%	6%	5%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	119	990	77	294	1371	52	144	165	98	88	438	88
v/c Ratio	0.41	0.71	0.09	0.64	0.91	0.07	0.80	0.18	0.15	0.21	0.93	0.14
Control Delay	57.6	32.9	2.8	65.1	47.5	0.2	62.8	39.8	2.3	29.6	79.9	1.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.6	32.9	2.8	65.1	47.5	0.2	62.8	39.8	2.3	29.6	79.9	1.6
Queue Length 50th (ft)	56	239	1	137	640	0	90	61	0	52	400	0
Queue Length 95th (ft)	89	273	16	181	#797	0	#190	93	20	92	#596	13
Internal Link Dist (ft)		1521			2444			493			930	
Turn Bay Length (ft)	600		330	300		250	300		350	450		275
Base Capacity (vph)	291	1385	829	679	1504	702	179	939	653	424	489	657
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.71	0.09	0.43	0.91	0.07	0.80	0.18	0.15	0.21	0.90	0.13

Intersection Summary

Description: Signal Permit No. TS-152-10













Date Issued: 6-4-99

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

Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	960	75	285	1330	50	140	160	95	85	425	85
Future Volume (vph)	115	960	75	285	1330	50	140	160	95	85	425	85
Ideal Flow (vphpl)	2100	2100	2100	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Grade (%)		5%			5%			3%			-3%	
Total Lost time (s)	3.0	3.0	7.0	3.0	3.0	6.0	6.0	6.0	6.0	5.0	6.0	3.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3527	3505	1627	3283	3321	1458	1591	3243	1349	1671	1775	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.12	1.00	1.00	0.65	1.00	1.00
Satd. Flow (perm)	3527	3505	1627	3283	3321	1458	209	3243	1349	1139	1775	1538
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)	119	990	77	294	1371	52	144	165	98	88	438	88
RTOR Reduction (vph)	0	0	43	0	0	30	0	0	59	0	0	56
Lane Group Flow (vph)	119	990	34	294	1371	22	144	165	39	88	438	32
Heavy Vehicles (%)	7%	11%	7%	4%	6%	8%	8%	6%	14%	6%	5%	3%
Turn Type	Prot	NA	pm+ov	Prot	NA	Perm	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	1	6	7	5	2		7	4	5	3	8	1
Permitted Phases			6			2	4		4	8		8
Actuated Green, G (s)	9.0	54.4	64.4	17.3	62.7	62.7	49.7	39.7	57.0	44.9	37.3	46.3
Effective Green, g (s)	12.0	57.4	64.4	20.3	65.7	62.7	51.7	40.7	57.0	48.9	38.3	52.3
Actuated g/C Ratio	0.08	0.40	0.44	0.14	0.45	0.43	0.36	0.28	0.39	0.34	0.26	0.36
Clearance Time (s)	6.0	6.0	7.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0	6.0
Vehicle Extension (s)	3.0	5.0	2.0	2.0	5.0	5.0	2.0	2.0	2.0	2.0	2.0	3.0
Lane Grp Cap (vph)	291	1387	722	459	1504	630	179	910	530	419	468	554
v/s Ratio Prot	0.03	c0.28	0.00	0.09	c0.41		c0.06	0.05	0.01	0.01	c0.25	0.00
v/s Ratio Perm			0.02			0.02	0.23		0.02	0.06		0.02
v/c Ratio	0.41	0.71	0.05	0.64	0.91	0.04	0.80	0.18	0.07	0.21	0.94	0.06
Uniform Delay, d1	63.1	36.9	22.9	58.9	36.9	23.7	36.9	39.5	27.5	33.6	52.2	30.3
Progression Factor	0.84	0.78	0.55	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	3.0	0.0	2.3	9.9	0.1	21.3	0.0	0.0	0.1	25.9	0.0
Delay (s)	54.2	31.7	12.5	61.2	46.8	23.8	58.2	39.6	27.5	33.7	78.0	30.3
Level of Service	D	C	B	E	D	C	E	D	C	C	E	C
Approach Delay (s)		32.7			48.6			43.3			64.8	
Approach LOS		C			D			D			E	

Intersection Summary		
HCM 2000 Control Delay	45.8	HCM 2000 Level of Service D
HCM 2000 Volume to Capacity ratio	0.93	
Actuated Cycle Length (s)	145.0	Sum of lost time (s) 22.0
Intersection Capacity Utilization	87.7%	ICU Level of Service E
Analysis Period (min)	15	
Description: Signal Permit No. TS-152-10		
Date Issued: 6-4-99		
c Critical Lane Group		

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	95	935	190	115	1495	60	80	15	30	35	55	135
Future Volume (vph)	95	935	190	115	1495	60	80	15	30	35	55	135
Confl. Peds. (#/hr)			1						1			
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	11%	11%	7%	2%	6%	0%	4%	13%	9%	0%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	98	964	196	119	1541	62	82	46	0	36	57	139
v/c Ratio	0.36	0.43	0.18	0.29	0.75	0.06	0.47	0.20		0.19	0.22	0.44
Control Delay	6.9	8.9	1.5	3.6	7.4	0.1	52.4	21.6		43.4	43.4	15.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	6.9	8.9	1.5	3.6	7.4	0.1	52.4	21.6		43.4	43.4	15.8
Queue Length 50th (ft)	12	143	0	11	80	0	54	10		23	37	16
Queue Length 95th (ft)	29	213	25	m18	89	m0	99	42		52	72	70
Internal Link Dist (ft)		2444			1855			844			941	
Turn Bay Length (ft)	250		400	250		175	100			100		100
Base Capacity (vph)	271	2251	1084	408	2054	1010	249	316		268	368	406
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.36	0.43	0.18	0.29	0.75	0.06	0.33	0.15		0.13	0.15	0.34

Intersection Summary

Description: Signal Permit No. TS-113-10

Date Issued: 3/24/95

Date Revised: 9/17/02

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	95	935	190	115	1495	60	80	15	30	35	55	135
Future Volume (vph)	95	935	190	115	1495	60	80	15	30	35	55	135
Ideal Flow (vphpl)	1900	1900	1900	1714	1714	1714	1950	1950	1950	1950	1950	1950
Grade (%)		-2%			1%			-1%			-6%	
Total Lost time (s)	3.7	3.7	3.7	4.1	3.7	3.7	4.8	4.8		4.8	4.8	4.8
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	0.98	1.00	1.00	1.00	1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	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	0.85	1.00	0.90		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1642	3285	1493	1588	3057	1450	1790	1582		1908	2008	1707
Flt Permitted	0.11	1.00	1.00	0.26	1.00	1.00	0.72	1.00		0.73	1.00	1.00
Satd. Flow (perm)	183	3285	1493	440	3057	1450	1356	1582		1460	2008	1707
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)	98	964	196	119	1541	62	82	15	31	36	57	139
RTOR Reduction (vph)	0	0	62	0	0	20	0	27	0	0	0	99
Lane Group Flow (vph)	98	964	134	119	1541	42	82	19	0	36	57	40
Confl. Peds. (#/hr)			1						1			
Heavy Vehicles (%)	11%	11%	7%	2%	6%	0%	4%	13%	9%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6		6	2		2	4			8		8
Actuated Green, G (s)	78.6	72.1	72.1	75.6	70.6	70.6	11.9	11.9		11.9	11.9	11.9
Effective Green, g (s)	85.2	75.4	75.4	81.4	73.9	73.9	14.1	14.1		14.1	14.1	14.1
Actuated g/C Ratio	0.77	0.69	0.69	0.74	0.67	0.67	0.13	0.13		0.13	0.13	0.13
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	271	2251	1023	408	2053	974	173	202		187	257	218
v/s Ratio Prot	c0.03	0.29		0.02	c0.50			0.01			0.03	
v/s Ratio Perm	0.25		0.09	0.19		0.03	c0.06			0.02		0.02
v/c Ratio	0.36	0.43	0.13	0.29	0.75	0.04	0.47	0.09		0.19	0.22	0.18
Uniform Delay, d1	8.2	7.7	6.0	4.4	11.9	6.1	44.5	42.3		42.9	43.0	42.8
Progression Factor	1.00	1.00	1.00	0.63	0.40	0.08	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.8	0.6	0.3	0.3	2.1	0.1	2.0	0.2		0.5	0.4	0.4
Delay (s)	9.0	8.3	6.2	3.1	6.9	0.6	46.6	42.5		43.4	43.5	43.2
Level of Service	A	A	A	A	A	A	D	D		D	D	D
Approach Delay (s)		8.0			6.4			45.1			43.3	
Approach LOS		A			A			D			D	

Intersection Summary













HCM 2000 Control Delay	11.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	72.7%	ICU Level of Service	C
Analysis Period (min)	15		

Description: Signal Permit No. TS-113-10

Date Issued: 3/24/95

Date Revised: 9/17/02

c Critical Lane Group

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	65	890	25	35	1490	100	55	20	45	50	15	75
Future Volume (vph)	65	890	25	35	1490	100	55	20	45	50	15	75
Confl. Peds. (#/hr)									1			1
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	10%	11%	5%	3%	5%	0%	6%	10%	3%	0%	0%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	67	944	0	36	1536	103	57	67	0	52	15	77
v/c Ratio	0.25	0.39		0.07	0.62	0.09	0.41	0.32		0.36	0.07	0.32
Control Delay	8.4	6.6		2.4	6.1	0.9	53.4	23.0		51.4	42.8	10.6
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	8.4	6.6		2.4	6.1	0.9	53.4	23.0		51.4	42.8	10.6
Queue Length 50th (ft)	7	122		3	136	1	38	14		35	10	0
Queue Length 95th (ft)	43	211		m7	176	m3	77	54		72	29	35
Internal Link Dist (ft)		1855			716			860			573	
Turn Bay Length (ft)	275			175		250	100			100		100
Base Capacity (vph)	300	2398		525	2458	1180	185	260		190	267	291
Starvation Cap Reductn	0	0		0	7	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.22	0.39		0.07	0.63	0.09	0.31	0.26		0.27	0.06	0.26

Intersection Summary

Description: Signal Permit No. TS-080-10

m Volume for 95th percentile queue is metered by upstream signal.













Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	890	25	35	1490	100	55	20	45	50	15	75
Future Volume (vph)	65	890	25	35	1490	100	55	20	45	50	15	75
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803
Grade (%)		0%			0%			0%			-4%	
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	0.99		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	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.90		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1557	3078		1663	3263	1533	1616	1522		1747	1839	1481
Flt Permitted	0.12	1.00		0.28	1.00	1.00	0.75	1.00		0.71	1.00	1.00
Satd. Flow (perm)	198	3078		495	3263	1533	1272	1522		1312	1839	1481
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)	67	918	26	36	1536	103	57	21	46	52	15	77
RTOR Reduction (vph)	0	1	0	0	0	28	0	41	0	0	0	69
Lane Group Flow (vph)	67	943	0	36	1536	75	57	26	0	52	15	8
Confl. Peds. (#/hr)									1			1
Heavy Vehicles (%)	10%	11%	5%	3%	5%	0%	6%	10%	3%	0%	0%	4%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6			2		2	4			8		8
Actuated Green, G (s)	84.6	79.2		81.4	77.6	77.6	9.0	9.0		9.0	9.0	9.0
Effective Green, g (s)	88.6	81.2		85.4	79.6	79.6	11.0	11.0		11.0	11.0	11.0
Actuated g/C Ratio	0.81	0.74		0.78	0.72	0.72	0.10	0.10		0.10	0.10	0.10
Clearance Time (s)	6.0	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		3.0	6.0	6.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	250	2272		445	2361	1109	127	152		131	183	148
v/s Ratio Prot	c0.02	0.31		0.00	c0.47			0.02			0.01	
v/s Ratio Perm	0.20			0.06		0.05	c0.04			0.04		0.01
v/c Ratio	0.27	0.41		0.08	0.65	0.07	0.45	0.17		0.40	0.08	0.05
Uniform Delay, d1	5.2	5.4		3.0	7.9	4.4	46.6	45.3		46.4	44.9	44.8
Progression Factor	2.60	1.04		0.88	0.56	0.62	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.5	0.5		0.1	1.2	0.1	2.5	0.5		2.0	0.2	0.1
Delay (s)	14.0	6.2		2.7	5.6	2.9	49.2	45.8		48.4	45.1	44.9
Level of Service	B	A		A	A	A	D	D		D	D	D
Approach Delay (s)		6.7			5.4			47.4			46.2	
Approach LOS		A			A			D			D	

Intersection Summary

HCM 2000 Control Delay	9.6	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.4%	ICU Level of Service	C
Analysis Period (min)	15		

Description: Signal Permit No. TS-080-10

c Critical Lane Group

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	115	815	10	0	1380	110	30	5	5	35	5	145
Future Volume (vph)	115	815	10	0	1380	110	30	5	5	35	5	145
Confl. Peds. (#/hr)												2
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	12%	0%	0%	5%	6%	4%	0%	50%	13%	0%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	119	840	10	0	1423	113	31	5	5	36	154	0
v/c Ratio	0.37	0.33	0.01		0.62	0.11	0.50	0.03	0.03	0.30	0.56	
Control Delay	12.4	1.6	0.0		8.7	0.9	71.9	42.4	0.4	51.0	16.1	
Queue Delay	0.0	0.0	0.0		0.3	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	12.4	1.6	0.0		9.0	0.9	71.9	42.4	0.4	51.0	16.1	
Queue Length 50th (ft)	13	26	0		205	1	21	3	0	24	3	
Queue Length 95th (ft)	48	44	m0		319	m7	52	14	0	55	63	
Internal Link Dist (ft)		716			569			530			572	
Turn Bay Length (ft)	330		330			400	115		100	150		
Base Capacity (vph)	330	2520	1239		2304	1054	117	335	248	225	387	
Starvation Cap Reductn	0	0	0		335	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0		0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0		0	0	0	0	0	0	0	
Reduced v/c Ratio	0.36	0.33	0.01		0.72	0.11	0.26	0.01	0.02	0.16	0.40	

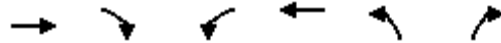
Intersection Summary

Description: Signal Permit No. TS-221-10

Date Issued: 12-15-07

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	815	10	0	1380	110	30	5	5	35	5	145
Future Volume (vph)	115	815	10	0	1380	110	30	5	5	35	5	145
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803
Grade (%)		2%			-2%			2%			1%	
Total Lost time (s)	3.1	3.1	6.0		3.1	3.1	4.3	4.3	6.0	4.3	4.3	
Lane Util. Factor	1.00	0.95	1.00		0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.98	
Flpb, ped/bikes	1.00	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	0.85	1.00	1.00	0.85	1.00	0.85	
Flt Protected	0.95	1.00	1.00		1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1585	3028	1517		3295	1460	1631	1785	1011	1508	1412	
Flt Permitted	0.13	1.00	1.00		1.00	1.00	0.37	1.00	1.00	0.75	1.00	
Satd. Flow (perm)	221	3028	1517		3295	1460	627	1785	1011	1198	1412	
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)	119	840	10	0	1423	113	31	5	5	36	5	149
RTOR Reduction (vph)	0	0	2	0	0	34	0	0	5	0	134	0
Lane Group Flow (vph)	119	840	8	0	1423	79	31	5	0	36	20	0
Confl. Peds. (#/hr)												2
Heavy Vehicles (%)	7%	12%	0%	0%	5%	6%	4%	0%	50%	13%	0%	7%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6		6	2		2	4		4	8		
Actuated Green, G (s)	88.6	88.6	88.6		74.0	74.0	9.4	9.4	9.4	9.4	9.4	
Effective Green, g (s)	91.5	91.5	88.6		76.9	76.9	11.1	11.1	9.4	11.1	11.1	
Actuated g/C Ratio	0.83	0.83	0.81		0.70	0.70	0.10	0.10	0.09	0.10	0.10	
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	5.0	6.0	6.0		6.0	6.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	326	2518	1221		2303	1020	63	180	86	120	142	
v/s Ratio Prot	c0.04	0.28			c0.43			0.00			0.01	
v/s Ratio Perm	0.27		0.01			0.05	c0.05		0.00	0.03		
v/c Ratio	0.37	0.33	0.01		0.62	0.08	0.49	0.03	0.00	0.30	0.14	
Uniform Delay, d1	5.8	2.2	2.1		8.8	5.3	46.8	44.6	46.0	45.8	45.1	
Progression Factor	4.65	0.54	1.00		0.81	0.54	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.4	0.3	0.0		1.0	0.1	5.9	0.1	0.0	1.4	0.5	
Delay (s)	28.2	1.5	2.1		8.1	3.0	52.7	44.6	46.0	47.3	45.6	
Level of Service	C	A	A		A	A	D	D	D	D	D	
Approach Delay (s)		4.8			7.7			50.9			45.9	
Approach LOS		A			A			D			D	
Intersection Summary												
HCM 2000 Control Delay			10.0		HCM 2000 Level of Service					A		
HCM 2000 Volume to Capacity ratio			0.57									
Actuated Cycle Length (s)			110.0		Sum of lost time (s)				10.5			
Intersection Capacity Utilization			74.9%		ICU Level of Service				D			
Analysis Period (min)	15											
Description: Signal Permit No. TS-221-10												
Date Issued: 12-15-07												
c Critical Lane Group												



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Volume (vph)	775	85	65	1020	475	255
Future Volume (vph)	775	85	65	1020	475	255
Confl. Peds. (#/hr)		1				
Confl. Bikes (#/hr)						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	11%	14%	15%	8%	1%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	799	88	67	1052	490	263
v/c Ratio	0.55	0.15	0.22	0.56	0.79	0.36
Control Delay	25.8	9.4	9.8	8.3	41.5	16.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.8	9.4	9.8	8.3	41.5	16.6
Queue Length 50th (ft)	227	10	5	54	306	91
Queue Length 95th (ft)	382	29	m24	189	379	126
Internal Link Dist (ft)	569			1661	173	
Turn Bay Length (ft)		400	425			100
Base Capacity (vph)	1466	603	314	1878	797	782
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	0.55	0.15	0.21	0.56	0.61	0.34

Intersection Summary













Description: Signal Permit No. TS-120-10

Date Issued: 8-29-96

Date Revised: 9-19-03

m Volume for 95th percentile queue is metered by upstream signal.













	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑
Traffic Volume (vph)	775	85	65	1020	475	255
Future Volume (vph)	775	85	65	1020	475	255
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803
Lane Width	12	10	12	12	15	16
Grade (%)	2%			-2%	4%	
Total Lost time (s)	4.0	7.0	5.0	4.0	4.0	7.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Fr t	1.00	0.85	1.00	1.00	1.00	0.85
Fl t Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3055	1226	1504	3204	1828	1685
Fl t Permitted	1.00	1.00	0.23	1.00	0.95	1.00
Satd. Flow (perm)	3055	1226	365	3204	1828	1685
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	799	88	67	1052	490	263
RTOR Reduction (vph)	0	49	0	0	0	33
Lane Group Flow (vph)	799	39	67	1052	490	230
Confl. Peds. (#/hr)		1				
Heavy Vehicles (%)	11%	14%	15%	8%	1%	1%
Turn Type	NA	Perm	pm+pt	NA	Prot	pm+ov
Protected Phases	6		5	2	4	5
Permitted Phases		6	2			4
Actuated Green, G (s)	48.4	48.4	61.5	61.5	35.5	41.6
Effective Green, g (s)	51.4	48.4	63.5	64.5	37.5	41.6
Actuated g/C Ratio	0.47	0.44	0.58	0.59	0.34	0.38
Clearance Time (s)	7.0	7.0	7.0	7.0	6.0	7.0
Vehicle Extension (s)	6.3	6.3	3.0	6.3	2.5	3.0
Lane Grp Cap (vph)	1427	539	294	1878	623	637
v/s Ratio Prot	0.26		0.02	c0.33	c0.27	0.02
v/s Ratio Perm		0.03	0.11			0.12
v/c Ratio	0.56	0.07	0.23	0.56	0.79	0.36
Uniform Delay, d1	21.1	17.8	12.1	14.0	32.6	24.6
Progression Factor	1.06	1.65	0.69	0.48	1.00	1.00
Incremental Delay, d2	1.5	0.2	0.3	0.9	6.3	0.4
Delay (s)	23.9	29.6	8.6	7.5	38.9	25.0
Level of Service	C	C	A	A	D	C
Approach Delay (s)	24.5			7.6	34.1	
Approach LOS	C			A	C	
Intersection Summary						
HCM 2000 Control Delay			20.2		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.69			
Actuated Cycle Length (s)			110.0		Sum of lost time (s)	15.0
Intersection Capacity Utilization			65.3%		ICU Level of Service	C
Analysis Period (min)			15			
Description: Signal Permit No. TS-120-10						
Date Issued: 8-29-96						
Date Revised: 9-19-03						
c Critical Lane Group						

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	100	920	60	165	1025	50	175	50	110	10	40	65
Future Volume (vph)	100	920	60	165	1025	50	175	50	110	10	40	65
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.97	0.97	0.92	0.92	0.97	0.97	0.97	0.92	0.97	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	1%	9%	2%	2%	7%	7%	2%	2%	2%	0%	2%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	109	1062	0	170	1114	54	180	165	0	11	112	0
v/c Ratio	0.44	0.71		0.75	0.74	0.08	0.79	0.44		0.05	0.32	
Control Delay	34.9	14.7		64.3	16.3	0.3	66.2	20.7		34.2	17.6	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	34.9	14.7		64.3	16.3	0.3	66.2	20.7		34.2	17.6	
Queue Length 50th (ft)	67	110		84	323	1	121	43		6	24	
Queue Length 95th (ft)	105	211		#197	460	m0	193	101		21	71	
Internal Link Dist (ft)		1661			2872			190			1347	
Turn Bay Length (ft)	250			300		150				150		
Base Capacity (vph)	246	1496		251	1509	648	286	445		264	421	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.44	0.71		0.68	0.74	0.08	0.63	0.37		0.04	0.27	

Intersection Summary

- # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	100	920	60	165	1025	50	175	50	110	10	40	65	
Future Volume (vph)	100	920	60	165	1025	50	175	50	110	10	40	65	
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	
Lane Width	12	12	12	12	12	8	12	12	12	12	12	12	
Grade (%)	0%					-2%		0%					
Total Lost time (s)	7.0	7.0		7.0	7.0	7.0	8.0	8.0		8.0	8.0		
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00		
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.90		1.00	0.90		
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00		
Satd. Flow (prot)	1696	3127		1696	3234	1254	1679	1586		1713	1551		
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.68	1.00		0.62	1.00		
Satd. Flow (perm)	1696	3127		1696	3234	1254	1211	1586		1118	1551		
Peak-hour factor, PHF	0.92	0.92	0.97	0.97	0.92	0.92	0.97	0.97	0.97	0.92	0.97	0.92	
Adj. Flow (vph)	109	1000	62	170	1114	54	180	52	113	11	41	71	
RTOR Reduction (vph)	0	4	0	0	0	29	0	76	0	0	58	0	
Lane Group Flow (vph)	109	1058	0	170	1114	25	180	89	0	11	54	0	
Heavy Vehicles (%)	1%	9%	2%	2%	7%	7%	2%	2%	2%	0%	2%	7%	
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA		Perm	NA		
Protected Phases	1	6		5	2			8				4	
Permitted Phases						2	8			4			
Actuated Green, G (s)	16.0	52.6		14.8	51.4	51.4	20.6	20.6		20.6	20.6		
Effective Green, g (s)	16.0	52.6		14.8	51.4	51.4	20.6	20.6		20.6	20.6		
Actuated g/C Ratio	0.15	0.48		0.13	0.47	0.47	0.19	0.19		0.19	0.19		
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	8.0	8.0		8.0	8.0		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0		
Lane Grp Cap (vph)	246	1495		228	1511	585	226	297		209	290		
v/s Ratio Prot	0.06	c0.34		0.10	c0.34			0.06			0.03		
v/s Ratio Perm						0.02	c0.15			0.01			
v/c Ratio	0.44	0.71		0.75	0.74	0.04	0.80	0.30		0.05	0.19		
Uniform Delay, d1	42.9	22.6		45.8	23.8	15.9	42.7	38.5		36.7	37.6		
Progression Factor	0.68	0.49		1.00	0.52	1.00	1.00	1.00		1.00	1.00		
Incremental Delay, d2	1.2	2.6		11.6	3.0	0.1	17.4	0.6		0.1	0.3		
Delay (s)	30.4	13.7		57.4	15.5	16.1	60.1	39.1		36.8	38.0		
Level of Service	C	B		E	B	B	E	D		D	D		
Approach Delay (s)		15.3			20.8			50.1			37.9		
Approach LOS		B			C			D			D		
Intersection Summary													
HCM 2000 Control Delay	22.7			HCM 2000 Level of Service				C					
HCM 2000 Volume to Capacity ratio	0.77												
Actuated Cycle Length (s)	110.0				Sum of lost time (s)				22.0				
Intersection Capacity Utilization	73.7%			ICU Level of Service				D					
Analysis Period (min)	15												
c Critical Lane Group													

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	45	785	120	80	990	245	45	0	35	205	20	40
Future Volume (vph)	45	785	120	80	990	245	45	0	35	205	20	40
Confl. Peds. (#/hr)						1						
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	10%	0%	8%	5%	0%	25%	0%	50%	5%	0%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	48	835	128	85	1053	261	48	0	37	218	21	43
v/c Ratio	0.14	0.46	0.12	0.20	0.52	0.25	0.28		0.13	0.51	0.11	0.11
Control Delay	1.9	4.0	0.6	4.7	7.6	0.6	52.6		0.9	47.8	43.6	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay	1.9	4.0	0.6	4.7	7.6	0.6	52.6		0.9	47.8	43.6	0.6
Queue Length 50th (ft)	1	108	3	10	75	0	17		0	75	14	0
Queue Length 95th (ft)	m1	111	m5	m18	152	1	36		0	110	37	0
Internal Link Dist (ft)		2872			2156			970			1182	
Turn Bay Length (ft)	200		400	325		425	100		100	240		100
Base Capacity (vph)	355	1825	1099	429	2025	1034	183		273	510	286	391
Starvation Cap Reductn	0	0	0	0	0	0	0		0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0		0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0		0	0	0	0
Reduced v/c Ratio	0.14	0.46	0.12	0.20	0.52	0.25	0.26		0.14	0.43	0.07	0.11

