Appendix M

Other Planned Roadway Improvements By Other Cumulative Projects

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO	TOTAL SHEETS
11	SD	76	R28.0-31.9	1	122

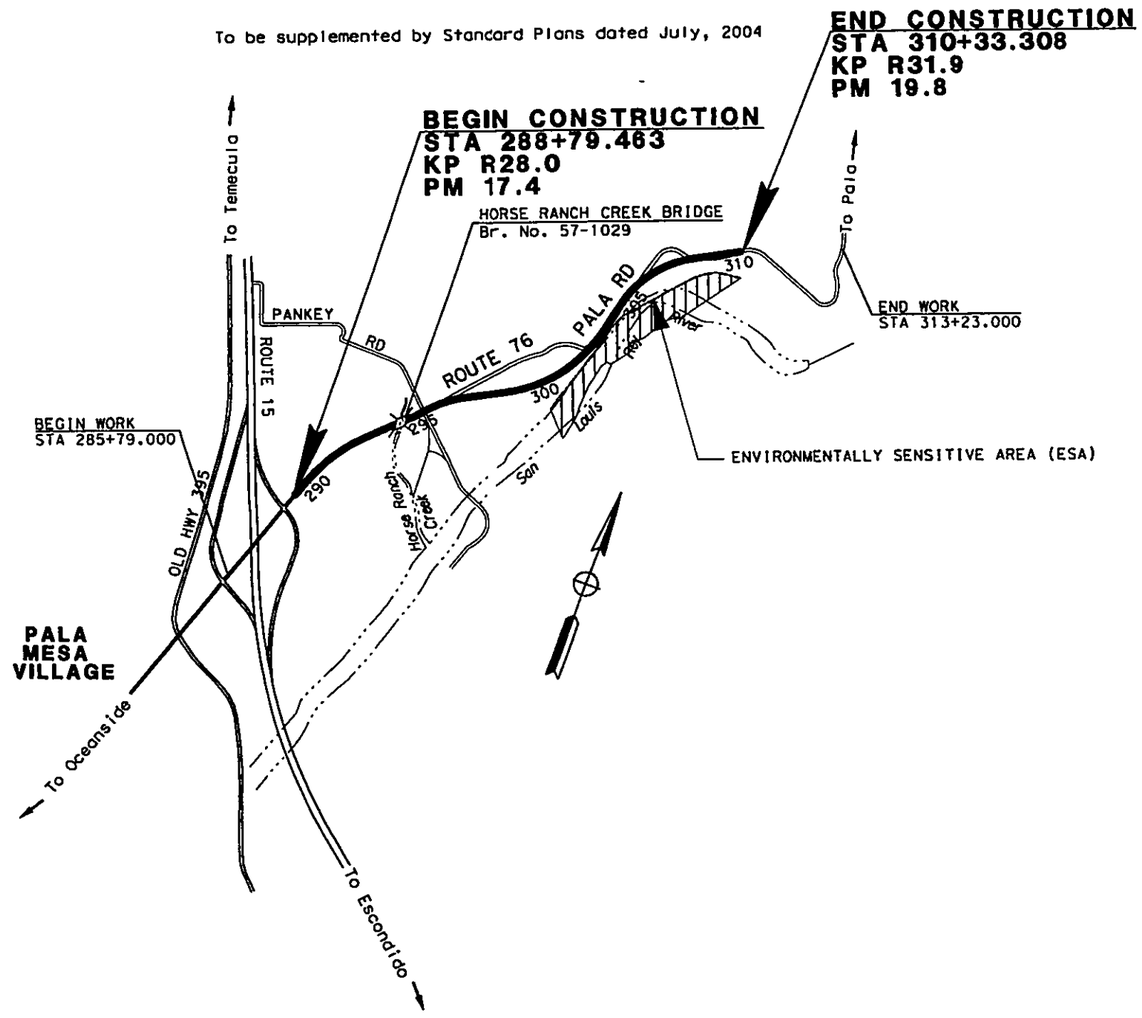
INDEX OF SHEETS

001	TITLE
002-008	TYPICAL CROSS SECTIONS
009	KEY MAP AND LINE INDEX
010-016	LAYOUT
017-023	PROFILE AND SUPERELEVATION DIAGRAM
024-028	CONSTRUCTION DETAILS
029-035	TEMPORARY WATER POLLUTION CONTROL
036-039	TEMPORARY WATER POLLUTION CONTROL DETAILS
040	TEMPORARY WATER POLLUTION CONTROL QUANTITIES
041-047	CONTOUR GRADING
048-054	DRAINAGE PLAN
055-058	DRAINAGE PROFILES
059-065	DRAINAGE DETAILS
066-068	DRAINAGE QUANTITIES
069-077	UTILITY PLAN
078-094	STAGE CONSTRUCTION AND TRAFFIC HANDLING
095-096	STAGE CONSTRUCTION QUANTITIES
097-103	PAVEMENT DELINEATION
104	PAVEMENT DELINEATION QUANTITIES
105	SUMMARY OF QUANTITIES
106-112	SIGN PLAN
113	SIGN QUANTITIES
114-120	PLANTING & IRRIGATION PLANS
121-122	SIGNAL, LIGHTING AND ELECTRICAL PLAN
	HORSE RANCH CREEK BRIDGE NO. 57-1029

PROJECT PLANS FOR CONSTRUCTION ON
STATE HIGHWAY

IN SAN DIEGO COUNTY
ON ROUTE 76 FROM INTERSTATE 15
TO 2.2 km EAST

To be supplemented by Standard Plans dated July, 2004



Project Engineer Date
Registered Civil Engineer

Plans Approval Date

REGISTERED PROFESSIONAL ENGINEER
HADI SAMII
No. 46173
Exp. 12/31/06
CIVIL
STATE OF CALIFORNIA

URS CORPORATION
1615 MURRAY CANYON RD,
SUITE 1000
SAN DIEGO, CA 92108

Contract No.

The Contractor shall possess the Class (or classes) of license as specified in the ''Notice to Contractors''.

NO SCALE

PROJECT ENGINEER | DATE | PROJECT MANAGER | DATE

RELATIVE BORDER SCALE 0 20 40 60 80

CU 00000 | EA 231501

Meadowood (TM 5354) Traffic Study Appendix

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO	TOTAL SHEETS
11	SD	76	R28.0-31.9	9	122

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Hadi Samii No. 46173 Exp. 12/31/06 CIVIL STATE OF CALIFORNIA

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San Diego, CA 92108

DATE	REVISION No.	DATE REVISED

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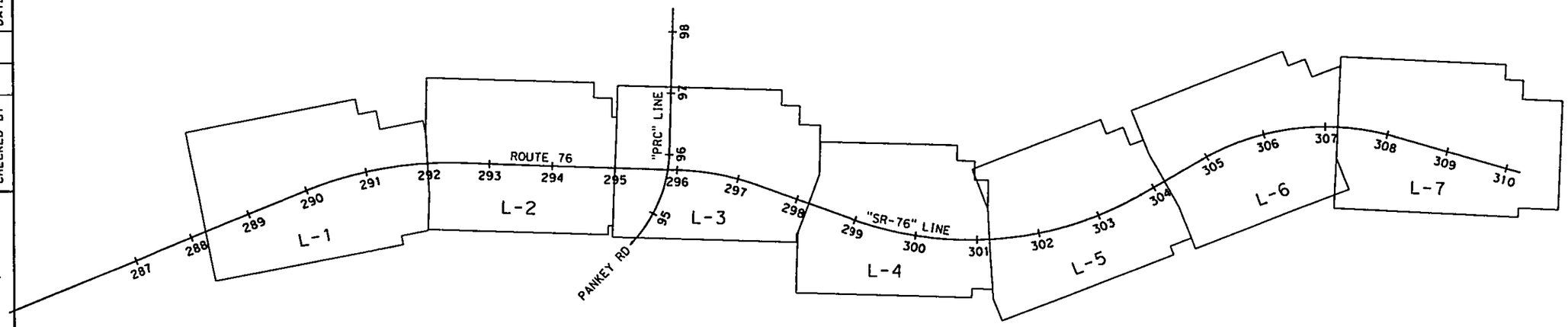

LINE INDEX

LINE	DESCRIPTION
"SR-76"	℄ ROUTE 76
"PRC"	℄ PANKEY ROAD CONSTRUCTION LINE

FINAL SUBMITTAL
NOT FOR CONSTRUCTION
JULY, 2006

ALL DIMENSIONS ARE IN METERS
UNLESS OTHERWISE SHOWN

KEY MAP AND LINE INDEX

SCALE 1:3500

K-1

USERNAME => atubosnick
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CU 00000

EA 231501

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO	TOTAL SHEETS
11	SD	76	R28.0-31.9	97	122

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Metric

DATE	REVISION No.	DATE REVISED

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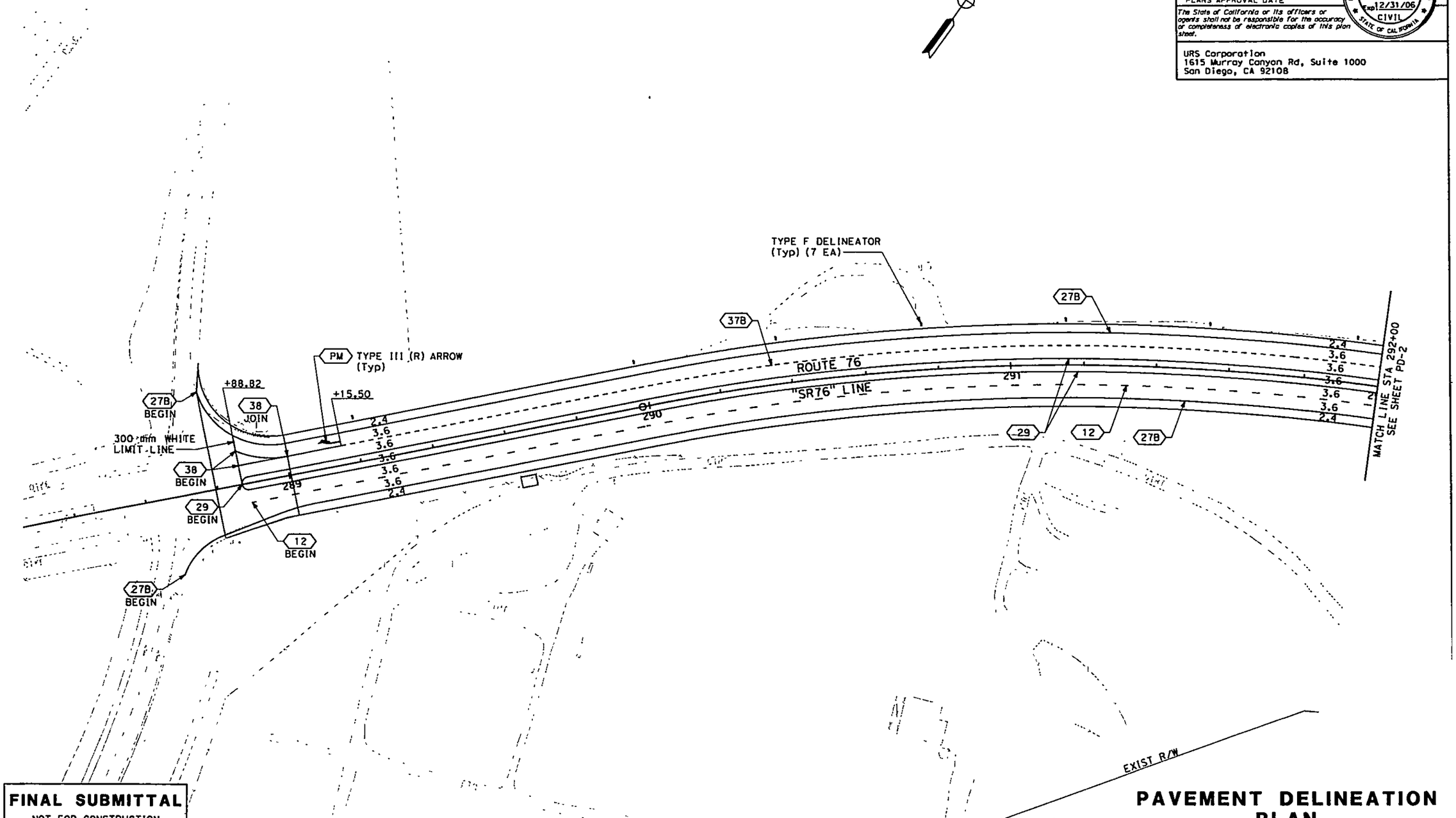
LEGEND

XXX - TRAFFIC LINE DETAIL NUMBER

PM - PAVEMENT MARKING



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JULY, 2006

THIS PLAN ACCURATE FOR PAVEMENT DELINEATION WORK ONLY.

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PAVEMENT DELINEATION PLAN

SCALE 1:500

PD-1

USERNAME => otudosnick
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CU 00000

EA 231501

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
11	SD	76	R28.0-31.9	98	122

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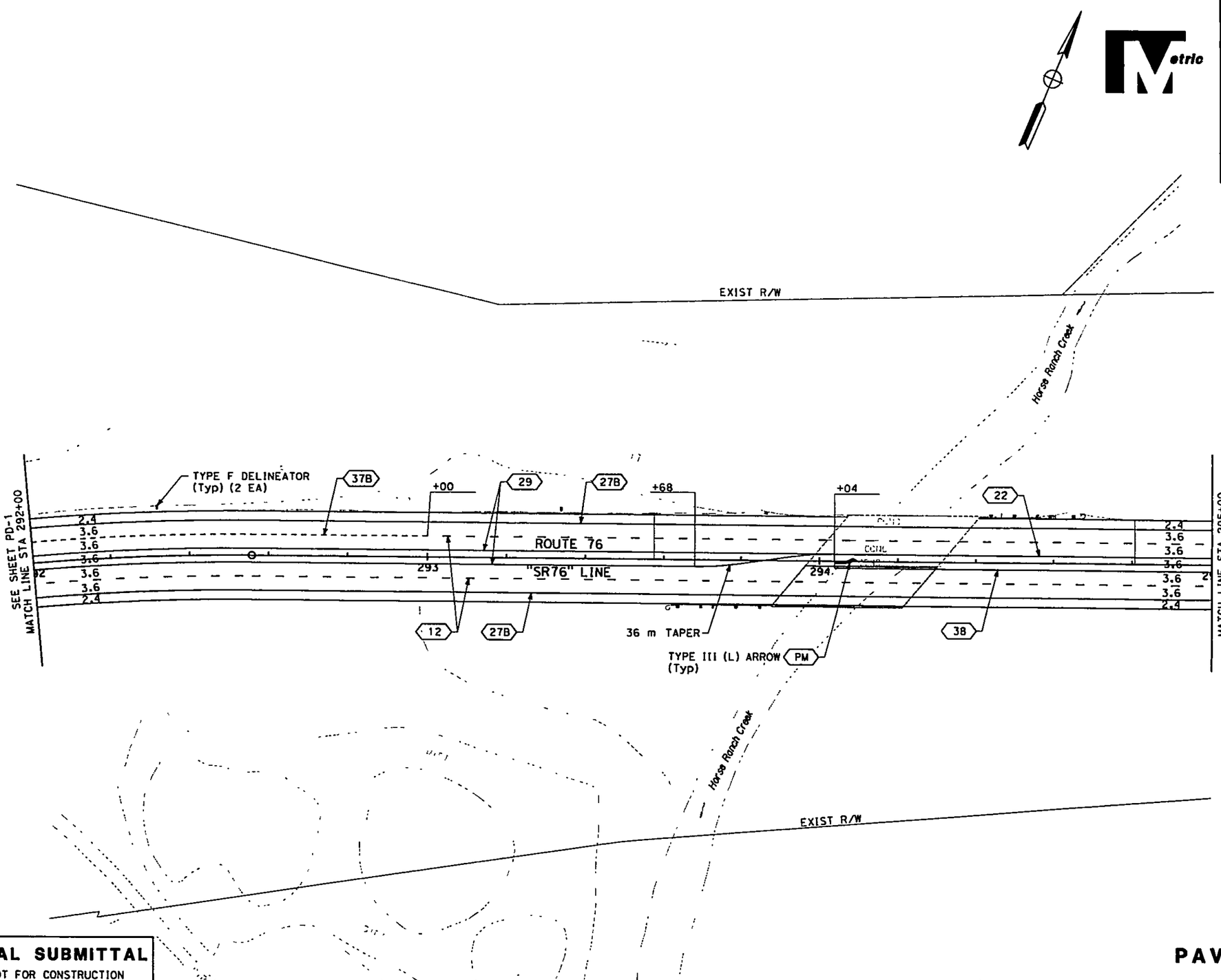

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PAVEMENT DELINEATION PLAN

SCALE 1:500

PD-2

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CU 00000 | EA 231501

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
11	SD	76	R28.0-31.9	99	122

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

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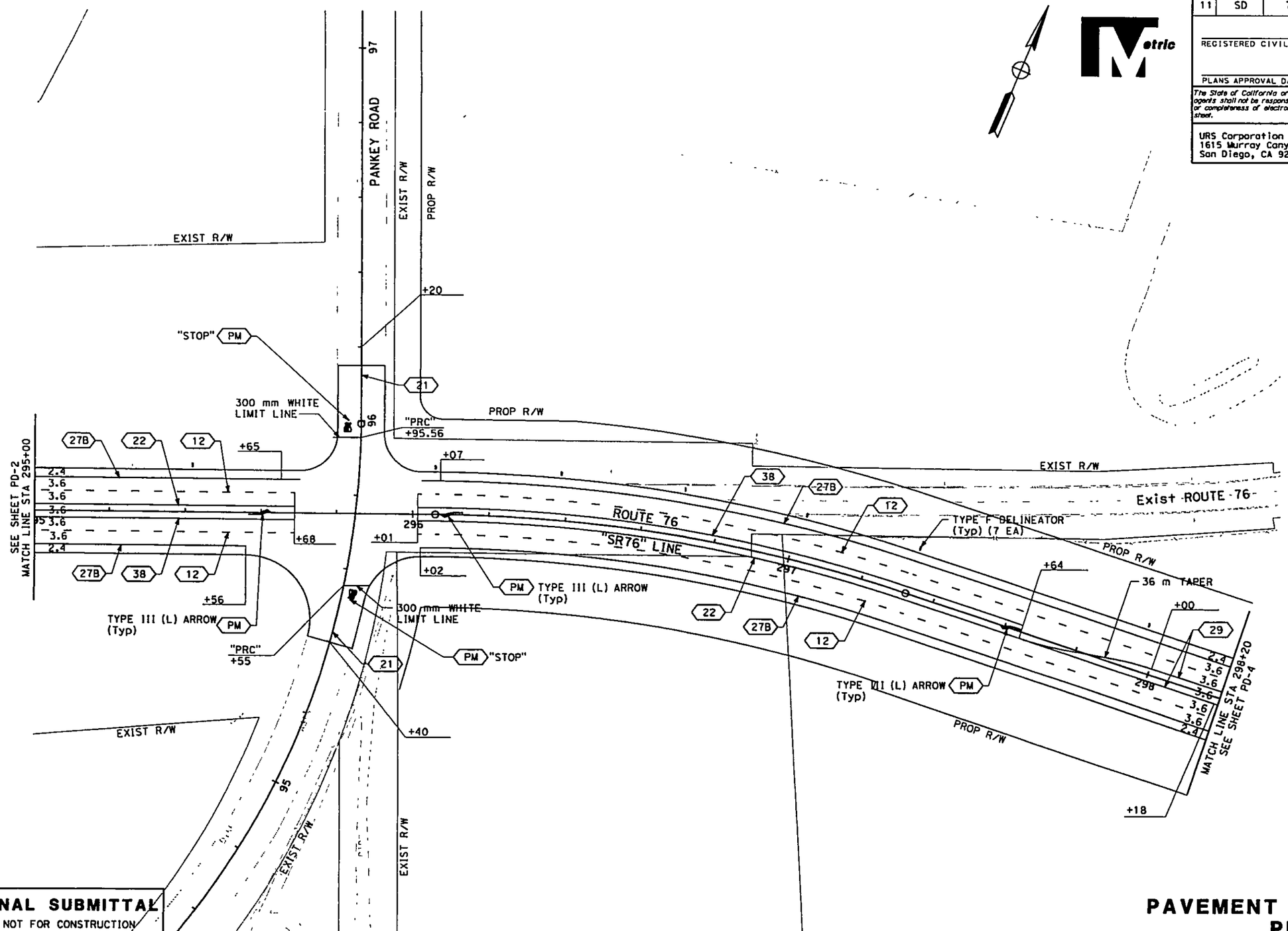
	CHECKED BY			



FINAL SUBMITTAL
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JULY, 2006

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PAVEMENT DELINEATION PLAN

SCALE 1:500

PD-3

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CU 00000

EA 231501

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO	TOTAL SHEETS
11	SD	76	R28.0-31.9	100	122

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

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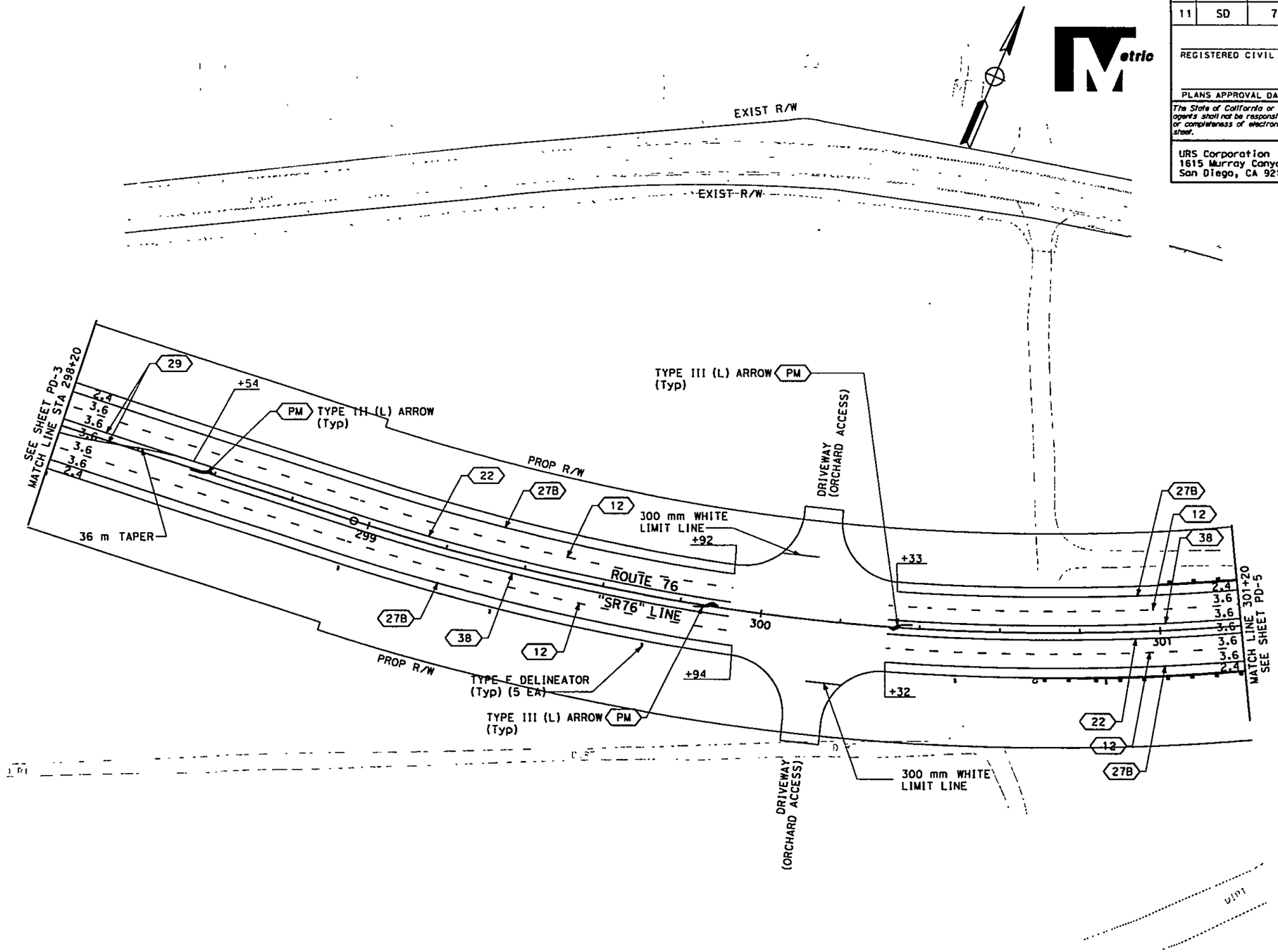

FINAL SUBMITTAL
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JULY, 2006

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PAVEMENT DELINEATION PLAN

SCALE 1:500

PD-4

DATE	REVISION No.	DATE REVISED

CALCULATED/DESIGNED BY
CHECKED BY
DESIGN OVERSIGHT

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DGN FILE => . .\17 Pavement_Del\na004.dgn

CU 00000

EA 231501

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET NO	TOTAL SHEETS
11	SD	76	R28.0-31.9	101	122

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

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San Diego, CA 92108

Metric

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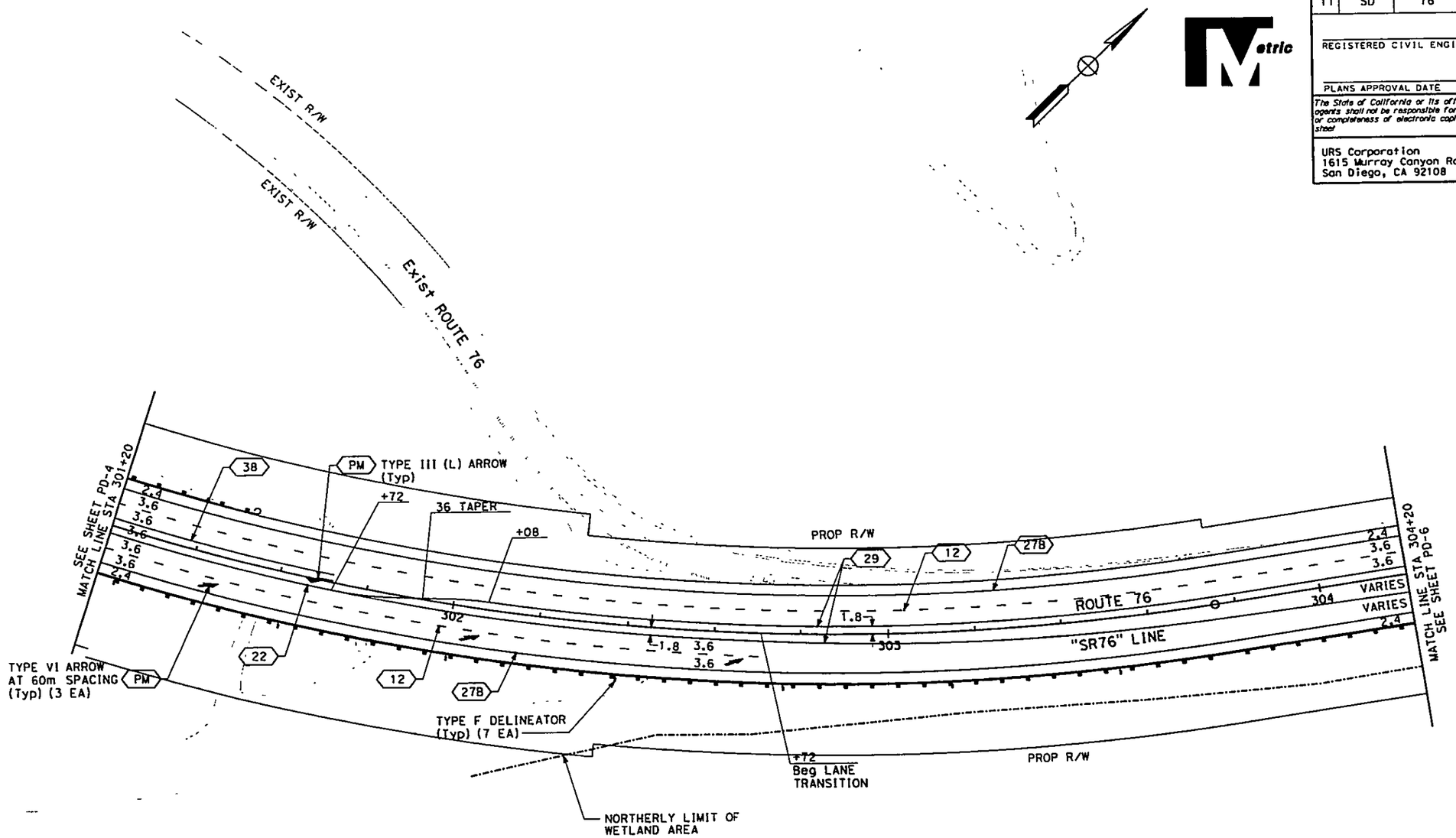

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PAVEMENT DELINEATION PLAN

SCALE 1:500

PD-5

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CU 00000

EA 231501

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
11	SD	76	R28.0-31.9	102	122

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

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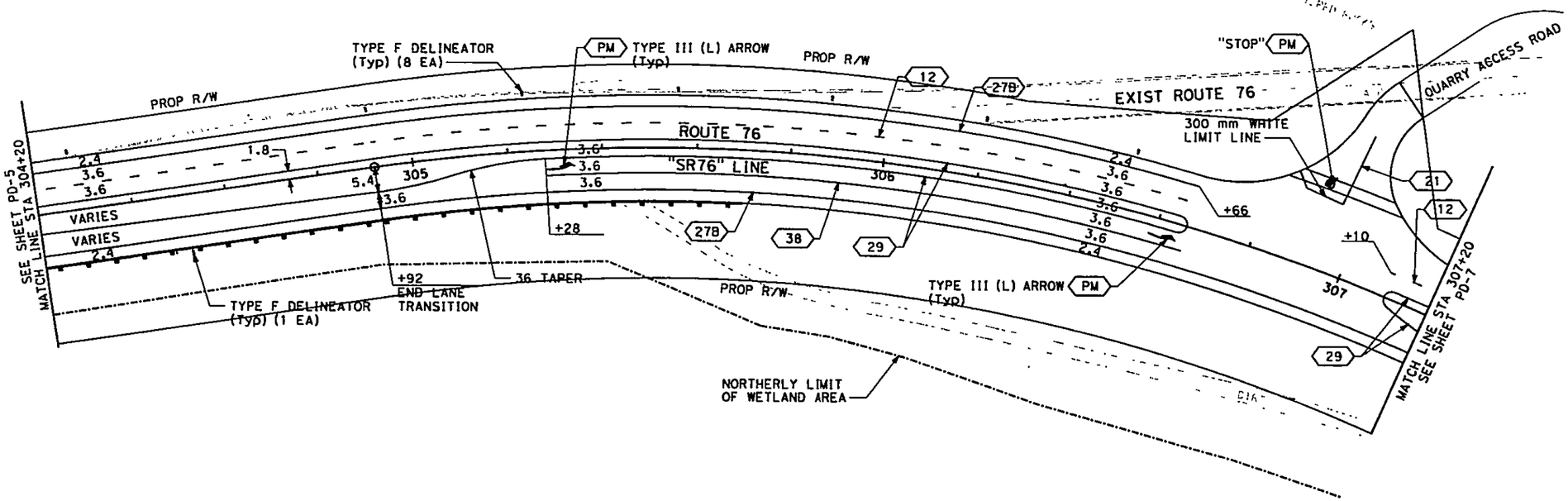
San Diego, CA 92108

Metric

DESIGN OVERSIGHT	CALCULATED/ DESIGNED BY	DATE	REVISION No.
	CHECKED BY		DATE REVISED



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PAVEMENT DELINEATION PLAN

SCALE 1:500

PD-6

LAST REVISION

USERNAME => atubosnick
DGN FILE => . .\17 Pavement Del\na006.dgn

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
11	SD	76	R28.0-31.9	103	122

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Hadi Samil 46173 EXP 12/31/06 CIVIL STATE OF CALIFORNIA

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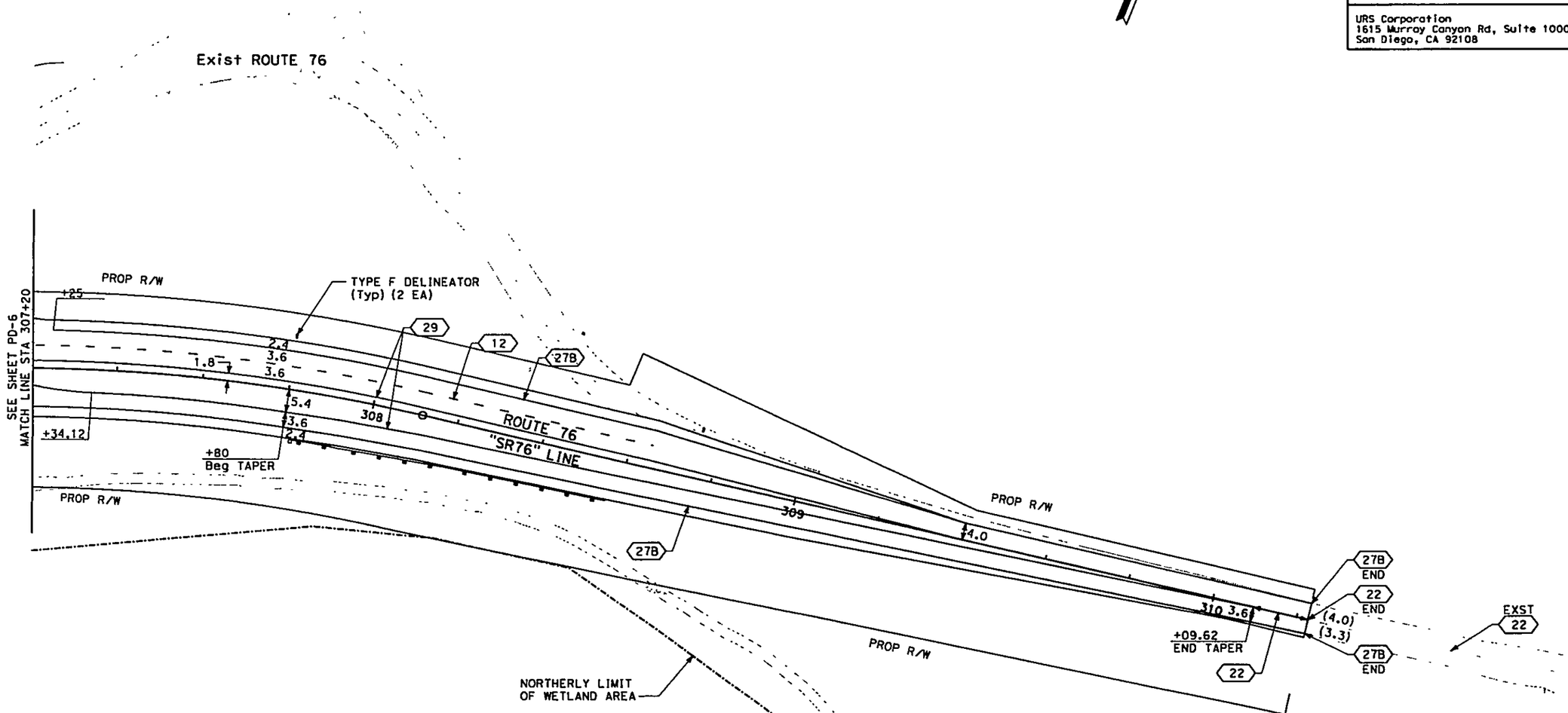
San Diego, CA 92108

Metric

DESIGN OVERSIGHT	CALCULATED/ DESIGNED BY	DATE	REVISION No.	DATE REVISED
	CHECKED BY			



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PAVEMENT DELINEATION PLAN

SCALE 1:500

PD-7

USERNAME => atubosnick
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CU 00000

EA 231501

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No.	TOTAL SHEETS
11	SD	76	R28.0-31.9	104	122

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San Diego, CA 92108

Metric

PAVEMENT DELINEATION QUANTITIES

SHEET No.	DETAIL No. OR PAVEMENT MARKING	REMOVE PAVEMENT MARKER (N)	REMOVE PAINTED TRAFFIC STRIPE		PAVEMENT MARKER				PAINT TRAFFIC STRIPE (2-COAT)		CROSS-WALKS & LIMIT LINES	THERMOPLASTIC TRAFFIC STRIPE				THERMOPLASTIC PAVEMENT MARKING
					NON-REFLECTIVE	RETROREFLECTIVE										
			100 mm	200 mm	TYPE A	TYPE D	TYPE G	TYPE H	100 mm YELLOW	100 mm WHITE	300 mm WHITE	100 mm WHITE	150 mm WHITE	200 mm WHITE	200 mm WHITE (BROKEN 3.66-0.92)	
		EA	m2		EA				m		m	m				m2
PD-1	PM										10					3.90
	12						23			315						
	27B									680						
	29					86			624							
	37B						33			285						
	38						6							36		
PD-2	PM															3.90
	12						35			500						
	22					28			100							
	27B									600						
	29					56			402							
	37B									100						
	38						14							100		
PD-3	PM										15					15.78
	12						41			575						
	21								40							
	22					66			235							
	27B									555						
	29					10			60							
	38						33							240		
PD-4	PM										19					11.70
	12						36			525						
	22					64			230							
	27B									520						
	29					10			70							
	38						32							230		
PD-5	PM															15.60
	12						32			455						
	22					16			55							
	27B									600						
	29					36			250							
	38						8							52		
PD-6	PM										15					9.84
	12						17			245						
	21								17							
	27B									546						
	29					72			520							
	38						20							140		
PD-7	12						10			145						
	22					4			15							
	27B									600						
	29					80			580							
	SHEET TOTAL					528	340		3206	7246	59			802		60.72

(N) - NOT A SEPARATE PAY ITEM, FOR INFORMATION ONLY.

DELINEATOR (CLASS 1)

SHEET No.	TYPE F
	EA
PD-1	7
PD-2	2
PD-3	7
PD-4	5
PD-5	7
PD-6	9
PD-7	2
TOTAL	39

DATE | REVISION No. | DATE REVISED

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JULY, 2006

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PAVEMENT DELINEATION QUANTITIES

SCALE 1:500

PDQ1

USERNAME => otubosnick
DGN FILE => ...\pd001.dgn

INTERGOVERNMENTAL AGREEMENT BETWEEN THE COUNTY OF SAN DIEGO AND THE PALA BAND OF MISSION INDIANS PURSUANT TO SECTION 10.8 OF PALA'S TRIBAL-STATE GAMING COMPACT

This Agreement ("Agreement") is entered into this first day of August, 2007, between the County of San Diego, a political subdivision of the State of California ("County"), and the Pala Band of Mission Indians, a federally recognized Indian Tribe located within the geographical boundaries of the County of San Diego, State of California ("Tribe"). The County and the Tribe shall be collectively referred to as the "Parties".

RECITALS

A. The Board of Supervisors of the County of San Diego and the Tribal Council of the Pala Band of Mission Indians recognize that each is a sovereign governmental entity with responsibility for the welfare of its people.

B. The County recognizes that all lands title to which are held in trust by the United States for the Tribe within the geographical boundaries of San Diego County (the "Reservation") are subject to Pala Tribal and applicable federal laws and regulatory authority. The Tribe recognizes that non-trust unincorporated lands located in San Diego County are subject to State law and County regulatory authority.

C. The County and the Tribe recognize that residents of the Reservation and the residents of San Diego County are neighbors with legitimate concerns over safety, development, and the character of life in San Diego County.

D. In 1988, Congress enacted the Indian Gaming Regulatory Act (P.L. 100-497, codified at 18 U.S.C. § 1166 *et seq.* and 25 U.S.C. § 2701, *et seq.*) ("IGRA") to regulate certain gaming on Indian lands in the United States. IGRA provides a regulatory framework for the operation of gaming by Indian tribes as a means, among other things, of promoting tribal economic development, self-sufficiency, and strong tribal government.

E. IGRA allocates regulatory authority over gaming among the federal government, the state in which a tribe has Indian land, and the tribe itself. IGRA makes Class III gaming activities lawful on the lands of federally-recognized Indian tribes only if such activities are, among other things, conducted in conformity with a tribal-state compact entered into between the Indian tribe and the state and approved by the Secretary of the Interior.

F. On September 10, 1999, the Tribe and the Governor of California entered into a tribal-state gaming compact (the "Compact") to permit the Tribe to conduct Class III gaming activities on its trust lands in compliance with IGRA. A Compact Amendment was approved by the Governor on June 21, 2004, ratified by the California State Legislature on July 1, 2004, and approved by the U.S. Department of the Interior on August 20, 2004.

G. Pursuant to IGRA and the Compact as amended, the Tribe intends to develop a two-story approximately 98,000 square foot expansion ("the Casino Expansion Project") of the existing Pala Casino and Hotel facility, to be located at currently paved parking areas and landscaped areas west of and adjacent to the existing Casino and Hotel facility. Approximately 44,700 square feet is to be devoted to gaming with 250 additional slot machines, and 53,300 square feet is to contain food service facilities, administrative areas, and indoor storage.

H. The Parties acknowledge that the Tribe's on-Reservation compact-related activities are not subject to the California Environmental Quality Act ("CEQA"). Pursuant to Section 10.8.1 of the Compact as amended, the Tribe caused to be prepared a Tribal Environmental Impact Report before the commencement of any planned expansion of its Gaming Facility. The Tribe issued a Notice of Preparation of a Draft TEIR on June 9, 2006 and subsequently issued the Draft TEIR on November 28, 2006. Public Notice was provided pursuant to the Compact. The County and the public reviewed and commented on both the Notice of Preparation and the Draft TEIR.

I. Section 10.8.8 of the Compact as amended requires the Tribe to negotiate with the County of San Diego and to enter into agreements containing provisions providing for the timely mitigation of any significant effect on the off-Reservation environment where such effect is attributable in whole or in part to the Casino Expansion Project unless the parties agree the particular mitigation is infeasible; relating to compensation for law enforcement, fire protection, emergency medical services and any other public services to be provided by the County to the Tribe as a consequence of the Casino Expansion Project; providing for reasonable compensation for programs designed to address gambling addiction; and providing for mitigation of any effect on public safety attributable to the Casino Expansion Project.

J. The Tribe and the County have a longstanding, government-to-government relationship based on mutual respect and consideration of their respective jurisdiction, laws, regulations and duties to their citizens.

NOW, THEREFORE, the Parties hereby agree that this Agreement shall satisfy the requirements of Section 10.8.8 of the Amended Compact and sets forth (1) the County and Tribe's obligations in providing Mitigation Measures for any potentially Significant Effect on the Off-Reservation Environment; (2) the provisions relating to compensation for law enforcement, fire protection, emergency medical services and any

other public services to be provided by the County to the Tribe as a consequence of the Casino Expansion Project; (3) provisions providing for reasonable compensation for programs designed to address gambling addiction; (4) provisions providing for mitigation of any effect on public safety attributable to the Casino Expansion Project; and (5) a continued strengthening of the government-to-government relationship between the County and the Tribe.

A. MITIGATION MEASURES ASSOCIATED WITH THE PROJECT

In preparing the Final Tribal Environmental Impact Report, the Tribe and the County met several times, including meetings between technical staff, to analyze the impacts of the Casino Expansion Project on the off-Reservation environment. In compliance with the Compact as amended, the parties analyzed each of the matters set forth in Section 10.8.1 of the Off-Reservation Environmental Impact Analysis Checklist. The parties agree that implementation of the following mitigation measures will address the off-Reservation environmental impacts of the Casino Expansion Project.

Unless otherwise stated, all mitigation measures, including first annual payments where annual payments are to occur, shall be performed by Tribe, and Tribe shall inform the County in writing of the completion of such measures, prior to the earlier of the following events: completion of the entire Casino Expansion Project, or Tribe's placing in operation a total of 2,400 Class III slot machines in the Casino and Casino Expansion combined. Tribe presently has fewer than 2,400 Class III slot machines in operation. As Tribe adds Class III slot machines to its Casino facilities, Tribe agrees to report the additional Class III slot machines to the County up to a total of 2,400 Class III machines.

County shall notify Tribe in writing of any concerns or need for clarifying information regarding completion of the mitigation measures contained in this Agreement. Tribe agrees to respond to requests for clarifying information and to cooperate with County in resolving concerns County may raise. In addition, Tribe shall promptly respond to County inquiries concerning compliance with mitigation measures set forth below that are to be complied with during future operation of the expanded Casino.

1. Aesthetics

New exterior lighting will be designed and constructed so as to meet or exceed standards consistent with the County's Dark Skies Ordinance.

2. Air Quality/Transit

a) Utilize construction dust suppression measures. During construction of the Casino Expansion Project, the Tribe shall require that contractors utilize standard techniques for dust suppression, such as watering of active construction areas,

application of surfactants to exposed soils, limiting of truck speeds on unpaved surfaces, and prohibiting grading activities if wind speeds exceed 25 miles per hour to minimize contribution of PM_{10} to the atmosphere. Tribe shall exercise reasonable measures to prevent dust from becoming a nuisance to off-Reservation residents and motorists on SR-76 and nearby County roads.

b) Sweep construction soil from roads. If soil material is carried over to adjacent roads, Tribe will assure the roads are swept in a timely manner.

c) Utilize low-emission construction equipment. During construction, whenever reasonably available and feasible, low-sulfur diesel equipment and electric equipment will be utilized.

d) Avoid use of portable generators. For construction activities, Tribe will use reasonable efforts to use only commercial electrical power in order to avoid and or minimize the use of portable gasoline and diesel engine generators.

e) Encourage use of buses/vans. Tribe will continually seek ways to expand the availability of van/bus services for Casino Guests, to reduce individual vehicular traffic levels, and where reasonably feasible, Tribe will contract with companies that use low-emission vehicles.

f) Encourage employee carpooling. Tribe will continue to encourage employees to carpool, vanpool or rideshare and provide ride-matching services.

g) Consider future transportation demand management and transit improvement recommendations. Though specific recommendations have not been determined, Tribe agrees to consider implementation of recommendations once they have been formulated for the following:

   (1) Transportation Demand Management Program – being developed by San Diego Association of Governments (SANDAG) and the Reservation Transportation Authority (RTA).

   (2) Park and Ride/Transit Facility at I-15/SR76 intersection - being considered by SANDAG.

   (3) Interregional Transit Service Plan – being developed by Riverside and San Diego county transit agencies.

h) Support improvements to North County Transit bus stop. If the use of bus service increases and an additional bus stop bench is warranted, Tribe agrees to install an additional bus stop bench (Wabash Valley bench, 8-foot long, royal blue, model #

PP307D). For the expanded Casino, Tribe will provide pedestrian access equivalent to what currently exists from the bus stop to the existing Casino.

3. Hazardous Materials

Tribe shall enter into a new contract with the County Office of Emergency Services (OES), Hazardous Incident Response Team (HIRT), for hazardous materials emergency response services. A copy of the contract is attached hereto as Appendix A. Tribe shall pay County annually the amount of $5,000 for the HIRT contract, with adjustments every two years consistent with changes in the Consumer Price Index for All Urban Consumers in the San Diego, California area (CPI Index), but in no event shall the annual increase be greater than 5% each year.

4. Water Resources

a) Groundwater. To avoid impacts to the off-Reservation areas of the Pala Basin, the Tribe agrees as follows:

(1) For the Casino Expansion Project's groundwater requirements, no new wells shall be placed in the area designated in Appendix B.

(2) All wastewater treatment plant effluent shall be disposed of via on-Reservation percolation ponds, or, in the alternative, the effluent shall be reclaimed for beneficial use such as landscaping and agricultural uses within the Pala Basin.

b) Storm Water – Tribe shall:

(1) Assure the use of appropriate construction best-management-practices (BMPs) at the Casino Expansion Project construction site to prevent off-Reservation water quality impacts throughout the duration of construction.

(2) Assure that the construction contractor has prepared and implements a storm water pollution prevention plan (SWPPP) to meet Environmental Protection Agency (EPA) NPDES requirements.

(3) Assure that runoff that goes off-Reservation from the parking and roof areas is treated via filters and oil-water separators.

5. Noise

a) Traffic Noise. Tribe shall not allow concentrated, heavy, truck traffic associated with construction of the Casino Expansion Project from 10 p.m. to 7 a.m.

b) Backup electrical generator testing. After the Casino Expansion Project's backup generators are installed, testing will not be performed from 7 p.m. to 7 a.m.

6. Traffic

Tribe and County agree that a combination of mitigation measures is required to adequately address potential traffic impacts. Although several of the Air Quality/Transit mitigation measures identified in Section A.2 are expected to reduce the traffic volume generated by the Casino Expansion Project, additional traffic, primarily between I-15 and the Pala Casino, will result from the project. To enhance traffic safety and reduce congestion at the I-15/SR76 interchange, on SR76 between the I-15 and the Pala Casino/Spa frontage, and along the Pala Casino/Spa frontage, Tribe agrees and County supports the following improvement projects:

a) Fair Share Contributions to I-15/SR76 Interchange Improvements. Tribe shall enter into an agreement with Caltrans and County to provide fair-share contributions to Caltrans for improvements to the I-15/SR76 interchange. For the purpose of this Agreement, "fair-share" shall mean a percentage derived by taking the trips generated by the Pala Casino as a percentage of total trips of all users. For example, if total trips at the interchange average 20,000 and Pala Casino generated trips total 2,000, the Tribe's fair share of the costs of the improvements would be 10%.

b) Financial Support to Assure SR76 Widening and Realignment from I-15 to Rosemary Mountain Quarry Entrance. Tribe shall enter into an agreement with Granite Construction Company to provide $13,000,000 in financial support to Granite Construction Company to facilitate widening and realigning SR76 from the I-15 easterly to the Rosemary Mountain Quarry entrance, a distance of approximately 1.3 miles.

c) SR76 Operational Improvements between Rosemary Mountain Quarry Entrance and Pala Casino Frontage. Tribe agrees to pay up to $20,000,000 to Caltrans for improvements to SR76 that will enhance safety and relieve congestion on SR76. Such improvements may include passing lanes, turnouts, shoulder widening, curve realignment, and intersection improvements. Tribe agrees to act reasonably in developing with Caltrans proposed improvements to SR76. Notwithstanding anything else to the contrary in this Agreement, when Caltrans has provided Tribe with proposed improvements, the Tribe has the right in its sole and absolute determination to agree or to disagree with the desired improvements. If the Tribe does not agree with a project proposed by Caltrans, such project shall not be funded by any portion of the $20,000,000. Tribe shall only pay Caltrans for an improvement to SR76 after a written agreement concerning that project has been entered into between Caltrans and the Tribe. If agreement between Tribe and Caltrans has not been reached as to the use of the $20,000,000, or any part thereof,

by June 30, 2010, Tribe shall no longer be obligated to pay for improvements pursuant to this paragraph 6.c.

d) Pala Casino/Spa SR76 Frontage Improvements. Tribe shall improve SR76 in accordance with Caltrans and County requirements along an approximately one mile segment of SR76 approaching the Casino Expansion Project and along the Casino frontage, from just east of Gomez Bridge to just west of Pala Bridge. Improvements may include an additional through lane in each direction, turn lanes, a second signalized intersection for ingress and/or egress for the Casino/Hotel, and landscaped medians. County agrees to expeditiously process all applications and submittals by Tribe for such improvements, and agrees to coordinate such improvements with Caltrans in order to allow the Tribe to expeditiously begin the construction of such improvements. At this time, the approximate cost of the improvements is $5,000,000. County agrees to accept all submissions to Caltrans in place of any additional encroachment submissions they would otherwise require.

e) All-Weather Crossings on Pala Mission Road. Within 12 months from the date of this Agreement, County will construct all-weather crossings to replace two dip sections on Pala Mission Road. County agrees to identify funds required in combination with uncommitted funds remaining from the August 6, 2003 Cooperative Agreement with Pala/County to fund the construction cost of the project.

7. Wastewater Treatment

a) Tribe shall construct a state-of-the-art Sequence Batch Reactor (SBR) wastewater treatment plant (WTP) to the satisfaction of Pala EPA that will replace the existing WTP and treat existing flows plus flows from the Casino Expansion Project. The new plant will be on-Reservation adjacent to the existing plant. Treatment will be to tertiary treatment standards. County agrees to expeditiously process all applications and submittals by Tribe for an encroachment permit required for any part of the new WTP.

b) All of the new WTP's effluent shall be disposed of via on-Reservation percolation ponds or be reclaimed for beneficial use such as landscaping and agricultural uses.

c) Tribe shall dispose of sludge off-Reservation at appropriately permitted landfills in accordance with applicable federal, state and local laws.

8. Solid Waste

a) Solid waste that is not diverted for recycling/reuse will be disposed of only at permitted off-Reservation landfills.

b) To minimize impacts to off-Reservation landfills, Tribe will, to the extent feasible, separate and divert solid waste to reuse or recycling including at a minimum all wastes consisting of cardboard, mixed paper, glass, plastic, copper, aluminum, tin, white goods and green waste resulting from landscaping activities. The goal of this activity is to separate or divert 50% of the solid waste of the facility.

c) During construction of the Casino Expansion Project, to the extent feasible, waste materials from construction activities shall be recycled or diverted for reuse. The goal of this activity is that 90% of inert wastes and 50% of non-inert wastes shall be recycled or diverted for reuse.

9. Security and Law Enforcement

The Tribe and the Sheriff, respectively, shall provide security and law enforcement as set forth below.

a) Security. The Tribe agrees to provide on-site security in the Casino Expansion Project during all hours of operations. The Tribe acknowledges that assistance from the County Sheriff may be required from time to time with respect to the apprehension and arrest of persons engaged in suspected criminal activity.

b) Law Enforcement Responsibilities. County and Tribe agree that under Public Law 280 (18 U.S.C. § 1162), the County and the County Sheriff have concurrent jurisdiction with the Tribe over crimes committed on the Reservation.

c) Compensation to County.

(1) Pursuant to an existing agreement between the Tribe and Sheriff, Tribe presently provides funding for two full-time deputy sheriff units.

(2) Tribe agrees to pay County $200,000 annually to provide the funding for a deputy sheriff unit. After the first annual payment, subsequent annual payments shall be increased consistent with changes in the Consumer Price Index for All Urban Consumers in the San Diego, California area (CPI Index), but in no event shall the annual increase be greater than 5% each year. This requirement is considered satisfied if Tribe's payments under the existing Tribe/Sheriff Agreement referenced in the preceding subparagraph meet or exceed this amount. Should the existing agreement be terminated or should Tribe cease paying at least $200,000 under the agreement referenced above, Tribe shall be obligated to pay the difference between $200,000 and the amount being paid under the agreement referenced above, for Sheriff's services.

d) County of San Diego District Attorney Tribal Liaison Project. The Tribe shall pay County annually for a portion of the cost of the District Attorney's Office – Tribal Liaison Project that consists of dedicated District Attorney Staff who work closely with Tribes in the San Diego region to prosecute Indian gaming-related crime. The first annual payment shall be $6,000 and subsequent annual payments shall be increased by the CPI Index but in no event shall the annual increase be greater than 5% each year. These funds will be due for as long as the District Attorney's Office has dedicated staff working solely on Indian gaming related crimes.

e) Criminal Prosecution Caseload. The Tribe shall pay County annually for costs of processing additional Criminal Prosecution Caseload. First annual payment shall be $15,000 and subsequent annual payments shall be increased by the CPI Index but in no event shall the annual increase be greater than 5% each year.

10. Public Health and Safety

a) Fire and Life Safety Services: The Pala Fire Department is presently continuously staffed by professional firefighters with emergency medical training and paramedics. The department is equipped with two fire engines, a rescue unit, a water tender, a 110 foot ladder truck, and a brush engine. The Tribe has initiated construction of a new fire station with training facilities. The department currently provides fire protection and emergency medical services to the Reservation, Casino/Hotel/Spa, as well as the surrounding non-Reservation rural area including SR76 through to the I-15 and Pala Temecula Road to the Riverside County line, and will provide such services to the proposed Casino Expansion Project. The Fire Department has mutual aid agreements with nearby fire departments. The Tribe agrees to continue providing these services to its Reservation/Casino/Spa facilities, including the proposed Casino Expansion Project.

b) Emergency Plan. Tribe shall coordinate with the County's emergency services programs to help assure public safety in the event of an emergency and will exchange emergency response policies and procedures, as needed and agreed upon by the Parties.

c) Regional Light/Air Unit. Tribe will cooperate with County with regard to its north county regional emergency response light/air unit. Such cooperation shall include both operational issues as well as ideas as to how to pay for the equipment required by the unit. The unit is being developed to assist emergency response personnel entering large facilities such as the Casino Expansion Project by providing a pre-positioned vehicle with twenty mobile self-contained breathing apparatus and emergency lighting capability.

11. Impacts of Gambling Addiction

a) Compensation to County. Tribe shall pay County $150,000 annually for programs designed to address gambling addiction. These funds shall be segregated by County and shall only be used for gambling addiction treatment programs. Beginning with the sixth annual payment, annual payments shall be increased commensurate with the annual change in the CPI Index but in no event shall the annual increase be greater than 5% each year.

b) Tribe shall continue its existing Responsible Gaming programs within the existing casino and shall expand this program to include the Casino Expansion Project area. Existing programs consist of the following:

1) Voluntary exclusion program
2) Involuntary exclusion program
3) In-casino responsible gaming signage
4) Responsible gaming communications including brochures
5) Training programs to educate staff on problem gaming including trained counselors
6) Non-monetary support for the California Council on Problem Gambling which provides the following throughout California:
   i. Conducts Responsible Gambling workshops for Casino employees
   ii. Staffs a 24 hour/day, 7 days/week "Problem Gambling Help Line" with live professional counselors who can provide first contact crisis intervention
   iii. Trains and certifies California Certified Gambling Counselors
   iv. Provides information on cost accessible programs for those with compulsive gambling program
   v. Maintains a "Speakers Bureau" of volunteers to help educate children and adults at schools and community service forums

B. DISPUTE RESOLUTION

1. In an effort to foster good government-government relationships, and to assure that the Tribe is not unreasonably prevented from engaging in activities authorized under the Compact and benefiting therefrom, while assuring that the off-Reservation environment is not negatively impacted by the construction and operation of the existing casino and the Casino Expansion Project, the County and the Tribe agree to the following:

a) The Tribe and the County shall make their best efforts to resolve disputes that occur under this Agreement by good faith negotiations whenever possible. Disputes between the Tribe and the County shall first be subjected to a process of

meeting and conferring in good faith in order to foster a spirit of cooperation and efficiency in the administration of the terms, provisions, and conditions of this Agreement as follows:

(i) Either party shall give the other, as soon as possible after the event giving rise to the concern, a written notice setting forth, with specificity, the issues to be resolved.

(ii) The parties shall meet and confer in a good faith attempt to resolve the dispute through negotiation not later than ten (10) days after receipt of the notice, unless both parties agree in writing to an extension of time. If the County asserts, and provides the Tribe with a reasonable basis for such assertion, that the Tribe's activities are causing an imminent danger to the public health and safety, the Tribe agrees to cease such activity until the County's concerns have been satisfied.

(iii) If the dispute is not resolved to the satisfaction of the parties within thirty (30) calendar days after the first meeting, then upon the request of either party in writing, the dispute shall be submitted to binding arbitration in accordance with this section. The Tribe and the County will submit to any arbitration proceeding as described in this section, and consent to the jurisdiction of the United States District Court for the Southern District of California and, if the United States District Court for the Southern District of California finds that it lacks jurisdiction, to the jurisdiction of the Superior Court for the County of San Diego, State of California, in each case for the purpose of compelling arbitration in the event either party refuses to arbitrate any arbitral dispute as contemplated herein, and for the enforcement of any decision and collection of any award of the arbitrator as contemplated herein. The disputes to be submitted to arbitration shall be limited to claims of breach or violation of this Agreement. The arbitrator shall reach decisions including providing the substance of outstanding and unresolved portions of such agreements to make possible their conclusion and resolutions of any disputes pursuant to this Agreement, within ninety (90) days of the disputes or issues being first submitted to him or her.

b) Arbitration Rules. Any dispute between the Tribe and the County arising out of or relating to this Agreement, or the breach thereof, shall be settled in accordance with the Commercial Arbitration Rules of the American Arbitration Association. The arbitration shall be held on the Tribe's land or, if unreasonably inconvenient under the circumstances, at such other location mutually agreeable to the parties. Each side shall bear its own costs, attorneys' fees, and one-half the costs and expenses of the American Arbitration Association and the arbitrator, unless the arbitrator rules otherwise. In any court action brought pursuant to this Agreement, neither party shall be entitled to recover attorney fees and costs except as otherwise provided by law. The arbitration shall be administered by a single neutral arbitrator. The provisions of Section 1283.05 of the California Code of Civil

Procedure shall apply; provided that no discovery authorized by that section may be conducted without leave of the arbitrator. The decision of the arbitrator shall be in writing, give reasons for the decision, and shall be binding.

Any party to an arbitration in which an award has been made pursuant to this Agreement may petition any federal court, or in the event the federal court finds that it lacks jurisdiction, any state court of competent jurisdiction to confirm the award. The County and the Tribe expressly consent to be sued in such courts for the purposes of confirmation of such an award, and for enforcement of the terms of this Agreement.

An award shall be confirmed, provided that:

(i) The award is limited to the purposes of arbitration stated in this Agreement.

(ii) No monetary damages are awarded other than decisions requiring the payment of sums pursuant to obligations of the parties under this Agreement. (Awards may be made by the arbitrator for only such payments, for injunctive relief, for creation or enforcement of provisions of such agreements, and for declaratory relief, all in respect only to this Agreement).

(iii) If an award is confirmed, judgment shall be entered in conformity therewith. The judgment so entered has the same force and effect as, and is subject to all the provisions of law relating to, a judgment in civil action; and may be enforced like any other judgment of the court in which it is entered.

(iv) In no instance shall the Parties to this Agreement be entitled to consequential damages, punitive damages, or lost profits

c) No Waiver or Preclusion of Other Means of Dispute Resolution. This Dispute Resolution Section may not be construed to waive, limit, or restrict any remedy that is otherwise available to either party, nor may this Section be construed to preclude, limit, or restrict the ability of the parties to pursue, by mutual agreement, any other method of dispute resolution, including, but not limited to, mediation or utilization of a technical advisor to the Tribal and State Gaming Agencies; provided that neither party is under any obligation to agree to such alternative method of dispute resolution.

C. CONSENT TO JURISDICTION: LIMITED EXPRESS WAIVER OF SOVEREIGN IMMUNITY

1. The Tribe expressly and irrevocably waives its sovereign immunity specifically and exclusively to the County for the limited purposes set forth in Subsection B.

Additionally, the Tribe does hereby unconditionally waive any claim or defense of exhaustion of tribal administrative or judicial remedies. This waiver shall commence as of the date of execution of this Agreement.

2. The express waivers and consents provided for under this Section shall extend to civil actions authorized by this Agreement, including, but not limited to, actions to compel arbitration, any arbitration proceeding herein, any action to confirm or enforce any judgment or arbitration award as provided herein, and any appellate proceedings emanating from a matter in which an immunity waiver has been granted. Except as stated herein or elsewhere in this Agreement, no other waivers or consents to be sued, either express or implied, are granted by either party.

3. Notwithstanding any other provision of this Agreement, the Tribe's waiver of sovereign immunity shall not extend to any assets of the Tribe other than the revenue stream from the Facility.

4. The Tribe does not waive any aspect of its sovereign immunity with respect to actions by third parties. This waiver is granted only to the County and not to any other individual or entity.

D. NOTICE

a) All notices required by this Agreement will be deemed to have been given when made in writing and delivered or mailed to the respective representatives of County and Tribe at their respective addresses as follows:

For the Tribe:

Tribal Chairman
Pala Band of Mission Indians
35008 Pala Temecula Road
PMB 50
Pala, CA 92059

For the County:

John Snyder, Director
Dept of Public Works
5555 Overland Ave, Suite 2156
San Diego, CA 92123

With a Copy To:

Howard Dickstein
Dickstein & Zerbi
1530 J Street, Suite 250
Sacramento, CA 95814

With a Copy to:

Claudia Anzures
Chief Deputy County Counsel
1600 Pacific Highway, Suite 355
San Diego, CA 92101

In lieu of written notice to the above addresses, any party may provide notices through the use of facsimile machines provided confirmation of delivery is obtained at the time of

transmission of the notices and provided the following facsimile telephone numbers are used:

To Tribe: Pala Band of Mission Indians, Fax: 1-760-891-3584
Howard Dickstein, Fax: 916-669-0350

To County: Chief Administrative Office, Fax: 619-531-5476
County Counsel, Fax: 619-531-6005
Public Works, Fax: 858-268-0461

Any party may change the address or facsimile number to which such communications are to be given by providing the other parties with written notice of such change at least fifteen (15) calendar days prior to the effective date of the change.

All notices will be effective upon receipt and will be deemed received through delivery if personally served or served using facsimile machines, or on the fifth (5th) day following deposit in the mail if sent by first class mail.

E. MISCELLANEOUS PROVISIONS

a. Term of Agreement. The term of this Agreement commences on the date of execution and runs concurrent with the term of the Compact.

b. No Third Party Beneficiaries. This Agreement is not intended to, and will not be construed to, confer a benefit or create any right on a third party, or the power or right to bring an action to enforce any of its terms.

c. Amendments. This Agreement may be amended only by written instrument duly signed and executed by the County and the Tribe.

d. Waiver. The waiver by either party or any of its officers, agents or employees, or the failure of either party or its officers, agents or employees to take action with respect to any right conferred by, or any breach of any obligation or responsibility of this Agreement, will not be deemed to be a waiver of such obligation or responsibility, or subsequent breach of same, or of any terms, covenants or conditions of this Agreement, unless such waiver is expressly set forth in writing in a document signed and executed by the appropriate authority of the County or of the Tribe.

e. Authorized Representatives. The persons executing this Agreement on behalf of the parties hereto affirmatively represent that each has the requisite legal authority to enter into this Agreement on behalf of their respective party and to bind their respective party to the terms and conditions of this Agreement. The persons executing this Agreement on behalf of their respective party understand that both parties are relying on these representations in entering into this Agreement.

f. Successors in Interest. The terms of this Agreement will be binding on all successors in interest of each party.

g. Severability. The provisions of this Agreement are severable, and the adjudicated invalidity of any provision or portion of this Agreement shall not in and of itself affect the validity of any other provision or portion of this Agreement, and the remaining provisions of the Agreement shall remain in full force and effect. If a court of competent jurisdiction were to determine that a provision of this Agreement is invalid or unenforceable, then the parties agree to promptly use good faith efforts to amend this Agreement to reflect the original intent of the parties in accordance with applicable law and consistent with the Compact between the Tribe and the State of California. If the parties are unable to reach agreement, the parties will resolve the dispute in accordance with the Dispute Resolution Section of this Agreement.

h. Construction of Agreement. This Agreement shall be construed and enforced in accordance with the laws of the United States, the Tribe and the State of California.

i. Force Majeure. In the event of a forced delay in performance by either the Tribe or the County due to causes beyond the reasonable control of that party, including but not limited to fire, floods, catastrophic weather events or other natural disasters, epidemics, embargoes, war, acts of war (whether or not war is declared), insurrections, riots, civil commotion, strikes, lockouts or other labor disturbances, acts of God, acts or inaction by the other party its employees or agents, unusual delay in transportation, unavailability of materials, the time for performance shall be extended for the period of the forced delay.

j. Acknowledgement. The County acknowledges and agrees that the matters addressed herein are the only issues required of the Tribe in connection with the Tribe's development of the Project and its obligations under the Compact.

k. Entire Agreement.

(1) This Agreement constitutes the entire agreement between the County and the Tribe and supersedes all prior negotiations, representations, or other agreements, whether written or oral.

(2) In the event of a dispute between the parties as to the language of this Agreement or the construction or meaning of any term hereof, this Agreement will be deemed to have been drafted by the parties in equal parts so that no presumptions or inferences concerning its terms or interpretation may be construed against any party to this Agreement.

IN WITNESS WHEREOF, the parties have executed this Agreement as of the day and year above set forth.

TRIBE:

PALA BAND OF MISSION INDIANS,
a federally recognized Indian Tribe

By:

_____
Robert Smith, Chairman

COUNTY:

COUNTY OF SAN DIEGO
a political subdivision of the State of California
By:

_____
Clerk of the Board of Supervisors

PROPOSAL TO PROVIDE HIRT SERVICES
TO THE PALA BAND OF MISSION INDIANS

The Unified San Diego County Emergency Services Organization proposes to provide Hazardous Materials Emergency Response Services to the Pala Indian Reservation. This response would be on an as needed basis and be available on a twenty-four (24) hour/seven (7) day a week basis. The Hazardous Materials Incident Response Team (HIRT) will provide the actual response when requested. Provider response standards will be in accordance with Section 100.0 "HIRT Provider Response Standards" of the HIRT Policy and Procedures Manual. Section 100.0 is attached herein.