Intersection Summary

Description: Signal Permit No. TS-185-10

Date Issued: 2-26-2003

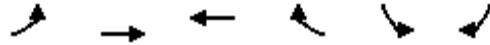
Date Revised: 3-10-2008

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	45	785	120	80	990	245	45	0	35	205	20	40	
Future Volume (vph)	45	785	120	80	990	245	45	0	35	205	20	40	
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	
Lane Width	12	12	12	12	12	12	11	11	11	12	12	12	
Grade (%)		5%			-5%			4%				6%	
Total Lost time (s)	4.9	4.9	3.9	4.9	4.9	4.9	5.0		4.9	5.0	5.0	4.9	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97		1.00	0.97	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00		1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	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	0.85	1.00		0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1637	3036	1494	1626	3344	1538	2518		968	3070	1749	1443	
Flt Permitted	0.20	1.00	1.00	0.28	1.00	1.00	0.95		1.00	0.95	1.00	1.00	
Satd. Flow (perm)	351	3036	1494	476	3344	1538	2518		968	3070	1749	1443	
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)	48	835	128	85	1053	261	48	0	37	218	21	43	
RTOR Reduction (vph)	0	0	47	0	0	112	0	0	32	0	0	34	
Lane Group Flow (vph)	48	835	81	85	1053	149	48	0	5	218	21	9	
Confl. Peds. (#/hr)						1							
Heavy Vehicles (%)	2%	10%	0%	8%	5%	0%	25%	0%	50%	5%	0%	3%	
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	Perm	Prot		pm+ov	Prot	NA	pm+ov	
Protected Phases	1	6	7	5	2		7	4	5	3	8	1	
Permitted Phases	6		6	2		2			4			8	
Actuated Green, G (s)	65.7	60.2	65.7	66.7	60.7	60.7	5.5		9.3	14.5	12.3	17.8	
Effective Green, g (s)	69.9	62.3	69.9	70.9	62.8	62.8	6.5		13.5	15.5	13.3	22.0	
Actuated g/C Ratio	0.64	0.57	0.64	0.64	0.57	0.57	0.06		0.12	0.14	0.12	0.20	
Clearance Time (s)	7.0	7.0	6.0	7.0	7.0	7.0	6.0		7.0	6.0	6.0	7.0	
Vehicle Extension (s)	3.0	4.8	3.0	3.0	4.8	4.8	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	311	1719	949	391	1909	878	148		118	432	211	288	
v/s Ratio Prot	0.01	0.27	0.01	c0.02	c0.31		0.02		0.00	c0.07	c0.01	0.00	
v/s Ratio Perm	0.09		0.05	0.12		0.10			0.00			0.00	
v/c Ratio	0.15	0.49	0.09	0.22	0.55	0.17	0.32		0.04	0.50	0.10	0.03	
Uniform Delay, d1	8.8	14.3	7.7	8.0	14.8	11.2	49.6		42.5	43.7	43.0	35.4	
Progression Factor	0.18	0.24	0.64	0.58	0.46	0.03	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	0.7	0.0	0.2	1.0	0.4	1.3		0.1	0.9	0.2	0.0	
Delay (s)	1.8	4.1	5.0	4.8	7.7	0.7	50.9		42.7	44.6	43.2	35.5	
Level of Service	A	A	A	A	A	A	D		D	D	D	D	
Approach Delay (s)		4.1			6.2			47.3			43.1		
Approach LOS		A			A			D			D		
Intersection Summary													
HCM 2000 Control Delay			10.5		HCM 2000 Level of Service					B			
HCM 2000 Volume to Capacity ratio			0.50										
Actuated Cycle Length (s)			110.0		Sum of lost time (s)					19.8			
Intersection Capacity Utilization			57.3%		ICU Level of Service					B			
Analysis Period (min)			15										
Description: Signal Permit No. TS-185-10													
Date Issued: 2-26-2003													
Date Revised: 3-10-2008													
c Critical Lane Group													



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Traffic Volume (vph)	105	915	1155	0	5	165
Future Volume (vph)	105	915	1155	0	5	165
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	11%	8%	0%	0%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	108	943	1191	0	5	170
v/c Ratio	0.38	0.42	0.61		0.02	0.38
Control Delay	6.7	5.1	15.5		41.6	24.6
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	6.7	5.1	15.5		41.6	24.6
Queue Length 50th (ft)	2	52	258		3	66
Queue Length 95th (ft)	21	3	338		14	126
Internal Link Dist (ft)		852	1385		1671	
Turn Bay Length (ft)	345				75	
Base Capacity (vph)	378	2272	1960		233	558
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.29	0.42	0.61		0.02	0.30
Intersection Summary						



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	105	915	1155	0	5	165
Future Volume (vph)	105	915	1155	0	5	165
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803
Lane Width	9	12	12	12	12	12
Grade (%)		0%	-5%		0%	
Total Lost time (s)	7.0	7.0	7.0		7.0	7.0
Lane Util. Factor	1.00	0.95	0.95		1.00	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1542	3086	3251		1713	1517
Flt Permitted	0.16	1.00	1.00		0.95	1.00
Satd. Flow (perm)	262	3086	3251		1713	1517
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	108	943	1191	0	5	170
RTOR Reduction (vph)	0	0	0	0	0	42
Lane Group Flow (vph)	108	943	1191	0	5	128
Heavy Vehicles (%)	0%	11%	8%	0%	0%	1%
Turn Type	pm+pt	NA	NA	Perm	Prot	pm+ov
Protected Phases	1	6	2		8	1
Permitted Phases	6			2		8
Actuated Green, G (s)	81.0	81.0	66.3		15.0	22.7
Effective Green, g (s)	81.0	81.0	66.3		15.0	22.7
Actuated g/C Ratio	0.74	0.74	0.60		0.14	0.21
Clearance Time (s)	7.0	7.0	7.0		7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	282	2272	1959		233	409
v/s Ratio Prot	0.03	c0.31	c0.37		0.00	c0.02
v/s Ratio Perm	0.25					0.06
v/c Ratio	0.38	0.42	0.61		0.02	0.31
Uniform Delay, d1	7.6	5.5	13.7		41.1	37.0
Progression Factor	0.74	0.82	1.00		1.00	1.00
Incremental Delay, d2	0.8	0.5	1.4		0.2	0.4
Delay (s)	6.4	5.0	15.1		41.3	37.5
Level of Service	A	A	B		D	D
Approach Delay (s)		5.2	15.1		37.6	
Approach LOS		A	B		D	

Intersection Summary

HCM 2000 Control Delay	12.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	60.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

SR 228 Widening Project
 Future Year 2045 Build (PM Peak)

Queues
 225: Franklin Rd & SR 228



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	360	1410	85	190	1320	95	200	420	245	85	195	85
Future Volume (vph)	360	1410	85	190	1320	95	200	420	245	85	195	85
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	1%	2%	0%	2%	3%	0%	2%	2%	1%	2%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%				0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	371	1454	88	196	1361	98	206	433	253	88	201	88
v/c Ratio	0.83	0.75	0.08	0.55	0.81	0.12	0.80	0.63	0.46	0.44	0.80	0.17
Control Delay	55.6	13.3	0.1	69.3	37.7	0.3	63.6	56.2	20.9	46.1	84.3	0.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.6	13.3	0.1	69.3	37.7	0.3	63.6	56.2	20.9	46.1	84.3	0.7
Queue Length 50th (ft)	186	140	0	95	590	0	160	200	98	62	191	0
Queue Length 95th (ft)	#260	155	m0	135	726	0	#247	253	169	105	278	0
Internal Link Dist (ft)		1521			2444			517			930	
Turn Bay Length (ft)	600		330	300		250	300		350	450		275
Base Capacity (vph)	448	1931	1139	423	1684	837	263	783	542	201	300	567
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.83	0.75	0.08	0.46	0.81	0.12	0.78	0.55	0.47	0.44	0.67	0.16

Intersection Summary

Description: Signal Permit No. TS-152-10

Date Issued: 6-4-99

























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

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

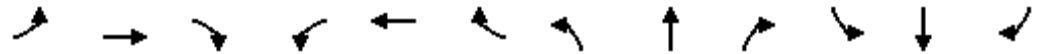
SR 228 Widening Project
 Future Year 2045 Build (PM Peak)

HCM Signalized Intersection Capacity Analysis
 225: Franklin Rd & SR 228

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	360	1410	85	190	1320	95	200	420	245	85	195	85	
Future Volume (vph)	360	1410	85	190	1320	95	200	420	245	85	195	85	
Ideal Flow (vphpl)	2100	2100	2100	1900	1900	1900	1700	1700	1700	1700	1700	1700	
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11	
Grade (%)		5%			5%			3%				-3%	
Total Lost time (s)	3.0	3.0	7.0	3.0	3.0	6.0	6.0	6.0	6.0	5.0	6.0	3.0	
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	3736	3814	1740	3347	3417	1575	1508	3015	1362	1554	1668	1418	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.28	1.00	1.00	0.50	1.00	1.00	
Satd. Flow (perm)	3736	3814	1740	3347	3417	1575	441	3015	1362	818	1668	1418	
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)	371	1454	88	196	1361	98	206	433	253	88	201	88	
RTOR Reduction (vph)	0	0	36	0	0	52	0	0	80	0	0	63	
Lane Group Flow (vph)	371	1454	52	196	1361	46	206	433	173	88	201	25	
Heavy Vehicles (%)	1%	2%	0%	2%	3%	0%	2%	2%	1%	2%	0%	0%	
Turn Type	Prot	NA	pm+ov	Prot	NA	Perm	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	
Protected Phases	1	6	7	5	2		7	4	5	3	8	1	
Permitted Phases			6			2	4		4	8		8	
Actuated Green, G (s)	15.0	72.9	89.4	13.0	70.9	70.9	45.1	33.1	46.1	26.6	21.6	36.6	
Effective Green, g (s)	18.0	75.9	89.4	16.0	73.9	70.9	46.1	34.1	46.1	30.6	22.6	42.6	
Actuated g/C Ratio	0.12	0.51	0.60	0.11	0.49	0.47	0.31	0.23	0.31	0.20	0.15	0.28	
Clearance Time (s)	6.0	6.0	7.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0	6.0	
Vehicle Extension (s)	3.0	5.0	2.0	2.0	5.0	5.0	2.0	2.0	2.0	2.0	2.0	3.0	
Lane Grp Cap (vph)	448	1929	1037	357	1683	744	260	685	418	201	251	402	
v/s Ratio Prot	0.10	c0.38	0.01	0.06	c0.40		c0.09	0.14	0.04	0.02	0.12	0.01	
v/s Ratio Perm			0.02			0.03	c0.15		0.09	0.07		0.01	
v/c Ratio	0.83	0.75	0.05	0.55	0.81	0.06	0.79	0.63	0.41	0.44	0.80	0.06	
Uniform Delay, d1	64.5	29.6	12.6	63.6	32.1	21.5	42.8	52.3	41.2	50.4	61.5	39.1	
Progression Factor	0.66	0.36	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	9.4	2.1	0.0	0.9	4.3	0.2	14.2	1.4	0.2	0.6	15.7	0.1	
Delay (s)	51.8	12.8	0.0	64.5	36.4	21.6	57.0	53.7	41.5	50.9	77.2	39.2	
Level of Service	D	B	A	E	D	C	E	D	D	D	E	D	
Approach Delay (s)		19.7			38.8			51.0			62.2		
Approach LOS		B			D			D			E		
Intersection Summary													
HCM 2000 Control Delay			35.4									HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			0.86										
Actuated Cycle Length (s)			150.0									Sum of lost time (s)	22.0
Intersection Capacity Utilization			86.3%									ICU Level of Service	E
Analysis Period (min)			15										
Description: Signal Permit No. TS-152-10													
Date Issued: 6-4-99													
c Critical Lane Group													

SR 228 Widening Project
 Future Year 2045 Build (PM Peak)

Queues
 230: Castle Creek Dr (West)/High Pointe Dr & SR 228



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	85	1500	185	70	1280	30	235	65	65	30	30	70
Future Volume (vph)	85	1500	185	70	1280	30	235	65	65	30	30	70
Confl. Peds. (#/hr)			1						1			
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	2%	1%	2%	3%	0%	1%	0%	1%	0%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	88	1546	191	72	1320	31	242	134	0	31	31	72
v/c Ratio	0.30	0.73	0.19	0.35	0.73	0.04	0.77	0.31		0.11	0.07	0.16
Control Delay	9.9	22.3	2.6	21.0	37.7	2.4	58.6	26.0		34.2	33.0	3.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	9.9	22.3	2.6	21.0	37.7	2.4	58.6	26.0		34.2	33.0	3.5
Queue Length 50th (ft)	21	460	0	42	521	0	174	57		19	19	0
Queue Length 95th (ft)	45	632	36	m73	642	m3	255	106		43	42	18
Internal Link Dist (ft)		2444			1855			844			941	
Turn Bay Length (ft)	250		400	250		175	100			100		100
Base Capacity (vph)	305	2125	1017	218	1801	872	387	515		332	544	533
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.29	0.73	0.19	0.33	0.73	0.04	0.63	0.26		0.09	0.06	0.14

Intersection Summary

Description: Signal Permit No. TS-113-10

Date Issued: 3/24/95

Date Revised: 9/17/02

m Volume for 95th percentile queue is metered by upstream signal.

SR 228 Widening Project
 Future Year 2045 Build (PM Peak)

HCM Signalized Intersection Capacity Analysis
 230: Castle Creek Dr (West)/High Pointe Dr & SR 228



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑	↗	↘	↑↑	↗	↘	↗		↘	↑	↗
Traffic Volume (vph)	85	1500	185	70	1280	30	235	65	65	30	30	70
Future Volume (vph)	85	1500	185	70	1280	30	235	65	65	30	30	70
Ideal Flow (vphpl)	1900	1900	1900	1714	1714	1714	1803	1803	1803	1803	1803	1803
Grade (%)		-2%			1%			-1%				-6%
Total Lost time (s)	3.7	3.7	3.7	4.1	3.7	3.7	4.8	4.8		4.8	4.8	4.8
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	0.98	1.00	1.00	1.00	1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	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	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1823	3575	1581	1588	3146	1450	1704	1657		1764	1857	1579
Flt Permitted	0.12	1.00	1.00	0.08	1.00	1.00	0.74	1.00		0.61	1.00	1.00
Satd. Flow (perm)	229	3575	1581	129	3146	1450	1322	1657		1135	1857	1579
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)	88	1546	191	72	1320	31	242	67	67	31	31	72
RTOR Reduction (vph)	0	0	80	0	0	13	0	32	0	0	0	55
Lane Group Flow (vph)	88	1546	111	72	1320	18	242	102	0	31	31	17
Confl. Peds. (#/hr)			1						1			
Heavy Vehicles (%)	0%	2%	1%	2%	3%	0%	1%	0%	1%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6		6	2		2	4			8		8
Actuated Green, G (s)	73.8	66.6	66.6	71.4	65.4	65.4	26.4	26.4		26.4	26.4	26.4
Effective Green, g (s)	80.4	69.9	69.9	77.2	68.7	68.7	28.6	28.6		28.6	28.6	28.6
Actuated g/C Ratio	0.67	0.58	0.58	0.64	0.57	0.57	0.24	0.24		0.24	0.24	0.24
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	292	2082	920	191	1801	830	315	394		270	442	376
v/s Ratio Prot	0.03	c0.43		c0.03	0.42			0.06				0.02
v/s Ratio Perm	0.17		0.07	0.21		0.01	c0.18			0.03		0.01
v/c Ratio	0.30	0.74	0.12	0.38	0.73	0.02	0.77	0.26		0.11	0.07	0.05
Uniform Delay, d1	11.6	18.4	11.3	15.5	18.9	11.1	42.6	37.1		35.8	35.4	35.2
Progression Factor	1.00	1.00	1.00	1.84	1.71	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.6	2.4	0.3	1.1	2.3	0.0	10.7	0.4		0.2	0.1	0.1
Delay (s)	12.2	20.9	11.5	29.5	34.7	11.1	53.3	37.4		36.0	35.5	35.2
Level of Service	B	C	B	C	C	B	D	D		D	D	D
Approach Delay (s)		19.5			33.9			47.7			35.5	
Approach LOS		B			C			D			D	

Intersection Summary

HCM 2000 Control Delay	28.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	78.4%	ICU Level of Service	D
Analysis Period (min)	15		
Description: Signal Permit No. TS-113-10			
Date Issued: 3/24/95			
Date Revised: 9/17/02			

c Critical Lane Group

SR 228 Widening Project
 Future Year 2045 Build (PM Peak)

Queues
 235: Castle Creek Dr (East)/High Pointe Dr & SR 228



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	135	1500	30	65	1280	45	20	40	105	55	45	70
Future Volume (vph)	135	1500	30	65	1280	45	20	40	105	55	45	70
Confl. Peds. (#/hr)									1			1
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	2%	0%	2%	3%	0%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	139	1577	0	67	1320	46	21	149	0	57	46	72
v/c Ratio	0.41	0.65		0.25	0.57	0.04	0.13	0.53		0.63	0.21	0.28
Control Delay	11.7	5.9		7.1	6.0	0.4	46.5	24.4		79.1	47.8	10.4
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	11.7	5.9		7.1	6.0	0.4	46.5	24.4		79.1	47.8	10.4
Queue Length 50th (ft)	13	96		5	91	0	15	34		43	33	0
Queue Length 95th (ft)	m58	174		m27	182	m1	38	95		86	66	34
Internal Link Dist (ft)		1855			716			860			573	
Turn Bay Length (ft)	275			175		250	100			100		100
Base Capacity (vph)	363	2438		298	2320	1094	284	423		162	398	398
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.38	0.65		0.22	0.57	0.04	0.07	0.35		0.35	0.12	0.18

Intersection Summary

Description: Signal Permit No. TS-080-10

m Volume for 95th percentile queue is metered by upstream signal.

SR 228 Widening Project
 Future Year 2045 Build (PM Peak)

HCM Signalized Intersection Capacity Analysis
 235: Castle Creek Dr (East)/High Pointe Dr & SR 228

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	135	1500	30	65	1280	45	20	40	105	55	45	70
Future Volume (vph)	135	1500	30	65	1280	45	20	40	105	55	45	70
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803
Grade (%)		0%			0%			0%			-4%	
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	0.99		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	1.00
Frft	1.00	1.00		1.00	1.00	0.85	1.00	0.89		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1713	3350		1679	3326	1533	1713	1590		1747	1839	1541
Flt Permitted	0.16	1.00		0.12	1.00	1.00	0.73	1.00		0.41	1.00	1.00
Satd. Flow (perm)	283	3350		207	3326	1533	1311	1590		750	1839	1541
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)	139	1546	31	67	1320	46	21	41	108	57	46	72
RTOR Reduction (vph)	0	1	0	0	0	14	0	89	0	0	0	63
Lane Group Flow (vph)	139	1576	0	67	1320	32	21	60	0	57	46	9
Confl. Peds. (#/hr)									1			1
Heavy Vehicles (%)	0%	2%	0%	2%	3%	0%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6			2		2	4			8		8
Actuated Green, G (s)	92.0	84.1		87.2	81.7	81.7	12.4	12.4		12.4	12.4	12.4
Effective Green, g (s)	96.0	86.1		91.2	83.7	83.7	14.4	14.4		14.4	14.4	14.4
Actuated g/C Ratio	0.80	0.72		0.76	0.70	0.70	0.12	0.12		0.12	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	6.0
Vehicle Extension (s)	3.0	6.0		3.0	6.0	6.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	344	2403		249	2319	1069	157	190		90	220	184
v/s Ratio Prot	c0.03	c0.47		0.02	0.40			0.04			0.03	
v/s Ratio Perm	0.29			0.19		0.02	0.02			c0.08		0.01
v/c Ratio	0.40	0.66		0.27	0.57	0.03	0.13	0.32		0.63	0.21	0.05
Uniform Delay, d1	5.6	9.0		6.4	9.1	5.6	47.2	48.3		50.3	47.7	46.7
Progression Factor	3.19	0.48		1.68	0.51	0.84	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.6	1.0		0.5	0.9	0.0	0.4	1.0		13.7	0.5	0.1
Delay (s)	18.4	5.4		11.2	5.5	4.8	47.6	49.3		63.9	48.1	46.8
Level of Service	B	A		B	A	A	D	D		E	D	D
Approach Delay (s)		6.4			5.7			49.1			52.7	
Approach LOS		A			A			D			D	

Intersection Summary

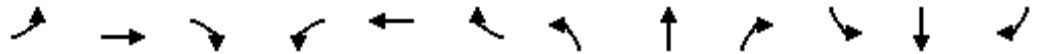
HCM 2000 Control Delay	10.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.5%	ICU Level of Service	D
Analysis Period (min)	15		

Description: Signal Permit No. TS-080-10

c Critical Lane Group

SR 228 Widening Project
 Future Year 2045 Build (PM Peak)

Queues
 240: Seven Fields Blvd & SR 228



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	145	1400	125	15	1150	195	45	25	15	220	30	175
Future Volume (vph)	145	1400	125	15	1150	195	45	25	15	220	30	175
Confl. Peds. (#/hr)												2
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	1%	1%	0%	3%	1%	0%	0%	0%	0%	0%	0%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	149	1443	129	15	1186	201	46	26	15	227	211	0
v/c Ratio	0.46	0.64	0.13	0.06	0.59	0.20	0.26	0.06	0.04	0.75	0.43	
Control Delay	13.5	6.3	0.8	2.6	10.9	1.0	39.2	33.5	0.2	58.3	10.4	
Queue Delay	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	13.5	6.4	0.8	2.6	11.0	1.0	39.2	33.5	0.2	58.3	10.4	
Queue Length 50th (ft)	11	57	0	1	332	5	29	16	0	165	19	
Queue Length 95th (ft)	m60	244	m6	m4	358	9	60	37	0	236	78	
Internal Link Dist (ft)		716			569			530			572	
Turn Bay Length (ft)	330		330	150		400	115		100	150		
Base Capacity (vph)	335	2250	1025	298	2025	997	234	531	488	395	582	
Starvation Cap Reductn	0	81	0	0	132	0	0	0	0	0	0	
Spillback Cap Reductn	0	9	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.44	0.67	0.13	0.05	0.63	0.20	0.20	0.05	0.03	0.57	0.36	

Intersection Summary

Description: Signal Permit No. TS-221-10

Date Issued: 12-15-07

m Volume for 95th percentile queue is metered by upstream signal.

SR 228 Widening Project
 Future Year 2045 Build (PM Peak)

HCM Signalized Intersection Capacity Analysis

240: Seven Fields Blvd & SR 228

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	145	1400	125	15	1150	195	45	25	15	220	30	175
Future Volume (vph)	145	1400	125	15	1150	195	45	25	15	220	30	175
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803
Grade (%)		2%			-2%			2%				1%
Total Lost time (s)	3.1	3.1	6.0	3.1	3.1	3.1	4.3	4.3	6.0	4.3	4.3	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	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	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.87	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1679	3358	1517	1680	3426	1548	1696	1785	1517	1704	1532	
Flt Permitted	0.15	1.00	1.00	0.13	1.00	1.00	0.44	1.00	1.00	0.74	1.00	
Satd. Flow (perm)	273	3358	1517	222	3426	1548	788	1785	1517	1328	1532	
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)	149	1443	129	15	1186	201	46	26	15	227	31	180
RTOR Reduction (vph)	0	0	49	0	0	82	0	0	12	0	139	0
Lane Group Flow (vph)	149	1443	80	15	1186	119	46	26	3	227	72	0
Confl. Peds. (#/hr)												2
Heavy Vehicles (%)	1%	1%	0%	3%	1%	0%	0%	0%	0%	0%	0%	1%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6		6	2		2	4		4	8		
Actuated Green, G (s)	82.4	74.0	74.0	70.6	68.1	68.1	25.5	25.5	25.5	25.5	25.5	
Effective Green, g (s)	85.4	76.9	74.0	76.4	71.0	71.0	27.2	27.2	25.5	27.2	27.2	
Actuated g/C Ratio	0.71	0.64	0.62	0.64	0.59	0.59	0.23	0.23	0.21	0.23	0.23	
Clearance Time (s)	6.0	6.0	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	6.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	326	2151	935	206	2027	915	178	404	322	301	347	
v/s Ratio Prot	c0.04	c0.43		0.00	0.35			0.01			0.05	
v/s Ratio Perm	0.28		0.05	0.04		0.08	0.06		0.00	c0.17		
v/c Ratio	0.46	0.67	0.09	0.07	0.59	0.13	0.26	0.06	0.01	0.75	0.21	
Uniform Delay, d1	9.8	13.6	9.3	10.2	15.3	10.8	38.1	36.4	37.3	43.3	37.6	
Progression Factor	1.49	0.36	0.26	0.32	0.58	0.30	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.8	1.3	0.1	0.1	1.1	0.3	0.8	0.1	0.0	10.2	0.3	
Delay (s)	15.5	6.3	2.5	3.4	10.0	3.5	38.9	36.5	37.3	53.5	37.9	
Level of Service	B	A	A	A	B	A	D	D	D	D	D	
Approach Delay (s)		6.8			9.0			37.9			46.0	
Approach LOS		A			A			D			D	
Intersection Summary												
HCM 2000 Control Delay			13.1				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)				10.5	
Intersection Capacity Utilization			76.2%				ICU Level of Service				D	
Analysis Period (min)			15									
Description: Signal Permit No. TS-221-10												
Date Issued: 12-15-07												
c Critical Lane Group												



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Volume (vph)	1150	485	245	1095	265	195
Future Volume (vph)	1150	485	245	1095	265	195
Confl. Peds. (#/hr)		1				
Confl. Bikes (#/hr)						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	0%	0%	3%	2%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1186	500	253	1129	273	201
v/c Ratio	0.66	0.52	0.66	0.46	0.72	0.32
Control Delay	14.6	2.4	16.8	9.5	54.8	22.5
Queue Delay	0.2	0.2	0.0	0.0	0.0	0.0
Total Delay	14.7	2.6	16.8	9.5	54.8	22.5
Queue Length 50th (ft)	196	31	84	222	199	92
Queue Length 95th (ft)	379	9	m95	486	270	129
Internal Link Dist (ft)	569			1661	173	
Turn Bay Length (ft)		400	425			100
Base Capacity (vph)	1797	963	428	2433	512	622
Starvation Cap Reductn	99	86	0	0	0	0
Spillback Cap Reductn	0	0	0	24	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.57	0.59	0.47	0.53	0.32

Intersection Summary

Description: Signal Permit No. TS-120-10

Date Issued: 8-29-96

Date Revised: 9-19-03

m Volume for 95th percentile queue is metered by upstream signal.



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↓	↑↑	↓	↓
Traffic Volume (vph)	1150	485	245	1095	265	195
Future Volume (vph)	1150	485	245	1095	265	195
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803
Lane Width	12	10	12	12	15	16
Grade (%)	2%			-2%	4%	
Total Lost time (s)	4.0	7.0	5.0	4.0	4.0	7.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frb, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3325	1398	1730	3359	1810	1685
Flt Permitted	1.00	1.00	0.13	1.00	0.95	1.00
Satd. Flow (perm)	3325	1398	243	3359	1810	1685
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1186	500	253	1129	273	201
RTOR Reduction (vph)	0	243	0	0	0	20
Lane Group Flow (vph)	1186	258	253	1129	273	181
Confl. Peds. (#/hr)		1				
Heavy Vehicles (%)	2%	0%	0%	3%	2%	1%
Turn Type	NA	Perm	pm+pt	NA	Prot	pm+ov
Protected Phases	6		5	2	4	5
Permitted Phases		6	2			4
Actuated Green, G (s)	61.8	61.8	83.9	83.9	23.1	38.2
Effective Green, g (s)	64.8	61.8	85.9	86.9	25.1	38.2
Actuated g/C Ratio	0.54	0.51	0.72	0.72	0.21	0.32
Clearance Time (s)	7.0	7.0	7.0	7.0	6.0	7.0
Vehicle Extension (s)	6.3	6.3	3.0	6.3	2.5	3.0
Lane Grp Cap (vph)	1795	719	385	2432	378	536
v/s Ratio Prot	0.36		c0.09	0.34	c0.15	0.04
v/s Ratio Perm		0.18	c0.38			0.07
v/c Ratio	0.66	0.36	0.66	0.46	0.72	0.34
Uniform Delay, d1	19.7	17.3	15.8	6.9	44.2	31.2
Progression Factor	0.59	0.40	0.87	1.19	1.00	1.00
Incremental Delay, d2	1.5	1.1	2.7	0.4	6.3	0.4
Delay (s)	13.2	8.0	16.5	8.6	50.5	31.6
Level of Service	B	A	B	A	D	C
Approach Delay (s)	11.7			10.1	42.5	
Approach LOS	B			B	D	

Intersection Summary			
HCM 2000 Control Delay	15.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	74.1%	ICU Level of Service	D
Analysis Period (min)	15		
Description: Signal Permit No. TS-120-10			
Date Issued: 8-29-96			

Date Revised: 9-19-03
c Critical Lane Group

SR 228 Widening Project
 Future Year 2045 Build (PM Peak)

Queues
 250: SR 228 & Myoma Rd



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	115	1235	70	170	1260	35	150	40	100	20	50	80
Future Volume (vph)	115	1235	70	170	1260	35	150	40	100	20	50	80
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.97	0.97	0.92	0.92	0.97	0.97	0.97	0.92	0.97	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	2%	2%	2%	2%	0%	2%	2%	2%	11%	2%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	125	1414	0	175	1370	38	155	144	0	22	139	0
v/c Ratio	0.62	0.93		0.54	0.76	0.05	0.79	0.41		0.12	0.43	
Control Delay	63.5	30.8		47.9	26.9	0.6	73.1	18.8		41.0	26.8	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	63.5	30.8		47.9	26.9	0.6	73.1	18.8		41.0	26.8	
Queue Length 50th (ft)	80	501		92	298	0	116	31		15	50	
Queue Length 95th (ft)	m122	#758		168	#664	m1	183	87		37	106	
Internal Link Dist (ft)		1661			2872			275			1347	
Turn Bay Length (ft)	250			300		150				150		
Base Capacity (vph)	328	1518		325	1796	761	261	430		235	406	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.38	0.93		0.54	0.76	0.05	0.59	0.33		0.09	0.34	

Intersection Summary

- # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

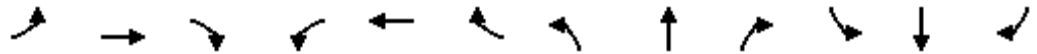
SR 228 Widening Project
 Future Year 2045 Build (PM Peak)

HCM Signalized Intersection Capacity Analysis
 250: SR 228 & Myoma Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	115	1235	70	170	1260	35	150	40	100	20	50	80	
Future Volume (vph)	115	1235	70	170	1260	35	150	40	100	20	50	80	
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	
Lane Width	12	12	12	12	12	8	12	12	12	12	12	12	
Grade (%)		0%			-2%			0%			0%		
Total Lost time (s)	7.0	7.0		7.0	7.0	7.0	8.0	8.0		8.0	8.0		
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00		
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.89		1.00	0.91		
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00		
Satd. Flow (prot)	1713	3333		1696	3392	1341	1679	1578		1543	1582		
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.66	1.00		0.64	1.00		
Satd. Flow (perm)	1713	3333		1696	3392	1341	1162	1578		1046	1582		
Peak-hour factor, PHF	0.92	0.92	0.97	0.97	0.92	0.92	0.97	0.97	0.97	0.92	0.97	0.92	
Adj. Flow (vph)	125	1342	72	175	1370	38	155	41	103	22	52	87	
RTOR Reduction (vph)	0	3	0	0	0	18	0	81	0	0	54	0	
Lane Group Flow (vph)	125	1411	0	175	1370	20	155	63	0	22	85	0	
Heavy Vehicles (%)	0%	2%	2%	2%	2%	0%	2%	2%	2%	11%	2%	4%	
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA		Perm	NA		
Protected Phases	5	2		1	6			8				4	
Permitted Phases						6	8			4			
Actuated Green, G (s)	14.0	54.6		23.0	63.6	63.6	20.4	20.4		20.4	20.4		
Effective Green, g (s)	14.0	54.6		23.0	63.6	63.6	20.4	20.4		20.4	20.4		
Actuated g/C Ratio	0.12	0.46		0.19	0.53	0.53	0.17	0.17		0.17	0.17		
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	8.0	8.0		8.0	8.0		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0		
Lane Grp Cap (vph)	199	1516		325	1797	710	197	268		177	268		
v/s Ratio Prot	0.07	c0.42		0.10	c0.40			0.04			0.05		
v/s Ratio Perm						0.02	c0.13			0.02			
v/c Ratio	0.63	0.93		0.54	0.76	0.03	0.79	0.24		0.12	0.32		
Uniform Delay, d1	50.5	30.9		43.7	22.2	13.5	47.7	43.1		42.2	43.7		
Progression Factor	1.04	0.59		0.95	0.98	1.00	1.00	1.00		1.00	1.00		
Incremental Delay, d2	5.1	10.2		1.5	2.8	0.1	18.4	0.5		0.3	0.7		
Delay (s)	57.6	28.5		43.1	24.5	13.5	66.2	43.5		42.5	44.4		
Level of Service	E	C		D	C	B	E	D		D	D		
Approach Delay (s)		30.8			26.3			55.3			44.1		
Approach LOS		C			C			E			D		
Intersection Summary													
HCM 2000 Control Delay			31.5									HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.88										
Actuated Cycle Length (s)			120.0									Sum of lost time (s)	22.0
Intersection Capacity Utilization			89.9%									ICU Level of Service	E
Analysis Period (min)			15										
c	Critical Lane Group												

SR 228 Widening Project
 Future Year 2045 Build (PM Peak)

Queues
 255: Heritage Creek Dr & SR 228



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	65	980	215	160	1005	240	240	30	180	340	20	55
Future Volume (vph)	65	980	215	160	1005	240	240	30	180	340	20	55
Confl. Peds. (#/hr)							1					
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	0%	0%	2%	0%	0%	0%	0%	1%	0%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	69	1043	229	170	1069	255	255	32	191	362	21	59
v/c Ratio	0.26	0.66	0.21	0.57	0.61	0.22	0.51	0.18	0.47	0.70	0.09	0.15
Control Delay	12.8	16.4	0.2	28.3	13.2	0.4	50.9	49.9	23.5	54.9	44.9	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	12.8	16.4	0.2	28.3	13.2	0.4	50.9	49.9	23.5	54.9	44.9	3.2
Queue Length 50th (ft)	14	134	0	36	113	1	97	23	62	137	14	0
Queue Length 95th (ft)	m20	m185	m0	126	162	0	136	54	135	184	39	14
Internal Link Dist (ft)		2872			2071			970			1182	
Turn Bay Length (ft)	200		400	325		425	100		100	240		100
Base Capacity (vph)	279	1573	1099	300	1764	1148	622	216	400	611	249	408
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.66	0.21	0.57	0.61	0.22	0.41	0.15	0.48	0.59	0.08	0.14

Intersection Summary

Description: Signal Permit No. TS-185-10

























Date Issued: 2-26-2003

Date Revised: 3-10-2008

m Volume for 95th percentile queue is metered by upstream signal.

SR 228 Widening Project
 Future Year 2045 Build (PM Peak)

HCM Signalized Intersection Capacity Analysis
 255: Heritage Creek Dr & SR 228

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	980	215	160	1005	240	240	30	180	340	20	55
Future Volume (vph)	65	980	215	160	1005	240	240	30	180	340	20	55
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803
Lane Width	12	12	12	12	12	12	11	11	11	12	12	12
Grade (%)		5%			-5%			4%			6%	
Total Lost time (s)	4.9	4.9	3.9	4.9	4.9	3.9	5.0	5.0	4.9	5.0	5.0	4.9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	0.97	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	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	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1637	3275	1494	1756	3442	1547	3148	1708	1452	3191	1749	1457
Flt Permitted	0.17	1.00	1.00	0.16	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	294	3275	1494	289	3442	1547	3148	1708	1452	3191	1749	1457
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)	69	1043	229	170	1069	255	255	32	191	362	21	59
RTOR Reduction (vph)	0	0	83	0	0	86	0	0	72	0	0	47
Lane Group Flow (vph)	69	1043	146	170	1069	169	255	32	119	362	21	12
Confl. Peds. (#/hr)						1						
Heavy Vehicles (%)	2%	2%	0%	0%	2%	0%	0%	0%	0%	1%	0%	2%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	1	6	7	5	2	3	7	4	5	3	8	1
Permitted Phases	6		6	2		2			4			8
Actuated Green, G (s)	60.5	54.4	72.3	65.3	56.8	75.3	17.9	12.6	21.1	18.5	13.2	19.3
Effective Green, g (s)	64.7	56.5	76.5	69.5	58.9	79.5	18.9	13.6	25.3	19.5	14.2	23.5
Actuated g/C Ratio	0.54	0.47	0.64	0.58	0.49	0.66	0.16	0.11	0.21	0.16	0.12	0.20
Clearance Time (s)	7.0	7.0	6.0	7.0	7.0	6.0	6.0	6.0	7.0	6.0	6.0	7.0
Vehicle Extension (s)	3.0	4.8	3.0	3.0	4.8	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	250	1541	952	296	1689	1024	495	193	306	518	206	285
v/s Ratio Prot	0.02	c0.32	0.03	c0.05	0.31	0.03	0.08	0.02	c0.03	c0.11	0.01	0.00
v/s Ratio Perm	0.13		0.07	0.28		0.08			0.05			0.01
v/c Ratio	0.28	0.68	0.15	0.57	0.63	0.16	0.52	0.17	0.39	0.70	0.10	0.04
Uniform Delay, d1	15.4	24.7	8.7	15.8	22.6	7.7	46.3	48.1	40.7	47.5	47.2	39.1
Progression Factor	1.02	0.61	0.02	1.85	0.51	0.05	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	1.1	0.0	2.2	1.5	0.1	0.9	0.4	0.8	4.1	0.2	0.1
Delay (s)	16.0	16.1	0.2	31.5	13.0	0.5	47.3	48.5	41.5	51.6	47.4	39.2
Level of Service	B	B	A	C	B	A	D	D	D	D	D	D
Approach Delay (s)		13.4			13.0			45.1			49.7	
Approach LOS		B			B			D			D	
Intersection Summary												
HCM 2000 Control Delay			21.5			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.63									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			19.8			
Intersection Capacity Utilization			67.1%			ICU Level of Service			C			
Analysis Period (min)			15									
Description: Signal Permit No. TS-185-10												
Date Issued: 2-26-2003												

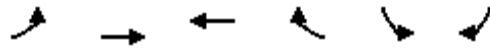
Date Revised: 3-10-2008
c Critical Lane Group

SR 228 Widening Project
 Future Year 2045 Build (PM Peak)

Queues
 265: SR 228 & Beaver St Ext



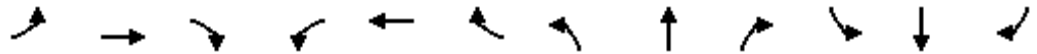
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Traffic Volume (vph)	335	1185	1225	5	20	180
Future Volume (vph)	335	1185	1225	5	20	180
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	2%	2%	0%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	345	1222	1263	5	21	186
v/c Ratio	0.80	0.45	0.65	0.01	0.18	0.36
Control Delay	36.7	1.2	21.6	9.2	57.0	26.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.7	1.2	21.6	9.2	57.0	26.1
Queue Length 50th (ft)	120	10	343	0	16	90
Queue Length 95th (ft)	194	21	498	7	43	136
Internal Link Dist (ft)		855	1414		1732	
Turn Bay Length (ft)	345			295	75	
Base Capacity (vph)	537	2743	1933	884	114	514
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	0.64	0.45	0.65	0.01	0.18	0.36
Intersection Summary						



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↗	↑↑	↑↑	↗	↗	↗
Traffic Volume (vph)	335	1185	1225	5	20	180
Future Volume (vph)	335	1185	1225	5	20	180
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803
Lane Width	9	12	12	12	12	12
Grade (%)		0%	-5%		0%	
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1542	3359	3442	1571	1713	1533
Flt Permitted	0.13	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	210	3359	3442	1571	1713	1533
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	345	1222	1263	5	21	186
RTOR Reduction (vph)	0	0	0	2	0	24
Lane Group Flow (vph)	345	1222	1263	3	21	162
Heavy Vehicles (%)	0%	2%	2%	0%	0%	0%
Turn Type	pm+pt	NA	NA	Perm	Prot	pm+ov
Protected Phases	1	6	2		8	1
Permitted Phases	6			2		8
Actuated Green, G (s)	98.0	98.0	67.4	67.4	8.0	31.6
Effective Green, g (s)	98.0	98.0	67.4	67.4	8.0	31.6
Actuated g/C Ratio	0.82	0.82	0.56	0.56	0.07	0.26
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	433	2743	1933	882	114	493
v/s Ratio Prot	c0.16	0.36	0.37		0.01	c0.06
v/s Ratio Perm	c0.49			0.00		0.04
v/c Ratio	0.80	0.45	0.65	0.00	0.18	0.33
Uniform Delay, d1	25.4	3.2	18.2	11.5	52.9	35.7
Progression Factor	1.33	0.23	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.9	0.4	1.7	0.0	0.8	0.4
Delay (s)	41.8	1.1	19.9	11.6	53.7	36.0
Level of Service	D	A	B	B	D	D
Approach Delay (s)		10.1	19.9		37.8	
Approach LOS		B	B		D	

Intersection Summary

HCM 2000 Control Delay	16.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	76.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	135	1125	105	165	1515	110	155	160	150	155	175	145
Future Volume (vph)	135	1125	105	165	1515	110	155	160	150	155	175	145
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	2%	0%	0%	2%	4%	0%	1%	2%	1%	1%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	139	1160	108	170	1562	113	160	165	155	160	180	149
v/c Ratio	0.55	0.55	0.09	0.41	0.74	0.12	0.75	0.32	0.30	0.61	0.79	0.36
Control Delay	63.5	11.6	0.3	63.5	24.1	2.1	69.1	58.1	12.6	59.3	87.4	11.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.5	11.6	0.3	63.5	24.1	2.1	69.1	58.1	12.6	59.3	87.4	11.8
Queue Length 50th (ft)	70	135	1	80	564	0	130	75	27	128	172	21
Queue Length 95th (ft)	107	151	3	117	668	23	#214	113	82	197	#258	71
Internal Link Dist (ft)		1521			2444			507			930	
Turn Bay Length (ft)	600		330	300		250	300		350	450		275
Base Capacity (vph)	251	2115	1165	569	2104	943	215	567	508	261	258	441
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.55	0.09	0.30	0.74	0.12	0.74	0.29	0.31	0.61	0.70	0.34

Intersection Summary

Description: Signal Permit No. TS-152-10

Date Issued: 6-4-99













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

Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	135	1125	105	165	1515	110	155	160	150	155	175	145
Future Volume (vph)	135	1125	105	165	1515	110	155	160	150	155	175	145
Ideal Flow (vphpl)	2100	2100	2100	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Grade (%)		5%			5%			3%			-3%	
Total Lost time (s)	3.0	3.0	7.0	3.0	3.0	6.0	6.0	6.0	6.0	5.0	6.0	3.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3774	3814	1740	3414	3451	1514	1719	3403	1508	1753	1846	1554
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.28	1.00	1.00	0.65	1.00	1.00
Satd. Flow (perm)	3774	3814	1740	3414	3451	1514	515	3403	1508	1195	1846	1554
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)	139	1160	108	170	1562	113	160	165	155	160	180	149
RTOR Reduction (vph)	0	0	42	0	0	46	0	0	87	0	0	92
Lane Group Flow (vph)	139	1160	66	170	1562	67	160	165	68	160	180	57
Heavy Vehicles (%)	0%	2%	0%	0%	2%	4%	0%	1%	2%	1%	1%	2%
Turn Type	Prot	NA	pm+ov	Prot	NA	Perm	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	1	6	7	5	2		7	4	5	3	8	1
Permitted Phases			6			2	4		4	8		8
Actuated Green, G (s)	7.0	80.1	91.1	15.3	88.4	88.4	32.6	21.6	36.9	24.6	17.6	24.6
Effective Green, g (s)	10.0	83.1	91.1	18.3	91.4	88.4	34.6	22.6	36.9	28.6	18.6	30.6
Actuated g/C Ratio	0.07	0.55	0.61	0.12	0.61	0.59	0.23	0.15	0.25	0.19	0.12	0.20
Clearance Time (s)	6.0	6.0	7.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0	6.0
Vehicle Extension (s)	5.5	8.0	2.0	5.5	8.0	8.0	2.0	2.0	5.5	2.0	2.0	5.5
Lane Grp Cap (vph)	251	2112	1056	416	2102	892	215	512	370	261	228	317
v/s Ratio Prot	0.04	c0.30	0.00	0.05	c0.45		c0.06	0.05	0.02	0.04	0.10	0.01
v/s Ratio Perm			0.03			0.04	c0.11		0.03	0.08		0.02
v/c Ratio	0.55	0.55	0.06	0.41	0.74	0.07	0.74	0.32	0.18	0.61	0.79	0.18
Uniform Delay, d1	67.8	21.4	12.0	60.9	20.9	13.2	49.6	56.9	44.6	54.2	63.8	49.3
Progression Factor	0.82	0.48	0.09	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.6	0.9	0.0	1.6	2.4	0.2	11.5	0.1	0.6	3.0	15.3	0.7
Delay (s)	60.0	11.2	1.1	62.5	23.3	13.4	61.1	57.0	45.2	57.2	79.1	50.0
Level of Service	E	B	A	E	C	B	E	E	D	E	E	D
Approach Delay (s)		15.3			26.3			54.6			63.1	
Approach LOS		B			C			D			E	

Intersection Summary

HCM 2000 Control Delay	30.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	80.5%	ICU Level of Service	D
Analysis Period (min)	15		
Description: Signal Permit No. TS-152-10			
Date Issued: 6-4-99			
c Critical Lane Group			

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	85	1210	165	70	1540	30	235	65	65	30	30	70
Future Volume (vph)	85	1210	165	70	1540	30	235	65	65	30	30	70
Confl. Peds. (#/hr)			1						1			
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	1%	2%	0%	2%	0%	1%	0%	0%	0%	0%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	88	1247	170	72	1588	31	242	134	0	31	31	72
v/c Ratio	0.34	0.61	0.18	0.25	0.88	0.04	0.78	0.31		0.11	0.07	0.16
Control Delay	12.9	17.6	2.6	10.5	32.5	0.2	53.6	21.1		29.7	28.7	2.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	12.9	17.6	2.6	10.5	32.5	0.2	53.6	21.1		29.7	28.7	2.1
Queue Length 50th (ft)	18	294	0	26	408	0	141	43		15	15	0
Queue Length 95th (ft)	51	381	32	m31	#676	m0	#244	92		39	38	10
Internal Link Dist (ft)		2444			1855			844			941	
Turn Bay Length (ft)	250		400	250		175	100			100		100
Base Capacity (vph)	275	2043	960	300	1795	871	346	472		308	486	490
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.32	0.61	0.18	0.24	0.88	0.04	0.70	0.28		0.10	0.06	0.15

Intersection Summary

Description: Signal Permit No. TS-113-10

Date Issued: 3/24/95

Date Revised: 9/17/02

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

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

SR 228 Widening Project
 Future Year 2045 Build (SAT Peak)

HCM Signalized Intersection Capacity Analysis
 230: Castle Creek Dr (West)/High Pointe Dr & SR 228

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	85	1210	165	70	1540	30	235	65	65	30	30	70
Future Volume (vph)	85	1210	165	70	1540	30	235	65	65	30	30	70
Ideal Flow (vphpl)	1900	1900	1900	1714	1714	1714	1803	1803	1803	1803	1803	1803
Grade (%)		-2%			1%			-1%			-6%	
Total Lost time (s)	3.7	3.7	3.7	4.1	3.7	3.7	4.8	4.8		4.8	4.8	4.8
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	0.98	1.00	1.00	1.00	1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	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	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1787	3610	1566	1620	3177	1450	1704	1665		1764	1857	1533
Flt Permitted	0.07	1.00	1.00	0.13	1.00	1.00	0.74	1.00		0.63	1.00	1.00
Satd. Flow (perm)	136	3610	1566	229	3177	1450	1322	1665		1175	1857	1533
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)	88	1247	170	72	1588	31	242	67	67	31	31	72
RTOR Reduction (vph)	0	0	76	0	0	14	0	37	0	0	0	55
Lane Group Flow (vph)	88	1247	94	72	1588	17	242	97	0	31	31	17
Confl. Peds. (#/hr)			1						1			
Heavy Vehicles (%)	2%	1%	2%	0%	2%	0%	1%	0%	0%	0%	0%	3%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6		6	2		2	4			8		8
Actuated Green, G (s)	57.8	51.9	51.9	57.6	51.8	51.8	21.3	21.3		21.3	21.3	21.3
Effective Green, g (s)	64.4	55.2	55.2	63.4	55.1	55.1	23.5	23.5		23.5	23.5	23.5
Actuated g/C Ratio	0.64	0.55	0.55	0.63	0.55	0.55	0.24	0.24		0.24	0.24	0.24
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	239	1992	864	266	1750	798	310	391		276	436	360
v/s Ratio Prot	c0.03	0.35		0.02	c0.50			0.06			0.02	
v/s Ratio Perm	0.20		0.06	0.15		0.01	c0.18			0.03		0.01
v/c Ratio	0.37	0.63	0.11	0.27	0.91	0.02	0.78	0.25		0.11	0.07	0.05
Uniform Delay, d1	14.8	15.3	10.7	10.0	20.2	10.2	35.8	31.1		30.1	29.8	29.6
Progression Factor	1.00	1.00	1.00	1.38	1.29	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.0	1.5	0.3	0.4	6.4	0.0	12.0	0.3		0.2	0.1	0.1
Delay (s)	15.8	16.8	10.9	14.2	32.3	10.2	47.8	31.4		30.2	29.8	29.6
Level of Service	B	B	B	B	C	B	D	C		C	C	C
Approach Delay (s)		16.1			31.1			42.0			29.8	
Approach LOS		B			C			D			C	

Intersection Summary













HCM 2000 Control Delay	26.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	84.5%	ICU Level of Service	E
Analysis Period (min)	15		

Description: Signal Permit No. TS-113-10

Date Issued: 3/24/95

Date Revised: 9/17/02

c Critical Lane Group

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	135	1220	20	65	1535	45	20	40	105	55	40	70
Future Volume (vph)	135	1220	20	65	1535	45	20	40	105	55	40	70
Confl. Peds. (#/hr)									1			1
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	0%	0%	0%	0%	0%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	139	1279	0	67	1582	46	21	149	0	57	41	72
v/c Ratio	0.49	0.54		0.19	0.71	0.04	0.13	0.52		0.57	0.18	0.27
Control Delay	25.7	4.4		4.1	10.1	0.4	40.0	20.3		62.9	40.4	6.6
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	25.7	4.4		4.1	10.1	0.4	40.0	20.3		62.9	40.4	6.6
Queue Length 50th (ft)	42	70		10	170	0	12	23		34	23	0
Queue Length 95th (ft)	m104	84		m14	204	m1	34	83		#82	55	24
Internal Link Dist (ft)		1855			716			860			573	
Turn Bay Length (ft)	275			175		250	100			100		100
Base Capacity (vph)	305	2363		398	2223	1048	184	315		115	257	295
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.46	0.54		0.17	0.71	0.04	0.11	0.47		0.50	0.16	0.24

Intersection Summary

Description: Signal Permit No. TS-080-10

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

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.













Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	135	1220	20	65	1535	45	20	40	105	55	40	70
Future Volume (vph)	135	1220	20	65	1535	45	20	40	105	55	40	70
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803
Grade (%)		0%			0%			0%			-4%	
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	0.99		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	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.89		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1713	3384		1713	3359	1533	1713	1590		1747	1839	1510
Flt Permitted	0.10	1.00		0.18	1.00	1.00	0.73	1.00		0.45	1.00	1.00
Satd. Flow (perm)	172	3384		318	3359	1533	1317	1590		826	1839	1510
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)	139	1258	21	67	1582	46	21	41	108	57	41	72
RTOR Reduction (vph)	0	1	0	0	0	16	0	95	0	0	0	63
Lane Group Flow (vph)	139	1278	0	67	1582	30	21	54	0	57	41	9
Confl. Peds. (#/hr)									1			1
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	0%	0%	0%	0%	0%	2%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6			2		2	4			8		8
Actuated Green, G (s)	74.2	66.6		69.4	64.2	64.2	10.2	10.2		10.2	10.2	10.2
Effective Green, g (s)	78.2	68.6		73.4	66.2	66.2	12.2	12.2		12.2	12.2	12.2
Actuated g/C Ratio	0.78	0.69		0.73	0.66	0.66	0.12	0.12		0.12	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	6.0
Vehicle Extension (s)	3.0	6.0		3.0	6.0	6.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	282	2321		333	2223	1014	160	193		100	224	184
v/s Ratio Prot	c0.05	0.38		0.01	c0.47			0.03			0.02	
v/s Ratio Perm	0.34			0.13		0.02	0.02			c0.07		0.01
v/c Ratio	0.49	0.55		0.20	0.71	0.03	0.13	0.28		0.57	0.18	0.05
Uniform Delay, d1	9.9	7.9		4.6	10.8	5.8	39.2	39.9		41.4	39.4	38.8
Progression Factor	2.95	0.43		1.18	0.73	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.1	0.8		0.2	1.5	0.0	0.4	0.8		7.3	0.4	0.1
Delay (s)	30.4	4.2		5.7	9.4	5.9	39.5	40.7		48.7	39.8	38.9
Level of Service	C	A		A	A	A	D	D		D	D	D
Approach Delay (s)		6.7			9.1			40.6			42.4	
Approach LOS		A			A			D			D	

Intersection Summary

HCM 2000 Control Delay	11.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.2%	ICU Level of Service	D
Analysis Period (min)	15		

Description: Signal Permit No. TS-080-10

c Critical Lane Group

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	120	1040	95	10	1350	210	75	35	15	175	25	155
Future Volume (vph)	120	1040	95	10	1350	210	75	35	15	175	25	155
Confl. Peds. (#/hr)												2
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	0%	0%	2%	0%	0%	0%	0%	1%	0%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	124	1072	98	10	1392	216	77	36	15	180	186	0
v/c Ratio	0.42	0.46	0.09	0.02	0.70	0.22	0.45	0.10	0.04	0.69	0.43	
Control Delay	20.0	5.3	1.8	5.2	15.8	1.7	42.7	31.2	0.2	50.9	10.7	
Queue Delay	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	20.0	5.3	1.8	5.2	15.9	1.7	42.7	31.2	0.2	50.9	10.7	
Queue Length 50th (ft)	30	63	1	2	294	3	43	19	0	106	13	
Queue Length 95th (ft)	83	167	13	m3	371	13	86	44	0	172	68	
Internal Link Dist (ft)		716			569			530			572	
Turn Bay Length (ft)	330		330	150		400	115		100	150		
Base Capacity (vph)	312	2336	1054	462	1993	998	212	440	424	322	498	
Starvation Cap Reductn	0	0	0	0	45	0	0	0	0	0	0	
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	
Reduced v/c Ratio	0.40	0.46	0.09	0.02	0.71	0.22	0.36	0.08	0.04	0.56	0.37	

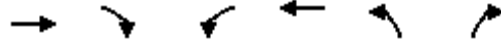
Intersection Summary

Description: Signal Permit No. TS-221-10

Date Issued: 12-15-07

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	120	1040	95	10	1350	210	75	35	15	175	25	155	
Future Volume (vph)	120	1040	95	10	1350	210	75	35	15	175	25	155	
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	
Grade (%)		2%			-2%			2%				1%	
Total Lost time (s)	3.1	3.1	6.0	3.1	3.1	3.1	4.3	4.3	6.0	4.3	4.3		
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00	1.00	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	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.87		
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1662	3325	1517	1730	3392	1548	1696	1785	1517	1687	1529		
Flt Permitted	0.11	1.00	1.00	0.24	1.00	1.00	0.48	1.00	1.00	0.73	1.00		
Satd. Flow (perm)	184	3325	1517	437	3392	1548	860	1785	1517	1303	1529		
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)	124	1072	98	10	1392	216	77	36	15	180	26	160	
RTOR Reduction (vph)	0	0	37	0	0	89	0	0	12	0	128	0	
Lane Group Flow (vph)	124	1072	61	10	1392	127	77	36	3	180	58	0	
Confl. Peds. (#/hr)												2	
Heavy Vehicles (%)	2%	2%	0%	0%	2%	0%	0%	0%	0%	1%	0%	1%	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		
Protected Phases	1	6		5	2			4			8		
Permitted Phases	6		6	2		2	4		4	8			
Actuated Green, G (s)	69.8	62.6	62.6	57.1	55.9	55.9	18.2	18.2	18.2	18.2	18.2		
Effective Green, g (s)	72.7	65.5	62.6	62.9	58.8	58.8	19.9	19.9	18.2	19.9	19.9		
Actuated g/C Ratio	0.73	0.66	0.63	0.63	0.59	0.59	0.20	0.20	0.18	0.20	0.20		
Clearance Time (s)	6.0	6.0	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	6.0	3.0	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	293	2177	949	327	1994	910	171	355	276	259	304		
v/s Ratio Prot	c0.05	0.32		0.00	c0.41			0.02			0.04		
v/s Ratio Perm	0.26		0.04	0.02		0.08	0.09		0.00	c0.14			
v/c Ratio	0.42	0.49	0.06	0.03	0.70	0.14	0.45	0.10	0.01	0.69	0.19		
Uniform Delay, d1	10.3	8.8	7.3	7.1	14.4	9.2	35.2	32.7	33.5	37.2	33.3		
Progression Factor	2.53	0.59	0.74	0.99	0.89	0.73	1.00	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.8	0.7	0.1	0.0	1.7	0.3	1.9	0.1	0.0	7.8	0.3		
Delay (s)	27.0	5.9	5.5	7.1	14.5	7.0	37.1	32.9	33.5	45.1	33.6		
Level of Service	C	A	A	A	B	A	D	C	C	D	C		
Approach Delay (s)		7.9			13.4			35.5			39.3		
Approach LOS		A			B			D			D		
Intersection Summary													
HCM 2000 Control Delay			14.9		HCM 2000 Level of Service						B		
HCM 2000 Volume to Capacity ratio			0.66										
Actuated Cycle Length (s)			100.0		Sum of lost time (s)						10.5		
Intersection Capacity Utilization			76.2%		ICU Level of Service						D		
Analysis Period (min)			15										
Description: Signal Permit No. TS-221-10													
Date Issued: 12-15-07													
c Critical Lane Group													



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Volume (vph)	945	285	160	1235	330	140
Future Volume (vph)	945	285	160	1235	330	140
Confl. Peds. (#/hr)		1				
Confl. Bikes (#/hr)						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	1%	1%	1%	2%	1%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	974	294	165	1273	340	144
v/c Ratio	0.57	0.36	0.45	0.56	0.73	0.21
Control Delay	17.3	4.1	13.1	6.7	43.2	13.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.3	4.1	13.1	6.7	43.2	13.2
Queue Length 50th (ft)	161	4	20	71	199	41
Queue Length 95th (ft)	282	32	m40	m182	268	69
Internal Link Dist (ft)	569			1661	173	
Turn Bay Length (ft)		400	425			100
Base Capacity (vph)	1698	812	396	2258	603	672
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	0.57	0.36	0.42	0.56	0.56	0.21

Intersection Summary













Description: Signal Permit No. TS-120-10

Date Issued: 8-29-96

Date Revised: 9-19-03

m Volume for 95th percentile queue is metered by upstream signal.

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑
Traffic Volume (vph)	945	285	160	1235	330	140
Future Volume (vph)	945	285	160	1235	330	140
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803
Lane Width	12	10	12	12	15	16
Grade (%)	2%			-2%	4%	
Total Lost time (s)	4.0	7.0	5.0	4.0	4.0	7.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Fr t	1.00	0.85	1.00	1.00	1.00	0.85
Fl t Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3358	1384	1713	3392	1828	1685
Fl t Permitted	1.00	1.00	0.18	1.00	0.95	1.00
Satd. Flow (perm)	3358	1384	330	3392	1828	1685
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	974	294	165	1273	340	144
RTOR Reduction (vph)	0	154	0	0	0	30
Lane Group Flow (vph)	974	140	165	1273	340	114
Confl. Peds. (#/hr)		1				
Heavy Vehicles (%)	1%	1%	1%	2%	1%	1%
Turn Type	NA	Perm	pm+pt	NA	Prot	pm+ov
Protected Phases	6		5	2	4	5
Permitted Phases		6	2			4
Actuated Green, G (s)	47.6	47.6	63.6	63.6	23.4	32.4
Effective Green, g (s)	50.6	47.6	65.6	66.6	25.4	32.4
Actuated g/C Ratio	0.51	0.48	0.66	0.67	0.25	0.32
Clearance Time (s)	7.0	7.0	7.0	7.0	6.0	7.0
Vehicle Extension (s)	6.3	6.3	3.0	6.3	2.5	3.0
Lane Grp Cap (vph)	1699	658	368	2259	464	545
v/s Ratio Prot	0.29		0.05	c0.38	c0.19	0.02
v/s Ratio Perm		0.10	0.24			0.05
v/c Ratio	0.57	0.21	0.45	0.56	0.73	0.21
Uniform Delay, d1	17.2	15.3	9.6	8.9	34.2	24.5
Progression Factor	0.84	1.14	1.42	0.61	1.00	1.00
Incremental Delay, d2	1.3	0.7	0.5	0.5	5.6	0.2
Delay (s)	15.8	18.1	14.2	6.0	39.8	24.7
Level of Service	B	B	B	A	D	C
Approach Delay (s)	16.3			6.9	35.3	
Approach LOS	B			A	D	
Intersection Summary						
HCM 2000 Control Delay			15.0		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.66			
Actuated Cycle Length (s)			100.0		Sum of lost time (s)	15.0
Intersection Capacity Utilization			67.0%		ICU Level of Service	C
Analysis Period (min)			15			
Description: Signal Permit No. TS-120-10						
Date Issued: 8-29-96						
Date Revised: 9-19-03						
c Critical Lane Group						

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	55	775	190	140	1190	115	155	10	115	140	10	50
Future Volume (vph)	55	775	190	140	1190	115	155	10	115	140	10	50
Confl. Peds. (#/hr)						1						
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	4%	2%	0%	2%	0%	0%	1%	0%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	59	824	202	149	1266	122	165	11	122	149	11	53
v/c Ratio	0.22	0.48	0.23	0.35	0.65	0.13	0.45	0.08	0.29	0.49	0.08	0.15
Control Delay	4.5	2.7	0.4	3.8	6.3	0.2	46.5	43.3	7.5	48.5	43.2	0.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	4.5	2.7	0.4	3.8	6.3	0.2	46.5	43.3	7.5	48.5	43.2	0.9
Queue Length 50th (ft)	1	11	0	10	50	0	52	7	0	46	7	0
Queue Length 95th (ft)	m3	m23	m0	m14	60	m0	86	24	44	78	24	2
Internal Link Dist (ft)		2872			2160			970			1182	
Turn Bay Length (ft)	200		400	325		425	100		100	240		100
Base Capacity (vph)	288	1727	868	429	1947	946	367	170	403	319	174	353
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.48	0.23	0.35	0.65	0.13	0.45	0.06	0.30	0.47	0.06	0.15

Intersection Summary

Description: Signal Permit No. TS-185-10

Date Issued: 2-26-2003

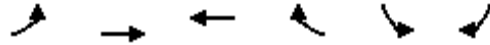
Date Revised: 3-10-2008

m Volume for 95th percentile queue is metered by upstream signal.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	55	775	190	140	1190	115	155	10	115	140	10	50	
Future Volume (vph)	55	775	190	140	1190	115	155	10	115	140	10	50	
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	
Lane Width	12	12	12	12	12	12	11	11	11	12	12	12	
Grade (%)		5%			-5%			4%			6%		
Total Lost time (s)	4.9	4.9	4.9	4.9	4.9	4.9	5.0	5.0	4.9	5.0	5.0	4.9	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	0.97	1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	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	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1637	3275	1465	1688	3442	1538	3086	1708	1452	3191	1749	1443	
Flt Permitted	0.14	1.00	1.00	0.26	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	234	3275	1465	462	3442	1538	3086	1708	1452	3191	1749	1443	
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)	59	824	202	149	1266	122	165	11	122	149	11	53	
RTOR Reduction (vph)	0	0	98	0	0	56	0	0	97	0	0	45	
Lane Group Flow (vph)	59	824	104	149	1266	66	165	11	25	149	11	8	
Confl. Peds. (#/hr)						1							
Heavy Vehicles (%)	2%	2%	2%	4%	2%	0%	2%	0%	0%	1%	0%	3%	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	pm+ov	Prot	NA	pm+ov	
Protected Phases	1	6		5	2		7	4	5	3	8	1	
Permitted Phases	6		6	2		2			4			8	
Actuated Green, G (s)	55.1	49.5	49.5	59.9	51.9	51.9	10.9	7.9	15.9	8.6	5.6	11.2	
Effective Green, g (s)	59.3	51.6	51.6	64.1	54.0	54.0	11.9	8.9	20.1	9.6	6.6	15.4	
Actuated g/C Ratio	0.59	0.52	0.52	0.64	0.54	0.54	0.12	0.09	0.20	0.10	0.07	0.15	
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	6.0	6.0	7.0	6.0	6.0	7.0	
Vehicle Extension (s)	3.0	4.8	4.8	3.0	4.8	4.8	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	246	1689	755	419	1858	830	367	152	291	306	115	222	
v/s Ratio Prot	0.02	0.25		c0.04	c0.37		c0.05	0.01	c0.01	0.05	0.01	0.00	
v/s Ratio Perm	0.12		0.07	0.19		0.04			0.01			0.00	
v/c Ratio	0.24	0.49	0.14	0.36	0.68	0.08	0.45	0.07	0.08	0.49	0.10	0.04	
Uniform Delay, d1	10.9	15.7	12.6	8.2	16.7	11.1	41.0	41.8	32.5	42.9	43.9	36.0	
Progression Factor	0.57	0.14	0.03	0.33	0.30	0.01	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	0.5	0.2	0.4	1.5	0.1	0.9	0.2	0.1	1.2	0.4	0.1	
Delay (s)	6.4	2.8	0.6	3.1	6.6	0.2	41.9	42.0	32.6	44.1	44.3	36.1	
Level of Service	A	A	A	A	A	A	D	D	C	D	D	D	
Approach Delay (s)		2.6			5.8			38.1			42.1		
Approach LOS		A			A			D			D		
Intersection Summary													
HCM 2000 Control Delay			10.2		HCM 2000 Level of Service					B			
HCM 2000 Volume to Capacity ratio			0.58										
Actuated Cycle Length (s)			100.0		Sum of lost time (s)					19.8			
Intersection Capacity Utilization			61.7%		ICU Level of Service					B			
Analysis Period (min)			15										
Description: Signal Permit No. TS-185-10													
Date Issued: 2-26-2003													
Date Revised: 3-10-2008													
c Critical Lane Group													



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Traffic Volume (vph)	135	900	1295	25	5	155
Future Volume (vph)	135	900	1295	25	5	155
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	1%	1%	2%	0%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	139	928	1335	26	5	160
v/c Ratio	0.55	0.39	0.72	0.03	0.02	0.32
Control Delay	29.6	2.3	20.6	5.0	36.6	22.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.6	2.3	20.6	5.0	36.6	22.7
Queue Length 50th (ft)	26	20	308	0	3	65
Queue Length 95th (ft)	80	53	451	14	13	109
Internal Link Dist (ft)		835	1399		1692	
Turn Bay Length (ft)	345			295	75	
Base Capacity (vph)	338	2408	1864	862	256	505
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	0.41	0.39	0.72	0.03	0.02	0.32
Intersection Summary						



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	135	900	1295	25	5	155
Future Volume (vph)	135	900	1295	25	5	155
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803
Lane Width	9	12	12	12	12	12
Grade (%)		0%	-5%		0%	
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1526	3392	3442	1571	1713	1533
Flt Permitted	0.11	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	171	3392	3442	1571	1713	1533
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	139	928	1335	26	5	160
RTOR Reduction (vph)	0	0	0	12	0	19
Lane Group Flow (vph)	139	928	1335	14	5	141
Heavy Vehicles (%)	1%	1%	2%	0%	0%	0%
Turn Type	pm+pt	NA	NA	Perm	Prot	pm+ov
Protected Phases	1	6	2		8	1
Permitted Phases	6			2		8
Actuated Green, G (s)	71.0	71.0	54.2	54.2	15.0	24.8
Effective Green, g (s)	71.0	71.0	54.2	54.2	15.0	24.8
Actuated g/C Ratio	0.71	0.71	0.54	0.54	0.15	0.25
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	254	2408	1865	851	256	487
v/s Ratio Prot	c0.05	0.27	c0.39		0.00	c0.03
v/s Ratio Perm	0.33			0.01		0.06
v/c Ratio	0.55	0.39	0.72	0.02	0.02	0.29
Uniform Delay, d1	12.1	5.8	17.1	10.6	36.2	30.5
Progression Factor	2.82	0.31	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.2	0.4	2.4	0.0	0.1	0.3
Delay (s)	36.2	2.2	19.5	10.6	36.4	30.8
Level of Service	D	A	B	B	D	C
Approach Delay (s)		6.7	19.4		31.0	
Approach LOS		A	B		C	

Intersection Summary

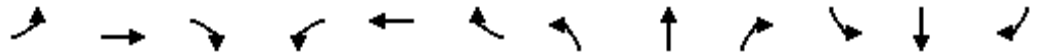
HCM 2000 Control Delay	14.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	66.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Appendix J3:

Revised Synchro Traffic Analyses
(2045 Design Field View Assumptions with Supplemental Growth)

SR 228 Widening Project
 Future Year 2045 Build w/ Supplemental (AM)

Queues
 225: Franklin Rd & SR 228



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	145	1150	85	330	1430	70	180	215	140	120	505	100
Future Volume (vph)	145	1150	85	330	1430	70	180	215	140	120	505	100
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	11%	7%	4%	6%	8%	8%	6%	14%	6%	5%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	149	1186	88	340	1474	72	186	222	144	124	521	103
v/c Ratio	0.62	0.98	0.12	0.67	0.96	0.10	1.28	0.23	0.21	0.32	1.07	0.16
Control Delay	68.1	57.2	3.9	64.3	53.2	0.3	199.8	39.3	5.6	33.6	108.5	2.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.1	57.2	3.9	64.3	53.2	0.3	199.8	39.3	5.6	33.6	108.5	2.8
Queue Length 50th (ft)	71	580	1	158	697	0	~177	83	12	77	~541	0
Queue Length 95th (ft)	110	#797	21	204	#868	0	#340	120	48	126	#768	23
Internal Link Dist (ft)		1521			2444			483				930
Turn Bay Length (ft)	600		330	300		250	300		350	450		275
Base Capacity (vph)	242	1216	721	679	1534	715	145	961	699	385	489	648
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.98	0.12	0.50	0.96	0.10	1.28	0.23	0.21	0.32	1.07	0.16

Intersection Summary

Description: Signal Permit No. TS-152-10

Date Issued: 6-4-99

~ Volume exceeds capacity, queue is theoretically infinite.































Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

SR 228 Widening Project
 Future Year 2045 Build w/ Supplemental (AM)

HCM Signalized Intersection Capacity Analysis
 225: Franklin Rd & SR 228

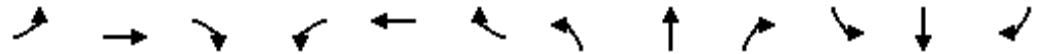
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 		 	 			 			 	
Traffic Volume (vph)	145	1150	85	330	1430	70	180	215	140	120	505	100
Future Volume (vph)	145	1150	85	330	1430	70	180	215	140	120	505	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Grade (%)		5%			5%			3%				-3%
Total Lost time (s)	3.0	3.0	7.0	3.0	3.0	6.0	6.0	6.0	6.0	5.0	6.0	3.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3191	3171	1472	3283	3321	1458	1591	3243	1349	1671	1775	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.09	1.00	1.00	0.61	1.00	1.00
Satd. Flow (perm)	3191	3171	1472	3283	3321	1458	156	3243	1349	1078	1775	1538
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)	149	1186	88	340	1474	72	186	222	144	124	521	103
RTOR Reduction (vph)	0	0	49	0	0	40	0	0	69	0	0	65
Lane Group Flow (vph)	149	1186	39	340	1474	32	186	222	75	124	521	38
Heavy Vehicles (%)	7%	11%	7%	4%	6%	8%	8%	6%	14%	6%	5%	3%
Turn Type	Prot	NA	pm+ov	Prot	NA	Perm	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	1	6	7	5	2		7	4	5	3	8	1
Permitted Phases			6			2	4		4	8		8
Actuated Green, G (s)	8.0	52.6	60.6	19.4	64.0	64.0	50.0	42.0	61.4	44.0	39.0	47.0
Effective Green, g (s)	11.0	55.6	60.6	22.4	67.0	64.0	52.0	43.0	61.4	48.0	40.0	53.0
Actuated g/C Ratio	0.08	0.38	0.42	0.15	0.46	0.44	0.36	0.30	0.42	0.33	0.28	0.37
Clearance Time (s)	6.0	6.0	7.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0	6.0
Vehicle Extension (s)	3.0	5.0	2.0	2.0	5.0	5.0	2.0	2.0	2.0	2.0	2.0	3.0
Lane Grp Cap (vph)	242	1215	615	507	1534	643	145	961	571	385	489	562
v/s Ratio Prot	0.05	c0.37	0.00	0.10	c0.44		c0.08	0.07	0.02	0.02	0.29	0.01
v/s Ratio Perm			0.02			0.02	c0.38		0.04	0.09		0.02
v/c Ratio	0.62	0.98	0.06	0.67	0.96	0.05	1.28	0.23	0.13	0.32	1.07	0.07
Uniform Delay, d1	65.0	44.0	25.2	57.8	37.7	23.1	39.5	38.5	25.5	35.1	52.5	29.9
Progression Factor	0.88	0.82	0.66	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.5	20.4	0.0	2.7	15.4	0.1	169.5	0.0	0.0	0.2	59.2	0.1
Delay (s)	61.3	56.7	16.6	60.6	53.1	23.3	209.0	38.6	25.6	35.2	111.7	30.0
Level of Service	E	E	B	E	D	C	F	D	C	D	F	C
Approach Delay (s)		54.7			53.3			92.6			87.8	
Approach LOS		D			D			F			F	

Intersection Summary

HCM 2000 Control Delay	64.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.17		
Actuated Cycle Length (s)	145.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	96.9%	ICU Level of Service	F
Analysis Period (min)	15		
Description: Signal Permit No. TS-152-10			
Date Issued: 6-4-99			
c Critical Lane Group			

SR 228 Widening Project
 Future Year 2045 Build w/ Supplemental (AM)

Queues
 230: Castle Creek Dr (West)/High Pointe Dr & SR 228



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	95	1160	190	115	1645	60	80	15	30	35	55	135
Future Volume (vph)	95	1160	190	115	1645	60	80	15	30	35	55	135
Confl. Peds. (#/hr)			1						1			
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	11%	11%	7%	2%	6%	0%	4%	13%	9%	0%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	98	1196	196	119	1696	62	82	46	0	36	57	139
v/c Ratio	0.43	0.63	0.21	0.36	0.87	0.06	0.51	0.21		0.21	0.24	0.46
Control Delay	17.3	13.3	1.8	7.8	21.9	2.3	54.0	21.2		42.7	42.7	15.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	17.3	13.3	1.8	7.8	21.9	2.3	54.0	21.2		42.7	42.7	15.2
Queue Length 50th (ft)	13	232	0	20	284	0	54	9		23	36	13
Queue Length 95th (ft)	68	356	28	m54	#806	m5	99	41		51	71	66
Internal Link Dist (ft)		2444			1855			844			941	
Turn Bay Length (ft)	250		400	250		175	100			100		100
Base Capacity (vph)	226	1897	928	330	1947	963	304	378		328	451	470
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.43	0.63	0.21	0.36	0.87	0.06	0.27	0.12		0.11	0.13	0.30

Intersection Summary

Description: Signal Permit No. TS-113-10

Date Issued: 3/24/95

Date Revised: 9/17/02

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

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

SR 228 Widening Project
 Future Year 2045 Build w/ Supplemental (AM)

HCM Signalized Intersection Capacity Analysis
 230: Castle Creek Dr (West)/High Pointe Dr & SR 228