The Pala Fire Department will function as the Incident Commander (IC) for all hazardous materials responses on the Pala Reservation. The HIRT will not act as the Incident Commander for any reason. Other responsibilities of the responsible Fire Department include the safeguarding of personnel at the scene by restricting access to the scene, initiating containment (if it can be done safely) and isolating persons and materials until the arrival of HIRT. To ensure the most effective and safest possible response, all first responder personnel should be trained to First Responder Operational (FRO) standards.

HIRT will normally be requested through the San Diego Fire-Rescue Department's dispatch center.

Generally, the HIRT response will consist of one hazardous materials vehicle and four trained Hazmat Specialists from the San Diego Fire-Rescue Department (SDFD), as well as two hazardous materials specialists and one response vehicle from the San Diego County Department of Environmental Health Services, Hazardous Materials Division (HMD). The level of response may increase or decrease depending upon the severity of the incident.

The Pala Fire Department will be a non-voting member of the HIRT Policy Committee and a voting member of the HIRT Operations Committee. Any training offered by the HIRT program would be made available to them at no additional cost.

Accepted By	Accepted By
_____	_____
Pala Band of Mission Indians	Thomas Amabile HIRT Administrator

UNIFIED SAN DIEGO COUNTY HAZMAT INCIDENT RESPONSE TEAM (HIRT)	SUBJECT: HIRT PROVIDER RESPONSE STANDARDS

SECTION 100.0	ADOPTED: 8/17/93	REVISED:

HIRT RESPONSE STANDARDS

I. TRAINING STANDARDS

All HIRT providers will:

A. Be trained to NFPA standards.

B. Meet all operational requirements of CCR Title 8 Section 5192 and 29 CFR 1910.120.

C. Be trained to perform entry in both level A and level B protective equipment.

II. OPERATING STANDARDS

A. Mitigation/Control Capabilities

The HIRT Provider responsible for mitigation/control actions will be able to:

1. Respond to reported incidents and advise the Incident Commander (IC) on additional local, State, Federal and private resources required to manage and/or mitigate the problem.

2. Perform technical response procedures in accordance with established standard operating procedures (SOPs), personal protection guidelines and all applicable State regulations.

3. Request use of the State of California Emergency reserve Account (ERA) for emergency cleanup.

4. Provide technical expertise, assistance and equipment at the incident.

5. Perform duties as directed by the IC.

6. Act as the IC's agent in the management of cleanup operations.

B. Public Health and Safety Capabilities

The HIRT Provider responsible for Public health and Safety issues will be able to:

1. Identify, or assist in the identification of, unknown spilled material at the scene.

2. Act as technical advisor on characteristics and direct health and environmental effects of the hazardous materials at the scene.

3. Assist the IC in determining the necessity for evacuation and establishing reentry criteria.

4. Sample contaminated soil, water or air to determine the extent of contamination and identify any public health concerns.

5. Provide analytical laboratory support as needed.

6. Assist the IC in identifying potential sources of hazardous materials release.

7. Provide information on proper protective actions at the scene.

8. Recommend cleanup levels and advise on the adequacy of cleanup both during and after the emergency.

9. Assist the IC in obtaining financial and other resources necessary for any required cleanup.

10. Assist the agency having jurisdiction in obtaining appropriate enforcement action against any responsible party.

11. Provide on-scene liaison with Poison Control, Emergency Medical Services (EMS) and State and Federal agencies.

C. Capabilities Required of All Providers

All HIRT Providers will be able to perform the following functions:

1. Understand what hazardous materials are, the risks associated with them at an incident, and the potential outcomes associated with a hazmat emergency.

2. Recognize the presence of hazardous materials in an emergency situation.

3. Identify hazardous materials.

4. Understand the role of the individual trained to the first responder awareness level as well as the role of the DOT Emergency Response Guidebook.

5. Recognize the need for additional resources and advise the IC to make the appropriate notifications.

6. Basic hazard and risk assessment.

7. Select and use proper specialized chemical protective equipment.

8. Understand basic hazmat terms.

9. Basic and advanced control, containment and/or confinement operations within the capabilities of the resources and PPE

available within the unit.

10. Understand and implement decontamination procedures.

11. Understand the relevant SOPs and termination procedures.

12. Implement an employers (business) emergency response plan.

13. Classify, identify and verify known and unknown materials using field survey instruments and equipment.

14. Function within an assigned role in the Incident Command System.

15. Understand basic chemical and toxicological terminology and behavior.

16. Understand hazmat medical management protocols as established by the California Emergency Medical Services Authority (EMSA).

17. Rescue/Evacuation.

18. Isolation/Deny entry.

19. Contain/Control.

20. Exposure protection.

21. Communicate with the IC, first responder agencies, dispatch centers and State and Federal regulatory agencies.

UNIFIED SAN DIEGO COUNTY HAZMAT INCIDENT RESPONSE TEAM (HIRT)	SUBJECT: HIRT PROVIDER RESPONSE STANDARDS

SECTION 100.0	ADOPTED: 8/17/93	REVISED:

III. BACKUP TEAMS

A backup team must be provided as a rescue team for the personnel working in the hot zone. The backup team shall:

A. Be protected at the same level of protection as the team working in the hot zone.

B. Maintain line of sight contact among personnel operating in the hot zone.

C. Visually monitor personnel operating within the hot zone.

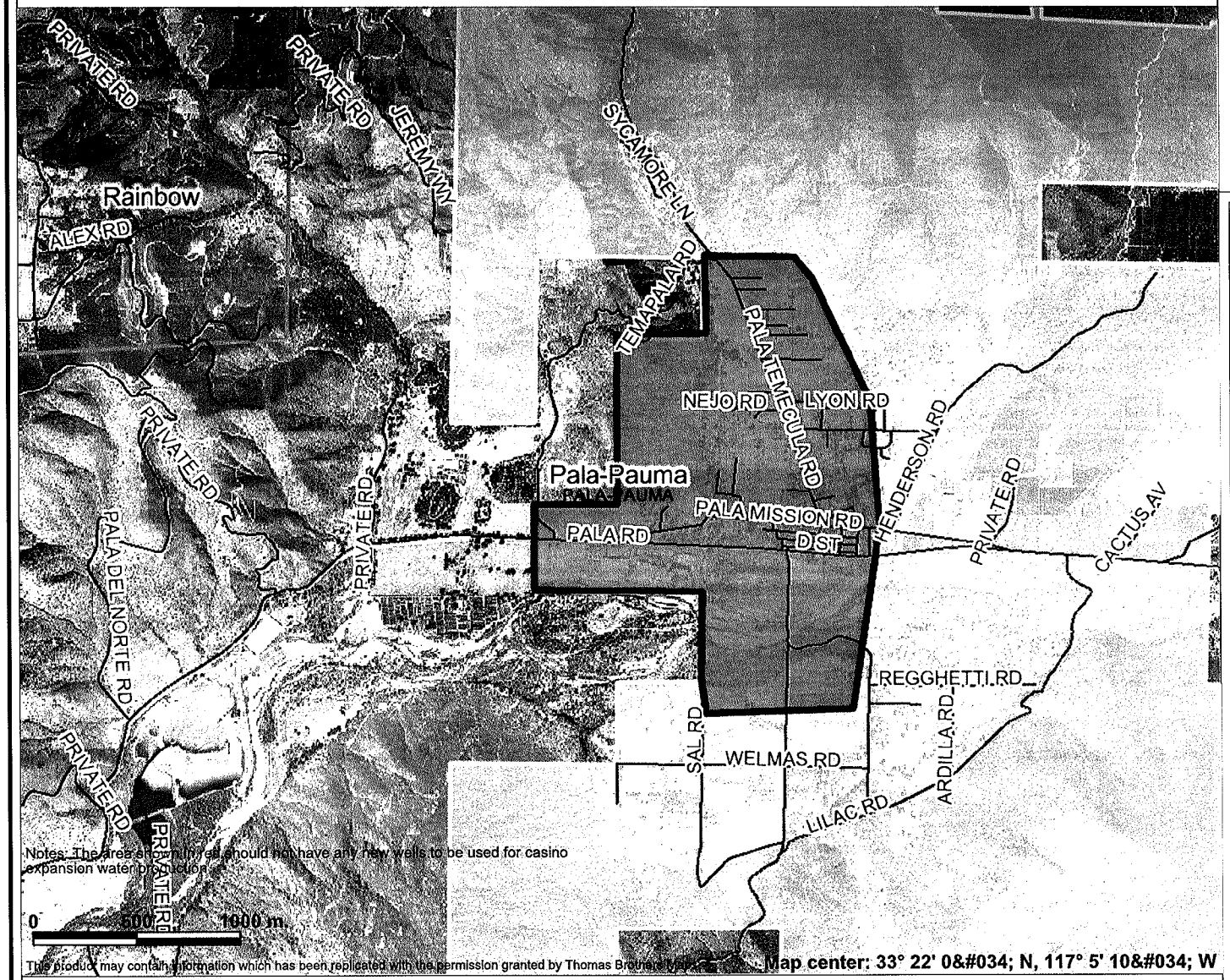
IV. RESPONSE TIMES

A. Each HIRT provider will meet a maximum response time of sixty minutes for ninety percent of all hazardous materials incidents dispatched.

B. A second, simultaneous, response will require a maximum response time of ninety minutes.

C. Response time begins at the time of dispatch and ends when the unit arrives on scene.

Area of No New Wells for Casino Expansion



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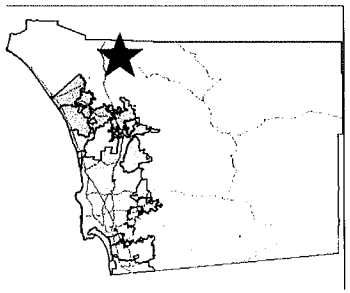
Map center: 33° 22' 0" N, 117° 5' 10" W



Legend

- Highways
- Freeways
- Streets
- Water Bodies
- Water Bodies
- Indian Reservations
- Sponsor Groups
- Sponsor Groups
- Other
- Community Planning Area
- Community Planning Areas
- 2005 Orthophoto South West
- 2005 Orthophoto South East
- 2005 Orthophoto North West
- 2005 Orthophoto North East

N

Scale: 1:29,103

County of San Diego Department of Planning and Land Use DPLU GIS

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Pictures of SR-76 currently being widened from 2 to 4 lanes. Pictures taken Dec 2008 and Jan 2009.

Intersection of SR-76 at Pankey Road. Pankey Road closed south of SR-76 due to SR-76 widening.

Looking west along SR-76 in the vicinity of Granite driveway

Looking west along SR-76 prior to Pankey Rd where new alignment deviates from existing alignment

Looking west along SR-76 just before I-15 interchange

Appendix N

Existing + Cumulative Intersection Level of Service Calculations

AM Existing + Cumulative
1: Pala Rd (SR-76) & Via Monserate

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	9	1227	1937	44	91	33
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	9	1292	2039	46	96	35
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2085				3373	2062
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2085				3373	2062
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				0	49
cM capacity (veh/h)	265				8	69

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	9	1292	2085	131
Volume Left	9	0	0	96
Volume Right	0	0	46	35
cSH	265	1700	1700	11
Volume to Capacity	0.04	0.76	1.23	12.12
Queue Length 95th (ft)	3	0	0	Err
Control Delay (s)	19.1	0.0	0.0	Err
Lane LOS	C			F
Approach Delay (s)	0.1		0.0	Err
Approach LOS				F

Intersection Summary			
Average Delay	371.2		
Intersection Capacity Utilization	119.2%	ICU Level of Service	H
Analysis Period (min)	15		

LOS Engineering

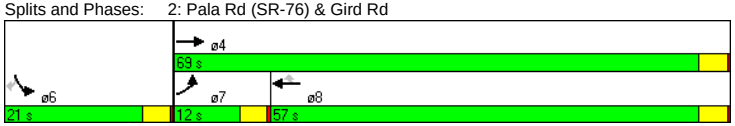
AM Existing + Cumulative
2: Pala Rd (SR-76) & Gird Rd

Timings

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	151	1175	1298	49	80	139
Turn Type	Prot			Perm		Perm
Protected Phases	7	4	8		6	
Permitted Phases				8		6
Detector Phases	7	4	8	8	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	12.0	69.0	57.0	57.0	21.0	21.0
Total Split (%)	13.3%	76.7%	63.3%	63.3%	23.3%	23.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	None	None	None	Min	Min
Act Effct Green (s)	8.0	65.0	53.0	53.0	9.7	9.7
Actuated g/C Ratio	0.10	0.79	0.64	0.64	0.12	0.12
v/c Ratio	1.04	0.84	1.14	0.06	0.45	0.50
Control Delay	123.9	13.9	93.5	5.8	41.9	12.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	123.9	13.9	93.5	5.8	41.9	12.3
LOS	F	B	F	A	D	B
Approach Delay		26.4	90.3		23.1	
Approach LOS		C	F		C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 82.7	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.14	
Intersection Signal Delay: 55.9	Intersection LOS: E
Intersection Capacity Utilization 92.6%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 2: Pala Rd (SR-76) & Gird Rd



LOS Engineering

AM Existing + Cumulative
2: Pala Rd (SR-76) & Gird Rd

Queues

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1900	1900	1700	1700	1700
Storage Length (ft)	450			20	0	180
Storage Lanes	1			1	1	1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1583	1863	1863	1417	1583	1417
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1583	1863	1863	1417	1583	1417
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				7		146
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		3191	8309		1271	
Travel Time (s)		72.5	188.8		28.9	
Volume (vph)	151	1175	1298	49	80	139
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	159	1237	1366	52	84	146
Lane Group Flow (vph)	159	1237	1366	52	84	146
v/c Ratio	1.04	0.84	1.14	0.06	0.45	0.50
Control Delay	123.9	13.9	93.5	5.8	41.9	12.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	123.9	13.9	93.5	5.8	41.9	12.3
Queue Length 50th (ft)	~90	300	~841	8	41	0
Queue Length 95th (ft)	#220	#866	#1167	23	85	51
Internal Link Dist (ft)		3111	8229		1191	
Turn Bay Length (ft)	450			20		180
Base Capacity (vph)	153	1465	1195	911	299	386
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	1.04	0.84	1.14	0.06	0.28	0.38

Intersection Summary

Area Type: Other

~ 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.

LOS Engineering

AM Existing + Cumulative
2: Pala Rd (SR-76) & Gird Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1900	1900	1700	1700	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	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)	1583	1863	1863	1417	1583	1417
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1583	1863	1863	1417	1583	1417
Volume (vph)	151	1175	1298	49	80	139
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	159	1237	1366	52	84	146
RTOR Reduction (vph)	0	0	0	3	0	129
Lane Group Flow (vph)	159	1237	1366	49	84	17
Turn Type	Prot			Perm		Perm
Protected Phases	7	4	8		6	
Permitted Phases				8		6
Actuated Green, G (s)	8.0	65.1	53.1	53.1	9.7	9.7
Effective Green, g (s)	8.0	65.1	53.1	53.1	9.7	9.7
Actuated g/C Ratio	0.10	0.79	0.64	0.64	0.12	0.12
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	153	1465	1195	909	185	166
v/s Ratio Prot	c0.10	0.66	c0.73		c0.05	
v/s Ratio Perm				0.03		0.01
v/c Ratio	1.04	0.84	1.14	0.05	0.45	0.10
Uniform Delay, d1	37.4	5.6	14.8	5.5	34.1	32.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	83.5	4.7	74.8	0.0	1.8	0.3
Delay (s)	120.9	10.3	89.6	5.5	35.8	32.9
Level of Service	F	B	F	A	D	C
Approach Delay (s)		22.9	86.5		34.0	
Approach LOS		C	F		C	

Intersection Summary

HCM Average Control Delay	53.4	HCM Level of Service	D
HCM Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	82.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	92.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

AM Existing + Cumulative
3: Pala Rd (SR-76) & Sage Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	2	1046	1555	2	8	16
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	2	1101	1637	2	8	17
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1639				2743	1638
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1639				2743	1638
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				62	86
cM capacity (veh/h)	395				22	124

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	2	1101	1639	17
Volume Left	2	0	0	0
Volume Right	0	0	2	17
cSH	395	1700	1700	124
Volume to Capacity	0.01	0.65	0.96	0.14
Queue Length 95th (ft)	0	0	0	11
Control Delay (s)	14.2	0.0	0.0	38.5
Lane LOS	B			E
Approach Delay (s)	0.0		0.0	Err
Approach LOS				F

Intersection Summary			
Average Delay		Err	
Intersection Capacity Utilization		Err%	ICU Level of Service	H
Analysis Period (min)		15	

LOS Engineering

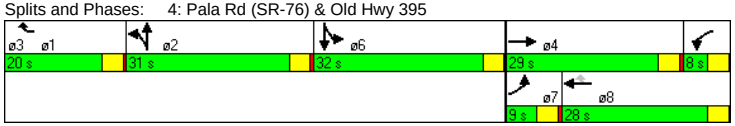
AM Existing + Cumulative
4: Pala Rd (SR-76) & Old Hwy 395

Timings

Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBT
Lane Configurations							
Volume (vph)	87	697	82	1121	122	204	218
Turn Type	Prot		Prot		custom		
Protected Phases	7	4	3	8	1	2	6
Permitted Phases					8		
Detector Phases	7	4	3	8	1	2	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	20.0	20.0	20.0
Total Split (s)	9.0	29.0	8.0	28.0	20.0	31.0	32.0
Total Split (%)	7.5%	24.2%	6.7%	23.3%	16.7%	25.8%	26.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	Min	Min	Min
Act Effct Green (s)	5.0	25.0	4.0	24.0	33.6	27.0	28.0
Actuated g/C Ratio	0.05	0.23	0.04	0.22	0.31	0.25	0.26
v/c Ratio	1.28	1.11	1.48	1.52	0.27	1.61	1.65
Control Delay	240.6	105.2	326.5	273.9	15.7	315.8	331.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	240.6	105.2	326.5	273.9	15.7	315.8	331.9
LOS	F	F	F	F	B	F	F
Approach Delay		117.9		253.4		315.8	331.9
Approach LOS		F		F		F	F

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 109.6	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.65	
Intersection Signal Delay: 246.0	Intersection LOS: F
Intersection Capacity Utilization 104.2%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 4: Pala Rd (SR-76) & Old Hwy 395



LOS Engineering

AM Existing + Cumulative
4: Pala Rd (SR-76) & Old Hwy 395

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	330		0	150		150	0		0	0		0
Storage Lanes	1		0	1		1	0		0	0		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.974				0.850		0.962			0.981	
Flt Protected	0.950			0.950				0.980			0.973	
Satd. Flow (prot)	1583	3447	0	1583	3539	1417	0	1756	0	0	1778	0
Flt Permitted	0.950			0.950				0.980			0.973	
Satd. Flow (perm)	1583	3447	0	1583	3539	1417	0	1756	0	0	1778	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18				68		15			6	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		652			462			899			4464	
Travel Time (s)		14.8			10.5			20.4			101.5	
Volume (vph)	87	697	145	82	1121	122	284	204	192	400	218	102
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	92	734	153	86	1180	128	299	215	202	421	229	107
Lane Group Flow (vph)	92	887	0	86	1180	128	0	716	0	0	757	0
v/c Ratio	1.28	1.11		1.48	1.52	0.27		1.61			1.65	
Control Delay	240.6	105.2		326.5	273.9	15.7		315.8			331.9	
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0			0.0	
Total Delay	240.6	105.2		326.5	273.9	15.7		315.8			331.9	
Queue Length 50th (ft)	~82	~371		~84	~612	31		~724			~779	
Queue Length 95th (ft)	#188	#502		#187	#748	79		#959			#1018	
Internal Link Dist (ft)		572			382			819			4384	
Turn Bay Length (ft)	330			150		150						
Base Capacity (vph)	72	800		58	775	518		444			458	
Starvation Cap Reductn	0	0		0	0	0		0			0	
Spillback Cap Reductn	0	0		0	0	0		0			0	
Storage Cap Reductn	0	0		0	0	0		0			0	
Reduced v/c Ratio	1.28	1.11		1.48	1.52	0.25		1.61			1.65	

Intersection Summary

Area Type: Other

~ 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.

LOS Engineering

AM Existing + Cumulative
4: Pala Rd (SR-76) & Old Hwy 395

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	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	
Frt	1.00	0.97		1.00	1.00	0.85		0.96			0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98			0.97	
Satd. Flow (prot)	1583	3448		1583	3539	1417		1755			1778	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.98			0.97	
Satd. Flow (perm)	1583	3448		1583	3539	1417		1755			1778	
Volume (vph)	87	697	145	82	1121	122	284	204	192	400	218	102
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	92	734	153	86	1180	128	299	215	202	421	229	107
RTOR Reduction (vph)	0	14	0	0	0	50	0	11	0	0	4	0
Lane Group Flow (vph)	92	873	0	86	1180	78	0	705	0	0	753	0
Turn Type	Prot			Prot		custom	Split			Split		
Protected Phases	7	4		3	8	1	2	2		6	6	
Permitted Phases						8						
Actuated Green, G (s)	5.0	25.0		4.0	24.0	29.6		27.0			28.0	
Effective Green, g (s)	5.0	25.0		4.0	24.0	29.6		27.0			28.0	
Actuated g/C Ratio	0.05	0.23		0.04	0.22	0.27		0.25			0.26	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	72	786		58	775	434		432			454	
v/s Ratio Prot	0.06	c0.25		0.05	c0.33	c0.01		c0.40			c0.42	
v/s Ratio Perm						0.05						
v/c Ratio	1.28	1.11		1.48	1.52	0.18		1.63			1.66	
Uniform Delay, d1	52.3	42.3		52.8	42.8	30.7		41.3			40.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	197.7	67.0		288.9	241.7	0.2		294.4			305.6	
Delay (s)	250.0	109.3		341.7	284.5	30.9		335.7			346.4	
Level of Service	F	F		F	F	C		F			F	
Approach Delay (s)		122.5			264.8			335.7			346.4	
Approach LOS		F			F			F			F	

Intersection Summary

HCM Average Control Delay	257.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.45		
Actuated Cycle Length (s)	109.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	104.2%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

AM Existing + Cumulative
6: Pala Rd (SR-76) & I-15 SB Ramps

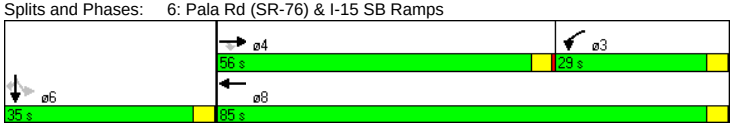
Timings

Lane Group	EBT	EBR	WBL	WBT	SBT	SBR
Lane Configurations						
Volume (vph)	947	350	346	791	1	570
Turn Type		Perm	Prot			Perm
Protected Phases	4		3	8	6	
Permitted Phases		4				6
Detector Phases	4	4	3	8	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0	20.0
Total Split (s)	56.0	56.0	29.0	85.0	35.0	35.0
Total Split (%)	46.7%	46.7%	24.2%	70.8%	29.2%	29.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lead	Lag			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	None	None	None	None	C-Min	C-Min
Act Effct Green (s)	52.0	52.0	25.0	81.0	31.0	31.0
Actuated g/C Ratio	0.43	0.43	0.21	0.68	0.26	0.26
v/c Ratio	1.24	0.50	1.10	0.66	0.31	1.14
Control Delay	148.1	12.2	106.7	24.2	38.2	109.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	148.1	12.2	106.7	24.2	38.2	109.2
LOS	F	B	F	C	D	F
Approach Delay	111.5			49.3	95.6	
Approach LOS	F			D	F	

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 40 (33%), Referenced to phase 2: and 6:SBTL, Start of Green
Natural Cycle: 140
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.24
Intersection Signal Delay: 85.4 Intersection LOS: F
Intersection Capacity Utilization 103.0% ICU Level of Service G
Analysis Period (min) 15

Splits and Phases: 6: Pala Rd (SR-76) & I-15 SB Ramps



AM Existing + Cumulative
6: Pala Rd (SR-76) & I-15 SB Ramps

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	0		0	500		0	0		0	0		900
Storage Lanes	0		1	1		0	0		0	0		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50	50	50					50	50	50
Trailing Detector (ft)		0	0	0	0					0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	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			0.850									0.850
Flt Protected				0.950							0.953	
Satd. Flow (prot)	0	1863	1417	1583	1863	0	0	0	0	0	1775	1417
Flt Permitted				0.950							0.953	
Satd. Flow (perm)	0	1863	1417	1583	1863	0	0	0	0	0	1775	1417
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			215									218
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		654			1271			961			1209	
Travel Time (s)		14.9			28.9			21.8			27.5	
Volume (vph)	0	947	350	346	791	0	0	0	0	135	1	570
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	997	368	364	833	0	0	0	0	142	1	600
Lane Group Flow (vph)	0	997	368	364	833	0	0	0	0	0	143	600
v/c Ratio		1.24	0.50	1.10	0.66						0.31	1.14
Control Delay		148.1	12.2	106.7	24.2						38.2	109.2
Queue Delay		0.0	0.0	0.0	0.0						0.0	0.0
Total Delay		148.1	12.2	106.7	24.2						38.2	109.2
Queue Length 50th (ft)		~956	77	~316	632						90	~409
Queue Length 95th (ft)		#1208	165	m#279	m593						149	#637
Internal Link Dist (ft)		574			1191			881			1129	
Turn Bay Length (ft)				500								900
Base Capacity (vph)		807	736	330	1258						459	528
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		1.24	0.50	1.10	0.66						0.31	1.14

Intersection Summary

Area Type: Other
~ 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.

AM Existing + Cumulative

6: Pala Rd (SR-76) & I-15 SB Ramps — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)		4.0	4.0	4.0	4.0						4.0	4.0
Lane Util. Factor		1.00	1.00	1.00	1.00						1.00	1.00
Frt		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)		1863	1417	1583	1863						1775	1417
Flt Permitted		1.00	1.00	0.95	1.00						0.95	1.00
Satd. Flow (perm)		1863	1417	1583	1863						1775	1417
Volume (vph)	0	947	350	346	791	0	0	0	0	135	1	570
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	997	368	364	833	0	0	0	0	142	1	600
RTOR Reduction (vph)	0	0	122	0	0	0	0	0	0	0	0	162
Lane Group Flow (vph)	0	997	246	364	833	0	0	0	0	0	143	438
Turn Type			Perm	Prot						Perm		Perm
Protected Phases		4		3	8						6	
Permitted Phases			4							6		6
Actuated Green, G (s)		52.0	52.0	25.0	81.0						31.0	31.0
Effective Green, g (s)		52.0	52.0	25.0	81.0						31.0	31.0
Actuated g/C Ratio		0.43	0.43	0.21	0.68						0.26	0.26
Clearance Time (s)		4.0	4.0	4.0	4.0						4.0	4.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0						3.0	3.0
Lane Grp Cap (vph)		807	614	330	1258						459	366
v/s Ratio Prot		c0.54		c0.23	0.45							
v/s Ratio Perm			0.17								0.08	c0.31
v/c Ratio		1.24	0.40	1.10	0.66						0.31	1.20
Uniform Delay, d1		34.0	23.3	47.5	11.5						35.9	44.5
Progression Factor		1.00	1.00	1.32	2.00						1.00	1.00
Incremental Delay, d2		116.6	0.4	51.1	0.1						1.8	112.5
Delay (s)		150.6	23.7	113.6	23.1						37.7	157.0
Level of Service		F	C	F	C						D	F
Approach Delay (s)		116.4			50.6			0.0			134.0	
Approach LOS		F			D			A			F	

Intersection Summary			
HCM Average Control Delay	96.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.19		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	103.0%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

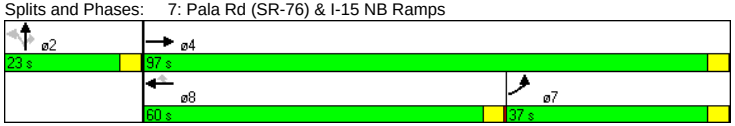
AM Existing + Cumulative

7: Pala Rd (SR-76) & I-15 NB Ramps — Timings

Lane Group	EBL	EBT	WBT	WBR	NBT	NBR
Lane Configurations						
Volume (vph)	500	594	887	129	0	320
Turn Type	Prot			Perm		Perm
Protected Phases	7	4	8		2	
Permitted Phases				8		2
Detector Phases	7	4	8	8	2	2
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	37.0	97.0	60.0	60.0	23.0	23.0
Total Split (%)	30.8%	80.8%	50.0%	50.0%	19.2%	19.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lag		Lead	Lead		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	None	None	None	C-Min	C-Min
Act Effct Green (s)	33.0	93.0	56.0	56.0	19.0	19.0
Actuated g/C Ratio	0.28	0.78	0.47	0.47	0.16	0.16
v/c Ratio	1.21	0.43	1.07	0.20	1.04	0.66
Control Delay	143.5	14.2	84.5	16.2	114.5	11.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	143.5	14.2	84.5	16.2	114.5	11.8
LOS	F	B	F	B	F	B
Approach Delay		73.3	75.8		59.5	
Approach LOS		E	E		E	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:, Start of Green	
Natural Cycle: 130	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.21	
Intersection Signal Delay: 71.2	Intersection LOS: E
Intersection Capacity Utilization 103.0%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 7: Pala Rd (SR-76) & I-15 NB Ramps



AM Existing + Cumulative
7: Pala Rd (SR-76) & I-15 NB Ramps

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	450		0	0		50	0		800	0		0
Storage Lanes	1		0	0		1	0		1	0		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	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						0.850			0.850			
Flt Protected	0.950							0.950				
Satd. Flow (prot)	1583	1863	0	0	1863	1417	0	1770	1417	0	0	0
Flt Permitted	0.950							0.950				
Satd. Flow (perm)	1583	1863	0	0	1863	1417	0	1770	1417	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						25			337			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1271			2232			991			1241	
Travel Time (s)		28.9			50.7			22.5			28.2	
Volume (vph)	500	594	0	0	887	129	277	0	320	0	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	526	625	0	0	934	136	292	0	337	0	0	0
Lane Group Flow (vph)	526	625	0	0	934	136	0	292	337	0	0	0
v/c Ratio	1.21	0.43			1.07	0.20		1.04	0.66			
Control Delay	143.5	14.2			84.5	16.2		114.5	11.8			
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	143.5	14.2			84.5	16.2		114.5	11.8			
Queue Length 50th (ft)	~484	348			~805	49		~245	0			
Queue Length 95th (ft)	m#375	m301			#1053	90		#420	91			
Internal Link Dist (ft)		1191			2152			911			1161	
Turn Bay Length (ft)	450					50			800			
Base Capacity (vph)	435	1444			869	675		280	508			
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	1.21	0.43			1.07	0.20		1.04	0.66			

Intersection Summary

Area Type: Other

~ 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.

LOS Engineering

AM Existing + Cumulative
7: Pala Rd (SR-76) & I-15 NB Ramps

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0	4.0			
Lane Util. Factor	1.00	1.00			1.00	1.00		1.00	1.00			
Frt	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)	1583	1863			1863	1417		1770	1417			
Flt Permitted	0.95	1.00			1.00	1.00		0.95	1.00			
Satd. Flow (perm)	1583	1863			1863	1417		1770	1417			
Volume (vph)	500	594	0	0	887	129	277	0	320	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	526	625	0	0	934	136	292	0	337	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	13	0	0	284	0	0	0
Lane Group Flow (vph)	526	625	0	0	934	123	0	292	53	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Actuated Green, G (s)	33.0	93.0			56.0	56.0		19.0	19.0			
Effective Green, g (s)	33.0	93.0			56.0	56.0		19.0	19.0			
Actuated g/C Ratio	0.28	0.78			0.47	0.47		0.16	0.16			
Clearance Time (s)	4.0	4.0			4.0	4.0		4.0	4.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0	3.0			
Lane Grp Cap (vph)	435	1444			869	661		280	224			
v/s Ratio Prot	c0.33	0.34			c0.50							
v/s Ratio Perm						0.09		0.17	0.04			
v/c Ratio	1.21	0.43			1.07	0.19		1.04	0.24			
Uniform Delay, d1	43.5	4.6			32.0	18.7		50.5	44.2			
Progression Factor	1.31	3.00			1.00	1.00		1.00	1.00			
Incremental Delay, d2	96.2	0.0			52.7	0.1		65.4	2.5			
Delay (s)	153.3	13.7			84.7	18.8		115.9	46.7			
Level of Service	F	B			F	B		F	D			
Approach Delay (s)		77.5			76.3			78.8			0.0	
Approach LOS		E			E			E			A	

Intersection Summary

HCM Average Control Delay	77.3	HCM Level of Service	E
HCM Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	103.0%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

AM Existing + Cumulative

8: Pala Rd (SR-76) & Pankey Rd — HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	139	645	154	131	852	77	110	250	147	26	169	55
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	146	679	162	138	897	81	116	263	155	27	178	58
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	978			841			2413	2306	760	2552	2347	937
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	978			841			2413	2306	760	2552	2347	937
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	79			83			0	0	62	0	0	82
cM capacity (veh/h)	706			794			0	25	406	0	24	321

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	987	1116	534	263
Volume Left	146	138	116	27
Volume Right	162	81	155	58
cSH	706	794	0	0
Volume to Capacity	0.21	0.17	Err	Err
Queue Length 95th (ft)	19	16	Err	Err
Control Delay (s)	5.7	5.0	Err	Err
Lane LOS	A	A	F	F
Approach Delay (s)	5.7	5.0	Err	Err
Approach LOS			F	F

Intersection Summary			
Average Delay		Err	
Intersection Capacity Utilization	124.1%	ICU Level of Service	H
Analysis Period (min)		15	

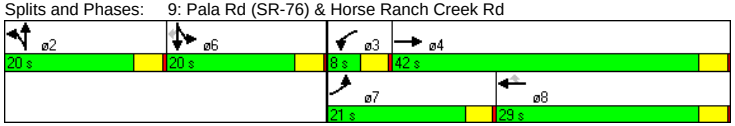
AM Existing + Cumulative

9: Pala Rd (SR-76) & Horse Ranch Creek Rd — Timings

Lane Group	EBL	EBT	WBT	WBR	SBL	SBT	SBR	ø2	ø3
Lane Configurations									
Volume (vph)	407	440	800	73	47	0	258		
Turn Type	Prot			Perm	Split		Perm		
Protected Phases	7	4	8		6	6		2	3
Permitted Phases				8			6		
Detector Phases	7	4	8	8	6	6	6		
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	8.0
Total Split (s)	21.0	42.0	29.0	29.0	20.0	20.0	20.0	20.0	8.0
Total Split (%)	23.3%	46.7%	32.2%	32.2%	22.2%	22.2%	22.2%	22%	9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lag	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					Yes
Recall Mode	None	None	None	None	Min	Min	Min	Min	None
Act Effct Green (s)	13.5	38.1	20.4	20.4	7.7	7.7	7.7		
Actuated g/C Ratio	0.21	0.60	0.32	0.32	0.12	0.12	0.12		
v/c Ratio	0.66	0.22	0.74	0.15	0.27	0.19	0.20		
Control Delay	29.1	6.1	24.3	5.5	32.0	0.6	0.7		
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay	29.1	6.1	24.3	5.5	32.0	0.6	0.7		
LOS	C	A	C	A	C	A	A		
Approach Delay		17.2	22.7			5.4			
Approach LOS		B	C			A			

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 63.7	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.74	
Intersection Signal Delay: 17.8	Intersection LOS: B
Intersection Capacity Utilization 49.0%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 9: Pala Rd (SR-76) & Horse Ranch Creek Rd



AM Existing + Cumulative
9: Pala Rd (SR-76) & Horse Ranch Creek Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	250		0	250		250	0		0	150		150
Storage Lanes	2		0	1		1	0		0	1		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50	50	50	50		50	50	50
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	0.95	0.91	0.95
Frt						0.850					0.850	0.850
Flt Protected	0.950									0.950		
Satd. Flow (prot)	3072	3539	0	1667	3539	1417	0	1863	0	1504	1441	1346
Flt Permitted	0.950									0.950		
Satd. Flow (perm)	3072	3539	0	1667	3539	1417	0	1863	0	1504	1441	1346
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						77					594	594
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2833			5160			734			1509	
Travel Time (s)		64.4			117.3			16.7			34.3	
Volume (vph)	407	440	0	0	800	73	0	0	0	47	0	258
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	428	463	0	0	842	77	0	0	0	49	0	272
Lane Group Flow (vph)	428	463	0	0	842	77	0	0	0	49	134	138
v/c Ratio	0.66	0.22			0.74	0.15				0.27	0.19	0.20
Control Delay	29.1	6.1			24.3	5.5				32.0	0.6	0.7
Queue Delay	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Total Delay	29.1	6.1			24.3	5.5				32.0	0.6	0.7
Queue Length 50th (ft)	80	36			151	0				18	0	0
Queue Length 95th (ft)	136	63			238	26				52	0	0
Internal Link Dist (ft)		2753			5080			654			1429	
Turn Bay Length (ft)	250					250				150		150
Base Capacity (vph)	788	2205			1309	573				339	785	764
Starvation Cap Reductn	0	0			0	0				0	0	0
Spillback Cap Reductn	0	0			0	0				0	0	0
Storage Cap Reductn	0	0			0	0				0	0	0
Reduced v/c Ratio	0.54	0.21			0.64	0.13				0.14	0.17	0.18

Intersection Summary
Area Type: Other

LOS Engineering

AM Existing + Cumulative
9: Pala Rd (SR-76) & Horse Ranch Creek Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0			4.0	4.0				4.0	4.0	4.0
Lane Util. Factor	0.97	0.95			0.95	1.00				0.95	0.91	0.95
Frt	1.00	1.00			1.00	0.85				1.00	0.85	0.85
Flt Protected	0.95	1.00			1.00	1.00				0.95	1.00	1.00
Satd. Flow (prot)	3072	3539			3539	1417				1504	1441	1346
Flt Permitted	0.95	1.00			1.00	1.00				0.95	1.00	1.00
Satd. Flow (perm)	3072	3539			3539	1417				1504	1441	1346
Volume (vph)	407	440	0	0	800	73	0	0	0	47	0	258
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	428	463	0	0	842	77	0	0	0	49	0	272
RTOR Reduction (vph)	0	0	0	0	0	52	0	0	0	0	118	121
Lane Group Flow (vph)	428	463	0	0	842	25	0	0	0	49	16	17
Turn Type	Prot			Prot		Perm	Split			Split		Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases						8						6
Actuated Green, G (s)	13.5	38.0			20.5	20.5				7.7	7.7	7.7
Effective Green, g (s)	13.5	38.0			20.5	20.5				7.7	7.7	7.7
Actuated g/C Ratio	0.21	0.60			0.32	0.32				0.12	0.12	0.12
Clearance Time (s)	4.0	4.0			4.0	4.0				4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0			3.0	3.0				3.0	3.0	3.0
Lane Grp Cap (vph)	655	2125			1146	459				183	175	164
v/s Ratio Prot	c0.14	0.13			c0.24					c0.03	0.01	
v/s Ratio Perm						0.02						0.01
v/c Ratio	0.65	0.22			0.73	0.05				0.27	0.09	0.10
Uniform Delay, d1	22.8	5.8			19.0	14.7				25.2	24.7	24.7
Progression Factor	1.00	1.00			1.00	1.00				1.00	1.00	1.00
Incremental Delay, d2	2.3	0.1			2.5	0.0				0.8	0.2	0.3
Delay (s)	25.1	5.9			21.5	14.8				26.0	24.9	25.0
Level of Service	C	A			C	B				C	C	C
Approach Delay (s)		15.1			20.9			0.0			25.1	
Approach LOS		B			C			A			C	

Intersection Summary			
HCM Average Control Delay	19.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	63.3	Sum of lost time (s)	21.6
Intersection Capacity Utilization	49.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

AM Existing + Cumulative

10: Pala Rd (SR-76) & Rice Canyon Rd — HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	32	1048	545	33	80	140
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	34	1103	574	35	84	147
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	608				1762	591
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	608				1762	591
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				6	71
cM capacity (veh/h)	970				89	507

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	1137	608	232
Volume Left	34	0	84
Volume Right	0	35	147
cSH	970	1700	188
Volume to Capacity	0.03	0.36	1.23
Queue Length 95th (ft)	3	0	311
Control Delay (s)	1.1	0.0	191.8
Lane LOS	A		F
Approach Delay (s)	1.1	0.0	191.8
Approach LOS			F

Intersection Summary			
Average Delay		23.1	
Intersection Capacity Utilization		102.2%	ICU Level of Service G
Analysis Period (min)		15	

LOS Engineering

AM Existing + Cumulative

11: Pala Rd (SR-76) & Couser Canyon Rd — HCM Unsignalized Intersection Capacity Analysis

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	987	37	6	513	65	30
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1039	39	6	540	68	32
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1078		1611	1058
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1078		1611	1058
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		40	88
cM capacity (veh/h)			647		114	273

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	1078	546	100
Volume Left	0	6	68
Volume Right	39	0	32
cSH	1700	647	139
Volume to Capacity	0.63	0.01	0.72
Queue Length 95th (ft)	0	1	103
Control Delay (s)	0.0	0.3	78.5
Lane LOS		A	F
Approach Delay (s)	0.0	0.3	78.5
Approach LOS			F

Intersection Summary			
Average Delay		4.6	
Intersection Capacity Utilization		66.9%	ICU Level of Service C
Analysis Period (min)		15	

LOS Engineering

AM Existing + Cumulative

12: Pala Mesa Dr & Old Hwy 395

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	250	121	300	78	56	67	52	368	109	138	717	24
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	263	127	316	82	59	71	55	387	115	145	755	25
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1655	1669	767	1979	1625	445	780			502		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1655	1669	767	1979	1625	445	780			502		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	0	21	0	29	89	93			86		
cM capacity (veh/h)	25	78	402	0	83	613	837			1062		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	706	82	129	55	502	145	780
Volume Left	263	82	0	55	0	145	0
Volume Right	316	0	71	0	115	0	25
cSH	55	0	156	837	1700	1062	1700
Volume to Capacity	12.78	Err	0.83	0.07	0.30	0.14	0.46
Queue Length 95th (ft)	Err	Err	137	5	0	12	0
Control Delay (s)	Err	Err	89.9	9.6	0.0	8.9	0.0
Lane LOS	F	F	F	A		A	
Approach Delay (s)	Err	Err		0.9		1.4	
Approach LOS	F	F					

Intersection Summary				
Average Delay		Err		
Intersection Capacity Utilization	101.5%		ICU Level of Service	G
Analysis Period (min)		15		

LOS Engineering

AM Existing + Cumulative

14: Stewart Canyon Rd & Old Hwy 395

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	21	14	35	18	3	189	8	404	15	278	1003	29
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	22	15	37	19	3	199	8	425	16	293	1056	31
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2299	2114	1071	2135	2122	433	1086			441		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2299	2114	1071	2135	2122	433	1086			441		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	60	86	0	91	68	99			74		
cM capacity (veh/h)	14	37	268	17	37	623	642			1119		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	74	221	8	441	293	1086
Volume Left	22	19	8	0	293	0
Volume Right	37	199	0	16	0	31
cSH	34	146	642	1700	1119	1700
Volume to Capacity	2.14	1.51	0.01	0.26	0.26	0.64
Queue Length 95th (ft)	207	373	1	0	26	0
Control Delay (s)	776.7	319.2	10.7	0.0	9.4	0.0
Lane LOS	F	F	B		A	
Approach Delay (s)	776.7	319.2	0.2		2.0	
Approach LOS	F	F				

Intersection Summary				
Average Delay		61.5		
Intersection Capacity Utilization	81.5%		ICU Level of Service	D
Analysis Period (min)		15		

LOS Engineering

AM Existing + Cumulative
15: Reche Rd & Old Hwy 395 HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	270	273	457	213	233	459
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	284	287	481	224	245	483
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1673	487	728			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1673	487	728			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	51	45			
cM capacity (veh/h)	47	581	875			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	572	481	224	728
Volume Left	284	481	0	0
Volume Right	287	0	0	483
cSH	88	875	1700	1700
Volume to Capacity	6.50	0.55	0.13	0.43
Queue Length 95th (ft)	Err	86	0	0
Control Delay (s)	Err	14.0	0.0	0.0
Lane LOS	F	B		
Approach Delay (s)	Err	9.6		0.0
Approach LOS	F			

Intersection Summary			
Average Delay	2853.5		
Intersection Capacity Utilization	114.2%	ICU Level of Service	H
Analysis Period (min)	15		

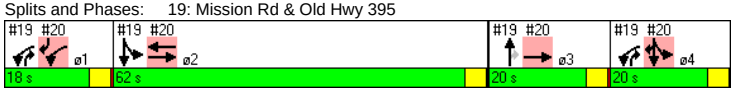
LOS Engineering

AM Existing + Cumulative
19: Mission Rd & Old Hwy 395 Timings

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	ø1	ø4
Lane Configurations								
Volume (vph)	199	1000	76	187	843	59		
Turn Type		Free		pm+ov	Split			
Protected Phases	1 4		3	1 4	2	2	1	4
Permitted Phases		Free		3				
Detector Phases	1 4		3	1 4	2	2		
Minimum Initial (s)			4.0		4.0	4.0	4.0	4.0
Minimum Split (s)			20.0		20.0	20.0	8.0	20.0
Total Split (s)	38.0	0.0	20.0	38.0	62.0	62.0	18.0	20.0
Total Split (%)	31.7%	0.0%	16.7%	31.7%	51.7%	51.7%	15%	17%
Yellow Time (s)			3.5		3.5	3.5	3.5	3.5
All-Red Time (s)			0.5		0.5	0.5	0.5	0.5
Lead/Lag			Lead		Lag	Lag	Lead	Lag
Lead-Lag Optimize?			Yes		Yes	Yes	Yes	Yes
Recall Mode			None		Min	Min	None	None
Act Effct Green (s)	34.0	119.7	15.7	53.7	58.0	58.0		
Actuated g/C Ratio	0.28	1.00	0.13	0.45	0.48	0.48		
v/c Ratio	0.46	0.74	0.33	0.31	1.16	0.07		
Control Delay	42.0	3.5	51.3	22.8	115.0	16.9		
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay	42.0	3.5	51.3	22.8	115.0	16.9		
LOS	D	A	D	C	F	B		
Approach Delay	9.9		31.1			108.6		
Approach LOS	A		C			F		

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 119.7	
Natural Cycle: 140	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.16	
Intersection Signal Delay: 49.9	Intersection LOS: D
Intersection Capacity Utilization 77.9%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 19: Mission Rd & Old Hwy 395



LOS Engineering

AM Existing + Cumulative
19: Mission Rd & Old Hwy 395 — Queues

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1700	1700	1900	1700	1700	1900
Storage Length (ft)	0	130		210	100	
Storage Lanes	1	1		1	1	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1583	1417	1863	1417	1583	1863
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1583	1417	1863	1417	1583	1863
Right Turn on Red		No		No		
Satd. Flow (RTOR)						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30		30			30
Link Distance (ft)	434		4960			1035
Travel Time (s)	9.9		112.7			23.5
Volume (vph)	199	1000	76	187	843	59
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	209	1053	80	197	887	62
Lane Group Flow (vph)	209	1053	80	197	887	62
v/c Ratio	0.46	0.74	0.33	0.31	1.16	0.07
Control Delay	42.0	3.5	51.3	22.8	115.0	16.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.0	3.5	51.3	22.8	115.0	16.9
Queue Length 50th (ft)	128	86	57	95	~813	25
Queue Length 95th (ft)	m136	m24	107	153	#1060	50
Internal Link Dist (ft)	354		4880			955
Turn Bay Length (ft)		130		210	100	
Base Capacity (vph)	450	1417	249	636	767	903
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	0.46	0.74	0.32	0.31	1.16	0.07

Intersection Summary

Area Type: Other

~ 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.

LOS Engineering

AM Existing + Cumulative
19: Mission Rd & Old Hwy 395 — HCM Signalized Intersection Capacity Analysis

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1700	1700	1900	1700	1700	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1583	1417	1863	1417	1583	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1583	1417	1863	1417	1583	1863
Volume (vph)	199	1000	76	187	843	59
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	209	1053	80	197	887	62
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	209	1053	80	197	887	62
Turn Type		Free		pm+ov	Split	
Protected Phases	1 4		3	1 4	2	2
Permitted Phases		Free		3		
Actuated Green, G (s)	34.0	119.7	15.7	49.7	58.0	58.0
Effective Green, g (s)	34.0	119.7	15.7	49.7	58.0	58.0
Actuated g/C Ratio	0.28	1.00	0.13	0.42	0.48	0.48
Clearance Time (s)			4.0		4.0	4.0
Vehicle Extension (s)			3.0		3.0	3.0
Lane Grp Cap (vph)	450	1417	244	636	767	903
v/s Ratio Prot	0.13		0.04	0.09	c0.56	0.03
v/s Ratio Perm		c0.74		0.05		
v/c Ratio	0.46	0.74	0.33	0.31	1.16	0.07
Uniform Delay, d1	35.3	0.0	47.2	23.5	30.9	16.4
Progression Factor	1.13	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	1.4	0.8	0.3	84.8	0.0
Delay (s)	40.1	1.4	48.0	23.8	115.7	16.5
Level of Service	D	A	D	C	F	B
Approach Delay (s)	7.8		30.8			109.2
Approach LOS	A		C			F

Intersection Summary

HCM Average Control Delay	49.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	119.7	Sum of lost time (s)	4.0
Intersection Capacity Utilization	77.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

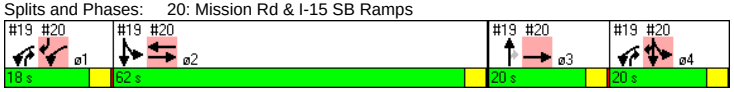
AM Existing + Cumulative
20: Mission Rd & I-15 SB Ramps

Timings

Lane Group	EBT	WBL	WBT	SBT	SBR	ø3
Lane Configurations						
Volume (vph)	737	117	369	8	845	
Turn Type		Prot			custom	
Protected Phases	2 3	1	2	4	1 4	3
Permitted Phases					4	
Detector Phases	2 3	1	2	4	1 4	
Minimum Initial (s)		4.0	4.0	4.0		4.0
Minimum Split (s)		8.0	20.0	20.0		20.0
Total Split (s)	82.0	18.0	62.0	20.0	38.0	20.0
Total Split (%)	68.3%	15.0%	51.7%	16.7%	31.7%	17%
Yellow Time (s)		3.5	3.5	3.5		3.5
All-Red Time (s)		0.5	0.5	0.5		0.5
Lead/Lag		Lead	Lag	Lag		Lead
Lead-Lag Optimize?		Yes	Yes	Yes		Yes
Recall Mode		None	Min	None		None
Act Effct Green (s)	77.7	14.0	58.0	16.0	34.0	
Actuated g/C Ratio	0.65	0.12	0.48	0.13	0.28	
v/c Ratio	0.90	0.66	0.43	0.07	1.13	
Control Delay	6.8	68.7	22.0	46.4	90.0	
Queue Delay	36.6	0.0	0.0	0.0	0.0	
Total Delay	43.4	68.7	22.0	46.4	90.0	
LOS	D	E	C	D	F	
Approach Delay	43.4		33.3	89.2		
Approach LOS	D		C	F		

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 119.7	
Natural Cycle: 140	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.16	
Intersection Signal Delay: 58.1	Intersection LOS: E
Intersection Capacity Utilization 84.6%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 20: Mission Rd & I-15 SB Ramps



LOS Engineering

AM Existing + Cumulative
20: Mission Rd & I-15 SB Ramps

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	0		0	285		0	0		0	0		200
Storage Lanes	0		0	1		0	0		0	0		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50		50	50					50	50	50
Trailing Detector (ft)		0		0	0					0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	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		0.964										0.850
Flt Protected				0.950							0.974	
Satd. Flow (prot)	0	1796	0	1583	1863	0	0	0	0	0	1814	1417
Flt Permitted				0.950							0.974	
Satd. Flow (perm)	0	1796	0	1583	1863	0	0	0	0	0	1814	1417
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		31										539
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		434			744			972			897	
Travel Time (s)		9.9			16.9			22.1			20.4	
Volume (vph)	0	737	270	117	369	0	0	0	0	9	8	845
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	776	284	123	388	0	0	0	0	9	8	889
Lane Group Flow (vph)	0	1060	0	123	388	0	0	0	0	0	17	889
v/c Ratio		0.90		0.66	0.43						0.07	1.13
Control Delay		6.8		68.7	22.0						46.4	90.0
Queue Delay		36.6		0.0	0.0						0.0	0.0
Total Delay		43.4		68.7	22.0						46.4	90.0
Queue Length 50th (ft)		86		93	191						12	~479
Queue Length 95th (ft)		m97		#175	273						34	#730
Internal Link Dist (ft)		354			664			892			817	
Turn Bay Length (ft)				285								200
Base Capacity (vph)		1181		185	903						243	789
Starvation Cap Reductn		195		0	0						0	0
Spillback Cap Reductn		0		0	0						0	0
Storage Cap Reductn		0		0	0						0	0
Reduced v/c Ratio		1.08		0.66	0.43						0.07	1.13

Intersection Summary	
Area Type:	Other
~	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.

LOS Engineering

AM Existing + Cumulative
20: Mission Rd & I-15 SB Ramps

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)		4.0		4.0	4.0						4.0	4.0
Lane Util. Factor		1.00		1.00	1.00						1.00	1.00
Frt		0.96		1.00	1.00						1.00	0.85
Flt Protected		1.00		0.95	1.00						0.97	1.00
Satd. Flow (prot)		1795		1583	1863						1815	1417
Flt Permitted		1.00		0.95	1.00						0.97	1.00
Satd. Flow (perm)		1795		1583	1863						1815	1417
Volume (vph)	0	737	270	117	369	0	0	0	0	9	8	845
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	776	284	123	388	0	0	0	0	9	8	889
RTOR Reduction (vph)	0	11	0	0	0	0	0	0	0	0	0	386
Lane Group Flow (vph)	0	1049	0	123	388	0	0	0	0	0	17	503
Turn Type				Prot						Split		custom
Protected Phases		2 3		1	2					4	4	1 4
Permitted Phases												4
Actuated Green, G (s)		77.7		14.0	58.0						16.0	34.0
Effective Green, g (s)		77.7		14.0	58.0						16.0	34.0
Actuated g/C Ratio		0.65		0.12	0.48						0.13	0.28
Clearance Time (s)				4.0	4.0						4.0	
Vehicle Extension (s)				3.0	3.0						3.0	
Lane Grp Cap (vph)		1165		185	903						243	402
v/s Ratio Prot		c0.58		0.08	0.21						0.01	c0.36
v/s Ratio Perm												
v/c Ratio		0.90		0.66	0.43						0.07	1.25
Uniform Delay, d1		17.7		50.6	20.1						45.3	42.9
Progression Factor		0.25		1.00	1.00						1.00	1.00
Incremental Delay, d2		1.0		8.7	0.3						0.1	132.2
Delay (s)		5.5		59.3	20.4						45.5	175.1
Level of Service		A		E	C						D	F
Approach Delay (s)		5.5			29.8			0.0			172.7	
Approach LOS		A			C			A			F	

Intersection Summary			
HCM Average Control Delay	71.6	HCM Level of Service	E
HCM Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	119.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	84.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

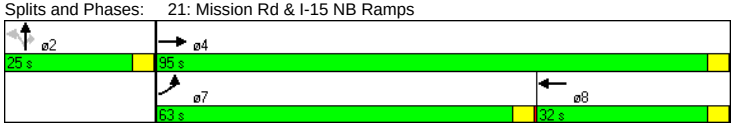
AM Existing + Cumulative
21: Mission Rd & I-15 NB Ramps

Timings

Lane Group	EBL	EBT	WBT	NBT	NBR
Lane Configurations					
Volume (vph)	542	173	299	4	80
Turn Type	Prot				Perm
Protected Phases	7	4	8	2	
Permitted Phases					2
Detector Phases	7	4	8	2	2
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0
Total Split (s)	63.0	95.0	32.0	25.0	25.0
Total Split (%)	52.5%	79.2%	26.7%	20.8%	20.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Recall Mode	None	None	None	Min	Min
Act Effct Green (s)	33.4	57.2	19.0	14.6	14.6
Actuated g/C Ratio	0.41	0.70	0.23	0.18	0.18
v/c Ratio	0.88	0.14	0.76	0.67	0.26
Control Delay	38.6	4.1	45.3	48.5	11.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	38.6	4.1	45.3	48.5	11.6
LOS	D	A	D	D	B
Approach Delay		30.3	45.3	38.1	
Approach LOS		C	D	D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 81.4	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.88	
Intersection Signal Delay: 35.6	Intersection LOS: D
Intersection Capacity Utilization 84.6%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 21: Mission Rd & I-15 NB Ramps



LOS Engineering

AM Existing + Cumulative
21: Mission Rd & I-15 NB Ramps

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	300		0	0		0	0		200	0		0
Storage Lanes	1		0	0		0	0		1	0		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50		50	50	50			
Trailing Detector (ft)	0	0			0		0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	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					0.995				0.850			
Flt Protected	0.950							0.953				
Satd. Flow (prot)	1583	1863	0	0	1853	0	0	1775	1417	0	0	0
Flt Permitted	0.950							0.953				
Satd. Flow (perm)	1583	1863	0	0	1853	0	0	1775	1417	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					2				84			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		744			1271			1082			1005	
Travel Time (s)		16.9			28.9			24.6			22.8	
Volume (vph)	542	173	0	0	299	12	200	4	80	0	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	571	182	0	0	315	13	211	4	84	0	0	0
Lane Group Flow (vph)	571	182	0	0	328	0	0	215	84	0	0	0
v/c Ratio	0.88	0.14			0.76			0.67	0.26			
Control Delay	38.6	4.1			45.3			48.5	11.6			
Queue Delay	0.0	0.0			0.0			0.0	0.0			
Total Delay	38.6	4.1			45.3			48.5	11.6			
Queue Length 50th (ft)	253	24			150			101	0			
Queue Length 95th (ft)	488	52			#362			#246	45			
Internal Link Dist (ft)		664			1191			1002			925	
Turn Bay Length (ft)	300								200			
Base Capacity (vph)	904	1494			620			467	434			
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	0.63	0.12			0.53			0.46	0.19			

Intersection Summary

Area Type: Other

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

LOS Engineering

AM Existing + Cumulative
21: Mission Rd & I-15 NB Ramps

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0			4.0			4.0	4.0			
Lane Util. Factor	1.00	1.00			1.00			1.00	1.00			
Frt	1.00	1.00			0.99			1.00	0.85			
Flt Protected	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (prot)	1583	1863			1853			1776	1417			
Flt Permitted	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (perm)	1583	1863			1853			1776	1417			
Volume (vph)	542	173	0	0	299	12	200	4	80	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	571	182	0	0	315	13	211	4	84	0	0	0
RTOR Reduction (vph)	0	0	0	0	2	0	0	0	69	0	0	0
Lane Group Flow (vph)	571	182	0	0	326	0	0	215	15	0	0	0
Turn Type	Prot						Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases							2		2			
Actuated Green, G (s)	33.4	57.2			19.8			14.6	14.6			
Effective Green, g (s)	33.4	57.2			19.8			14.6	14.6			
Actuated g/C Ratio	0.42	0.72			0.25			0.18	0.18			
Clearance Time (s)	4.0	4.0			4.0			4.0	4.0			
Vehicle Extension (s)	3.0	3.0			3.0			3.0	3.0			
Lane Grp Cap (vph)	663	1335			460			325	259			
v/s Ratio Prot	c0.36	0.10			c0.18							
v/s Ratio Perm								0.12	0.01			
v/c Ratio	0.86	0.14			0.71			0.66	0.06			
Uniform Delay, d1	21.1	3.5			27.4			30.3	26.9			
Progression Factor	1.00	1.00			1.00			1.00	1.00			
Incremental Delay, d2	11.1	0.0			5.0			5.0	0.1			
Delay (s)	32.2	3.6			32.4			35.3	27.0			
Level of Service	C	A			C			D	C			
Approach Delay (s)		25.3			32.4			33.0			0.0	
Approach LOS		C			C			C			A	

Intersection Summary

HCM Average Control Delay	28.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	79.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	84.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

AM Existing + Cumulative

22: Stewart Canyon Rd & Horse Ranch Creek Rd — HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Yield			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	20	284	188	7	16	22
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	299	198	7	17	23
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	432	28	40			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	432	28	40			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	71	87			
cM capacity (veh/h)	508	1047	1570			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	320	205	40
Volume Left	21	198	0
Volume Right	299	0	23
cSH	978	1570	1700
Volume to Capacity	0.33	0.13	0.02
Queue Length 95th (ft)	36	11	0
Control Delay (s)	10.5	7.4	0.0
Lane LOS	B	A	
Approach Delay (s)	10.5	7.4	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	8.6		
Intersection Capacity Utilization	42.8%	ICU Level of Service	A
Analysis Period (min)	15		

LOS Engineering

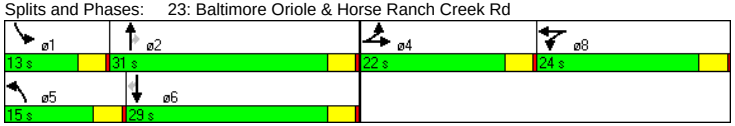
AM Existing + Cumulative

23: Baltimore Oriole & Horse Ranch Creek Rd — Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	12	2	177	26	49	145	136	24	228	42
Turn Type	Split		Split		Prot		Perm	Prot		Perm
Protected Phases	4	4	8	8	5	2		1	6	
Permitted Phases							2			6
Detector Phases	4	4	8	8	5	2	2	1	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0	20.0
Total Split (s)	22.0	22.0	24.0	24.0	15.0	31.0	31.0	13.0	29.0	29.0
Total Split (%)	24.4%	24.4%	26.7%	26.7%	16.7%	34.4%	34.4%	14.4%	32.2%	32.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag					Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	7.5	7.5	12.2	12.2	8.8	30.5	30.5	7.9	27.1	27.1
Actuated g/C Ratio	0.12	0.12	0.21	0.21	0.14	0.54	0.54	0.12	0.48	0.48
v/c Ratio	0.07	0.02	0.39	0.38	0.23	0.15	0.17	0.13	0.27	0.06
Control Delay	23.8	19.8	18.0	15.0	21.2	9.4	3.4	23.7	12.5	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.8	19.8	18.0	15.0	21.2	9.4	3.4	23.7	12.5	6.5
LOS	C	B	B	B	C	A	A	C	B	A
Approach Delay		22.7		16.4		8.7			12.6	
Approach LOS		C		B		A			B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 56.3	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.39	
Intersection Signal Delay: 12.4	Intersection LOS: B
Intersection Capacity Utilization 38.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 23: Baltimore Oriole & Horse Ranch Creek Rd



LOS Engineering

AM Existing + Cumulative

23: Baltimore Oriole & Horse Ranch Creek Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	50
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.910			0.950				0.850			0.850
Flt Protected	0.950			0.950	0.977		0.950			0.950		
Satd. Flow (prot)	1583	1695	0	1504	1642	0	1583	1863	1417	1583	1863	1417
Flt Permitted	0.950			0.950	0.977		0.950			0.950		
Satd. Flow (perm)	1583	1695	0	1504	1642	0	1583	1863	1417	1583	1863	1417
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			26				143			44
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1047			1324			958			2343	
Travel Time (s)		23.8			30.1			21.8			53.3	
Volume (vph)	12	2	3	177	26	44	49	145	136	24	228	42
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	13	2	3	186	27	46	52	153	143	25	240	44
Lane Group Flow (vph)	13	5	0	122	137	0	52	153	143	25	240	44
v/c Ratio	0.07	0.02		0.39	0.38		0.23	0.15	0.17	0.13	0.27	0.06
Control Delay	23.8	19.8		18.0	15.0		21.2	9.4	3.4	23.7	12.5	6.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.8	19.8		18.0	15.0		21.2	9.4	3.4	23.7	12.5	6.5
Queue Length 50th (ft)	1	0		9	8		4	11	0	2	17	0
Queue Length 95th (ft)	20	10		92	88		48	91	35	30	145	21
Internal Link Dist (ft)		967			1244			878			2263	
Turn Bay Length (ft)												
Base Capacity (vph)	441	475		552	619		325	1213	972	263	1136	882
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	0.03	0.01		0.22	0.22		0.16	0.13	0.15	0.10	0.21	0.05

Intersection Summary

Area Type: Other

LOS Engineering

AM Existing + Cumulative

23: Baltimore Oriole & Horse Ranch Creek Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
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	1.00		0.95	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.91		1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1583	1695		1504	1642		1583	1863	1417	1583	1863	1417
Flt Permitted	0.95	1.00		0.95	0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1583	1695		1504	1642		1583	1863	1417	1583	1863	1417
Volume (vph)	12	2	3	177	26	44	49	145	136	24	228	42
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	13	2	3	186	27	46	52	153	143	25	240	44
RTOR Reduction (vph)	0	3	0	0	21	0	0	0	71	0	0	24
Lane Group Flow (vph)	13	2	0	122	116	0	52	153	72	25	240	20
Turn Type	Split			Split			Prot		Perm	Prot		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	1.2	1.2		11.3	11.3		3.8	30.1	30.1	1.4	27.7	27.7
Effective Green, g (s)	1.2	1.2		11.3	11.3		3.8	30.1	30.1	1.4	27.7	27.7
Actuated g/C Ratio	0.02	0.02		0.19	0.19		0.06	0.50	0.50	0.02	0.46	0.46
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	32	34		283	309		100	935	711	37	860	654
v/s Ratio Prot	c0.01	0.00		c0.08	0.07		c0.03	0.08		0.02	c0.13	
v/s Ratio Perm									0.05			0.01
v/c Ratio	0.41	0.06		0.43	0.38		0.52	0.16	0.10	0.68	0.28	0.03
Uniform Delay, d1	29.0	28.8		21.5	21.3		27.2	8.1	7.8	29.1	10.0	8.8
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.2	0.7		1.1	0.8		4.8	0.1	0.1	39.3	0.2	0.0
Delay (s)	37.3	29.6		22.6	22.0		32.0	8.2	7.9	68.4	10.2	8.8
Level of Service	D	C		C	C		C	A	A	E	B	A
Approach Delay (s)		35.1			22.3			11.6			14.7	
Approach LOS		D			C			B			B	

Intersection Summary

HCM Average Control Delay	16.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	38.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

AM Existing + Cumulative

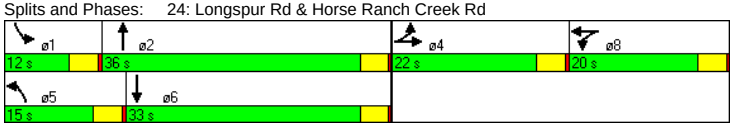
24: Longspur Rd & Horse Ranch Creek Rd — Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	7	29	151	39	115	256	30	328
Turn Type	Split		Split		Prot		Prot	
Protected Phases	4	4	8	8	5	2	1	6
Permitted Phases								
Detector Phases	4	4	8	8	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	22.0	22.0	20.0	20.0	15.0	36.0	12.0	33.0
Total Split (%)	24.4%	24.4%	22.2%	22.2%	16.7%	40.0%	13.3%	36.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Max	None	Max
Act Effct Green (s)	7.4	7.4	11.0	11.0	10.0	47.5	7.0	40.1
Actuated g/C Ratio	0.09	0.09	0.14	0.14	0.12	0.61	0.08	0.51
v/c Ratio	0.05	0.37	0.53	0.52	0.62	0.22	0.24	0.22
Control Delay	32.1	22.9	38.6	32.1	44.8	7.2	38.8	14.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.1	22.9	38.6	32.1	44.8	7.2	38.8	14.5
LOS	C	C	D	C	D	A	D	B
Approach Delay		23.7		35.1		15.1		16.3
Approach LOS		C		D		B		B

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 78.5
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.62
Intersection Signal Delay: 19.6 — Intersection LOS: B
Intersection Capacity Utilization 40.7% — ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 24: Longspur Rd & Horse Ranch Creek Rd



AM Existing + Cumulative

24: Longspur Rd & Horse Ranch Creek Rd — Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.915			0.956			0.939			0.980	
Flt Protected	0.950			0.950	0.981		0.950			0.950		
Satd. Flow (prot)	1583	1704	0	1504	1660	0	1583	3323	0	1583	3468	0
Flt Permitted	0.950			0.950	0.981		0.950			0.950		
Satd. Flow (perm)	1583	1704	0	1504	1660	0	1583	3323	0	1583	3468	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		40			20			184			20	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1010			908			1206			958	
Travel Time (s)		23.0			20.6			27.4			21.8	
Volume (vph)	7	29	38	151	39	35	115	256	175	30	328	50
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	7	31	40	159	41	37	121	269	184	32	345	53
Lane Group Flow (vph)	7	71	0	110	127	0	121	453	0	32	398	0
v/c Ratio	0.05	0.37		0.53	0.52		0.62	0.22		0.24	0.22	
Control Delay	32.1	22.9		38.6	32.1		44.8	7.2		38.8	14.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	32.1	22.9		38.6	32.1		44.8	7.2		38.8	14.5	
Queue Length 50th (ft)	3	13		49	47		51	25		14	59	
Queue Length 95th (ft)	15	52		103	103		#117	81		43	109	
Internal Link Dist (ft)		930			828			1126			878	
Turn Bay Length (ft)												
Base Capacity (vph)	317	374		286	332		217	2082		149	1780	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.02	0.19		0.38	0.38		0.56	0.22		0.21	0.22	

Intersection Summary

Area Type: Other
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

AM Existing + Cumulative

24: Longspur Rd & Horse Ranch Creek Rd — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		0.95	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.92		1.00	0.96		1.00	0.94		1.00	0.98	
Flt Protected	0.95	1.00		0.95	0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	1705		1504	1660		1583	3324		1583	3469	
Flt Permitted	0.95	1.00		0.95	0.98		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	1705		1504	1660		1583	3324		1583	3469	
Volume (vph)	7	29	38	151	39	35	115	256	175	30	328	50
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	7	31	40	159	41	37	121	269	184	32	345	53
RTOR Reduction (vph)	0	37	0	0	18	0	0	79	0	0	10	0
Lane Group Flow (vph)	7	34	0	110	109	0	121	374	0	32	388	0
Turn Type	Split			Split			Prot			Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	6.4	6.4		9.9	9.9		8.8	46.8		3.1	41.1	
Effective Green, g (s)	6.4	6.4		9.9	9.9		8.8	46.8		3.1	41.1	
Actuated g/C Ratio	0.08	0.08		0.12	0.12		0.11	0.57		0.04	0.50	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	123	133		181	200		169	1892		60	1735	
v/s Ratio Prot	0.00	c0.02		c0.07	0.07		c0.08	0.11		0.02	c0.11	
v/s Ratio Perm												
v/c Ratio	0.06	0.26		0.61	0.55		0.72	0.20		0.53	0.22	
Uniform Delay, d1	35.1	35.7		34.3	34.0		35.5	8.6		38.8	11.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	1.0		5.7	3.0		13.5	0.2		8.8	0.3	
Delay (s)	35.3	36.7		40.0	37.1		48.9	8.8		47.7	11.9	
Level of Service	D	D		D	D		D	A		D	B	
Approach Delay (s)		36.6			38.4			17.3			14.5	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM Average Control Delay	21.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	82.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	40.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

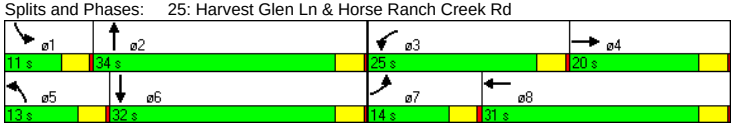
AM Existing + Cumulative

25: Harvest Glen Ln & Horse Ranch Creek Rd — Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	1	14	125	13	49	517	42	467
Turn Type	Prot		Prot		Prot		Prot	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases								
Detector Phases	7	4	3	8	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	14.0	20.0	25.0	31.0	13.0	34.0	11.0	32.0
Total Split (%)	15.6%	22.2%	27.8%	34.4%	14.4%	37.8%	12.2%	35.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	6.4	6.8	10.5	10.5	7.7	30.9	7.1	30.4
Actuated g/C Ratio	0.11	0.11	0.19	0.20	0.13	0.60	0.12	0.59
v/c Ratio	0.01	0.09	0.43	0.13	0.25	0.35	0.22	0.24
Control Delay	27.0	23.8	20.3	10.7	23.9	9.5	25.0	10.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.0	23.8	20.3	10.7	23.9	9.5	25.0	10.0
LOS	C	C	C	B	C	A	C	A
Approach Delay		24.0		17.8		10.5		11.2
Approach LOS		C		B		B		B

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 51.8	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.43	
Intersection Signal Delay: 11.8	Intersection LOS: B
Intersection Capacity Utilization 47.2%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 25: Harvest Glen Ln & Horse Ranch Creek Rd



AM Existing + Cumulative

25: Harvest Glen Ln & Horse Ranch Creek Rd — Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.975			0.897			0.964			0.998	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1583	1816	0	1583	1671	0	1583	3412	0	1583	3532	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1583	1816	0	1583	1671	0	1583	3412	0	1583	3532	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			31			49			1	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1058			1173			1033			1206	
Travel Time (s)		24.0			26.7			23.5			27.4	
Volume (vph)	1	14	3	125	13	29	49	517	161	42	467	5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1	15	3	132	14	31	52	544	169	44	492	5
Lane Group Flow (vph)	1	18	0	132	45	0	52	713	0	44	497	0
v/c Ratio	0.01	0.09		0.43	0.13		0.25	0.35		0.22	0.24	
Control Delay	27.0	23.8		20.3	10.7		23.9	9.5		25.0	10.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	27.0	23.8		20.3	10.7		23.9	9.5		25.0	10.0	
Queue Length 50th (ft)	0	2		14	1		6	28		5	20	
Queue Length 95th (ft)	5	24		98	28		52	174		48	130	
Internal Link Dist (ft)		978			1093			953			1126	
Turn Bay Length (ft)												
Base Capacity (vph)	278	461		558	704		269	2320		216	2340	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.00	0.04		0.24	0.06		0.19	0.31		0.20	0.21	

Intersection Summary

Area Type: Other

LOS Engineering

AM Existing + Cumulative

25: Harvest Glen Ln & Horse Ranch Creek Rd — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.97		1.00	0.90		1.00	0.96		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	1816		1583	1670		1583	3413		1583	3534	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	1816		1583	1670		1583	3413		1583	3534	
Volume (vph)	1	14	3	125	13	29	49	517	161	42	467	5
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1	15	3	132	14	31	52	544	169	44	492	5
RTOR Reduction (vph)	0	3	0	0	26	0	0	24	0	0	0	0
Lane Group Flow (vph)	1	15	0	132	19	0	52	689	0	44	497	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	0.9	1.2		8.3	8.6		3.0	29.4		2.5	28.9	
Effective Green, g (s)	0.9	1.2		8.3	8.6		3.0	29.4		2.5	28.9	
Actuated g/C Ratio	0.02	0.02		0.14	0.15		0.05	0.51		0.04	0.50	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	25	38		229	250		83	1748		69	1779	
v/s Ratio Prot	0.00	c0.01		c0.08	0.01		c0.03	c0.20		0.03	0.14	
v/s Ratio Perm												
v/c Ratio	0.04	0.40		0.58	0.07		0.63	0.39		0.64	0.28	
Uniform Delay, d1	27.8	27.7		22.9	21.0		26.7	8.6		27.0	8.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	6.7		3.5	0.1		13.8	0.1		17.7	0.1	
Delay (s)	28.5	34.4		26.4	21.1		40.5	8.7		44.7	8.3	
Level of Service	C	C		C	C		D	A		D	A	
Approach Delay (s)		34.1			25.1			10.9			11.3	
Approach LOS		C			C			B			B	

Intersection Summary

HCM Average Control Delay	13.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	57.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	47.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

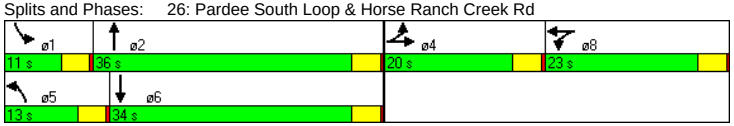
AM Existing + Cumulative
26: Pardee South Loop & Horse Ranch Creek Rd

Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	62	0	42	0	18	659	7	570
Turn Type	Split		Split		Prot		Prot	
Protected Phases	4	4	8	8	5	2	1	6
Permitted Phases								
Detector Phases	4	4	8	8	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	20.0	20.0	23.0	23.0	13.0	36.0	11.0	34.0
Total Split (%)	22.2%	22.2%	25.6%	25.6%	14.4%	40.0%	12.2%	37.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	9.3	9.3	8.2	8.2	7.6	46.7	7.1	46.5
Actuated g/C Ratio	0.14	0.14	0.12	0.12	0.11	0.75	0.10	0.75
v/c Ratio	0.30	0.04	0.17	0.18	0.11	0.27	0.04	0.24
Control Delay	20.4	0.1	20.9	14.0	23.2	7.7	23.9	7.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.4	0.1	20.9	14.0	23.2	7.7	23.9	7.7
LOS	C	A	C	B	C	A	C	A
Approach Delay		15.0		17.1		8.1		7.9
Approach LOS		B		B		A		A

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 62.4	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.30	
Intersection Signal Delay: 8.8	Intersection LOS: A
Intersection Capacity Utilization 35.8%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 26: Pardee South Loop & Horse Ranch Creek Rd



LOS Engineering

AM Existing + Cumulative
26: Pardee South Loop & Horse Ranch Creek Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.850			0.900			0.997			0.995	
Flt Protected	0.950			0.950	0.984		0.950			0.950		
Satd. Flow (prot)	1583	1583	0	1504	1567	0	1583	3529	0	1583	3522	0
Flt Permitted	0.950			0.950	0.984		0.950			0.950		
Satd. Flow (perm)	1583	1583	0	1504	1567	0	1583	3529	0	1583	3522	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		474			26			3			4	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		869			1419			1340			1033	
Travel Time (s)		19.8			32.3			30.5			23.5	
Volume (vph)	62	0	23	42	0	25	18	659	14	7	570	21
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	65	0	24	44	0	26	19	694	15	7	600	22
Lane Group Flow (vph)	65	24	0	31	39	0	19	709	0	7	622	0
v/c Ratio	0.30	0.04		0.17	0.18		0.11	0.27		0.04	0.24	
Control Delay	20.4	0.1		20.9	14.0		23.2	7.7		23.9	7.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	20.4	0.1		20.9	14.0		23.2	7.7		23.9	7.7	
Queue Length 50th (ft)	5	0		2	1		2	0		1	0	
Queue Length 95th (ft)	56	0		35	31		25	169		14	150	
Internal Link Dist (ft)		789			1339			1260			953	
Turn Bay Length (ft)												
Base Capacity (vph)	387	745		411	447		233	2801		188	2769	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.17	0.03		0.08	0.09		0.08	0.25		0.04	0.22	

Intersection Summary	
Area Type:	Other

LOS Engineering

AM Existing + Cumulative

26: Pardee South Loop & Horse Ranch Creek Rd — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		0.95	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.85		1.00	0.90		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	1583		1504	1567		1583	3528		1583	3520	
Flt Permitted	0.95	1.00		0.95	0.98		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	1583		1504	1567		1583	3528		1583	3520	
Volume (vph)	62	0	23	42	0	25	18	659	14	7	570	21
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	65	0	24	44	0	26	19	694	15	7	600	22
RTOR Reduction (vph)	0	22	0	0	25	0	0	1	0	0	1	0
Lane Group Flow (vph)	65	2	0	31	14	0	19	708	0	7	621	0
Turn Type	Split			Split			Prot			Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	4.4	4.4		3.7	3.7		1.5	43.3		1.3	43.1	
Effective Green, g (s)	4.4	4.4		3.7	3.7		1.5	43.3		1.3	43.1	
Actuated g/C Ratio	0.06	0.06		0.05	0.05		0.02	0.63		0.02	0.63	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	101	101		81	84		35	2224		30	2208	
v/s Ratio Prot	c0.04	0.00		c0.02	0.01		c0.01	c0.20		0.00	0.18	
v/s Ratio Perm												
v/c Ratio	0.64	0.02		0.38	0.17		0.54	0.32		0.23	0.28	
Uniform Delay, d1	31.4	30.1		31.4	31.0		33.3	5.9		33.2	5.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	13.2	0.1		3.0	1.0		16.1	0.1		4.0	0.1	
Delay (s)	44.6	30.2		34.4	32.0		49.3	6.0		37.2	5.9	
Level of Service	D	C		C	C		D	A		D	A	
Approach Delay (s)		40.7			33.1			7.1			6.2	
Approach LOS		D			C			A			A	

Intersection Summary			
HCM Average Control Delay	9.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	68.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	35.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

AM Existing + Cumulative

27: School/Park Access & Horse Ranch Creek Rd — HCM Unsignalized Intersection Capacity Analysis

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	0	691	0	0	664
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	727	0	0	699
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1077	364			727	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1077	364			727	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	214	633			872	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	0	485	242	349	349
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	0
cSH	1700	1700	1700	1700	1700
Volume to Capacity	0.00	0.29	0.14	0.21	0.21
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS	A				
Approach Delay (s)	0.0	0.0		0.0	
Approach LOS	A				

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	22.4%	ICU Level of Service	A
Analysis Period (min)	15		

LOS Engineering

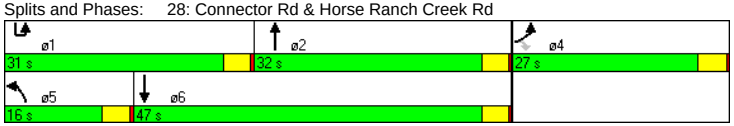
AM Existing + Cumulative
28: Connector Rd & Horse Ranch Creek Rd

Timings

Lane Group	EBL	EBR	NBL	NBT	SBT	ø1
Lane Configurations						
Volume (vph)	219	6	2	476	297	
Turn Type		Perm	Prot			
Protected Phases	4		5	2	6	1
Permitted Phases		4				
Detector Phases	4	4	5	2	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0	8.0
Total Split (s)	27.0	27.0	16.0	32.0	47.0	31.0
Total Split (%)	30.0%	30.0%	17.8%	35.6%	52.2%	34%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag			Lead	Lag	Lag	Lead
Lead-Lag Optimize?			Yes	Yes	Yes	Yes
Recall Mode	None	None	None	Min	Min	None
Act Effct Green (s)	8.8	8.8	5.9	20.9	19.3	
Actuated g/C Ratio	0.23	0.23	0.13	0.58	0.53	
v/c Ratio	0.33	0.02	0.01	0.25	0.37	
Control Delay	10.6	7.8	15.5	4.9	3.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	10.6	7.8	15.5	4.9	3.9	
LOS	B	A	B	A	A	
Approach Delay	10.5			4.9	3.9	
Approach LOS	B			A	A	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 36.3	
Natural Cycle: 50	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.37	
Intersection Signal Delay: 5.4	Intersection LOS: A
Intersection Capacity Utilization 34.0%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 28: Connector Rd & Horse Ranch Creek Rd



LOS Engineering

AM Existing + Cumulative
28: Connector Rd & Horse Ranch Creek Rd

Queues

Lane Group	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Ideal Flow (vphpl)	1700	1700	1700	1900	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	
Trailing Detector (ft)	0	0	0	0	0	0	
Turning Speed (mph)	15	9	15		9		9
Lane Util. Factor	0.97	1.00	1.00	0.95	1.00	0.95	0.95
Frt		0.850				0.916	
Flt Protected	0.950		0.950				
Satd. Flow (prot)	3072	1417	1583	3539	1667	3242	0
Flt Permitted	0.950		0.950				
Satd. Flow (perm)	3072	1417	1583	3539	1667	3242	0
Right Turn on Red		Yes					Yes
Satd. Flow (RTOR)		6				397	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30			30		30	
Link Distance (ft)	2875			1509		1400	
Travel Time (s)	65.3			34.3		31.8	
Volume (vph)	219	6	2	476	0	297	377
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	231	6	2	501	0	313	397
Lane Group Flow (vph)	231	6	2	501	0	710	0
v/c Ratio	0.33	0.02	0.01	0.25		0.37	
Control Delay	10.6	7.8	15.5	4.9		3.9	
Queue Delay	0.0	0.0	0.0	0.0		0.0	
Total Delay	10.6	7.8	15.5	4.9		3.9	
Queue Length 50th (ft)	10	0	0	19		11	
Queue Length 95th (ft)	47	6	5	45		61	
Internal Link Dist (ft)	2795			1429		1320	
Turn Bay Length (ft)							
Base Capacity (vph)	1412	654	392	2504		2567	
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	0.16	0.01	0.01	0.20		0.28	

Intersection Summary	
Area Type:	Other

LOS Engineering

AM Existing + Cumulative

28: Connector Rd & Horse Ranch Creek Rd — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Ideal Flow (vphpl)	1700	1700	1700	1900	1700	1900	1700
Total Lost time (s)	4.0	4.0	4.0	4.0		4.0	
Lane Util. Factor	0.97	1.00	1.00	0.95		0.95	
Frt	1.00	0.85	1.00	1.00		0.92	
Flt Protected	0.95	1.00	0.95	1.00		1.00	
Satd. Flow (prot)	3072	1417	1583	3539		3242	
Flt Permitted	0.95	1.00	0.95	1.00		1.00	
Satd. Flow (perm)	3072	1417	1583	3539		3242	
Volume (vph)	219	6	2	476	0	297	377
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	231	6	2	501	0	313	397
RTOR Reduction (vph)	0	5	0	0	0	207	0
Lane Group Flow (vph)	231	1	2	501	0	503	0
Turn Type		Perm	Prot		Prot		
Protected Phases	4		5	2	1	6	
Permitted Phases		4					
Actuated Green, G (s)	7.6	7.6	0.9	23.7		18.8	
Effective Green, g (s)	7.6	7.6	0.9	23.7		18.8	
Actuated g/C Ratio	0.19	0.19	0.02	0.60		0.48	
Clearance Time (s)	4.0	4.0	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	594	274	36	2134		1551	
v/s Ratio Prot	c0.08		0.00	c0.14		c0.16	
v/s Ratio Perm		0.00					
v/c Ratio	0.39	0.00	0.06	0.23		0.32	
Uniform Delay, d1	13.8	12.8	18.8	3.6		6.3	
Progression Factor	1.00	1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.4	0.0	0.6	0.1		0.1	
Delay (s)	14.2	12.8	19.4	3.7		6.5	
Level of Service	B	B	B	A		A	
Approach Delay (s)	14.2			3.7		6.5	
Approach LOS	B			A		A	

Intersection Summary			
HCM Average Control Delay	6.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	39.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	34.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

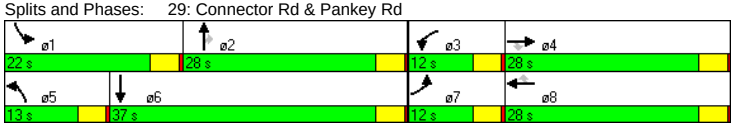
AM Existing + Cumulative

29: Connector Rd & Pankey Rd — Timings

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Volume (vph)	50	112	200	29	262	169	150	299	10	126	19
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot	
Protected Phases	7	4		3	8		5	2		1	6
Permitted Phases			4			8			2		
Detector Phases	7	4	4	3	8	8	5	2	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0
Total Split (s)	12.0	28.0	28.0	12.0	28.0	28.0	13.0	28.0	28.0	22.0	37.0
Total Split (%)	13.3%	31.1%	31.1%	13.3%	31.1%	31.1%	14.4%	31.1%	31.1%	24.4%	41.1%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min
Act Effct Green (s)	7.2	16.4	16.4	7.0	14.3	14.3	10.6	22.5	22.5	10.5	15.7
Actuated g/C Ratio	0.11	0.27	0.27	0.11	0.24	0.24	0.18	0.37	0.37	0.16	0.26
v/c Ratio	0.30	0.35	0.34	0.19	0.63	0.38	0.57	0.45	0.02	0.51	0.05
Control Delay	37.6	20.9	6.9	37.3	30.6	7.1	43.0	24.4	12.8	35.4	16.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.6	20.9	6.9	37.3	30.6	7.1	43.0	24.4	12.8	35.4	16.4
LOS	D	C	A	D	C	A	D	C	B	D	B
Approach Delay		17.3			22.4			30.2			32.4
Approach LOS		B			C			C			C

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 60.2	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.63	
Intersection Signal Delay: 24.6	Intersection LOS: C
Intersection Capacity Utilization 54.0%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 29: Connector Rd & Pankey Rd



LOS Engineering

AM Existing + Cumulative
29: Connector Rd & Pankey Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	50	50	50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.957	0.850			0.850			0.850		0.970	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1583	1694	1346	1583	1863	1417	1583	1863	1417	1583	1807	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1583	1694	1346	1583	1863	1417	1583	1863	1417	1583	1807	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		22	163			178			11		5	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1256			2875			1488			1443	
Travel Time (s)		28.5			65.3			33.8			32.8	
Volume (vph)	50	112	200	29	262	169	150	299	10	126	19	5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	118	211	31	276	178	158	315	11	133	20	5
Lane Group Flow (vph)	53	166	163	31	276	178	158	315	11	133	25	0
v/c Ratio	0.30	0.35	0.34	0.19	0.63	0.38	0.57	0.45	0.02	0.51	0.05	
Control Delay	37.6	20.9	6.9	37.3	30.6	7.1	43.0	24.4	12.8	35.4	16.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	37.6	20.9	6.9	37.3	30.6	7.1	43.0	24.4	12.8	35.4	16.4	
Queue Length 50th (ft)	20	37	0	12	100	0	61	113	0	49	6	
Queue Length 95th (ft)	66	128	48	44	215	48	#216	247	13	122	24	
Internal Link Dist (ft)		1176			2795			1408			1363	
Turn Bay Length (ft)												
Base Capacity (vph)	209	660	615	203	681	631	278	784	603	414	811	
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	0.25	0.25	0.27	0.15	0.41	0.28	0.57	0.40	0.02	0.32	0.03	

Intersection Summary

Area Type: Other

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

LOS Engineering

AM Existing + Cumulative
29: Connector Rd & Pankey Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.96	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
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)	1583	1693	1346	1583	1863	1417	1583	1863	1417	1583	1807	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1583	1693	1346	1583	1863	1417	1583	1863	1417	1583	1807	
Volume (vph)	50	112	200	29	262	169	150	299	10	126	19	5
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	118	211	31	276	178	158	315	11	133	20	5
RTOR Reduction (vph)	0	16	121	0	0	136	0	0	7	0	4	0
Lane Group Flow (vph)	53	150	42	31	276	42	158	315	4	133	21	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	3.7	16.4	16.4	2.3	15.0	15.0	10.6	22.5	22.5	6.5	18.4	
Effective Green, g (s)	3.7	16.4	16.4	2.3	15.0	15.0	10.6	22.5	22.5	6.5	18.4	
Actuated g/C Ratio	0.06	0.26	0.26	0.04	0.24	0.24	0.17	0.35	0.35	0.10	0.29	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	92	436	347	57	439	334	263	658	501	162	522	
v/s Ratio Prot	c0.03	0.09		0.02	c0.15		c0.10	c0.17		c0.08	0.01	
v/s Ratio Perm			0.03			0.03			0.00			
v/c Ratio	0.58	0.34	0.12	0.54	0.63	0.13	0.60	0.48	0.01	0.82	0.04	
Uniform Delay, d1	29.2	19.3	18.1	30.2	21.9	19.2	24.6	16.0	13.4	28.0	16.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	8.5	0.5	0.2	10.2	2.8	0.2	3.8	0.6	0.0	27.1	0.0	
Delay (s)	37.7	19.7	18.3	40.4	24.7	19.4	28.4	16.6	13.4	55.2	16.3	
Level of Service	D	B	B	D	C	B	C	B	B	E	B	
Approach Delay (s)		21.6			23.7			20.4			49.0	
Approach LOS		C			C			C			D	

Intersection Summary

HCM Average Control Delay	24.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	63.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	54.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

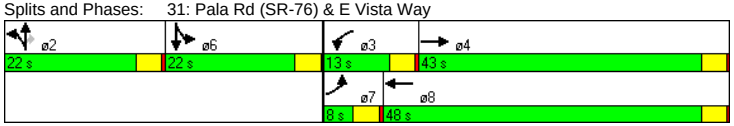
AM Existing + Cumulative
31: Pala Rd (SR-76) & E Vista Way

Timings

Lane Group	EBL	EBT	WBL	WBT	NBT	NBR	SBT
Lane Configurations							
Volume (vph)	74	945	291	1666	47	283	200
Turn Type	Prot		Prot			Perm	
Protected Phases	7	4	3	8	2		6
Permitted Phases						2	
Detector Phases	7	4	3	8	2	2	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	20.0	20.0	20.0
Total Split (s)	8.0	43.0	13.0	48.0	22.0	22.0	22.0
Total Split (%)	8.0%	43.0%	13.0%	48.0%	22.0%	22.0%	22.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lead	Lag			
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			
Recall Mode	None	None	None	None	Max	Max	Max
Act Effct Green (s)	4.0	39.0	9.0	44.0	18.0	18.0	18.0
Actuated g/C Ratio	0.04	0.39	0.09	0.44	0.18	0.18	0.18
v/c Ratio	1.24	1.00	1.11	2.17	1.14	0.60	1.34
Control Delay	232.8	54.4	129.7	550.2	131.4	9.9	201.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	232.8	54.4	129.7	550.2	131.4	9.9	201.3
LOS	F	D	F	F	F	A	F
Approach Delay		64.0		488.4	76.8		201.3
Approach LOS		E		F	E		F

Intersection Summary	
Cycle Length: 100	
Actuated Cycle Length: 100	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 2.17	
Intersection Signal Delay: 269.4	Intersection LOS: F
Intersection Capacity Utilization 151.5%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 31: Pala Rd (SR-76) & E Vista Way



AM Existing + Cumulative
31: Pala Rd (SR-76) & E Vista Way

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	300		150	450		0	0		200	0		0
Storage Lanes	1		0	2		0	0		1	0		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.960			0.998				0.850		0.927	
Flt Protected	0.950			0.950				0.959			0.999	
Satd. Flow (prot)	1583	3398	0	3072	1859	0	0	1786	1417	0	1725	0
Flt Permitted	0.950			0.950				0.959			0.999	
Satd. Flow (perm)	1583	3398	0	3072	1859	0	0	1786	1417	0	1725	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		62			1				298		51	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		710			526			797			552	
Travel Time (s)		16.1			12.0			18.1			12.5	
Volume (vph)	74	945	350	291	1666	20	300	47	283	6	200	241
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	78	995	368	306	1754	21	316	49	298	6	211	254
Lane Group Flow (vph)	78	1363	0	306	1775	0	0	365	298	0	471	0
v/c Ratio	1.24	1.00		1.11	2.17			1.14	0.60		1.34	
Control Delay	232.8	54.4		129.7	550.2			131.4	9.9		201.3	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay	232.8	54.4		129.7	550.2			131.4	9.9		201.3	
Queue Length 50th (ft)	~62	434		~115	~1848			~273	0		~368	
Queue Length 95th (ft)	#157	#601		#201	#2116			#451	75		#566	
Internal Link Dist (ft)		630			446			717			472	
Turn Bay Length (ft)	300			450					200			
Base Capacity (vph)	63	1363		276	819			321	499		352	
Starvation Cap Reductn	0	0		0	0			0	0		0	
Spillback Cap Reductn	0	0		0	0			0	0		0	
Storage Cap Reductn	0	0		0	0			0	0		0	
Reduced v/c Ratio	1.24	1.00		1.11	2.17			1.14	0.60		1.34	

Intersection Summary	
Area Type:	Other
~	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.

AM Existing + Cumulative

31: Pala Rd (SR-76) & E Vista Way

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95		0.97	1.00			1.00	1.00		1.00	
Frt	1.00	0.96		1.00	1.00			1.00	0.85		0.93	
Flt Protected	0.95	1.00		0.95	1.00			0.96	1.00		1.00	
Satd. Flow (prot)	1583	3396		3072	1859			1785	1417		1726	
Flt Permitted	0.95	1.00		0.95	1.00			0.96	1.00		1.00	
Satd. Flow (perm)	1583	3396		3072	1859			1785	1417		1726	
Volume (vph)	74	945	350	291	1666	20	300	47	283	6	200	241
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	78	995	368	306	1754	21	316	49	298	6	211	254
RTOR Reduction (vph)	0	38	0	0	1	0	0	0	244	0	42	0
Lane Group Flow (vph)	78	1325	0	306	1774	0	0	365	54	0	429	0
Turn Type	Prot			Prot			Split		Perm	Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases									2			
Actuated Green, G (s)	4.0	39.0		9.0	44.0			18.0	18.0		18.0	
Effective Green, g (s)	4.0	39.0		9.0	44.0			18.0	18.0		18.0	
Actuated g/C Ratio	0.04	0.39		0.09	0.44			0.18	0.18		0.18	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	63	1324		276	818			321	255		311	
v/s Ratio Prot	0.05	0.39		c0.10	c0.95			c0.20			c0.25	
v/s Ratio Perm									0.04			
v/c Ratio	1.24	1.00		1.11	2.17			1.14	0.21		1.38	
Uniform Delay, d1	48.0	30.5		45.5	28.0			41.0	34.9		41.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	190.6	24.9		86.5	530.2			92.7	1.9		189.9	
Delay (s)	238.6	55.4		132.0	558.2			133.7	36.8		230.9	
Level of Service	F	E		F	F			F	D		F	
Approach Delay (s)		65.4			495.5			90.1			230.9	
Approach LOS		E			F			F			F	

Intersection Summary			
HCM Average Control Delay	277.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.75		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	151.5%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

AM Existing + Cumulative

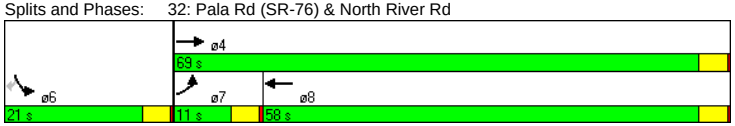
32: Pala Rd (SR-76) & North River Rd

Timings

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Volume (vph)	170	1142	1877	150	185
Turn Type	Prot				Perm
Protected Phases	7	4	8	6	
Permitted Phases					6
Detector Phases	7	4	8	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0
Total Split (s)	11.0	69.0	58.0	21.0	21.0
Total Split (%)	12.2%	76.7%	64.4%	23.3%	23.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Recall Mode	None	None	None	Max	Max
Act Effct Green (s)	7.0	65.0	54.0	17.0	17.0
Actuated g/C Ratio	0.08	0.72	0.60	0.19	0.19
v/c Ratio	1.46	0.89	2.08	0.53	0.52
Control Delay	277.3	20.6	507.3	40.2	16.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	277.3	20.6	507.3	40.2	16.7
LOS	F	C	F	D	B
Approach Delay		53.9	507.3	27.2	
Approach LOS		D	F	C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 2.08	
Intersection Signal Delay: 309.7	Intersection LOS: F
Intersection Capacity Utilization 146.8%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 32: Pala Rd (SR-76) & North River Rd



AM Existing + Cumulative
32: Pala Rd (SR-76) & North River Rd

Queues

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1900	1900	1700	1700	1700
Storage Length (ft)	150			0	50	0
Storage Lanes	1			0	1	1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50		50	50
Trailing Detector (ft)	0	0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.981			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1583	1863	1827	0	1583	1417
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1583	1863	1827	0	1583	1417
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			16			136
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		1356	1400		1286	
Travel Time (s)		30.8	31.8		29.2	
Volume (vph)	170	1142	1877	300	150	185
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	179	1202	1976	316	158	195
Lane Group Flow (vph)	179	1202	2292	0	158	195
v/c Ratio	1.46	0.89	2.08		0.53	0.52
Control Delay	277.3	20.6	507.3		40.2	16.7
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	277.3	20.6	507.3		40.2	16.7
Queue Length 50th (ft)	~140	448	~2109		82	29
Queue Length 95th (ft)	#268	#878	#2377		145	94
Internal Link Dist (ft)		1276	1320		1206	
Turn Bay Length (ft)	150				50	
Base Capacity (vph)	123	1346	1103		299	378
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	1.46	0.89	2.08		0.53	0.52

Intersection Summary

Area Type: Other

~ 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.

LOS Engineering

AM Existing + Cumulative
32: Pala Rd (SR-76) & North River Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1900	1900	1700	1700	1700
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.98		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1583	1863	1828		1583	1417
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1583	1863	1828		1583	1417
Volume (vph)	170	1142	1877	300	150	185
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	179	1202	1976	316	158	195
RTOR Reduction (vph)	0	0	6	0	0	110
Lane Group Flow (vph)	179	1202	2286	0	158	85
Turn Type	Prot					Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	7.0	65.0	54.0		17.0	17.0
Effective Green, g (s)	7.0	65.0	54.0		17.0	17.0
Actuated g/C Ratio	0.08	0.72	0.60		0.19	0.19
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	123	1346	1097		299	268
v/s Ratio Prot	c0.11	0.65	c1.25		c0.10	
v/s Ratio Perm						0.06
v/c Ratio	1.46	0.89	2.08		0.53	0.32
Uniform Delay, d1	41.5	9.8	18.0		32.9	31.5
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	244.1	7.9	490.7		6.5	3.1
Delay (s)	285.6	17.7	508.7		39.4	34.6
Level of Service	F	B	F		D	C
Approach Delay (s)		52.4	508.7		36.7	
Approach LOS		D	F		D	

Intersection Summary

HCM Average Control Delay	310.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.69		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	146.8%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

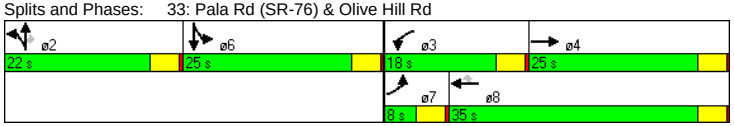
AM Existing + Cumulative
33: Pala Rd (SR-76) & Olive Hill Rd

Timings

Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Configurations									
Volume (vph)	100	1092	466	1877	200	153	249	150	300
Turn Type	Prot		Prot		Perm		Perm	Split	
Protected Phases	7	4	3	8		2		6	6
Permitted Phases					8		2		
Detector Phases	7	4	3	8	8	2	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	8.0	25.0	18.0	35.0	35.0	22.0	22.0	25.0	25.0
Total Split (%)	8.9%	27.8%	20.0%	38.9%	38.9%	24.4%	24.4%	27.8%	27.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes				
Recall Mode	None	None	None	None	None	Max	Max	Max	Max
Act Effct Green (s)	4.0	21.0	14.0	31.0	31.0	18.0	18.0	21.0	21.0
Actuated g/C Ratio	0.04	0.23	0.16	0.34	0.34	0.20	0.20	0.23	0.23
v/c Ratio	1.50	1.62	2.00	1.62	0.38	0.76	0.53	0.43	1.19
Control Delay	319.2	313.1	486.9	308.7	12.8	49.0	8.6	33.7	138.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	319.2	313.1	486.9	308.7	12.8	49.0	8.6	33.7	138.6
LOS	F	F	F	F	B	D	A	C	F
Approach Delay		313.5		318.0		29.3			114.1
Approach LOS		F		F		C			F

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 2.00	
Intersection Signal Delay: 261.8	Intersection LOS: F
Intersection Capacity Utilization 119.8%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 33: Pala Rd (SR-76) & Olive Hill Rd



AM Existing + Cumulative
33: Pala Rd (SR-76) & Olive Hill Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	250		0	250		200	0		150	150		0
Storage Lanes	1		0	1		1	0		1	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50	50	50	50	50	50	50	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.979				0.850			0.850		0.941	
Flt Protected	0.950			0.950				0.979		0.950		
Satd. Flow (prot)	1583	3465	0	1583	3539	1417	0	1824	1417	1583	1753	0
Flt Permitted	0.950			0.950				0.979		0.950		
Satd. Flow (perm)	1583	3465	0	1583	3539	1417	0	1824	1417	1583	1753	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19				111			262		34	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		585			663			961			1186	
Travel Time (s)		13.3			15.1			21.8			27.0	
Volume (vph)	100	1092	178	466	1877	200	110	153	249	150	300	193
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	1149	187	491	1976	211	116	161	262	158	316	203
Lane Group Flow (vph)	105	1336	0	491	1976	211	0	277	262	158	519	0
v/c Ratio	1.50	1.62		2.00	1.62	0.38		0.76	0.53	0.43	1.19	
Control Delay	319.2	313.1		486.9	308.7	12.8		49.0	8.6	33.7	138.6	
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay	319.2	313.1		486.9	308.7	12.8		49.0	8.6	33.7	138.6	
Queue Length 50th (ft)	~83	~584		~440	~859	40		150	0	77	~346	
Queue Length 95th (ft)	#186	#717		#630	#996	97		#266	64	136	#543	
Internal Link Dist (ft)		505			583			881			1106	
Turn Bay Length (ft)	250			250		200			150	150		
Base Capacity (vph)	70	823		246	1219	561		365	493	369	435	
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	1.50	1.62		2.00	1.62	0.38		0.76	0.53	0.43	1.19	

Intersection Summary	
Area Type:	Other
~	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.

AM Existing + Cumulative

33: Pala Rd (SR-76) & Olive Hill Rd — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85		1.00	0.85	1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98	1.00	0.95	1.00	
Satd. Flow (prot)	1583	3465		1583	3539	1417		1825	1417	1583	1753	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.98	1.00	0.95	1.00	
Satd. Flow (perm)	1583	3465		1583	3539	1417		1825	1417	1583	1753	
Volume (vph)	100	1092	178	466	1877	200	110	153	249	150	300	193
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	1149	187	491	1976	211	116	161	262	158	316	203
RTOR Reduction (vph)	0	15	0	0	0	73	0	0	210	0	26	0
Lane Group Flow (vph)	105	1321	0	491	1976	138	0	277	52	158	493	0
Turn Type	Prot			Prot		Perm	Split		Perm	Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases						8			2			
Actuated Green, G (s)	4.0	21.0		14.0	31.0	31.0		18.0	18.0	21.0	21.0	
Effective Green, g (s)	4.0	21.0		14.0	31.0	31.0		18.0	18.0	21.0	21.0	
Actuated g/C Ratio	0.04	0.23		0.16	0.34	0.34		0.20	0.20	0.23	0.23	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	4.0	
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)	70	809		246	1219	488		365	283	369	409	
v/s Ratio Prot	0.07	0.38		c0.31	c0.56			c0.15		0.10	c0.28	
v/s Ratio Perm						0.10			0.04			
v/c Ratio	1.50	1.63		2.00	1.62	0.28		0.76	0.19	0.43	1.21	
Uniform Delay, d1	43.0	34.5		38.0	29.5	21.4		34.0	29.9	29.4	34.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	285.7	290.7		462.4	283.3	0.3		13.8	1.4	3.6	113.4	
Delay (s)	328.7	325.2		500.4	312.8	21.8		47.7	31.3	33.0	147.9	
Level of Service	F	F		F	F	C		D	C	C	F	
Approach Delay (s)		325.4			324.2			39.8			121.1	
Approach LOS		F			F			D			F	

Intersection Summary			
HCM Average Control Delay	270.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.35		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	119.8%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

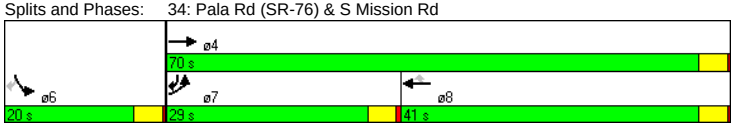
AM Existing + Cumulative

34: Pala Rd (SR-76) & S Mission Rd — Timings

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	600	891	1673	202	239	900
Turn Type	Prot			Perm		pm+ov
Protected Phases	7	4	8		6	7
Permitted Phases				8		6
Detector Phases	7	4	8	8	6	7
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0	8.0
Total Split (s)	29.0	70.0	41.0	41.0	20.0	29.0
Total Split (%)	32.2%	77.8%	45.6%	45.6%	22.2%	32.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead		Lag	Lag		Lead
Lead-Lag Optimize?	Yes		Yes	Yes		Yes
Recall Mode	None	None	None	None	Max	None
Act Effct Green (s)	23.8	64.8	37.0	37.0	16.0	43.8
Actuated g/C Ratio	0.27	0.73	0.42	0.42	0.18	0.49
v/c Ratio	0.77	0.69	1.19	0.30	0.45	0.77
Control Delay	37.1	9.8	120.8	4.2	35.9	23.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.1	9.8	120.8	4.2	35.9	23.6
LOS	D	A	F	A	D	C
Approach Delay		20.8	108.2		26.2	
Approach LOS		C	F		C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 88.8	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.19	
Intersection Signal Delay: 58.5	Intersection LOS: E
Intersection Capacity Utilization 88.1%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 34: Pala Rd (SR-76) & S Mission Rd



LOS Engineering

Queues

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1900	1900	1700	1700	1700
Storage Length (ft)	500			300	500	0
Storage Lanes	2			1	2	2
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	0.97	1.00	0.95	1.00	0.97	0.88
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	3072	1863	3539	1417	3072	2493
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	3072	1863	3539	1417	3072	2493
Right Turn on Red				Yes		No
Satd. Flow (RTOR)				203		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		565	451		1333	
Travel Time (s)		12.8	10.3		30.3	
Volume (vph)	600	891	1673	202	239	900
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	632	938	1761	213	252	947
Lane Group Flow (vph)	632	938	1761	213	252	947
v/c Ratio	0.77	0.69	1.19	0.30	0.45	0.77
Control Delay	37.1	9.8	120.8	4.2	35.9	23.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.1	9.8	120.8	4.2	35.9	23.6
Queue Length 50th (ft)	168	237	~650	3	67	235
Queue Length 95th (ft)	230	361	#786	45	104	323
Internal Link Dist (ft)		485	371		1253	
Turn Bay Length (ft)	500			300	500	
Base Capacity (vph)	853	1366	1475	709	554	1247
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	0.74	0.69	1.19	0.30	0.45	0.76

Intersection Summary

Area Type: Other

~ 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.

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1900	1900	1700	1700	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	0.95	1.00	0.97	0.88
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3072	1863	3539	1417	3072	2493
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3072	1863	3539	1417	3072	2493
Volume (vph)	600	891	1673	202	239	900
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	632	938	1761	213	252	947
RTOR Reduction (vph)	0	0	0	118	0	0
Lane Group Flow (vph)	632	938	1761	95	252	947
Turn Type	Prot			Perm		pm+ov
Protected Phases	7	4	8		6	7
Permitted Phases				8		6
Actuated Green, G (s)	23.8	64.8	37.0	37.0	16.0	39.8
Effective Green, g (s)	23.8	64.8	37.0	37.0	16.0	39.8
Actuated g/C Ratio	0.27	0.73	0.42	0.42	0.18	0.45
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	823	1359	1475	590	554	1230
v/s Ratio Prot	0.21	0.50	c0.50		0.08	c0.21
v/s Ratio Perm				0.07		0.17
v/c Ratio	0.77	0.69	1.19	0.16	0.45	0.77
Uniform Delay, d1	30.0	6.5	25.9	16.2	32.5	20.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.3	1.5	94.2	0.1	2.7	3.0
Delay (s)	34.3	8.1	120.1	16.3	35.2	23.6
Level of Service	C	A	F	B	D	C
Approach Delay (s)		18.6	108.9		26.0	
Approach LOS		B	F		C	

Intersection Summary

HCM Average Control Delay	58.1	HCM Level of Service	E
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	88.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	88.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

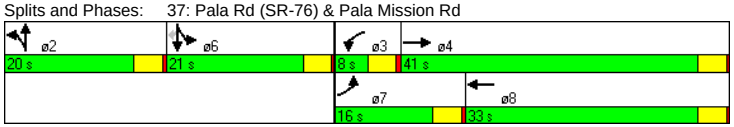
AM Existing + Cumulative
37: Pala Rd (SR-76) & Pala Mission Rd

Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	SBT	SBR
Lane Configurations							
Volume (vph)	240	434	16	262	26	11	164
Turn Type	Prot		Prot		Split		Perm
Protected Phases	7	4	3	8	2	6	
Permitted Phases							6
Detector Phases	7	4	3	8	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	20.0	20.0	20.0
Total Split (s)	16.0	41.0	8.0	33.0	20.0	21.0	21.0
Total Split (%)	17.8%	45.6%	8.9%	36.7%	22.2%	23.3%	23.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lead	Lag			
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			
Recall Mode	None	None	None	None	Max	None	None
Act Effct Green (s)	12.4	30.9	4.1	15.7	16.5	7.7	7.7
Actuated g/C Ratio	0.19	0.47	0.06	0.24	0.25	0.11	0.11
v/c Ratio	0.85	0.29	0.19	0.70	0.07	0.21	0.55
Control Delay	58.6	12.6	41.4	32.0	24.3	31.6	12.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.6	12.6	41.4	32.0	24.3	31.6	12.8
LOS	E	B	D	C	C	C	B
Approach Delay		28.5		32.5		16.5	
Approach LOS		C		C		B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 66.1	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 27.4	Intersection LOS: C
Intersection Capacity Utilization 49.3%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 37: Pala Rd (SR-76) & Pala Mission Rd



AM Existing + Cumulative
37: Pala Rd (SR-76) & Pala Mission Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	250		0	250		0	200		0	0		50
Storage Lanes	1		0	1		0	1		0	0		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	50
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.993			0.985							0.850
Flt Protected	0.950			0.950			0.950				0.965	
Satd. Flow (prot)	1583	3514	0	1583	1835	0	1583	1863	0	0	1798	1417
Flt Permitted	0.950			0.950			0.950				0.965	
Satd. Flow (perm)	1583	3514	0	1583	1835	0	1583	1863	0	0	1798	1417
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6			7							173
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		941			1076			1007			1565	
Travel Time (s)		21.4			24.5			22.9			35.6	
Volume (vph)	240	434	21	16	262	29	26	0	0	29	11	164
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	253	457	22	17	276	31	27	0	0	31	12	173
Lane Group Flow (vph)	253	479	0	17	307	0	27	0	0	0	43	173
v/c Ratio	0.85	0.29		0.19	0.70		0.07				0.21	0.55
Control Delay	58.6	12.6		41.4	32.0		24.3				31.6	12.8
Queue Delay	0.0	0.0		0.0	0.0		0.0				0.0	0.0
Total Delay	58.6	12.6		41.4	32.0		24.3				31.6	12.8
Queue Length 50th (ft)	103	57		7	112		9				17	0
Queue Length 95th (ft)	#287	122		29	205		33				48	53
Internal Link Dist (ft)		861			996			927			1485	
Turn Bay Length (ft)	250			250			200					50
Base Capacity (vph)	296	1816		89	682		395				398	449
Starvation Cap Reductn	0	0		0	0		0				0	0
Spillback Cap Reductn	0	0		0	0		0				0	0
Storage Cap Reductn	0	0		0	0		0				0	0
Reduced v/c Ratio	0.85	0.26		0.19	0.45		0.07				0.11	0.39

Intersection Summary	
Area Type:	Other
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

AM Existing + Cumulative

37: Pala Rd (SR-76) & Pala Mission Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0				4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00				1.00	1.00
Frt	1.00	0.99		1.00	0.98		1.00				1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95				0.97	1.00
Satd. Flow (prot)	1583	3515		1583	1835		1583				1798	1417
Flt Permitted	0.95	1.00		0.95	1.00		0.95				0.97	1.00
Satd. Flow (perm)	1583	3515		1583	1835		1583				1798	1417
Volume (vph)	240	434	21	16	262	29	26	0	0	29	11	164
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	253	457	22	17	276	31	27	0	0	31	12	173
RTOR Reduction (vph)	0	3	0	0	5	0	0	0	0	0	0	158
Lane Group Flow (vph)	253	476	0	17	302	0	27	0	0	0	43	15
Turn Type	Prot			Prot			Split			Split		Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases												6
Actuated Green, G (s)	12.4	30.9		0.7	19.2		16.5				6.2	6.2
Effective Green, g (s)	12.4	30.9		0.7	19.2		16.5				6.2	6.2
Actuated g/C Ratio	0.18	0.44		0.01	0.27		0.23				0.09	0.09
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0				4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0				3.0	3.0
Lane Grp Cap (vph)	279	1545		16	501		372				159	125
v/s Ratio Prot	c0.16	0.14		0.01	c0.16		c0.02				c0.02	
v/s Ratio Perm												0.01
v/c Ratio	0.91	0.31		1.06	0.60		0.07				0.27	0.12
Uniform Delay, d1	28.4	12.8		34.8	22.2		20.9				29.9	29.5
Progression Factor	1.00	1.00		1.00	1.00		1.00				1.00	1.00
Incremental Delay, d2	30.5	0.1		246.4	2.0		0.4				0.9	0.4
Delay (s)	58.9	12.9		281.2	24.3		21.3				30.9	30.0
Level of Service	E	B		F	C		C				C	C
Approach Delay (s)		28.8			37.8			21.3			30.2	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM Average Control Delay	31.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	70.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	49.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

PM Existing + Cumulative
1: Pala Rd (SR-76) & Via Monserate

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	50	2083	1584	110	50	20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	53	2193	1667	116	53	21
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1783				4023	1725
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1783				4023	1725
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	85				0	81
cM capacity (veh/h)	348				3	110

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	53	2193	1783	74
Volume Left	53	0	0	53
Volume Right	0	0	116	21
cSH	348	1700	1700	4
Volume to Capacity	0.15	1.29	1.05	19.93
Queue Length 95th (ft)	13	0	0	Err
Control Delay (s)	17.2	0.0	0.0	Err
Lane LOS	C			F
Approach Delay (s)	0.4		0.0	Err
Approach LOS				F

Intersection Summary			
Average Delay	179.8		
Intersection Capacity Utilization	120.8%	ICU Level of Service	H
Analysis Period (min)	15		

LOS Engineering

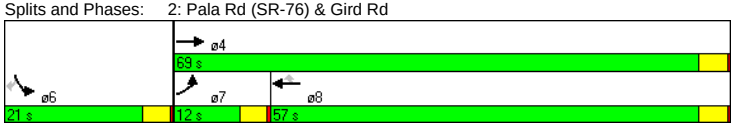
PM Existing + Cumulative
2: Pala Rd (SR-76) & Gird Rd

Timings

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	220	1723	1324	120	60	80
Turn Type	Prot			Perm		Perm
Protected Phases	7	4	8		6	
Permitted Phases				8		6
Detector Phases	7	4	8	8	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	12.0	69.0	57.0	57.0	21.0	21.0
Total Split (%)	13.3%	76.7%	63.3%	63.3%	23.3%	23.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	None	None	None	Min	Min
Act Effct Green (s)	8.0	65.1	53.1	53.1	8.6	8.6
Actuated g/C Ratio	0.10	0.80	0.65	0.65	0.11	0.11
v/c Ratio	1.50	1.22	1.15	0.14	0.38	0.37
Control Delay	284.0	121.1	96.6	5.6	40.4	13.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	284.0	121.1	96.6	5.6	40.4	13.3
LOS	F	F	F	A	D	B
Approach Delay		139.6	89.1		24.9	
Approach LOS		F	F		C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 81.7	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.50	
Intersection Signal Delay: 114.4	Intersection LOS: F
Intersection Capacity Utilization 101.1%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 2: Pala Rd (SR-76) & Gird Rd



LOS Engineering

PM Existing + Cumulative
2: Pala Rd (SR-76) & Gird Rd

Queues

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1900	1900	1700	1700	1700
Storage Length (ft)	450			20	0	180
Storage Lanes	1			1	1	1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1583	1863	1863	1417	1583	1417
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1583	1863	1863	1417	1583	1417
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				16		84
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		3191	8309		1271	
Travel Time (s)		72.5	188.8		28.9	
Volume (vph)	220	1723	1324	120	60	80
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	232	1814	1394	126	63	84
Lane Group Flow (vph)	232	1814	1394	126	63	84
v/c Ratio	1.50	1.22	1.15	0.14	0.38	0.37
Control Delay	284.0	121.1	96.6	5.6	40.4	13.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	284.0	121.1	96.6	5.6	40.4	13.3
Queue Length 50th (ft)	~167	~1156	~851	19	31	0
Queue Length 95th (ft)	#317	#1501	#1165	44	68	39
Internal Link Dist (ft)		3111	8229		1191	
Turn Bay Length (ft)	450			20		180
Base Capacity (vph)	155	1484	1210	926	299	336
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	1.50	1.22	1.15	0.14	0.21	0.25

Intersection Summary

Area Type: Other

~ 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.

LOS Engineering

PM Existing + Cumulative
2: Pala Rd (SR-76) & Gird Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1900	1900	1700	1700	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	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)	1583	1863	1863	1417	1583	1417
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1583	1863	1863	1417	1583	1417
Volume (vph)	220	1723	1324	120	60	80
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	232	1814	1394	126	63	84
RTOR Reduction (vph)	0	0	0	6	0	75
Lane Group Flow (vph)	232	1814	1394	120	63	9
Turn Type	Prot			Perm		Perm
Protected Phases	7	4	8		6	
Permitted Phases				8		6
Actuated Green, G (s)	8.0	65.1	53.1	53.1	8.6	8.6
Effective Green, g (s)	8.0	65.1	53.1	53.1	8.6	8.6
Actuated g/C Ratio	0.10	0.80	0.65	0.65	0.11	0.11
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	155	1484	1211	921	167	149
v/s Ratio Prot	c0.15	c0.97	0.75		c0.04	
v/s Ratio Perm				0.08		0.01
v/c Ratio	1.50	1.22	1.15	0.13	0.38	0.06
Uniform Delay, d1	36.9	8.3	14.3	5.5	34.1	32.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	254.3	106.3	77.9	0.1	1.4	0.2
Delay (s)	291.2	114.6	92.2	5.5	35.5	33.1
Level of Service	F	F	F	A	D	C
Approach Delay (s)		134.7	85.0		34.1	
Approach LOS		F	F		C	

Intersection Summary

HCM Average Control Delay	110.3	HCM Level of Service	F
HCM Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	81.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	101.1%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

PM Existing + Cumulative
3: Pala Rd (SR-76) & Sage Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	10	1563	1584	10	10	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	1645	1667	11	11	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1678				3339	1673
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1678				3339	1673
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				0	91
cM capacity (veh/h)	382				9	118

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	11	1645	1678	11
Volume Left	11	0	0	0
Volume Right	0	0	11	11
cSH	382	1700	1700	118
Volume to Capacity	0.03	0.97	0.99	0.09
Queue Length 95th (ft)	2	0	0	7
Control Delay (s)	14.7	0.0	0.0	38.4
Lane LOS	B			E
Approach Delay (s)	0.1		0.0	Err
Approach LOS				F

Intersection Summary			
Average Delay		Err	
Intersection Capacity Utilization		Err%	ICU Level of Service	H
Analysis Period (min)		15	

LOS Engineering

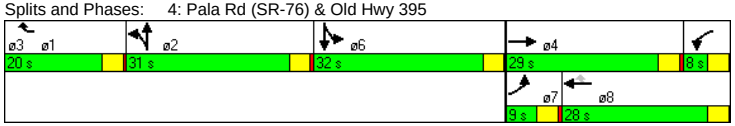
PM Existing + Cumulative
4: Pala Rd (SR-76) & Old Hwy 395

Timings

Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBT
Lane Configurations							
Volume (vph)	104	989	100	955	290	279	205
Turn Type	Prot		Prot		custom		
Protected Phases	7	4	3	8	1	2	6
Permitted Phases					8		
Detector Phases	7	4	3	8	1	2	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	20.0	20.0	20.0
Total Split (s)	9.0	29.0	8.0	28.0	20.0	31.0	32.0
Total Split (%)	7.5%	24.2%	6.7%	23.3%	16.7%	25.8%	26.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	Min	Min	Min
Act Effct Green (s)	5.0	25.0	4.0	24.0	33.9	27.0	28.0
Actuated g/C Ratio	0.05	0.23	0.04	0.22	0.31	0.25	0.25
v/c Ratio	1.51	1.49	1.81	1.30	0.54	1.51	1.60
Control Delay	326.6	257.7	458.2	180.8	15.3	273.0	308.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	326.6	257.7	458.2	180.8	15.3	273.0	308.1
LOS	F	F	F	F	B	F	F
Approach Delay		263.5		165.7		273.0	308.1
Approach LOS		F		F		F	F

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 109.9	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.81	
Intersection Signal Delay: 239.4	Intersection LOS: F
Intersection Capacity Utilization 107.2%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 4: Pala Rd (SR-76) & Old Hwy 395



LOS Engineering

PM Existing + Cumulative
4: Pala Rd (SR-76) & Old Hwy 395

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	330		0	150		150	0		0	0		0
Storage Lanes	1		0	1		1	0		0	0		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.981				0.850		0.971			0.971	
Flt Protected	0.950			0.950				0.983			0.976	
Satd. Flow (prot)	1583	3472	0	1583	3539	1417	0	1778	0	0	1765	0
Flt Permitted	0.950			0.950				0.983			0.976	
Satd. Flow (perm)	1583	3472	0	1583	3539	1417	0	1778	0	0	1765	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12				191		11			11	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		652			462			899			4464	
Travel Time (s)		14.8			10.5			20.4			101.5	
Volume (vph)	104	989	140	100	955	290	220	279	140	340	205	149
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	109	1041	147	105	1005	305	232	294	147	358	216	157
Lane Group Flow (vph)	109	1188	0	105	1005	305	0	673	0	0	731	0
v/c Ratio	1.51	1.49		1.81	1.30	0.54		1.51			1.60	
Control Delay	326.6	257.7		458.2	180.8	15.3		273.0			308.1	
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0			0.0	
Total Delay	326.6	257.7		458.2	180.8	15.3		273.0			308.1	
Queue Length 50th (ft)	~107	~612		~112	~478	60		~663			~740	
Queue Length 95th (ft)	#222	#754		#225	#613	149		#896			#980	
Internal Link Dist (ft)		572			382			819			4384	
Turn Bay Length (ft)	330			150		150						
Base Capacity (vph)	72	799		58	773	600		445			458	
Starvation Cap Reductn	0	0		0	0	0		0			0	
Spillback Cap Reductn	0	0		0	0	0		0			0	
Storage Cap Reductn	0	0		0	0	0		0			0	
Reduced v/c Ratio	1.51	1.49		1.81	1.30	0.51		1.51			1.60	

Intersection Summary

Area Type: Other

~ 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.

LOS Engineering

PM Existing + Cumulative
4: Pala Rd (SR-76) & Old Hwy 395

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	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	
Frt	1.00	0.98		1.00	1.00	0.85		0.97			0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98			0.98	
Satd. Flow (prot)	1583	3474		1583	3539	1417		1777			1766	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.98			0.98	
Satd. Flow (perm)	1583	3474		1583	3539	1417		1777			1766	
Volume (vph)	104	989	140	100	955	290	220	279	140	340	205	149
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	109	1041	147	105	1005	305	232	294	147	358	216	157
RTOR Reduction (vph)	0	9	0	0	0	139	0	8	0	0	8	0
Lane Group Flow (vph)	109	1179	0	105	1005	166	0	665	0	0	723	0
Turn Type	Prot			Prot		custom	Split			Split		
Protected Phases	7	4		3	8	1	2	2		6	6	
Permitted Phases						8						
Actuated Green, G (s)	5.0	25.0		4.0	24.0	29.9		27.0			28.0	
Effective Green, g (s)	5.0	25.0		4.0	24.0	29.9		27.0			28.0	
Actuated g/C Ratio	0.05	0.23		0.04	0.22	0.27		0.25			0.25	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	72	790		58	773	437		437			450	
v/s Ratio Prot	0.07	c0.34		0.07	c0.28	c0.02		c0.37			c0.41	
v/s Ratio Perm						0.10						
v/c Ratio	1.51	1.49		1.81	1.30	0.38		1.52			1.61	
Uniform Delay, d1	52.5	42.5		53.0	43.0	32.5		41.5			41.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	290.0	228.1		424.2	144.5	0.6		245.9			283.0	
Delay (s)	342.4	270.6		477.2	187.4	33.0		287.4			324.0	
Level of Service	F	F		F	F	C		F			F	
Approach Delay (s)		276.6			175.7			287.4			324.0	
Approach LOS		F			F			F			F	

Intersection Summary

HCM Average Control Delay	252.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.38		
Actuated Cycle Length (s)	109.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	107.2%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

PM Existing + Cumulative
6: Pala Rd (SR-76) & I-15 SB Ramps

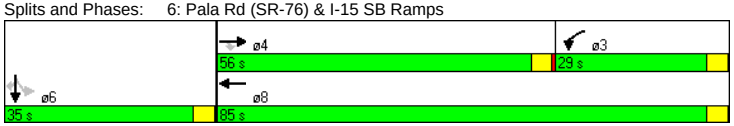
Timings

Lane Group	EBT	EBR	WBL	WBT	SBT	SBR
Lane Configurations						
Volume (vph)	1139	300	373	854	10	520
Turn Type		Perm	Prot			Perm
Protected Phases	4		3	8	6	
Permitted Phases		4				6
Detector Phases	4	4	3	8	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0	20.0
Total Split (s)	56.0	56.0	29.0	85.0	35.0	35.0
Total Split (%)	46.7%	46.7%	24.2%	70.8%	29.2%	29.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lead	Lag			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	None	None	None	None	C-Min	C-Min
Act Effct Green (s)	52.0	52.0	25.0	81.0	31.0	31.0
Actuated g/C Ratio	0.43	0.43	0.21	0.68	0.26	0.26
v/c Ratio	1.49	0.45	1.19	0.71	0.55	1.08
Control Delay	253.8	14.0	141.2	27.9	43.8	90.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	253.8	14.0	141.2	27.9	43.8	90.4
LOS	F	B	F	C	D	F
Approach Delay	203.8			62.3	75.7	
Approach LOS	F			E	E	

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 40 (33%), Referenced to phase 2: and 6:SBTL, Start of Green
Natural Cycle: 140
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.49
Intersection Signal Delay: 124.7 Intersection LOS: F
Intersection Capacity Utilization 115.5% ICU Level of Service H
Analysis Period (min) 15

Splits and Phases: 6: Pala Rd (SR-76) & I-15 SB Ramps



PM Existing + Cumulative
6: Pala Rd (SR-76) & I-15 SB Ramps

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	0		0	500		0	0		0	0		900
Storage Lanes	0		1	1		0	0		0	0		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50	50	50					50	50	50
Trailing Detector (ft)		0	0	0	0					0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	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			0.850									0.850
Flt Protected				0.950							0.954	
Satd. Flow (prot)	0	1863	1417	1583	1863	0	0	0	0	0	1777	1417
Flt Permitted				0.950							0.954	
Satd. Flow (perm)	0	1863	1417	1583	1863	0	0	0	0	0	1777	1417
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			153									191
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		654			1271			961			1209	
Travel Time (s)		14.9			28.9			21.8			27.5	
Volume (vph)	0	1139	300	373	854	0	0	0	0	229	10	520
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1199	316	393	899	0	0	0	0	241	11	547
Lane Group Flow (vph)	0	1199	316	393	899	0	0	0	0	0	252	547
v/c Ratio		1.49	0.45	1.19	0.71						0.55	1.08
Control Delay		253.8	14.0	141.2	27.9						43.8	90.4
Queue Delay		0.0	0.0	0.0	0.0						0.0	0.0
Total Delay		253.8	14.0	141.2	27.9						43.8	90.4
Queue Length 50th (ft)		~1282	82	~359	660						169	~356
Queue Length 95th (ft)		#1541	161	m#254	m565						257	#577
Internal Link Dist (ft)		574			1191			881			1129	
Turn Bay Length (ft)				500								900
Base Capacity (vph)		807	701	330	1258						459	508
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		1.49	0.45	1.19	0.71						0.55	1.08

Intersection Summary

Area Type: Other
~ 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.

PM Existing + Cumulative
6: Pala Rd (SR-76) & I-15 SB Ramps

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)		4.0	4.0	4.0	4.0						4.0	4.0
Lane Util. Factor		1.00	1.00	1.00	1.00						1.00	1.00
Frt		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)		1863	1417	1583	1863						1778	1417
Flt Permitted		1.00	1.00	0.95	1.00						0.95	1.00
Satd. Flow (perm)		1863	1417	1583	1863						1778	1417
Volume (vph)	0	1139	300	373	854	0	0	0	0	229	10	520
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1199	316	393	899	0	0	0	0	241	11	547
RTOR Reduction (vph)	0	0	87	0	0	0	0	0	0	0	0	142
Lane Group Flow (vph)	0	1199	229	393	899	0	0	0	0	0	252	405
Turn Type			Perm	Prot						Perm		Perm
Protected Phases		4		3	8						6	
Permitted Phases			4							6		6
Actuated Green, G (s)		52.0	52.0	25.0	81.0						31.0	31.0
Effective Green, g (s)		52.0	52.0	25.0	81.0						31.0	31.0
Actuated g/C Ratio		0.43	0.43	0.21	0.68						0.26	0.26
Clearance Time (s)		4.0	4.0	4.0	4.0						4.0	4.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0						3.0	3.0
Lane Grp Cap (vph)		807	614	330	1258						459	366
v/s Ratio Prot		c0.64		c0.25	0.48							
v/s Ratio Perm			0.16								0.14	c0.29
v/c Ratio		1.49	0.37	1.19	0.71						0.55	1.11
Uniform Delay, d1		34.0	23.0	47.5	12.2						38.5	44.5
Progression Factor		1.00	1.00	1.33	2.15						1.00	1.00
Incremental Delay, d2		225.2	0.4	88.9	0.2						4.7	79.3
Delay (s)		259.2	23.4	152.3	26.5						43.1	123.8
Level of Service		F	C	F	C						D	F
Approach Delay (s)		210.0			64.7			0.0			98.3	
Approach LOS		F			E			A			F	

Intersection Summary			
HCM Average Control Delay	133.2	HCM Level of Service	F
HCM Volume to Capacity ratio	1.31		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	115.5%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

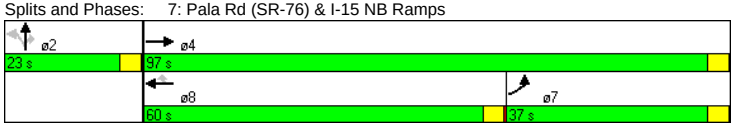
PM Existing + Cumulative
7: Pala Rd (SR-76) & I-15 NB Ramps

Timings

Lane Group	EBL	EBT	WBT	WBR	NBT	NBR
Lane Configurations						
Volume (vph)	600	799	868	266	10	307
Turn Type	Prot			Perm		Perm
Protected Phases	7	4	8		2	
Permitted Phases				8		2
Detector Phases	7	4	8	8	2	2
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	37.0	97.0	60.0	60.0	23.0	23.0
Total Split (%)	30.8%	80.8%	50.0%	50.0%	19.2%	19.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lag		Lead	Lead		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	None	None	None	C-Min	C-Min
Act Effct Green (s)	33.0	93.0	56.0	56.0	19.0	19.0
Actuated g/C Ratio	0.28	0.78	0.47	0.47	0.16	0.16
v/c Ratio	1.45	0.58	1.05	0.41	1.54	0.72
Control Delay	243.7	16.0	77.1	19.0	293.9	20.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	243.7	16.0	77.1	19.0	293.9	20.2
LOS	F	B	E	B	F	C
Approach Delay		113.7	63.5		176.8	
Approach LOS		F	E		F	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:, Start of Green	
Natural Cycle: 150	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.54	
Intersection Signal Delay: 110.1	Intersection LOS: F
Intersection Capacity Utilization 115.5%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 7: Pala Rd (SR-76) & I-15 NB Ramps



PM Existing + Cumulative
7: Pala Rd (SR-76) & I-15 NB Ramps

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	450		0	0		50	0		800	0		0
Storage Lanes	1		0	0		1	0		1	0		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	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						0.850			0.850			
Flt Protected	0.950							0.954				
Satd. Flow (prot)	1583	1863	0	0	1863	1417	0	1777	1417	0	0	0
Flt Permitted	0.950							0.954				
Satd. Flow (perm)	1583	1863	0	0	1863	1417	0	1777	1417	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						52			266			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1271			2232			991			1241	
Travel Time (s)		28.9			50.7			22.5			28.2	
Volume (vph)	600	799	0	0	868	266	400	10	307	0	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	632	841	0	0	914	280	421	11	323	0	0	0
Lane Group Flow (vph)	632	841	0	0	914	280	0	432	323	0	0	0
v/c Ratio	1.45	0.58			1.05	0.41		1.54	0.72			
Control Delay	243.7	16.0			77.1	19.0		293.9	20.2			
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	243.7	16.0			77.1	19.0		293.9	20.2			
Queue Length 50th (ft)	~658	445			~773	112		~470	39			
Queue Length 95th (ft)	m#427	m341			#1019	183		#671	147			
Internal Link Dist (ft)		1191			2152			911			1161	
Turn Bay Length (ft)	450					50			800			
Base Capacity (vph)	435	1444			869	689		281	448			
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	1.45	0.58			1.05	0.41		1.54	0.72			

Intersection Summary

Area Type: Other

~ 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.