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↗	↘	↘	↗	↘	↘	↗		↘	↗	↘
Traffic Volume (vph)	95	1160	190	115	1645	60	80	15	30	35	55	135
Future Volume (vph)	95	1160	190	115	1645	60	80	15	30	35	55	135
Ideal Flow (vphpl)	1650	1650	1650	1714	1714	1714	1650	1650	1650	1650	1650	1650
Grade (%)		-2%			1%			-1%			-6%	
Total Lost time (s)	3.7	3.7	3.7	4.1	3.7	3.7	4.8	4.8		4.8	4.8	4.8
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	0.98	1.00	1.00	1.00	1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	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	0.85	1.00	0.90		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1426	2853	1296	1588	3057	1450	1515	1339		1615	1700	1445
Flt Permitted	0.07	1.00	1.00	0.19	1.00	1.00	0.72	1.00		0.73	1.00	1.00
Satd. Flow (perm)	100	2853	1296	320	3057	1450	1148	1339		1236	1700	1445
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)	98	1196	196	119	1696	62	82	15	31	36	57	139
RTOR Reduction (vph)	0	0	66	0	0	23	0	27	0	0	0	102
Lane Group Flow (vph)	98	1196	130	119	1696	39	82	19	0	36	57	37
Confl. Peds. (#/hr)			1						1			
Heavy Vehicles (%)	11%	11%	7%	2%	6%	0%	4%	13%	9%	0%	0%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6		6	2		2	4			8		8
Actuated Green, G (s)	78.9	69.8	69.8	72.7	66.7	66.7	13.2	13.2		13.2	13.2	13.2
Effective Green, g (s)	85.5	73.1	73.1	78.5	70.0	70.0	15.4	15.4		15.4	15.4	15.4
Actuated g/C Ratio	0.78	0.66	0.66	0.71	0.64	0.64	0.14	0.14		0.14	0.14	0.14
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	227	1895	861	330	1945	922	160	187		173	238	202
v/s Ratio Prot	c0.05	0.42		0.03	c0.55			0.01			0.03	
v/s Ratio Perm	0.29		0.10	0.23		0.03	c0.07			0.03		0.03
v/c Ratio	0.43	0.63	0.15	0.36	0.87	0.04	0.51	0.10		0.21	0.24	0.18
Uniform Delay, d1	15.6	10.7	6.9	6.0	16.3	7.5	43.8	41.3		41.9	42.1	41.7
Progression Factor	1.00	1.00	1.00	1.26	0.93	5.30	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.3	1.6	0.4	0.5	4.5	0.1	2.8	0.2		0.6	0.5	0.4
Delay (s)	16.9	12.3	7.3	8.1	19.6	39.7	46.6	41.5		42.5	42.6	42.2
Level of Service	B	B	A	A	B	D	D	D		D	D	D
Approach Delay (s)		11.9			19.6			44.8			42.3	
Approach LOS		B			B			D			D	

Intersection Summary

HCM 2000 Control Delay	18.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	78.9%	ICU Level of Service	D
Analysis Period (min)	15		
Description: Signal Permit No. TS-113-10			
Date Issued: 3/24/95			
Date Revised: 9/17/02			

c Critical Lane Group

SR 228 Widening Project
 Future Year 2045 Build w/ Supplemental (AM)

Queues
 235: Castle Creek Dr (East)/High Pointe Dr & SR 228



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	65	1120	25	35	1680	100	55	20	45	50	15	75
Future Volume (vph)	65	1120	25	35	1680	100	55	20	45	50	15	75
Confl. Peds. (#/hr)									1			1
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	10%	11%	5%	3%	5%	0%	6%	10%	3%	0%	0%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	67	1181	0	36	1732	103	57	67	0	52	15	77
v/c Ratio	0.29	0.49		0.09	0.67	0.08	0.43	0.34		0.38	0.08	0.33
Control Delay	12.5	5.7		3.6	9.7	2.6	54.7	23.4		52.3	42.6	10.9
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	12.5	5.7		3.6	9.8	2.6	54.7	23.4		52.3	42.6	10.9
Queue Length 50th (ft)	7	122		6	243	5	38	14		34	10	0
Queue Length 95th (ft)	m35	156		m9	278	m12	78	55		73	29	35
Internal Link Dist (ft)		1855			716			860			573	
Turn Bay Length (ft)	275			175		250	100			100		100
Base Capacity (vph)	258	2390		457	2580	1238	169	241		174	244	273
Starvation Cap Reductn	0	0		0	34	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.26	0.49		0.08	0.68	0.08	0.34	0.28		0.30	0.06	0.28

Intersection Summary

Description: Signal Permit No. TS-080-10

m Volume for 95th percentile queue is metered by upstream signal.

SR 228 Widening Project
 Future Year 2045 Build w/ Supplemental (AM)

HCM Signalized Intersection Capacity Analysis
 235: Castle Creek Dr (East)/High Pointe Dr & SR 228



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗	↗	↖	↗		↖	↗	↗
Traffic Volume (vph)	65	1120	25	35	1680	100	55	20	45	50	15	75
Future Volume (vph)	65	1120	25	35	1680	100	55	20	45	50	15	75
Ideal Flow (vphpl)	1803	1803	1803	1908	1908	1908	1650	1650	1650	1650	1650	1650
Grade (%)		0%			0%			0%			-4%	
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	0.99		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	1.00
Frft	1.00	1.00		1.00	1.00	0.85	1.00	0.90		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1557	3080		1760	3453	1622	1479	1393		1599	1683	1355
Flt Permitted	0.09	1.00		0.21	1.00	1.00	0.75	1.00		0.71	1.00	1.00
Satd. Flow (perm)	142	3080		391	3453	1622	1164	1393		1201	1683	1355
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)	67	1155	26	36	1732	103	57	21	46	52	15	77
RTOR Reduction (vph)	0	1	0	0	0	29	0	41	0	0	0	69
Lane Group Flow (vph)	67	1180	0	36	1732	74	57	26	0	52	15	8
Confl. Peds. (#/hr)									1			1
Heavy Vehicles (%)	10%	11%	5%	3%	5%	0%	6%	10%	3%	0%	0%	4%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6			2		2	4			8		8
Actuated Green, G (s)	84.7	79.0		80.7	77.0	77.0	9.3	9.3		9.3	9.3	9.3
Effective Green, g (s)	88.7	81.0		84.7	79.0	79.0	11.3	11.3		11.3	11.3	11.3
Actuated g/C Ratio	0.81	0.74		0.77	0.72	0.72	0.10	0.10		0.10	0.10	0.10
Clearance Time (s)	6.0	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		3.0	6.0	6.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	213	2268		372	2479	1164	119	143		123	172	139
v/s Ratio Prot	c0.02	0.38		0.01	c0.50			0.02			0.01	
v/s Ratio Perm	0.23			0.07		0.05	c0.05			0.04		0.01
v/c Ratio	0.31	0.52		0.10	0.70	0.06	0.48	0.18		0.42	0.09	0.06
Uniform Delay, d1	7.9	6.2		3.4	8.8	4.6	46.6	45.1		46.3	44.7	44.5
Progression Factor	3.95	0.74		1.29	0.85	1.82	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.7	0.7		0.1	1.3	0.1	3.0	0.6		2.3	0.2	0.2
Delay (s)	31.9	5.3		4.5	8.7	8.4	49.6	45.7		48.6	44.9	44.7
Level of Service	C	A		A	A	A	D	D		D	D	D
Approach Delay (s)		6.7			8.6			47.5			46.1	
Approach LOS		A			A			D			D	

Intersection Summary

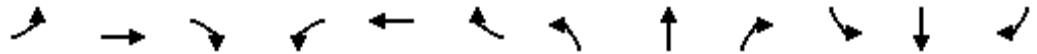
HCM 2000 Control Delay	10.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.6%	ICU Level of Service	C
Analysis Period (min)	15		

Description: Signal Permit No. TS-080-10

c Critical Lane Group

SR 228 Widening Project
 Future Year 2045 Build w/ Supplemental (AM)

Queues
 240: Seven Fields Blvd & SR 228



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	115	1045	10	0	1575	110	30	5	5	35	5	150
Future Volume (vph)	115	1045	10	0	1575	110	30	5	5	35	5	150
Confl. Peds. (#/hr)												2
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	7%	12%	0%	0%	5%	6%	4%	0%	50%	13%	0%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%				0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	119	1077	10	0	1624	113	31	5	5	36	5	155
v/c Ratio	0.42	0.43	0.01		0.71	0.11	0.25	0.03	0.03	0.31	0.03	0.61
Control Delay	17.9	1.5	0.0		8.9	0.8	49.5	43.0	0.4	52.2	43.0	17.8
Queue Delay	0.0	0.0	0.0		0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.9	1.5	0.0		9.0	0.8	49.5	43.0	0.4	52.2	43.0	17.8
Queue Length 50th (ft)	15	26	0		205	1	21	3	0	24	3	0
Queue Length 95th (ft)	71	39	m0		261	m5	49	14	0	55	14	61
Internal Link Dist (ft)		716			569			530				572
Turn Bay Length (ft)	330		330			400	115		100	150		
Base Capacity (vph)	287	2517	1238		2303	1054	242	334	247	224	335	369
Starvation Cap Reductn	0	0	0		69	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0		0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0		0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.43	0.01		0.73	0.11	0.13	0.01	0.02	0.16	0.01	0.42

Intersection Summary

Description: Signal Permit No. TS-221-10

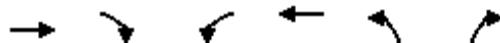
Date Issued: 12-15-07

m Volume for 95th percentile queue is metered by upstream signal.

SR 228 Widening Project
 Future Year 2045 Build w/ Supplemental (AM)

HCM Signalized Intersection Capacity Analysis
 240: Seven Fields Blvd & SR 228

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	115	1045	10	0	1575	110	30	5	5	35	5	150	
Future Volume (vph)	115	1045	10	0	1575	110	30	5	5	35	5	150	
Ideal Flow (vphpl)	1794	1794	1794	1794	1794	1794	1794	1794	1794	1794	1794	1794	
Grade (%)		2%			-2%			2%				1%	
Total Lost time (s)	3.1	3.1	6.0		3.1	3.1	4.3	4.3	6.0	4.3	4.3	6.0	
Lane Util. Factor	1.00	0.95	1.00		0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	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	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00		1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1577	3013	1510		3279	1453	1622	1776	1006	1501	1785	1391	
Flt Permitted	0.10	1.00	1.00		1.00	1.00	0.75	1.00	1.00	0.75	1.00	1.00	
Satd. Flow (perm)	160	3013	1510		3279	1453	1288	1776	1006	1192	1785	1391	
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)	119	1077	10	0	1624	113	31	5	5	36	5	155	
RTOR Reduction (vph)	0	0	2	0	0	34	0	0	5	0	0	142	
Lane Group Flow (vph)	119	1077	8	0	1624	79	31	5	0	36	5	13	
Confl. Peds. (#/hr)												2	
Heavy Vehicles (%)	7%	12%	0%	0%	5%	6%	4%	0%	50%	13%	0%	7%	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	
Protected Phases	1	6		5	2			4			8		
Permitted Phases	6		6	2		2	4		4	8		8	
Actuated Green, G (s)	89.0	89.0	89.0		74.4	74.4	9.0	9.0	9.0	9.0	9.0	9.0	
Effective Green, g (s)	91.9	91.9	89.0		77.3	77.3	10.7	10.7	9.0	10.7	10.7	9.0	
Actuated g/C Ratio	0.84	0.84	0.81		0.70	0.70	0.10	0.10	0.08	0.10	0.10	0.08	
Clearance Time (s)	6.0	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	5.0	6.0	6.0		6.0	6.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	281	2517	1221		2304	1021	125	172	82	115	173	113	
v/s Ratio Prot	0.04	c0.36			c0.50			0.00			0.00		
v/s Ratio Perm	0.31		0.01			0.05	0.02		0.00	c0.03		0.01	
v/c Ratio	0.42	0.43	0.01		0.70	0.08	0.25	0.03	0.00	0.31	0.03	0.11	
Uniform Delay, d1	9.1	2.3	2.0		9.6	5.1	45.9	44.9	46.4	46.2	44.9	46.8	
Progression Factor	2.90	0.39	1.00		0.71	0.56	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.9	0.5	0.0		1.4	0.1	1.0	0.1	0.0	1.6	0.1	0.4	
Delay (s)	28.3	1.4	2.0		8.3	3.0	47.0	45.0	46.4	47.8	45.0	47.2	
Level of Service	C	A	A		A	A	D	D	D	D	D	D	
Approach Delay (s)		4.0			7.9			46.7			47.3		
Approach LOS		A			A			D			D		
Intersection Summary													
HCM 2000 Control Delay			9.4									HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.63										
Actuated Cycle Length (s)			110.0									Sum of lost time (s)	10.5
Intersection Capacity Utilization			72.2%									ICU Level of Service	C
Analysis Period (min)			15										
Description: Signal Permit No. TS-221-10													
Date Issued: 12-15-07													
c Critical Lane Group													



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Volume (vph)	915	85	65	1170	490	255
Future Volume (vph)	915	85	65	1170	490	255
Confl. Peds. (#/hr)		1				
Confl. Bikes (#/hr)						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	11%	14%	15%	8%	1%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	943	88	67	1206	505	263
v/c Ratio	0.61	0.14	0.26	0.63	0.84	0.38
Control Delay	18.5	5.1	9.3	8.1	47.7	18.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.5	5.1	9.3	8.1	47.7	18.0
Queue Length 50th (ft)	178	2	7	93	323	92
Queue Length 95th (ft)	282	20	m22	205	435	145
Internal Link Dist (ft)	569			1661	173	
Turn Bay Length (ft)		400	425			100
Base Capacity (vph)	1543	631	262	1921	681	701
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	0.61	0.14	0.26	0.63	0.74	0.38

Intersection Summary

Description: Signal Permit No. TS-120-10

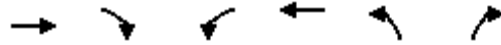
Date Issued: 8-29-96

Date Revised: 9-19-03

m Volume for 95th percentile queue is metered by upstream signal.

SR 228 Widening Project
 Future Year 2045 Build w/ Supplemental (AM)

HCM Signalized Intersection Capacity Analysis
 245: Adams Ridge Blvd & SR 228



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑
Traffic Volume (vph)	915	85	65	1170	490	255
Future Volume (vph)	915	85	65	1170	490	255
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803
Lane Width	12	10	12	12	15	16
Grade (%)	2%			-2%	4%	
Total Lost time (s)	4.0	7.0	5.0	4.0	4.0	7.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3055	1226	1504	3204	1828	1685
Flt Permitted	1.00	1.00	0.19	1.00	0.95	1.00
Satd. Flow (perm)	3055	1226	297	3204	1828	1685
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	943	88	67	1206	505	263
RTOR Reduction (vph)	0	47	0	0	0	39
Lane Group Flow (vph)	943	41	67	1206	505	224
Confl. Peds. (#/hr)		1				
Heavy Vehicles (%)	11%	14%	15%	8%	1%	1%
Turn Type	NA	Perm	pm+pt	NA	Perm	pm+ov
Protected Phases	6		5	2		5
Permitted Phases		6	2		4	4
Actuated Green, G (s)	51.2	51.2	63.0	63.0	34.0	38.8
Effective Green, g (s)	54.2	51.2	65.0	66.0	36.0	38.8
Actuated g/C Ratio	0.49	0.47	0.59	0.60	0.33	0.35
Clearance Time (s)	7.0	7.0	7.0	7.0	6.0	7.0
Vehicle Extension (s)	6.3	6.3	3.0	6.3	2.5	3.0
Lane Grp Cap (vph)	1505	570	250	1922	598	594
v/s Ratio Prot	0.31		0.02	c0.38		0.02
v/s Ratio Perm		0.03	0.14		c0.28	0.12
v/c Ratio	0.63	0.07	0.27	0.63	0.84	0.38
Uniform Delay, d1	20.5	16.3	12.2	14.1	34.4	26.6
Progression Factor	0.77	1.05	0.68	0.46	1.00	1.00
Incremental Delay, d2	1.8	0.2	0.4	1.1	10.4	0.4
Delay (s)	17.7	17.3	8.7	7.5	44.8	27.0
Level of Service	B	B	A	A	D	C
Approach Delay (s)	17.6			7.6	38.7	
Approach LOS	B			A	D	

Intersection Summary			
HCM 2000 Control Delay	18.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	17.0
Intersection Capacity Utilization	70.3%	ICU Level of Service	C
Analysis Period (min)	15		
Description: Signal Permit No. TS-120-10			
Date Issued: 8-29-96			

Date Revised: 9-19-03
c Critical Lane Group

SR 228 Widening Project
 Future Year 2045 Build w/ Supplemental (AM)

Queues
 250: SR 228 & Myoma Rd
























Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	100	985	60	165	1145	50	175	50	110	10	40	65
Future Volume (vph)	100	985	60	165	1145	50	175	50	110	10	40	65
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.97	0.97	0.92	0.92	0.97	0.97	0.97	0.92	0.97	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	1%	9%	2%	2%	7%	7%	2%	2%	2%	0%	0%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%				0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	109	1133	0	170	1245	54	180	165	0	11	112	0
v/c Ratio	0.61	0.66		0.73	0.75	0.07	0.77	0.43		0.05	0.31	
Control Delay	54.1	20.8		62.5	9.9	0.2	62.3	19.1		32.9	16.9	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	54.1	20.8		62.5	9.9	0.2	62.3	19.1		32.9	16.9	
Queue Length 50th (ft)	69	195		87	31	0	121	41		6	24	
Queue Length 95th (ft)	m118	225		#175	326	m0	185	95		21	68	
Internal Link Dist (ft)		1661			2872			328			1347	
Turn Bay Length (ft)	250			300		150				150		
Base Capacity (vph)	179	1709		267	1667	803	319	489		296	464	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.61	0.66		0.64	0.75	0.07	0.56	0.34		0.04	0.24	

Intersection Summary

- # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

SR 228 Widening Project
 Future Year 2045 Build w/ Supplemental (AM)

HCM Signalized Intersection Capacity Analysis
 250: SR 228 & Myoma Rd

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	100	985	60	165	1145	50	175	50	110	10	40	65	
Future Volume (vph)	100	985	60	165	1145	50	175	50	110	10	40	65	
Ideal Flow (vphpl)	2100	2100	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803	
Grade (%)		0%			-2%			0%			0%		
Total Lost time (s)	7.0	7.0		7.0	7.0	7.0	8.0	8.0		8.0	8.0		
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00		
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.90		1.00	0.90		
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00		
Satd. Flow (prot)	1975	3643		1696	3234	1447	1679	1586		1713	1562		
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.68	1.00		0.62	1.00		
Satd. Flow (perm)	1975	3643		1696	3234	1447	1211	1586		1124	1562		
Peak-hour factor, PHF	0.92	0.92	0.97	0.97	0.92	0.92	0.97	0.97	0.97	0.92	0.97	0.92	
Adj. Flow (vph)	109	1071	62	170	1245	54	180	52	113	11	41	71	
RTOR Reduction (vph)	0	3	0	0	0	26	0	78	0	0	57	0	
Lane Group Flow (vph)	109	1130	0	170	1245	28	180	87	0	11	55	0	
Heavy Vehicles (%)	1%	9%	2%	2%	7%	7%	2%	2%	2%	0%	0%	7%	
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA		Perm	NA		
Protected Phases	1	6		5	2			4			8		
Permitted Phases						2	4			8			
Actuated Green, G (s)	10.0	51.5		15.2	56.7	56.7	21.3	21.3		21.3	21.3		
Effective Green, g (s)	10.0	51.5		15.2	56.7	56.7	21.3	21.3		21.3	21.3		
Actuated g/C Ratio	0.09	0.47		0.14	0.52	0.52	0.19	0.19		0.19	0.19		
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	8.0	8.0		8.0	8.0		
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0		
Lane Grp Cap (vph)	179	1705		234	1666	745	234	307		217	302		
v/s Ratio Prot	0.06	c0.31		0.10	c0.39			0.05			0.04		
v/s Ratio Perm						0.02	c0.15			0.01			
v/c Ratio	0.61	0.66		0.73	0.75	0.04	0.77	0.28		0.05	0.18		
Uniform Delay, d1	48.1	22.6		45.4	21.0	13.2	42.0	37.8		36.1	37.1		
Progression Factor	0.85	0.78		1.06	0.31	1.00	1.00	1.00		1.00	1.00		
Incremental Delay, d2	4.9	1.7		8.7	2.5	0.1	14.1	0.5		0.1	0.3		
Delay (s)	46.0	19.3		56.7	8.9	13.2	56.1	38.3		36.2	37.4		
Level of Service	D	B		E	A	B	E	D		D	D		
Approach Delay (s)		21.6			14.6			47.6			37.3		
Approach LOS		C			B			D			D		
Intersection Summary													
HCM 2000 Control Delay			21.8									HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.76										
Actuated Cycle Length (s)			110.0									Sum of lost time (s)	22.0
Intersection Capacity Utilization			73.6%									ICU Level of Service	D
Analysis Period (min)			15										

c Critical Lane Group

SR 228 Widening Project
 Future Year 2045 Build w/ Supplemental (AM)

Queues
 255: Heritage Creek Dr & SR 228



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	45	980	120	80	1275	245	45	0	35	205	20	40
Future Volume (vph)	45	980	120	80	1275	245	45	0	35	205	20	40
Confl. Peds. (#/hr)								1				
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	10%	0%	8%	5%	0%	25%	0%	50%	5%	0%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	48	1043	128	85	1356	261	48	0	37	218	21	43
v/c Ratio	0.21	0.62	0.13	0.24	0.64	0.24	0.30		0.14	0.53	0.12	0.12
Control Delay	5.2	4.9	0.2	4.4	8.3	0.4	53.5		1.0	48.5	43.5	0.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0
Total Delay	5.2	4.9	0.2	4.4	8.3	0.4	53.5		1.0	48.5	43.5	0.7
Queue Length 50th (ft)	1	140	0	8	161	0	17		0	75	13	0
Queue Length 95th (ft)	m3	27	m0	m12	259	m0	36		0	111	37	0
Internal Link Dist (ft)		2872			2325			970			1182	
Turn Bay Length (ft)	200		400	325		425	100		100	240		100
Base Capacity (vph)	245	1673	1012	371	2135	1086	168		262	471	263	368
Starvation Cap Reductn	0	0	0	0	0	0	0		0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0		0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0		0	0	0	0
Reduced v/c Ratio	0.20	0.62	0.13	0.23	0.64	0.24	0.29		0.14	0.46	0.08	0.12

Intersection Summary

Description: Signal Permit No. TS-185-10

























Date Issued: 2-26-2003

Date Revised: 3-10-2008

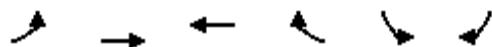
m Volume for 95th percentile queue is metered by upstream signal.