LOS Engineering

PM Existing + Cumulative
7: Pala Rd (SR-76) & I-15 NB Ramps

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0	4.0			
Lane Util. Factor	1.00	1.00			1.00	1.00		1.00	1.00			
Frt	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)	1583	1863			1863	1417		1776	1417			
Flt Permitted	0.95	1.00			1.00	1.00		0.95	1.00			
Satd. Flow (perm)	1583	1863			1863	1417		1776	1417			
Volume (vph)	600	799	0	0	868	266	400	10	307	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	632	841	0	0	914	280	421	11	323	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	28	0	0	224	0	0	0
Lane Group Flow (vph)	632	841	0	0	914	252	0	432	99	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Actuated Green, G (s)	33.0	93.0			56.0	56.0		19.0	19.0			
Effective Green, g (s)	33.0	93.0			56.0	56.0		19.0	19.0			
Actuated g/C Ratio	0.28	0.78			0.47	0.47		0.16	0.16			
Clearance Time (s)	4.0	4.0			4.0	4.0		4.0	4.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0	3.0			
Lane Grp Cap (vph)	435	1444			869	661		281	224			
v/s Ratio Prot	c0.40	0.45			c0.49							
v/s Ratio Perm						0.18		0.24	0.07			
v/c Ratio	1.45	0.58			1.05	0.38		1.54	0.44			
Uniform Delay, d1	43.5	5.5			32.0	20.8		50.5	45.7			
Progression Factor	1.26	2.75			1.00	1.00		1.00	1.00			
Incremental Delay, d2	205.0	0.1			45.1	0.4		258.9	6.2			
Delay (s)	259.6	15.3			77.1	21.1		309.4	51.9			
Level of Service	F	B			E	C		F	D			
Approach Delay (s)		120.1			63.9			199.3			0.0	
Approach LOS		F			E			F			A	

Intersection Summary

HCM Average Control Delay	118.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.26		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	115.5%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

PM Existing + Cumulative

8: Pala Rd (SR-76) & Pankey Rd — HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	147	671	328	210	566	83	315	387	230	106	450	198
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	155	706	345	221	596	87	332	407	242	112	474	208
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	683			1052			2715	2314	879	2716	2443	639
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	683			1052			2715	2314	879	2716	2443	639
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	83			67			0	0	30	0	0	56
cM capacity (veh/h)	910			662			0	21	347	0	17	476

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	1206	904	981	794
Volume Left	155	221	332	112
Volume Right	345	87	242	208
cSH	910	662	0	0
Volume to Capacity	0.17	0.33	Err	Err
Queue Length 95th (ft)	15	37	Err	Err
Control Delay (s)	5.0	8.8	Err	Err
Lane LOS	A	A	F	F
Approach Delay (s)	5.0	8.8	Err	Err
Approach LOS			F	F

Intersection Summary			
Average Delay		Err	
Intersection Capacity Utilization	183.8%	ICU Level of Service	H
Analysis Period (min)		15	

LOS Engineering

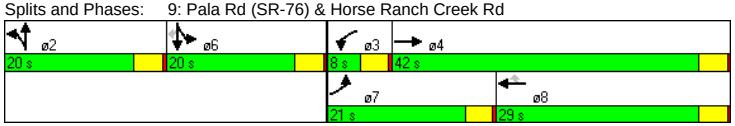
PM Existing + Cumulative

9: Pala Rd (SR-76) & Horse Ranch Creek Rd — Timings

Lane Group	EBL	EBT	WBT	WBR	SBL	SBT	SBR	ø2	ø3
Lane Configurations									
Volume (vph)	535	500	550	94	71	0	367		
Turn Type	Prot			Perm	Split		Perm		
Protected Phases	7	4	8		6	6		2	3
Permitted Phases				8			6		
Detector Phases	7	4	8	8	6	6	6		
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	8.0
Total Split (s)	21.0	42.0	29.0	29.0	20.0	20.0	20.0	20.0	8.0
Total Split (%)	23.3%	46.7%	32.2%	32.2%	22.2%	22.2%	22.2%	22%	9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lag	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					Yes
Recall Mode	None	None	None	None	Min	Min	Min	Min	None
Act Effct Green (s)	16.6	36.5	15.8	15.8	8.7	8.7	8.7		
Actuated g/C Ratio	0.26	0.58	0.25	0.25	0.14	0.14	0.14		
v/c Ratio	0.70	0.26	0.65	0.23	0.36	0.26	0.27		
Control Delay	28.4	7.1	25.0	6.2	31.1	0.9	0.9		
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay	28.4	7.1	25.0	6.2	31.1	0.9	0.9		
LOS	C	A	C	A	C	A	A		
Approach Delay		18.1	22.3			5.8			
Approach LOS		B	C			A			

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 63	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.70	
Intersection Signal Delay: 16.8	Intersection LOS: B
Intersection Capacity Utilization 48.0%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 9: Pala Rd (SR-76) & Horse Ranch Creek Rd



LOS Engineering

PM Existing + Cumulative
9: Pala Rd (SR-76) & Horse Ranch Creek Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	250		0	250		250	0		0	150		150
Storage Lanes	2		0	1		1	0		0	1		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50	50	50	50		50	50	50
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	0.95	0.91	0.95
Frt						0.850					0.850	0.850
Flt Protected	0.950									0.950		
Satd. Flow (prot)	3072	3539	0	1667	3539	1417	0	1863	0	1504	1441	1346
Flt Permitted	0.950									0.950		
Satd. Flow (perm)	3072	3539	0	1667	3539	1417	0	1863	0	1504	1441	1346
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						99					617	617
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2833			5160			734			1509	
Travel Time (s)		64.4			117.3			16.7			34.3	
Volume (vph)	535	500	0	0	550	94	0	0	0	71	0	367
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	563	526	0	0	579	99	0	0	0	75	0	386
Lane Group Flow (vph)	563	526	0	0	579	99	0	0	0	75	190	196
v/c Ratio	0.70	0.26			0.65	0.23				0.36	0.26	0.27
Control Delay	28.4	7.1			25.0	6.2				31.1	0.9	0.9
Queue Delay	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Total Delay	28.4	7.1			25.0	6.2				31.1	0.9	0.9
Queue Length 50th (ft)	99	45			103	0				28	0	0
Queue Length 95th (ft)	#206	81			165	32				70	0	0
Internal Link Dist (ft)		2753			5080			654			1429	
Turn Bay Length (ft)	250					250				150		150
Base Capacity (vph)	832	2124			1235	559				346	806	785
Starvation Cap Reductn	0	0			0	0				0	0	0
Spillback Cap Reductn	0	0			0	0				0	0	0
Storage Cap Reductn	0	0			0	0				0	0	0
Reduced v/c Ratio	0.68	0.25			0.47	0.18				0.22	0.24	0.25

Intersection Summary

Area Type: Other

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

LOS Engineering

PM Existing + Cumulative
9: Pala Rd (SR-76) & Horse Ranch Creek Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0			4.0	4.0				4.0	4.0	4.0
Lane Util. Factor	0.97	0.95			0.95	1.00				0.95	0.91	0.95
Frt	1.00	1.00			1.00	0.85				1.00	0.85	0.85
Flt Protected	0.95	1.00			1.00	1.00				0.95	1.00	1.00
Satd. Flow (prot)	3072	3539			3539	1417				1504	1441	1346
Flt Permitted	0.95	1.00			1.00	1.00				0.95	1.00	1.00
Satd. Flow (perm)	3072	3539			3539	1417				1504	1441	1346
Volume (vph)	535	500	0	0	550	94	0	0	0	71	0	367
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	563	526	0	0	579	99	0	0	0	75	0	386
RTOR Reduction (vph)	0	0	0	0	0	74	0	0	0	0	164	169
Lane Group Flow (vph)	563	526	0	0	579	25	0	0	0	75	26	27
Turn Type	Prot			Prot		Perm	Split			Split		Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases						8						6
Actuated Green, G (s)	16.6	36.5			15.9	15.9				8.7	8.7	8.7
Effective Green, g (s)	16.6	36.5			15.9	15.9				8.7	8.7	8.7
Actuated g/C Ratio	0.26	0.58			0.25	0.25				0.14	0.14	0.14
Clearance Time (s)	4.0	4.0			4.0	4.0				4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0			3.0	3.0				3.0	3.0	3.0
Lane Grp Cap (vph)	812	2057			896	359				208	200	186
v/s Ratio Prot	c0.18	0.15			c0.16					c0.05	0.02	
v/s Ratio Perm						0.02						0.02
v/c Ratio	0.69	0.26			0.65	0.07				0.36	0.13	0.15
Uniform Delay, d1	20.8	6.5			20.9	17.8				24.5	23.7	23.8
Progression Factor	1.00	1.00			1.00	1.00				1.00	1.00	1.00
Incremental Delay, d2	2.6	0.1			1.6	0.1				1.1	0.3	0.4
Delay (s)	23.4	6.5			22.6	17.9				25.6	24.0	24.1
Level of Service	C	A			C	B				C	C	C
Approach Delay (s)		15.2			21.9			0.0			24.3	
Approach LOS		B			C			A			C	

Intersection Summary

HCM Average Control Delay	19.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	62.8	Sum of lost time (s)	21.6
Intersection Capacity Utilization	48.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

PM Existing + Cumulative
10: Pala Rd (SR-76) & Rice Canyon Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	50	989	1193	30	50	70
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	53	1041	1256	32	53	74
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1287				2418	1272
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1287				2418	1272
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	90				0	64
cM capacity (veh/h)	539				32	205

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	1094	1287	126
Volume Left	53	0	53
Volume Right	0	32	74
cSH	539	1700	63
Volume to Capacity	0.10	0.76	1.99
Queue Length 95th (ft)	8	0	296
Control Delay (s)	3.6	0.0	601.2
Lane LOS	A		F
Approach Delay (s)	3.6	0.0	601.2
Approach LOS			F

Intersection Summary			
Average Delay	31.8		
Intersection Capacity Utilization	107.4%	ICU Level of Service	G
Analysis Period (min)	15		

LOS Engineering

PM Existing + Cumulative
11: Pala Rd (SR-76) & Couser Canyon Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	879	70	30	1123	60	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	925	74	32	1182	63	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			999		2207	962
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			999		2207	962
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		0	97
cM capacity (veh/h)			693		46	310

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	999	1214	74
Volume Left	0	32	63
Volume Right	74	0	11
cSH	1700	693	53
Volume to Capacity	0.59	0.05	1.39
Queue Length 95th (ft)	0	4	168
Control Delay (s)	0.0	1.8	385.8
Lane LOS		A	F
Approach Delay (s)	0.0	1.8	385.8
Approach LOS			F

Intersection Summary			
Average Delay	13.4		
Intersection Capacity Utilization	94.3%	ICU Level of Service	F
Analysis Period (min)	15		

LOS Engineering

PM Existing + Cumulative

12: Pala Mesa Dr & Old Hwy 395

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	150	139	200	155	176	225	110	810	146	189	480	80
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	158	146	211	163	185	237	116	853	154	199	505	84
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2359	2183	547	2348	2148	929	589			1006		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2359	2183	547	2348	2148	929	589			1006		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	0	61	0	0	27	88			71		
cM capacity (veh/h)	0	29	537	0	30	324	986			688		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	515	163	422	116	1006	199	589
Volume Left	158	163	0	116	0	199	0
Volume Right	211	0	237	0	154	0	84
cSH	0	0	62	986	1700	688	1700
Volume to Capacity	Err	Err	6.85	0.12	0.59	0.29	0.35
Queue Length 95th (ft)	Err	Err	Err	10	0	30	0
Control Delay (s)	Err	Err	Err	9.1	0.0	12.3	0.0
Lane LOS	F	F	F	A		B	
Approach Delay (s)	Err	Err		0.9		3.1	
Approach LOS	F	F					

Intersection Summary				
Average Delay	Err			
Intersection Capacity Utilization	127.4%	ICU Level of Service	H	
Analysis Period (min)	15			

LOS Engineering

PM Existing + Cumulative

14: Stewart Canyon Rd & Old Hwy 395

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	16	30	24	6	314	60	710	21	368	690	80
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	17	32	25	6	331	63	747	22	387	726	84
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2751	2439	768	2426	2470	758	811			769		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2751	2439	768	2426	2470	758	811			769		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	0	92	0	58	19	92			54		
cM capacity (veh/h)	1	16	401	0	15	407	815			845		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	59	362	63	769	387	811
Volume Left	11	25	63	0	387	0
Volume Right	32	331	0	22	0	84
cSH	5	0	815	1700	845	1700
Volume to Capacity	11.51	Err	0.08	0.45	0.46	0.48
Queue Length 95th (ft)	Err	Err	6	0	61	0
Control Delay (s)	Err	Err	9.8	0.0	12.8	0.0
Lane LOS	F	F	A		B	
Approach Delay (s)	Err	Err	0.7		4.1	
Approach LOS	F	F				

Intersection Summary				
Average Delay	Err			
Intersection Capacity Utilization	94.8%	ICU Level of Service	F	
Analysis Period (min)	15			

LOS Engineering

PM Existing + Cumulative
15: Reche Rd & Old Hwy 395 — HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	290	229	861	296	130	350
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	305	241	906	312	137	368
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2445	321	505			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2445	321	505			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	67	14			
cM capacity (veh/h)	5	720	1059			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	546	906	312	505
Volume Left	305	906	0	0
Volume Right	241	0	0	368
cSH	9	1059	1700	1700
Volume to Capacity	61.79	0.86	0.18	0.30
Queue Length 95th (ft)	Err	280	0	0
Control Delay (s)	Err	24.5	0.0	0.0
Lane LOS	F	C		
Approach Delay (s)	Err	18.2		0.0
Approach LOS	F			

Intersection Summary			
Average Delay	2416.8		
Intersection Capacity Utilization	125.3%	ICU Level of Service	H
Analysis Period (min)	15		

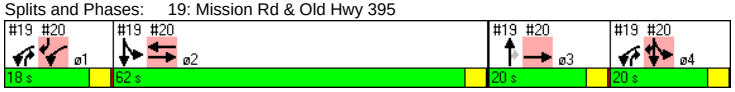
LOS Engineering

PM Existing + Cumulative
19: Mission Rd & Old Hwy 395 — Timings

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	ø1	ø4
Lane Configurations								
Volume (vph)	305	840	118	248	1050	65		
Turn Type		Free		pm+ov	Split			
Protected Phases	1 4		3	1 4	2	2	1	4
Permitted Phases		Free		3				
Detector Phases	1 4		3	1 4	2	2		
Minimum Initial (s)			4.0		4.0	4.0	4.0	4.0
Minimum Split (s)			20.0		20.0	20.0	8.0	20.0
Total Split (s)	38.0	0.0	20.0	38.0	62.0	62.0	18.0	20.0
Total Split (%)	31.7%	0.0%	16.7%	31.7%	51.7%	51.7%	15%	17%
Yellow Time (s)			3.5		3.5	3.5	3.5	3.5
All-Red Time (s)			0.5		0.5	0.5	0.5	0.5
Lead/Lag			Lead		Lag	Lag	Lead	Lag
Lead-Lag Optimize?			Yes		Yes	Yes	Yes	Yes
Recall Mode			None		Min	Min	None	None
Act Effct Green (s)	34.0	120.0	16.0	54.0	58.0	58.0		
Actuated g/C Ratio	0.28	1.00	0.13	0.45	0.48	0.48		
v/c Ratio	0.71	0.62	0.50	0.41	1.44	0.08		
Control Delay	51.7	2.5	56.0	24.7	235.0	17.0		
Queue Delay	0.7	0.0	0.0	0.7	10.3	0.0		
Total Delay	52.4	2.5	56.0	25.4	245.3	17.0		
LOS	D	A	E	C	F	B		
Approach Delay	15.8		35.3			232.1		
Approach LOS	B		D			F		

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.44	
Intersection Signal Delay: 110.3	Intersection LOS: F
Intersection Capacity Utilization 97.2%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 19: Mission Rd & Old Hwy 395



LOS Engineering

PM Existing + Cumulative
19: Mission Rd & Old Hwy 395 — Queues

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1700	1700	1900	1700	1700	1900
Storage Length (ft)	0	130		210	100	
Storage Lanes	1	1		1	1	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1583	1417	1863	1417	1583	1863
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1583	1417	1863	1417	1583	1863
Right Turn on Red		No		No		
Satd. Flow (RTOR)						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30		30			30
Link Distance (ft)	434		4960			1035
Travel Time (s)	9.9		112.7			23.5
Volume (vph)	305	840	118	248	1050	65
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	321	884	124	261	1105	68
Lane Group Flow (vph)	321	884	124	261	1105	68
v/c Ratio	0.71	0.62	0.50	0.41	1.44	0.08
Control Delay	51.7	2.5	56.0	24.7	235.0	17.0
Queue Delay	0.7	0.0	0.0	0.7	10.3	0.0
Total Delay	52.4	2.5	56.0	25.4	245.3	17.0
Queue Length 50th (ft)	214	44	91	134	~1164	28
Queue Length 95th (ft)	m271	m18	154	206	#1422	53
Internal Link Dist (ft)	354		4880			955
Turn Bay Length (ft)		130		210	100	
Base Capacity (vph)	449	1417	248	638	765	900
Starvation Cap Reductn	21	0	0	0	0	0
Spillback Cap Reductn	0	0	0	156	12	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.75	0.62	0.50	0.54	1.47	0.08

Intersection Summary
Area Type: Other
~ 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.

LOS Engineering

PM Existing + Cumulative
19: Mission Rd & Old Hwy 395 — HCM Signalized Intersection Capacity Analysis

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1700	1700	1900	1700	1700	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1583	1417	1863	1417	1583	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1583	1417	1863	1417	1583	1863
Volume (vph)	305	840	118	248	1050	65
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	321	884	124	261	1105	68
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	321	884	124	261	1105	68
Turn Type		Free		pm+ov	Split	
Protected Phases	1 4		3	1 4	2	2
Permitted Phases		Free		3		
Actuated Green, G (s)	34.0	120.0	16.0	50.0	58.0	58.0
Effective Green, g (s)	34.0	120.0	16.0	50.0	58.0	58.0
Actuated g/C Ratio	0.28	1.00	0.13	0.42	0.48	0.48
Clearance Time (s)			4.0		4.0	4.0
Vehicle Extension (s)			3.0		3.0	3.0
Lane Grp Cap (vph)	449	1417	248	638	765	900
v/s Ratio Prot	c0.20		0.07	0.12	c0.70	0.04
v/s Ratio Perm		c0.62		0.07		
v/c Ratio	0.71	0.62	0.50	0.41	1.44	0.08
Uniform Delay, d1	38.6	0.0	48.3	24.6	31.0	16.6
Progression Factor	1.16	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.2	1.2	1.6	0.4	207.4	0.0
Delay (s)	48.2	1.2	49.9	25.0	238.4	16.7
Level of Service	D	A	D	C	F	B
Approach Delay (s)	13.7		33.0			225.5
Approach LOS	B		C			F

Intersection Summary

HCM Average Control Delay	106.3	HCM Level of Service	F
HCM Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	97.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

PM Existing + Cumulative
20: Mission Rd & I-15 SB Ramps

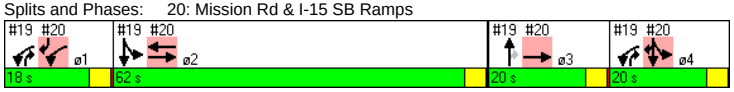
Timings

Lane Group	EBT	WBL	WBT	SBT	SBR	ø3
Lane Configurations						
Volume (vph)	1228	80	495	10	650	
Turn Type		Prot			custom	
Protected Phases	2 3	1	2	4	1 4	3
Permitted Phases					4	
Detector Phases	2 3	1	2	4	1 4	
Minimum Initial (s)		4.0	4.0	4.0		4.0
Minimum Split (s)		8.0	20.0	20.0		20.0
Total Split (s)	82.0	18.0	62.0	20.0	38.0	20.0
Total Split (%)	68.3%	15.0%	51.7%	16.7%	31.7%	17%
Yellow Time (s)		3.5	3.5	3.5		3.5
All-Red Time (s)		0.5	0.5	0.5		0.5
Lead/Lag		Lead	Lag	Lag		Lead
Lead-Lag Optimize?		Yes	Yes	Yes		Yes
Recall Mode		None	Min	None		None
Act Effct Green (s)	78.0	14.0	58.0	16.0	34.0	
Actuated g/C Ratio	0.65	0.12	0.48	0.13	0.28	
v/c Ratio	1.15	0.45	0.58	0.09	0.95	
Control Delay	83.3	58.1	25.5	46.8	38.4	
Queue Delay	108.1	0.0	0.0	0.4	3.3	
Total Delay	191.3	58.1	25.5	47.2	41.6	
LOS	F	E	C	D	D	
Approach Delay	191.3		30.0	41.8		
Approach LOS	F		C	D		

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Natural Cycle: 150
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.44
Intersection Signal Delay: 116.0 — Intersection LOS: F
Intersection Capacity Utilization 84.3% — ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 20: Mission Rd & I-15 SB Ramps



LOS Engineering

PM Existing + Cumulative
20: Mission Rd & I-15 SB Ramps

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	0		0	285		0	0		0	0		200
Storage Lanes	0		0	1		0	0		0	0		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50		50	50					50	50	50
Trailing Detector (ft)		0		0	0					0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	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		0.991										0.850
Flt Protected				0.950							0.976	
Satd. Flow (prot)	0	1846	0	1583	1863	0	0	0	0	0	1818	1417
Flt Permitted				0.950							0.976	
Satd. Flow (perm)	0	1846	0	1583	1863	0	0	0	0	0	1818	1417
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6										446
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		434			744			972			897	
Travel Time (s)		9.9			16.9			22.1			20.4	
Volume (vph)	0	1228	90	80	495	0	0	0	0	10	10	650
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1293	95	84	521	0	0	0	0	11	11	684
Lane Group Flow (vph)	0	1388	0	84	521	0	0	0	0	0	22	684
v/c Ratio		1.15		0.45	0.58						0.09	0.95
Control Delay		83.3		58.1	25.5						46.8	38.4
Queue Delay		108.1		0.0	0.0						0.4	3.3
Total Delay		191.3		58.1	25.5						47.2	41.6
Queue Length 50th (ft)		~1272		62	281						15	220
Queue Length 95th (ft)		m139		115	392						41	#490
Internal Link Dist (ft)		354			664			892			817	
Turn Bay Length (ft)				285								200
Base Capacity (vph)		1202		185	900						242	721
Starvation Cap Reductn		182		0	0						0	0
Spillback Cap Reductn		209		0	0						97	17
Storage Cap Reductn		0		0	0						0	0
Reduced v/c Ratio		1.40		0.45	0.58						0.15	0.97

Intersection Summary

Area Type: Other
~ 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.

LOS Engineering

PM Existing + Cumulative
20: Mission Rd & I-15 SB Ramps

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)		4.0		4.0	4.0						4.0	4.0
Lane Util. Factor		1.00		1.00	1.00						1.00	1.00
Frt		0.99		1.00	1.00						1.00	0.85
Flt Protected		1.00		0.95	1.00						0.98	1.00
Satd. Flow (prot)		1846		1583	1863						1817	1417
Flt Permitted		1.00		0.95	1.00						0.98	1.00
Satd. Flow (perm)		1846		1583	1863						1817	1417
Volume (vph)	0	1228	90	80	495	0	0	0	0	10	10	650
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1293	95	84	521	0	0	0	0	11	11	684
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	0	0	0	320
Lane Group Flow (vph)	0	1386	0	84	521	0	0	0	0	0	22	364
Turn Type				Prot						Split		custom
Protected Phases		2 3		1	2					4	4	1 4
Permitted Phases												4
Actuated Green, G (s)		78.0		14.0	58.0						16.0	34.0
Effective Green, g (s)		78.0		14.0	58.0						16.0	34.0
Actuated g/C Ratio		0.65		0.12	0.48						0.13	0.28
Clearance Time (s)				4.0	4.0						4.0	
Vehicle Extension (s)				3.0	3.0						3.0	
Lane Grp Cap (vph)		1200		185	900						242	401
v/s Ratio Prot		c0.75		0.05	0.28						0.01	c0.26
v/s Ratio Perm												
v/c Ratio		1.15		0.45	0.58						0.09	0.91
Uniform Delay, d1		21.0		49.4	22.2						45.6	41.5
Progression Factor		0.34		1.00	1.00						1.00	1.00
Incremental Delay, d2		70.7		1.8	0.9						0.2	23.8
Delay (s)		77.8		51.2	23.1						45.8	65.3
Level of Service		E		D	C						D	E
Approach Delay (s)		77.8			27.0			0.0			64.7	
Approach LOS		E			C			A			E	

Intersection Summary			
HCM Average Control Delay	63.0	HCM Level of Service	E
HCM Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	84.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

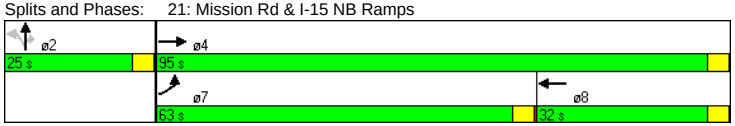
PM Existing + Cumulative
21: Mission Rd & I-15 NB Ramps

Timings

Lane Group	EBL	EBT	WBT	NBT	NBR
Lane Configurations					
Volume (vph)	920	288	225	10	170
Turn Type	Prot				Perm
Protected Phases	7	4	8	2	
Permitted Phases					2
Detector Phases	7	4	8	2	2
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0
Total Split (s)	63.0	95.0	32.0	25.0	25.0
Total Split (%)	52.5%	79.2%	26.7%	20.8%	20.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Recall Mode	None	None	None	Min	Min
Act Effct Green (s)	59.1	83.0	19.9	21.1	21.1
Actuated g/C Ratio	0.53	0.74	0.18	0.19	0.19
v/c Ratio	1.16	0.22	0.75	1.13	0.46
Control Delay	112.0	4.9	57.8	133.6	13.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	112.0	4.9	57.8	133.6	13.7
LOS	F	A	E	F	B
Approach Delay		86.4	57.8	95.1	
Approach LOS		F	E	F	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 112.1	
Natural Cycle: 140	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.16	
Intersection Signal Delay: 85.4	Intersection LOS: F
Intersection Capacity Utilization 99.3%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 21: Mission Rd & I-15 NB Ramps



LOS Engineering

PM Existing + Cumulative
21: Mission Rd & I-15 NB Ramps

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	300		0	0		0	0		200	0		0
Storage Lanes	1		0	0		0	0		1	0		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50		50	50	50			
Trailing Detector (ft)	0	0			0		0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	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					0.994				0.850			
Flt Protected	0.950							0.954				
Satd. Flow (prot)	1583	1863	0	0	1852	0	0	1777	1417	0	0	0
Flt Permitted	0.950							0.954				
Satd. Flow (perm)	1583	1863	0	0	1852	0	0	1777	1417	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					2				155			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		744			1271			1082			1005	
Travel Time (s)		16.9			28.9			24.6			22.8	
Volume (vph)	920	288	0	0	225	10	350	10	170	0	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	968	303	0	0	237	11	368	11	179	0	0	0
Lane Group Flow (vph)	968	303	0	0	248	0	0	379	179	0	0	0
v/c Ratio	1.16	0.22			0.75			1.13	0.46			
Control Delay	112.0	4.9			57.8			133.6	13.7			
Queue Delay	0.0	0.0			0.0			0.0	0.0			
Total Delay	112.0	4.9			57.8			133.6	13.7			
Queue Length 50th (ft)	~826	58			170			~318	14			
Queue Length 95th (ft)	#1183	85			257			#554	84			
Internal Link Dist (ft)		664			1191			1002			925	
Turn Bay Length (ft)	300								200			
Base Capacity (vph)	835	1413			434			334	392			
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	1.16	0.21			0.57			1.13	0.46			

Intersection Summary

Area Type: Other

~ 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.

LOS Engineering

PM Existing + Cumulative
21: Mission Rd & I-15 NB Ramps

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0			4.0			4.0	4.0			
Lane Util. Factor	1.00	1.00			1.00			1.00	1.00			
Frt	1.00	1.00			0.99			1.00	0.85			
Flt Protected	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (prot)	1583	1863			1852			1776	1417			
Flt Permitted	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (perm)	1583	1863			1852			1776	1417			
Volume (vph)	920	288	0	0	225	10	350	10	170	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	968	303	0	0	237	11	368	11	179	0	0	0
RTOR Reduction (vph)	0	0	0	0	2	0	0	0	126	0	0	0
Lane Group Flow (vph)	968	303	0	0	246	0	0	379	53	0	0	0
Turn Type	Prot						Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases							2		2			
Actuated Green, G (s)	59.1	83.0			19.9			21.0	21.0			
Effective Green, g (s)	59.1	83.0			19.9			21.0	21.0			
Actuated g/C Ratio	0.53	0.74			0.18			0.19	0.19			
Clearance Time (s)	4.0	4.0			4.0			4.0	4.0			
Vehicle Extension (s)	3.0	3.0			3.0			3.0	3.0			
Lane Grp Cap (vph)	835	1381			329			333	266			
v/s Ratio Prot	c0.61	0.16			c0.13							
v/s Ratio Perm								0.21	0.04			
v/c Ratio	1.16	0.22			0.75			1.14	0.20			
Uniform Delay, d1	26.4	4.5			43.7			45.5	38.4			
Progression Factor	1.00	1.00			1.00			1.00	1.00			
Incremental Delay, d2	84.9	0.1			9.0			92.2	0.4			
Delay (s)	111.4	4.6			52.7			137.7	38.8			
Level of Service	F	A			D			F	D			
Approach Delay (s)		85.9			52.7			106.0			0.0	
Approach LOS		F			D			F			A	

Intersection Summary

HCM Average Control Delay	87.3	HCM Level of Service	F
HCM Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	112.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	99.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

PM Existing + Cumulative

22: Stewart Canyon Rd & Horse Ranch Creek Rd — HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Yield			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	19	378	297	23	17	38
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	20	398	313	24	18	40
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	687	38	58			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	687	38	58			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	94	62	80			
cM capacity (veh/h)	329	1034	1546			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	418	337	58
Volume Left	20	313	0
Volume Right	398	0	40
cSH	938	1546	1700
Volume to Capacity	0.45	0.20	0.03
Queue Length 95th (ft)	58	19	0
Control Delay (s)	11.9	7.5	0.0
Lane LOS	B	A	
Approach Delay (s)	11.9	7.5	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	9.2		
Intersection Capacity Utilization	55.4%	ICU Level of Service	B
Analysis Period (min)	15		

LOS Engineering

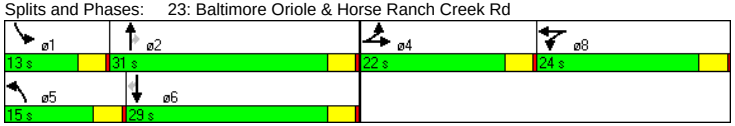
PM Existing + Cumulative

23: Baltimore Oriole & Horse Ranch Creek Rd — Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	24	7	212	15	50	255	264	56	291	43
Turn Type	Split		Split		Prot		Perm	Prot		Perm
Protected Phases	4	4	8	8	5	2		1	6	
Permitted Phases							2			6
Detector Phases	4	4	8	8	5	2	2	1	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0	20.0
Total Split (s)	22.0	22.0	24.0	24.0	15.0	31.0	31.0	13.0	29.0	29.0
Total Split (%)	24.4%	24.4%	26.7%	26.7%	16.7%	34.4%	34.4%	14.4%	32.2%	32.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag					Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	8.0	8.0	12.9	12.9	8.9	30.0	30.0	8.7	29.7	29.7
Actuated g/C Ratio	0.12	0.12	0.20	0.20	0.13	0.49	0.49	0.13	0.48	0.48
v/c Ratio	0.13	0.06	0.43	0.41	0.25	0.30	0.33	0.29	0.34	0.06
Control Delay	27.0	22.1	22.0	19.3	26.0	13.9	3.9	27.1	14.8	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.0	22.1	22.0	19.3	26.0	13.9	3.9	27.1	14.8	6.8
LOS	C	C	C	B	C	B	A	C	B	A
Approach Delay		25.4		20.6		10.3			15.7	
Approach LOS		C		C		B			B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 61.6	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.43	
Intersection Signal Delay: 14.5	Intersection LOS: B
Intersection Capacity Utilization 42.6%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 23: Baltimore Oriole & Horse Ranch Creek Rd



LOS Engineering

PM Existing + Cumulative
23: Baltimore Oriole & Horse Ranch Creek Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	50
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.937			0.962				0.850			0.850
Flt Protected	0.950			0.950	0.969		0.950			0.950		
Satd. Flow (prot)	1583	1745	0	1504	1650	0	1583	1863	1417	1583	1863	1417
Flt Permitted	0.950			0.950	0.969		0.950			0.950		
Satd. Flow (perm)	1583	1745	0	1504	1650	0	1583	1863	1417	1583	1863	1417
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			17				278			45
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1047			1324			958			2343	
Travel Time (s)		23.8			30.1			21.8			53.3	
Volume (vph)	24	7	5	212	15	34	50	255	264	56	291	43
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	25	7	5	223	16	36	53	268	278	59	306	45
Lane Group Flow (vph)	25	12	0	131	144	0	53	268	278	59	306	45
v/c Ratio	0.13	0.06		0.43	0.41		0.25	0.30	0.33	0.29	0.34	0.06
Control Delay	27.0	22.1		22.0	19.3		26.0	13.9	3.9	27.1	14.8	6.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.0	22.1		22.0	19.3		26.0	13.9	3.9	27.1	14.8	6.8
Queue Length 50th (ft)	2	1		11	11		5	20	0	5	24	0
Queue Length 95th (ft)	33	18		108	106		54	162	49	60	193	22
Internal Link Dist (ft)		967			1244			878			2263	
Turn Bay Length (ft)												
Base Capacity (vph)	426	474		518	580		299	1123	965	254	1095	851
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	0.06	0.03		0.25	0.25		0.18	0.24	0.29	0.23	0.28	0.05

Intersection Summary

Area Type: Other

LOS Engineering

PM Existing + Cumulative
23: Baltimore Oriole & Horse Ranch Creek Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
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	1.00		0.95	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.94		1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.97		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1583	1746		1504	1651		1583	1863	1417	1583	1863	1417
Flt Permitted	0.95	1.00		0.95	0.97		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1583	1746		1504	1651		1583	1863	1417	1583	1863	1417
Volume (vph)	24	7	5	212	15	34	50	255	264	56	291	43
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	25	7	5	223	16	36	53	268	278	59	306	45
RTOR Reduction (vph)	0	5	0	0	14	0	0	0	149	0	0	24
Lane Group Flow (vph)	25	7	0	131	130	0	53	268	129	59	306	21
Turn Type	Split			Split			Prot		Perm	Prot		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	2.8	2.8		12.0	12.0		3.5	29.6	29.6	3.2	29.3	29.3
Effective Green, g (s)	2.8	2.8		12.0	12.0		3.5	29.6	29.6	3.2	29.3	29.3
Actuated g/C Ratio	0.04	0.04		0.19	0.19		0.06	0.47	0.47	0.05	0.46	0.46
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	70	77		284	312		87	867	659	80	858	653
v/s Ratio Prot	c0.02	0.00		c0.09	0.08		0.03	0.14		c0.04	c0.16	
v/s Ratio Perm									0.09			0.01
v/c Ratio	0.36	0.09		0.46	0.42		0.61	0.31	0.20	0.74	0.36	0.03
Uniform Delay, d1	29.5	29.2		22.9	22.7		29.4	10.6	10.0	29.8	11.1	9.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.1	0.5		1.2	0.9		11.5	0.2	0.1	29.4	0.3	0.0
Delay (s)	32.6	29.7		24.1	23.6		40.9	10.8	10.1	59.2	11.3	9.4
Level of Service	C	C		C	C		D	B	B	E	B	A
Approach Delay (s)		31.7			23.9			13.2			18.0	
Approach LOS		C			C			B			B	

Intersection Summary

HCM Average Control Delay	17.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	63.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	42.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

PM Existing + Cumulative
24: Longspur Rd & Horse Ranch Creek Rd

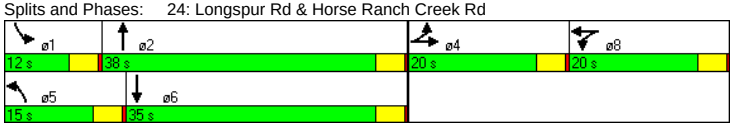
Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	6	36	265	35	125	522	52	400
Turn Type	Split		Split		Prot		Prot	
Protected Phases	4	4	8	8	5	2	1	6
Permitted Phases								
Detector Phases	4	4	8	8	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	20.0	20.0	20.0	20.0	15.0	38.0	12.0	35.0
Total Split (%)	22.2%	22.2%	22.2%	22.2%	16.7%	42.2%	13.3%	38.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Max	None	Max
Act Effct Green (s)	7.6	7.6	12.6	12.6	9.8	39.9	7.2	35.4
Actuated g/C Ratio	0.10	0.10	0.16	0.16	0.12	0.52	0.09	0.46
v/c Ratio	0.04	0.44	0.68	0.66	0.67	0.46	0.39	0.29
Control Delay	33.3	23.5	45.4	40.3	51.3	13.9	44.0	16.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.3	23.5	45.4	40.3	51.3	13.9	44.0	16.4
LOS	C	C	D	D	D	B	D	B
Approach Delay		24.1		42.7		19.1		19.3
Approach LOS		C		D		B		B

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 76.7
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.68
Intersection Signal Delay: 23.8 Intersection LOS: C
Intersection Capacity Utilization 52.3% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 24: Longspur Rd & Horse Ranch Creek Rd



LOS Engineering

PM Existing + Cumulative
24: Longspur Rd & Horse Ranch Creek Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.911			0.966			0.950			0.983	
Flt Protected	0.950			0.950	0.972		0.950			0.950		
Satd. Flow (prot)	1583	1697	0	1504	1662	0	1583	3362	0	1583	3479	0
Flt Permitted	0.950			0.950	0.972		0.950			0.950		
Satd. Flow (perm)	1583	1697	0	1504	1662	0	1583	3362	0	1583	3479	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		56			14			111			17	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1010			908			1206			958	
Travel Time (s)		23.0			20.6			27.4			21.8	
Volume (vph)	6	36	53	265	35	41	125	522	260	52	400	51
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	6	38	56	279	37	43	132	549	274	55	421	54
Lane Group Flow (vph)	6	94	0	169	190	0	132	823	0	55	475	0
v/c Ratio	0.04	0.44		0.68	0.66		0.67	0.46		0.39	0.29	
Control Delay	33.3	23.5		45.4	40.3		51.3	13.9		44.0	16.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	33.3	23.5		45.4	40.3		51.3	13.9		44.0	16.4	
Queue Length 50th (ft)	3	18		82	85		62	132		26	81	
Queue Length 95th (ft)	14	62		157	163		#145	211		65	133	
Internal Link Dist (ft)		930			828			1126			878	
Turn Bay Length (ft)												
Base Capacity (vph)	292	359		303	346		218	1803		156	1613	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.02	0.26		0.56	0.55		0.61	0.46		0.35	0.29	

Intersection Summary

Area Type: Other
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

LOS Engineering

PM Existing + Cumulative

24: Longspur Rd & Horse Ranch Creek Rd — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		0.95	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.91		1.00	0.97		1.00	0.95		1.00	0.98	
Flt Protected	0.95	1.00		0.95	0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	1696		1504	1661		1583	3362		1583	3479	
Flt Permitted	0.95	1.00		0.95	0.97		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	1696		1504	1661		1583	3362		1583	3479	
Volume (vph)	6	36	53	265	35	41	125	522	260	52	400	51
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	6	38	56	279	37	43	132	549	274	55	421	54
RTOR Reduction (vph)	0	52	0	0	12	0	0	55	0	0	9	0
Lane Group Flow (vph)	6	42	0	169	178	0	132	768	0	55	466	0
Turn Type	Split			Split			Prot			Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	6.3	6.3		12.6	12.6		8.2	39.9		4.5	36.2	
Effective Green, g (s)	6.3	6.3		12.6	12.6		8.2	39.9		4.5	36.2	
Actuated g/C Ratio	0.08	0.08		0.16	0.16		0.10	0.50		0.06	0.46	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	126	135		239	264		164	1692		90	1588	
v/s Ratio Prot	0.00	c0.03		c0.11	0.11		c0.08	c0.23		0.03	0.13	
v/s Ratio Perm												
v/c Ratio	0.05	0.31		0.71	0.68		0.80	0.45		0.61	0.29	
Uniform Delay, d1	33.7	34.5		31.6	31.4		34.8	12.7		36.5	13.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	1.3		9.2	6.7		24.1	0.9		11.7	0.5	
Delay (s)	33.9	35.8		40.8	38.1		58.9	13.6		48.2	14.0	
Level of Service	C	D		D	D		E	B		D	B	
Approach Delay (s)		35.7			39.4			19.8			17.5	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM Average Control Delay	23.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	79.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	52.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

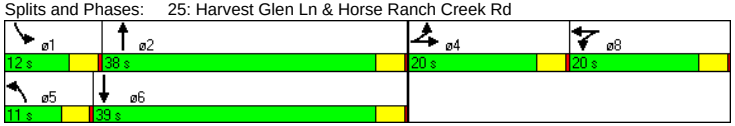
PM Existing + Cumulative

25: Harvest Glen Ln & Horse Ranch Creek Rd — Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	1	21	239	29	40	850	49	667
Turn Type	Split		Split		Prot		Prot	
Protected Phases	4	4	8	8	5	2	1	6
Permitted Phases								
Detector Phases	4	4	8	8	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	20.0	20.0	20.0	20.0	11.0	38.0	12.0	39.0
Total Split (%)	22.2%	22.2%	22.2%	22.2%	12.2%	42.2%	13.3%	43.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	6.8	6.8	11.5	11.5	6.7	31.1	7.1	33.8
Actuated g/C Ratio	0.10	0.10	0.19	0.19	0.10	0.51	0.11	0.55
v/c Ratio	0.01	0.17	0.57	0.55	0.27	0.64	0.30	0.36
Control Delay	33.0	28.0	33.5	28.7	37.7	16.0	35.9	11.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.0	28.0	33.5	28.7	37.7	16.0	35.9	11.3
LOS	C	C	C	C	D	B	D	B
Approach Delay		28.1		30.9		16.8		13.0
Approach LOS		C		C		B		B

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 61.2	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.64	
Intersection Signal Delay: 17.8	Intersection LOS: B
Intersection Capacity Utilization 59.6%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 25: Harvest Glen Ln & Horse Ranch Creek Rd



PM Existing + Cumulative
25: Harvest Glen Ln & Horse Ranch Creek Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.950			0.951			0.969			0.999	
Flt Protected	0.950			0.950	0.976		0.950			0.950		
Satd. Flow (prot)	1583	1770	0	1504	1643	0	1583	3429	0	1583	3536	0
Flt Permitted	0.950			0.950	0.976		0.950			0.950		
Satd. Flow (perm)	1583	1770	0	1504	1643	0	1583	3429	0	1583	3536	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			24			41			1	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1058			1173			1033			1206	
Travel Time (s)		24.0			26.7			23.5			27.4	
Volume (vph)	1	21	10	239	29	57	40	850	220	49	667	4
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1	22	11	252	31	60	42	895	232	52	702	4
Lane Group Flow (vph)	1	33	0	161	182	0	42	1127	0	52	706	0
v/c Ratio	0.01	0.17		0.57	0.55		0.27	0.64		0.30	0.36	
Control Delay	33.0	28.0		33.5	28.7		37.7	16.0		35.9	11.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	33.0	28.0		33.5	28.7		37.7	16.0		35.9	11.3	
Queue Length 50th (ft)	0	7		50	49		13	143		16	42	
Queue Length 95th (ft)	5	37		145	145		52	332		60	182	
Internal Link Dist (ft)		978			1093			953			1126	
Turn Bay Length (ft)												
Base Capacity (vph)	345	395		391	445		173	1930		203	2083	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.00	0.08		0.41	0.41		0.24	0.58		0.26	0.34	

Intersection Summary

Area Type: Other

LOS Engineering

PM Existing + Cumulative
25: Harvest Glen Ln & Horse Ranch Creek Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		0.95	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.95		1.00	0.95		1.00	0.97		1.00	1.00	
Flt Protected	0.95	1.00		0.95	0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	1770		1504	1641		1583	3430		1583	3536	
Flt Permitted	0.95	1.00		0.95	0.98		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	1770		1504	1641		1583	3430		1583	3536	
Volume (vph)	1	21	10	239	29	57	40	850	220	49	667	4
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1	22	11	252	31	60	42	895	232	52	702	4
RTOR Reduction (vph)	0	11	0	0	20	0	0	21	0	0	0	0
Lane Group Flow (vph)	1	22	0	161	162	0	42	1106	0	52	706	0
Turn Type	Split			Split			Prot			Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	2.4	2.4		11.5	11.5		2.1	31.9		4.0	33.8	
Effective Green, g (s)	2.4	2.4		11.5	11.5		2.1	31.9		4.0	33.8	
Actuated g/C Ratio	0.04	0.04		0.17	0.17		0.03	0.48		0.06	0.51	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	58	65		263	287		51	1663		96	1816	
v/s Ratio Prot	0.00	c0.01		c0.11	0.10		0.03	c0.32		c0.03	0.20	
v/s Ratio Perm												
v/c Ratio	0.02	0.34		0.61	0.57		0.82	0.66		0.54	0.39	
Uniform Delay, d1	30.6	30.9		25.1	24.9		31.7	12.9		30.0	9.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	3.2		4.2	2.5		64.6	1.0		6.1	0.1	
Delay (s)	30.7	34.1		29.3	27.4		96.3	13.9		36.1	9.9	
Level of Service	C	C		C	C		F	B		D	A	
Approach Delay (s)		34.0			28.3			16.9			11.7	
Approach LOS		C			C			B			B	

Intersection Summary

HCM Average Control Delay	17.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	65.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	59.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

PM Existing + Cumulative
26: Pardee South Loop & Horse Ranch Creek Rd

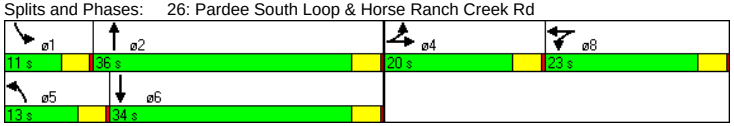
Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	35	0	42	0	61	1052	34	810
Turn Type	Split		Split		Prot		Prot	
Protected Phases	4	4	8	8	5	2	1	6
Permitted Phases								
Detector Phases	4	4	8	8	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	20.0	20.0	23.0	23.0	13.0	36.0	11.0	34.0
Total Split (%)	22.2%	22.2%	25.6%	25.6%	14.4%	40.0%	12.2%	37.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	7.8	7.8	7.7	7.7	8.3	51.9	6.9	48.0
Actuated g/C Ratio	0.10	0.10	0.10	0.10	0.11	0.69	0.09	0.64
v/c Ratio	0.24	0.02	0.22	0.20	0.39	0.48	0.27	0.42
Control Delay	30.6	0.1	30.8	18.7	33.0	11.1	34.3	12.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.6	0.1	30.8	18.7	33.0	11.1	34.3	12.4
LOS	C	A	C	B	C	B	C	B
Approach Delay		22.6		24.6		12.2		13.2
Approach LOS		C		C		B		B

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 75.1
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.48
Intersection Signal Delay: 13.2 Intersection LOS: B
Intersection Capacity Utilization 53.2% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 26: Pardee South Loop & Horse Ranch Creek Rd



LOS Engineering

PM Existing + Cumulative
26: Pardee South Loop & Horse Ranch Creek Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.850			0.897			0.992			0.987	
Flt Protected	0.950			0.950	0.985		0.950			0.950		
Satd. Flow (prot)	1583	1583	0	1504	1564	0	1583	3511	0	1583	3493	0
Flt Permitted	0.950			0.950	0.985		0.950			0.950		
Satd. Flow (perm)	1583	1583	0	1504	1564	0	1583	3511	0	1583	3493	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		439			24			7			12	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		869			1419			1340			1033	
Travel Time (s)		19.8			32.3			30.5			23.5	
Volume (vph)	35	0	12	42	0	23	61	1052	60	34	810	75
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	37	0	13	44	0	24	64	1107	63	36	853	79
Lane Group Flow (vph)	37	13	0	33	35	0	64	1170	0	36	932	0
v/c Ratio	0.24	0.02		0.22	0.20		0.39	0.48		0.27	0.42	
Control Delay	30.6	0.1		30.8	18.7		33.0	11.1		34.3	12.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	30.6	0.1		30.8	18.7		33.0	11.1		34.3	12.4	
Queue Length 50th (ft)	12	0		11	4		21	124		12	142	
Queue Length 95th (ft)	41	0		40	30		63	306		43	236	
Internal Link Dist (ft)		789			1339			1260			953	
Turn Bay Length (ft)												
Base Capacity (vph)	308	662		335	367		192	2426		145	2292	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.12	0.02		0.10	0.10		0.33	0.48		0.25	0.41	

Intersection Summary

Area Type: Other

LOS Engineering

PM Existing + Cumulative

26: Pardee South Loop & Horse Ranch Creek Rd — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		0.95	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.85		1.00	0.90		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	1583		1504	1563		1583	3511		1583	3494	
Flt Permitted	0.95	1.00		0.95	0.98		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	1583		1504	1563		1583	3511		1583	3494	
Volume (vph)	35	0	12	42	0	23	61	1052	60	34	810	75
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	37	0	13	44	0	24	64	1107	63	36	853	79
RTOR Reduction (vph)	0	12	0	0	22	0	0	3	0	0	5	0
Lane Group Flow (vph)	37	1	0	33	13	0	64	1167	0	36	927	0
Turn Type	Split			Split			Prot			Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	5.4	5.4		5.3	5.3		5.7	50.2		2.9	47.4	
Effective Green, g (s)	5.4	5.4		5.3	5.3		5.7	50.2		2.9	47.4	
Actuated g/C Ratio	0.07	0.07		0.07	0.07		0.07	0.63		0.04	0.59	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	107	107		100	104		113	2209		58	2075	
v/s Ratio Prot	c0.02	0.00		c0.02	0.01		c0.04	c0.33		0.02	0.27	
v/s Ratio Perm												
v/c Ratio	0.35	0.01		0.33	0.12		0.57	0.53		0.62	0.45	
Uniform Delay, d1	35.5	34.7		35.6	35.1		35.9	8.2		37.9	9.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.9	0.0		1.9	0.5		6.4	0.2		18.8	0.2	
Delay (s)	37.5	34.7		37.5	35.6		42.2	8.5		56.8	9.1	
Level of Service	D	C		D	D		D	A		E	A	
Approach Delay (s)		36.7			36.5			10.2			10.9	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM Average Control Delay	11.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	79.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	53.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

PM Existing + Cumulative

27: School/Park Access & Horse Ranch Creek Rd — HCM Unsignalized Intersection Capacity Analysis

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	0	1173	0	0	878
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	1235	0	0	924
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1697	617			1235	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1697	617			1235	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			100	
cM capacity (veh/h)	83	433			560	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	0	823	412	462	462
Volume Left	0	0	0	0	0
Volume Right	0	0	0	0	0
cSH	1700	1700	1700	1700	1700
Volume to Capacity	0.00	0.48	0.24	0.27	0.27
Queue Length 95th (ft)	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0
Lane LOS	A				
Approach Delay (s)	0.0	0.0		0.0	
Approach LOS	A				

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	35.8%	ICU Level of Service	A
Analysis Period (min)	15		

LOS Engineering

PM Existing + Cumulative
28: Connector Rd & Horse Ranch Creek Rd

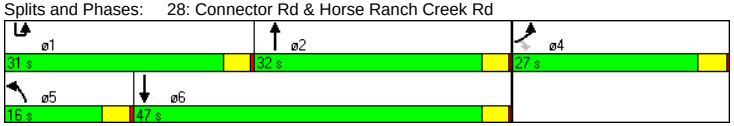
Timings

Lane Group	EBL	EBR	NBL	NBT	SBT	ø1
Lane Configurations						
Volume (vph)	568	3	7	620	433	
Turn Type		Perm	Prot			
Protected Phases	4		5	2	6	1
Permitted Phases		4				
Detector Phases	4	4	5	2	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0	8.0
Total Split (s)	27.0	27.0	16.0	32.0	47.0	31.0
Total Split (%)	30.0%	30.0%	17.8%	35.6%	52.2%	34%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag			Lead	Lag	Lag	Lead
Lead-Lag Optimize?			Yes	Yes	Yes	Yes
Recall Mode	None	None	None	Min	Min	None
Act Effct Green (s)	13.2	13.2	6.2	15.5	14.3	
Actuated g/C Ratio	0.35	0.35	0.14	0.41	0.38	
v/c Ratio	0.56	0.01	0.03	0.45	0.63	
Control Delay	13.9	9.3	24.3	8.8	8.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	13.9	9.3	24.3	8.8	8.0	
LOS	B	A	C	A	A	
Approach Delay	13.8			9.0	8.0	
Approach LOS	B			A	A	

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 37.9
Natural Cycle: 50
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.63
Intersection Signal Delay: 9.9 Intersection LOS: A
Intersection Capacity Utilization 51.4% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 28: Connector Rd & Horse Ranch Creek Rd



LOS Engineering

PM Existing + Cumulative
28: Connector Rd & Horse Ranch Creek Rd

Queues

Lane Group	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Ideal Flow (vphpl)	1700	1700	1700	1900	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	
Trailing Detector (ft)	0	0	0	0	0	0	
Turning Speed (mph)	15	9	15		9		9
Lane Util. Factor	0.97	1.00	1.00	0.95	1.00	0.95	0.95
Frt		0.850				0.923	
Flt Protected	0.950		0.950				
Satd. Flow (prot)	3072	1417	1583	3539	1667	3267	0
Flt Permitted	0.950		0.950				
Satd. Flow (perm)	3072	1417	1583	3539	1667	3267	0
Right Turn on Red		Yes					Yes
Satd. Flow (RTOR)		3				404	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30			30		30	
Link Distance (ft)	2875			1509		1400	
Travel Time (s)	65.3			34.3		31.8	
Volume (vph)	568	3	7	620	0	433	456
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	598	3	7	653	0	456	480
Lane Group Flow (vph)	598	3	7	653	0	936	0
v/c Ratio	0.56	0.01	0.03	0.45		0.63	
Control Delay	13.9	9.3	24.3	8.8		8.0	
Queue Delay	0.0	0.0	0.0	0.0		0.0	
Total Delay	13.9	9.3	24.3	8.8		8.0	
Queue Length 50th (ft)	38	0	1	38		30	
Queue Length 95th (ft)	154	5	14	104		142	
Internal Link Dist (ft)	2795			1429		1320	
Turn Bay Length (ft)							
Base Capacity (vph)	1544	714	386	2093		2294	
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	0.39	0.00	0.02	0.31		0.41	

Intersection Summary

Area Type: Other

LOS Engineering

PM Existing + Cumulative
28: Connector Rd & Horse Ranch Creek Rd — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Ideal Flow (vphpl)	1700	1700	1700	1900	1700	1900	1700
Total Lost time (s)	4.0	4.0	4.0	4.0		4.0	
Lane Util. Factor	0.97	1.00	1.00	0.95		0.95	
Frt	1.00	0.85	1.00	1.00		0.92	
Flt Protected	0.95	1.00	0.95	1.00		1.00	
Satd. Flow (prot)	3072	1417	1583	3539		3267	
Flt Permitted	0.95	1.00	0.95	1.00		1.00	
Satd. Flow (perm)	3072	1417	1583	3539		3267	
Volume (vph)	568	3	7	620	0	433	456
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	598	3	7	653	0	456	480
RTOR Reduction (vph)	0	2	0	0	0	260	0
Lane Group Flow (vph)	598	1	7	653	0	676	0
Turn Type		Perm	Prot		Prot		
Protected Phases	4		5	2	1	6	
Permitted Phases		4					
Actuated Green, G (s)	13.2	13.2	0.7	19.0		14.3	
Effective Green, g (s)	13.2	13.2	0.7	19.0		14.3	
Actuated g/C Ratio	0.33	0.33	0.02	0.47		0.36	
Clearance Time (s)	4.0	4.0	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	1009	465	28	1673		1162	
v/s Ratio Prot	c0.19		0.00	c0.18		c0.21	
v/s Ratio Perm		0.00					
v/c Ratio	0.59	0.00	0.25	0.39		0.58	
Uniform Delay, d1	11.3	9.1	19.5	6.9		10.5	
Progression Factor	1.00	1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.9	0.0	4.7	0.2		0.7	
Delay (s)	12.2	9.1	24.1	7.0		11.3	
Level of Service	B	A	C	A		B	
Approach Delay (s)	12.2			7.2		11.3	
Approach LOS	B			A		B	

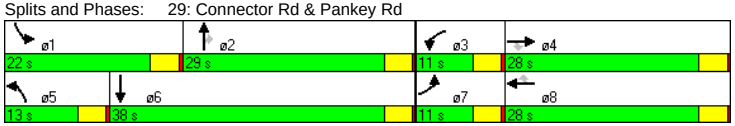
Intersection Summary			
HCM Average Control Delay	10.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	40.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

PM Existing + Cumulative
29: Connector Rd & Pankey Rd — Timings

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Volume (vph)	75	432	300	15	238	260	200	373	33	209	436
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot	
Protected Phases	7	4		3	8		5	2		1	6
Permitted Phases			4			8			2		
Detector Phases	7	4	4	3	8	8	5	2	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0
Total Split (s)	11.0	28.0	28.0	11.0	28.0	28.0	13.0	29.0	29.0	22.0	38.0
Total Split (%)	12.2%	31.1%	31.1%	12.2%	31.1%	31.1%	14.4%	32.2%	32.2%	24.4%	42.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min
Act Effct Green (s)	6.9	24.6	24.6	6.3	18.1	18.1	9.5	19.9	19.9	14.0	24.5
Actuated g/C Ratio	0.09	0.34	0.34	0.08	0.25	0.25	0.13	0.27	0.27	0.19	0.34
v/c Ratio	0.54	0.76	0.48	0.13	0.54	0.49	1.03	0.77	0.08	0.72	0.75
Control Delay	52.3	34.6	5.8	42.1	31.9	7.0	110.2	37.9	9.1	44.7	30.1
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	52.3	34.6	5.8	42.1	31.9	7.0	110.2	37.9	9.1	44.7	30.1
LOS	D	C	A	D	C	A	F	D	A	D	C
Approach Delay		25.5			19.6			60.2			34.8
Approach LOS		C			B			E			C

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 72.9	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.03	
Intersection Signal Delay: 34.8	Intersection LOS: C
Intersection Capacity Utilization 81.4%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 29: Connector Rd & Pankey Rd



PM Existing + Cumulative
29: Connector Rd & Pankey Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	50	50	50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850		0.996	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1583	1770	1346	1583	1863	1417	1583	1863	1417	1583	1855	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1583	1770	1346	1583	1863	1417	1583	1863	1417	1583	1855	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			316			274			35		2	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1256			2875			1488			1443	
Travel Time (s)		28.5			65.3			33.8			32.8	
Volume (vph)	75	432	300	15	238	260	200	373	33	209	436	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	79	455	316	16	251	274	211	393	35	220	459	11
Lane Group Flow (vph)	79	455	316	16	251	274	211	393	35	220	470	0
v/c Ratio	0.54	0.76	0.48	0.13	0.54	0.49	1.03	0.77	0.08	0.72	0.75	
Control Delay	52.3	34.6	5.8	42.1	31.9	7.0	110.2	37.9	9.1	44.7	30.1	
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	52.3	34.6	5.8	42.1	31.9	7.0	110.2	37.9	9.1	44.7	30.1	
Queue Length 50th (ft)	36	192	0	7	109	0	~116	167	0	95	180	
Queue Length 95th (ft)	#110	#469	68	29	195	58	#295	#335	22	#214	327	
Internal Link Dist (ft)		1176			2795			1408			1363	
Turn Bay Length (ft)												
Base Capacity (vph)	151	628	682	139	583	632	205	609	487	381	779	
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	0.52	0.72	0.46	0.12	0.43	0.43	1.03	0.65	0.07	0.58	0.60	

Intersection Summary

Area Type: Other

~ 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.

LOS Engineering

PM Existing + Cumulative
29: Connector Rd & Pankey Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	0.95	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	
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)	1583	1770	1346	1583	1863	1417	1583	1863	1417	1583	1856	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1583	1770	1346	1583	1863	1417	1583	1863	1417	1583	1856	
Volume (vph)	75	432	300	15	238	260	200	373	33	209	436	10
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	79	455	316	16	251	274	211	393	35	220	459	11
RTOR Reduction (vph)	0	0	213	0	0	200	0	0	26	0	1	0
Lane Group Flow (vph)	79	455	103	16	251	74	211	393	9	220	469	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	5.3	24.6	24.6	1.1	20.4	20.4	9.5	20.0	20.0	14.0	24.5	
Effective Green, g (s)	5.3	24.6	24.6	1.1	20.4	20.4	9.5	20.0	20.0	14.0	24.5	
Actuated g/C Ratio	0.07	0.32	0.32	0.01	0.27	0.27	0.13	0.26	0.26	0.18	0.32	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	111	575	437	23	502	382	199	492	374	293	601	
v/s Ratio Prot	c0.05	c0.26		0.01	0.13		c0.13	0.21		c0.14	c0.25	
v/s Ratio Perm			0.08			0.05			0.01			
v/c Ratio	0.71	0.79	0.23	0.70	0.50	0.19	1.06	0.80	0.02	0.75	0.78	
Uniform Delay, d1	34.5	23.2	18.7	37.1	23.3	21.3	33.1	26.0	20.6	29.2	23.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	19.3	7.3	0.3	63.9	0.8	0.2	80.6	8.8	0.0	10.3	6.4	
Delay (s)	53.8	30.6	19.0	101.0	24.1	21.6	113.7	34.8	20.7	39.5	29.5	
Level of Service	D	C	B	F	C	C	F	C	C	D	C	
Approach Delay (s)		28.4			25.1			60.1			32.7	
Approach LOS		C			C			E			C	

Intersection Summary

HCM Average Control Delay	36.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	75.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

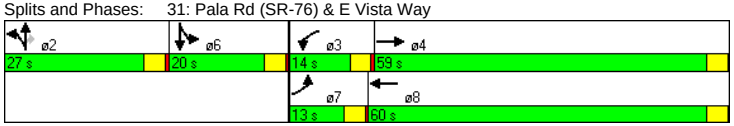
PM Existing + Cumulative
31: Pala Rd (SR-76) & E Vista Way

Timings

Lane Group	EBL	EBT	WBL	WBT	NBT	NBR	SBT
Lane Configurations							
Volume (vph)	100	2034	396	1193	70	359	80
Turn Type	Prot		Prot			Perm	
Protected Phases	7	4	3	8	2		6
Permitted Phases						2	
Detector Phases	7	4	3	8	2	2	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	20.0	20.0	20.0
Total Split (s)	13.0	59.0	14.0	60.0	27.0	27.0	20.0
Total Split (%)	10.8%	49.2%	11.7%	50.0%	22.5%	22.5%	16.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lead	Lag			
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			
Recall Mode	None	None	None	None	Max	Max	Max
Act Effct Green (s)	9.0	55.0	10.0	56.0	23.0	23.0	16.0
Actuated g/C Ratio	0.08	0.46	0.08	0.47	0.19	0.19	0.13
v/c Ratio	0.88	1.61	1.63	1.49	1.14	0.71	0.66
Control Delay	111.0	302.3	335.1	253.1	135.1	16.8	54.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	111.0	302.3	335.1	253.1	135.1	16.8	54.6
LOS	F	F	F	F	F	B	D
Approach Delay		294.7		273.2	76.9		54.6
Approach LOS		F		F	E		D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.63	
Intersection Signal Delay: 248.7	Intersection LOS: F
Intersection Capacity Utilization 124.3%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 31: Pala Rd (SR-76) & E Vista Way



LOS Engineering

PM Existing + Cumulative
31: Pala Rd (SR-76) & E Vista Way

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	300		150	450		0	0		200	0		0
Storage Lanes	1		0	2		0	0		1	0		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.975			0.996				0.850		0.941	
Flt Protected	0.950			0.950				0.961			0.997	
Satd. Flow (prot)	1583	3451	0	3072	1855	0	0	1790	1417	0	1748	0
Flt Permitted	0.950			0.950				0.961			0.997	
Satd. Flow (perm)	1583	3451	0	3072	1855	0	0	1790	1417	0	1748	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		25			1				320		27	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		710			526			797			552	
Travel Time (s)		16.1			12.0			18.1			12.5	
Volume (vph)	100	2034	400	396	1193	30	300	70	359	10	80	70
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	2141	421	417	1256	32	316	74	378	11	84	74
Lane Group Flow (vph)	105	2562	0	417	1288	0	0	390	378	0	169	0
v/c Ratio	0.88	1.61		1.63	1.49			1.14	0.71		0.66	
Control Delay	111.0	302.3		335.1	253.1			135.1	16.8		54.6	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay	111.0	302.3		335.1	253.1			135.1	16.8		54.6	
Queue Length 50th (ft)	82	~1504		~240	~1389			~352	38		106	
Queue Length 95th (ft)	#190	#1637		#343	#1655			#547	153		#183	
Internal Link Dist (ft)		630			446			717			472	
Turn Bay Length (ft)	300			450					200			
Base Capacity (vph)	119	1595		256	866			343	530		256	
Starvation Cap Reductn	0	0		0	0			0	0		0	
Spillback Cap Reductn	0	0		0	0			0	0		0	
Storage Cap Reductn	0	0		0	0			0	0		0	
Reduced v/c Ratio	0.88	1.61		1.63	1.49			1.14	0.71		0.66	

Intersection Summary	
Area Type:	Other
~	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.

LOS Engineering

PM Existing + Cumulative

31: Pala Rd (SR-76) & E Vista Way — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95		0.97	1.00			1.00	1.00		1.00	
Frt	1.00	0.98		1.00	1.00			1.00	0.85		0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.96	1.00		1.00	
Satd. Flow (prot)	1583	3452		3072	1856			1790	1417		1747	
Flt Permitted	0.95	1.00		0.95	1.00			0.96	1.00		1.00	
Satd. Flow (perm)	1583	3452		3072	1856			1790	1417		1747	
Volume (vph)	100	2034	400	396	1193	30	300	70	359	10	80	70
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	2141	421	417	1256	32	316	74	378	11	84	74
RTOR Reduction (vph)	0	14	0	0	1	0	0	0	259	0	23	0
Lane Group Flow (vph)	105	2548	0	417	1287	0	0	390	119	0	146	0
Turn Type	Prot			Prot			Split		Perm	Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases									2			
Actuated Green, G (s)	9.0	55.0		10.0	56.0			23.0	23.0		16.0	
Effective Green, g (s)	9.0	55.0		10.0	56.0			23.0	23.0		16.0	
Actuated g/C Ratio	0.08	0.46		0.08	0.47			0.19	0.19		0.13	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	119	1582		256	866			343	272		233	
v/s Ratio Prot	0.07	c0.74		c0.14	0.69			c0.22			c0.08	
v/s Ratio Perm									0.08			
v/c Ratio	0.88	1.61		1.63	1.49			1.14	0.44		0.62	
Uniform Delay, d1	55.0	32.5		55.0	32.0			48.5	42.8		49.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	48.1	277.9		300.2	225.2			91.1	5.1		12.0	
Delay (s)	103.0	310.4		355.2	257.2			139.6	47.9		61.2	
Level of Service	F	F		F	F			F	D		E	
Approach Delay (s)		302.2			281.1			94.5			61.2	
Approach LOS		F			F			F			E	

Intersection Summary			
HCM Average Control Delay	257.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.36		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	124.3%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

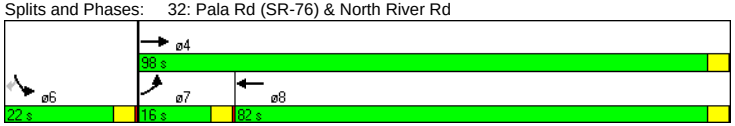
PM Existing + Cumulative

32: Pala Rd (SR-76) & North River Rd — Timings

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Volume (vph)	200	2323	1489	250	200
Turn Type	Prot				Perm
Protected Phases	7	4	8	6	
Permitted Phases					6
Detector Phases	7	4	8	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0
Total Split (s)	16.0	98.0	82.0	22.0	22.0
Total Split (%)	13.3%	81.7%	68.3%	18.3%	18.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Recall Mode	None	None	None	Max	Max
Act Effct Green (s)	12.0	94.0	78.0	18.0	18.0
Actuated g/C Ratio	0.10	0.78	0.65	0.15	0.15
v/c Ratio	1.34	1.68	1.44	1.11	0.57
Control Delay	229.1	326.2	225.0	138.0	16.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	229.1	326.2	225.0	138.0	16.8
LOS	F	F	F	F	B
Approach Delay		318.5	225.0	84.0	
Approach LOS		F	F	F	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.68	
Intersection Signal Delay: 262.4	Intersection LOS: F
Intersection Capacity Utilization 144.4%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 32: Pala Rd (SR-76) & North River Rd



LOS Engineering

PM Existing + Cumulative
32: Pala Rd (SR-76) & North River Rd

Queues

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1900	1900	1700	1700	1700
Storage Length (ft)	150			0	50	0
Storage Lanes	1			0	1	1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50		50	50
Trailing Detector (ft)	0	0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.988			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1583	1863	1840	0	1583	1417
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1583	1863	1840	0	1583	1417
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			9			182
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		1356	1400		1286	
Travel Time (s)		30.8	31.8		29.2	
Volume (vph)	200	2323	1489	150	250	200
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	211	2445	1567	158	263	211
Lane Group Flow (vph)	211	2445	1725	0	263	211
v/c Ratio	1.34	1.68	1.44		1.11	0.57
Control Delay	229.1	326.2	225.0		138.0	16.8
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	229.1	326.2	225.0		138.0	16.8
Queue Length 50th (ft)	~213	~2765	~1826		~233	20
Queue Length 95th (ft)	#369	#3018	#2095		#402	98
Internal Link Dist (ft)		1276	1320		1206	
Turn Bay Length (ft)	150				50	
Base Capacity (vph)	158	1459	1199		237	367
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	1.34	1.68	1.44		1.11	0.57

Intersection Summary

Area Type: Other

~ 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.

LOS Engineering

PM Existing + Cumulative
32: Pala Rd (SR-76) & North River Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1900	1900	1700	1700	1700
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1583	1863	1840		1583	1417
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1583	1863	1840		1583	1417
Volume (vph)	200	2323	1489	150	250	200
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	211	2445	1567	158	263	211
RTOR Reduction (vph)	0	0	3	0	0	155
Lane Group Flow (vph)	211	2445	1722	0	263	56
Turn Type	Prot					Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	12.0	94.0	78.0		18.0	18.0
Effective Green, g (s)	12.0	94.0	78.0		18.0	18.0
Actuated g/C Ratio	0.10	0.78	0.65		0.15	0.15
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	158	1459	1196		237	213
v/s Ratio Prot	0.13	c1.31	0.94		c0.17	
v/s Ratio Perm						0.04
v/c Ratio	1.34	1.68	1.44		1.11	0.26
Uniform Delay, d1	54.0	13.0	21.0		51.0	45.1
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	187.5	307.1	202.7		91.0	3.0
Delay (s)	241.5	320.1	223.7		142.0	48.1
Level of Service	F	F	F		F	D
Approach Delay (s)		313.9	223.7		100.2	
Approach LOS		F	F		F	

Intersection Summary

HCM Average Control Delay	261.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.58		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	144.4%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

PM Existing + Cumulative
33: Pala Rd (SR-76) & Olive Hill Rd

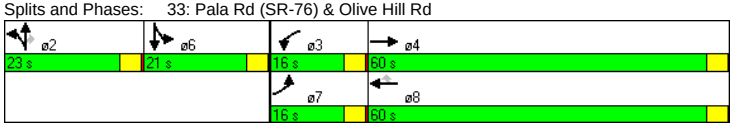
Timings

Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Configurations									
Volume (vph)	150	2223	247	1539	150	200	345	150	200
Turn Type	Prot		Prot		Perm		Perm	Split	
Protected Phases	7	4	3	8		2		6	6
Permitted Phases					8		2		
Detector Phases	7	4	3	8	8	2	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	16.0	60.0	16.0	60.0	60.0	23.0	23.0	21.0	21.0
Total Split (%)	13.3%	50.0%	13.3%	50.0%	50.0%	19.2%	19.2%	17.5%	17.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes				
Recall Mode	None	None	None	None	None	Max	Max	Max	Max
Act Effct Green (s)	12.0	56.0	12.0	56.0	56.0	19.0	19.0	17.0	17.0
Actuated g/C Ratio	0.10	0.47	0.10	0.47	0.47	0.16	0.16	0.14	0.14
v/c Ratio	1.00	1.56	1.65	0.98	0.22	1.09	0.91	0.71	1.11
Control Delay	126.0	281.2	351.3	49.9	8.8	126.2	49.6	67.0	134.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	126.0	281.2	351.3	49.9	8.8	126.2	49.6	67.0	134.2
LOS	F	F	F	D	A	F	D	E	F
Approach Delay		272.1		85.1		85.2			110.7
Approach LOS		F		F		F			F

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Natural Cycle: 150
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.65
Intersection Signal Delay: 173.3 Intersection LOS: F
Intersection Capacity Utilization 127.9% ICU Level of Service H
Analysis Period (min) 15

Splits and Phases: 33: Pala Rd (SR-76) & Olive Hill Rd



LOS Engineering

PM Existing + Cumulative
33: Pala Rd (SR-76) & Olive Hill Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	250		0	250		200	0		150	150		0
Storage Lanes	1		0	1		1	0		1	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50	50	50	50	50	50	50	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.988				0.850			0.850		0.957	
Flt Protected	0.950			0.950				0.984		0.950		
Satd. Flow (prot)	1583	3497	0	1583	3539	1417	0	1833	1417	1583	1783	0
Flt Permitted	0.950			0.950				0.984		0.950		
Satd. Flow (perm)	1583	3497	0	1583	3539	1417	0	1833	1417	1583	1783	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10				94			206		14	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		585			663			961			1186	
Travel Time (s)		13.3			15.1			21.8			27.0	
Volume (vph)	150	2223	200	247	1539	150	100	200	345	150	200	80
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	158	2340	211	260	1620	158	105	211	363	158	211	84
Lane Group Flow (vph)	158	2551	0	260	1620	158	0	316	363	158	295	0
v/c Ratio	1.00	1.56		1.65	0.98	0.22		1.09	0.91	0.71	1.11	
Control Delay	126.0	281.2		351.3	49.9	8.8		126.2	49.6	67.0	134.2	
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay	126.0	281.2		351.3	49.9	8.8		126.2	49.6	67.0	134.2	
Queue Length 50th (ft)	124	~1480		~292	633	27		~275	128	118	~253	
Queue Length 95th (ft)	#266	#1613		#461	#813	68		#456	#314	#213	#433	
Internal Link Dist (ft)		505			583			881			1106	
Turn Bay Length (ft)	250			250		200			150	150		
Base Capacity (vph)	158	1637		158	1652	711		290	398	224	265	
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	1.00	1.56		1.65	0.98	0.22		1.09	0.91	0.71	1.11	

Intersection Summary

Area Type: Other
~ 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.

LOS Engineering

PM Existing + Cumulative
33: Pala Rd (SR-76) & Olive Hill Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85		1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98	1.00	0.95	1.00	
Satd. Flow (prot)	1583	3495		1583	3539	1417		1832	1417	1583	1783	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.98	1.00	0.95	1.00	
Satd. Flow (perm)	1583	3495		1583	3539	1417		1832	1417	1583	1783	
Volume (vph)	150	2223	200	247	1539	150	100	200	345	150	200	80
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	158	2340	211	260	1620	158	105	211	363	158	211	84
RTOR Reduction (vph)	0	5	0	0	0	50	0	0	173	0	12	0
Lane Group Flow (vph)	158	2546	0	260	1620	108	0	316	190	158	283	0
Turn Type	Prot			Prot		Perm	Split		Perm	Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases						8			2			
Actuated Green, G (s)	12.0	56.0		12.0	56.0	56.0		19.0	19.0	17.0	17.0	
Effective Green, g (s)	12.0	56.0		12.0	56.0	56.0		19.0	19.0	17.0	17.0	
Actuated g/C Ratio	0.10	0.47		0.10	0.47	0.47		0.16	0.16	0.14	0.14	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	158	1631		158	1652	661		290	224	224	253	
v/s Ratio Prot	0.10	c0.73		c0.16	0.46			c0.17		0.10	c0.16	
v/s Ratio Perm						0.08			0.13			
v/c Ratio	1.00	1.56		1.65	0.98	0.16		1.09	0.85	0.71	1.12	
Uniform Delay, d1	54.0	32.0		54.0	31.5	18.5		50.5	49.1	49.1	51.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	71.6	255.4		317.1	17.7	0.1		78.9	30.7	17.0	92.2	
Delay (s)	125.6	287.4		371.1	49.1	18.6		129.4	79.8	66.2	143.7	
Level of Service	F	F		F	D	B		F	E	E	F	
Approach Delay (s)		278.0			87.8			102.9			116.6	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM Average Control Delay	179.4	HCM Level of Service	F
HCM Volume to Capacity ratio	1.41		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	127.9%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

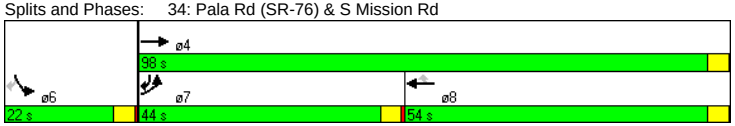
PM Existing + Cumulative
34: Pala Rd (SR-76) & S Mission Rd

Timings

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	1000	1768	1386	240	300	550
Turn Type	Prot			Perm		pm+ov
Protected Phases	7	4	8		6	7
Permitted Phases				8		6
Detector Phases	7	4	8	8	6	7
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0	8.0
Total Split (s)	44.0	98.0	54.0	54.0	22.0	44.0
Total Split (%)	36.7%	81.7%	45.0%	45.0%	18.3%	36.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead		Lag	Lag		Lead
Lead-Lag Optimize?	Yes		Yes	Yes		Yes
Recall Mode	None	None	None	None	Max	None
Act Effct Green (s)	40.0	94.0	50.0	50.0	18.0	62.0
Actuated g/C Ratio	0.33	0.78	0.42	0.42	0.15	0.52
v/c Ratio	1.03	1.28	0.99	0.35	0.69	0.45
Control Delay	75.2	147.6	56.1	5.9	56.8	19.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	75.2	147.6	56.1	5.9	56.8	19.7
LOS	E	F	E	A	E	B
Approach Delay		121.4	48.7		32.8	
Approach LOS		F	D		C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.28	
Intersection Signal Delay: 84.5	Intersection LOS: F
Intersection Capacity Utilization 109.3%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 34: Pala Rd (SR-76) & S Mission Rd



LOS Engineering

PM Existing + Cumulative
34: Pala Rd (SR-76) & S Mission Rd

Queues

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1900	1900	1700	1700	1700
Storage Length (ft)	500			300	500	0
Storage Lanes	2			1	2	2
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	0.97	1.00	0.95	1.00	0.97	0.88
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	3072	1863	3539	1417	3072	2493
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	3072	1863	3539	1417	3072	2493
Right Turn on Red				Yes		No
Satd. Flow (RTOR)				220		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		565	451		1333	
Travel Time (s)		12.8	10.3		30.3	
Volume (vph)	1000	1768	1386	240	300	550
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1053	1861	1459	253	316	579
Lane Group Flow (vph)	1053	1861	1459	253	316	579
v/c Ratio	1.03	1.28	0.99	0.35	0.69	0.45
Control Delay	75.2	147.6	56.1	5.9	56.8	19.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	75.2	147.6	56.1	5.9	56.8	19.7
Queue Length 50th (ft)	~449	~1824	581	15	121	154
Queue Length 95th (ft)	#580	#2088	#751	69	171	206
Internal Link Dist (ft)		485	371		1253	
Turn Bay Length (ft)	500			300	500	
Base Capacity (vph)	1024	1459	1475	719	461	1288
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	1.03	1.28	0.99	0.35	0.69	0.45

Intersection Summary

Area Type: Other

~ 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.

LOS Engineering

PM Existing + Cumulative
34: Pala Rd (SR-76) & S Mission Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1900	1900	1700	1700	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	0.95	1.00	0.97	0.88
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3072	1863	3539	1417	3072	2493
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3072	1863	3539	1417	3072	2493
Volume (vph)	1000	1768	1386	240	300	550
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1053	1861	1459	253	316	579
RTOR Reduction (vph)	0	0	0	128	0	0
Lane Group Flow (vph)	1053	1861	1459	125	316	579
Turn Type	Prot			Perm		pm+ov
Protected Phases	7	4	8		6	7
Permitted Phases				8		6
Actuated Green, G (s)	40.0	94.0	50.0	50.0	18.0	58.0
Effective Green, g (s)	40.0	94.0	50.0	50.0	18.0	58.0
Actuated g/C Ratio	0.33	0.78	0.42	0.42	0.15	0.48
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1024	1459	1475	590	461	1288
v/s Ratio Prot	0.34	c1.00	0.41		c0.10	0.15
v/s Ratio Perm				0.09		0.08
v/c Ratio	1.03	1.28	0.99	0.21	0.69	0.45
Uniform Delay, d1	40.0	13.0	34.7	22.4	48.3	20.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	35.6	129.5	20.6	0.2	8.1	0.3
Delay (s)	75.6	142.5	55.4	22.6	56.4	20.7
Level of Service	E	F	E	C	E	C
Approach Delay (s)		118.3	50.5		33.3	
Approach LOS		F	D		C	

Intersection Summary

HCM Average Control Delay	83.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.18		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	109.3%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

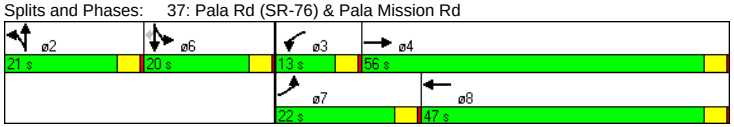
PM Existing + Cumulative
37: Pala Rd (SR-76) & Pala Mission Rd

Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Configurations								
Volume (vph)	250	528	50	675	18	20	30	190
Turn Type	Prot		Prot		Split			Perm
Protected Phases	7	4	3	8	2	2	6	
Permitted Phases								6
Detector Phases	7	4	3	8	2	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	22.0	56.0	13.0	47.0	21.0	21.0	20.0	20.0
Total Split (%)	20.0%	50.9%	11.8%	42.7%	19.1%	19.1%	18.2%	18.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	None	None	None	Max	Max	None	None
Act Effct Green (s)	18.0	55.1	7.9	43.0	17.0	17.0	8.9	8.9
Actuated g/C Ratio	0.17	0.53	0.08	0.42	0.17	0.17	0.09	0.09
v/c Ratio	0.95	0.32	0.44	0.96	0.07	0.11	0.34	0.66
Control Delay	86.4	14.9	57.8	54.3	38.6	29.1	49.6	17.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	86.4	14.9	57.8	54.3	38.6	29.1	49.6	17.1
LOS	F	B	E	D	D	C	D	B
Approach Delay		36.7		54.5		32.6	23.9	
Approach LOS		D		D		C	C	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 103	
Natural Cycle: 110	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.96	
Intersection Signal Delay: 42.2	Intersection LOS: D
Intersection Capacity Utilization 72.2%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 37: Pala Rd (SR-76) & Pala Mission Rd



LOS Engineering

PM Existing + Cumulative
37: Pala Rd (SR-76) & Pala Mission Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	250		0	250		0	200		0	0		50
Storage Lanes	1		0	1		0	1		0	0		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	50
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.989			0.994			0.948				0.850
Flt Protected	0.950			0.950			0.950				0.981	
Satd. Flow (prot)	1583	3500	0	1583	1852	0	1583	1766	0	0	1827	1417
Flt Permitted	0.950			0.950			0.950				0.981	
Satd. Flow (perm)	1583	3500	0	1583	1852	0	1583	1766	0	0	1827	1417
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10			2			11				200
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		941			1076			1007			1565	
Travel Time (s)		21.4			24.5			22.9			35.6	
Volume (vph)	250	528	41	50	675	30	18	20	10	20	30	190
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	263	556	43	53	711	32	19	21	11	21	32	200
Lane Group Flow (vph)	263	599	0	53	743	0	19	32	0	0	53	200
v/c Ratio	0.95	0.32		0.44	0.96		0.07	0.11			0.34	0.66
Control Delay	86.4	14.9		57.8	54.3		38.6	29.1			49.6	17.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0
Total Delay	86.4	14.9		57.8	54.3		38.6	29.1			49.6	17.1
Queue Length 50th (ft)	171	114		33	458		11	12			33	0
Queue Length 95th (ft)	#354	173		77	#778		33	41			72	68
Internal Link Dist (ft)		861			996			927			1485	
Turn Bay Length (ft)	250			250			200					50
Base Capacity (vph)	277	1878		135	775		261	301			266	377
Starvation Cap Reductn	0	0		0	0		0	0			0	0
Spillback Cap Reductn	0	0		0	0		0	0			0	0
Storage Cap Reductn	0	0		0	0		0	0			0	0
Reduced v/c Ratio	0.95	0.32		0.39	0.96		0.07	0.11			0.20	0.53

Intersection Summary	
Area Type:	Other
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

LOS Engineering

PM Existing + Cumulative

37: Pala Rd (SR-76) & Pala Mission Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.99		1.00	0.99		1.00	0.95			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.98	1.00
Satd. Flow (prot)	1583	3501		1583	1851		1583	1767			1827	1417
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00			0.98	1.00
Satd. Flow (perm)	1583	3501		1583	1851		1583	1767			1827	1417
Volume (vph)	250	528	41	50	675	30	18	20	10	20	30	190
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	263	556	43	53	711	32	19	21	11	21	32	200
RTOR Reduction (vph)	0	5	0	0	1	0	0	9	0	0	0	183
Lane Group Flow (vph)	263	594	0	53	742	0	19	23	0	0	53	17
Turn Type	Prot			Prot			Split			Split		Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases												6
Actuated Green, G (s)	18.0	55.1		6.8	43.9		17.0	17.0			8.9	8.9
Effective Green, g (s)	18.0	55.1		6.8	43.9		17.0	17.0			8.9	8.9
Actuated g/C Ratio	0.17	0.53		0.07	0.42		0.16	0.16			0.09	0.09
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	275	1858		104	783		259	289			157	121
v/s Ratio Prot	c0.17	0.17		0.03	c0.40		0.01	c0.01			c0.03	
v/s Ratio Perm												0.01
v/c Ratio	0.96	0.32		0.51	0.95		0.07	0.08			0.34	0.14
Uniform Delay, d1	42.5	13.8		46.9	28.8		36.7	36.8			44.7	43.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	42.0	0.1		3.9	20.2		0.5	0.5			1.3	0.5
Delay (s)	84.5	13.9		50.8	49.0		37.3	37.3			46.0	44.5
Level of Service	F	B		D	D		D	D			D	D
Approach Delay (s)		35.4			49.2			37.3			44.8	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	42.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	103.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	72.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

Appendix O

Existing + Project + Cumulative Intersection Level of Service Calculations

AM Existing + Cumulative + Project
1: Pala Rd (SR-76) & Via Monserate

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	9	1237	1969	44	91	33
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	9	1302	2073	46	96	35
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2119				3417	2096
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2119				3417	2096
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				0	47
cM capacity (veh/h)	257				8	66

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	9	1302	2119	131
Volume Left	9	0	0	96
Volume Right	0	0	46	35
cSH	257	1700	1700	10
Volume to Capacity	0.04	0.77	1.25	12.96
Queue Length 95th (ft)	3	0	0	Err
Control Delay (s)	19.5	0.0	0.0	Err
Lane LOS	C			F
Approach Delay (s)	0.1		0.0	Err
Approach LOS				F

Intersection Summary			
Average Delay	366.6		
Intersection Capacity Utilization	120.8%	ICU Level of Service	H
Analysis Period (min)	15		

LOS Engineering

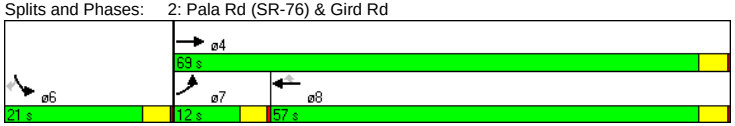
AM Existing + Cumulative + Project
2: Pala Rd (SR-76) & Gird Rd

Timings

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	151	1185	1330	49	80	139
Turn Type	Prot			Perm		Perm
Protected Phases	7	4	8		6	
Permitted Phases				8		6
Detector Phases	7	4	8	8	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	12.0	69.0	57.0	57.0	21.0	21.0
Total Split (%)	13.3%	76.7%	63.3%	63.3%	23.3%	23.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	None	None	None	Min	Min
Act Effct Green (s)	8.0	65.0	53.0	53.0	9.7	9.7
Actuated g/C Ratio	0.10	0.79	0.64	0.64	0.12	0.12
v/c Ratio	1.04	0.85	1.17	0.06	0.45	0.50
Control Delay	123.9	14.3	105.3	5.8	41.9	12.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	123.9	14.3	105.3	5.8	41.9	12.3
LOS	F	B	F	A	D	B
Approach Delay		26.7	101.8		23.1	
Approach LOS		C	F		C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 82.7	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.17	
Intersection Signal Delay: 61.7	Intersection LOS: E
Intersection Capacity Utilization 94.3%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 2: Pala Rd (SR-76) & Gird Rd



LOS Engineering

AM Existing + Cumulative + Project
2: Pala Rd (SR-76) & Gird Rd

Queues

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1900	1900	1700	1700	1700
Storage Length (ft)	450			20	0	180
Storage Lanes	1			1	1	1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1583	1863	1863	1417	1583	1417
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1583	1863	1863	1417	1583	1417
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				7		146
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		3191	8309		1271	
Travel Time (s)		72.5	188.8		28.9	
Volume (vph)	151	1185	1330	49	80	139
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	159	1247	1400	52	84	146
Lane Group Flow (vph)	159	1247	1400	52	84	146
v/c Ratio	1.04	0.85	1.17	0.06	0.45	0.50
Control Delay	123.9	14.3	105.3	5.8	41.9	12.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	123.9	14.3	105.3	5.8	41.9	12.3
Queue Length 50th (ft)	~90	308	~878	8	41	0
Queue Length 95th (ft)	#220	#878	#1207	23	85	51
Internal Link Dist (ft)		3111	8229		1191	
Turn Bay Length (ft)	450			20		180
Base Capacity (vph)	153	1465	1195	911	299	386
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	1.04	0.85	1.17	0.06	0.28	0.38

Intersection Summary

Area Type: Other

~ 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.

LOS Engineering

AM Existing + Cumulative + Project
2: Pala Rd (SR-76) & Gird Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1900	1900	1700	1700	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	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)	1583	1863	1863	1417	1583	1417
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1583	1863	1863	1417	1583	1417
Volume (vph)	151	1185	1330	49	80	139
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	159	1247	1400	52	84	146
RTOR Reduction (vph)	0	0	0	3	0	129
Lane Group Flow (vph)	159	1247	1400	49	84	17
Turn Type	Prot			Perm		Perm
Protected Phases	7	4	8		6	
Permitted Phases				8		6
Actuated Green, G (s)	8.0	65.1	53.1	53.1	9.7	9.7
Effective Green, g (s)	8.0	65.1	53.1	53.1	9.7	9.7
Actuated g/C Ratio	0.10	0.79	0.64	0.64	0.12	0.12
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	153	1465	1195	909	185	166
v/s Ratio Prot	c0.10	0.67	c0.75		c0.05	
v/s Ratio Perm				0.03		0.01
v/c Ratio	1.04	0.85	1.17	0.05	0.45	0.10
Uniform Delay, d1	37.4	5.7	14.8	5.5	34.1	32.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	83.5	5.0	86.4	0.0	1.8	0.3
Delay (s)	120.9	10.7	101.2	5.5	35.8	32.9
Level of Service	F	B	F	A	D	C
Approach Delay (s)		23.2	97.8		34.0	
Approach LOS		C	F		C	

Intersection Summary

HCM Average Control Delay	59.1	HCM Level of Service	E
HCM Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	82.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	94.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

AM Existing + Cumulative + Project
3: Pala Rd (SR-76) & Sage Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	2	1056	1587	2	8	16
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	2	1112	1671	2	8	17
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1673				2787	1672
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1673				2787	1672
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				59	86
cM capacity (veh/h)	383				21	118

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	2	1112	1673	17
Volume Left	2	0	0	0
Volume Right	0	0	2	17
cSH	383	1700	1700	118
Volume to Capacity	0.01	0.65	0.98	0.14
Queue Length 95th (ft)	0	0	0	12
Control Delay (s)	14.4	0.0	0.0	40.4
Lane LOS	B			E
Approach Delay (s)	0.0		0.0	Err
Approach LOS				F

Intersection Summary			
Average Delay		Err	
Intersection Capacity Utilization		Err%	ICU Level of Service	H
Analysis Period (min)		15	

LOS Engineering

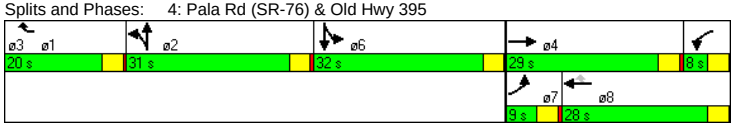
AM Existing + Cumulative + Project
4: Pala Rd (SR-76) & Old Hwy 395

Timings

Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBT
Lane Configurations							
Volume (vph)	94	700	82	1130	122	207	227
Turn Type	Prot		Prot		custom		
Protected Phases	7	4	3	8	1	2	6
Permitted Phases					8		
Detector Phases	7	4	3	8	1	2	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	20.0	20.0	20.0
Total Split (s)	9.0	29.0	8.0	28.0	20.0	31.0	32.0
Total Split (%)	7.5%	24.2%	6.7%	23.3%	16.7%	25.8%	26.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	Min	Min	Min
Act Effct Green (s)	5.0	25.0	4.0	24.0	33.6	27.0	28.0
Actuated g/C Ratio	0.05	0.23	0.04	0.22	0.31	0.25	0.26
v/c Ratio	1.38	1.11	1.48	1.53	0.27	1.62	1.73
Control Delay	274.7	106.5	326.5	278.9	15.7	318.6	363.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	274.7	106.5	326.5	278.9	15.7	318.6	363.3
LOS	F	F	F	F	B	F	F
Approach Delay		123.3		257.8		318.6	363.3
Approach LOS		F		F		F	F

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 109.6	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.73	
Intersection Signal Delay: 256.3	Intersection LOS: F
Intersection Capacity Utilization 106.5%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 4: Pala Rd (SR-76) & Old Hwy 395



LOS Engineering

AM Existing + Cumulative + Project
4: Pala Rd (SR-76) & Old Hwy 395

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	330		0	150		150	0		0	0		0
Storage Lanes	1		0	1		1	0		0	0		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.974				0.850		0.962			0.978	
Flt Protected	0.950			0.950				0.980			0.974	
Satd. Flow (prot)	1583	3447	0	1583	3539	1417	0	1756	0	0	1774	0
Flt Permitted	0.950			0.950				0.980			0.974	
Satd. Flow (perm)	1583	3447	0	1583	3539	1417	0	1756	0	0	1774	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18				68		15			8	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		652			462			899			4464	
Travel Time (s)		14.8			10.5			20.4			101.5	
Volume (vph)	94	700	145	82	1130	122	284	207	192	400	227	125
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	99	737	153	86	1189	128	299	218	202	421	239	132
Lane Group Flow (vph)	99	890	0	86	1189	128	0	719	0	0	792	0
v/c Ratio	1.38	1.11		1.48	1.53	0.27		1.62			1.73	
Control Delay	274.7	106.5		326.5	278.9	15.7		318.6			363.3	
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0			0.0	
Total Delay	274.7	106.5		326.5	278.9	15.7		318.6			363.3	
Queue Length 50th (ft)	~92	~374		~84	~618	31		~728			~830	
Queue Length 95th (ft)	#203	#505		#187	#756	79		#964			#1072	
Internal Link Dist (ft)		572			382			819			4384	
Turn Bay Length (ft)	330			150		150						
Base Capacity (vph)	72	800		58	775	518		444			459	
Starvation Cap Reductn	0	0		0	0	0		0			0	
Spillback Cap Reductn	0	0		0	0	0		0			0	
Storage Cap Reductn	0	0		0	0	0		0			0	
Reduced v/c Ratio	1.38	1.11		1.48	1.53	0.25		1.62			1.73	

Intersection Summary

Area Type: Other

~ 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.

LOS Engineering

AM Existing + Cumulative + Project
4: Pala Rd (SR-76) & Old Hwy 395

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	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	
Frt	1.00	0.97		1.00	1.00	0.85		0.96			0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98			0.97	
Satd. Flow (prot)	1583	3448		1583	3539	1417		1756			1774	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.98			0.97	
Satd. Flow (perm)	1583	3448		1583	3539	1417		1756			1774	
Volume (vph)	94	700	145	82	1130	122	284	207	192	400	227	125
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	99	737	153	86	1189	128	299	218	202	421	239	132
RTOR Reduction (vph)	0	14	0	0	0	50	0	11	0	0	6	0
Lane Group Flow (vph)	99	876	0	86	1189	78	0	708	0	0	786	0
Turn Type	Prot			Prot		custom	Split			Split		
Protected Phases	7	4		3	8	1	2	2		6	6	
Permitted Phases						8						
Actuated Green, G (s)	5.0	25.0		4.0	24.0	29.6		27.0			28.0	
Effective Green, g (s)	5.0	25.0		4.0	24.0	29.6		27.0			28.0	
Actuated g/C Ratio	0.05	0.23		0.04	0.22	0.27		0.25			0.26	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	72	786		58	775	434		433			453	
v/s Ratio Prot	0.06	c0.25		0.05	c0.34	c0.01		c0.40			c0.44	
v/s Ratio Perm						0.05						
v/c Ratio	1.38	1.11		1.48	1.53	0.18		1.63			1.74	
Uniform Delay, d1	52.3	42.3		52.8	42.8	30.7		41.3			40.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	234.7	68.4		288.9	246.9	0.2		295.8			340.0	
Delay (s)	287.0	110.7		341.7	289.7	30.9		337.1			380.8	
Level of Service	F	F		F	F	C		F			F	
Approach Delay (s)		128.3			269.3			337.1			380.8	
Approach LOS		F			F			F			F	

Intersection Summary

HCM Average Control Delay	268.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.48		
Actuated Cycle Length (s)	109.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	106.5%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

AM Existing + Cumulative + Project
6: Pala Rd (SR-76) & I-15 SB Ramps

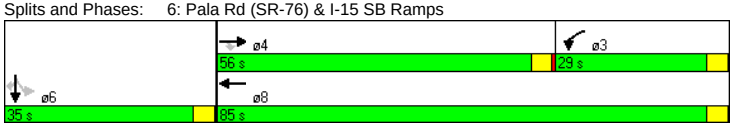
Timings

Lane Group	EBT	EBR	WBL	WBT	SBT	SBR
Lane Configurations						
Volume (vph)	950	350	400	800	1	570
Turn Type		Perm	Prot			Perm
Protected Phases	4		3	8	6	
Permitted Phases		4				6
Detector Phases	4	4	3	8	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0	20.0
Total Split (s)	56.0	56.0	29.0	85.0	35.0	35.0
Total Split (%)	46.7%	46.7%	24.2%	70.8%	29.2%	29.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lead	Lag			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	None	None	None	None	C-Min	C-Min
Act Effct Green (s)	52.0	52.0	25.0	81.0	31.0	31.0
Actuated g/C Ratio	0.43	0.43	0.21	0.68	0.26	0.26
v/c Ratio	1.24	0.50	1.28	0.67	0.32	1.14
Control Delay	149.6	12.2	174.3	24.1	38.3	111.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	149.6	12.2	174.3	24.1	38.3	111.9
LOS	F	B	F	C	D	F
Approach Delay	112.7			74.2	97.5	
Approach LOS	F			E	F	

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 40 (33%), Referenced to phase 2: and 6:SBTL, Start of Green
Natural Cycle: 140
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.28
Intersection Signal Delay: 94.9 Intersection LOS: F
Intersection Capacity Utilization 106.3% ICU Level of Service G
Analysis Period (min) 15

Splits and Phases: 6: Pala Rd (SR-76) & I-15 SB Ramps



LOS Engineering

AM Existing + Cumulative + Project
6: Pala Rd (SR-76) & I-15 SB Ramps

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	0		0	500		0	0		0	0		900
Storage Lanes	0		1	1		0	0		0	0		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50	50	50					50	50	50
Trailing Detector (ft)		0	0	0	0					0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	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			0.850									0.850
Flt Protected				0.950							0.953	
Satd. Flow (prot)	0	1863	1417	1583	1863	0	0	0	0	0	1775	1417
Flt Permitted				0.950							0.953	
Satd. Flow (perm)	0	1863	1417	1583	1863	0	0	0	0	0	1775	1417
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			214									214
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		654			1271			961			1209	
Travel Time (s)		14.9			28.9			21.8			27.5	
Volume (vph)	0	950	350	400	800	0	0	0	0	138	1	570
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1000	368	421	842	0	0	0	0	145	1	600
Lane Group Flow (vph)	0	1000	368	421	842	0	0	0	0	0	146	600
v/c Ratio		1.24	0.50	1.28	0.67						0.32	1.14
Control Delay		149.6	12.2	174.3	24.1						38.3	111.9
Queue Delay		0.0	0.0	0.0	0.0						0.0	0.0
Total Delay		149.6	12.2	174.3	24.1						38.3	111.9
Queue Length 50th (ft)		~961	77	~410	642						92	~414
Queue Length 95th (ft)		#1214	166	m#334	m571						152	#642
Internal Link Dist (ft)		574			1191			881			1129	
Turn Bay Length (ft)				500								900
Base Capacity (vph)		807	735	330	1258						459	525
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		1.24	0.50	1.28	0.67						0.32	1.14

Intersection Summary

Area Type: Other
~ 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.

LOS Engineering

AM Existing + Cumulative + Project
6: Pala Rd (SR-76) & I-15 SB Ramps

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)		4.0	4.0	4.0	4.0						4.0	4.0
Lane Util. Factor		1.00	1.00	1.00	1.00						1.00	1.00
Frt		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)		1863	1417	1583	1863						1775	1417
Flt Permitted		1.00	1.00	0.95	1.00						0.95	1.00
Satd. Flow (perm)		1863	1417	1583	1863						1775	1417
Volume (vph)	0	950	350	400	800	0	0	0	0	138	1	570
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1000	368	421	842	0	0	0	0	145	1	600
RTOR Reduction (vph)	0	0	121	0	0	0	0	0	0	0	0	159
Lane Group Flow (vph)	0	1000	247	421	842	0	0	0	0	0	146	441
Turn Type			Perm	Prot						Perm		Perm
Protected Phases		4		3	8						6	
Permitted Phases			4							6		6
Actuated Green, G (s)		52.0	52.0	25.0	81.0						31.0	31.0
Effective Green, g (s)		52.0	52.0	25.0	81.0						31.0	31.0
Actuated g/C Ratio		0.43	0.43	0.21	0.68						0.26	0.26
Clearance Time (s)		4.0	4.0	4.0	4.0						4.0	4.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0						3.0	3.0
Lane Grp Cap (vph)		807	614	330	1258						459	366
v/s Ratio Prot		c0.54		c0.27	0.45							
v/s Ratio Perm			0.17								0.08	c0.31
v/c Ratio		1.24	0.40	1.28	0.67						0.32	1.21
Uniform Delay, d1		34.0	23.3	47.5	11.6						36.0	44.5
Progression Factor		1.00	1.00	1.31	1.98						1.00	1.00
Incremental Delay, d2		118.1	0.4	126.3	0.1						1.8	115.6
Delay (s)		152.1	23.8	188.4	23.0						37.8	160.1
Level of Service		F	C	F	C						D	F
Approach Delay (s)		117.6			78.1			0.0			136.2	
Approach LOS		F			E			A			F	

Intersection Summary			
HCM Average Control Delay	107.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.24		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	106.3%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

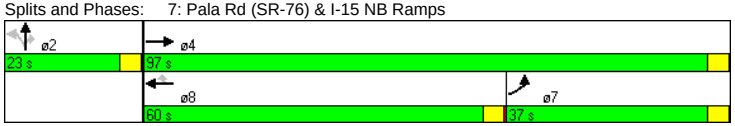
AM Existing + Cumulative + Project
7: Pala Rd (SR-76) & I-15 NB Ramps

Timings

Lane Group	EBL	EBT	WBT	WBR	NBT	NBR
Lane Configurations						
Volume (vph)	500	600	950	139	0	340
Turn Type	Prot			Perm		Perm
Protected Phases	7	4	8		2	
Permitted Phases				8		2
Detector Phases	7	4	8	8	2	2
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	37.0	97.0	60.0	60.0	23.0	23.0
Total Split (%)	30.8%	80.8%	50.0%	50.0%	19.2%	19.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lag		Lead	Lead		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	None	None	None	C-Min	C-Min
Act Effct Green (s)	33.0	93.0	56.0	56.0	19.0	19.0
Actuated g/C Ratio	0.28	0.78	0.47	0.47	0.16	0.16
v/c Ratio	1.21	0.44	1.15	0.22	1.04	0.68
Control Delay	143.4	14.2	112.1	16.6	114.5	11.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	143.4	14.2	112.1	16.6	114.5	11.9
LOS	F	B	F	B	F	B
Approach Delay		72.9	100.0		58.0	
Approach LOS		E	F		E	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:, Start of Green	
Natural Cycle: 140	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.21	
Intersection Signal Delay: 80.1	Intersection LOS: F
Intersection Capacity Utilization 106.3%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 7: Pala Rd (SR-76) & I-15 NB Ramps



LOS Engineering

AM Existing + Cumulative + Project
7: Pala Rd (SR-76) & I-15 NB Ramps

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	450		0	0		50	0		800	0		0
Storage Lanes	1		0	0		1	0		1	0		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	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						0.850			0.850			
Flt Protected	0.950							0.950				
Satd. Flow (prot)	1583	1863	0	0	1863	1417	0	1770	1417	0	0	0
Flt Permitted	0.950							0.950				
Satd. Flow (perm)	1583	1863	0	0	1863	1417	0	1770	1417	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						25			358			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1271			2232			991			1241	
Travel Time (s)		28.9			50.7			22.5			28.2	
Volume (vph)	500	600	0	0	950	139	277	0	340	0	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	526	632	0	0	1000	146	292	0	358	0	0	0
Lane Group Flow (vph)	526	632	0	0	1000	146	0	292	358	0	0	0
v/c Ratio	1.21	0.44			1.15	0.22		1.04	0.68			
Control Delay	143.4	14.2			112.1	16.6		114.5	11.9			
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	143.4	14.2			112.1	16.6		114.5	11.9			
Queue Length 50th (ft)	~485	352			~911	53		~245	0			
Queue Length 95th (ft)	m#374	m303			#1164	97		#420	94			
Internal Link Dist (ft)		1191			2152			911			1161	
Turn Bay Length (ft)	450					50			800			
Base Capacity (vph)	435	1444			869	675		280	526			
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	1.21	0.44			1.15	0.22		1.04	0.68			

Intersection Summary

Area Type: Other

~ 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.

LOS Engineering

AM Existing + Cumulative + Project
7: Pala Rd (SR-76) & I-15 NB Ramps

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0	4.0			
Lane Util. Factor	1.00	1.00			1.00	1.00		1.00	1.00			
Frt	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)	1583	1863			1863	1417		1770	1417			
Flt Permitted	0.95	1.00			1.00	1.00		0.95	1.00			
Satd. Flow (perm)	1583	1863			1863	1417		1770	1417			
Volume (vph)	500	600	0	0	950	139	277	0	340	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	526	632	0	0	1000	146	292	0	358	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	13	0	0	301	0	0	0
Lane Group Flow (vph)	526	632	0	0	1000	133	0	292	57	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Actuated Green, G (s)	33.0	93.0			56.0	56.0		19.0	19.0			
Effective Green, g (s)	33.0	93.0			56.0	56.0		19.0	19.0			
Actuated g/C Ratio	0.28	0.78			0.47	0.47		0.16	0.16			
Clearance Time (s)	4.0	4.0			4.0	4.0		4.0	4.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0	3.0			
Lane Grp Cap (vph)	435	1444			869	661		280	224			
v/s Ratio Prot	c0.33	0.34			c0.54							
v/s Ratio Perm						0.09		0.17	0.04			
v/c Ratio	1.21	0.44			1.15	0.20		1.04	0.25			
Uniform Delay, d1	43.5	4.6			32.0	18.8		50.5	44.3			
Progression Factor	1.31	2.99			1.00	1.00		1.00	1.00			
Incremental Delay, d2	96.2	0.0			81.1	0.2		65.4	2.7			
Delay (s)	153.2	13.8			113.1	19.0		115.9	47.0			
Level of Service	F	B			F	B		F	D			
Approach Delay (s)		77.1			101.1			77.9			0.0	
Approach LOS		E			F			E			A	

Intersection Summary			
HCM Average Control Delay	86.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	106.3%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

AM Existing + Cumulative + Project
8: Pala Rd (SR-76) & Pankey Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	140	670	154	195	920	77	110	256	168	26	187	60
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	147	705	162	205	968	81	116	269	177	27	197	63
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1049			867			2662	2541	786	2812	2582	1009
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1049			867			2662	2541	786	2812	2582	1009
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	78			74			0	0	55	0	0	78
cM capacity (veh/h)	663			776			0	15	392	0	15	292

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	1015	1255	562	287
Volume Left	147	205	116	27
Volume Right	162	81	177	63
cSH	663	776	0	0
Volume to Capacity	0.22	0.26	Err	Err
Queue Length 95th (ft)	21	27	Err	Err
Control Delay (s)	6.4	8.4	Err	Err
Lane LOS	A	A	F	F
Approach Delay (s)	6.4	8.4	Err	Err
Approach LOS			F	F

Intersection Summary			
Average Delay		Err	
Intersection Capacity Utilization	143.5%	ICU Level of Service	H
Analysis Period (min)		15	

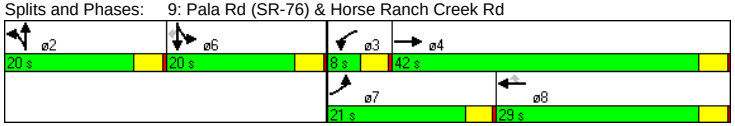
AM Existing + Cumulative + Project
9: Pala Rd (SR-76) & Horse Ranch Creek Rd

Timings

Lane Group	EBL	EBT	WBT	WBR	SBL	SBT	SBR	ø2	ø3
Lane Configurations									
Volume (vph)	452	440	800	80	70	0	390		
Turn Type	Prot			Perm	Split		Perm		
Protected Phases	7	4	8		6	6		2	3
Permitted Phases				8			6		
Detector Phases	7	4	8	8	6	6	6		
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	8.0
Total Split (s)	21.0	42.0	29.0	29.0	20.0	20.0	20.0	20.0	8.0
Total Split (%)	23.3%	46.7%	32.2%	32.2%	22.2%	22.2%	22.2%	22%	9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lag	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					Yes
Recall Mode	None	None	None	None	Min	Min	Min	Min	None
Act Effct Green (s)	14.6	39.5	20.8	20.8	9.1	9.1	9.1		
Actuated g/C Ratio	0.22	0.59	0.31	0.31	0.14	0.14	0.14		
v/c Ratio	0.71	0.22	0.76	0.17	0.33	0.56	0.57		
Control Delay	31.7	6.7	26.3	5.8	32.4	11.6	11.5		
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay	31.7	6.7	26.3	5.8	32.4	11.6	11.5		
LOS	C	A	C	A	C	B	B		
Approach Delay		19.4	24.4			14.5			
Approach LOS		B	C			B			

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 66.5	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.76	
Intersection Signal Delay: 20.4	Intersection LOS: C
Intersection Capacity Utilization 52.5%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 9: Pala Rd (SR-76) & Horse Ranch Creek Rd



AM Existing + Cumulative + Project
9: Pala Rd (SR-76) & Horse Ranch Creek Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	250		0	250		250	0		0	150		150
Storage Lanes	2		0	1		1	0		0	1		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50	50	50	50		50	50	50
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	0.95	0.91	0.95
Frt						0.850					0.854	0.850
Flt Protected	0.950									0.950	0.999	
Satd. Flow (prot)	3072	3539	0	1667	3539	1417	0	1863	0	1504	1446	1346
Flt Permitted	0.950									0.950	0.999	
Satd. Flow (perm)	3072	3539	0	1667	3539	1417	0	1863	0	1504	1446	1346
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						84					205	206
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2833			5160			734			1509	
Travel Time (s)		64.4			117.3			16.7			34.3	
Volume (vph)	452	440	0	0	800	80	0	0	0	70	0	390
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	476	463	0	0	842	84	0	0	0	74	0	411
Lane Group Flow (vph)	476	463	0	0	842	84	0	0	0	68	211	206
v/c Ratio	0.71	0.22			0.76	0.17				0.33	0.56	0.57
Control Delay	31.7	6.7			26.3	5.8				32.4	11.6	11.5
Queue Delay	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Total Delay	31.7	6.7			26.3	5.8				32.4	11.6	11.5
Queue Length 50th (ft)	95	38			163	0				28	2	0
Queue Length 95th (ft)	161	73			256	29				67	63	56
Internal Link Dist (ft)		2753			5080			654			1429	
Turn Bay Length (ft)	250					250				150		150
Base Capacity (vph)	768	2171			1264	560				333	479	458
Starvation Cap Reductn	0	0			0	0				0	0	0
Spillback Cap Reductn	0	0			0	0				0	0	0
Storage Cap Reductn	0	0			0	0				0	0	0
Reduced v/c Ratio	0.62	0.21			0.67	0.15				0.20	0.44	0.45

Intersection Summary

Area Type: Other

LOS Engineering

AM Existing + Cumulative + Project
9: Pala Rd (SR-76) & Horse Ranch Creek Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0			4.0	4.0				4.0	4.0	4.0
Lane Util. Factor	0.97	0.95			0.95	1.00				0.95	0.91	0.95
Frt	1.00	1.00			1.00	0.85				1.00	0.85	0.85
Flt Protected	0.95	1.00			1.00	1.00				0.95	1.00	1.00
Satd. Flow (prot)	3072	3539			3539	1417				1504	1446	1346
Flt Permitted	0.95	1.00			1.00	1.00				0.95	1.00	1.00
Satd. Flow (perm)	3072	3539			3539	1417				1504	1446	1346
Volume (vph)	452	440	0	0	800	80	0	0	0	70	0	390
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	476	463	0	0	842	84	0	0	0	74	0	411
RTOR Reduction (vph)	0	0	0	0	0	58	0	0	0	0	177	178
Lane Group Flow (vph)	476	463	0	0	842	26	0	0	0	68	34	28
Turn Type	Prot			Prot		Perm	Split			Split		Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases						8						6
Actuated Green, G (s)	14.6	39.5			20.9	20.9				9.1	9.1	9.1
Effective Green, g (s)	14.6	39.5			20.9	20.9				9.1	9.1	9.1
Actuated g/C Ratio	0.22	0.60			0.32	0.32				0.14	0.14	0.14
Clearance Time (s)	4.0	4.0			4.0	4.0				4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0			3.0	3.0				3.0	3.0	3.0
Lane Grp Cap (vph)	676	2108			1116	447				206	198	185
v/s Ratio Prot	c0.15	0.13			c0.24					c0.05	0.02	
v/s Ratio Perm						0.02						0.02
v/c Ratio	0.70	0.22			0.75	0.06				0.33	0.17	0.15
Uniform Delay, d1	23.9	6.2			20.4	15.8				25.8	25.3	25.2
Progression Factor	1.00	1.00			1.00	1.00				1.00	1.00	1.00
Incremental Delay, d2	3.3	0.1			2.9	0.1				0.9	0.4	0.4
Delay (s)	27.2	6.3			23.3	15.9				26.8	25.7	25.6
Level of Service	C	A			C	B				C	C	C
Approach Delay (s)		16.9			22.7			0.0			25.8	
Approach LOS		B			C			A			C	

Intersection Summary

HCM Average Control Delay	21.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	66.3	Sum of lost time (s)	21.7
Intersection Capacity Utilization	52.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

AM Existing + Cumulative + Project
10: Pala Rd (SR-76) & Rice Canyon Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	32	1071	552	33	80	140
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	34	1127	581	35	84	147
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	616				1793	598
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	616				1793	598
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				2	71
cM capacity (veh/h)	964				86	502

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	1161	616	232
Volume Left	34	0	84
Volume Right	0	35	147
cSH	964	1700	181
Volume to Capacity	0.03	0.36	1.28
Queue Length 95th (ft)	3	0	325
Control Delay (s)	1.2	0.0	211.4
Lane LOS	A		F
Approach Delay (s)	1.2	0.0	211.4
Approach LOS			F

Intersection Summary			
Average Delay	25.0		
Intersection Capacity Utilization	103.4%	ICU Level of Service	G
Analysis Period (min)	15		

LOS Engineering

AM Existing + Cumulative + Project
11: Pala Rd (SR-76) & Couser Canyon Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	1010	37	6	520	65	30
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1063	39	6	547	68	32
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1102		1643	1083
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1102		1643	1083
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		37	88
cM capacity (veh/h)			633		109	264

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	1102	554	100
Volume Left	0	6	68
Volume Right	39	0	32
cSH	1700	633	134
Volume to Capacity	0.65	0.01	0.75
Queue Length 95th (ft)	0	1	109
Control Delay (s)	0.0	0.3	86.2
Lane LOS		A	F
Approach Delay (s)	0.0	0.3	86.2
Approach LOS			F

Intersection Summary			
Average Delay	5.0		
Intersection Capacity Utilization	68.1%	ICU Level of Service	C
Analysis Period (min)	15		

LOS Engineering

AM Existing + Cumulative + Project
12: Pala Mesa Dr & Old Hwy 395

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	250	124	300	114	65	72	52	368	121	139	717	24
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	263	131	316	120	68	76	55	387	127	146	755	25
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1667	1684	767	1989	1633	451	780			515		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1667	1684	767	1989	1633	451	780			515		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	0	21	0	16	88	93			86		
cM capacity (veh/h)	17	76	402	0	81	608	837			1051		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	709	120	144	55	515	146	780
Volume Left	263	120	0	55	0	146	0
Volume Right	316	0	76	0	127	0	25
cSH	40	0	149	837	1700	1051	1700
Volume to Capacity	17.75	Err	0.97	0.07	0.30	0.14	0.46
Queue Length 95th (ft)	Err	Err	176	5	0	12	0
Control Delay (s)	Err	Err	123.9	9.6	0.0	9.0	0.0
Lane LOS	F	F	F	A		A	
Approach Delay (s)	Err	Err		0.9		1.4	
Approach LOS	F	F					

Intersection Summary				
Average Delay		Err		
Intersection Capacity Utilization	102.4%		ICU Level of Service	G
Analysis Period (min)		15		

LOS Engineering

AM Existing + Cumulative + Project
14: Stewart Canyon Rd & Old Hwy 395

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	21	14	35	23	3	275	8	404	16	307	1003	29
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	22	15	37	24	3	289	8	425	17	323	1056	31
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2451	2176	1071	2197	2183	434	1086			442		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2451	2176	1071	2197	2183	434	1086			442		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	55	86	0	90	53	99			71		
cM capacity (veh/h)	8	33	268	14	32	622	642			1118		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	74	317	8	442	323	1086
Volume Left	22	24	8	0	323	0
Volume Right	37	289	0	17	0	31
cSH	22	139	642	1700	1118	1700
Volume to Capacity	3.32	2.28	0.01	0.26	0.29	0.64
Queue Length 95th (ft)	Err	667	1	0	30	0
Control Delay (s)	Err	648.3	10.7	0.0	9.5	0.0
Lane LOS	F	F	B		A	
Approach Delay (s)	Err	648.3	0.2		2.2	
Approach LOS	F	F				

Intersection Summary				
Average Delay		420.0		
Intersection Capacity Utilization	87.2%		ICU Level of Service	E
Analysis Period (min)		15		

LOS Engineering

AM Existing + Cumulative + Project
15: Reche Rd & Old Hwy 395 — HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	270	280	475	281	255	459
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	284	295	500	296	268	483
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1806	510	752			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1806	510	752			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	48	42			
cM capacity (veh/h)	36	563	858			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	579	500	296	752
Volume Left	284	500	0	0
Volume Right	295	0	0	483
cSH	69	858	1700	1700
Volume to Capacity	8.35	0.58	0.17	0.44
Queue Length 95th (ft)	Err	96	0	0
Control Delay (s)	Err	14.9	0.0	0.0
Lane LOS	F	B		
Approach Delay (s)	Err	9.4		0.0
Approach LOS	F			

Intersection Summary			
Average Delay	2726.0		
Intersection Capacity Utilization	116.9%	ICU Level of Service	H
Analysis Period (min)	15		

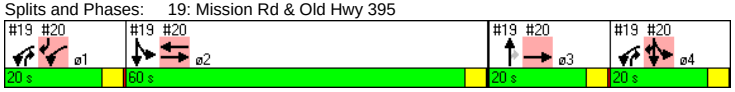
LOS Engineering

AM Existing + Cumulative + Project
19: Mission Rd & Old Hwy 395 — Timings

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	ø1	ø4
Lane Configurations								
Volume (vph)	220	1000	81	250	843	60		
Turn Type		Free		pm+ov	Split			
Protected Phases	1 4		3	1 4	2	2	1	4
Permitted Phases		Free		3				
Detector Phases	1 4		3	1 4	2	2		
Minimum Initial (s)			4.0		4.0	4.0	4.0	4.0
Minimum Split (s)			20.0		20.0	20.0	8.0	20.0
Total Split (s)	40.0	0.0	20.0	40.0	60.0	60.0	20.0	20.0
Total Split (%)	33.3%	0.0%	16.7%	33.3%	50.0%	50.0%	17%	17%
Yellow Time (s)			3.5		3.5	3.5	3.5	3.5
All-Red Time (s)			0.5		0.5	0.5	0.5	0.5
Lead/Lag			Lead		Lag	Lag	Lead	Lag
Lead-Lag Optimize?			Yes		Yes	Yes	Yes	Yes
Recall Mode			None		Min	Min	None	None
Act Effct Green (s)	36.0	120.0	16.0	56.0	56.0	56.0		
Actuated g/C Ratio	0.30	1.00	0.13	0.47	0.47	0.47		
v/c Ratio	0.49	0.74	0.34	0.40	1.20	0.07		
Control Delay	40.6	3.4	51.6	23.3	133.5	18.1		
Queue Delay	0.0	0.0	0.0	0.0	15.4	0.0		
Total Delay	40.6	3.4	51.6	23.3	148.9	18.1		
LOS	D	A	D	C	F	B		
Approach Delay	10.1		30.2			140.3		
Approach LOS	B		C			F		

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 140	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.20	
Intersection Signal Delay: 60.7	Intersection LOS: E
Intersection Capacity Utilization 79.2%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 19: Mission Rd & Old Hwy 395



LOS Engineering

AM Existing + Cumulative + Project
19: Mission Rd & Old Hwy 395

Queues

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1700	1700	1900	1700	1700	1900
Storage Length (ft)	0	130		210	100	
Storage Lanes	1	1		1	1	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1583	1417	1863	1417	1583	1863
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1583	1417	1863	1417	1583	1863
Right Turn on Red		No		No		
Satd. Flow (RTOR)						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30		30			30
Link Distance (ft)	434		4960			1035
Travel Time (s)	9.9		112.7			23.5
Volume (vph)	220	1000	81	250	843	60
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	232	1053	85	263	887	63
Lane Group Flow (vph)	232	1053	85	263	887	63
v/c Ratio	0.49	0.74	0.34	0.40	1.20	0.07
Control Delay	40.6	3.4	51.6	23.3	133.5	18.1
Queue Delay	0.0	0.0	0.0	0.0	15.4	0.0
Total Delay	40.6	3.4	51.6	23.3	148.9	18.1
Queue Length 50th (ft)	138	82	61	130	~834	26
Queue Length 95th (ft)	m144	m18	112	200	#1081	53
Internal Link Dist (ft)	354		4880			955
Turn Bay Length (ft)		130		210	100	
Base Capacity (vph)	475	1417	248	661	739	869
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	10	21	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.74	0.34	0.40	1.24	0.07

Intersection Summary

Area Type: Other

~ 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.

LOS Engineering

AM Existing + Cumulative + Project
19: Mission Rd & Old Hwy 395

HCM Signalized Intersection Capacity Analysis

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1700	1700	1900	1700	1700	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1583	1417	1863	1417	1583	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1583	1417	1863	1417	1583	1863
Volume (vph)	220	1000	81	250	843	60
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	232	1053	85	263	887	63
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	232	1053	85	263	887	63
Turn Type		Free		pm+ov	Split	
Protected Phases	1 4		3	1 4	2	2
Permitted Phases		Free		3		
Actuated Green, G (s)	36.0	120.0	16.0	52.0	56.0	56.0
Effective Green, g (s)	36.0	120.0	16.0	52.0	56.0	56.0
Actuated g/C Ratio	0.30	1.00	0.13	0.43	0.47	0.47
Clearance Time (s)			4.0		4.0	4.0
Vehicle Extension (s)			3.0		3.0	3.0
Lane Grp Cap (vph)	475	1417	248	661	739	869
v/s Ratio Prot	0.15		0.05	0.12	c0.56	0.03
v/s Ratio Perm		c0.74		0.07		
v/c Ratio	0.49	0.74	0.34	0.40	1.20	0.07
Uniform Delay, d1	34.4	0.0	47.2	23.3	32.0	17.7
Progression Factor	1.12	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	1.3	0.8	0.4	102.9	0.0
Delay (s)	38.8	1.3	48.1	23.7	134.9	17.7
Level of Service	D	A	D	C	F	B
Approach Delay (s)	8.1		29.6			127.1
Approach LOS	A		C			F

Intersection Summary

HCM Average Control Delay	54.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	79.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

AM Existing + Cumulative + Project
20: Mission Rd & I-15 SB Ramps

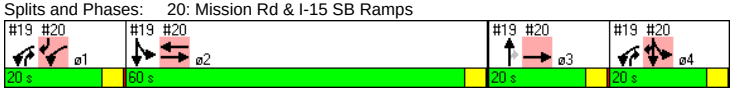
Timings

Lane Group	EBT	WBL	WBT	SBT	SBR	ø3
Lane Configurations						
Volume (vph)	800	117	370	8	865	
Turn Type		Prot			custom	
Protected Phases	2 3	1	2	4	1 4	3
Permitted Phases					4	
Detector Phases	2 3	1	2	4	1 4	
Minimum Initial (s)		4.0	4.0	4.0		4.0
Minimum Split (s)		8.0	20.0	20.0		20.0
Total Split (s)	80.0	20.0	60.0	20.0	40.0	20.0
Total Split (%)	66.7%	16.7%	50.0%	16.7%	33.3%	17%
Yellow Time (s)		3.5	3.5	3.5		3.5
All-Red Time (s)		0.5	0.5	0.5		0.5
Lead/Lag		Lead	Lag	Lag		Lead
Lead-Lag Optimize?		Yes	Yes	Yes		Yes
Recall Mode		None	Min	None		None
Act Effct Green (s)	76.0	16.0	56.0	16.0	36.0	
Actuated g/C Ratio	0.63	0.13	0.47	0.13	0.30	
v/c Ratio	0.98	0.58	0.45	0.07	1.14	
Control Delay	14.3	60.9	23.6	46.4	96.5	
Queue Delay	65.8	0.0	0.0	0.1	0.0	
Total Delay	80.1	60.9	23.6	46.5	96.5	
LOS	F	E	C	D	F	
Approach Delay	80.1		32.6	95.6		
Approach LOS	F		C	F		

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Natural Cycle: 140
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.20
Intersection Signal Delay: 76.2 Intersection LOS: E
Intersection Capacity Utilization 86.0% ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 20: Mission Rd & I-15 SB Ramps



AM Existing + Cumulative + Project
20: Mission Rd & I-15 SB Ramps

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	0		0	285		0	0		0	0		200
Storage Lanes	0		0	1		0	0		0	0		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50		50	50					50	50	50
Trailing Detector (ft)		0		0	0					0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	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		0.966										0.850
Flt Protected				0.950							0.974	
Satd. Flow (prot)	0	1799	0	1583	1863	0	0	0	0	0	1814	1417
Flt Permitted				0.950							0.974	
Satd. Flow (perm)	0	1799	0	1583	1863	0	0	0	0	0	1814	1417
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		28										531
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		434			744			972			897	
Travel Time (s)		9.9			16.9			22.1			20.4	
Volume (vph)	0	800	270	117	370	0	0	0	0	9	8	865
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	842	284	123	389	0	0	0	0	9	8	911
Lane Group Flow (vph)	0	1126	0	123	389	0	0	0	0	0	17	911
v/c Ratio		0.98		0.58	0.45						0.07	1.14
Control Delay		14.3		60.9	23.6						46.4	96.5
Queue Delay		65.8		0.0	0.0						0.1	0.0
Total Delay		80.1		60.9	23.6						46.5	96.5
Queue Length 50th (ft)		147		91	198						12	~520
Queue Length 95th (ft)		m148		157	283						34	#772
Internal Link Dist (ft)		354			664			892			817	
Turn Bay Length (ft)				285								200
Base Capacity (vph)		1150		211	869						242	797
Starvation Cap Reductn		180		0	0						0	0
Spillback Cap Reductn		18		0	0						24	0
Storage Cap Reductn		0		0	0						0	0
Reduced v/c Ratio		1.16		0.58	0.45						0.08	1.14

Intersection Summary

Area Type: Other
~ 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.