SR 228 Widening Project
 Future Year 2045 Build w/ Supplemental (AM)

HCM Signalized Intersection Capacity Analysis
 255: Heritage Creek Dr & SR 228

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	45	980	120	80	1275	245	45	0	35	205	20	40
Future Volume (vph)	45	980	120	80	1275	245	45	0	35	205	20	40
Ideal Flow (vphpl)	1662	1662	1662	1914	1914	1914	1662	1662	1662	1662	1662	1662
Lane Width	12	12	12	12	12	12	11	11	11	12	12	12
Grade (%)		5%			-5%			4%				6%
Total Lost time (s)	4.9	4.9	3.9	4.9	4.9	4.9	5.0		4.9	5.0	5.0	4.9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97		1.00	0.97	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00		1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	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	0.85	1.00		0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00
Satd. Flow (prot)	1509	2799	1377	1726	3550	1633	2321		892	2830	1612	1330
Flt Permitted	0.12	1.00	1.00	0.20	1.00	1.00	0.95		1.00	0.95	1.00	1.00
Satd. Flow (perm)	185	2799	1377	366	3550	1633	2321		892	2830	1612	1330
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)	48	1043	128	85	1356	261	48	0	37	218	21	43
RTOR Reduction (vph)	0	0	47	0	0	113	0	0	32	0	0	34
Lane Group Flow (vph)	48	1043	81	85	1356	148	48	0	5	218	21	9
Confl. Peds. (#/hr)							1					
Heavy Vehicles (%)	2%	10%	0%	8%	5%	0%	25%	0%	50%	5%	0%	3%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	Perm	Prot		pm+ov	Prot	NA	pm+ov
Protected Phases	1	6	7	5	2		7	4	5	3	8	1
Permitted Phases	6		6	2		2			4			8
Actuated Green, G (s)	65.4	59.8	65.3	66.2	60.2	60.2	5.5		9.3	14.9	12.7	18.3
Effective Green, g (s)	69.6	61.9	69.5	70.4	62.3	62.3	6.5		13.5	15.9	13.7	22.5
Actuated g/C Ratio	0.63	0.56	0.63	0.64	0.57	0.57	0.06		0.12	0.14	0.12	0.20
Clearance Time (s)	7.0	7.0	6.0	7.0	7.0	7.0	6.0		7.0	6.0	6.0	7.0
Vehicle Extension (s)	3.0	4.8	3.0	3.0	4.8	4.8	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	209	1575	870	334	2010	924	137		109	409	200	272
v/s Ratio Prot	0.02	0.37	0.01	c0.02	c0.38		0.02		0.00	c0.08	c0.01	0.00
v/s Ratio Perm	0.13		0.05	0.14		0.09			0.00			0.00
v/c Ratio	0.23	0.66	0.09	0.25	0.67	0.16	0.35		0.04	0.53	0.10	0.03
Uniform Delay, d1	11.3	16.8	7.9	9.0	16.7	11.4	49.7		42.5	43.6	42.7	35.0
Progression Factor	0.51	0.20	0.06	0.49	0.43	0.03	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	1.8	0.0	0.3	1.4	0.3	1.6		0.2	1.3	0.2	0.0
Delay (s)	6.3	5.2	0.5	4.7	8.5	0.6	51.3		42.7	44.9	42.9	35.1
Level of Service	A	A	A	A	A	A	D		D	D	D	D
Approach Delay (s)		4.7			7.1			47.5			43.3	
Approach LOS		A			A			D			D	
Intersection Summary												
HCM 2000 Control Delay			10.4				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.59									
Actuated Cycle Length (s)			110.0				Sum of lost time (s)			19.8		
Intersection Capacity Utilization			64.0%				ICU Level of Service			C		
Analysis Period (min)			15									
Description: Signal Permit No. TS-185-10												
Date Issued: 2-26-2003												

Date Revised: 3-10-2008
c Critical Lane Group



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Traffic Volume (vph)	105	1110	1440	25	5	165
Future Volume (vph)	105	1110	1440	25	5	165
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	11%	8%	0%	0%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	108	1144	1485	26	5	170
v/c Ratio	0.40	0.43	0.72	0.03	0.02	0.40
Control Delay	10.6	2.8	17.9	3.6	41.6	31.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.6	2.8	17.9	3.6	41.6	31.1
Queue Length 50th (ft)	4	2	355	0	3	84
Queue Length 95th (ft)	m27	3	473	12	14	144
Internal Link Dist (ft)		816	1453		1340	
Turn Bay Length (ft)	345			295	75	
Base Capacity (vph)	409	2647	2072	1011	233	423
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	0.26	0.43	0.72	0.03	0.02	0.40

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

SR 228 Widening Project
 Future Year 2045 Build w/ Supplemental (AM)

HCM Signalized Intersection Capacity Analysis
 265: SR 228 & Beaver St Ext



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑↑	↗	→	↙	↘
Traffic Volume (vph)	105	1110	1440	25	5	165
Future Volume (vph)	105	1110	1440	25	5	165
Ideal Flow (vphpl)	2100	2100	1900	1900	1803	1803
Grade (%)		0%	-5%		0%	
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1995	3595	3426	1655	1713	1517
Flt Permitted	0.10	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	202	3595	3426	1655	1713	1517
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	108	1144	1485	26	5	170
RTOR Reduction (vph)	0	0	0	10	0	19
Lane Group Flow (vph)	108	1144	1485	16	5	151
Heavy Vehicles (%)	0%	11%	8%	0%	0%	1%
Turn Type	pm+pt	NA	NA	Perm	Prot	pm+ov
Protected Phases	1	6	2		8	1
Permitted Phases	6			2		8
Actuated Green, G (s)	81.0	81.0	66.5	66.5	15.0	22.5
Effective Green, g (s)	81.0	81.0	66.5	66.5	15.0	22.5
Actuated g/C Ratio	0.74	0.74	0.60	0.60	0.14	0.20
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	270	2647	2071	1000	233	406
v/s Ratio Prot	0.03	c0.32	c0.43		0.00	c0.03
v/s Ratio Perm	0.27			0.01		0.07
v/c Ratio	0.40	0.43	0.72	0.02	0.02	0.37
Uniform Delay, d1	11.2	5.6	15.2	8.7	41.1	37.7
Progression Factor	1.71	0.42	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8	0.4	2.2	0.0	0.2	0.6
Delay (s)	20.0	2.8	17.3	8.7	41.3	38.2
Level of Service	B	A	B	A	D	D
Approach Delay (s)		4.3	17.2		38.3	
Approach LOS		A	B		D	

Intersection Summary

HCM 2000 Control Delay	13.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	65.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

SR 228 Widening Project
 Future Year 2045 Build w/ Supplemental (PM Peak)

Queues
 225: Franklin Rd & SR 228



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	415	1545	120	250	1495	120	230	495	285	120	265	105
Future Volume (vph)	415	1545	120	250	1495	120	230	495	285	120	265	105
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	1%	2%	0%	2%	3%	0%	2%	2%	1%	2%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	428	1593	124	258	1541	124	237	510	294	124	273	108
v/c Ratio	0.95	0.89	0.12	0.93	0.97	0.16	1.04	0.76	0.52	0.62	0.98	0.18
Control Delay	83.7	33.9	3.1	84.3	32.3	0.7	108.1	53.4	20.3	47.5	99.9	1.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	83.7	33.9	3.1	84.3	32.3	0.7	108.1	53.4	20.3	47.5	99.9	1.9
Queue Length 50th (ft)	171	562	9	98	602	3	~158	197	91	71	213	0
Queue Length 95th (ft)	#272	682	32	m#137	#791	m4	#315	261	180	#123	#387	15
Internal Link Dist (ft)		1521			2444			483			930	
Turn Bay Length (ft)	600		330	300		250	300		350	450		275
Base Capacity (vph)	450	1783	1030	278	1594	782	227	674	569	201	279	589
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.95	0.89	0.12	0.93	0.97	0.16	1.04	0.76	0.52	0.62	0.98	0.18

Intersection Summary

Description: Signal Permit No. TS-152-10

Date Issued: 6-4-99

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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































Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

SR 228 Widening Project
 Future Year 2045 Build w/ Supplemental (PM Peak)

HCM Signalized Intersection Capacity Analysis

225: Franklin Rd & SR 228

														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations	 	 		 	 			 			 			
Traffic Volume (vph)	415	1545	120	250	1495	120	230	495	285	120	265	105		
Future Volume (vph)	415	1545	120	250	1495	120	230	495	285	120	265	105		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11		
Grade (%)		5%			5%			3%				-3%		
Total Lost time (s)	3.0	3.0	7.0	3.0	3.0	6.0	6.0	6.0	6.0	5.0	6.0	3.0		
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00		
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85		
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00		
Satd. Flow (prot)	3380	3451	1575	3347	3417	1575	1685	3370	1523	1736	1864	1585		
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.17	1.00	1.00	0.35	1.00	1.00		
Satd. Flow (perm)	3380	3451	1575	3347	3417	1575	296	3370	1523	633	1864	1585		
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)	428	1593	124	258	1541	124	237	510	294	124	273	108		
RTOR Reduction (vph)	0	0	38	0	0	69	0	0	109	0	0	76		
Lane Group Flow (vph)	428	1593	86	258	1541	55	237	510	185	124	273	32		
Heavy Vehicles (%)	1%	2%	0%	2%	3%	0%	2%	2%	1%	2%	0%	0%		
Turn Type	Prot	NA	pm+ov	Prot	NA	Perm	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov		
Protected Phases	1	6	7	5	2		7	4	5	3	8	1		
Permitted Phases			6			2	4		4	8		8		
Actuated Green, G (s)	13.0	59.0	70.0	7.0	53.0	53.0	34.0	23.0	30.0	22.0	17.0	30.0		
Effective Green, g (s)	16.0	62.0	70.0	10.0	56.0	53.0	36.0	24.0	30.0	26.0	18.0	36.0		
Actuated g/C Ratio	0.13	0.52	0.58	0.08	0.47	0.44	0.30	0.20	0.25	0.22	0.15	0.30		
Clearance Time (s)	6.0	6.0	7.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0	6.0		
Vehicle Extension (s)	3.0	5.0	2.0	2.0	5.0	5.0	2.0	2.0	2.0	2.0	2.0	3.0		
Lane Grp Cap (vph)	450	1783	918	278	1594	695	227	674	380	201	279	475		
v/s Ratio Prot	0.13	c0.46	0.01	0.08	c0.45		c0.10	0.15	0.03	0.04	0.15	0.01		
v/s Ratio Perm			0.05			0.03	c0.21		0.09	0.10		0.01		
v/c Ratio	0.95	0.89	0.09	0.93	0.97	0.08	1.04	0.76	0.49	0.62	0.98	0.07		
Uniform Delay, d1	51.6	26.0	11.0	54.6	31.1	19.4	37.0	45.2	38.4	39.9	50.8	30.0		
Progression Factor	1.00	1.00	1.00	1.06	0.65	0.31	1.00	1.00	1.00	1.00	1.00	1.00		
Incremental Delay, d2	30.2	7.3	0.0	23.7	10.9	0.1	71.7	4.3	0.4	3.9	47.2	0.1		
Delay (s)	81.8	33.4	11.0	81.7	31.3	6.2	108.7	49.6	38.8	43.8	98.0	30.1		
Level of Service	F	C	B	F	C	A	F	D	D	D	F	C		
Approach Delay (s)		41.7			36.4			60.0			70.2			
Approach LOS		D			D			E			E			
Intersection Summary														
HCM 2000 Control Delay			45.9									HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio			1.07											
Actuated Cycle Length (s)			120.0								22.0		Sum of lost time (s)	
Intersection Capacity Utilization			96.5%										ICU Level of Service	F
Analysis Period (min)			15											
Description: Signal Permit No. TS-152-10														
Date Issued: 6-4-99														
c Critical Lane Group														

SR 228 Widening Project
 Future Year 2045 Build w/ Supplemental (PM Peak)

Queues
 230: Castle Creek Dr (West)/High Pointe Dr & SR 228



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	85	1690	185	70	1495	30	235	65	65	30	30	70
Future Volume (vph)	85	1690	185	70	1495	30	235	65	65	30	30	70
Confl. Peds. (#/hr)			1						1			
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	2%	1%	2%	3%	0%	1%	0%	1%	0%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	88	1742	191	72	1541	31	242	134	0	31	31	72
v/c Ratio	0.58	0.94	0.21	0.38	0.87	0.04	0.84	0.34		0.13	0.08	0.17
Control Delay	80.1	22.7	0.5	26.6	36.3	0.8	68.2	27.7		35.8	34.5	3.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	80.1	22.7	0.5	26.6	36.3	0.8	68.2	27.7		35.8	34.5	3.9
Queue Length 50th (ft)	69	~763	1	37	585	0	174	57		18	18	0
Queue Length 95th (ft)	m89	#916	m1	m66	730	m0	#301	114		45	44	19
Internal Link Dist (ft)		2444			1855			844			941	
Turn Bay Length (ft)	250		400	250		175	100			100		100
Base Capacity (vph)	154	1844	893	200	1773	860	314	424		269	441	449
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.57	0.94	0.21	0.36	0.87	0.04	0.77	0.32		0.12	0.07	0.16

Intersection Summary

Description: Signal Permit No. TS-113-10

Date Issued: 3/24/95

Date Revised: 9/17/02

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

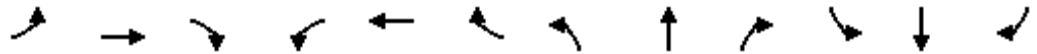
m Volume for 95th percentile queue is metered by upstream signal.

SR 228 Widening Project

HCM Signalized Intersection Capacity Analysis

Future Year 2045 Build w/ Supplemental (PM Peak)

230: Castle Creek Dr (West)/High Pointe Dr & SR 228



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑	↗	↘	↑↑	↗	↘	↗		↘	↑	↗
Traffic Volume (vph)	85	1690	185	70	1495	30	235	65	65	30	30	70
Future Volume (vph)	85	1690	185	70	1495	30	235	65	65	30	30	70
Ideal Flow (vphpl)	1650	1650	1650	1714	1714	1714	1650	1650	1650	1650	1650	1650
Grade (%)		-2%			1%			-1%				-6%
Total Lost time (s)	3.7	3.7	3.7	4.1	3.7	3.7	4.8	4.8		4.8	4.8	4.8
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	0.98	1.00	1.00	1.00	1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	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	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1583	3104	1373	1588	3146	1450	1560	1516		1615	1700	1445
Flt Permitted	0.95	1.00	1.00	0.06	1.00	1.00	0.74	1.00		0.61	1.00	1.00
Satd. Flow (perm)	1583	3104	1373	100	3146	1450	1210	1516		1039	1700	1445
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)	88	1742	191	72	1541	31	242	67	67	31	31	72
RTOR Reduction (vph)	0	0	80	0	0	14	0	31	0	0	0	55
Lane Group Flow (vph)	88	1742	111	72	1541	17	242	103	0	31	31	17
Confl. Peds. (#/hr)			1						1			
Heavy Vehicles (%)	0%	2%	1%	2%	3%	0%	1%	0%	1%	0%	0%	0%
Turn Type	Prot	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	1	6		5	2			4			8	
Permitted Phases			6	2		2	4			8		8
Actuated Green, G (s)	8.3	66.6	66.6	70.3	64.3	64.3	26.4	26.4		26.4	26.4	26.4
Effective Green, g (s)	11.6	69.9	69.9	76.1	67.6	67.6	28.6	28.6		28.6	28.6	28.6
Actuated g/C Ratio	0.10	0.58	0.58	0.63	0.56	0.56	0.24	0.24		0.24	0.24	0.24
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	153	1808	799	173	1772	816	288	361		247	405	344
v/s Ratio Prot	c0.06	c0.56		0.03	0.49			0.07				0.02
v/s Ratio Perm			0.08	0.23		0.01	c0.20			0.03		0.01
v/c Ratio	0.58	0.96	0.14	0.42	0.87	0.02	0.84	0.28		0.13	0.08	0.05
Uniform Delay, d1	51.8	23.8	11.4	19.8	22.4	11.6	43.5	37.3		35.9	35.5	35.2
Progression Factor	1.36	0.56	0.10	1.74	1.34	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.9	9.2	0.2	1.3	4.9	0.0	19.3	0.4		0.2	0.1	0.1
Delay (s)	73.5	22.5	1.3	35.8	34.8	11.6	62.8	37.8		36.1	35.5	35.3
Level of Service	E	C	A	D	C	B	E	D		D	D	D
Approach Delay (s)		22.7			34.5			53.9			35.5	
Approach LOS		C			C			D			D	

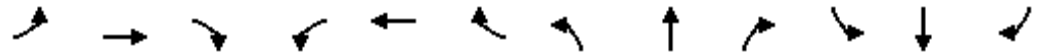
Intersection Summary

HCM 2000 Control Delay	30.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	92.0%	ICU Level of Service	F
Analysis Period (min)	15		
Description: Signal Permit No. TS-113-10			
Date Issued: 3/24/95			
Date Revised: 9/17/02			

c Critical Lane Group

SR 228 Widening Project
 Future Year 2045 Build w/ Supplemental (PM Peak)

Queues
 235: Castle Creek Dr (East)/High Pointe Dr & SR 228



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	135	1735	30	65	1505	45	20	40	105	55	40	70
Future Volume (vph)	135	1735	30	65	1505	45	20	40	105	55	40	70
Confl. Peds. (#/hr)									1			1
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	2%	0%	2%	3%	0%	0%	0%	0%	0%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	139	1820	0	67	1552	46	21	149	0	57	41	72
v/c Ratio	0.47	0.75		0.30	0.65	0.04	0.14	0.55		0.65	0.20	0.29
Control Delay	15.9	16.1		12.8	11.7	3.1	46.1	25.0		80.5	46.8	10.4
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	15.9	16.1		12.8	11.7	3.1	46.1	25.0		80.5	46.8	10.4
Queue Length 50th (ft)	46	373		12	172	1	15	34		43	29	0
Queue Length 95th (ft)	m72	m409		m40	361	m6	38	96		86	60	34
Internal Link Dist (ft)		1855			716			860			573	
Turn Bay Length (ft)	275			175		250	100			100		100
Base Capacity (vph)	307	2413		260	2395	1130	260	394		153	364	369
Starvation Cap Reductn	0	0		0	35	0	0	0		0	0	0
Spillback Cap Reductn	0	21		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.45	0.76		0.26	0.66	0.04	0.08	0.38		0.37	0.11	0.20

Intersection Summary

Description: Signal Permit No. TS-080-10

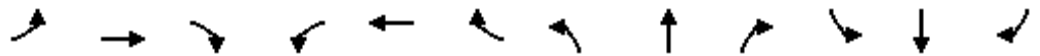
m Volume for 95th percentile queue is metered by upstream signal.

SR 228 Widening Project

HCM Signalized Intersection Capacity Analysis

Future Year 2045 Build w/ Supplemental (PM Peak)

235: Castle Creek Dr (East)/High Pointe Dr & SR 228



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↶	↷		↶	↷	↷	↶	↷		↶	↷	↷
Traffic Volume (vph)	135	1735	30	65	1505	45	20	40	105	55	40	70
Future Volume (vph)	135	1735	30	65	1505	45	20	40	105	55	40	70
Ideal Flow (vphpl)	1803	1803	1803	1908	1908	1908	1650	1650	1650	1650	1650	1650
Grade (%)		0%			0%			0%			-4%	
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	0.99		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	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.89		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1713	3351		1777	3520	1622	1568	1455		1599	1683	1410
Flt Permitted	0.10	1.00		0.08	1.00	1.00	0.73	1.00		0.42	1.00	1.00
Satd. Flow (perm)	187	3351		143	3520	1622	1205	1455		708	1683	1410
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)	139	1789	31	67	1552	46	21	41	108	57	41	72
RTOR Reduction (vph)	0	1	0	0	0	15	0	88	0	0	0	63
Lane Group Flow (vph)	139	1819	0	67	1552	31	21	61	0	57	41	9
Confl. Peds. (#/hr)									1			1
Heavy Vehicles (%)	0%	2%	0%	2%	3%	0%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6			2		2	4			8		8
Actuated Green, G (s)	92.6	83.3		85.4	79.7	79.7	13.0	13.0		13.0	13.0	13.0
Effective Green, g (s)	96.6	85.3		89.4	81.7	81.7	15.0	15.0		15.0	15.0	15.0
Actuated g/C Ratio	0.80	0.71		0.75	0.68	0.68	0.12	0.12		0.12	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	6.0
Vehicle Extension (s)	3.0	6.0		3.0	6.0	6.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	294	2382		211	2396	1104	150	181		88	210	176
v/s Ratio Prot	c0.04	c0.54		0.02	0.44			0.04			0.02	
v/s Ratio Perm	0.34			0.22		0.02	0.02			c0.08		0.01
v/c Ratio	0.47	0.76		0.32	0.65	0.03	0.14	0.33		0.65	0.20	0.05
Uniform Delay, d1	10.2	11.0		10.0	10.9	6.2	46.8	47.9		50.0	47.1	46.2
Progression Factor	2.51	1.17		2.57	0.86	5.86	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.6	1.2		0.7	1.0	0.0	0.4	1.1		15.2	0.5	0.1
Delay (s)	26.3	14.1		26.3	10.4	36.6	47.2	49.0		65.2	47.5	46.4
Level of Service	C	B		C	B	D	D	D		E	D	D
Approach Delay (s)		14.9			11.7			48.8			53.0	
Approach LOS		B			B			D			D	

Intersection Summary

HCM 2000 Control Delay	16.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	83.2%	ICU Level of Service	E
Analysis Period (min)	15		

Description: Signal Permit No. TS-080-10

c Critical Lane Group

SR 228 Widening Project
 Future Year 2045 Build w/ Supplemental (PM Peak)

Queues
 240: Seven Fields Blvd & SR 228



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	150	1640	125	15	1375	195	45	25	15	220	30	180
Future Volume (vph)	150	1640	125	15	1375	195	45	25	15	220	30	180
Confl. Peds. (#/hr)												2
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	1%	1%	0%	3%	1%	0%	0%	0%	0%	0%	0%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	155	1691	129	15	1418	201	46	26	15	227	31	186
v/c Ratio	0.51	0.74	0.12	0.07	0.72	0.21	0.17	0.07	0.04	0.81	0.08	0.42
Control Delay	21.9	6.6	0.3	5.7	25.6	1.7	38.5	36.4	0.2	66.7	36.7	8.5
Queue Delay	0.0	0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.9	6.8	0.3	5.7	25.7	1.7	38.5	36.4	0.2	66.7	36.7	8.5
Queue Length 50th (ft)	26	44	1	3	613	10	29	16	0	164	19	0
Queue Length 95th (ft)	m73	267	m0	m3	688	m27	61	40	0	#272	45	59
Internal Link Dist (ft)		716			569			530				572
Turn Bay Length (ft)	330		330	150		400	115		100	150		
Base Capacity (vph)	359	2288	1039	346	1978	977	313	424	403	315	426	477
Starvation Cap Reductn	0	104	0	0	67	0	0	0	0	0	0	0
Spillback Cap Reductn	0	28	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.77	0.12	0.04	0.74	0.21	0.15	0.06	0.04	0.72	0.07	0.39

Intersection Summary

Description: Signal Permit No. TS-221-10

Date Issued: 12-15-07

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

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

SR 228 Widening Project
 Future Year 2045 Build w/ Supplemental (PM Peak)

HCM Signalized Intersection Capacity Analysis

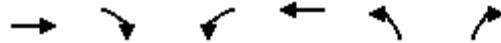
240: Seven Fields Blvd & SR 228

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	150	1640	125	15	1375	195	45	25	15	220	30	180
Future Volume (vph)	150	1640	125	15	1375	195	45	25	15	220	30	180
Ideal Flow (vphpl)	1794	1794	1794	1794	1794	1794	1794	1794	1794	1794	1794	1794
Grade (%)		2%			-2%			2%			1%	
Total Lost time (s)	3.1	3.1	6.0	3.1	3.1	3.1	4.3	4.3	6.0	4.3	4.3	6.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	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	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1671	3341	1510	1671	3409	1540	1687	1776	1510	1696	1785	1480
Flt Permitted	0.10	1.00	1.00	0.08	1.00	1.00	0.74	1.00	1.00	0.74	1.00	1.00
Satd. Flow (perm)	169	3341	1510	149	3409	1540	1309	1776	1510	1321	1785	1480
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)	155	1691	129	15	1418	201	46	26	15	227	31	186
RTOR Reduction (vph)	0	0	45	0	0	84	0	0	12	0	0	149
Lane Group Flow (vph)	155	1691	84	15	1418	117	46	26	3	227	31	37
Confl. Peds. (#/hr)												2
Heavy Vehicles (%)	1%	1%	0%	3%	1%	0%	0%	0%	0%	0%	0%	1%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6		6	2		2	4		4	8		8
Actuated Green, G (s)	84.2	75.7	75.7	69.2	66.7	66.7	23.8	23.8	23.8	23.8	23.8	23.8
Effective Green, g (s)	87.1	78.6	75.7	75.0	69.6	69.6	25.5	25.5	23.8	25.5	25.5	23.8
Actuated g/C Ratio	0.73	0.65	0.63	0.62	0.58	0.58	0.21	0.21	0.20	0.21	0.21	0.20
Clearance Time (s)	6.0	6.0	6.0	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	6.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	302	2188	952	161	1977	893	278	377	299	280	379	293
v/s Ratio Prot	c0.06	c0.51		0.00	0.42			0.01			0.02	
v/s Ratio Perm	0.31		0.06	0.05		0.08	0.04		0.00	c0.17		0.02
v/c Ratio	0.51	0.77	0.09	0.09	0.72	0.13	0.17	0.07	0.01	0.81	0.08	0.13
Uniform Delay, d1	14.9	14.5	8.7	12.1	18.1	11.5	38.6	37.8	38.6	45.0	37.9	39.5
Progression Factor	1.66	0.36	0.07	0.84	1.19	0.63	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	1.9	0.1	0.2	2.0	0.3	0.3	0.1	0.0	16.1	0.1	0.2
Delay (s)	25.9	7.0	0.7	10.3	23.5	7.5	38.8	37.8	38.6	61.1	38.0	39.7
Level of Service	C	A	A	B	C	A	D	D	D	E	D	D
Approach Delay (s)		8.1			21.4			38.5			50.5	
Approach LOS		A			C			D			D	

Intersection Summary		
HCM 2000 Control Delay	18.5	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.77	B
Actuated Cycle Length (s)	120.0	Sum of lost time (s)
Intersection Capacity Utilization	82.2%	10.5
Analysis Period (min)	15	ICU Level of Service
		E
Description: Signal Permit No. TS-221-10		
Date Issued: 12-15-07		
c Critical Lane Group		

SR 228 Widening Project
 Future Year 2045 Build w/ Supplemental (PM Peak)

Queues
 245: Adams Ridge Blvd & SR 228



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Volume (vph)	1330	500	245	1235	270	195
Future Volume (vph)	1330	500	245	1235	270	195
Confl. Peds. (#/hr)		1				
Confl. Bikes (#/hr)						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	0%	0%	3%	2%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1371	515	253	1273	278	201
v/c Ratio	0.75	0.53	0.73	0.52	0.78	0.33
Control Delay	19.2	2.5	23.3	16.9	60.7	24.4
Queue Delay	0.3	0.2	0.0	0.3	0.0	0.0
Total Delay	19.5	2.8	23.3	17.2	60.7	24.4
Queue Length 50th (ft)	430	16	97	435	203	92
Queue Length 95th (ft)	395	48	m183	575	296	147
Internal Link Dist (ft)	569			1661	173	
Turn Bay Length (ft)		400	425			100
Base Capacity (vph)	1832	978	383	2471	407	599
Starvation Cap Reductn	109	93	0	0	0	0
Spillback Cap Reductn	0	0	0	557	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.80	0.58	0.66	0.67	0.68	0.34

Intersection Summary

Description: Signal Permit No. TS-120-10

Date Issued: 8-29-96

Date Revised: 9-19-03

m Volume for 95th percentile queue is metered by upstream signal.