AM Existing + Cumulative + Project
20: Mission Rd & I-15 SB Ramps

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)		4.0		4.0	4.0						4.0	4.0
Lane Util. Factor		1.00		1.00	1.00						1.00	1.00
Frt		0.97		1.00	1.00						1.00	0.85
Flt Protected		1.00		0.95	1.00						0.97	1.00
Satd. Flow (prot)		1799		1583	1863						1815	1417
Flt Permitted		1.00		0.95	1.00						0.97	1.00
Satd. Flow (perm)		1799		1583	1863						1815	1417
Volume (vph)	0	800	270	117	370	0	0	0	0	9	8	865
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	842	284	123	389	0	0	0	0	9	8	911
RTOR Reduction (vph)	0	10	0	0	0	0	0	0	0	0	0	372
Lane Group Flow (vph)	0	1116	0	123	389	0	0	0	0	0	17	539
Turn Type				Prot						Split		custom
Protected Phases		2 3		1	2					4	4	1 4
Permitted Phases												4
Actuated Green, G (s)		76.0		16.0	56.0						16.0	36.0
Effective Green, g (s)		76.0		16.0	56.0						16.0	36.0
Actuated g/C Ratio		0.63		0.13	0.47						0.13	0.30
Clearance Time (s)				4.0	4.0						4.0	
Vehicle Extension (s)				3.0	3.0						3.0	
Lane Grp Cap (vph)		1139		211	869						242	425
v/s Ratio Prot		c0.62		0.08	0.21						0.01	c0.38
v/s Ratio Perm												
v/c Ratio		0.98		0.58	0.45						0.07	1.27
Uniform Delay, d1		21.3		48.9	21.6						45.5	42.0
Progression Factor		0.37		1.00	1.00						1.00	1.00
Incremental Delay, d2		4.4		4.1	0.4						0.1	138.5
Delay (s)		12.2		52.9	21.9						45.6	180.5
Level of Service		B		D	C						D	F
Approach Delay (s)		12.2			29.4			0.0			178.0	
Approach LOS		B			C			A			F	

Intersection Summary			
HCM Average Control Delay	75.6	HCM Level of Service	E
HCM Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	86.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

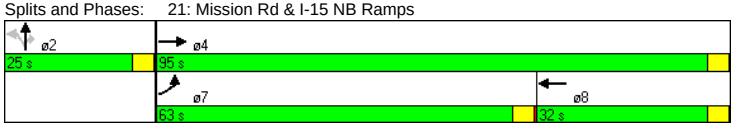
AM Existing + Cumulative + Project
21: Mission Rd & I-15 NB Ramps

Timings

Lane Group	EBL	EBT	WBT	NBT	NBR
Lane Configurations					
Volume (vph)	600	178	300	4	80
Turn Type	Prot				Perm
Protected Phases	7	4	8	2	
Permitted Phases					2
Detector Phases	7	4	8	2	2
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0
Total Split (s)	63.0	95.0	32.0	25.0	25.0
Total Split (%)	52.5%	79.2%	26.7%	20.8%	20.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Recall Mode	None	None	None	Min	Min
Act Effct Green (s)	38.8	63.3	19.8	15.1	15.1
Actuated g/C Ratio	0.44	0.72	0.23	0.17	0.17
v/c Ratio	0.91	0.14	0.78	0.70	0.27
Control Delay	41.5	4.0	50.2	53.5	11.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	41.5	4.0	50.2	53.5	11.9
LOS	D	A	D	D	B
Approach Delay		33.0	50.2	41.8	
Approach LOS		C	D	D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 87.9	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.91	
Intersection Signal Delay: 38.7	Intersection LOS: D
Intersection Capacity Utilization 86.0%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 21: Mission Rd & I-15 NB Ramps



LOS Engineering

AM Existing + Cumulative + Project
21: Mission Rd & I-15 NB Ramps

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	300		0	0		0	0		200	0		0
Storage Lanes	1		0	0		0	0		1	0		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50		50	50	50			
Trailing Detector (ft)	0	0			0		0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	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					0.995				0.850			
Flt Protected	0.950							0.953				
Satd. Flow (prot)	1583	1863	0	0	1853	0	0	1775	1417	0	0	0
Flt Permitted	0.950							0.953				
Satd. Flow (perm)	1583	1863	0	0	1853	0	0	1775	1417	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					2				84			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		744			1271			1082			1005	
Travel Time (s)		16.9			28.9			24.6			22.8	
Volume (vph)	600	178	0	0	300	12	200	4	80	0	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	632	187	0	0	316	13	211	4	84	0	0	0
Lane Group Flow (vph)	632	187	0	0	329	0	0	215	84	0	0	0
v/c Ratio	0.91	0.14			0.78			0.70	0.27			
Control Delay	41.5	4.0			50.2			53.5	11.9			
Queue Delay	0.0	0.0			0.0			0.0	0.0			
Total Delay	41.5	4.0			50.2			53.5	11.9			
Queue Length 50th (ft)	327	27			182			121	0			
Queue Length 95th (ft)	577	53			#363			#246	45			
Internal Link Dist (ft)		664			1191			1002			925	
Turn Bay Length (ft)	300								200			
Base Capacity (vph)	892	1487			582			435	410			
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	0.71	0.13			0.57			0.49	0.20			

Intersection Summary

Area Type: Other

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

LOS Engineering

AM Existing + Cumulative + Project
21: Mission Rd & I-15 NB Ramps

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0			4.0			4.0	4.0			
Lane Util. Factor	1.00	1.00			1.00			1.00	1.00			
Frt	1.00	1.00			0.99			1.00	0.85			
Flt Protected	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (prot)	1583	1863			1853			1776	1417			
Flt Permitted	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (perm)	1583	1863			1853			1776	1417			
Volume (vph)	600	178	0	0	300	12	200	4	80	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	632	187	0	0	316	13	211	4	84	0	0	0
RTOR Reduction (vph)	0	0	0	0	2	0	0	0	69	0	0	0
Lane Group Flow (vph)	632	187	0	0	327	0	0	215	15	0	0	0
Turn Type	Prot						Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases							2		2			
Actuated Green, G (s)	38.8	63.3			20.5			15.1	15.1			
Effective Green, g (s)	38.8	63.3			20.5			15.1	15.1			
Actuated g/C Ratio	0.45	0.73			0.24			0.17	0.17			
Clearance Time (s)	4.0	4.0			4.0			4.0	4.0			
Vehicle Extension (s)	3.0	3.0			3.0			3.0	3.0			
Lane Grp Cap (vph)	711	1365			440			310	248			
v/s Ratio Prot	c0.40	0.10			c0.18							
v/s Ratio Perm								0.12	0.01			
v/c Ratio	0.89	0.14			0.74			0.69	0.06			
Uniform Delay, d1	21.8	3.4			30.5			33.5	29.7			
Progression Factor	1.00	1.00			1.00			1.00	1.00			
Incremental Delay, d2	13.0	0.0			6.7			6.6	0.1			
Delay (s)	34.8	3.5			37.2			40.0	29.8			
Level of Service	C	A			D			D	C			
Approach Delay (s)		27.7			37.2			37.2			0.0	
Approach LOS		C			D			D			A	

Intersection Summary

HCM Average Control Delay	31.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	86.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

AM Existing + Cumulative + Project
22: Stewart Canyon Rd & Horse Ranch Creek Rd — HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Yield			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	20	314	279	7	16	22
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	331	294	7	17	23
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	623	28	40			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	623	28	40			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	94	68	81			
cM capacity (veh/h)	366	1047	1570			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	352	301	40
Volume Left	21	294	0
Volume Right	331	0	23
cSH	942	1570	1700
Volume to Capacity	0.37	0.19	0.02
Queue Length 95th (ft)	44	17	0
Control Delay (s)	11.1	7.7	0.0
Lane LOS	B	A	
Approach Delay (s)	11.1	7.7	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	9.0		
Intersection Capacity Utilization	49.7%	ICU Level of Service	A
Analysis Period (min)	15		

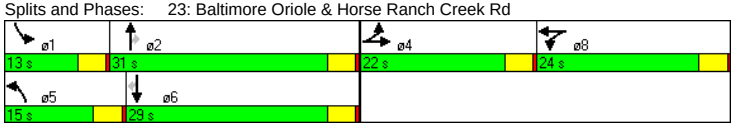
LOS Engineering

AM Existing + Cumulative + Project
23: Baltimore Oriole & Horse Ranch Creek Rd — Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	12	2	217	26	54	226	180	29	253	42
Turn Type	Split		Split		Prot		Perm	Prot		Perm
Protected Phases	4	4	8	8	5	2		1	6	
Permitted Phases							2			6
Detector Phases	4	4	8	8	5	2	2	1	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0	20.0
Total Split (s)	22.0	22.0	24.0	24.0	15.0	31.0	31.0	13.0	29.0	29.0
Total Split (%)	24.4%	24.4%	26.7%	26.7%	16.7%	34.4%	34.4%	14.4%	32.2%	32.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag					Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	7.6	7.6	13.1	13.1	9.0	30.4	30.4	8.2	27.0	27.0
Actuated g/C Ratio	0.12	0.12	0.22	0.22	0.14	0.53	0.53	0.13	0.47	0.47
v/c Ratio	0.07	0.03	0.44	0.43	0.25	0.24	0.22	0.16	0.30	0.06
Control Delay	25.3	20.2	18.9	16.0	22.4	10.2	3.3	25.1	13.2	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	25.3	20.2	18.9	16.0	22.4	10.2	3.3	25.1	13.2	6.6
LOS	C	C	B	B	C	B	A	C	B	A
Approach Delay		23.7		17.4		9.0			13.5	
Approach LOS		C		B		A			B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 57.2	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.44	
Intersection Signal Delay: 12.8	Intersection LOS: B
Intersection Capacity Utilization 41.7%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 23: Baltimore Oriole & Horse Ranch Creek Rd



LOS Engineering

AM Existing + Cumulative + Project
23: Baltimore Oriole & Horse Ranch Creek Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	50
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.900			0.948				0.850			0.850
Flt Protected	0.950			0.950	0.976		0.950			0.950		
Satd. Flow (prot)	1583	1676	0	1504	1637	0	1583	1863	1417	1583	1863	1417
Flt Permitted	0.950			0.950	0.976		0.950			0.950		
Satd. Flow (perm)	1583	1676	0	1504	1637	0	1583	1863	1417	1583	1863	1417
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			27				189			44
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1047			1324			958			2343	
Travel Time (s)		23.8			30.1			21.8			53.3	
Volume (vph)	12	2	4	217	26	54	54	226	180	29	253	42
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	13	2	4	228	27	57	57	238	189	31	266	44
Lane Group Flow (vph)	13	6	0	147	165	0	57	238	189	31	266	44
v/c Ratio	0.07	0.03		0.44	0.43		0.25	0.24	0.22	0.16	0.30	0.06
Control Delay	25.3	20.2		18.9	16.0		22.4	10.2	3.3	25.1	13.2	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	25.3	20.2		18.9	16.0		22.4	10.2	3.3	25.1	13.2	6.6
Queue Length 50th (ft)	1	0		12	11		5	18	0	3	20	0
Queue Length 95th (ft)	21	11		112	110		55	143	42	37	168	22
Internal Link Dist (ft)		967			1244			878			2263	
Turn Bay Length (ft)												
Base Capacity (vph)	439	468		556	622		323	1200	980	262	1125	873
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	0.03	0.01		0.26	0.27		0.18	0.20	0.19	0.12	0.24	0.05

Intersection Summary

Area Type: Other

LOS Engineering

AM Existing + Cumulative + Project
23: Baltimore Oriole & Horse Ranch Creek Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
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	1.00		0.95	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.90		1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1583	1676		1504	1638		1583	1863	1417	1583	1863	1417
Flt Permitted	0.95	1.00		0.95	0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1583	1676		1504	1638		1583	1863	1417	1583	1863	1417
Volume (vph)	12	2	4	217	26	54	54	226	180	29	253	42
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	13	2	4	228	27	57	57	238	189	31	266	44
RTOR Reduction (vph)	0	4	0	0	22	0	0	0	96	0	0	24
Lane Group Flow (vph)	13	2	0	147	143	0	57	238	93	31	266	20
Turn Type	Split			Split			Prot		Perm	Prot		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	1.2	1.2		12.2	12.2		3.8	30.0	30.0	1.4	27.6	27.6
Effective Green, g (s)	1.2	1.2		12.2	12.2		3.8	30.0	30.0	1.4	27.6	27.6
Actuated g/C Ratio	0.02	0.02		0.20	0.20		0.06	0.49	0.49	0.02	0.45	0.45
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	31	33		302	329		99	919	699	36	846	643
v/s Ratio Prot	c0.01	0.00		c0.10	0.09		c0.04	0.13		0.02	c0.14	
v/s Ratio Perm									0.07			0.01
v/c Ratio	0.42	0.06		0.49	0.44		0.58	0.26	0.13	0.86	0.31	0.03
Uniform Delay, d1	29.5	29.2		21.5	21.3		27.7	8.9	8.4	29.6	10.6	9.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.9	0.8		1.2	0.9		7.9	0.2	0.1	95.3	0.2	0.0
Delay (s)	38.4	30.1		22.8	22.2		35.6	9.1	8.4	124.9	10.8	9.2
Level of Service	D	C		C	C		D	A	A	F	B	A
Approach Delay (s)		35.7			22.5			12.0			21.0	
Approach LOS		D			C			B			C	

Intersection Summary

HCM Average Control Delay	17.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	60.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	41.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

AM Existing + Cumulative + Project
24: Longspur Rd & Horse Ranch Creek Rd

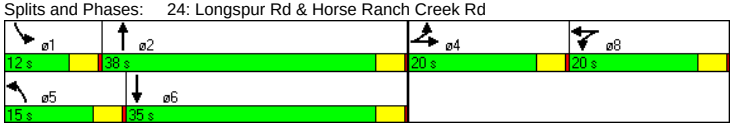
Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	7	29	206	39	120	396	30	399
Turn Type	Split		Split		Prot		Prot	
Protected Phases	4	4	8	8	5	2	1	6
Permitted Phases								
Detector Phases	4	4	8	8	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	20.0	20.0	20.0	20.0	15.0	38.0	12.0	35.0
Total Split (%)	22.2%	22.2%	22.2%	22.2%	16.7%	42.2%	13.3%	38.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Max	None	Max
Act Effct Green (s)	7.3	7.3	11.7	11.7	9.8	44.8	6.9	37.7
Actuated g/C Ratio	0.09	0.09	0.15	0.15	0.12	0.57	0.08	0.48
v/c Ratio	0.05	0.38	0.61	0.60	0.65	0.33	0.25	0.28
Control Delay	33.4	23.9	42.3	37.1	49.3	9.9	40.4	15.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.4	23.9	42.3	37.1	49.3	9.9	40.4	15.5
LOS	C	C	D	D	D	A	D	B
Approach Delay		24.7		39.6		16.2		17.1
Approach LOS		C		D		B		B

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 78.4
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.65
Intersection Signal Delay: 21.0 Intersection LOS: C
Intersection Capacity Utilization 46.1% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 24: Longspur Rd & Horse Ranch Creek Rd



LOS Engineering

AM Existing + Cumulative + Project
24: Longspur Rd & Horse Ranch Creek Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.915			0.965			0.945			0.983	
Flt Protected	0.950			0.950	0.975		0.950			0.950		
Satd. Flow (prot)	1583	1704	0	1504	1665	0	1583	3345	0	1583	3479	0
Flt Permitted	0.950			0.950	0.975		0.950			0.950		
Satd. Flow (perm)	1583	1704	0	1504	1665	0	1583	3345	0	1583	3479	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		41			15			148			16	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1010			908			1206			958	
Travel Time (s)		23.0			20.6			27.4			21.8	
Volume (vph)	7	29	39	206	39	35	120	396	229	30	399	50
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	7	31	41	217	41	37	126	417	241	32	420	53
Lane Group Flow (vph)	7	72	0	138	157	0	126	658	0	32	473	0
v/c Ratio	0.05	0.38		0.61	0.60		0.65	0.33		0.25	0.28	
Control Delay	33.4	23.9		42.3	37.1		49.3	9.9		40.4	15.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	33.4	23.9		42.3	37.1		49.3	9.9		40.4	15.5	
Queue Length 50th (ft)	3	14		65	66		57	55		15	77	
Queue Length 95th (ft)	15	53		129	133		#133	145		43	131	
Internal Link Dist (ft)		930			828			1126			878	
Turn Bay Length (ft)												
Base Capacity (vph)	285	341		292	335		215	1974		148	1679	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.02	0.21		0.47	0.47		0.59	0.33		0.22	0.28	

Intersection Summary

Area Type: Other
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

LOS Engineering

AM Existing + Cumulative + Project
24: Longspur Rd & Horse Ranch Creek Rd — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		0.95	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.91		1.00	0.96		1.00	0.95		1.00	0.98	
Flt Protected	0.95	1.00		0.95	0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	1704		1504	1665		1583	3345		1583	3480	
Flt Permitted	0.95	1.00		0.95	0.98		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	1704		1504	1665		1583	3345		1583	3480	
Volume (vph)	7	29	39	206	39	35	120	396	229	30	399	50
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	7	31	41	217	41	37	126	417	241	32	420	53
RTOR Reduction (vph)	0	38	0	0	13	0	0	67	0	0	8	0
Lane Group Flow (vph)	7	34	0	138	144	0	126	591	0	32	465	0
Turn Type	Split			Split			Prot			Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	6.1	6.1		11.7	11.7		8.5	44.8		3.0	39.3	
Effective Green, g (s)	6.1	6.1		11.7	11.7		8.5	44.8		3.0	39.3	
Actuated g/C Ratio	0.07	0.07		0.14	0.14		0.10	0.55		0.04	0.48	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	118	127		216	239		165	1836		58	1676	
v/s Ratio Prot	0.00	c0.02		c0.09	0.09		c0.08	c0.18		0.02	0.13	
v/s Ratio Perm												
v/c Ratio	0.06	0.27		0.64	0.60		0.76	0.32		0.55	0.28	
Uniform Delay, d1	35.1	35.6		33.0	32.8		35.6	10.1		38.6	12.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	1.1		6.1	4.2		18.7	0.5		10.9	0.4	
Delay (s)	35.3	36.8		39.0	37.0		54.3	10.5		49.5	13.1	
Level of Service	D	D		D	D		D	B		D	B	
Approach Delay (s)		36.6			38.0			17.6			15.4	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM Average Control Delay	21.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	81.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	46.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

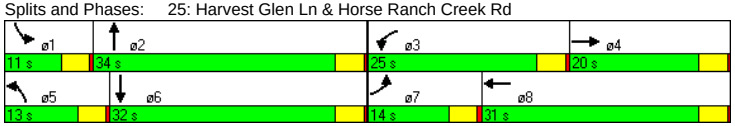
LOS Engineering

AM Existing + Cumulative + Project
25: Harvest Glen Ln & Horse Ranch Creek Rd — Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	1	15	254	18	49	644	66	570
Turn Type	Prot		Prot		Prot		Prot	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases								
Detector Phases	7	4	3	8	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	14.0	20.0	25.0	31.0	13.0	34.0	11.0	32.0
Total Split (%)	15.6%	22.2%	27.8%	34.4%	14.4%	37.8%	12.2%	35.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	6.0	6.5	14.2	14.5	7.3	24.1	6.9	23.6
Actuated g/C Ratio	0.10	0.10	0.26	0.27	0.12	0.44	0.12	0.43
v/c Ratio	0.01	0.10	0.65	0.25	0.26	0.60	0.37	0.40
Control Delay	33.0	30.4	27.6	7.8	30.8	15.4	34.8	14.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.0	30.4	27.6	7.8	30.8	15.4	34.8	14.7
LOS	C	C	C	A	C	B	C	B
Approach Delay		30.6		21.3		16.2		16.7
Approach LOS		C		C		B		B

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 54.6	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.65	
Intersection Signal Delay: 17.5	Intersection LOS: B
Intersection Capacity Utilization 61.8%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 25: Harvest Glen Ln & Horse Ranch Creek Rd



LOS Engineering

AM Existing + Cumulative + Project
25: Harvest Glen Ln & Horse Ranch Creek Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.976			0.873			0.960			0.999	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1583	1818	0	1583	1626	0	1583	3398	0	1583	3536	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1583	1818	0	1583	1626	0	1583	3398	0	1583	3536	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			106			62			1	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1058			1173			1033			1206	
Travel Time (s)		24.0			26.7			23.5			27.4	
Volume (vph)	1	15	3	254	18	101	49	644	235	66	570	5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1	16	3	267	19	106	52	678	247	69	600	5
Lane Group Flow (vph)	1	19	0	267	125	0	52	925	0	69	605	0
v/c Ratio	0.01	0.10		0.65	0.25		0.26	0.60		0.37	0.40	
Control Delay	33.0	30.4		27.6	7.8		30.8	15.4		34.8	14.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	33.0	30.4		27.6	7.8		30.8	15.4		34.8	14.7	
Queue Length 50th (ft)	0	5		74	4		15	117		20	73	
Queue Length 95th (ft)	5	28		205	46		59	266		#82	176	
Internal Link Dist (ft)		978			1093			953			1126	
Turn Bay Length (ft)												
Base Capacity (vph)	252	424		569	742		248	1784		198	1765	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.00	0.04		0.47	0.17		0.21	0.52		0.35	0.34	

Intersection Summary

Area Type: Other

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

LOS Engineering

AM Existing + Cumulative + Project
25: Harvest Glen Ln & Horse Ranch Creek Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.87		1.00	0.96		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	1819		1583	1626		1583	3397		1583	3535	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	1819		1583	1626		1583	3397		1583	3535	
Volume (vph)	1	15	3	254	18	101	49	644	235	66	570	5
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1	16	3	267	19	106	52	678	247	69	600	5
RTOR Reduction (vph)	0	3	0	0	80	0	0	37	0	0	1	0
Lane Group Flow (vph)	1	16	0	267	45	0	52	888	0	69	604	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	0.8	1.1		14.2	14.5		4.1	24.1		3.6	23.6	
Effective Green, g (s)	0.8	1.1		14.2	14.5		4.1	24.1		3.6	23.6	
Actuated g/C Ratio	0.01	0.02		0.24	0.25		0.07	0.41		0.06	0.40	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	21	34		381	400		110	1388		97	1414	
v/s Ratio Prot	0.00	c0.01		c0.17	0.03		0.03	c0.26		c0.04	0.17	
v/s Ratio Perm												
v/c Ratio	0.05	0.47		0.70	0.11		0.47	0.64		0.71	0.43	
Uniform Delay, d1	28.7	28.7		20.5	17.3		26.4	14.0		27.2	12.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	10.0		5.7	0.1		3.2	1.0		21.7	0.2	
Delay (s)	29.7	38.7		26.2	17.4		29.6	15.0		48.9	13.0	
Level of Service	C	D		C	B		C	B		D	B	
Approach Delay (s)		38.2			23.4			15.8			16.7	
Approach LOS		D			C			B			B	

Intersection Summary

HCM Average Control Delay	17.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	59.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	61.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

AM Existing + Cumulative + Project
26: Pardee South Loop & Horse Ranch Creek Rd

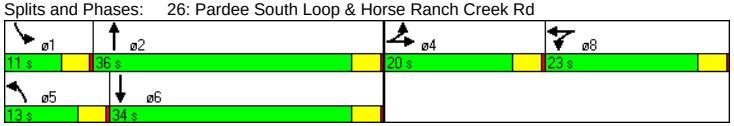
Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	62	0	228	0	54	759	40	769
Turn Type	Split		Split		Prot		Prot	
Protected Phases	4	4	8	8	5	2	1	6
Permitted Phases								
Detector Phases	4	4	8	8	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	20.0	20.0	23.0	23.0	13.0	36.0	11.0	34.0
Total Split (%)	22.2%	22.2%	25.6%	25.6%	14.4%	40.0%	12.2%	37.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	8.4	8.4	12.5	12.5	7.7	31.1	6.9	30.4
Actuated g/C Ratio	0.13	0.13	0.20	0.20	0.12	0.50	0.10	0.49
v/c Ratio	0.32	0.11	0.57	0.54	0.31	0.51	0.25	0.48
Control Delay	34.5	0.6	32.8	20.4	36.4	17.3	37.5	18.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.5	0.6	32.8	20.4	36.4	17.3	37.5	18.0
LOS	C	A	C	C	D	B	D	B
Approach Delay		20.3		26.0		18.4		18.9
Approach LOS		C		C		B		B

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 61.9
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.57
Intersection Signal Delay: 19.9 Intersection LOS: B
Intersection Capacity Utilization 54.6% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 26: Pardee South Loop & Horse Ranch Creek Rd



LOS Engineering

AM Existing + Cumulative + Project
26: Pardee South Loop & Horse Ranch Creek Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.850			0.903			0.983			0.996	
Flt Protected	0.950			0.950	0.983		0.950			0.950		
Satd. Flow (prot)	1583	1583	0	1504	1571	0	1583	3479	0	1583	3525	0
Flt Permitted	0.950			0.950	0.983		0.950			0.950		
Satd. Flow (perm)	1583	1583	0	1504	1571	0	1583	3479	0	1583	3525	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		243			92			16			3	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		869			1419			1340			1033	
Travel Time (s)		19.8			32.3			30.5			23.5	
Volume (vph)	62	0	45	228	0	126	54	759	94	40	769	21
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	65	0	47	240	0	133	57	799	99	42	809	22
Lane Group Flow (vph)	65	47	0	167	206	0	57	898	0	42	831	0
v/c Ratio	0.32	0.11		0.57	0.54		0.31	0.51		0.25	0.48	
Control Delay	34.5	0.6		32.8	20.4		36.4	17.3		37.5	18.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	34.5	0.6		32.8	20.4		36.4	17.3		37.5	18.0	
Queue Length 50th (ft)	25	0		66	43		22	163		16	152	
Queue Length 95th (ft)	70	0		150	125		66	277		54	264	
Internal Link Dist (ft)		789			1339			1260			953	
Turn Bay Length (ft)												
Base Capacity (vph)	364	551		441	525		228	2002		182	1965	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.18	0.09		0.38	0.39		0.25	0.45		0.23	0.42	

Intersection Summary

Area Type: Other

LOS Engineering

AM Existing + Cumulative + Project

26: Pardee South Loop & Horse Ranch Creek Rd — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		0.95	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.85		1.00	0.90		1.00	0.98		1.00	1.00	
Flt Protected	0.95	1.00		0.95	0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	1583		1504	1570		1583	3481		1583	3525	
Flt Permitted	0.95	1.00		0.95	0.98		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	1583		1504	1570		1583	3481		1583	3525	
Volume (vph)	62	0	45	228	0	126	54	759	94	40	769	21
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	65	0	47	240	0	133	57	799	99	42	809	22
RTOR Reduction (vph)	0	44	0	0	77	0	0	9	0	0	2	0
Lane Group Flow (vph)	65	3	0	167	129	0	57	889	0	42	829	0
Turn Type	Split			Split			Prot			Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	4.8	4.8		11.0	11.0		4.2	30.3		3.4	29.5	
Effective Green, g (s)	4.8	4.8		11.0	11.0		4.2	30.3		3.4	29.5	
Actuated g/C Ratio	0.07	0.07		0.17	0.17		0.06	0.46		0.05	0.45	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	116	116		253	264		102	1610		82	1588	
v/s Ratio Prot	c0.04	0.00		c0.11	0.08		c0.04	c0.26		0.03	0.24	
v/s Ratio Perm												
v/c Ratio	0.56	0.03		0.66	0.49		0.56	0.55		0.51	0.52	
Uniform Delay, d1	29.3	28.2		25.5	24.7		29.8	12.7		30.2	12.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.1	0.1		6.3	1.4		6.5	0.4		5.3	0.3	
Delay (s)	35.4	28.3		31.8	26.1		36.2	13.1		35.6	13.2	
Level of Service	D	C		C	C		D	B		D	B	
Approach Delay (s)		32.4			28.7			14.5			14.3	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	17.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	65.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	54.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

AM Existing + Cumulative + Project

27: School/Park Access & Horse Ranch Creek Rd — HCM Unsignalized Intersection Capacity Analysis

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	144	763	215	0	1093
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	152	803	226	0	1151
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1492	515			1029	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1492	515			1029	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	70			100	
cM capacity (veh/h)	114	505			670	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	152	535	494	575	575
Volume Left	0	0	0	0	0
Volume Right	152	0	226	0	0
cSH	505	1700	1700	1700	1700
Volume to Capacity	0.30	0.31	0.29	0.34	0.34
Queue Length 95th (ft)	31	0	0	0	0
Control Delay (s)	15.2	0.0	0.0	0.0	0.0
Lane LOS	C				
Approach Delay (s)	15.2	0.0		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	44.6%	ICU Level of Service	A
Analysis Period (min)	15		

LOS Engineering

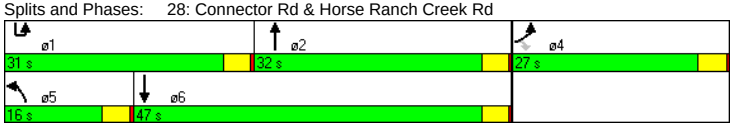
AM Existing + Cumulative + Project
28: Connector Rd & Horse Ranch Creek Rd

Timings

Lane Group	EBL	EBR	NBL	NBT	SBT	ø1
Lane Configurations						
Volume (vph)	274	10	5	525	448	
Turn Type		Perm	Prot			
Protected Phases	4		5	2	6	1
Permitted Phases		4				
Detector Phases	4	4	5	2	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0	8.0
Total Split (s)	27.0	27.0	16.0	32.0	47.0	31.0
Total Split (%)	30.0%	30.0%	17.8%	35.6%	52.2%	34%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag			Lead	Lag	Lag	Lead
Lead-Lag Optimize?			Yes	Yes	Yes	Yes
Recall Mode	None	None	None	Min	Min	None
Act Effct Green (s)	9.0	9.0	5.8	19.6	18.2	
Actuated g/C Ratio	0.24	0.24	0.13	0.53	0.49	
v/c Ratio	0.39	0.03	0.02	0.30	0.54	
Control Delay	13.2	8.7	19.8	5.4	5.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	13.2	8.7	19.8	5.4	5.6	
LOS	B	A	B	A	A	
Approach Delay	13.0			5.5	5.6	
Approach LOS	B			A	A	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 37.2	
Natural Cycle: 50	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.54	
Intersection Signal Delay: 6.8	Intersection LOS: A
Intersection Capacity Utilization 43.0%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 28: Connector Rd & Horse Ranch Creek Rd



LOS Engineering

AM Existing + Cumulative + Project
28: Connector Rd & Horse Ranch Creek Rd

Queues

Lane Group	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Ideal Flow (vphpl)	1700	1700	1700	1900	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	
Trailing Detector (ft)	0	0	0	0	0	0	
Turning Speed (mph)	15	9	15		9		9
Lane Util. Factor	0.97	1.00	1.00	0.95	1.00	0.95	0.95
Frt		0.850				0.923	
Flt Protected	0.950		0.950				
Satd. Flow (prot)	3072	1417	1583	3539	1667	3267	0
Flt Permitted	0.950		0.950				
Satd. Flow (perm)	3072	1417	1583	3539	1667	3267	0
Right Turn on Red		Yes					Yes
Satd. Flow (RTOR)		11				405	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30			30		30	
Link Distance (ft)	2875			1509		1400	
Travel Time (s)	65.3			34.3		31.8	
Volume (vph)	274	10	5	525	0	448	472
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	288	11	5	553	0	472	497
Lane Group Flow (vph)	288	11	5	553	0	969	0
v/c Ratio	0.39	0.03	0.02	0.30		0.54	
Control Delay	13.2	8.7	19.8	5.4		5.6	
Queue Delay	0.0	0.0	0.0	0.0		0.0	
Total Delay	13.2	8.7	19.8	5.4		5.6	
Queue Length 50th (ft)	15	0	1	23		24	
Queue Length 95th (ft)	72	10	10	56		113	
Internal Link Dist (ft)	2795			1429		1320	
Turn Bay Length (ft)							
Base Capacity (vph)	1416	659	380	2260		2415	
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	0.20	0.02	0.01	0.24		0.40	

Intersection Summary	
Area Type:	Other

LOS Engineering

AM Existing + Cumulative + Project
28: Connector Rd & Horse Ranch Creek Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Ideal Flow (vphpl)	1700	1700	1700	1900	1700	1900	1700
Total Lost time (s)	4.0	4.0	4.0	4.0		4.0	
Lane Util. Factor	0.97	1.00	1.00	0.95		0.95	
Frt	1.00	0.85	1.00	1.00		0.92	
Flt Protected	0.95	1.00	0.95	1.00		1.00	
Satd. Flow (prot)	3072	1417	1583	3539		3267	
Flt Permitted	0.95	1.00	0.95	1.00		1.00	
Satd. Flow (perm)	3072	1417	1583	3539		3267	
Volume (vph)	274	10	5	525	0	448	472
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	288	11	5	553	0	472	497
RTOR Reduction (vph)	0	9	0	0	0	221	0
Lane Group Flow (vph)	288	2	5	553	0	748	0
Turn Type		Perm	Prot		Prot		
Protected Phases	4		5	2	1	6	
Permitted Phases		4					
Actuated Green, G (s)	9.0	9.0	0.8	23.0		18.2	
Effective Green, g (s)	9.0	9.0	0.8	23.0		18.2	
Actuated g/C Ratio	0.22	0.22	0.02	0.58		0.45	
Clearance Time (s)	4.0	4.0	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	691	319	32	2035		1486	
v/s Ratio Prot	c0.09		0.00	c0.16		c0.23	
v/s Ratio Perm		0.00					
v/c Ratio	0.42	0.01	0.16	0.27		0.50	
Uniform Delay, d1	13.3	12.0	19.3	4.3		7.7	
Progression Factor	1.00	1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.4	0.0	2.3	0.1		0.3	
Delay (s)	13.7	12.0	21.5	4.4		8.0	
Level of Service	B	B	C	A		A	
Approach Delay (s)	13.6			4.5		8.0	
Approach LOS	B			A		A	

Intersection Summary			
HCM Average Control Delay	7.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	43.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

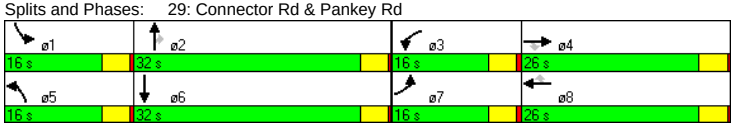
AM Existing + Cumulative + Project
29: Connector Rd & Pankey Rd

Timings

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Volume (vph)	50	124	200	52	299	219	150	299	17	142	19
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot	
Protected Phases	7	4		3	8		5	2		1	6
Permitted Phases			4			8			2		
Detector Phases	7	4	4	3	8	8	5	2	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0
Total Split (s)	16.0	26.0	26.0	16.0	26.0	26.0	16.0	32.0	32.0	16.0	32.0
Total Split (%)	17.8%	28.9%	28.9%	17.8%	28.9%	28.9%	17.8%	35.6%	35.6%	17.8%	35.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min
Act Effct Green (s)	8.1	15.3	15.3	8.2	15.4	15.4	10.6	18.2	18.2	10.4	18.1
Actuated g/C Ratio	0.13	0.25	0.25	0.13	0.25	0.25	0.17	0.30	0.30	0.17	0.30
v/c Ratio	0.27	0.38	0.37	0.27	0.67	0.43	0.59	0.56	0.04	0.57	0.05
Control Delay	35.5	24.3	7.2	35.5	31.7	6.9	41.4	27.3	10.8	40.6	19.6
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	35.5	24.3	7.2	35.5	31.7	6.9	41.4	27.3	10.8	40.6	19.6
LOS	D	C	A	D	C	A	D	C	B	D	B
Approach Delay		18.3			22.5			31.2			37.6
Approach LOS		B			C			C			D

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 60.8	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.67	
Intersection Signal Delay: 25.7	Intersection LOS: C
Intersection Capacity Utilization 56.9%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 29: Connector Rd & Pankey Rd



AM Existing + Cumulative + Project
29: Connector Rd & Pankey Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	50	50	50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.966	0.850			0.850			0.850		0.970	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1583	1709	1346	1583	1863	1417	1583	1863	1417	1583	1807	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1583	1709	1346	1583	1863	1417	1583	1863	1417	1583	1807	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15	173			231			18		5	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1256			2875			1488			1443	
Travel Time (s)		28.5			65.3			33.8			32.8	
Volume (vph)	50	124	200	52	299	219	150	299	17	142	19	5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	131	211	55	315	231	158	315	18	149	20	5
Lane Group Flow (vph)	53	169	173	55	315	231	158	315	18	149	25	0
v/c Ratio	0.27	0.38	0.37	0.27	0.67	0.43	0.59	0.56	0.04	0.57	0.05	
Control Delay	35.5	24.3	7.2	35.5	31.7	6.9	41.4	27.3	10.8	40.6	19.6	
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	35.5	24.3	7.2	35.5	31.7	6.9	41.4	27.3	10.8	40.6	19.6	
Queue Length 50th (ft)	21	57	0	22	122	0	62	122	0	58	7	
Queue Length 95th (ft)	62	135	51	63	249	55	#179	230	16	#165	26	
Internal Link Dist (ft)		1176			2795			1408			1363	
Turn Bay Length (ft)												
Base Capacity (vph)	298	614	588	298	659	651	322	790	611	321	768	
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	0.18	0.28	0.29	0.18	0.48	0.35	0.49	0.40	0.03	0.46	0.03	

Intersection Summary

Area Type: Other

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

LOS Engineering

AM Existing + Cumulative + Project
29: Connector Rd & Pankey Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.97	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.97	
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)	1583	1710	1346	1583	1863	1417	1583	1863	1417	1583	1807	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1583	1710	1346	1583	1863	1417	1583	1863	1417	1583	1807	
Volume (vph)	50	124	200	52	299	219	150	299	17	142	19	5
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	131	211	55	315	231	158	315	18	149	20	5
RTOR Reduction (vph)	0	11	130	0	0	174	0	0	13	0	4	0
Lane Group Flow (vph)	53	158	43	55	315	57	158	315	5	149	21	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	4.4	15.4	15.4	4.4	15.4	15.4	8.2	18.3	18.3	8.0	18.1	
Effective Green, g (s)	4.4	15.4	15.4	4.4	15.4	15.4	8.2	18.3	18.3	8.0	18.1	
Actuated g/C Ratio	0.07	0.25	0.25	0.07	0.25	0.25	0.13	0.29	0.29	0.13	0.29	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	112	424	334	112	462	351	209	549	418	204	527	
v/s Ratio Prot	0.03	0.09		c0.03	c0.17		c0.10	c0.17		0.09	0.01	
v/s Ratio Perm			0.03			0.04			0.00			
v/c Ratio	0.47	0.37	0.13	0.49	0.68	0.16	0.76	0.57	0.01	0.73	0.04	
Uniform Delay, d1	27.7	19.3	18.1	27.8	21.1	18.3	26.0	18.6	15.5	26.0	15.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	3.1	0.6	0.2	3.4	4.1	0.2	14.4	1.5	0.0	12.6	0.0	
Delay (s)	30.9	19.9	18.3	31.1	25.3	18.5	40.4	20.0	15.5	38.6	15.8	
Level of Service	C	B	B	C	C	B	D	C	B	D	B	
Approach Delay (s)		20.7			23.2			26.4			35.3	
Approach LOS		C			C			C			D	

Intersection Summary

HCM Average Control Delay	24.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	62.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

AM Existing + Cumulative + Project
31: Pala Rd (SR-76) & E Vista Way

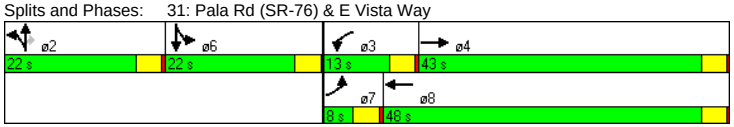
Timings

Lane Group	EBL	EBT	WBL	WBT	NBT	NBR	SBT
Lane Configurations							
Volume (vph)	74	950	300	1680	47	286	200
Turn Type	Prot		Prot			Perm	
Protected Phases	7	4	3	8	2		6
Permitted Phases						2	
Detector Phases	7	4	3	8	2	2	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	20.0	20.0	20.0
Total Split (s)	8.0	43.0	13.0	48.0	22.0	22.0	22.0
Total Split (%)	8.0%	43.0%	13.0%	48.0%	22.0%	22.0%	22.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lead	Lag			
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			
Recall Mode	None	None	None	None	Max	Max	Max
Act Effct Green (s)	4.0	39.0	9.0	44.0	18.0	18.0	18.0
Actuated g/C Ratio	0.04	0.39	0.09	0.44	0.18	0.18	0.18
v/c Ratio	1.24	1.00	1.14	2.18	1.14	0.60	1.34
Control Delay	232.8	55.2	141.2	557.7	131.4	9.9	201.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	232.8	55.2	141.2	557.7	131.4	9.9	201.3
LOS	F	E	F	F	F	A	F
Approach Delay		64.8		495.2	76.5		201.3
Approach LOS		E		F	E		F

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Natural Cycle: 150
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 2.18
Intersection Signal Delay: 273.4 Intersection LOS: F
Intersection Capacity Utilization 152.2% ICU Level of Service H
Analysis Period (min) 15

Splits and Phases: 31: Pala Rd (SR-76) & E Vista Way



AM Existing + Cumulative + Project
31: Pala Rd (SR-76) & E Vista Way

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	300		150	450		0	0		200	0		0
Storage Lanes	1		0	2		0	0		1	0		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.960			0.998				0.850		0.927	
Flt Protected	0.950			0.950				0.959			0.999	
Satd. Flow (prot)	1583	3398	0	3072	1859	0	0	1786	1417	0	1725	0
Flt Permitted	0.950			0.950				0.959			0.999	
Satd. Flow (perm)	1583	3398	0	3072	1859	0	0	1786	1417	0	1725	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		62			1				301		51	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		710			526			797			552	
Travel Time (s)		16.1			12.0			18.1			12.5	
Volume (vph)	74	950	350	300	1680	20	300	47	286	6	200	241
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	78	1000	368	316	1768	21	316	49	301	6	211	254
Lane Group Flow (vph)	78	1368	0	316	1789	0	0	365	301	0	471	0
v/c Ratio	1.24	1.00		1.14	2.18			1.14	0.60		1.34	
Control Delay	232.8	55.2		141.2	557.7			131.4	9.9		201.3	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay	232.8	55.2		141.2	557.7			131.4	9.9		201.3	
Queue Length 50th (ft)	~62	~440		~122	~1867			~273	0		~368	
Queue Length 95th (ft)	#157	#605		#208	#2134			#451	76		#566	
Internal Link Dist (ft)		630			446			717			472	
Turn Bay Length (ft)	300			450					200			
Base Capacity (vph)	63	1363		276	819			321	502		352	
Starvation Cap Reductn	0	0		0	0			0	0		0	
Spillback Cap Reductn	0	0		0	0			0	0		0	
Storage Cap Reductn	0	0		0	0			0	0		0	
Reduced v/c Ratio	1.24	1.00		1.14	2.18			1.14	0.60		1.34	

Intersection Summary

Area Type: Other
~ 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.

AM Existing + Cumulative + Project
31: Pala Rd (SR-76) & E Vista Way

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95		0.97	1.00			1.00	1.00		1.00	
Frt	1.00	0.96		1.00	1.00			1.00	0.85		0.93	
Flt Protected	0.95	1.00		0.95	1.00			0.96	1.00		1.00	
Satd. Flow (prot)	1583	3396		3072	1859			1785	1417		1726	
Flt Permitted	0.95	1.00		0.95	1.00			0.96	1.00		1.00	
Satd. Flow (perm)	1583	3396		3072	1859			1785	1417		1726	
Volume (vph)	74	950	350	300	1680	20	300	47	286	6	200	241
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	78	1000	368	316	1768	21	316	49	301	6	211	254
RTOR Reduction (vph)	0	38	0	0	1	0	0	0	247	0	42	0
Lane Group Flow (vph)	78	1330	0	316	1788	0	0	365	54	0	429	0
Turn Type	Prot			Prot			Split		Perm	Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases									2			
Actuated Green, G (s)	4.0	39.0		9.0	44.0			18.0	18.0		18.0	
Effective Green, g (s)	4.0	39.0		9.0	44.0			18.0	18.0		18.0	
Actuated g/C Ratio	0.04	0.39		0.09	0.44			0.18	0.18		0.18	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	63	1324		276	818			321	255		311	
v/s Ratio Prot	0.05	0.39		c0.10	c0.96			c0.20			c0.25	
v/s Ratio Perm									0.04			
v/c Ratio	1.24	1.00		1.14	2.19			1.14	0.21		1.38	
Uniform Delay, d1	48.0	30.5		45.5	28.0			41.0	35.0		41.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	190.6	25.9		99.1	537.9			92.7	1.9		189.9	
Delay (s)	238.6	56.4		144.6	565.9			133.7	36.9		230.9	
Level of Service	F	E		F	F			F	D		F	
Approach Delay (s)		66.2			502.6			89.9			230.9	
Approach LOS		E			F			F			F	

Intersection Summary			
HCM Average Control Delay	282.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.76		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	152.2%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

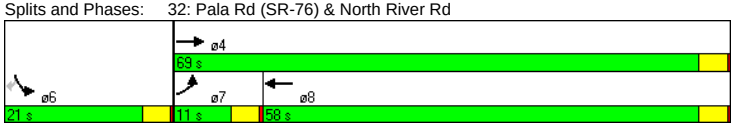
AM Existing + Cumulative + Project
32: Pala Rd (SR-76) & North River Rd

Timings

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Volume (vph)	170	1150	1900	150	185
Turn Type	Prot				Perm
Protected Phases	7	4	8	6	
Permitted Phases					6
Detector Phases	7	4	8	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0
Total Split (s)	11.0	69.0	58.0	21.0	21.0
Total Split (%)	12.2%	76.7%	64.4%	23.3%	23.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Recall Mode	None	None	None	Max	Max
Act Effct Green (s)	7.0	65.0	54.0	17.0	17.0
Actuated g/C Ratio	0.08	0.72	0.60	0.19	0.19
v/c Ratio	1.46	0.90	2.10	0.53	0.52
Control Delay	277.3	21.3	516.1	40.2	16.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	277.3	21.3	516.1	40.2	16.9
LOS	F	C	F	D	B
Approach Delay		54.3	516.1	27.3	
Approach LOS		D	F	C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 90	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 2.10	
Intersection Signal Delay: 315.4	Intersection LOS: F
Intersection Capacity Utilization 148.0%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 32: Pala Rd (SR-76) & North River Rd



LOS Engineering

AM Existing + Cumulative + Project
32: Pala Rd (SR-76) & North River Rd

Queues

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1900	1900	1700	1700	1700
Storage Length (ft)	150			0	50	0
Storage Lanes	1			0	1	1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50		50	50
Trailing Detector (ft)	0	0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.982			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1583	1863	1829	0	1583	1417
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1583	1863	1829	0	1583	1417
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			16			135
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		1356	1400		1286	
Travel Time (s)		30.8	31.8		29.2	
Volume (vph)	170	1150	1900	300	150	185
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	179	1211	2000	316	158	195
Lane Group Flow (vph)	179	1211	2316	0	158	195
v/c Ratio	1.46	0.90	2.10		0.53	0.52
Control Delay	277.3	21.3	516.1		40.2	16.9
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	277.3	21.3	516.1		40.2	16.9
Queue Length 50th (ft)	~140	457	~2138		82	29
Queue Length 95th (ft)	#268	#888	#2405		145	94
Internal Link Dist (ft)		1276	1320		1206	
Turn Bay Length (ft)	150				50	
Base Capacity (vph)	123	1346	1104		299	377
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	1.46	0.90	2.10		0.53	0.52

Intersection Summary

Area Type: Other

~ 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.

LOS Engineering

AM Existing + Cumulative + Project
32: Pala Rd (SR-76) & North River Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1900	1900	1700	1700	1700
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.98		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1583	1863	1828		1583	1417
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1583	1863	1828		1583	1417
Volume (vph)	170	1150	1900	300	150	185
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	179	1211	2000	316	158	195
RTOR Reduction (vph)	0	0	6	0	0	110
Lane Group Flow (vph)	179	1211	2310	0	158	86
Turn Type	Prot					Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	7.0	65.0	54.0		17.0	17.0
Effective Green, g (s)	7.0	65.0	54.0		17.0	17.0
Actuated g/C Ratio	0.08	0.72	0.60		0.19	0.19
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	123	1346	1097		299	268
v/s Ratio Prot	c0.11	0.65	c1.26		c0.10	
v/s Ratio Perm						0.06
v/c Ratio	1.46	0.90	2.11		0.53	0.32
Uniform Delay, d1	41.5	9.9	18.0		32.9	31.5
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	244.1	8.3	500.5		6.5	3.1
Delay (s)	285.6	18.3	518.5		39.4	34.6
Level of Service	F	B	F		D	C
Approach Delay (s)		52.7	518.5		36.8	
Approach LOS		D	F		D	

Intersection Summary

HCM Average Control Delay	317.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.70		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	148.0%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

AM Existing + Cumulative + Project
33: Pala Rd (SR-76) & Olive Hill Rd

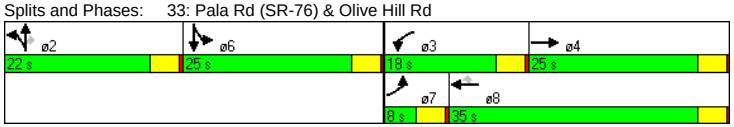
Timings

Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Configurations									
Volume (vph)	100	1100	470	1900	200	153	250	150	300
Turn Type	Prot		Prot		Perm		Perm	Split	
Protected Phases	7	4	3	8		2		6	6
Permitted Phases					8		2		
Detector Phases	7	4	3	8	8	2	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	8.0	25.0	18.0	35.0	35.0	22.0	22.0	25.0	25.0
Total Split (%)	8.9%	27.8%	20.0%	38.9%	38.9%	24.4%	24.4%	27.8%	27.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes				
Recall Mode	None	None	None	None	None	Max	Max	Max	Max
Act Effct Green (s)	4.0	21.0	14.0	31.0	31.0	18.0	18.0	21.0	21.0
Actuated g/C Ratio	0.04	0.23	0.16	0.34	0.34	0.20	0.20	0.23	0.23
v/c Ratio	1.50	1.63	2.01	1.64	0.38	0.76	0.53	0.43	1.19
Control Delay	319.2	317.8	494.0	317.3	12.8	49.0	8.5	33.7	138.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	319.2	317.8	494.0	317.3	12.8	49.0	8.5	33.7	138.6
LOS	F	F	F	F	B	D	A	C	F
Approach Delay		317.9		325.9		29.3			114.1
Approach LOS		F		F		C			F

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 90
Natural Cycle: 150
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 2.01
Intersection Signal Delay: 267.2 Intersection LOS: F
Intersection Capacity Utilization 120.2% ICU Level of Service H
Analysis Period (min) 15

Splits and Phases: 33: Pala Rd (SR-76) & Olive Hill Rd



AM Existing + Cumulative + Project
33: Pala Rd (SR-76) & Olive Hill Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	250		0	250		200	0		150	150		0
Storage Lanes	1		0	1		1	0		1	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50	50	50	50	50	50	50	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.979				0.850			0.850		0.941	
Flt Protected	0.950			0.950				0.979		0.950		
Satd. Flow (prot)	1583	3465	0	1583	3539	1417	0	1824	1417	1583	1753	0
Flt Permitted	0.950			0.950				0.979		0.950		
Satd. Flow (perm)	1583	3465	0	1583	3539	1417	0	1824	1417	1583	1753	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19				110			263		34	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		585			663			961			1186	
Travel Time (s)		13.3			15.1			21.8			27.0	
Volume (vph)	100	1100	178	470	1900	200	110	153	250	150	300	193
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	1158	187	495	2000	211	116	161	263	158	316	203
Lane Group Flow (vph)	105	1345	0	495	2000	211	0	277	263	158	519	0
v/c Ratio	1.50	1.63		2.01	1.64	0.38		0.76	0.53	0.43	1.19	
Control Delay	319.2	317.8		494.0	317.3	12.8		49.0	8.5	33.7	138.6	
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay	319.2	317.8		494.0	317.3	12.8		49.0	8.5	33.7	138.6	
Queue Length 50th (ft)	~83	~590		~445	~874	40		150	0	77	~346	
Queue Length 95th (ft)	#186	#724		#633	#1012	97		#266	65	136	#543	
Internal Link Dist (ft)		505			583			881			1106	
Turn Bay Length (ft)	250			250		200			150	150		
Base Capacity (vph)	70	823		246	1219	560		365	494	369	435	
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	1.50	1.63		2.01	1.64	0.38		0.76	0.53	0.43	1.19	

Intersection Summary

Area Type: Other
~ 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.

AM Existing + Cumulative + Project
33: Pala Rd (SR-76) & Olive Hill Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85		1.00	0.85	1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98	1.00	0.95	1.00	
Satd. Flow (prot)	1583	3465		1583	3539	1417		1825	1417	1583	1753	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.98	1.00	0.95	1.00	
Satd. Flow (perm)	1583	3465		1583	3539	1417		1825	1417	1583	1753	
Volume (vph)	100	1100	178	470	1900	200	110	153	250	150	300	193
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	1158	187	495	2000	211	116	161	263	158	316	203
RTOR Reduction (vph)	0	15	0	0	0	72	0	0	210	0	26	0
Lane Group Flow (vph)	105	1330	0	495	2000	139	0	277	53	158	493	0
Turn Type	Prot			Prot		Perm	Split		Perm	Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases						8			2			
Actuated Green, G (s)	4.0	21.0		14.0	31.0	31.0		18.0	18.0	21.0	21.0	
Effective Green, g (s)	4.0	21.0		14.0	31.0	31.0		18.0	18.0	21.0	21.0	
Actuated g/C Ratio	0.04	0.23		0.16	0.34	0.34		0.20	0.20	0.23	0.23	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	4.0	
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)	70	809		246	1219	488		365	283	369	409	
v/s Ratio Prot	0.07	0.38		c0.31	c0.57			c0.15		0.10	c0.28	
v/s Ratio Perm						0.10			0.04			
v/c Ratio	1.50	1.64		2.01	1.64	0.28		0.76	0.19	0.43	1.21	
Uniform Delay, d1	43.0	34.5		38.0	29.5	21.4		34.0	29.9	29.4	34.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	285.7	295.6		469.6	292.0	0.3		13.8	1.4	3.6	113.4	
Delay (s)	328.7	330.1		507.6	321.5	21.8		47.7	31.4	33.0	147.9	
Level of Service	F	F		F	F	C		D	C	C	F	
Approach Delay (s)		330.0			332.2			39.8			121.1	
Approach LOS		F			F			D			F	

Intersection Summary			
HCM Average Control Delay	275.6	HCM Level of Service	F
HCM Volume to Capacity ratio	1.35		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	120.2%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

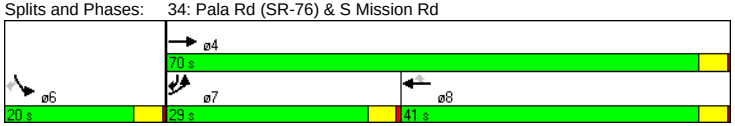
AM Existing + Cumulative + Project
34: Pala Rd (SR-76) & S Mission Rd

Timings

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	600	900	1700	202	239	900
Turn Type	Prot			Perm		pm+ov
Protected Phases	7	4	8		6	7
Permitted Phases				8		6
Detector Phases	7	4	8	8	6	7
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0	8.0
Total Split (s)	29.0	70.0	41.0	41.0	20.0	29.0
Total Split (%)	32.2%	77.8%	45.6%	45.6%	22.2%	32.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead		Lag	Lag		Lead
Lead-Lag Optimize?	Yes		Yes	Yes		Yes
Recall Mode	None	None	None	None	Max	None
Act Effct Green (s)	23.8	64.8	37.0	37.0	16.0	43.8
Actuated g/C Ratio	0.27	0.73	0.42	0.42	0.18	0.49
v/c Ratio	0.77	0.70	1.21	0.30	0.45	0.77
Control Delay	37.1	10.0	128.8	4.4	35.9	23.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.1	10.0	128.8	4.4	35.9	23.6
LOS	D	B	F	A	D	C
Approach Delay		20.8	115.5		26.2	
Approach LOS		C	F		C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 88.8	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.21	
Intersection Signal Delay: 61.8	Intersection LOS: E
Intersection Capacity Utilization 88.8%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 34: Pala Rd (SR-76) & S Mission Rd



LOS Engineering

AM Existing + Cumulative + Project
34: Pala Rd (SR-76) & S Mission Rd

Queues

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1900	1900	1700	1700	1700
Storage Length (ft)	500			300	500	0
Storage Lanes	2			1	2	2
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	0.97	1.00	0.95	1.00	0.97	0.88
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	3072	1863	3539	1417	3072	2493
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	3072	1863	3539	1417	3072	2493
Right Turn on Red				Yes		No
Satd. Flow (RTOR)				200		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		565	451		1333	
Travel Time (s)		12.8	10.3		30.3	
Volume (vph)	600	900	1700	202	239	900
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	632	947	1789	213	252	947
Lane Group Flow (vph)	632	947	1789	213	252	947
v/c Ratio	0.77	0.70	1.21	0.30	0.45	0.77
Control Delay	37.1	10.0	128.8	4.4	35.9	23.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.1	10.0	128.8	4.4	35.9	23.6
Queue Length 50th (ft)	168	242	~667	4	67	235
Queue Length 95th (ft)	230	369	#804	46	104	323
Internal Link Dist (ft)		485	371		1253	
Turn Bay Length (ft)	500			300	500	
Base Capacity (vph)	853	1366	1475	707	554	1247
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	0.74	0.69	1.21	0.30	0.45	0.76

Intersection Summary

Area Type: Other

~ 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.

LOS Engineering

AM Existing + Cumulative + Project
34: Pala Rd (SR-76) & S Mission Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1900	1900	1700	1700	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	0.95	1.00	0.97	0.88
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3072	1863	3539	1417	3072	2493
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3072	1863	3539	1417	3072	2493
Volume (vph)	600	900	1700	202	239	900
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	632	947	1789	213	252	947
RTOR Reduction (vph)	0	0	0	117	0	0
Lane Group Flow (vph)	632	947	1789	96	252	947
Turn Type	Prot			Perm		pm+ov
Protected Phases	7	4	8		6	7
Permitted Phases				8		6
Actuated Green, G (s)	23.8	64.8	37.0	37.0	16.0	39.8
Effective Green, g (s)	23.8	64.8	37.0	37.0	16.0	39.8
Actuated g/C Ratio	0.27	0.73	0.42	0.42	0.18	0.45
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	823	1359	1475	590	554	1230
v/s Ratio Prot	0.21	0.51	c0.51		0.08	c0.21
v/s Ratio Perm				0.07		0.17
v/c Ratio	0.77	0.70	1.21	0.16	0.45	0.77
Uniform Delay, d1	30.0	6.6	25.9	16.2	32.5	20.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.3	1.6	102.3	0.1	2.7	3.0
Delay (s)	34.3	8.2	128.2	16.3	35.2	23.6
Level of Service	C	A	F	B	D	C
Approach Delay (s)		18.6	116.3		26.0	
Approach LOS		B	F		C	

Intersection Summary

HCM Average Control Delay	61.4	HCM Level of Service	E
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	88.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	88.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

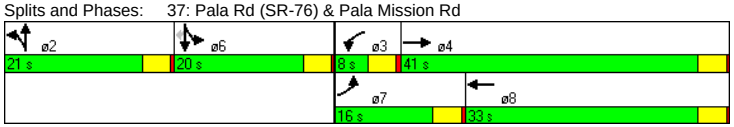
AM Existing + Cumulative + Project
37: Pala Rd (SR-76) & Pala Mission Rd

Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	SBT	SBR
Lane Configurations							
Volume (vph)	240	439	16	264	31	11	164
Turn Type	Prot		Prot		Split		Perm
Protected Phases	7	4	3	8	2	6	
Permitted Phases							6
Detector Phases	7	4	3	8	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	20.0	20.0	20.0
Total Split (s)	16.0	41.0	8.0	33.0	21.0	20.0	20.0
Total Split (%)	17.8%	45.6%	8.9%	36.7%	23.3%	22.2%	22.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lead	Lag			
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			
Recall Mode	None	None	None	None	Max	None	None
Act Effct Green (s)	12.4	31.1	4.1	15.9	17.5	7.7	7.7
Actuated g/C Ratio	0.18	0.46	0.06	0.24	0.26	0.11	0.11
v/c Ratio	0.87	0.31	0.19	0.70	0.08	0.22	0.56
Control Delay	62.1	12.9	42.3	32.8	24.2	32.4	13.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.1	12.9	42.3	32.8	24.2	32.4	13.0
LOS	E	B	D	C	C	C	B
Approach Delay		29.4		33.3		16.9	
Approach LOS		C		C		B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 67.4	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.87	
Intersection Signal Delay: 28.2	Intersection LOS: C
Intersection Capacity Utilization 49.4%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 37: Pala Rd (SR-76) & Pala Mission Rd



AM Existing + Cumulative + Project
37: Pala Rd (SR-76) & Pala Mission Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	250		0	250		0	200		0	0		50
Storage Lanes	1		0	1		0	1		0	0		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	50
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.988			0.985							0.850
Flt Protected	0.950			0.950			0.950				0.965	
Satd. Flow (prot)	1583	3497	0	1583	1835	0	1583	1863	0	0	1798	1417
Flt Permitted	0.950			0.950			0.950				0.965	
Satd. Flow (perm)	1583	3497	0	1583	1835	0	1583	1863	0	0	1798	1417
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12			7							173
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		941			1076			1007			1565	
Travel Time (s)		21.4			24.5			22.9			35.6	
Volume (vph)	240	439	39	16	264	29	31	0	0	29	11	164
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	253	462	41	17	278	31	33	0	0	31	12	173
Lane Group Flow (vph)	253	503	0	17	309	0	33	0	0	0	43	173
v/c Ratio	0.87	0.31		0.19	0.70		0.08				0.22	0.56
Control Delay	62.1	12.9		42.3	32.8		24.2				32.4	13.0
Queue Delay	0.0	0.0		0.0	0.0		0.0				0.0	0.0
Total Delay	62.1	12.9		42.3	32.8		24.2				32.4	13.0
Queue Length 50th (ft)	105	62		7	116		11				17	0
Queue Length 95th (ft)	#293	129		29	210		38				49	54
Internal Link Dist (ft)		861			996			927			1485	
Turn Bay Length (ft)	250			250			200					50
Base Capacity (vph)	290	1785		88	673		411				373	431
Starvation Cap Reductn	0	0		0	0		0				0	0
Spillback Cap Reductn	0	0		0	0		0				0	0
Storage Cap Reductn	0	0		0	0		0				0	0
Reduced v/c Ratio	0.87	0.28		0.19	0.46		0.08				0.12	0.40

Intersection Summary	
Area Type:	Other
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

AM Existing + Cumulative + Project
37: Pala Rd (SR-76) & Pala Mission Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0				4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00				1.00	1.00
Frt	1.00	0.99		1.00	0.98		1.00				1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95				0.97	1.00
Satd. Flow (prot)	1583	3496		1583	1835		1583				1798	1417
Flt Permitted	0.95	1.00		0.95	1.00		0.95				0.97	1.00
Satd. Flow (perm)	1583	3496		1583	1835		1583				1798	1417
Volume (vph)	240	439	39	16	264	29	31	0	0	29	11	164
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	253	462	41	17	278	31	33	0	0	31	12	173
RTOR Reduction (vph)	0	7	0	0	5	0	0	0	0	0	0	158
Lane Group Flow (vph)	253	496	0	17	304	0	33	0	0	0	43	15
Turn Type	Prot			Prot			Split			Split		Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases												6
Actuated Green, G (s)	12.4	31.1		0.7	19.4		17.5				6.2	6.2
Effective Green, g (s)	12.4	31.1		0.7	19.4		17.5				6.2	6.2
Actuated g/C Ratio	0.17	0.43		0.01	0.27		0.24				0.09	0.09
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0				4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0				3.0	3.0
Lane Grp Cap (vph)	275	1521		15	498		387				156	123
v/s Ratio Prot	c0.16	0.14		0.01	c0.17		c0.02				c0.02	
v/s Ratio Perm												0.01
v/c Ratio	0.92	0.33		1.13	0.61		0.09				0.28	0.12
Uniform Delay, d1	29.1	13.3		35.4	22.7		20.8				30.5	30.1
Progression Factor	1.00	1.00		1.00	1.00		1.00				1.00	1.00
Incremental Delay, d2	33.8	0.1		279.2	2.2		0.4				1.0	0.4
Delay (s)	62.9	13.4		314.6	25.0		21.3				31.5	30.6
Level of Service	E	B		F	C		C				C	C
Approach Delay (s)		30.0			40.1			21.3			30.8	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM Average Control Delay	32.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	71.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	49.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

PM Existing + Cumulative + Project
1: Pala Rd (SR-76) & Via Monserate

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	50	2120	1600	110	50	20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	53	2232	1684	116	53	21
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1800				4079	1742
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1800				4079	1742
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	85				0	80
cM capacity (veh/h)	342				2	107

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	53	2232	1800	74
Volume Left	53	0	0	53
Volume Right	0	0	116	21
cSH	342	1700	1700	3
Volume to Capacity	0.15	1.31	1.06	21.78
Queue Length 95th (ft)	13	0	0	Err
Control Delay (s)	17.4	0.0	0.0	Err
Lane LOS	C			F
Approach Delay (s)	0.4		0.0	Err
Approach LOS				F

Intersection Summary			
Average Delay	177.4		
Intersection Capacity Utilization	122.7%	ICU Level of Service	H
Analysis Period (min)	15		

LOS Engineering

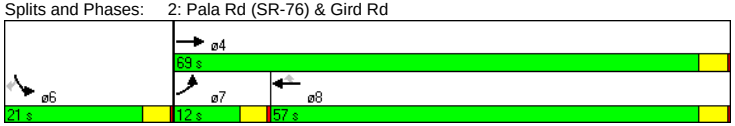
PM Existing + Cumulative + Project
2: Pala Rd (SR-76) & Gird Rd

Timings

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	220	1760	1340	120	60	80
Turn Type	Prot			Perm		Perm
Protected Phases	7	4	8		6	
Permitted Phases				8		6
Detector Phases	7	4	8	8	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	12.0	69.0	57.0	57.0	21.0	21.0
Total Split (%)	13.3%	76.7%	63.3%	63.3%	23.3%	23.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	None	None	None	Min	Min
Act Effct Green (s)	8.0	65.1	53.1	53.1	8.6	8.6
Actuated g/C Ratio	0.10	0.80	0.65	0.65	0.11	0.11
v/c Ratio	1.50	1.25	1.17	0.14	0.38	0.37
Control Delay	284.0	132.7	102.5	5.6	40.4	13.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	284.0	132.7	102.5	5.6	40.4	13.3
LOS	F	F	F	A	D	B
Approach Delay		149.6	94.6		24.9	
Approach LOS		F	F		C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 81.7	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.50	
Intersection Signal Delay: 122.3	Intersection LOS: F
Intersection Capacity Utilization 103.0%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 2: Pala Rd (SR-76) & Gird Rd



LOS Engineering

PM Existing + Cumulative + Project
2: Pala Rd (SR-76) & Gird Rd

Queues

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1900	1900	1700	1700	1700
Storage Length (ft)	450			20	0	180
Storage Lanes	1			1	1	1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1583	1863	1863	1417	1583	1417
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1583	1863	1863	1417	1583	1417
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				16		84
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		3191	8309		1271	
Travel Time (s)		72.5	188.8		28.9	
Volume (vph)	220	1760	1340	120	60	80
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	232	1853	1411	126	63	84
Lane Group Flow (vph)	232	1853	1411	126	63	84
v/c Ratio	1.50	1.25	1.17	0.14	0.38	0.37
Control Delay	284.0	132.7	102.5	5.6	40.4	13.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	284.0	132.7	102.5	5.6	40.4	13.3
Queue Length 50th (ft)	~167	~1198	~869	19	31	0
Queue Length 95th (ft)	#317	#1546	#1186	44	68	39
Internal Link Dist (ft)		3111	8229		1191	
Turn Bay Length (ft)	450			20		180
Base Capacity (vph)	155	1484	1210	926	299	336
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	1.50	1.25	1.17	0.14	0.21	0.25

Intersection Summary

Area Type: Other

~ 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.

LOS Engineering

PM Existing + Cumulative + Project
2: Pala Rd (SR-76) & Gird Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1900	1900	1700	1700	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	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)	1583	1863	1863	1417	1583	1417
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1583	1863	1863	1417	1583	1417
Volume (vph)	220	1760	1340	120	60	80
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	232	1853	1411	126	63	84
RTOR Reduction (vph)	0	0	0	6	0	75
Lane Group Flow (vph)	232	1853	1411	120	63	9
Turn Type	Prot			Perm		Perm
Protected Phases	7	4	8		6	
Permitted Phases				8		6
Actuated Green, G (s)	8.0	65.1	53.1	53.1	8.6	8.6
Effective Green, g (s)	8.0	65.1	53.1	53.1	8.6	8.6
Actuated g/C Ratio	0.10	0.80	0.65	0.65	0.11	0.11
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	155	1484	1211	921	167	149
v/s Ratio Prot	c0.15	c0.99	0.76		c0.04	
v/s Ratio Perm				0.08		0.01
v/c Ratio	1.50	1.25	1.17	0.13	0.38	0.06
Uniform Delay, d1	36.9	8.3	14.3	5.5	34.1	32.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	254.3	117.7	83.6	0.1	1.4	0.2
Delay (s)	291.2	126.0	97.9	5.5	35.5	33.1
Level of Service	F	F	F	A	D	C
Approach Delay (s)		144.4	90.4		34.1	
Approach LOS		F	F		C	

Intersection Summary

HCM Average Control Delay	118.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	81.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	103.0%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

PM Existing + Cumulative + Project
3: Pala Rd (SR-76) & Sage Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	10	1600	1600	10	10	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	1684	1684	11	11	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1695				3395	1689
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1695				3395	1689
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				0	91
cM capacity (veh/h)	376				8	116

Direction, Lane #	EB 1	EB 2	WB 1	SB 1
Volume Total	11	1684	1695	11
Volume Left	11	0	0	0
Volume Right	0	0	11	11
cSH	376	1700	1700	116
Volume to Capacity	0.03	0.99	1.00	0.09
Queue Length 95th (ft)	2	0	0	7
Control Delay (s)	14.8	0.0	0.0	39.3
Lane LOS	B			E
Approach Delay (s)	0.1		0.0	Err
Approach LOS				F

Intersection Summary			
Average Delay		Err	
Intersection Capacity Utilization		Err%	ICU Level of Service	H
Analysis Period (min)		15	

LOS Engineering

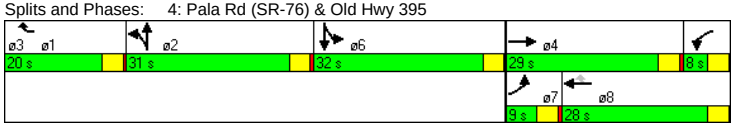
PM Existing + Cumulative + Project
4: Pala Rd (SR-76) & Old Hwy 395

Timings

Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	SBT
Lane Configurations							
Volume (vph)	130	1000	100	960	290	290	210
Turn Type	Prot		Prot		custom		
Protected Phases	7	4	3	8	1	2	6
Permitted Phases					8		
Detector Phases	7	4	3	8	1	2	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	20.0	20.0	20.0
Total Split (s)	9.0	29.0	8.0	28.0	20.0	31.0	32.0
Total Split (%)	7.5%	24.2%	6.7%	23.3%	16.7%	25.8%	26.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lead	Lag	Lag	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	Min	Min	Min
Act Effct Green (s)	5.0	25.0	4.0	24.0	33.9	27.0	28.0
Actuated g/C Ratio	0.05	0.23	0.04	0.22	0.31	0.25	0.25
v/c Ratio	1.90	1.50	1.81	1.31	0.54	1.54	1.63
Control Delay	483.0	264.1	458.2	184.0	15.4	283.5	323.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	483.0	264.1	458.2	184.0	15.4	283.5	323.0
LOS	F	F	F	F	B	F	F
Approach Delay		286.6		168.1		283.5	323.0
Approach LOS		F		F		F	F

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 109.9	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.90	
Intersection Signal Delay: 252.4	Intersection LOS: F
Intersection Capacity Utilization 108.8%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 4: Pala Rd (SR-76) & Old Hwy 395



LOS Engineering

PM Existing + Cumulative + Project
4: Pala Rd (SR-76) & Old Hwy 395

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	330		0	150		150	0		0	0		0
Storage Lanes	1		0	1		1	0		0	0		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50	50	50	50		50	50	
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.982				0.850		0.971			0.970	
Flt Protected	0.950			0.950				0.983			0.977	
Satd. Flow (prot)	1583	3476	0	1583	3539	1417	0	1778	0	0	1765	0
Flt Permitted	0.950			0.950				0.983			0.977	
Satd. Flow (perm)	1583	3476	0	1583	3539	1417	0	1778	0	0	1765	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11				190		11			11	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		652			462			899			4464	
Travel Time (s)		14.8			10.5			20.4			101.5	
Volume (vph)	130	1000	140	100	960	290	220	290	140	340	210	160
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	137	1053	147	105	1011	305	232	305	147	358	221	168
Lane Group Flow (vph)	137	1200	0	105	1011	305	0	684	0	0	747	0
v/c Ratio	1.90	1.50		1.81	1.31	0.54		1.54			1.63	
Control Delay	483.0	264.1		458.2	184.0	15.4		283.5			323.0	
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0			0.0	
Total Delay	483.0	264.1		458.2	184.0	15.4		283.5			323.0	
Queue Length 50th (ft)	~149	~622		~112	~483	61		~679			~764	
Queue Length 95th (ft)	#275	#763		#225	#617	150		#914			#1006	
Internal Link Dist (ft)		572			382			819			4384	
Turn Bay Length (ft)	330			150		150						
Base Capacity (vph)	72	799		58	773	599		445			458	
Starvation Cap Reductn	0	0		0	0	0		0			0	
Spillback Cap Reductn	0	0		0	0	0		0			0	
Storage Cap Reductn	0	0		0	0	0		0			0	
Reduced v/c Ratio	1.90	1.50		1.81	1.31	0.51		1.54			1.63	

Intersection Summary

Area Type: Other

~ 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.

LOS Engineering

PM Existing + Cumulative + Project
4: Pala Rd (SR-76) & Old Hwy 395

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	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	
Frt	1.00	0.98		1.00	1.00	0.85		0.97			0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98			0.98	
Satd. Flow (prot)	1583	3474		1583	3539	1417		1779			1764	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.98			0.98	
Satd. Flow (perm)	1583	3474		1583	3539	1417		1779			1764	
Volume (vph)	130	1000	140	100	960	290	220	290	140	340	210	160
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	137	1053	147	105	1011	305	232	305	147	358	221	168
RTOR Reduction (vph)	0	8	0	0	0	138	0	8	0	0	8	0
Lane Group Flow (vph)	137	1192	0	105	1011	167	0	676	0	0	739	0
Turn Type	Prot			Prot		custom	Split			Split		
Protected Phases	7	4		3	8	1	2	2		6	6	
Permitted Phases						8						
Actuated Green, G (s)	5.0	25.0		4.0	24.0	29.9		27.0			28.0	
Effective Green, g (s)	5.0	25.0		4.0	24.0	29.9		27.0			28.0	
Actuated g/C Ratio	0.05	0.23		0.04	0.22	0.27		0.25			0.25	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0			3.0	
Lane Grp Cap (vph)	72	790		58	773	437		437			449	
v/s Ratio Prot	0.09	c0.34		0.07	c0.29	c0.02		c0.38			c0.42	
v/s Ratio Perm						0.10						
v/c Ratio	1.90	1.51		1.81	1.31	0.38		1.55			1.65	
Uniform Delay, d1	52.5	42.5		53.0	43.0	32.5		41.5			41.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00			1.00	
Incremental Delay, d2	453.5	235.3		424.2	147.8	0.6		257.0			300.3	
Delay (s)	505.9	277.7		477.2	190.8	33.0		298.4			341.3	
Level of Service	F	F		F	F	C		F			F	
Approach Delay (s)		301.1			178.1			298.4			341.3	
Approach LOS		F			F			F			F	

Intersection Summary

HCM Average Control Delay	266.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.40		
Actuated Cycle Length (s)	109.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	108.8%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

PM Existing + Cumulative + Project
6: Pala Rd (SR-76) & I-15 SB Ramps

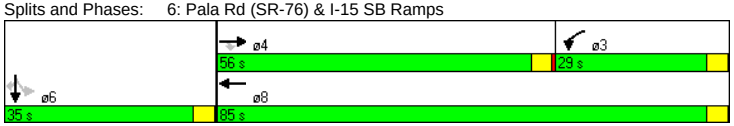
Timings

Lane Group	EBT	EBR	WBL	WBT	SBT	SBR
Lane Configurations						
Volume (vph)	1150	300	400	860	10	520
Turn Type		Perm	Prot			Perm
Protected Phases	4		3	8	6	
Permitted Phases		4				6
Detector Phases	4	4	3	8	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0	20.0
Total Split (s)	56.0	56.0	29.0	85.0	35.0	35.0
Total Split (%)	46.7%	46.7%	24.2%	70.8%	29.2%	29.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lead	Lag			
Lead-Lag Optimize?	Yes	Yes	Yes			
Recall Mode	None	None	None	None	C-Min	C-Min
Act Effct Green (s)	52.0	52.0	25.0	81.0	31.0	31.0
Actuated g/C Ratio	0.43	0.43	0.21	0.68	0.26	0.26
v/c Ratio	1.50	0.45	1.28	0.72	0.58	1.08
Control Delay	260.2	14.1	175.0	27.7	44.6	92.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	260.2	14.1	175.0	27.7	44.6	92.8
LOS	F	B	F	C	D	F
Approach Delay	209.3			74.4	77.1	
Approach LOS	F			E	E	

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Offset: 40 (33%), Referenced to phase 2: and 6:SBTL, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.50
Intersection Signal Delay: 131.2 Intersection LOS: F
Intersection Capacity Utilization 117.2% ICU Level of Service H
Analysis Period (min) 15

Splits and Phases: 6: Pala Rd (SR-76) & I-15 SB Ramps



PM Existing + Cumulative + Project
6: Pala Rd (SR-76) & I-15 SB Ramps

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	0		0	500		0	0		0	0		900
Storage Lanes	0		1	1		0	0		0	0		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50	50	50					50	50	50
Trailing Detector (ft)		0	0	0	0					0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	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			0.850									0.850
Flt Protected				0.950							0.954	
Satd. Flow (prot)	0	1863	1417	1583	1863	0	0	0	0	0	1777	1417
Flt Permitted				0.950							0.954	
Satd. Flow (perm)	0	1863	1417	1583	1863	0	0	0	0	0	1777	1417
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			152									188
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		654			1271			961			1209	
Travel Time (s)		14.9			28.9			21.8			27.5	
Volume (vph)	0	1150	300	400	860	0	0	0	0	240	10	520
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1211	316	421	905	0	0	0	0	253	11	547
Lane Group Flow (vph)	0	1211	316	421	905	0	0	0	0	0	264	547
v/c Ratio		1.50	0.45	1.28	0.72						0.58	1.08
Control Delay		260.2	14.1	175.0	27.7						44.6	92.8
Queue Delay		0.0	0.0	0.0	0.0						0.0	0.0
Total Delay		260.2	14.1	175.0	27.7						44.6	92.8
Queue Length 50th (ft)		~1301	83	~404	667						179	~359
Queue Length 95th (ft)		#1562	161	m#291	m557						269	#581
Internal Link Dist (ft)		574			1191			881			1129	
Turn Bay Length (ft)				500								900
Base Capacity (vph)		807	700	330	1258						459	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		1.50	0.45	1.28	0.72						0.58	1.08

Intersection Summary

Area Type: Other
~ 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.

PM Existing + Cumulative + Project
6: Pala Rd (SR-76) & I-15 SB Ramps

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)		4.0	4.0	4.0	4.0						4.0	4.0
Lane Util. Factor		1.00	1.00	1.00	1.00						1.00	1.00
Frt		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)		1863	1417	1583	1863						1778	1417
Flt Permitted		1.00	1.00	0.95	1.00						0.95	1.00
Satd. Flow (perm)		1863	1417	1583	1863						1778	1417
Volume (vph)	0	1150	300	400	860	0	0	0	0	240	10	520
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1211	316	421	905	0	0	0	0	253	11	547
RTOR Reduction (vph)	0	0	86	0	0	0	0	0	0	0	0	139
Lane Group Flow (vph)	0	1211	230	421	905	0	0	0	0	0	264	408
Turn Type			Perm	Prot						Perm		Perm
Protected Phases		4		3	8						6	
Permitted Phases			4							6		6
Actuated Green, G (s)		52.0	52.0	25.0	81.0						31.0	31.0
Effective Green, g (s)		52.0	52.0	25.0	81.0						31.0	31.0
Actuated g/C Ratio		0.43	0.43	0.21	0.68						0.26	0.26
Clearance Time (s)		4.0	4.0	4.0	4.0						4.0	4.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0						3.0	3.0
Lane Grp Cap (vph)		807	614	330	1258						459	366
v/s Ratio Prot		c0.65		c0.27	0.49							
v/s Ratio Perm			0.16								0.15	c0.29
v/c Ratio		1.50	0.37	1.28	0.72						0.58	1.11
Uniform Delay, d1		34.0	23.0	47.5	12.3						38.8	44.5
Progression Factor		1.00	1.00	1.33	2.12						1.00	1.00
Incremental Delay, d2		231.8	0.4	126.3	0.2						5.2	81.4
Delay (s)		265.8	23.4	189.5	26.2						43.9	125.9
Level of Service		F	C	F	C						D	F
Approach Delay (s)		215.6			78.1			0.0			99.2	
Approach LOS		F			E			A			F	

Intersection Summary			
HCM Average Control Delay	140.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.34		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	117.2%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

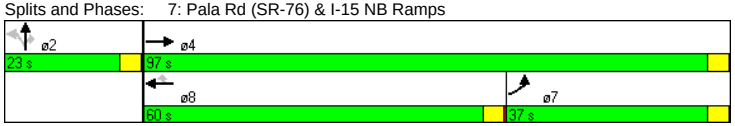
PM Existing + Cumulative + Project
7: Pala Rd (SR-76) & I-15 NB Ramps

Timings

Lane Group	EBL	EBT	WBT	WBR	NBT	NBR
Lane Configurations						
Volume (vph)	600	820	900	270	10	370
Turn Type	Prot			Perm		Perm
Protected Phases	7	4	8		2	
Permitted Phases				8		2
Detector Phases	7	4	8	8	2	2
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	37.0	97.0	60.0	60.0	23.0	23.0
Total Split (%)	30.8%	80.8%	50.0%	50.0%	19.2%	19.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lag		Lead	Lead		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	None	None	None	C-Min	C-Min
Act Effct Green (s)	33.0	93.0	56.0	56.0	19.0	19.0
Actuated g/C Ratio	0.28	0.78	0.47	0.47	0.16	0.16
v/c Ratio	1.45	0.60	1.09	0.41	1.54	0.88
Control Delay	243.6	16.2	89.6	19.2	293.9	39.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	243.6	16.2	89.6	19.2	293.9	39.4
LOS	F	B	F	B	F	D
Approach Delay		112.3	73.3		173.3	
Approach LOS		F	E		F	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:, Start of Green	
Natural Cycle: 150	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.54	
Intersection Signal Delay: 112.9	Intersection LOS: F
Intersection Capacity Utilization 117.2%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 7: Pala Rd (SR-76) & I-15 NB Ramps



PM Existing + Cumulative + Project
7: Pala Rd (SR-76) & I-15 NB Ramps

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	450		0	0		50	0		800	0		0
Storage Lanes	1		0	0		1	0		1	0		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	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						0.850			0.850			
Flt Protected	0.950							0.954				
Satd. Flow (prot)	1583	1863	0	0	1863	1417	0	1777	1417	0	0	0
Flt Permitted	0.950							0.954				
Satd. Flow (perm)	1583	1863	0	0	1863	1417	0	1777	1417	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						51			256			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1271			2232			991			1241	
Travel Time (s)		28.9			50.7			22.5			28.2	
Volume (vph)	600	820	0	0	900	270	400	10	370	0	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	632	863	0	0	947	284	421	11	389	0	0	0
Lane Group Flow (vph)	632	863	0	0	947	284	0	432	389	0	0	0
v/c Ratio	1.45	0.60			1.09	0.41		1.54	0.88			
Control Delay	243.6	16.2			89.6	19.2		293.9	39.4			
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	243.6	16.2			89.6	19.2		293.9	39.4			
Queue Length 50th (ft)	~658	454			~826	115		~470	106			
Queue Length 95th (ft)	m#426	m346			#1076	187		#671	#290			
Internal Link Dist (ft)		1191			2152			911			1161	
Turn Bay Length (ft)	450					50			800			
Base Capacity (vph)	435	1444			869	688		281	440			
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	1.45	0.60			1.09	0.41		1.54	0.88			

Intersection Summary

Area Type: Other

~ 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.

LOS Engineering

PM Existing + Cumulative + Project
7: Pala Rd (SR-76) & I-15 NB Ramps

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0	4.0			
Lane Util. Factor	1.00	1.00			1.00	1.00		1.00	1.00			
Frt	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)	1583	1863			1863	1417		1776	1417			
Flt Permitted	0.95	1.00			1.00	1.00		0.95	1.00			
Satd. Flow (perm)	1583	1863			1863	1417		1776	1417			
Volume (vph)	600	820	0	0	900	270	400	10	370	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	632	863	0	0	947	284	421	11	389	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	27	0	0	215	0	0	0
Lane Group Flow (vph)	632	863	0	0	947	257	0	432	174	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Actuated Green, G (s)	33.0	93.0			56.0	56.0		19.0	19.0			
Effective Green, g (s)	33.0	93.0			56.0	56.0		19.0	19.0			
Actuated g/C Ratio	0.28	0.78			0.47	0.47		0.16	0.16			
Clearance Time (s)	4.0	4.0			4.0	4.0		4.0	4.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0		3.0	3.0			
Lane Grp Cap (vph)	435	1444			869	661		281	224			
v/s Ratio Prot	c0.40	0.46			c0.51							
v/s Ratio Perm						0.18		0.24	0.12			
v/c Ratio	1.45	0.60			1.09	0.39		1.54	0.77			
Uniform Delay, d1	43.5	5.7			32.0	20.8		50.5	48.4			
Progression Factor	1.25	2.72			1.00	1.00		1.00	1.00			
Incremental Delay, d2	205.0	0.1			57.9	0.4		258.9	22.6			
Delay (s)	259.4	15.4			89.9	21.2		309.4	71.0			
Level of Service	F	B			F	C		F	E			
Approach Delay (s)		118.5			74.1			196.5			0.0	
Approach LOS		F			E			F			A	

Intersection Summary

HCM Average Control Delay	121.2	HCM Level of Service	F
HCM Volume to Capacity ratio	1.28		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	117.2%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

PM Existing + Cumulative + Project
8: Pala Rd (SR-76) & Pankey Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	152	750	328	200	600	83	315	408	305	106	459	200
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	160	789	345	211	632	87	332	429	321	112	483	211
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	719			1135			2831	2422	962	2914	2551	675
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	719			1135			2831	2422	962	2914	2551	675
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	82			66			0	0	0	0	0	54
cM capacity (veh/h)	882			616			0	17	310	0	14	454

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	1295	929	1082	805
Volume Left	160	211	332	112
Volume Right	345	87	321	211
cSH	882	616	0	0
Volume to Capacity	0.18	0.34	Err	Err
Queue Length 95th (ft)	16	38	Err	Err
Control Delay (s)	6.0	9.5	Err	Err
Lane LOS	A	A	F	F
Approach Delay (s)	6.0	9.5	Err	Err
Approach LOS			F	F

Intersection Summary			
Average Delay		Err	
Intersection Capacity Utilization	190.3%	ICU Level of Service	H
Analysis Period (min)		15	

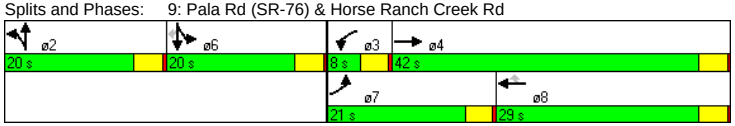
PM Existing + Cumulative + Project
9: Pala Rd (SR-76) & Horse Ranch Creek Rd

Timings

Lane Group	EBL	EBT	WBT	WBR	SBL	SBT	SBR	ø2	ø3
Lane Configurations									
Volume (vph)	689	500	550	121	82	0	370		
Turn Type	Prot			Perm	Split		Perm		
Protected Phases	7	4	8		6	6		2	3
Permitted Phases				8			6		
Detector Phases	7	4	8	8	6	6	6		
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	8.0
Total Split (s)	21.0	42.0	29.0	29.0	20.0	20.0	20.0	20.0	8.0
Total Split (%)	23.3%	46.7%	32.2%	32.2%	22.2%	22.2%	22.2%	22%	9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lag	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					Yes
Recall Mode	None	None	None	None	Min	Min	Min	Min	None
Act Effct Green (s)	17.3	37.5	16.2	16.2	9.3	9.3	9.3		
Actuated g/C Ratio	0.27	0.58	0.25	0.25	0.14	0.14	0.14		
v/c Ratio	0.88	0.26	0.65	0.28	0.40	0.26	0.27		
Control Delay	40.1	7.3	25.5	6.1	31.8	0.9	0.9		
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay	40.1	7.3	25.5	6.1	31.8	0.9	0.9		
LOS	D	A	C	A	C	A	A		
Approach Delay		26.3	22.0			6.5			
Approach LOS		C	C			A			

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 64.6	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.88	
Intersection Signal Delay: 21.2	Intersection LOS: C
Intersection Capacity Utilization 53.2%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 9: Pala Rd (SR-76) & Horse Ranch Creek Rd



PM Existing + Cumulative + Project
9: Pala Rd (SR-76) & Horse Ranch Creek Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	250		0	250		250	0		0	150		150
Storage Lanes	2		0	1		1	0		0	1		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50	50	50	50		50	50	50
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	0.95	0.91	0.95
Frt						0.850					0.850	0.850
Flt Protected	0.950									0.950		
Satd. Flow (prot)	3072	3539	0	1667	3539	1417	0	1863	0	1504	1441	1346
Flt Permitted	0.950									0.950		
Satd. Flow (perm)	3072	3539	0	1667	3539	1417	0	1863	0	1504	1441	1346
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						127					617	617
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2833			5160			734			1509	
Travel Time (s)		64.4			117.3			16.7			34.3	
Volume (vph)	689	500	0	0	550	121	0	0	0	82	0	370
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	725	526	0	0	579	127	0	0	0	86	0	389
Lane Group Flow (vph)	725	526	0	0	579	127	0	0	0	86	194	195
v/c Ratio	0.88	0.26			0.65	0.28				0.40	0.26	0.27
Control Delay	40.1	7.3			25.5	6.1				31.8	0.9	0.9
Queue Delay	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Total Delay	40.1	7.3			25.5	6.1				31.8	0.9	0.9
Queue Length 50th (ft)	138	46			104	0				32	0	0
Queue Length 95th (ft)	#303	83			167	36				78	0	0
Internal Link Dist (ft)		2753			5080			654			1429	
Turn Bay Length (ft)	250					250				150		150
Base Capacity (vph)	821	2111			1213	569				340	803	782
Starvation Cap Reductn	0	0			0	0				0	0	0
Spillback Cap Reductn	0	0			0	0				0	0	0
Storage Cap Reductn	0	0			0	0				0	0	0
Reduced v/c Ratio	0.88	0.25			0.48	0.22				0.25	0.24	0.25

Intersection Summary

Area Type: Other

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

LOS Engineering

PM Existing + Cumulative + Project
9: Pala Rd (SR-76) & Horse Ranch Creek Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0			4.0	4.0				4.0	4.0	4.0
Lane Util. Factor	0.97	0.95			0.95	1.00				0.95	0.91	0.95
Frt	1.00	1.00			1.00	0.85				1.00	0.85	0.85
Flt Protected	0.95	1.00			1.00	1.00				0.95	1.00	1.00
Satd. Flow (prot)	3072	3539			3539	1417				1504	1441	1346
Flt Permitted	0.95	1.00			1.00	1.00				0.95	1.00	1.00
Satd. Flow (perm)	3072	3539			3539	1417				1504	1441	1346
Volume (vph)	689	500	0	0	550	121	0	0	0	82	0	370
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	725	526	0	0	579	127	0	0	0	86	0	389
RTOR Reduction (vph)	0	0	0	0	0	95	0	0	0	0	166	167
Lane Group Flow (vph)	725	526	0	0	579	32	0	0	0	86	28	28
Turn Type	Prot			Prot		Perm	Split			Split		Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases						8						6
Actuated Green, G (s)	17.3	37.5			16.2	16.2				9.3	9.3	9.3
Effective Green, g (s)	17.3	37.5			16.2	16.2				9.3	9.3	9.3
Actuated g/C Ratio	0.27	0.58			0.25	0.25				0.14	0.14	0.14
Clearance Time (s)	4.0	4.0			4.0	4.0				4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0			3.0	3.0				3.0	3.0	3.0
Lane Grp Cap (vph)	825	2061			890	356				217	208	194
v/s Ratio Prot	c0.24	0.15			c0.16					c0.06	0.02	
v/s Ratio Perm						0.02						0.02
v/c Ratio	0.88	0.26			0.65	0.09				0.40	0.13	0.15
Uniform Delay, d1	22.5	6.6			21.6	18.5				25.0	24.0	24.1
Progression Factor	1.00	1.00			1.00	1.00				1.00	1.00	1.00
Incremental Delay, d2	10.5	0.1			1.7	0.1				1.2	0.3	0.3
Delay (s)	33.1	6.7			23.3	18.6				26.2	24.3	24.4
Level of Service	C	A			C	B				C	C	C
Approach Delay (s)		22.0			22.4			0.0			24.7	
Approach LOS		C			C			A			C	

Intersection Summary

HCM Average Control Delay	22.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	64.4	Sum of lost time (s)	21.6
Intersection Capacity Utilization	53.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

PM Existing + Cumulative + Project
10: Pala Rd (SR-76) & Rice Canyon Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	50	1000	1220	30	50	70
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	53	1053	1284	32	53	74
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1316				2458	1300
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1316				2458	1300
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	90				0	63
cM capacity (veh/h)	525				30	197

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	1105	1316	126
Volume Left	53	0	53
Volume Right	0	32	74
cSH	525	1700	60
Volume to Capacity	0.10	0.77	2.11
Queue Length 95th (ft)	8	0	305
Control Delay (s)	3.8	0.0	659.3
Lane LOS	A		F
Approach Delay (s)	3.8	0.0	659.3
Approach LOS			F

Intersection Summary			
Average Delay	34.3		
Intersection Capacity Utilization	107.9%	ICU Level of Service	G
Analysis Period (min)	15		

LOS Engineering

PM Existing + Cumulative + Project
11: Pala Rd (SR-76) & Couser Canyon Rd

HCM Unsignalized Intersection Capacity Analysis

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	890	70	30	1150	60	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	937	74	32	1211	63	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			1011		2247	974
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1011		2247	974
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			95		0	97
cM capacity (veh/h)			686		44	306

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	1011	1242	74
Volume Left	0	32	63
Volume Right	74	0	11
cSH	1700	686	50
Volume to Capacity	0.59	0.05	1.48
Queue Length 95th (ft)	0	4	174
Control Delay (s)	0.0	1.9	427.4
Lane LOS		A	F
Approach Delay (s)	0.0	1.9	427.4
Approach LOS			F

Intersection Summary			
Average Delay	14.6		
Intersection Capacity Utilization	95.7%	ICU Level of Service	F
Analysis Period (min)	15		

LOS Engineering

PM Existing + Cumulative + Project

12: Pala Mesa Dr & Old Hwy 395

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	150	150	200	174	181	227	110	810	189	194	480	80
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	158	158	211	183	191	239	116	853	199	204	505	84
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2374	2239	547	2387	2182	952	589			1052		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2374	2239	547	2387	2182	952	589			1052		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	0	61	0	0	24	88			69		
cM capacity (veh/h)	0	26	537	0	28	315	986			662		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	526	183	429	116	1052	204	589
Volume Left	158	183	0	116	0	204	0
Volume Right	211	0	239	0	199	0	84
cSH	0	0	57	986	1700	662	1700
Volume to Capacity	Err	Err	7.55	0.12	0.62	0.31	0.35
Queue Length 95th (ft)	Err	Err	Err	10	0	33	0
Control Delay (s)	Err	Err	Err	9.1	0.0	12.8	0.0
Lane LOS	F	F	F	A		B	
Approach Delay (s)	Err	Err		0.9		3.3	
Approach LOS	F	F					

Intersection Summary				
Average Delay		Err		
Intersection Capacity Utilization	131.3%		ICU Level of Service	H
Analysis Period (min)		15		

LOS Engineering

PM Existing + Cumulative + Project

14: Stewart Canyon Rd & Old Hwy 395

HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Volume (veh/h)	10	16	30	26	6	357	60	710	26	469	690	80
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	17	32	27	6	376	63	747	27	494	726	84
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	3008	2657	768	2641	2685	761	811			775		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	3008	2657	768	2641	2685	761	811			775		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	0	92	0	24	7	92			41		
cM capacity (veh/h)	0	9	401	0	8	405	815			841		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	59	409	63	775	494	811
Volume Left	11	27	63	0	494	0
Volume Right	32	376	0	27	0	84
cSH	1	0	815	1700	841	1700
Volume to Capacity	84.45	Err	0.08	0.46	0.59	0.48
Queue Length 95th (ft)	Err	Err	6	0	98	0
Control Delay (s)	Err	Err	9.8	0.0	15.2	0.0
Lane LOS	F	F	A		C	
Approach Delay (s)	Err	Err	0.7		5.7	
Approach LOS	F	F				

Intersection Summary				
Average Delay		Err		
Intersection Capacity Utilization	104.3%		ICU Level of Service	G
Analysis Period (min)		15		

LOS Engineering

PM Existing + Cumulative + Project
15: Reche Rd & Old Hwy 395 — HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	290	250	870	330	210	350
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	305	263	916	347	221	368
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2584	405	589			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2584	405	589			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	59	7			
cM capacity (veh/h)	2	646	986			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	568	916	347	589
Volume Left	305	916	0	0
Volume Right	263	0	0	368
cSH	4	986	1700	1700
Volume to Capacity	153.72	0.93	0.20	0.35
Queue Length 95th (ft)	Err	367	0	0
Control Delay (s)	Err	34.9	0.0	0.0
Lane LOS	F	D		
Approach Delay (s)	Err	25.3		0.0
Approach LOS	F			

Intersection Summary			
Average Delay	2360.8		
Intersection Capacity Utilization	131.5%	ICU Level of Service	H
Analysis Period (min)	15		

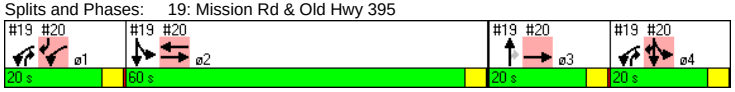
LOS Engineering

PM Existing + Cumulative + Project
19: Mission Rd & Old Hwy 395 — Timings

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	ø1	ø4
Lane Configurations								
Volume (vph)	380	840	120	280	1050	70		
Turn Type		Free		pm+ov	Split			
Protected Phases	1 4		3	1 4	2	2	1	4
Permitted Phases		Free		3				
Detector Phases	1 4		3	1 4	2	2		
Minimum Initial (s)			4.0		4.0	4.0	4.0	4.0
Minimum Split (s)			20.0		20.0	20.0	8.0	20.0
Total Split (s)	40.0	0.0	20.0	40.0	60.0	60.0	20.0	20.0
Total Split (%)	33.3%	0.0%	16.7%	33.3%	50.0%	50.0%	17%	17%
Yellow Time (s)			3.5		3.5	3.5	3.5	3.5
All-Red Time (s)			0.5		0.5	0.5	0.5	0.5
Lead/Lag			Lead		Lag	Lag	Lead	Lag
Lead-Lag Optimize?			Yes		Yes	Yes	Yes	Yes
Recall Mode			None		Min	Min	None	None
Act Effct Green (s)	36.0	120.0	16.0	56.0	56.0	56.0		
Actuated g/C Ratio	0.30	1.00	0.13	0.47	0.47	0.47		
v/c Ratio	0.84	0.62	0.51	0.45	1.50	0.09		
Control Delay	54.3	1.9	56.3	24.3	257.6	18.2		
Queue Delay	5.1	0.0	0.0	1.8	14.8	0.0		
Total Delay	59.4	1.9	56.3	26.1	272.4	18.2		
LOS	E	A	E	C	F	B		
Approach Delay	19.8		35.1			256.5		
Approach LOS	B		D			F		

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.50	
Intersection Signal Delay: 118.8	Intersection LOS: F
Intersection Capacity Utilization 101.9%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 19: Mission Rd & Old Hwy 395



LOS Engineering

PM Existing + Cumulative + Project
19: Mission Rd & Old Hwy 395 — Queues

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1700	1700	1900	1700	1700	1900
Storage Length (ft)	0	130		210	100	
Storage Lanes	1	1		1	1	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1583	1417	1863	1417	1583	1863
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1583	1417	1863	1417	1583	1863
Right Turn on Red		No		No		
Satd. Flow (RTOR)						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30		30			30
Link Distance (ft)	434		4960			1035
Travel Time (s)	9.9		112.7			23.5
Volume (vph)	380	840	120	280	1050	70
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	400	884	126	295	1105	74
Lane Group Flow (vph)	400	884	126	295	1105	74
v/c Ratio	0.84	0.62	0.51	0.45	1.50	0.09
Control Delay	54.3	1.9	56.3	24.3	257.6	18.2
Queue Delay	5.1	0.0	0.0	1.8	14.8	0.0
Total Delay	59.4	1.9	56.3	26.1	272.4	18.2
Queue Length 50th (ft)	281	27	92	150	~1186	31
Queue Length 95th (ft)	m325	m0	156	229	#1444	60
Internal Link Dist (ft)	354		4880			955
Turn Bay Length (ft)		130		210	100	
Base Capacity (vph)	475	1417	248	661	739	869
Starvation Cap Reductn	39	0	0	0	0	0
Spillback Cap Reductn	0	0	0	220	16	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.92	0.62	0.51	0.67	1.53	0.09

Intersection Summary

Area Type: Other

~ 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.

LOS Engineering

PM Existing + Cumulative + Project
19: Mission Rd & Old Hwy 395 — HCM Signalized Intersection Capacity Analysis

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1700	1700	1900	1700	1700	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1583	1417	1863	1417	1583	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1583	1417	1863	1417	1583	1863
Volume (vph)	380	840	120	280	1050	70
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	400	884	126	295	1105	74
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	400	884	126	295	1105	74
Turn Type		Free		pm+ov	Split	
Protected Phases	1 4		3	1 4	2	2
Permitted Phases		Free		3		
Actuated Green, G (s)	36.0	120.0	16.0	52.0	56.0	56.0
Effective Green, g (s)	36.0	120.0	16.0	52.0	56.0	56.0
Actuated g/C Ratio	0.30	1.00	0.13	0.43	0.47	0.47
Clearance Time (s)			4.0		4.0	4.0
Vehicle Extension (s)			3.0		3.0	3.0
Lane Grp Cap (vph)	475	1417	248	661	739	869
v/s Ratio Prot	c0.25		0.07	0.13	c0.70	0.04
v/s Ratio Perm		c0.62		0.07		
v/c Ratio	0.84	0.62	0.51	0.45	1.50	0.09
Uniform Delay, d1	39.3	0.0	48.3	23.9	32.0	17.8
Progression Factor	1.14	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.6	1.0	1.6	0.5	230.0	0.0
Delay (s)	51.5	1.0	50.0	24.4	262.0	17.8
Level of Service	D	A	D	C	F	B
Approach Delay (s)	16.7		32.0			246.7
Approach LOS	B		C			F

Intersection Summary

HCM Average Control Delay	113.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	101.9%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

PM Existing + Cumulative + Project
20: Mission Rd & I-15 SB Ramps

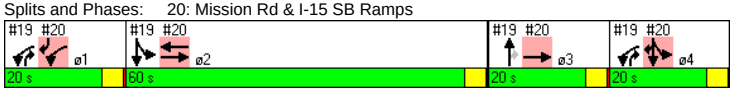
Timings

Lane Group	EBT	WBL	WBT	SBT	SBR	ø3
Lane Configurations						
Volume (vph)	1260	80	500	10	720	
Turn Type		Prot			custom	
Protected Phases	2 3	1	2	4	1 4	3
Permitted Phases					4	
Detector Phases	2 3	1	2	4	1 4	
Minimum Initial (s)		4.0	4.0	4.0		4.0
Minimum Split (s)		8.0	20.0	20.0		20.0
Total Split (s)	80.0	20.0	60.0	20.0	40.0	20.0
Total Split (%)	66.7%	16.7%	50.0%	16.7%	33.3%	17%
Yellow Time (s)		3.5	3.5	3.5		3.5
All-Red Time (s)		0.5	0.5	0.5		0.5
Lead/Lag		Lead	Lag	Lag		Lead
Lead-Lag Optimize?		Yes	Yes	Yes		Yes
Recall Mode		None	Min	None		None
Act Effct Green (s)	76.0	16.0	56.0	16.0	36.0	
Actuated g/C Ratio	0.63	0.13	0.47	0.13	0.30	
v/c Ratio	1.21	0.40	0.61	0.09	1.04	
Control Delay	111.3	53.9	27.5	46.8	61.1	
Queue Delay	137.7	0.0	0.0	0.6	46.7	
Total Delay	249.0	53.9	27.5	47.4	107.8	
LOS	F	D	C	D	F	
Approach Delay	249.0		31.1	106.0		
Approach LOS	F		C	F		

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Natural Cycle: 150
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.50
Intersection Signal Delay: 162.0 — Intersection LOS: F
Intersection Capacity Utilization 84.3% — ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 20: Mission Rd & I-15 SB Ramps



PM Existing + Cumulative + Project
20: Mission Rd & I-15 SB Ramps

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	0		0	285		0	0		0	0		200
Storage Lanes	0		0	1		0	0		0	0		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50		50	50					50	50	50
Trailing Detector (ft)		0		0	0					0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	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		0.991										0.850
Flt Protected				0.950							0.976	
Satd. Flow (prot)	0	1846	0	1583	1863	0	0	0	0	0	1818	1417
Flt Permitted				0.950							0.976	
Satd. Flow (perm)	0	1846	0	1583	1863	0	0	0	0	0	1818	1417
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		6										438
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		434			744			972			897	
Travel Time (s)		9.9			16.9			22.1			20.4	
Volume (vph)	0	1260	90	80	500	0	0	0	0	10	10	720
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1326	95	84	526	0	0	0	0	11	11	758
Lane Group Flow (vph)	0	1421	0	84	526	0	0	0	0	0	22	758
v/c Ratio		1.21		0.40	0.61						0.09	1.04
Control Delay		111.3		53.9	27.5						46.8	61.1
Queue Delay		137.7		0.0	0.0						0.6	46.7
Total Delay		249.0		53.9	27.5						47.4	107.8
Queue Length 50th (ft)		~1350		60	295						15	~377
Queue Length 95th (ft)		m160		113	412						41	#618
Internal Link Dist (ft)		354			664			892			817	
Turn Bay Length (ft)				285								200
Base Capacity (vph)		1171		211	869						242	732
Starvation Cap Reductn		173		0	0						0	0
Spillback Cap Reductn		237		0	0						108	75
Storage Cap Reductn		0		0	0						0	0
Reduced v/c Ratio		1.52		0.40	0.61						0.16	1.15

Intersection Summary

Area Type: Other
~ 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.

PM Existing + Cumulative + Project
20: Mission Rd & I-15 SB Ramps

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)		4.0		4.0	4.0						4.0	4.0
Lane Util. Factor		1.00		1.00	1.00						1.00	1.00
Frt		0.99		1.00	1.00						1.00	0.85
Flt Protected		1.00		0.95	1.00						0.98	1.00
Satd. Flow (prot)		1846		1583	1863						1817	1417
Flt Permitted		1.00		0.95	1.00						0.98	1.00
Satd. Flow (perm)		1846		1583	1863						1817	1417
Volume (vph)	0	1260	90	80	500	0	0	0	0	10	10	720
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1326	95	84	526	0	0	0	0	11	11	758
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	0	0	0	307
Lane Group Flow (vph)	0	1419	0	84	526	0	0	0	0	0	22	451
Turn Type				Prot						Split		custom
Protected Phases		2 3		1	2					4	4	1 4
Permitted Phases												4
Actuated Green, G (s)		76.0		16.0	56.0						16.0	36.0
Effective Green, g (s)		76.0		16.0	56.0						16.0	36.0
Actuated g/C Ratio		0.63		0.13	0.47						0.13	0.30
Clearance Time (s)				4.0	4.0						4.0	
Vehicle Extension (s)				3.0	3.0						3.0	
Lane Grp Cap (vph)		1169		211	869						242	425
v/s Ratio Prot		c0.77		0.05	0.28						0.01	c0.32
v/s Ratio Perm												
v/c Ratio		1.21		0.40	0.61						0.09	1.06
Uniform Delay, d1		22.0		47.6	23.8						45.6	42.0
Progression Factor		0.38		1.00	1.00						1.00	1.00
Incremental Delay, d2		96.9		1.2	1.2						0.2	61.1
Delay (s)		105.3		48.8	25.0						45.8	103.1
Level of Service		F		D	C						D	F
Approach Delay (s)		105.3			28.3			0.0			101.5	
Approach LOS		F			C			A			F	

Intersection Summary			
HCM Average Control Delay	87.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.16		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	84.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

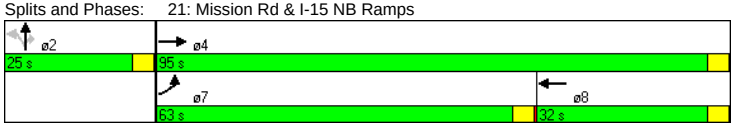
PM Existing + Cumulative + Project
21: Mission Rd & I-15 NB Ramps

Timings

Lane Group	EBL	EBT	WBT	NBT	NBR
Lane Configurations					
Volume (vph)	950	290	230	10	170
Turn Type	Prot				Perm
Protected Phases	7	4	8	2	
Permitted Phases					2
Detector Phases	7	4	8	2	2
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0
Total Split (s)	63.0	95.0	32.0	25.0	25.0
Total Split (%)	52.5%	79.2%	26.7%	20.8%	20.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Recall Mode	None	None	None	Min	Min
Act Effct Green (s)	59.1	83.2	20.1	21.0	21.0
Actuated g/C Ratio	0.53	0.74	0.18	0.19	0.19
v/c Ratio	1.20	0.22	0.76	1.14	0.46
Control Delay	128.6	4.9	58.2	134.7	13.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	128.6	4.9	58.2	134.7	13.7
LOS	F	A	E	F	B
Approach Delay		99.7	58.2	95.9	
Approach LOS		F	E	F	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 112.3	
Natural Cycle: 140	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.20	
Intersection Signal Delay: 93.7	Intersection LOS: F
Intersection Capacity Utilization 101.5%	ICU Level of Service G
Analysis Period (min) 15	

Splits and Phases: 21: Mission Rd & I-15 NB Ramps



PM Existing + Cumulative + Project
21: Mission Rd & I-15 NB Ramps

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	300		0	0		0	0		200	0		0
Storage Lanes	1		0	0		0	0		1	0		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50		50	50	50			
Trailing Detector (ft)	0	0			0		0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	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					0.994				0.850			
Flt Protected	0.950							0.954				
Satd. Flow (prot)	1583	1863	0	0	1852	0	0	1777	1417	0	0	0
Flt Permitted	0.950							0.954				
Satd. Flow (perm)	1583	1863	0	0	1852	0	0	1777	1417	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					2				155			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		744			1271			1082			1005	
Travel Time (s)		16.9			28.9			24.6			22.8	
Volume (vph)	950	290	0	0	230	10	350	10	170	0	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1000	305	0	0	242	11	368	11	179	0	0	0
Lane Group Flow (vph)	1000	305	0	0	253	0	0	379	179	0	0	0
v/c Ratio	1.20	0.22			0.76			1.14	0.46			
Control Delay	128.6	4.9			58.2			134.7	13.7			
Queue Delay	0.0	0.0			0.0			0.0	0.0			
Total Delay	128.6	4.9			58.2			134.7	13.7			
Queue Length 50th (ft)	~879	58			174			~320	14			
Queue Length 95th (ft)	#1238	86			262			#554	84			
Internal Link Dist (ft)		664			1191			1002			925	
Turn Bay Length (ft)	300								200			
Base Capacity (vph)	833	1413			434			333	391			
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	1.20	0.22			0.58			1.14	0.46			

Intersection Summary

Area Type: Other

~ 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.

LOS Engineering

PM Existing + Cumulative + Project
21: Mission Rd & I-15 NB Ramps

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0			4.0			4.0	4.0			
Lane Util. Factor	1.00	1.00			1.00			1.00	1.00			
Frt	1.00	1.00			0.99			1.00	0.85			
Flt Protected	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (prot)	1583	1863			1852			1776	1417			
Flt Permitted	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (perm)	1583	1863			1852			1776	1417			
Volume (vph)	950	290	0	0	230	10	350	10	170	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1000	305	0	0	242	11	368	11	179	0	0	0
RTOR Reduction (vph)	0	0	0	0	2	0	0	0	126	0	0	0
Lane Group Flow (vph)	1000	305	0	0	251	0	0	379	53	0	0	0
Turn Type	Prot						Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases							2		2			
Actuated Green, G (s)	59.1	83.3			20.2			21.0	21.0			
Effective Green, g (s)	59.1	83.3			20.2			21.0	21.0			
Actuated g/C Ratio	0.53	0.74			0.18			0.19	0.19			
Clearance Time (s)	4.0	4.0			4.0			4.0	4.0			
Vehicle Extension (s)	3.0	3.0			3.0			3.0	3.0			
Lane Grp Cap (vph)	833	1382			333			332	265			
v/s Ratio Prot	c0.63	0.16			c0.14							
v/s Ratio Perm								0.21	0.04			
v/c Ratio	1.20	0.22			0.75			1.14	0.20			
Uniform Delay, d1	26.6	4.5			43.7			45.6	38.6			
Progression Factor	1.00	1.00			1.00			1.00	1.00			
Incremental Delay, d2	101.7	0.1			9.4			93.5	0.4			
Delay (s)	128.3	4.6			53.1			139.1	38.9			
Level of Service	F	A			D			F	D			
Approach Delay (s)		99.4			53.1			107.0			0.0	
Approach LOS		F			D			F			A	

Intersection Summary

HCM Average Control Delay	95.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	112.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	101.5%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

PM Existing + Cumulative + Project
22: Stewart Canyon Rd & Horse Ranch Creek Rd — HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Yield			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	19	484	343	23	17	38
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	20	509	361	24	18	40
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	784	38	58			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	784	38	58			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	93	51	77			
cM capacity (veh/h)	277	1034	1546			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	529	385	58
Volume Left	20	361	0
Volume Right	509	0	40
cSH	937	1546	1700
Volume to Capacity	0.56	0.23	0.03
Queue Length 95th (ft)	91	23	0
Control Delay (s)	13.7	7.7	0.0
Lane LOS	B	A	
Approach Delay (s)	13.7	7.7	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	10.5		
Intersection Capacity Utilization	64.5%	ICU Level of Service	C
Analysis Period (min)	15		

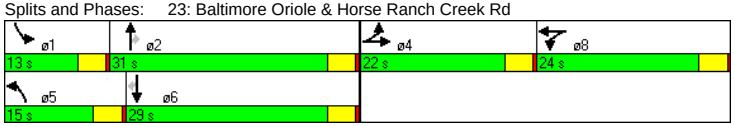
LOS Engineering

PM Existing + Cumulative + Project
23: Baltimore Oriole & Horse Ranch Creek Rd — Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	24	7	246	15	52	296	285	66	387	43
Turn Type	Split		Split		Prot		Perm	Prot		Perm
Protected Phases	4	4	8	8	5	2		1	6	
Permitted Phases							2			6
Detector Phases	4	4	8	8	5	2	2	1	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0	20.0
Total Split (s)	22.0	22.0	24.0	24.0	15.0	31.0	31.0	13.0	29.0	29.0
Total Split (%)	24.4%	24.4%	26.7%	26.7%	16.7%	34.4%	34.4%	14.4%	32.2%	32.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag					Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	7.4	7.4	12.6	12.6	8.3	30.4	30.4	8.4	33.5	33.5
Actuated g/C Ratio	0.11	0.11	0.20	0.20	0.12	0.49	0.49	0.13	0.54	0.54
v/c Ratio	0.15	0.09	0.51	0.49	0.29	0.35	0.36	0.35	0.41	0.06
Control Delay	31.1	21.6	26.6	23.3	30.8	15.7	3.9	31.0	15.6	6.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.1	21.6	26.6	23.3	30.8	15.7	3.9	31.0	15.6	6.7
LOS	C	C	C	C	C	B	A	C	B	A
Approach Delay		27.1		24.8		11.6			16.9	
Approach LOS		C		C		B			B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 62.6	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.51	
Intersection Signal Delay: 16.5	Intersection LOS: B
Intersection Capacity Utilization 48.8%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 23: Baltimore Oriole & Horse Ranch Creek Rd



LOS Engineering

PM Existing + Cumulative + Project
23: Baltimore Oriole & Horse Ranch Creek Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	50
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.908			0.963				0.850			0.850
Flt Protected	0.950			0.950	0.968		0.950			0.950		
Satd. Flow (prot)	1583	1691	0	1504	1650	0	1583	1863	1417	1583	1863	1417
Flt Permitted	0.950			0.950	0.968		0.950			0.950		
Satd. Flow (perm)	1583	1691	0	1504	1650	0	1583	1863	1417	1583	1863	1417
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			17				300			45
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1047			1324			958			2343	
Travel Time (s)		23.8			30.1			21.8			53.3	
Volume (vph)	24	7	10	246	15	39	52	296	285	66	387	43
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	25	7	11	259	16	41	55	312	300	69	407	45
Lane Group Flow (vph)	25	18	0	151	165	0	55	312	300	69	407	45
v/c Ratio	0.15	0.09		0.51	0.49		0.29	0.35	0.36	0.35	0.41	0.06
Control Delay	31.1	21.6		26.6	23.3		30.8	15.7	3.9	31.0	15.6	6.7
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.1	21.6		26.6	23.3		30.8	15.7	3.9	31.0	15.6	6.7
Queue Length 50th (ft)	5	1		31	30		11	59	0	14	41	0
Queue Length 95th (ft)	34	22		124	123		58	194	51	71	274	22
Internal Link Dist (ft)		967			1244			878			2263	
Turn Bay Length (ft)												
Base Capacity (vph)	390	425		471	529		269	1057	934	241	1073	836
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	0.06	0.04		0.32	0.31		0.20	0.30	0.32	0.29	0.38	0.05

Intersection Summary

Area Type: Other

LOS Engineering

PM Existing + Cumulative + Project
23: Baltimore Oriole & Horse Ranch Creek Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
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	1.00		0.95	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.91		1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.97		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1583	1692		1504	1650		1583	1863	1417	1583	1863	1417
Flt Permitted	0.95	1.00		0.95	0.97		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1583	1692		1504	1650		1583	1863	1417	1583	1863	1417
Volume (vph)	24	7	10	246	15	39	52	296	285	66	387	43
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	25	7	11	259	16	41	55	312	300	69	407	45
RTOR Reduction (vph)	0	11	0	0	14	0	0	0	160	0	0	23
Lane Group Flow (vph)	25	7	0	151	151	0	55	312	140	69	407	22
Turn Type	Split			Split			Prot		Perm	Prot		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	2.7	2.7		11.6	11.6		3.3	31.1	31.1	5.2	33.0	33.0
Effective Green, g (s)	2.7	2.7		11.6	11.6		3.3	31.1	31.1	5.2	33.0	33.0
Actuated g/C Ratio	0.04	0.04		0.17	0.17		0.05	0.47	0.47	0.08	0.50	0.50
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	64	69		262	287		78	870	662	124	923	702
v/s Ratio Prot	c0.02	0.00		c0.10	0.09		0.03	0.17		c0.04	c0.22	
v/s Ratio Perm									0.10			0.02
v/c Ratio	0.39	0.11		0.58	0.53		0.71	0.36	0.21	0.56	0.44	0.03
Uniform Delay, d1	31.1	30.8		25.2	25.0		31.2	11.4	10.5	29.6	10.8	8.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.9	0.7		3.1	1.7		25.1	0.3	0.2	5.3	0.3	0.0
Delay (s)	35.1	31.5		28.3	26.7		56.2	11.6	10.7	34.9	11.2	8.6
Level of Service	D	C		C	C		E	B	B	C	B	A
Approach Delay (s)		33.6			27.5			14.9			14.1	
Approach LOS		C			C			B			B	

Intersection Summary

HCM Average Control Delay	17.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	66.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	48.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

PM Existing + Cumulative + Project
24: Longspur Rd & Horse Ranch Creek Rd

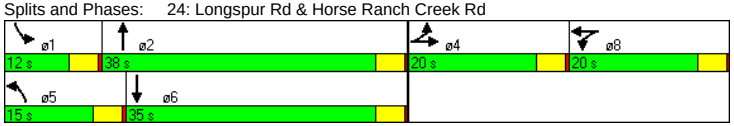
Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	6	36	301	35	127	591	52	545
Turn Type	Split		Split		Prot		Prot	
Protected Phases	4	4	8	8	5	2	1	6
Permitted Phases								
Detector Phases	4	4	8	8	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	20.0	20.0	20.0	20.0	15.0	38.0	12.0	35.0
Total Split (%)	22.2%	22.2%	22.2%	22.2%	16.7%	42.2%	13.3%	38.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Max	None	Max
Act Effct Green (s)	7.7	7.7	13.3	13.3	9.9	39.4	7.2	34.8
Actuated g/C Ratio	0.10	0.10	0.17	0.17	0.13	0.51	0.09	0.45
v/c Ratio	0.04	0.45	0.72	0.70	0.68	0.52	0.39	0.39
Control Delay	33.3	23.1	47.3	42.2	52.3	15.3	44.3	18.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.3	23.1	47.3	42.2	52.3	15.3	44.3	18.0
LOS	C	C	D	D	D	B	D	B
Approach Delay		23.7		44.6		20.0		20.1
Approach LOS		C		D		C		C

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 76.8
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.72
Intersection Signal Delay: 24.6 Intersection LOS: C
Intersection Capacity Utilization 56.0% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 24: Longspur Rd & Horse Ranch Creek Rd



LOS Engineering

PM Existing + Cumulative + Project
24: Longspur Rd & Horse Ranch Creek Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.908			0.969			0.951			0.987	
Flt Protected	0.950			0.950	0.970		0.950			0.950		
Satd. Flow (prot)	1583	1691	0	1504	1663	0	1583	3366	0	1583	3493	0
Flt Permitted	0.950			0.950	0.970		0.950			0.950		
Satd. Flow (perm)	1583	1691	0	1504	1663	0	1583	3366	0	1583	3493	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		61			13			104			12	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1010			908			1206			958	
Travel Time (s)		23.0			20.6			27.4			21.8	
Volume (vph)	6	36	58	301	35	41	127	591	285	52	545	51
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	6	38	61	317	37	43	134	622	300	55	574	54
Lane Group Flow (vph)	6	99	0	187	210	0	134	922	0	55	628	0
v/c Ratio	0.04	0.45		0.72	0.70		0.68	0.52		0.39	0.39	
Control Delay	33.3	23.1		47.3	42.2		52.3	15.3		44.3	18.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	33.3	23.1		47.3	42.2		52.3	15.3		44.3	18.0	
Queue Length 50th (ft)	3	18		92	96		65	165		27	120	
Queue Length 95th (ft)	14	63		#190	#188		#147	250		65	183	
Internal Link Dist (ft)		930			828			1126			878	
Turn Bay Length (ft)												
Base Capacity (vph)	292	362		306	349		218	1776		156	1590	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.02	0.27		0.61	0.60		0.61	0.52		0.35	0.39	

Intersection Summary

Area Type: Other
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

LOS Engineering

PM Existing + Cumulative + Project
24: Longspur Rd & Horse Ranch Creek Rd — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		0.95	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.91		1.00	0.97		1.00	0.95		1.00	0.99	
Flt Protected	0.95	1.00		0.95	0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	1691		1504	1664		1583	3366		1583	3494	
Flt Permitted	0.95	1.00		0.95	0.97		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	1691		1504	1664		1583	3366		1583	3494	
Volume (vph)	6	36	58	301	35	41	127	591	285	52	545	51
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	6	38	61	317	37	43	134	622	300	55	574	54
RTOR Reduction (vph)	0	56	0	0	11	0	0	52	0	0	7	0
Lane Group Flow (vph)	6	43	0	187	199	0	134	870	0	55	621	0
Turn Type	Split			Split			Prot			Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	6.3	6.3		13.3	13.3		8.2	39.3		4.4	35.5	
Effective Green, g (s)	6.3	6.3		13.3	13.3		8.2	39.3		4.4	35.5	
Actuated g/C Ratio	0.08	0.08		0.17	0.17		0.10	0.50		0.06	0.45	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	126	134		252	279		164	1668		88	1564	
v/s Ratio Prot	0.00	c0.03		c0.12	0.12		c0.08	c0.26		0.03	0.18	
v/s Ratio Perm												
v/c Ratio	0.05	0.32		0.74	0.71		0.82	0.52		0.62	0.40	
Uniform Delay, d1	33.7	34.5		31.4	31.2		34.8	13.6		36.6	14.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	1.4		11.2	8.4		25.9	1.2		13.0	0.8	
Delay (s)	33.9	35.9		42.5	39.6		60.8	14.8		49.7	15.5	
Level of Service	C	D		D	D		E	B		D	B	
Approach Delay (s)		35.7			41.0			20.6			18.2	
Approach LOS		D			D			C			B	

Intersection Summary			
HCM Average Control Delay	24.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	79.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	56.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

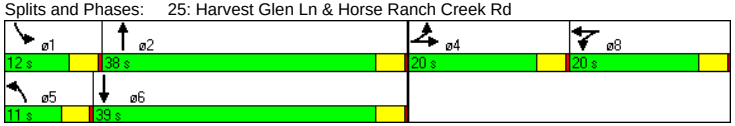
LOS Engineering

PM Existing + Cumulative + Project
25: Harvest Glen Ln & Horse Ranch Creek Rd — Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	1	26	324	31	40	909	134	768
Turn Type	Split		Split		Prot		Prot	
Protected Phases	4	4	8	8	5	2	1	6
Permitted Phases								
Detector Phases	4	4	8	8	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	20.0	20.0	20.0	20.0	11.0	38.0	12.0	39.0
Total Split (%)	22.2%	22.2%	22.2%	22.2%	12.2%	42.2%	13.3%	43.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	6.8	6.8	14.3	14.3	6.5	33.8	8.1	39.9
Actuated g/C Ratio	0.09	0.09	0.19	0.19	0.08	0.45	0.11	0.53
v/c Ratio	0.01	0.23	0.77	0.75	0.32	0.85	0.82	0.43
Control Delay	33.0	30.2	49.4	41.6	42.1	25.4	72.8	14.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.0	30.2	49.4	41.6	42.1	25.4	72.8	14.5
LOS	C	C	D	D	D	C	E	B
Approach Delay		30.3		45.3		25.9		23.2
Approach LOS		C		D		C		C

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 74.8	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 28.3	Intersection LOS: C
Intersection Capacity Utilization 74.0%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 25: Harvest Glen Ln & Horse Ranch Creek Rd



LOS Engineering

PM Existing + Cumulative + Project
25: Harvest Glen Ln & Horse Ranch Creek Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.957			0.941			0.958			0.999	
Flt Protected	0.950			0.950	0.977		0.950			0.950		
Satd. Flow (prot)	1583	1783	0	1504	1627	0	1583	3391	0	1583	3536	0
Flt Permitted	0.950			0.950	0.977		0.950			0.950		
Satd. Flow (perm)	1583	1783	0	1504	1627	0	1583	3391	0	1583	3536	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			31			73			1	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1058			1173			1033			1206	
Travel Time (s)		24.0			26.7			23.5			27.4	
Volume (vph)	1	26	10	324	31	94	40	909	353	134	768	4
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1	27	11	341	33	99	42	957	372	141	808	4
Lane Group Flow (vph)	1	38	0	221	252	0	42	1329	0	141	812	0
v/c Ratio	0.01	0.23		0.77	0.75		0.32	0.85		0.82	0.43	
Control Delay	33.0	30.2		49.4	41.6		42.1	25.4		72.8	14.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	33.0	30.2		49.4	41.6		42.1	25.4		72.8	14.5	
Queue Length 50th (ft)	1	13		111	110		20	304		72	152	
Queue Length 95th (ft)	5	42		#230	#231		52	#471		#183	216	
Internal Link Dist (ft)		978			1093			953			1126	
Turn Bay Length (ft)												
Base Capacity (vph)	289	334		317	368		140	1586		172	1886	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.00	0.11		0.70	0.68		0.30	0.84		0.82	0.43	

Intersection Summary

Area Type: Other

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

LOS Engineering

PM Existing + Cumulative + Project
25: Harvest Glen Ln & Horse Ranch Creek Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		0.95	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.96		1.00	0.94		1.00	0.96		1.00	1.00	
Flt Protected	0.95	1.00		0.95	0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	1782		1504	1627		1583	3391		1583	3537	
Flt Permitted	0.95	1.00		0.95	0.98		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	1782		1504	1627		1583	3391		1583	3537	
Volume (vph)	1	26	10	324	31	94	40	909	353	134	768	4
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1	27	11	341	33	99	42	957	372	141	808	4
RTOR Reduction (vph)	0	10	0	0	25	0	0	40	0	0	0	0
Lane Group Flow (vph)	1	28	0	221	227	0	42	1289	0	141	812	0
Turn Type	Split			Split			Prot			Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	4.2	4.2		14.3	14.3		3.8	35.6		8.1	39.9	
Effective Green, g (s)	4.2	4.2		14.3	14.3		3.8	35.6		8.1	39.9	
Actuated g/C Ratio	0.05	0.05		0.18	0.18		0.05	0.46		0.10	0.51	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	85	96		275	298		77	1544		164	1805	
v/s Ratio Prot	0.00	c0.02		c0.15	0.14		0.03	c0.38		c0.09	0.23	
v/s Ratio Perm												
v/c Ratio	0.01	0.29		0.80	0.76		0.55	0.83		0.86	0.45	
Uniform Delay, d1	35.0	35.6		30.6	30.3		36.4	18.7		34.5	12.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	1.7		15.5	10.9		7.7	4.1		33.4	0.2	
Delay (s)	35.1	37.2		46.1	41.2		44.0	22.8		67.9	12.4	
Level of Service	D	D		D	D		D	C		E	B	
Approach Delay (s)		37.2			43.5			23.4			20.6	
Approach LOS		D			D			C			C	

Intersection Summary

HCM Average Control Delay	26.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	78.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	74.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

PM Existing + Cumulative + Project
26: Pardee South Loop & Horse Ranch Creek Rd

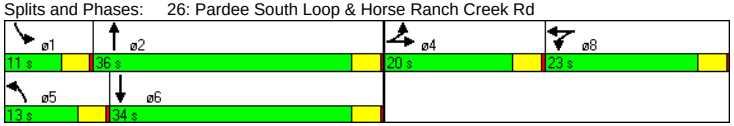
Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	35	0	118	0	76	1194	151	879
Turn Type	Split		Split		Prot		Prot	
Protected Phases	4	4	8	8	5	2	1	6
Permitted Phases								
Detector Phases	4	4	8	8	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	20.0	20.0	23.0	23.0	13.0	36.0	11.0	34.0
Total Split (%)	22.2%	22.2%	25.6%	25.6%	14.4%	40.0%	12.2%	37.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	7.4	7.4	9.9	9.9	8.0	38.7	7.1	43.0
Actuated g/C Ratio	0.10	0.10	0.13	0.13	0.10	0.53	0.10	0.59
v/c Ratio	0.25	0.04	0.46	0.40	0.48	0.81	1.03	0.49
Control Delay	34.9	0.2	36.2	16.0	41.4	22.9	118.7	15.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.9	0.2	36.2	16.0	41.4	22.9	118.7	15.0
LOS	C	A	D	B	D	C	F	B
Approach Delay		24.0		25.2		23.8		29.2
Approach LOS		C		C		C		C

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 73.2
Natural Cycle: 100
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.03
Intersection Signal Delay: 26.0 Intersection LOS: C
Intersection Capacity Utilization 71.7% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 26: Pardee South Loop & Horse Ranch Creek Rd



LOS Engineering

PM Existing + Cumulative + Project
26: Pardee South Loop & Horse Ranch Creek Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.850			0.894			0.976			0.988	
Flt Protected	0.950			0.950	0.986		0.950			0.950		
Satd. Flow (prot)	1583	1583	0	1504	1560	0	1583	3454	0	1583	3497	0
Flt Permitted	0.950			0.950	0.986		0.950			0.950		
Satd. Flow (perm)	1583	1583	0	1504	1560	0	1583	3454	0	1583	3497	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		324			77			27			11	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		869			1419			1340			1033	
Travel Time (s)		19.8			32.3			30.5			23.5	
Volume (vph)	35	0	16	118	0	73	76	1194	226	151	879	75
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	37	0	17	124	0	77	80	1257	238	159	925	79
Lane Group Flow (vph)	37	17	0	92	109	0	80	1495	0	159	1004	0
v/c Ratio	0.25	0.04		0.46	0.40		0.48	0.81		1.03	0.49	
Control Delay	34.9	0.2		36.2	16.0		41.4	22.9		118.7	15.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	34.9	0.2		36.2	16.0		41.4	22.9		118.7	15.0	
Queue Length 50th (ft)	15	0		40	13		33	319		~75	182	
Queue Length 95th (ft)	44	0		86	58		80	#563		#208	292	
Internal Link Dist (ft)		789			1339			1260			953	
Turn Bay Length (ft)												
Base Capacity (vph)	298	561		344	416		184	1840		154	2058	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.12	0.03		0.27	0.26		0.43	0.81		1.03	0.49	

Intersection Summary

Area Type: Other
~ 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.

LOS Engineering

PM Existing + Cumulative + Project
26: Pardee South Loop & Horse Ranch Creek Rd — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		0.95	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.85		1.00	0.89		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	1583		1504	1559		1583	3455		1583	3497	
Flt Permitted	0.95	1.00		0.95	0.99		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	1583		1504	1559		1583	3455		1583	3497	
Volume (vph)	35	0	16	118	0	73	76	1194	226	151	879	75
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	37	0	17	124	0	77	80	1257	238	159	925	79
RTOR Reduction (vph)	0	16	0	0	68	0	0	13	0	0	5	0
Lane Group Flow (vph)	37	1	0	92	41	0	80	1482	0	159	999	0
Turn Type	Split			Split			Prot			Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	4.9	4.9		8.7	8.7		5.3	40.5		7.1	42.3	
Effective Green, g (s)	4.9	4.9		8.7	8.7		5.3	40.5		7.1	42.3	
Actuated g/C Ratio	0.06	0.06		0.11	0.11		0.07	0.52		0.09	0.55	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	100	100		169	176		109	1813		146	1916	
v/s Ratio Prot	c0.02	0.00		c0.06	0.03		0.05	c0.43		c0.10	0.29	
v/s Ratio Perm												
v/c Ratio	0.37	0.01		0.54	0.23		0.73	0.82		1.09	0.52	
Uniform Delay, d1	34.7	33.9		32.4	31.2		35.3	15.3		35.1	11.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.3	0.0		3.6	0.7		22.3	3.0		100.3	0.3	
Delay (s)	37.0	33.9		35.9	31.9		57.6	18.3		135.4	11.3	
Level of Service	D	C		D	C		E	B		F	B	
Approach Delay (s)		36.0			33.7			20.3			28.3	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM Average Control Delay	24.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	77.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	71.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

PM Existing + Cumulative + Project
27: School/Park Access & Horse Ranch Creek Rd — HCM Unsignalized Intersection Capacity Analysis

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	62	1434	43	0	1036
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	65	1509	45	0	1091
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2077	777			1555	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2077	777			1555	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	81			100	
cM capacity (veh/h)	46	339			422	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	65	1006	548	545	545
Volume Left	0	0	0	0	0
Volume Right	65	0	45	0	0
cSH	339	1700	1700	1700	1700
Volume to Capacity	0.19	0.59	0.32	0.32	0.32
Queue Length 95th (ft)	17	0	0	0	0
Control Delay (s)	18.1	0.0	0.0	0.0	0.0
Lane LOS	C				
Approach Delay (s)	18.1	0.0		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	52.0%	ICU Level of Service	A
Analysis Period (min)	15		

LOS Engineering

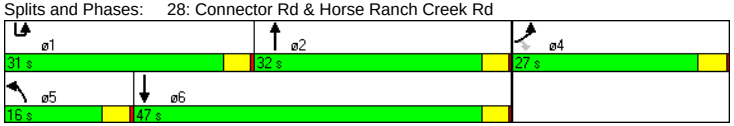
PM Existing + Cumulative + Project
28: Connector Rd & Horse Ranch Creek Rd

Timings

Lane Group	EBL	EBR	NBL	NBT	SBT	ø1
Lane Configurations						
Volume (vph)	659	5	12	796	508	
Turn Type		Perm	Prot			
Protected Phases	4		5	2	6	1
Permitted Phases		4				
Detector Phases	4	4	5	2	6	
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0	8.0
Total Split (s)	27.0	27.0	16.0	32.0	47.0	31.0
Total Split (%)	30.0%	30.0%	17.8%	35.6%	52.2%	34%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag			Lead	Lag	Lag	Lead
Lead-Lag Optimize?			Yes	Yes	Yes	Yes
Recall Mode	None	None	None	Min	Min	None
Act Effct Green (s)	16.4	16.4	6.4	19.3	18.0	
Actuated g/C Ratio	0.37	0.37	0.12	0.43	0.40	
v/c Ratio	0.62	0.01	0.07	0.55	0.69	
Control Delay	16.7	10.4	28.1	10.4	10.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0	
Total Delay	16.7	10.4	28.1	10.4	10.0	
LOS	B	B	C	B	A	
Approach Delay	16.7			10.7	10.0	
Approach LOS	B			B	A	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 44.8	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.69	
Intersection Signal Delay: 12.0	Intersection LOS: B
Intersection Capacity Utilization 57.8%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 28: Connector Rd & Horse Ranch Creek Rd



LOS Engineering

PM Existing + Cumulative + Project
28: Connector Rd & Horse Ranch Creek Rd

Queues

Lane Group	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Ideal Flow (vphpl)	1700	1700	1700	1900	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	
Trailing Detector (ft)	0	0	0	0	0	0	
Turning Speed (mph)	15	9	15		9		9
Lane Util. Factor	0.97	1.00	1.00	0.95	1.00	0.95	0.95
Frt		0.850				0.925	
Flt Protected	0.950		0.950				
Satd. Flow (prot)	3072	1417	1583	3539	1667	3274	0
Flt Permitted	0.950		0.950				
Satd. Flow (perm)	3072	1417	1583	3539	1667	3274	0
Right Turn on Red		Yes					Yes
Satd. Flow (RTOR)		5				378	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30			30		30	
Link Distance (ft)	2875			1509		1400	
Travel Time (s)	65.3			34.3		31.8	
Volume (vph)	659	5	12	796	0	508	502
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	694	5	13	838	0	535	528
Lane Group Flow (vph)	694	5	13	838	0	1063	0
v/c Ratio	0.62	0.01	0.07	0.55		0.69	
Control Delay	16.7	10.4	28.1	10.4		10.0	
Queue Delay	0.0	0.0	0.0	0.0		0.0	
Total Delay	16.7	10.4	28.1	10.4		10.0	
Queue Length 50th (ft)	60	0	3	72		56	
Queue Length 95th (ft)	211	7	22	136		187	
Internal Link Dist (ft)	2795			1429		1320	
Turn Bay Length (ft)							
Base Capacity (vph)	1433	664	341	2006		2202	
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	0.48	0.01	0.04	0.42		0.48	

Intersection Summary	
Area Type:	Other

LOS Engineering

PM Existing + Cumulative + Project
28: Connector Rd & Horse Ranch Creek Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Ideal Flow (vphpl)	1700	1700	1700	1900	1700	1900	1700
Total Lost time (s)	4.0	4.0	4.0	4.0		4.0	
Lane Util. Factor	0.97	1.00	1.00	0.95		0.95	
Frt	1.00	0.85	1.00	1.00		0.93	
Flt Protected	0.95	1.00	0.95	1.00		1.00	
Satd. Flow (prot)	3072	1417	1583	3539		3276	
Flt Permitted	0.95	1.00	0.95	1.00		1.00	
Satd. Flow (perm)	3072	1417	1583	3539		3276	
Volume (vph)	659	5	12	796	0	508	502
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	694	5	13	838	0	535	528
RTOR Reduction (vph)	0	3	0	0	0	234	0
Lane Group Flow (vph)	694	2	13	838	0	829	0
Turn Type		Perm	Prot		Prot		
Protected Phases	4		5	2	1	6	
Permitted Phases		4					
Actuated Green, G (s)	16.4	16.4	0.9	22.9		18.0	
Effective Green, g (s)	16.4	16.4	0.9	22.9		18.0	
Actuated g/C Ratio	0.35	0.35	0.02	0.48		0.38	
Clearance Time (s)	4.0	4.0	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	1065	491	30	1713		1247	
v/s Ratio Prot	c0.23		0.01	c0.24		c0.25	
v/s Ratio Perm		0.00					
v/c Ratio	0.65	0.00	0.43	0.49		0.66	
Uniform Delay, d1	13.0	10.1	22.9	8.2		12.1	
Progression Factor	1.00	1.00	1.00	1.00		1.00	
Incremental Delay, d2	1.4	0.0	9.7	0.2		1.3	
Delay (s)	14.5	10.1	32.7	8.5		13.5	
Level of Service	B	B	C	A		B	
Approach Delay (s)	14.4			8.8		13.5	
Approach LOS	B			A		B	

Intersection Summary			
HCM Average Control Delay	12.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	47.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	57.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

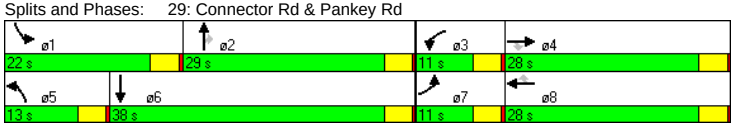
PM Existing + Cumulative + Project
29: Connector Rd & Pankey Rd

Timings

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Volume (vph)	75	474	300	26	256	286	200	373	60	268	436
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot	
Protected Phases	7	4		3	8		5	2		1	6
Permitted Phases			4			8			2		
Detector Phases	7	4	4	3	8	8	5	2	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0
Total Split (s)	11.0	28.0	28.0	11.0	28.0	28.0	13.0	29.0	29.0	22.0	38.0
Total Split (%)	12.2%	31.1%	31.1%	12.2%	31.1%	31.1%	14.4%	32.2%	32.2%	24.4%	42.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min
Act Effct Green (s)	6.8	25.3	25.3	6.4	20.7	20.7	9.2	20.0	20.0	16.8	27.5
Actuated g/C Ratio	0.08	0.32	0.32	0.08	0.27	0.27	0.12	0.26	0.26	0.22	0.35
v/c Ratio	0.59	0.87	0.49	0.22	0.54	0.50	1.13	0.82	0.15	0.83	0.72
Control Delay	57.3	46.6	6.2	43.6	32.1	6.7	143.5	43.9	7.8	53.9	29.1
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	57.3	46.6	6.2	43.6	32.1	6.7	143.5	43.9	7.8	53.9	29.1
LOS	E	D	A	D	C	A	F	D	A	D	C
Approach Delay		33.3			19.8			72.0			38.4
Approach LOS		C			B			E			D

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 78.1	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.13	
Intersection Signal Delay: 40.7	Intersection LOS: D
Intersection Capacity Utilization 83.9%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 29: Connector Rd & Pankey Rd



PM Existing + Cumulative + Project
29: Connector Rd & Pankey Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	50	50	50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850		0.996	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1583	1770	1346	1583	1863	1417	1583	1863	1417	1583	1855	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1583	1770	1346	1583	1863	1417	1583	1863	1417	1583	1855	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			316			301			63		2	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1256			2875			1488			1443	
Travel Time (s)		28.5			65.3			33.8			32.8	
Volume (vph)	75	474	300	26	256	286	200	373	60	268	436	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	79	499	316	27	269	301	211	393	63	282	459	11
Lane Group Flow (vph)	79	499	316	27	269	301	211	393	63	282	470	0
v/c Ratio	0.59	0.87	0.49	0.22	0.54	0.50	1.13	0.82	0.15	0.83	0.72	
Control Delay	57.3	46.6	6.2	43.6	32.1	6.7	143.5	43.9	7.8	53.9	29.1	
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	57.3	46.6	6.2	43.6	32.1	6.7	143.5	43.9	7.8	53.9	29.1	
Queue Length 50th (ft)	39	234	0	13	125	0	~128	178	0	133	185	
Queue Length 95th (ft)	#110	#530	68	41	210	62	#295	#335	29	#302	327	
Internal Link Dist (ft)		1176			2795			1408			1363	
Turn Bay Length (ft)												
Base Capacity (vph)	139	573	649	132	559	636	186	566	474	364	753	
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	0.87	0.49	0.20	0.48	0.47	1.13	0.69	0.13	0.77	0.62	

Intersection Summary

Area Type: Other

~ 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.