SR 228 Widening Project
 Future Year 2045 Build w/ Supplemental (PM Peak)

HCM Signalized Intersection Capacity Analysis
 245: Adams Ridge Blvd & SR 228



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑
Traffic Volume (vph)	1330	500	245	1235	270	195
Future Volume (vph)	1330	500	245	1235	270	195
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803
Lane Width	12	10	12	12	15	16
Grade (%)	2%			-2%	4%	
Total Lost time (s)	4.0	7.0	5.0	4.0	4.0	7.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3325	1396	1730	3359	1810	1685
Flt Permitted	1.00	1.00	0.09	1.00	0.95	1.00
Satd. Flow (perm)	3325	1396	170	3359	1810	1685
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1371	515	253	1273	278	201
RTOR Reduction (vph)	0	244	0	0	0	18
Lane Group Flow (vph)	1371	271	253	1273	278	183
Confl. Peds. (#/hr)		1				
Heavy Vehicles (%)	2%	0%	0%	3%	2%	1%
Turn Type	NA	Perm	pm+pt	NA	Prot	pm+ov
Protected Phases	6		5	2	4	5
Permitted Phases		6	2			4
Actuated Green, G (s)	63.1	63.1	85.3	85.3	21.7	36.9
Effective Green, g (s)	66.1	63.1	87.3	88.3	23.7	36.9
Actuated g/C Ratio	0.55	0.53	0.73	0.74	0.20	0.31
Clearance Time (s)	7.0	7.0	7.0	7.0	6.0	7.0
Vehicle Extension (s)	6.3	6.3	3.0	6.3	2.5	3.0
Lane Grp Cap (vph)	1831	734	347	2471	357	518
v/s Ratio Prot	c0.41		c0.10	0.38	c0.15	0.04
v/s Ratio Perm		0.19	0.43			0.06
v/c Ratio	0.75	0.37	0.73	0.52	0.78	0.35
Uniform Delay, d1	20.6	16.7	27.0	6.7	45.7	32.3
Progression Factor	0.77	0.69	0.69	2.26	1.00	1.00
Incremental Delay, d2	1.9	1.0	5.1	0.5	9.9	0.4
Delay (s)	17.8	12.6	23.7	15.7	55.5	32.7
Level of Service	B	B	C	B	E	C
Approach Delay (s)	16.4			17.1	46.0	
Approach LOS	B			B	D	

Intersection Summary			
HCM 2000 Control Delay	20.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	79.6%	ICU Level of Service	D
Analysis Period (min)	15		
Description: Signal Permit No. TS-120-10			
Date Issued: 8-29-96			

Date Revised: 9-19-03
c Critical Lane Group

SR 228 Widening Project
 Future Year 2045 Build w/ Supplemental (PM Peak)

Queues
 250: SR 228 & Myoma Rd
























Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	115	1410	70	170	1315	35	150	40	100	20	50	80
Future Volume (vph)	115	1410	70	170	1315	35	150	40	100	20	50	80
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.97	0.97	0.92	0.92	0.97	0.97	0.97	0.92	0.97	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	2%	2%	2%	2%	0%	2%	2%	2%	11%	2%	4%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%				0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	125	1605	0	175	1429	38	155	144	0	22	139	0
v/c Ratio	0.66	0.80		0.77	0.76	0.04	0.79	0.41		0.12	0.43	
Control Delay	84.5	17.6		66.8	25.5	1.5	73.1	18.8		41.0	26.8	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	84.5	17.6		66.8	25.5	1.5	73.1	18.8		41.0	26.8	
Queue Length 50th (ft)	98	187		111	303	0	116	31		15	50	
Queue Length 95th (ft)	m137	454		m#217	433	m1	183	87		37	106	
Internal Link Dist (ft)		1661			2872			328			1347	
Turn Bay Length (ft)	250			300		150				150		
Base Capacity (vph)	198	1995		226	1869	901	261	430		235	406	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.63	0.80		0.77	0.76	0.04	0.59	0.33		0.09	0.34	

Intersection Summary

- # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

SR 228 Widening Project
 Future Year 2045 Build w/ Supplemental (PM Peak)

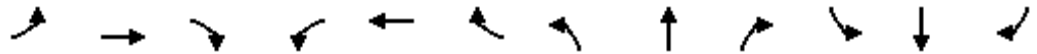
HCM Signalized Intersection Capacity Analysis
 250: SR 228 & Myoma Rd

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	115	1410	70	170	1315	35	150	40	100	20	50	80
Future Volume (vph)	115	1410	70	170	1315	35	150	40	100	20	50	80
Ideal Flow (vphpl)	2100	2100	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803
Grade (%)		0%			-2%			0%			0%	
Total Lost time (s)	7.0	7.0		7.0	7.0	7.0	8.0	8.0		8.0	8.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Flt	1.00	0.99		1.00	1.00	0.85	1.00	0.89		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1995	3885		1696	3392	1548	1679	1578		1543	1582	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.66	1.00		0.64	1.00	
Satd. Flow (perm)	1995	3885		1696	3392	1548	1162	1578		1046	1582	
Peak-hour factor, PHF	0.92	0.92	0.97	0.97	0.92	0.92	0.97	0.97	0.97	0.92	0.97	0.92
Adj. Flow (vph)	125	1533	72	175	1429	38	155	41	103	22	52	87
RTOR Reduction (vph)	0	2	0	0	0	17	0	81	0	0	54	0
Lane Group Flow (vph)	125	1603	0	175	1429	21	155	63	0	22	85	0
Heavy Vehicles (%)	0%	2%	2%	2%	2%	0%	2%	2%	2%	11%	2%	4%
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases						6	8			4		
Actuated Green, G (s)	11.5	61.6		16.0	66.1	66.1	20.4	20.4		20.4	20.4	
Effective Green, g (s)	11.5	61.6		16.0	66.1	66.1	20.4	20.4		20.4	20.4	
Actuated g/C Ratio	0.10	0.51		0.13	0.55	0.55	0.17	0.17		0.17	0.17	
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	8.0	8.0		8.0	8.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	191	1994		226	1868	852	197	268		177	268	
v/s Ratio Prot	0.06	c0.41		0.10	c0.42			0.04			0.05	
v/s Ratio Perm						0.01	c0.13			0.02		
v/c Ratio	0.65	0.80		0.77	0.76	0.02	0.79	0.24		0.12	0.32	
Uniform Delay, d1	52.3	24.2		50.3	20.9	12.3	47.7	43.1		42.2	43.7	
Progression Factor	1.37	0.57		0.96	1.02	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.1	2.8		12.0	2.4	0.0	18.4	0.5		0.3	0.7	
Delay (s)	78.0	16.5		60.1	23.7	12.3	66.2	43.5		42.5	44.4	
Level of Service	E	B		E	C	B	E	D		D	D	
Approach Delay (s)		20.9			27.3			55.3			44.1	
Approach LOS		C			C			E			D	
Intersection Summary												
HCM 2000 Control Delay			27.3									C
HCM 2000 Volume to Capacity ratio			0.81									
Actuated Cycle Length (s)			120.0							22.0		
Intersection Capacity Utilization			88.9%									E
Analysis Period (min)			15									

c Critical Lane Group

SR 228 Widening Project
 Future Year 2045 Build w/ Supplemental (PM Peak)

Queues
 255: Heritage Creek Dr & SR 228



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	65	1275	215	160	1230	240	240	30	180	340	20	55
Future Volume (vph)	65	1275	215	160	1230	240	240	30	180	340	20	55
Confl. Peds. (#/hr)							1					
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	0%	0%	2%	0%	0%	0%	0%	1%	0%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	69	1356	229	170	1309	255	255	32	191	362	21	59
v/c Ratio	0.37	0.95	0.23	0.72	0.71	0.21	0.53	0.20	0.50	0.73	0.10	0.16
Control Delay	27.6	37.6	0.4	57.3	12.4	0.3	50.9	50.7	24.4	56.2	45.8	3.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.6	37.6	0.4	57.3	12.4	0.3	50.9	50.7	24.4	56.2	45.8	3.4
Queue Length 50th (ft)	23	~578	0	89	150	0	97	23	62	137	14	0
Queue Length 95th (ft)	m43	#712	m0	m#151	297	m0	136	54	138	187	39	14
Internal Link Dist (ft)		2872			2325			970			1182	
Turn Bay Length (ft)	200		400	325		425	100		100	240		100
Base Capacity (vph)	197	1424	1017	237	1850	1215	577	196	375	563	226	379
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.95	0.23	0.72	0.71	0.21	0.44	0.16	0.51	0.64	0.09	0.16

Intersection Summary

Description: Signal Permit No. TS-185-10

Date Issued: 2-26-2003

Date Revised: 3-10-2008

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

























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

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

SR 228 Widening Project
 Future Year 2045 Build w/ Supplemental (PM Peak)

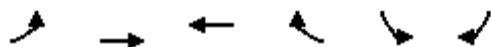
HCM Signalized Intersection Capacity Analysis
 255: Heritage Creek Dr & SR 228

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	1275	215	160	1230	240	240	30	180	340	20	55
Future Volume (vph)	65	1275	215	160	1230	240	240	30	180	340	20	55
Ideal Flow (vphpl)	1662	1662	1662	1914	1914	1914	1662	1662	1662	1662	1662	1662
Lane Width	12	12	12	12	12	12	11	11	11	12	12	12
Grade (%)		5%			-5%			4%			6%	
Total Lost time (s)	4.9	4.9	3.9	4.9	4.9	3.9	5.0	5.0	4.9	5.0	5.0	4.9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	0.97	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	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	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1509	3018	1377	1864	3654	1642	2902	1574	1338	2942	1612	1343
Flt Permitted	0.09	1.00	1.00	0.07	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	149	3018	1377	135	3654	1642	2902	1574	1338	2942	1612	1343
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)	69	1356	229	170	1309	255	255	32	191	362	21	59
RTOR Reduction (vph)	0	0	83	0	0	86	0	0	72	0	0	48
Lane Group Flow (vph)	69	1356	146	170	1309	169	255	32	119	362	21	11
Confl. Peds. (#/hr)						1						
Heavy Vehicles (%)	2%	2%	0%	0%	2%	0%	0%	0%	0%	1%	0%	2%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	1	6	7	5	2	3	7	4	5	3	8	1
Permitted Phases	6		6	2		2			4			8
Actuated Green, G (s)	59.4	53.3	72.1	65.0	56.1	75.3	18.8	12.6	21.5	19.2	13.0	19.1
Effective Green, g (s)	63.6	55.4	76.3	69.2	58.2	79.5	19.8	13.6	25.7	20.2	14.0	23.3
Actuated g/C Ratio	0.53	0.46	0.64	0.58	0.49	0.66	0.17	0.11	0.21	0.17	0.12	0.19
Clearance Time (s)	7.0	7.0	6.0	7.0	7.0	6.0	6.0	6.0	7.0	6.0	6.0	7.0
Vehicle Extension (s)	3.0	4.8	3.0	3.0	4.8	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	171	1393	875	236	1772	1087	478	178	286	495	188	260
v/s Ratio Prot	0.03	c0.45	0.03	c0.07	0.36	0.03	0.09	0.02	c0.04	c0.12	0.01	0.00
v/s Ratio Perm	0.18		0.08	0.35		0.08			0.05			0.01
v/c Ratio	0.40	0.97	0.17	0.72	0.74	0.16	0.53	0.18	0.42	0.73	0.11	0.04
Uniform Delay, d1	18.8	31.6	8.9	28.2	24.8	7.6	45.9	48.2	40.7	47.3	47.4	39.3
Progression Factor	2.02	0.82	0.04	1.88	0.42	0.03	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	13.7	0.1	7.4	2.0	0.0	1.1	0.5	1.0	5.5	0.3	0.1
Delay (s)	39.0	39.7	0.4	60.4	12.5	0.3	47.0	48.6	41.7	52.8	47.7	39.4
Level of Service	D	D	A	E	B	A	D	D	D	D	D	D
Approach Delay (s)		34.3			15.4			45.0			50.8	
Approach LOS		C			B			D			D	
Intersection Summary												
HCM 2000 Control Delay			29.5			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.83									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)				19.8		
Intersection Capacity Utilization			79.2%			ICU Level of Service				D		
Analysis Period (min)			15									
Description: Signal Permit No. TS-185-10												
Date Issued: 2-26-2003												

Date Revised: 3-10-2008
c Critical Lane Group

SR 228 Widening Project
 Future Year 2045 Build w/ Supplemental (PM Peak)

Queues
 265: SR 228 & Beaver St Ext



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Traffic Volume (vph)	335	1480	1450	25	20	180
Future Volume (vph)	335	1480	1450	25	20	180
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	2%	2%	0%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	345	1526	1495	26	21	186
v/c Ratio	0.82	0.51	0.76	0.03	0.10	0.35
Control Delay	47.0	1.5	26.0	6.2	47.5	27.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.0	1.5	26.0	6.2	47.5	27.3
Queue Length 50th (ft)	150	24	478	0	15	94
Queue Length 95th (ft)	m182	m47	614	16	39	148
Internal Link Dist (ft)		878	1391		1732	
Turn Bay Length (ft)	345			295	75	
Base Capacity (vph)	483	2995	1963	907	228	506
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	0.71	0.51	0.76	0.03	0.09	0.37

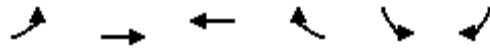
Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

SR 228 Widening Project
 Future Year 2045 Build w/ Supplemental (PM Peak)

HCM Signalized Intersection Capacity Analysis

265: SR 228 & Beaver St Ext



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑↑	↑↑	↗	↖	↗
Traffic Volume (vph)	335	1480	1450	25	20	180
Future Volume (vph)	335	1480	1450	25	20	180
Ideal Flow (vphpl)	2100	2100	1900	1900	1803	1803
Grade (%)		0%	-5%		0%	
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1995	3912	3628	1655	1713	1533
Flt Permitted	0.07	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	149	3912	3628	1655	1713	1533
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	345	1526	1495	26	21	186
RTOR Reduction (vph)	0	0	0	11	0	12
Lane Group Flow (vph)	345	1526	1495	15	21	174
Heavy Vehicles (%)	0%	2%	2%	0%	0%	0%
Turn Type	pm+pt	NA	NA	Perm	Prot	pm+ov
Protected Phases	1	6	2		8	1
Permitted Phases	6			2		8
Actuated Green, G (s)	91.9	91.9	65.0	65.0	14.1	34.0
Effective Green, g (s)	91.9	91.9	65.0	65.0	14.1	34.0
Actuated g/C Ratio	0.77	0.77	0.54	0.54	0.12	0.28
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	420	2995	1965	896	201	523
v/s Ratio Prot	c0.14	0.39	0.41		0.01	c0.06
v/s Ratio Perm	c0.49			0.01		0.06
v/c Ratio	0.82	0.51	0.76	0.02	0.10	0.33
Uniform Delay, d1	34.8	5.4	21.4	12.7	47.3	34.0
Progression Factor	1.30	0.21	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.7	0.3	2.8	0.0	0.2	0.4
Delay (s)	52.2	1.4	24.3	12.7	47.5	34.4
Level of Service	D	A	C	B	D	C
Approach Delay (s)		10.8	24.1		35.7	
Approach LOS		B	C		D	

Intersection Summary

HCM 2000 Control Delay	17.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	21.0
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

SR 228 Widening Project
 Future Year 2045 Build w/ Supplemental (SAT)

Queues
 225: Franklin Rd & SR 228



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	175	1285	140	220	1680	155	180	220	190	225	235	185
Future Volume (vph)	175	1285	140	220	1680	155	180	220	190	225	235	185
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	2%	0%	0%	2%	4%	0%	1%	2%	1%	1%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	180	1325	144	227	1732	160	186	227	196	232	242	191
v/c Ratio	0.79	0.73	0.14	0.49	0.85	0.17	0.99	0.40	0.35	0.86	0.94	0.43
Control Delay	81.2	20.2	0.5	63.0	29.9	4.5	111.1	58.3	16.7	80.4	105.7	17.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	81.2	20.2	0.5	63.0	29.9	4.5	111.1	58.3	16.7	80.4	105.7	17.5
Queue Length 50th (ft)	91	224	1	107	699	15	152	105	56	193	238	49
Queue Length 95th (ft)	#154	252	4	147	811	49	#295	150	120	#343	#407	111
Internal Link Dist (ft)		1521			2444			483				930
Turn Bay Length (ft)	600		330	300		250	300		350	450		275
Base Capacity (vph)	227	1804	1026	569	2048	920	188	567	555	270	258	441
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.79	0.73	0.14	0.40	0.85	0.17	0.99	0.40	0.35	0.86	0.94	0.43

Intersection Summary

Description: Signal Permit No. TS-152-10

































Date Issued: 6-4-99

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

Queue shown is maximum after two cycles.

SR 228 Widening Project
 Future Year 2045 Build w/ Supplemental (SAT)

HCM Signalized Intersection Capacity Analysis
 225: Franklin Rd & SR 228

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 	 		 	 			 		 	 	 
Traffic Volume (vph)	175	1285	140	220	1680	155	180	220	190	225	235	185
Future Volume (vph)	175	1285	140	220	1680	155	180	220	190	225	235	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Grade (%)		5%			5%			3%				-3%
Total Lost time (s)	3.0	3.0	7.0	3.0	3.0	6.0	6.0	6.0	6.0	5.0	6.0	3.0
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3414	3451	1575	3414	3451	1514	1719	3403	1508	1753	1846	1554
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.17	1.00	1.00	0.61	1.00	1.00
Satd. Flow (perm)	3414	3451	1575	3414	3451	1514	307	3403	1508	1126	1846	1554
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)	180	1325	144	227	1732	160	186	227	196	232	242	191
RTOR Reduction (vph)	0	0	61	0	0	53	0	0	84	0	0	90
Lane Group Flow (vph)	180	1325	83	227	1732	107	186	227	112	232	242	101
Heavy Vehicles (%)	0%	2%	0%	0%	2%	4%	0%	1%	2%	1%	1%	2%
Turn Type	Prot	NA	pm+ov	Prot	NA	Perm	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	1	6	7	5	2		7	4	5	3	8	1
Permitted Phases			6			2	4		4	8		8
Actuated Green, G (s)	7.1	75.4	86.4	17.6	85.9	85.9	35.0	24.0	41.6	27.0	20.0	27.1
Effective Green, g (s)	10.1	78.4	86.4	20.6	88.9	85.9	37.0	25.0	41.6	31.0	21.0	33.1
Actuated g/C Ratio	0.07	0.52	0.58	0.14	0.59	0.57	0.25	0.17	0.28	0.21	0.14	0.22
Clearance Time (s)	6.0	6.0	7.0	6.0	6.0	6.0	7.0	7.0	6.0	7.0	7.0	6.0
Vehicle Extension (s)	5.5	8.0	2.0	5.5	8.0	8.0	2.0	2.0	5.5	2.0	2.0	5.5
Lane Grp Cap (vph)	229	1803	907	468	2045	867	188	567	418	270	258	342
v/s Ratio Prot	0.05	c0.38	0.01	0.07	c0.50		c0.08	0.07	0.03	0.05	0.13	0.02
v/s Ratio Perm			0.05			0.07	c0.16		0.04	0.13		0.04
v/c Ratio	0.79	0.73	0.09	0.49	0.85	0.12	0.99	0.40	0.27	0.86	0.94	0.29
Uniform Delay, d1	68.9	27.7	14.2	59.8	25.0	14.7	51.1	55.8	42.3	55.7	63.9	48.7
Progression Factor	0.84	0.62	0.12	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	18.1	2.6	0.0	1.9	4.6	0.3	61.8	0.2	0.9	22.0	38.7	1.2
Delay (s)	76.0	19.8	1.8	61.7	29.6	15.0	112.9	56.0	43.2	77.7	102.5	49.9
Level of Service	E	B	A	E	C	B	F	E	D	E	F	D
Approach Delay (s)		24.3			31.9			69.2			78.8	
Approach LOS		C			C			E			E	

Intersection Summary

HCM 2000 Control Delay	40.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	90.4%	ICU Level of Service	E
Analysis Period (min)	15		
Description: Signal Permit No. TS-152-10			
Date Issued: 6-4-99			
c Critical Lane Group			

SR 228 Widening Project
 Future Year 2045 Build w/ Supplemental (SAT)

Queues
 230: Castle Creek Dr (West)/High Pointe Dr & SR 228



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	85	1460	165	70	1785	30	235	65	65	30	30	70
Future Volume (vph)	85	1460	165	70	1785	30	235	65	65	30	30	70
Confl. Peds. (#/hr)			1						1			
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	1%	2%	0%	2%	0%	1%	0%	0%	0%	0%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	88	1505	170	72	1840	31	242	134	0	31	31	72
v/c Ratio	0.42	0.84	0.20	0.33	1.01	0.04	0.84	0.34		0.12	0.08	0.17
Control Delay	17.6	24.7	2.5	14.5	38.8	0.1	62.2	22.1		30.5	29.3	2.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	17.6	24.7	2.5	14.5	38.8	0.1	62.2	22.1		30.5	29.3	2.2
Queue Length 50th (ft)	18	431	0	6	~725	0	144	44		15	15	0
Queue Length 95th (ft)	58	#572	30	m12	#869	m0	#272	96		40	39	10
Internal Link Dist (ft)		2444			1855			844			941	
Turn Bay Length (ft)	250		400	250		175	100			100		100
Base Capacity (vph)	212	1794	851	216	1817	880	304	419		271	428	443
Starvation Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.42	0.84	0.20	0.33	1.01	0.04	0.80	0.32		0.11	0.07	0.16

Intersection Summary

Description: Signal Permit No. TS-113-10

Date Issued: 3/24/95

Date Revised: 9/17/02

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

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

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

SR 228 Widening Project
 Future Year 2045 Build w/ Supplemental (SAT)

HCM Signalized Intersection Capacity Analysis
 230: Castle Creek Dr (West)/High Pointe Dr & SR 228



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↑↑	↗	↘	↑↑	↗	↘	↗		↘	↑	↗
Traffic Volume (vph)	85	1460	165	70	1785	30	235	65	65	30	30	70
Future Volume (vph)	85	1460	165	70	1785	30	235	65	65	30	30	70
Ideal Flow (vphpl)	1650	1650	1650	1714	1714	1714	1650	1650	1650	1650	1650	1650
Grade (%)		-2%			1%			-1%			-6%	
Total Lost time (s)	3.7	3.7	3.7	4.1	3.7	3.7	4.8	4.8		4.8	4.8	4.8
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	0.98	1.00	1.00	1.00	1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	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	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1552	3135	1360	1620	3177	1450	1560	1524		1615	1700	1402
Flt Permitted	0.07	1.00	1.00	0.08	1.00	1.00	0.74	1.00		0.63	1.00	1.00
Satd. Flow (perm)	117	3135	1360	129	3177	1450	1210	1524		1077	1700	1402
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)	88	1505	170	72	1840	31	242	67	67	31	31	72
RTOR Reduction (vph)	0	0	75	0	0	14	0	37	0	0	0	55
Lane Group Flow (vph)	88	1505	95	72	1840	17	242	97	0	31	31	17
Confl. Peds. (#/hr)			1						1			
Heavy Vehicles (%)	2%	1%	2%	0%	2%	0%	1%	0%	0%	0%	0%	3%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6		6	2		2	4			8		8
Actuated Green, G (s)	57.4	52.5	52.5	57.4	52.5	52.5	21.6	21.6		21.6	21.6	21.6
Effective Green, g (s)	64.0	55.8	55.8	63.2	55.8	55.8	23.8	23.8		23.8	23.8	23.8
Actuated g/C Ratio	0.64	0.56	0.56	0.63	0.56	0.56	0.24	0.24		0.24	0.24	0.24
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0		7.0	7.0	7.0
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0	6.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	192	1749	758	197	1772	809	287	362		256	404	333
v/s Ratio Prot	c0.04	0.48		0.03	c0.58			0.06			0.02	
v/s Ratio Perm	0.25		0.07	0.20		0.01	c0.20			0.03		0.01
v/c Ratio	0.46	0.86	0.13	0.37	1.04	0.02	0.84	0.27		0.12	0.08	0.05
Uniform Delay, d1	19.7	18.8	10.5	13.5	22.1	9.9	36.3	31.0		29.9	29.6	29.4
Progression Factor	1.00	1.00	1.00	1.44	0.74	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.7	5.8	0.3	0.7	27.4	0.0	19.6	0.4		0.2	0.1	0.1
Delay (s)	21.4	24.6	10.8	20.1	43.9	9.9	56.0	31.4		30.1	29.7	29.5
Level of Service	C	C	B	C	D	A	E	C		C	C	C
Approach Delay (s)		23.1			42.5			47.2			29.7	
Approach LOS		C			D			D			C	

Intersection Summary

HCM 2000 Control Delay	34.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.6
Intersection Capacity Utilization	93.9%	ICU Level of Service	F
Analysis Period (min)	15		
Description: Signal Permit No. TS-113-10			
Date Issued: 3/24/95			
Date Revised: 9/17/02			

c Critical Lane Group

SR 228 Widening Project
 Future Year 2045 Build w/ Supplemental (SAT)

Queues
 235: Castle Creek Dr (East)/High Pointe Dr & SR 228



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	135	1490	20	65	1795	45	20	40	105	55	40	70
Future Volume (vph)	135	1490	20	65	1795	45	20	40	105	55	40	70
Confl. Peds. (#/hr)									1			1
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	0%	0%	0%	0%	0%	2%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	139	1557	0	67	1851	46	21	149	0	57	41	72
v/c Ratio	0.54	0.67		0.23	0.82	0.04	0.13	0.51		0.53	0.18	0.26
Control Delay	30.8	11.3		6.0	13.8	1.2	37.4	19.2		56.2	38.0	6.1
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0
Total Delay	30.8	11.3		6.0	13.8	1.2	37.4	19.2		56.2	38.0	6.1
Queue Length 50th (ft)	39	485		8	178	0	12	24		34	24	0
Queue Length 95th (ft)	m44	624		m20	#733	m1	32	78		72	52	22
Internal Link Dist (ft)		1855			716			860			573	
Turn Bay Length (ft)	275			175		250	100			100		100
Base Capacity (vph)	276	2309		335	2256	1065	264	404		176	370	380
Starvation Cap Reductn	0	0		0	8	0	0	0		0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	0
Reduced v/c Ratio	0.50	0.67		0.20	0.82	0.04	0.08	0.37		0.32	0.11	0.19

Intersection Summary

Description: Signal Permit No. TS-080-10

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

Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

SR 228 Widening Project
 Future Year 2045 Build w/ Supplemental (SAT)

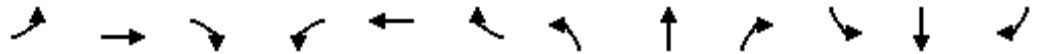
HCM Signalized Intersection Capacity Analysis
 235: Castle Creek Dr (East)/High Pointe Dr & SR 228

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	135	1490	20	65	1795	45	20	40	105	55	40	70
Future Volume (vph)	135	1490	20	65	1795	45	20	40	105	55	40	70
Ideal Flow (vphpl)	1803	1803	1803	1908	1908	1908	1650	1650	1650	1650	1650	1650
Grade (%)		0%			0%			0%			-4%	
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	0.99		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	1.00
Frft	1.00	1.00		1.00	1.00	0.85	1.00	0.89		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1713	3385		1813	3554	1622	1568	1456		1599	1683	1383
Flt Permitted	0.06	1.00		0.11	1.00	1.00	0.73	1.00		0.48	1.00	1.00
Satd. Flow (perm)	108	3385		214	3554	1622	1205	1456		803	1683	1383
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)	139	1536	21	67	1851	46	21	41	108	57	41	72
RTOR Reduction (vph)	0	1	0	0	0	17	0	93	0	0	0	62
Lane Group Flow (vph)	139	1556	0	67	1851	29	21	56	0	57	41	10
Confl. Peds. (#/hr)									1			1
Heavy Vehicles (%)	0%	1%	0%	0%	2%	0%	0%	0%	0%	0%	0%	2%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6			2		2	4			8		8
Actuated Green, G (s)	74.0	65.0		66.8	61.4	61.4	11.6	11.6		11.6	11.6	11.6
Effective Green, g (s)	78.0	67.0		70.8	63.4	63.4	13.6	13.6		13.6	13.6	13.6
Actuated g/C Ratio	0.78	0.67		0.71	0.63	0.63	0.14	0.14		0.14	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	6.0
Vehicle Extension (s)	3.0	6.0		3.0	6.0	6.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	260	2267		269	2253	1028	163	198		109	228	188
v/s Ratio Prot	c0.06	0.46		0.02	c0.52			0.04			0.02	
v/s Ratio Perm	0.36			0.16		0.02	0.02			c0.07		0.01
v/c Ratio	0.53	0.69		0.25	0.82	0.03	0.13	0.28		0.52	0.18	0.05
Uniform Delay, d1	22.5	10.1		7.0	14.0	6.8	38.0	38.8		40.2	38.3	37.6
Progression Factor	1.67	0.91		1.30	0.68	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.3	1.1		0.3	2.3	0.0	0.4	0.8		4.5	0.4	0.1
Delay (s)	38.9	10.2		9.4	11.9	6.9	38.3	39.6		44.7	38.6	37.7
Level of Service	D	B		A	B	A	D	D		D	D	D
Approach Delay (s)		12.6			11.7			39.4			40.3	
Approach LOS		B			B			D			D	

Intersection Summary		
HCM 2000 Control Delay	14.4	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.74	B
Actuated Cycle Length (s)	100.0	Sum of lost time (s)
Intersection Capacity Utilization	84.7%	12.0
Analysis Period (min)	15	ICU Level of Service
Description: Signal Permit No. TS-080-10		E
c Critical Lane Group		

SR 228 Widening Project
 Future Year 2045 Build w/ Supplemental (SAT)

Queues
 240: Seven Fields Blvd & SR 228



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	125	1310	95	10	1610	210	75	35	15	175	25	160
Future Volume (vph)	125	1310	95	10	1610	210	75	35	15	175	25	160
Confl. Peds. (#/hr)												2
Confl. Bikes (#/hr)												
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	0%	0%	2%	0%	0%	0%	0%	1%	0%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	129	1351	98	10	1660	216	77	36	15	180	26	165
v/c Ratio	0.51	0.58	0.09	0.03	0.84	0.22	0.29	0.10	0.04	0.70	0.07	0.41
Control Delay	37.5	3.1	0.8	7.5	27.2	4.6	35.5	31.2	0.2	51.1	30.7	8.4
Queue Delay	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.5	3.1	0.8	7.5	27.7	4.6	35.5	31.2	0.2	51.1	30.7	8.4
Queue Length 50th (ft)	44	35	0	2	573	15	42	19	0	106	13	0
Queue Length 95th (ft)	m95	94	m2	m4	#673	m39	80	44	0	173	34	52
Internal Link Dist (ft)		716			569			530				572
Turn Bay Length (ft)	330		330	150		400	115		100	150		
Base Capacity (vph)	268	2322	1048	372	1975	991	324	438	422	320	440	467
Starvation Cap Reductn	0	0	0	0	45	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	73	0	0	0	0	0	0	3
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.58	0.09	0.03	0.87	0.22	0.24	0.08	0.04	0.56	0.06	0.36

Intersection Summary

Description: Signal Permit No. TS-221-10

Date Issued: 12-15-07

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

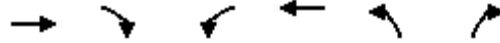
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

SR 228 Widening Project
 Future Year 2045 Build w/ Supplemental (SAT)

HCM Signalized Intersection Capacity Analysis
 240: Seven Fields Blvd & SR 228

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	125	1310	95	10	1610	210	75	35	15	175	25	160	
Future Volume (vph)	125	1310	95	10	1610	210	75	35	15	175	25	160	
Ideal Flow (vphpl)	1794	1794	1794	1794	1794	1794	1794	1794	1794	1794	1794	1794	
Grade (%)		2%			-2%			2%				1%	
Total Lost time (s)	3.1	3.1	6.0	3.1	3.1	3.1	4.3	4.3	6.0	4.3	4.3	6.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	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	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1654	3308	1510	1721	3375	1540	1687	1776	1510	1679	1785	1479	
Flt Permitted	0.06	1.00	1.00	0.16	1.00	1.00	0.74	1.00	1.00	0.73	1.00	1.00	
Satd. Flow (perm)	113	3308	1510	287	3375	1540	1315	1776	1510	1297	1785	1479	
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)	129	1351	98	10	1660	216	77	36	15	180	26	165	
RTOR Reduction (vph)	0	0	37	0	0	90	0	0	12	0	0	135	
Lane Group Flow (vph)	129	1351	61	10	1660	126	77	36	3	180	26	30	
Confl. Peds. (#/hr)												2	
Heavy Vehicles (%)	2%	2%	0%	0%	2%	0%	0%	0%	0%	1%	0%	1%	
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	
Protected Phases	1	6		5	2			4			8		
Permitted Phases	6		6	2		2	4		4	8		8	
Actuated Green, G (s)	69.7	62.5	62.5	56.8	55.6	55.6	18.3	18.3	18.3	18.3	18.3	18.3	
Effective Green, g (s)	72.6	65.4	62.5	62.6	58.5	58.5	20.0	20.0	18.3	20.0	20.0	18.3	
Actuated g/C Ratio	0.73	0.65	0.62	0.63	0.58	0.58	0.20	0.20	0.18	0.20	0.20	0.18	
Clearance Time (s)	6.0	6.0	6.0	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	6.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	251	2163	943	238	1974	900	263	355	276	259	357	270	
v/s Ratio Prot	c0.06	0.41		0.00	c0.49			0.02			0.01		
v/s Ratio Perm	0.32		0.04	0.02		0.08	0.06		0.00	c0.14		0.02	
v/c Ratio	0.51	0.62	0.06	0.04	0.84	0.14	0.29	0.10	0.01	0.69	0.07	0.11	
Uniform Delay, d1	19.3	10.1	7.3	7.8	16.9	9.4	34.0	32.7	33.4	37.2	32.5	34.1	
Progression Factor	2.18	0.25	0.29	1.42	1.28	2.42	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.4	1.0	0.1	0.1	3.4	0.2	0.6	0.1	0.0	7.8	0.1	0.2	
Delay (s)	43.4	3.6	2.2	11.2	25.0	23.0	34.6	32.8	33.4	45.0	32.6	34.3	
Level of Service	D	A	A	B	C	C	C	C	C	D	C	C	
Approach Delay (s)		6.7			24.7			34.0			39.4		
Approach LOS		A			C			C			D		
Intersection Summary													
HCM 2000 Control Delay			19.2									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.77										
Actuated Cycle Length (s)			100.0									Sum of lost time (s)	10.5
Intersection Capacity Utilization			81.7%									ICU Level of Service	D
Analysis Period (min)			15										
Description: Signal Permit No. TS-221-10													
Date Issued: 12-15-07													
c Critical Lane Group													



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Traffic Volume (vph)	1165	290	160	1445	335	140
Future Volume (vph)	1165	290	160	1445	335	140
Confl. Peds. (#/hr)		1				
Confl. Bikes (#/hr)						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	11%	14%	15%	8%	1%	1%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)	0%			0%	0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	1201	299	165	1490	345	144
v/c Ratio	0.74	0.39	0.61	0.68	0.80	0.23
Control Delay	17.3	2.0	24.8	10.1	50.4	15.4
Queue Delay	0.0	0.0	0.0	0.3	0.0	0.0
Total Delay	17.3	2.0	24.8	10.3	50.4	15.4
Queue Length 50th (ft)	403	11	58	211	202	41
Queue Length 95th (ft)	353	19	m71	m235	303	84
Internal Link Dist (ft)	569			1661	173	
Turn Bay Length (ft)		400	425			100
Base Capacity (vph)	1616	761	278	2190	475	602
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	189	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.74	0.39	0.59	0.74	0.73	0.24

Intersection Summary

Description: Signal Permit No. TS-120-10

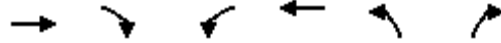
Date Issued: 8-29-96

Date Revised: 9-19-03

m Volume for 95th percentile queue is metered by upstream signal.

SR 228 Widening Project
 Future Year 2045 Build w/ Supplemental (SAT)

HCM Signalized Intersection Capacity Analysis
 245: Adams Ridge Blvd & SR 228



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑	↑	↑↑	↑	↑
Traffic Volume (vph)	1165	290	160	1445	335	140
Future Volume (vph)	1165	290	160	1445	335	140
Ideal Flow (vphpl)	1803	1803	1803	1803	1803	1803
Lane Width	12	10	12	12	15	16
Grade (%)	2%			-2%	4%	
Total Lost time (s)	4.0	7.0	5.0	4.0	4.0	7.0
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3055	1227	1504	3204	1828	1685
Flt Permitted	1.00	1.00	0.13	1.00	0.95	1.00
Satd. Flow (perm)	3055	1227	198	3204	1828	1685
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1201	299	165	1490	345	144
RTOR Reduction (vph)	0	150	0	0	0	30
Lane Group Flow (vph)	1201	149	165	1490	345	114
Confl. Peds. (#/hr)		1				
Heavy Vehicles (%)	11%	14%	15%	8%	1%	1%
Turn Type	NA	Perm	pm+pt	NA	Prot	pm+ov
Protected Phases	6		5	2	4	5
Permitted Phases		6	2		4	4
Actuated Green, G (s)	49.9	49.9	65.4	65.4	21.6	30.1
Effective Green, g (s)	52.9	49.9	67.4	68.4	23.6	30.1
Actuated g/C Ratio	0.53	0.50	0.67	0.68	0.24	0.30
Clearance Time (s)	7.0	7.0	7.0	7.0	6.0	7.0
Vehicle Extension (s)	6.3	6.3	3.0	6.3	2.5	3.0
Lane Grp Cap (vph)	1616	612	270	2191	431	507
v/s Ratio Prot	c0.39		0.06	c0.47	c0.19	0.02
v/s Ratio Perm		0.12	0.35			0.05
v/c Ratio	0.74	0.24	0.61	0.68	0.80	0.22
Uniform Delay, d1	18.3	14.3	12.3	9.3	36.0	26.2
Progression Factor	0.75	0.39	2.02	0.92	1.00	1.00
Incremental Delay, d2	2.6	0.8	1.9	0.8	10.0	0.2
Delay (s)	16.4	6.4	26.7	9.3	45.9	26.4
Level of Service	B	A	C	A	D	C
Approach Delay (s)	14.4			11.1	40.2	
Approach LOS	B			B	D	

Intersection Summary			
HCM 2000 Control Delay	16.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	73.7%	ICU Level of Service	D
Analysis Period (min)	15		
Description: Signal Permit No. TS-120-10			
Date Issued: 8-29-96			

Date Revised: 9-19-03
c Critical Lane Group

SR 228 Widening Project
 Future Year 2045 Build w/ Supplemental (SAT)

Queues
 250: SR 228 & Myoma Rd
























Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	65	1135	90	240	1400	55	220	70	145	10	75	60
Future Volume (vph)	65	1135	90	240	1400	55	220	70	145	10	75	60
Confl. Peds. (#/hr)												
Confl. Bikes (#/hr)												
Peak Hour Factor	0.92	0.92	0.97	0.97	0.92	0.92	0.97	0.97	0.97	0.92	0.97	0.92
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	1%	9%	2%	2%	7%	7%	2%	2%	2%	0%	0%	7%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%				0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	71	1327	0	247	1522	60	227	221	0	11	142	0
v/c Ratio	0.53	0.92		0.89	0.91	0.07	0.88	0.52		0.05	0.37	
Control Delay	43.9	24.0		74.2	19.6	0.2	70.1	22.8		30.2	25.7	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	43.9	24.0		74.2	19.6	0.2	70.1	22.8		30.2	25.7	
Queue Length 50th (ft)	38	107		134	~436	0	137	65		5	53	
Queue Length 95th (ft)	m59	#561		m#249	#655	m1	#263	138		20	108	
Internal Link Dist (ft)		1661			2872			328			1347	
Turn Bay Length (ft)	250			300		150				150		
Base Capacity (vph)	138	1447		278	1674	812	282	455		232	420	
Starvation Cap Reductn	0	0		0	0	0	0	0		0	0	
Spillback Cap Reductn	0	0		0	0	0	0	0		0	0	
Storage Cap Reductn	0	0		0	0	0	0	0		0	0	
Reduced v/c Ratio	0.51	0.92		0.89	0.91	0.07	0.80	0.49		0.05	0.34	

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

SR 228 Widening Project
 Future Year 2045 Build w/ Supplemental (SAT)

HCM Signalized Intersection Capacity Analysis
 250: SR 228 & Myoma Rd

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	65	1135	90	240	1400	55	220	70	145	10	75	60
Future Volume (vph)	65	1135	90	240	1400	55	220	70	145	10	75	60
Ideal Flow (vphpl)	2100	2100	1803	1803	1803	1803	1803	1803	1803	1803	1803	1803
Grade (%)		0%			-2%			0%			0%	
Total Lost time (s)	7.0	7.0		7.0	7.0	7.0	8.0	8.0		8.0	8.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.90		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1975	3638		1696	3234	1447	1679	1589		1713	1627	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.67	1.00		0.54	1.00	
Satd. Flow (perm)	1975	3638		1696	3234	1447	1178	1589		970	1627	
Peak-hour factor, PHF	0.92	0.92	0.97	0.97	0.92	0.92	0.97	0.97	0.97	0.92	0.97	0.92
Adj. Flow (vph)	71	1234	93	247	1522	60	227	72	149	11	77	65
RTOR Reduction (vph)	0	5	0	0	0	30	0	76	0	0	31	0
Lane Group Flow (vph)	71	1322	0	247	1522	30	227	145	0	11	111	0
Heavy Vehicles (%)	1%	9%	2%	2%	7%	7%	2%	2%	2%	0%	0%	7%
Turn Type	Prot	NA		Prot	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	1	6		5	2			4			8	
Permitted Phases						2	4			8		
Actuated Green, G (s)	5.6	39.7		16.3	50.4	50.4	22.0	22.0		22.0	22.0	
Effective Green, g (s)	5.6	39.7		16.3	50.4	50.4	22.0	22.0		22.0	22.0	
Actuated g/C Ratio	0.06	0.40		0.16	0.50	0.50	0.22	0.22		0.22	0.22	
Clearance Time (s)	7.0	7.0		7.0	7.0	7.0	8.0	8.0		8.0	8.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	110	1444		276	1629	729	259	349		213	357	
v/s Ratio Prot	0.04	c0.36		0.15	c0.47			0.09			0.07	
v/s Ratio Perm						0.02	c0.19			0.01		
v/c Ratio	0.65	0.92		0.89	0.93	0.04	0.88	0.41		0.05	0.31	
Uniform Delay, d1	46.2	28.6		41.0	23.2	12.6	37.7	33.5		30.8	32.6	
Progression Factor	0.72	0.48		1.19	0.46	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.3	8.2		21.6	8.4	0.1	26.5	0.8		0.1	0.5	
Delay (s)	42.7	22.0		70.3	19.1	12.6	64.1	34.3		30.9	33.1	
Level of Service	D	C		E	B	B	E	C		C	C	
Approach Delay (s)		23.1			25.8			49.4			33.0	
Approach LOS		C			C			D			C	
Intersection Summary												
HCM 2000 Control Delay			27.8									C
HCM 2000 Volume to Capacity ratio			0.96									
Actuated Cycle Length (s)			100.0							22.0		
Intersection Capacity Utilization			90.9%									E
Analysis Period (min)			15									

c Critical Lane Group

SR 228 Widening Project
 Future Year 2045 Build w/ Supplemental (SAT)

Queues
 255: Heritage Creek Dr & SR 228



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	55	1065	190	140	1485	115	155	10	115	140	10	50
Future Volume (vph)	55	1065	190	140	1485	115	155	10	115	140	10	50
Confl. Peds. (#/hr)						1						
Confl. Bikes (#/hr)												
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Growth Factor	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	2%	2%	2%	4%	2%	0%	2%	0%	0%	1%	0%	3%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Parking (#/hr)												
Mid-Block Traffic (%)		0%			0%			0%			0%	
Shared Lane Traffic (%)												
Lane Group Flow (vph)	59	1133	202	149	1580	122	165	11	122	149	11	53
v/c Ratio	0.30	0.71	0.25	0.45	0.77	0.12	0.49	0.09	0.31	0.52	0.09	0.15
Control Delay	20.3	5.0	0.4	13.8	9.3	0.3	47.7	43.2	9.9	50.0	43.1	0.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.3	5.0	0.4	13.8	9.3	0.3	47.7	43.2	9.9	50.0	43.1	0.9
Queue Length 50th (ft)	4	21	0	15	93	0	52	7	7	47	7	0
Queue Length 95th (ft)	m10	m33	m0	m41	144	m1	87	24	51	79	24	2
Internal Link Dist (ft)		2872			2325			970			1182	
Turn Bay Length (ft)	200		400	325		425	100		100	240		100
Base Capacity (vph)	217	1591	807	338	2052	994	340	157	366	294	161	334
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.71	0.25	0.44	0.77	0.12	0.49	0.07	0.33	0.51	0.07	0.16

Intersection Summary

Description: Signal Permit No. TS-185-10

























Date Issued: 2-26-2003

Date Revised: 3-10-2008

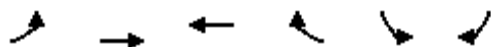
m Volume for 95th percentile queue is metered by upstream signal.

SR 228 Widening Project
 Future Year 2045 Build w/ Supplemental (SAT)

HCM Signalized Intersection Capacity Analysis
 255: Heritage Creek Dr & SR 228

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	55	1065	190	140	1485	115	155	10	115	140	10	50
Future Volume (vph)	55	1065	190	140	1485	115	155	10	115	140	10	50
Ideal Flow (vphpl)	1662	1662	1662	1914	1914	1914	1662	1662	1662	1662	1662	1662
Lane Width	12	12	12	12	12	12	11	11	11	12	12	12
Grade (%)		5%			-5%			4%			6%	
Total Lost time (s)	4.9	4.9	4.9	4.9	4.9	4.9	5.0	5.0	4.9	5.0	5.0	4.9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	1.00	1.00	0.97	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	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	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1509	3018	1350	1792	3654	1633	2845	1574	1338	2942	1612	1330
Flt Permitted	0.08	1.00	1.00	0.15	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	124	3018	1350	285	3654	1633	2845	1574	1338	2942	1612	1330
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)	59	1133	202	149	1580	122	165	11	122	149	11	53
RTOR Reduction (vph)	0	0	98	0	0	57	0	0	87	0	0	45
Lane Group Flow (vph)	59	1133	104	149	1580	65	165	11	35	149	11	8
Confl. Peds. (#/hr)						1						
Heavy Vehicles (%)	2%	2%	2%	4%	2%	0%	2%	0%	0%	1%	0%	3%
Turn Type	pm+pt	NA	Perm	pm+pt	NA	Perm	Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	1	6		5	2		7	4	5	3	8	1
Permitted Phases	6		6	2		2			4			8
Actuated Green, G (s)	55.0	49.3	49.3	59.2	51.4	51.4	11.0	8.2	16.0	8.7	5.9	11.6
Effective Green, g (s)	59.2	51.4	51.4	63.4	53.5	53.5	12.0	9.2	20.2	9.7	6.9	15.8
Actuated g/C Ratio	0.59	0.51	0.51	0.63	0.54	0.54	0.12	0.09	0.20	0.10	0.07	0.16
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	6.0	6.0	7.0	6.0	6.0	7.0
Vehicle Extension (s)	3.0	4.8	4.8	3.0	4.8	4.8	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	181	1551	693	329	1954	873	341	144	270	285	111	210
v/s Ratio Prot	0.03	0.38		c0.04	c0.43		c0.06	0.01	c0.01	0.05	0.01	0.00
v/s Ratio Perm	0.17		0.08	0.24		0.04			0.01			0.00
v/c Ratio	0.33	0.73	0.15	0.45	0.81	0.07	0.48	0.08	0.13	0.52	0.10	0.04
Uniform Delay, d1	15.2	18.9	12.8	10.6	19.1	11.3	41.1	41.5	32.7	42.9	43.6	35.7
Progression Factor	2.48	0.19	0.00	1.66	0.38	0.24	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	1.5	0.2	0.6	2.5	0.1	1.1	0.2	0.2	1.7	0.4	0.1
Delay (s)	38.2	5.1	0.2	18.3	9.7	2.8	42.2	41.7	32.9	44.7	44.0	35.8
Level of Service	D	A	A	B	A	A	D	D	C	D	D	D
Approach Delay (s)		5.8			9.9			38.4			42.4	
Approach LOS		A			A			D			D	
Intersection Summary												
HCM 2000 Control Delay			12.5				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			100.0				Sum of lost time (s)		19.8			
Intersection Capacity Utilization			68.3%				ICU Level of Service		C			
Analysis Period (min)			15									
Description: Signal Permit No. TS-185-10												
Date Issued: 2-26-2003												

Date Revised: 3-10-2008
c Critical Lane Group



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Traffic Volume (vph)	135	1190	1590	25	5	155
Future Volume (vph)	135	1190	1590	25	5	155
Confl. Peds. (#/hr)						
Confl. Bikes (#/hr)						
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Growth Factor	100%	100%	100%	100%	100%	100%
Heavy Vehicles (%)	1%	1%	2%	0%	0%	0%
Bus Blockages (#/hr)	0	0	0	0	0	0
Parking (#/hr)						
Mid-Block Traffic (%)		0%	0%		0%	
Shared Lane Traffic (%)						
Lane Group Flow (vph)	139	1227	1639	26	5	160
v/c Ratio	0.56	0.44	0.81	0.03	0.03	0.34
Control Delay	34.8	1.1	22.3	4.4	41.2	27.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.8	1.1	22.3	4.4	41.2	27.2
Queue Length 50th (ft)	35	13	411	0	3	74
Queue Length 95th (ft)	m71	26	570	13	14	123
Internal Link Dist (ft)		899	1370		1317	
Turn Bay Length (ft)	345			295	75	
Base Capacity (vph)	388	2819	2032	938	171	450
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	0.36	0.44	0.81	0.03	0.03	0.36

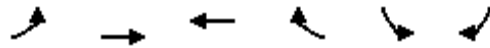
Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

SR 228 Widening Project
 Future Year 2045 Build w/ Supplemental (SAT)

HCM Signalized Intersection Capacity Analysis

265: SR 228 & Beaver St Ext



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↑↑	↑↑	↗	↖	↗
Traffic Volume (vph)	135	1190	1590	25	5	155
Future Volume (vph)	135	1190	1590	25	5	155
Ideal Flow (vphpl)	2100	2100	1900	1900	1803	1803
Grade (%)		0%	-5%		0%	
Total Lost time (s)	7.0	7.0	7.0	7.0	12.0	7.0
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1975	3950	3628	1655	1713	1533
Flt Permitted	0.06	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	132	3950	3628	1655	1713	1533
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	139	1227	1639	26	5	160
RTOR Reduction (vph)	0	0	0	11	0	8
Lane Group Flow (vph)	139	1227	1639	15	5	152
Heavy Vehicles (%)	1%	1%	2%	0%	0%	0%
Turn Type	pm+pt	NA	NA	Perm	Prot	pm+ov
Protected Phases	1	6	2		8	1
Permitted Phases	6			2		8
Actuated Green, G (s)	71.4	71.4	56.0	56.0	9.6	18.0
Effective Green, g (s)	71.4	71.4	56.0	56.0	9.6	18.0
Actuated g/C Ratio	0.71	0.71	0.56	0.56	0.10	0.18
Clearance Time (s)	7.0	7.0	7.0	7.0	12.0	7.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	249	2820	2031	926	164	275
v/s Ratio Prot	0.05	c0.31	c0.45		0.00	c0.05
v/s Ratio Perm	0.35			0.01		0.05
v/c Ratio	0.56	0.44	0.81	0.02	0.03	0.55
Uniform Delay, d1	18.5	5.9	17.7	9.8	41.0	37.3
Progression Factor	2.16	0.11	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.0	0.4	3.6	0.0	0.1	2.4
Delay (s)	42.0	1.0	21.2	9.8	41.1	39.7
Level of Service	D	A	C	A	D	D
Approach Delay (s)		5.2	21.0		39.8	
Approach LOS		A	C		D	

Intersection Summary

HCM 2000 Control Delay	15.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	26.0
Intersection Capacity Utilization	75.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group