LOS Engineering

PM Existing + Cumulative + Project
29: Connector Rd & Pankey Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	0.95	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	
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)	1583	1770	1346	1583	1863	1417	1583	1863	1417	1583	1856	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1583	1770	1346	1583	1863	1417	1583	1863	1417	1583	1856	
Volume (vph)	75	474	300	26	256	286	200	373	60	268	436	10
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	79	499	316	27	269	301	211	393	63	282	459	11
RTOR Reduction (vph)	0	0	217	0	0	217	0	0	47	0	1	0
Lane Group Flow (vph)	79	499	99	27	269	84	211	393	16	282	469	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	5.3	25.3	25.3	2.4	22.4	22.4	9.2	20.0	20.0	16.8	27.6	
Effective Green, g (s)	5.3	25.3	25.3	2.4	22.4	22.4	9.2	20.0	20.0	16.8	27.6	
Actuated g/C Ratio	0.07	0.31	0.31	0.03	0.28	0.28	0.11	0.25	0.25	0.21	0.34	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	104	556	423	47	518	394	181	463	352	330	636	
v/s Ratio Prot	c0.05	c0.28		0.02	0.14		c0.13	c0.21		c0.18	0.25	
v/s Ratio Perm			0.07			0.06			0.01			
v/c Ratio	0.76	0.90	0.23	0.57	0.52	0.21	1.17	0.85	0.04	0.85	0.74	
Uniform Delay, d1	37.0	26.4	20.4	38.5	24.5	22.3	35.6	28.8	23.0	30.7	23.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	26.7	17.1	0.3	15.9	0.9	0.3	118.6	13.5	0.1	18.9	4.4	
Delay (s)	63.7	43.4	20.7	54.4	25.4	22.6	154.2	42.4	23.0	49.6	27.7	
Level of Service	E	D	C	D	C	C	F	D	C	D	C	
Approach Delay (s)		37.2			25.3			75.9			35.9	
Approach LOS		D			C			E			D	

Intersection Summary

HCM Average Control Delay	43.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	80.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	83.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

PM Existing + Cumulative + Project
31: Pala Rd (SR-76) & E Vista Way

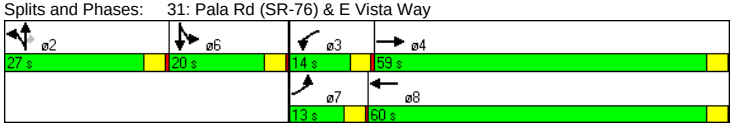
Timings

Lane Group	EBL	EBT	WBL	WBT	NBT	NBR	SBT
Lane Configurations							
Volume (vph)	100	2050	400	1200	70	370	80
Turn Type	Prot		Prot			Perm	
Protected Phases	7	4	3	8	2		6
Permitted Phases						2	
Detector Phases	7	4	3	8	2	2	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	20.0	20.0	20.0
Total Split (s)	13.0	59.0	14.0	60.0	27.0	27.0	20.0
Total Split (%)	10.8%	49.2%	11.7%	50.0%	22.5%	22.5%	16.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lead	Lag			
Lead-Lag Optimize?	Yes	Yes	Yes	Yes			
Recall Mode	None	None	None	None	Max	Max	Max
Act Effct Green (s)	9.0	55.0	10.0	56.0	23.0	23.0	16.0
Actuated g/C Ratio	0.08	0.46	0.08	0.47	0.19	0.19	0.13
v/c Ratio	0.88	1.61	1.64	1.50	1.14	0.73	0.66
Control Delay	111.0	306.1	341.6	256.6	135.1	18.5	54.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	111.0	306.1	341.6	256.6	135.1	18.5	54.6
LOS	F	F	F	F	F	B	D
Approach Delay		298.4		277.5	76.9		54.6
Approach LOS		F		F	E		D

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Natural Cycle: 150
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.64
Intersection Signal Delay: 251.7 Intersection LOS: F
Intersection Capacity Utilization 124.8% ICU Level of Service H
Analysis Period (min) 15

Splits and Phases: 31: Pala Rd (SR-76) & E Vista Way



LOS Engineering

PM Existing + Cumulative + Project
31: Pala Rd (SR-76) & E Vista Way

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	300		150	450		0	0		200	0		0
Storage Lanes	1		0	2		0	0		1	0		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.976			0.996				0.850		0.941	
Flt Protected	0.950			0.950				0.961			0.997	
Satd. Flow (prot)	1583	3454	0	3072	1855	0	0	1790	1417	0	1748	0
Flt Permitted	0.950			0.950				0.961			0.997	
Satd. Flow (perm)	1583	3454	0	3072	1855	0	0	1790	1417	0	1748	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		25			1				320		27	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		710			526			797			552	
Travel Time (s)		16.1			12.0			18.1			12.5	
Volume (vph)	100	2050	400	400	1200	30	300	70	370	10	80	70
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	2158	421	421	1263	32	316	74	389	11	84	74
Lane Group Flow (vph)	105	2579	0	421	1295	0	0	390	389	0	169	0
v/c Ratio	0.88	1.61		1.64	1.50			1.14	0.73		0.66	
Control Delay	111.0	306.1		341.6	256.6			135.1	18.5		54.6	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay	111.0	306.1		341.6	256.6			135.1	18.5		54.6	
Queue Length 50th (ft)	82	~1518		~243	~1401			~352	46		106	
Queue Length 95th (ft)	#190	#1651		#346	#1666			#547	167		#183	
Internal Link Dist (ft)		630			446			717			472	
Turn Bay Length (ft)	300			450					200			
Base Capacity (vph)	119	1597		256	866			343	530		256	
Starvation Cap Reductn	0	0		0	0			0	0		0	
Spillback Cap Reductn	0	0		0	0			0	0		0	
Storage Cap Reductn	0	0		0	0			0	0		0	
Reduced v/c Ratio	0.88	1.61		1.64	1.50			1.14	0.73		0.66	

Intersection Summary

Area Type: Other
~ 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.

LOS Engineering

PM Existing + Cumulative + Project
31: Pala Rd (SR-76) & E Vista Way

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95		0.97	1.00			1.00	1.00		1.00	
Frt	1.00	0.98		1.00	1.00			1.00	0.85		0.94	
Flt Protected	0.95	1.00		0.95	1.00			0.96	1.00		1.00	
Satd. Flow (prot)	1583	3453		3072	1856			1790	1417		1747	
Flt Permitted	0.95	1.00		0.95	1.00			0.96	1.00		1.00	
Satd. Flow (perm)	1583	3453		3072	1856			1790	1417		1747	
Volume (vph)	100	2050	400	400	1200	30	300	70	370	10	80	70
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	2158	421	421	1263	32	316	74	389	11	84	74
RTOR Reduction (vph)	0	14	0	0	1	0	0	0	259	0	23	0
Lane Group Flow (vph)	105	2565	0	421	1294	0	0	390	130	0	146	0
Turn Type	Prot			Prot			Split		Perm	Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases									2			
Actuated Green, G (s)	9.0	55.0		10.0	56.0			23.0	23.0		16.0	
Effective Green, g (s)	9.0	55.0		10.0	56.0			23.0	23.0		16.0	
Actuated g/C Ratio	0.08	0.46		0.08	0.47			0.19	0.19		0.13	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	119	1583		256	866			343	272		233	
v/s Ratio Prot	0.07	c0.74		c0.14	0.70			c0.22			c0.08	
v/s Ratio Perm									0.09			
v/c Ratio	0.88	1.62		1.64	1.49			1.14	0.48		0.62	
Uniform Delay, d1	55.0	32.5		55.0	32.0			48.5	43.2		49.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	48.1	282.2		307.0	228.8			91.1	5.9		12.0	
Delay (s)	103.0	314.7		362.0	260.8			139.6	49.1		61.2	
Level of Service	F	F		F	F			F	D		E	
Approach Delay (s)		306.4			285.6			94.4			61.2	
Approach LOS		F			F			F			E	

Intersection Summary			
HCM Average Control Delay	261.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.36		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	124.8%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

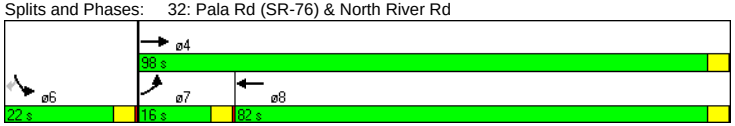
PM Existing + Cumulative + Project
32: Pala Rd (SR-76) & North River Rd

Timings

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Volume (vph)	200	2350	1500	250	200
Turn Type	Prot				Perm
Protected Phases	7	4	8	6	
Permitted Phases					6
Detector Phases	7	4	8	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0
Total Split (s)	16.0	98.0	82.0	22.0	22.0
Total Split (%)	13.3%	81.7%	68.3%	18.3%	18.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Recall Mode	None	None	None	Max	Max
Act Effct Green (s)	12.0	94.0	78.0	18.0	18.0
Actuated g/C Ratio	0.10	0.78	0.65	0.15	0.15
v/c Ratio	1.34	1.70	1.45	1.11	0.58
Control Delay	229.1	335.1	229.4	138.0	16.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	229.1	335.1	229.4	138.0	16.9
LOS	F	F	F	F	B
Approach Delay		326.7	229.4	84.1	
Approach LOS		F	F	F	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.70	
Intersection Signal Delay: 268.7	Intersection LOS: F
Intersection Capacity Utilization 145.8%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 32: Pala Rd (SR-76) & North River Rd



LOS Engineering

PM Existing + Cumulative + Project
32: Pala Rd (SR-76) & North River Rd

Queues

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1900	1900	1700	1700	1700
Storage Length (ft)	150			0	50	0
Storage Lanes	1			0	1	1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50		50	50
Trailing Detector (ft)	0	0	0		0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.988			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1583	1863	1840	0	1583	1417
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1583	1863	1840	0	1583	1417
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)			9			181
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		1356	1400		1286	
Travel Time (s)		30.8	31.8		29.2	
Volume (vph)	200	2350	1500	150	250	200
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	211	2474	1579	158	263	211
Lane Group Flow (vph)	211	2474	1737	0	263	211
v/c Ratio	1.34	1.70	1.45		1.11	0.58
Control Delay	229.1	335.1	229.4		138.0	16.9
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	229.1	335.1	229.4		138.0	16.9
Queue Length 50th (ft)	~213	~2812	~1845		~233	20
Queue Length 95th (ft)	#369	#3063	#2116		#402	99
Internal Link Dist (ft)		1276	1320		1206	
Turn Bay Length (ft)	150				50	
Base Capacity (vph)	158	1459	1199		237	366
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	1.34	1.70	1.45		1.11	0.58

Intersection Summary

Area Type: Other

~ 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.

LOS Engineering

PM Existing + Cumulative + Project
32: Pala Rd (SR-76) & North River Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1900	1900	1700	1700	1700
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1583	1863	1840		1583	1417
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1583	1863	1840		1583	1417
Volume (vph)	200	2350	1500	150	250	200
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	211	2474	1579	158	263	211
RTOR Reduction (vph)	0	0	3	0	0	154
Lane Group Flow (vph)	211	2474	1734	0	263	57
Turn Type	Prot					Perm
Protected Phases	7	4	8		6	
Permitted Phases						6
Actuated Green, G (s)	12.0	94.0	78.0		18.0	18.0
Effective Green, g (s)	12.0	94.0	78.0		18.0	18.0
Actuated g/C Ratio	0.10	0.78	0.65		0.15	0.15
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	158	1459	1196		237	213
v/s Ratio Prot	0.13	c1.33	0.94		c0.17	
v/s Ratio Perm						0.04
v/c Ratio	1.34	1.70	1.45		1.11	0.27
Uniform Delay, d1	54.0	13.0	21.0		51.0	45.2
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	187.5	316.0	207.1		91.0	3.1
Delay (s)	241.5	329.0	228.1		142.0	48.2
Level of Service	F	F	F		F	D
Approach Delay (s)		322.2	228.1		100.3	
Approach LOS		F	F		F	

Intersection Summary

HCM Average Control Delay	267.3	HCM Level of Service	F
HCM Volume to Capacity ratio	1.60		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	145.8%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

PM Existing + Cumulative + Project
33: Pala Rd (SR-76) & Olive Hill Rd

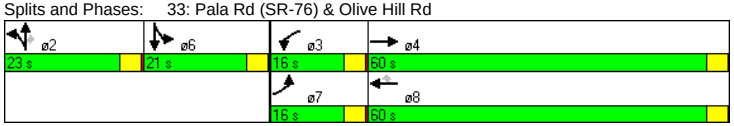
Timings

Lane Group	EBL	EBT	WBL	WBT	WBR	NBT	NBR	SBL	SBT
Lane Configurations									
Volume (vph)	150	2250	250	1550	150	200	350	150	200
Turn Type	Prot		Prot		Perm		Perm	Split	
Protected Phases	7	4	3	8		2		6	6
Permitted Phases					8		2		
Detector Phases	7	4	3	8	8	2	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	16.0	60.0	16.0	60.0	60.0	23.0	23.0	21.0	21.0
Total Split (%)	13.3%	50.0%	13.3%	50.0%	50.0%	19.2%	19.2%	17.5%	17.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lead	Lag	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes				
Recall Mode	None	None	None	None	None	Max	Max	Max	Max
Act Effct Green (s)	12.0	56.0	12.0	56.0	56.0	19.0	19.0	17.0	17.0
Actuated g/C Ratio	0.10	0.47	0.10	0.47	0.47	0.16	0.16	0.14	0.14
v/c Ratio	1.00	1.58	1.66	0.99	0.22	1.09	0.93	0.71	1.11
Control Delay	126.0	288.6	359.2	51.5	8.9	126.2	52.6	67.0	134.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	126.0	288.6	359.2	51.5	8.9	126.2	52.6	67.0	134.2
LOS	F	F	F	D	A	F	D	E	F
Approach Delay		279.3		87.6		86.6			110.7
Approach LOS		F		F		F			F

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 120
Natural Cycle: 150
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.66
Intersection Signal Delay: 177.8 Intersection LOS: F
Intersection Capacity Utilization 128.8% ICU Level of Service H
Analysis Period (min) 15

Splits and Phases: 33: Pala Rd (SR-76) & Olive Hill Rd



LOS Engineering

PM Existing + Cumulative + Project
33: Pala Rd (SR-76) & Olive Hill Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	250		0	250		200	0		150	150		0
Storage Lanes	1		0	1		1	0		1	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50	50	50	50	50	50	50	
Trailing Detector (ft)	0	0		0	0	0	0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.988				0.850			0.850		0.957	
Flt Protected	0.950			0.950				0.984		0.950		
Satd. Flow (prot)	1583	3497	0	1583	3539	1417	0	1833	1417	1583	1783	0
Flt Permitted	0.950			0.950				0.984		0.950		
Satd. Flow (perm)	1583	3497	0	1583	3539	1417	0	1833	1417	1583	1783	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		10				93			205		14	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		585			663			961			1186	
Travel Time (s)		13.3			15.1			21.8			27.0	
Volume (vph)	150	2250	200	250	1550	150	100	200	350	150	200	80
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	158	2368	211	263	1632	158	105	211	368	158	211	84
Lane Group Flow (vph)	158	2579	0	263	1632	158	0	316	368	158	295	0
v/c Ratio	1.00	1.58		1.66	0.99	0.22		1.09	0.93	0.71	1.11	
Control Delay	126.0	288.6		359.2	51.5	8.9		126.2	52.6	67.0	134.2	
Queue Delay	0.0	0.0		0.0	0.0	0.0		0.0	0.0	0.0	0.0	
Total Delay	126.0	288.6		359.2	51.5	8.9		126.2	52.6	67.0	134.2	
Queue Length 50th (ft)	124	~1504		~296	642	28		~275	134	118	~253	
Queue Length 95th (ft)	#266	#1637		#466	#823	69		#456	#324	#213	#433	
Internal Link Dist (ft)		505			583			881			1106	
Turn Bay Length (ft)	250			250		200			150	150		
Base Capacity (vph)	158	1637		158	1652	711		290	397	224	265	
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	1.00	1.58		1.66	0.99	0.22		1.09	0.93	0.71	1.11	

Intersection Summary

Area Type: Other
~ 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.

LOS Engineering

PM Existing + Cumulative + Project
33: Pala Rd (SR-76) & Olive Hill Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85		1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.98	1.00	0.95	1.00	
Satd. Flow (prot)	1583	3496		1583	3539	1417		1832	1417	1583	1783	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.98	1.00	0.95	1.00	
Satd. Flow (perm)	1583	3496		1583	3539	1417		1832	1417	1583	1783	
Volume (vph)	150	2250	200	250	1550	150	100	200	350	150	200	80
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	158	2368	211	263	1632	158	105	211	368	158	211	84
RTOR Reduction (vph)	0	5	0	0	0	50	0	0	173	0	12	0
Lane Group Flow (vph)	158	2574	0	263	1632	108	0	316	195	158	283	0
Turn Type	Prot			Prot		Perm	Split		Perm	Split		
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases						8			2			
Actuated Green, G (s)	12.0	56.0		12.0	56.0	56.0		19.0	19.0	17.0	17.0	
Effective Green, g (s)	12.0	56.0		12.0	56.0	56.0		19.0	19.0	17.0	17.0	
Actuated g/C Ratio	0.10	0.47		0.10	0.47	0.47		0.16	0.16	0.14	0.14	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0		4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	158	1631		158	1652	661		290	224	224	253	
v/s Ratio Prot	0.10	c0.74		c0.17	0.46			c0.17		0.10	c0.16	
v/s Ratio Perm						0.08			0.14			
v/c Ratio	1.00	1.58		1.66	0.99	0.16		1.09	0.87	0.71	1.12	
Uniform Delay, d1	54.0	32.0		54.0	31.7	18.5		50.5	49.3	49.1	51.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	71.6	263.1		325.3	19.1	0.1		78.9	34.4	17.0	92.2	
Delay (s)	125.6	295.1		379.3	50.8	18.6		129.4	83.7	66.2	143.7	
Level of Service	F	F		F	D	B		F	F	E	F	
Approach Delay (s)		285.3			90.4			104.8			116.6	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM Average Control Delay	184.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.42		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	128.8%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

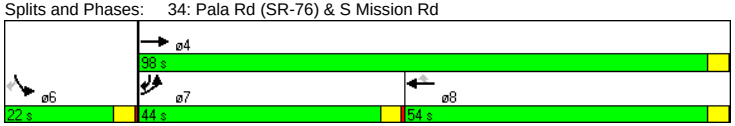
PM Existing + Cumulative + Project
34: Pala Rd (SR-76) & S Mission Rd

Timings

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	1000	1800	1400	240	300	550
Turn Type	Prot			Perm		pm+ov
Protected Phases	7	4	8		6	7
Permitted Phases				8		6
Detector Phases	7	4	8	8	6	7
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0	8.0
Total Split (s)	44.0	98.0	54.0	54.0	22.0	44.0
Total Split (%)	36.7%	81.7%	45.0%	45.0%	18.3%	36.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead		Lag	Lag		Lead
Lead-Lag Optimize?	Yes		Yes	Yes		Yes
Recall Mode	None	None	None	None	Max	None
Act Effct Green (s)	40.0	94.0	50.0	50.0	18.0	62.0
Actuated g/C Ratio	0.33	0.78	0.42	0.42	0.15	0.52
v/c Ratio	1.03	1.30	1.00	0.35	0.69	0.45
Control Delay	75.2	158.0	58.6	6.0	56.8	19.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	75.2	158.0	58.6	6.0	56.8	19.7
LOS	E	F	E	A	E	B
Approach Delay		128.4	50.9		32.8	
Approach LOS		F	D		C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Natural Cycle: 150	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.30	
Intersection Signal Delay: 89.0	Intersection LOS: F
Intersection Capacity Utilization 111.0%	ICU Level of Service H
Analysis Period (min) 15	

Splits and Phases: 34: Pala Rd (SR-76) & S Mission Rd



PM Existing + Cumulative + Project
34: Pala Rd (SR-76) & S Mission Rd

Queues

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1900	1900	1700	1700	1700
Storage Length (ft)	500			300	500	0
Storage Lanes	2			1	2	2
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	0.97	1.00	0.95	1.00	0.97	0.88
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	3072	1863	3539	1417	3072	2493
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	3072	1863	3539	1417	3072	2493
Right Turn on Red				Yes		No
Satd. Flow (RTOR)				218		
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		565	451		1333	
Travel Time (s)		12.8	10.3		30.3	
Volume (vph)	1000	1800	1400	240	300	550
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1053	1895	1474	253	316	579
Lane Group Flow (vph)	1053	1895	1474	253	316	579
v/c Ratio	1.03	1.30	1.00	0.35	0.69	0.45
Control Delay	75.2	158.0	58.6	6.0	56.8	19.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	75.2	158.0	58.6	6.0	56.8	19.7
Queue Length 50th (ft)	~449	~1878	591	16	121	154
Queue Length 95th (ft)	#580	#2141	#764	70	171	206
Internal Link Dist (ft)		485	371		1253	
Turn Bay Length (ft)	500			300	500	
Base Capacity (vph)	1024	1459	1475	718	461	1288
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	1.03	1.30	1.00	0.35	0.69	0.45

Intersection Summary

Area Type: Other

~ 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.

LOS Engineering

PM Existing + Cumulative + Project
34: Pala Rd (SR-76) & S Mission Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1900	1900	1700	1700	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.97	1.00	0.95	1.00	0.97	0.88
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3072	1863	3539	1417	3072	2493
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3072	1863	3539	1417	3072	2493
Volume (vph)	1000	1800	1400	240	300	550
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1053	1895	1474	253	316	579
RTOR Reduction (vph)	0	0	0	127	0	0
Lane Group Flow (vph)	1053	1895	1474	126	316	579
Turn Type	Prot			Perm		pm+ov
Protected Phases	7	4	8		6	7
Permitted Phases				8		6
Actuated Green, G (s)	40.0	94.0	50.0	50.0	18.0	58.0
Effective Green, g (s)	40.0	94.0	50.0	50.0	18.0	58.0
Actuated g/C Ratio	0.33	0.78	0.42	0.42	0.15	0.48
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1024	1459	1475	590	461	1288
v/s Ratio Prot	0.34	c1.02	0.42		c0.10	0.15
v/s Ratio Perm				0.09		0.08
v/c Ratio	1.03	1.30	1.00	0.21	0.69	0.45
Uniform Delay, d1	40.0	13.0	35.0	22.4	48.3	20.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	35.6	139.6	23.1	0.2	8.1	0.3
Delay (s)	75.6	152.6	58.1	22.6	56.4	20.7
Level of Service	E	F	E	C	E	C
Approach Delay (s)		125.1	52.9		33.3	
Approach LOS		F	D		C	

Intersection Summary

HCM Average Control Delay	88.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.20		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	111.0%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

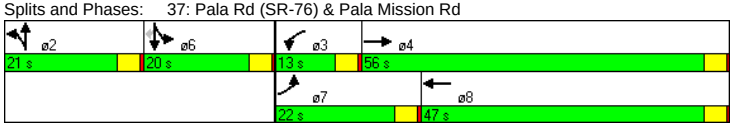
PM Existing + Cumulative + Project
37: Pala Rd (SR-76) & Pala Mission Rd

Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT	SBR
Lane Configurations								
Volume (vph)	250	530	50	680	40	20	30	190
Turn Type	Prot		Prot		Split			Perm
Protected Phases	7	4	3	8	2	2	6	
Permitted Phases								6
Detector Phases	7	4	3	8	2	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	22.0	56.0	13.0	47.0	21.0	21.0	20.0	20.0
Total Split (%)	20.0%	50.9%	11.8%	42.7%	19.1%	19.1%	18.2%	18.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes	Yes				
Recall Mode	None	None	None	None	Max	Max	None	None
Act Effct Green (s)	18.0	55.1	7.9	43.0	17.0	17.0	8.9	8.9
Actuated g/C Ratio	0.17	0.53	0.08	0.42	0.17	0.17	0.09	0.09
v/c Ratio	0.95	0.33	0.44	0.97	0.16	0.11	0.34	0.66
Control Delay	86.4	14.9	57.8	55.6	39.9	29.1	49.6	17.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	86.4	14.9	57.8	55.6	39.9	29.1	49.6	17.1
LOS	F	B	E	E	D	C	D	B
Approach Delay		36.4		55.7		35.2	23.9	
Approach LOS		D		E		D	C	

Intersection Summary	
Cycle Length: 110	
Actuated Cycle Length: 103	
Natural Cycle: 110	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.97	
Intersection Signal Delay: 42.5	Intersection LOS: D
Intersection Capacity Utilization 72.4%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 37: Pala Rd (SR-76) & Pala Mission Rd



LOS Engineering

PM Existing + Cumulative + Project
37: Pala Rd (SR-76) & Pala Mission Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	250		0	250		0	200		0	0		50
Storage Lanes	1		0	1		0	1		0	0		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	50
Trailing Detector (ft)	0	0		0	0		0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.987			0.994			0.948				0.850
Flt Protected	0.950			0.950			0.950				0.981	
Satd. Flow (prot)	1583	3493	0	1583	1852	0	1583	1766	0	0	1827	1417
Flt Permitted	0.950			0.950			0.950				0.981	
Satd. Flow (perm)	1583	3493	0	1583	1852	0	1583	1766	0	0	1827	1417
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12			2			11				200
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		941			1076			1007			1565	
Travel Time (s)		21.4			24.5			22.9			35.6	
Volume (vph)	250	530	50	50	680	30	40	20	10	20	30	190
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	263	558	53	53	716	32	42	21	11	21	32	200
Lane Group Flow (vph)	263	611	0	53	748	0	42	32	0	0	53	200
v/c Ratio	0.95	0.33		0.44	0.97		0.16	0.11			0.34	0.66
Control Delay	86.4	14.9		57.8	55.6		39.9	29.1			49.6	17.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0			0.0	0.0
Total Delay	86.4	14.9		57.8	55.6		39.9	29.1			49.6	17.1
Queue Length 50th (ft)	171	116		33	463		24	12			33	0
Queue Length 95th (ft)	#354	176		77	#786		59	41			72	68
Internal Link Dist (ft)		861			996			927			1485	
Turn Bay Length (ft)	250			250			200					50
Base Capacity (vph)	277	1875		135	775		261	301			266	377
Starvation Cap Reductn	0	0		0	0		0	0			0	0
Spillback Cap Reductn	0	0		0	0		0	0			0	0
Storage Cap Reductn	0	0		0	0		0	0			0	0
Reduced v/c Ratio	0.95	0.33		0.39	0.97		0.16	0.11			0.20	0.53

Intersection Summary	
Area Type:	Other
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

LOS Engineering

PM Existing + Cumulative + Project
37: Pala Rd (SR-76) & Pala Mission Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.99		1.00	0.99		1.00	0.95			1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.98	1.00
Satd. Flow (prot)	1583	3493		1583	1851		1583	1767			1827	1417
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00			0.98	1.00
Satd. Flow (perm)	1583	3493		1583	1851		1583	1767			1827	1417
Volume (vph)	250	530	50	50	680	30	40	20	10	20	30	190
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	263	558	53	53	716	32	42	21	11	21	32	200
RTOR Reduction (vph)	0	6	0	0	1	0	0	9	0	0	0	183
Lane Group Flow (vph)	263	605	0	53	747	0	42	23	0	0	53	17
Turn Type	Prot			Prot			Split			Split		Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases												6
Actuated Green, G (s)	18.0	55.1		6.8	43.9		17.0	17.0			8.9	8.9
Effective Green, g (s)	18.0	55.1		6.8	43.9		17.0	17.0			8.9	8.9
Actuated g/C Ratio	0.17	0.53		0.07	0.42		0.16	0.16			0.09	0.09
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	275	1854		104	783		259	289			157	121
v/s Ratio Prot	c0.17	0.17		0.03	c0.40		c0.03	0.01			c0.03	
v/s Ratio Perm												0.01
v/c Ratio	0.96	0.33		0.51	0.95		0.16	0.08			0.34	0.14
Uniform Delay, d1	42.5	13.8		46.9	29.0		37.3	36.8			44.7	43.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	42.0	0.1		3.9	21.5		1.3	0.5			1.3	0.5
Delay (s)	84.5	13.9		50.8	50.5		38.6	37.3			46.0	44.5
Level of Service	F	B		D	D		D	D			D	D
Approach Delay (s)		35.2			50.5			38.1			44.8	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	42.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	103.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

SAN DIEGO COUNTY SERIES 10 TRAFFIC MODEL (Year 2030): Data exported for SR-76 from Melrose Drive (Oceanside) to Pala Temecula Road (Pala)

Hwycov_id	Nm	Fxnm	Txnm	Lanes Iftlno	AM Vol Iftvla	dir	AM Cap Iftcpa	v/c ratio	AM LOS	AM Vol Itfvla	dir	AM Cap Itfcpa	v/c ratio	AM LOS	PM Vol Iftvlp	dir	PM Cap Iftcpp	v/c ratio	PM LOS	PM Vol Itfvlp	dir	PM Cap Itfcpp	v/c ratio	PM LOS
12033	MISSION	JEFFRIES RANCH	MELROSE	2	2416	WB	2010	1.202	F	1286	EB	3300	0.39	B	1201	WB	2010	0.598	C	2629	EB	3300	0.797	D
2670	MISSION	CRANBERRY	JEFFRIES RANCH	2	2393	WB	3300	0.725	D	1257	EB	2336	0.538	C	1185	WB	3300	0.359	B	2598	EB	2336	1.112	F
12731	MISSION	EAST VISTA	CRANBERRY	2	2411	WB	2336	1.032	F	1368	EB	2356	0.581	C	1727	WB	2336	0.739	D	2651	EB	2356	1.125	F
12735	MISSION	HOLLY	EAST VISTA	2	1984	WB	1904	1.042	F	1186	EB	3300	0.359	B	1419	WB	1904	0.745	D	2069	EB	3300	0.627	C
12736	MISSION	NORTH RIVER	HOLLY	2	1970	WB	3300	0.597	C	1187	EB	2122	0.559	C	1421	WB	3300	0.431	B	2059	EB	2122	0.97	E
31079	MISSION	UNKNOWN	NORTH RIVER	2	2421	WB	2122	1.141	F	1376	EB	3300	0.417	B	1611	WB	2122	0.759	D	2438	EB	3300	0.739	D
7210	MISSION	VIA GRENADA	UNKNOWN	2	2421	WB	3300	0.734	D	1376	EB	3300	0.417	B	1611	WB	3300	0.488	B	2438	EB	3300	0.739	D
7209	MISSION	VALLEY RANCH	VIA GRENADA	2	2421	WB	3300	0.734	D	1376	EB	3300	0.417	B	1611	WB	3300	0.488	B	2438	EB	3300	0.739	D
11625	MISSION	OLIVEHILL/CM DEL REY	VALLEY RANCH	2	2465	WB	3300	0.747	D	1391	EB	1904	0.731	D	1694	WB	3300	0.513	C	2593	EB	1904	1.362	F
11626	MISSION	THOROUGHBRED	OLIVEHILL/CM DEL REY	2	2567	WB	1904	1.348	F	1598	EB	3300	0.484	B	1851	WB	1904	0.972	E	2672	EB	3300	0.81	D
15943	PALA	THOROUGHBRED	MISSION	2	1498	EB	2122	0.706	C	2508	WB	3300	0.76	D	2576	EB	2122	1.214	F	1694	WB	3300	0.513	C
19215	PALA	MISSION	ZONE CONNECTOR	2	1070	EB	3300	0.324	B	1733	WB	2122	0.817	D	2273	EB	3300	0.689	C	1501	WB	2122	0.707	C
19216	PALA	ZONE CONNECTOR	RAMONA	2	1102	EB	3300	0.334	B	1809	WB	3300	0.548	C	2188	EB	3300	0.663	C	1319	WB	3300	0.4	B
30386	PALA	RAMONA	CALLE DE LA VUELTA	2	1110	EB	3300	0.336	B	1811	WB	3300	0.549	C	2168	EB	3300	0.657	C	1321	WB	3300	0.4	B
17167	PALA	CALLE DE LA VUELTA	VIA MONSERATE	2	1092	EB	3164	0.345	B	1790	WB	3300	0.542	C	2119	EB	3164	0.67	C	1260	WB	3300	0.382	B
3279	PALA	VIA MONSERATE	UNKNOWN	2	1140	EB	3300	0.345	B	1796	WB	3164	0.568	C	2077	EB	3300	0.629	C	1361	WB	3164	0.43	B
1799	PALA	UNKNOWN	LIMBER PINE	2	1140	EB	3300	0.345	B	1796	WB	3300	0.544	C	2077	EB	3300	0.629	C	1361	WB	3300	0.412	B
1800	PALA	LIMBER PINE	GIRD	2	1140	EB	2912	0.391	B	1796	WB	3300	0.544	C	2077	EB	2912	0.713	D	1361	WB	3300	0.412	B
3278	PALA	GIRD	UNKNOWN	2	1131	EB	3300	0.343	B	1339	WB	2912	0.46	B	1400	EB	3300	0.424	B	1236	WB	2912	0.424	B
17822	PALA	UNKNOWN	ZONE CONNECTOR	2	1182	EB	3300	0.358	B	1324	WB	3300	0.401	B	1416	EB	3300	0.429	B	1311	WB	3300	0.397	B
17823	PALA	ZONE CONNECTOR	OLD 395	2	1218	EB	1904	0.64	C	1361	WB	3300	0.412	B	1523	EB	1904	0.8	D	1448	WB	3300	0.439	B
8586	PALA	OLD 395	RAMP I-15 SB	2	1343	EB	3030	0.443	B	1265	WB	1632	0.775	D	1486	EB	3030	0.49	B	1531	WB	1632	0.938	E
1801	PALA	RAMP I-15 SB	RAMP I-15 NB	2	1022	EB	3030	0.337	B	994	WB	3030	0.328	B	1357	EB	3030	0.448	B	1285	WB	3030	0.424	B
11460	PALA	RAMP I-15 NB	PANKEY	2	842	EB	3100	0.272	A	1045	WB	3030	0.345	B	1449	EB	3100	0.467	B	1062	WB	3030	0.35	B
1804	PALA	PANKEY	PANKEY NEW	2	604	EB	1806	0.334	B	1158	WB	2028	0.571	C	1280	EB	1806	0.709	C	1357	WB	2028	0.669	C
11457	PALA-NEW	PANKEY NEW	PALA	2	812	EB	3100	0.262	A	1184	WB	1956	0.605	C	1425	EB	3100	0.46	B	1248	WB	1956	0.638	C
11456	PALA	PALA-NEW	RICE CANYON	2	813	EB	3100	0.262	A	1185	WB	3100	0.382	B	1426	EB	3100	0.46	B	1249	WB	3100	0.403	B
11453	PALA	RICE CANYON	COUSER CANYON	2	840	EB	2382	0.353	B	1724	WB	3100	0.556	C	1032	EB	3100	0.333	B	1343	WB	2382	0.564	C
7771	PALA	COUSER CANYON	UNKNOWN	2	798	EB	3100	0.257	A	677	WB	3100	0.218	A	847	EB	3100	0.273	A	1231	WB	3100	0.397	B
11454	PALA	UNKNOWN	UNKNOWN	1	759	EB	950	0.799	D	678	WB	950	0.714	D	848	EB	950	0.893	E	1203	WB	950	1.266	F
11451	PALA	UNKNOWN	PALA MISSION	1	857	EB	950	0.902	E	516	WB	950	0.543	C	653	EB	950	0.687	C	1251	WB	950	1.317	F

Notes: Shaded cells represent the worst v/c ratio for the study area segments by peak hour and direction

Appendix P

SANDAG Series 10 Cumulative, 10 GP, and 11 Traffic Model Volumes

Higher ADTs used for Plan to Plan Analysis (Horizon Year Analysis)

Segments	2030 Series 10 Cumulative	2030 Series 11	2030 Existing GP	Higher ADT Used in Traffic Study
Old Highway 395				
East Mission Road to Reche Road	19,900	16,000	21,900	21,900
Reche Road to Stewart Canyon Road	23,300	22,000	25,200	25,200
Stewart Canyon Road to Tecalote Lane	18,000	16,000	21,300	21,300
Tecalote Lane to Pala Mesa Drive	19,400	18,000	23,200	23,200
Pala Mesa Drive to SR-76 (Pala Road)	20,900	17,000	23,400	23,400
Stewart Canyon Road				
Old Hwy 395 to Horse Ranch Creek Rd	8,800	7,000	Not Shown	8,800
Pankey Road				
Street R/Pankey Place to SR-76 (Pala Rd)	8,900	7,000	See note(1)	8,900
SR-76 (Pala Road) to Shearer Crossing	20,000	20,000	6,500	20,000
Horse Ranch Creek Road				
Stewart Canyon Rd to Baltimore Oriole (#23)	Note 1: Series 10 and 11 traffic models did not have detailed information (manuall assignment on Horse Ranch Creek Road and on Street R/Pankey Place) as used in traffic study, thus volumes in traffic study are based on the detailed manual assignment of 3Ps traffic.			
Baltimore Oriole (#23) to Longspur Rd (#24)				
Longspur Rd (#24) to Harvest Glen Ln (#25)				
Harvest Glen Ln (#25) to Intersection (#26)				
Intersection (#26) to Park/School (#27)				
Park/Sch (#27) to Street R/Pankey Pl (#28)				
Street R/Pankey Pl (#28) to SR-76 (Pala Rd)				
Pala Mesa Drive				
Wilt Rd/Sage Rd to Old Highway 395	11,500	10,000	9,200	11,500
Old Highway 395 to Street R/Pankey Pl	See note(1)			7,500
Street R/Pankey Place				
Pala Mesa/Pankey to Horse Ranch Creek Rd	10,300	Not Shown	Not Shown	10,300

Higher Peak Hour Directional Volumes between Series 10 and Series 11 Models

State Route 76	AM (Eastbound)			AM (Westbound)			PM (Eastbound)			PM (Westbound)		
	Series 10	Series 11	Traffic Study	Series 10	Series 11	Traffic Study	Series 10	Series 11	Traffic Study	Series 10	Series 11	Traffic Study
Melrose Dr to E. Vista Way	**1368**	1193	1368	**2416**	2006	2416	**2651**	2372	2651	**1727**	1517	1727
E. Vista Way to North River Rd	**1187**	991	1187	**1984**	1904	1984	**2059**	1951	2059	**1419**	1224	1419
North River Rd to Olive Hill Rd	**1391**	1120	1391	**2421**	2372	2421	**2593**	2451	2593	**1611**	1393	1611
Olive Hill Rd to S Mission Rd	**1498**	1265	1498	**2567**	2524	2567	**2576**	2448	2576	**1851**	1587	1851
S Mission Rd to Via Monserate	**1092**	767	1092	**1733**	1587	1733	**2273**	1906	2273	**1501**	965	1501
Via Monserate to Gird Rd	**1140**	707	1140	**1796**	1757	1796	**2077**	1882	2077	**1361**	794	1361
Gird Rd to Sage Rd	**1131**	942	1131	**1339**	1248	1339	**1400**	1387	1400	**1236**	893	1236
Sage Rd to Old Hwy 395	**1218**	980	1218	**1361**	1334	1361	**1523**	1265	1523	**1448**	929	1448
Old Hwy 395 to I-15 SB Ramps	1343	**1600**	1600	**1265**	1245	1265	**1486**	1248	1486	**1531**	781	1531
I-15 SB Ramps to I-15 NB Ramps	**1022**	756	1022	**994**	569	994	**1357**	1334	1357	**1285**	462	1285
I-15 NB Ramps to Pankey Rd	**842**	668	842	**1045**	792	1045	**1449**	816	1449	**1062**	707	1062
Pankey Rd to Horse Ranch Creek Rd	604	**762**	762	**1184**	1109	1184	**1280**	1028	1280	**1357**	998	1357
Horse Ranch Creek Rd to Rice Cyn	604	**762**	762	**1184**	1109	1184	**1280**	1028	1280	**1357**	998	1357
Rice Cyn to Couser Cyn	**1724**	952	1724	**840**	615	840	**1032**	689	1032	**1343**	1117	1343
Couser Cyn to Pala Mission Rd	**857**	753	857	**678**	620	678	**848**	840	848	**1251**	1160	1251

Bold indicates higher volumes used between Series 10 cumulative and Series 11

County of San Diego
GP Update EIR

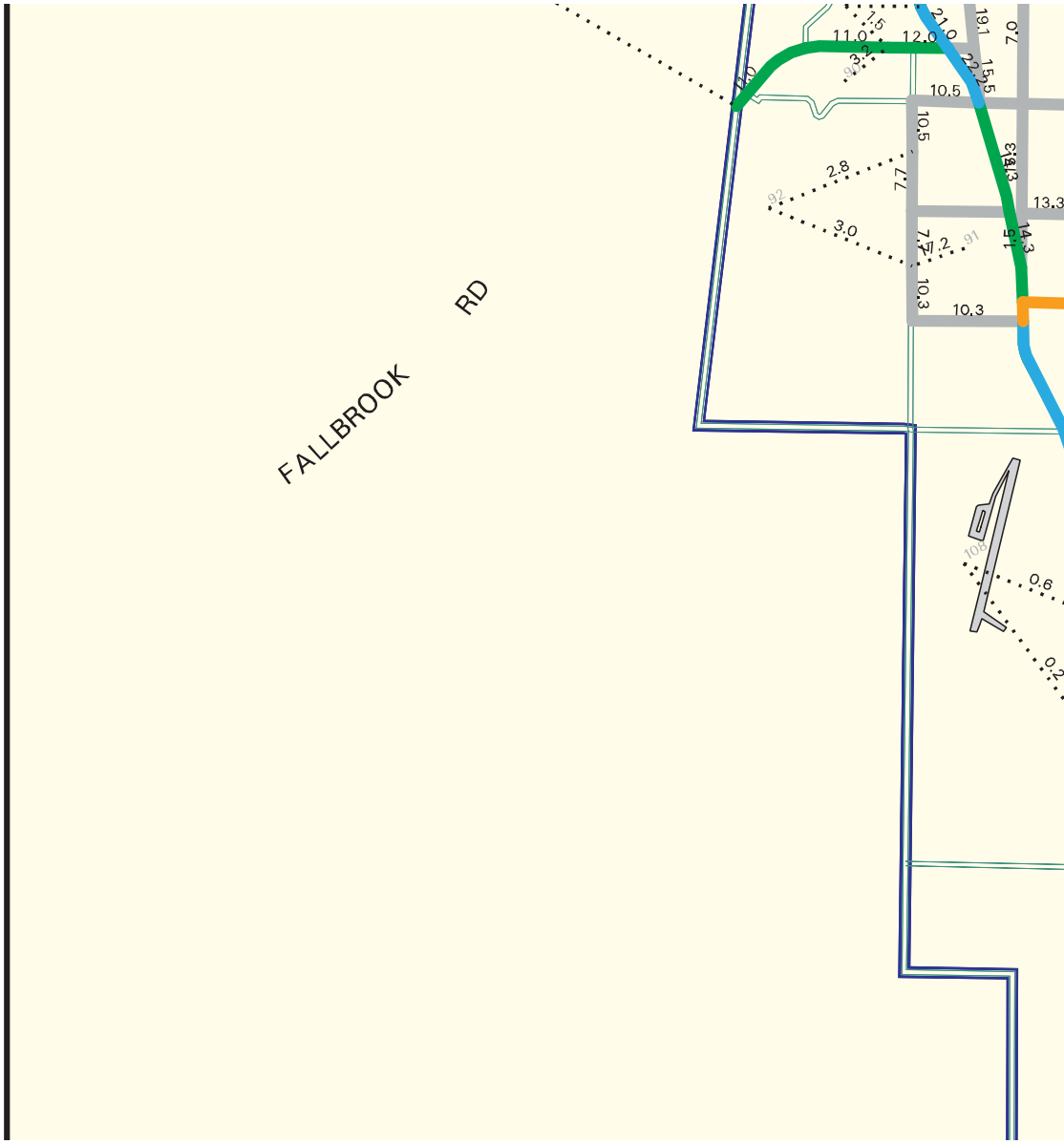
2030 CUMULATIVE
LOS and Volume Plot

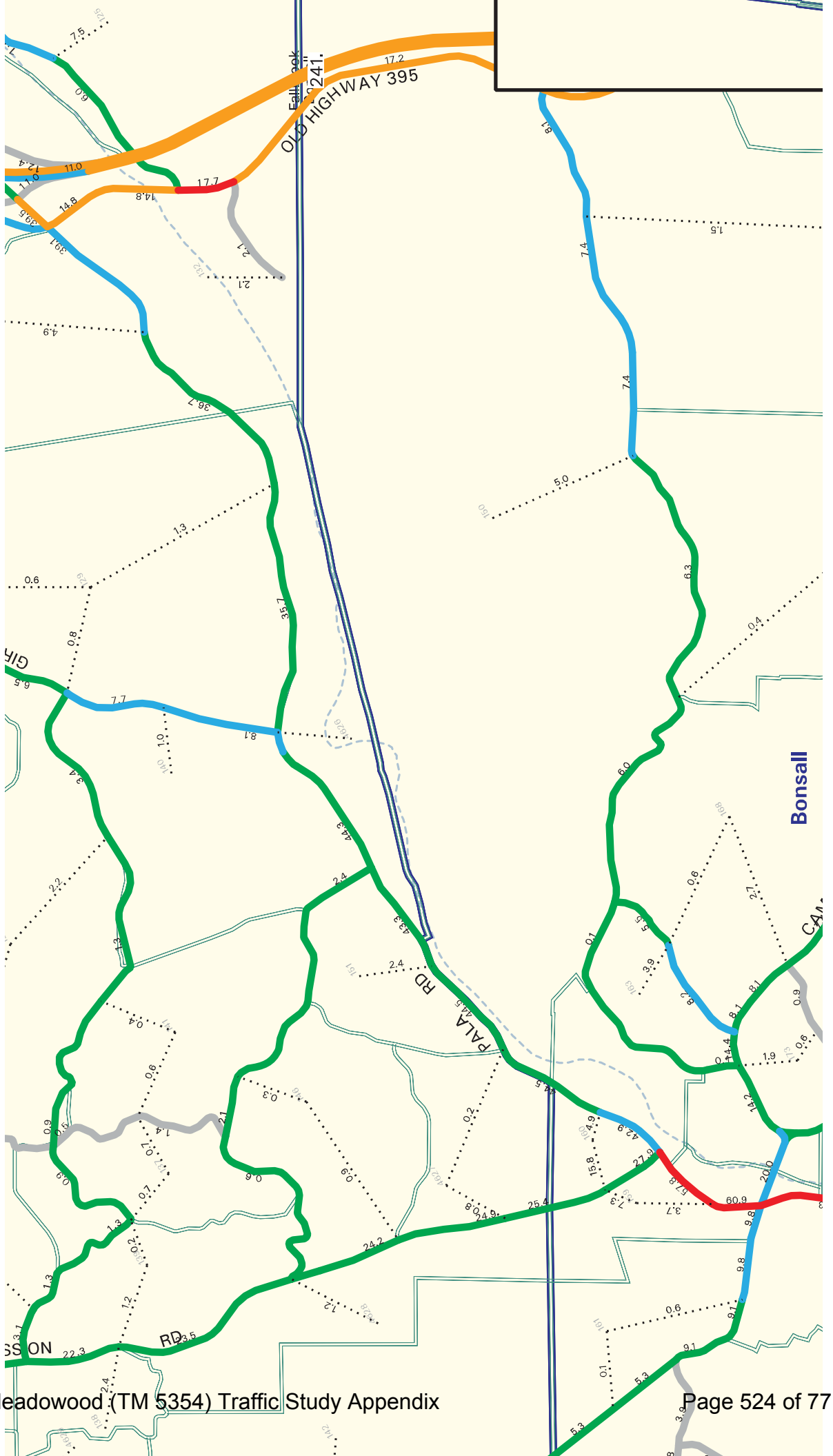
FALLBROOK & BONSALL Area

2030 Proposed Network
Model Rerun 12/09/08
With Updated Land Uses

Levels of Service:

- A - C
- D
- E
- F

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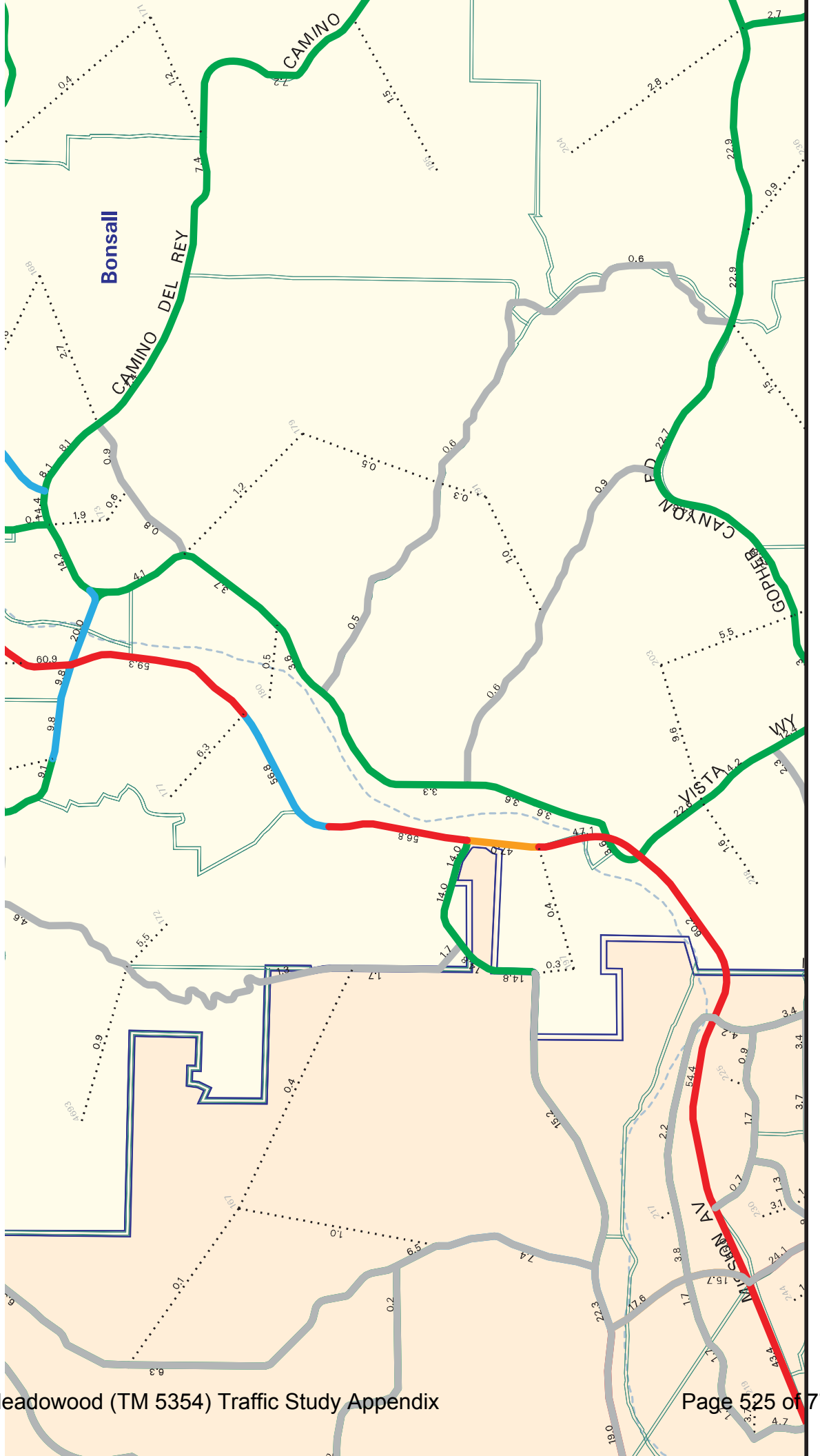
Bonsall
PALA RD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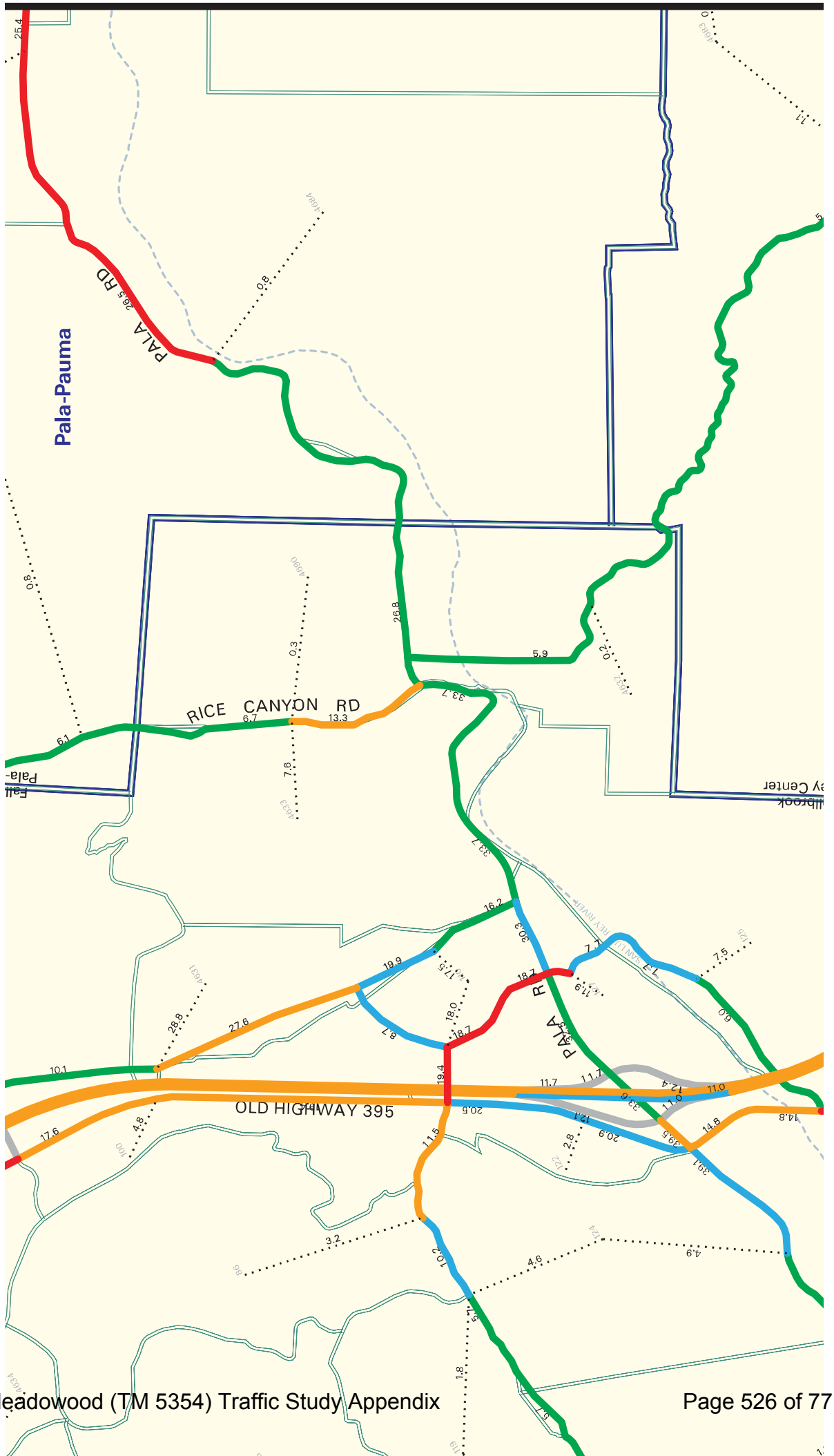
Bonsall
CAMINO
GOPHER CANYON RD
VISTA WY
MAIN SIGN AV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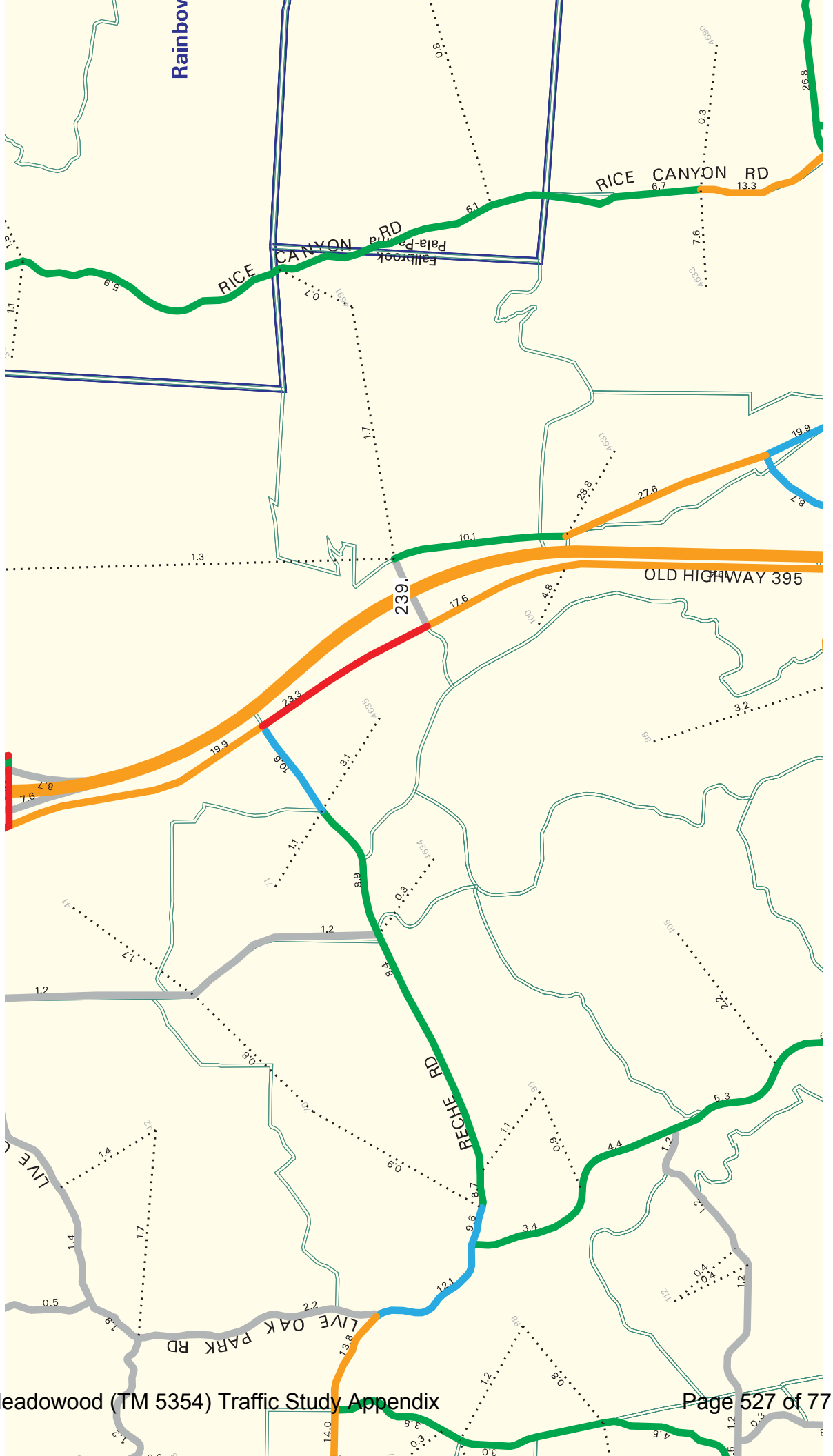
PALA RD
RICE CANYON RD
OLD HIGHWAY 395
PALA RD


Rainbow
RICE CANYON RD
RICE CANYON RD
Fallbrook
Pala-Pauma
OLD HIGHWAY 395
239.
RECHE RD
LIVE OAK PARK RD

Series 11 Transportation Forecast Information Center

Series 11 2030 Traffic Volume Forecast
February 2008 Update

The Transportation Forecast Information Center (TFIC) gives you quick access to transportation forecasts. You may use this tool to look at the forecasts on screen as well as print maps or tables. Click on a year below or click "help" for detailed instructions.

Forecast Years: 2003 2010 2020 2030 All Years Help

Forecasted average weekday traffic (AWT) volumes in thousands are displayed for freeways, ramps, and major and minor roads. Individual roadway segments can be selected to obtain additional information including street name, type of roadway, number of lanes, and posted speed. Traffic analysis zone (TAZ) zone connector volumes are shown and TAZ-level trip generation and land use forecasts are provided.

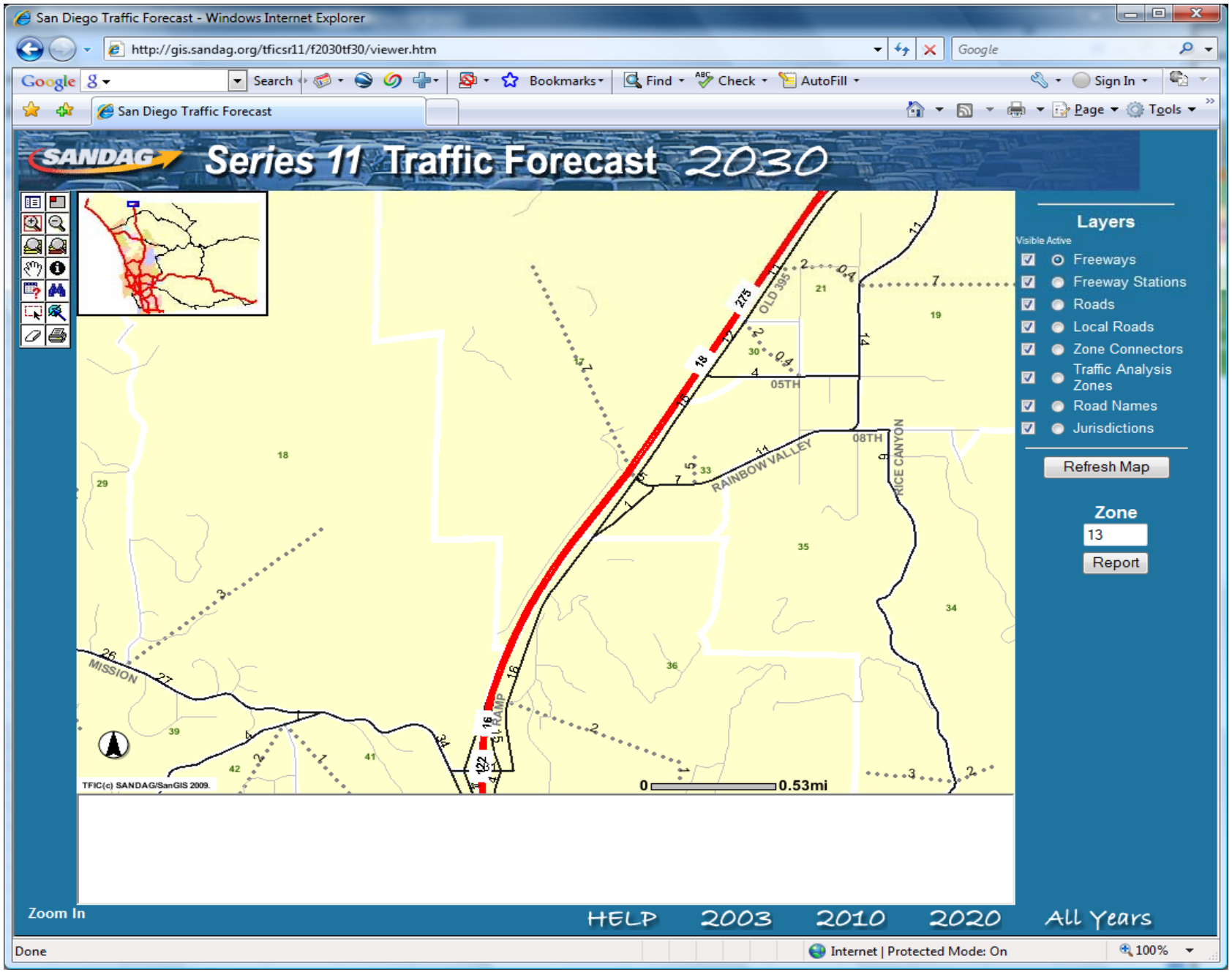
Forecast Year. Select an individual year (2003, 2010, 2020, or 2030) to obtain traffic forecasts for that year. Select "All Years" to obtain traffic volume forecasts for years 2003 through 2030. The volumes shown on the "All Year" map is for year 2030.

Source. SANDAG uses a regional transportation model to produce highway and transit forecasts for individual forecast years between 2003 and 2030. These forecasts are updated periodically to incorporate the most recent planning assumptions. Traffic forecasts shown here were completed in **October 2007** in support of the 2007 2030 Regional Transportation Plan (RTP). These traffic forecasts utilize the "Reasonably Expected" network as defined in the RTP, and the Final Series 11 2030 Regional Growth Forecast.

Forecasts differ from the TFIC Series 10, which was based on the Regional Transportation Plan (RTP) adopted in 2003 and Series 10 growth forecasts.

Disclaimer. We make every effort to produce accurate forecasts. If you find a traffic volume that appears to be in error, e-mail us at tfic@sandag.org with the location and description of the problem. We will make corrections to our databases and produce revised forecasts in the next update cycle.

Revised: Feburary, 2008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San Diego Traffic Forecast
SANDAG
Series 11 Traffic Forecast 2030
Layers
Visible Active
Freeways
Freeway Stations
Roads
Local Roads
Zone Connectors
Traffic Analysis Zones
Road Names
Jurisdictions
Refresh Map
Zone
13
Report
OLD 395
05TH
08TH
RAINBOW VALLEY
RICE CANYON
MISSION
RAMP
TFIC(c) SANDAG/SanGIS 2009.
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2003
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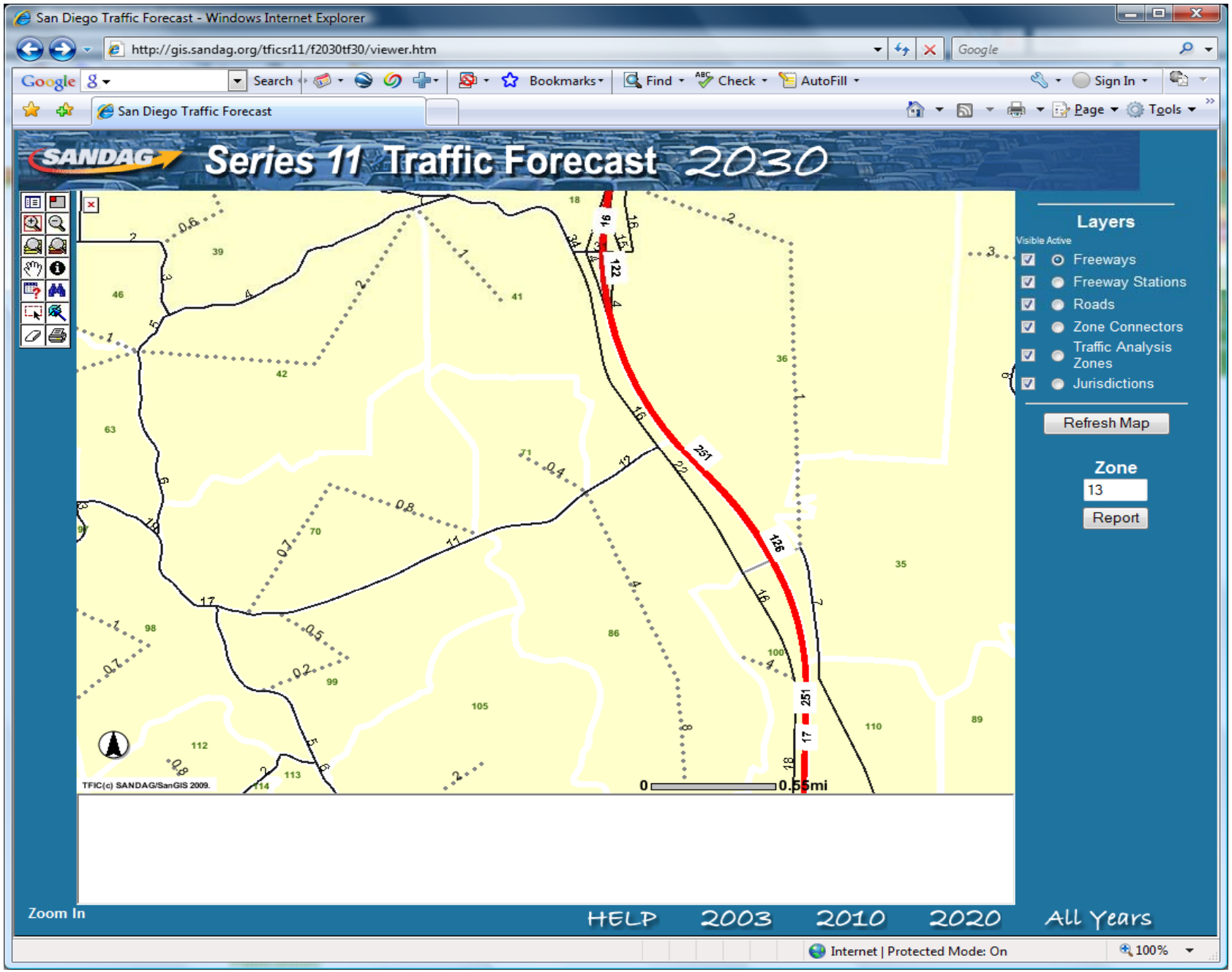
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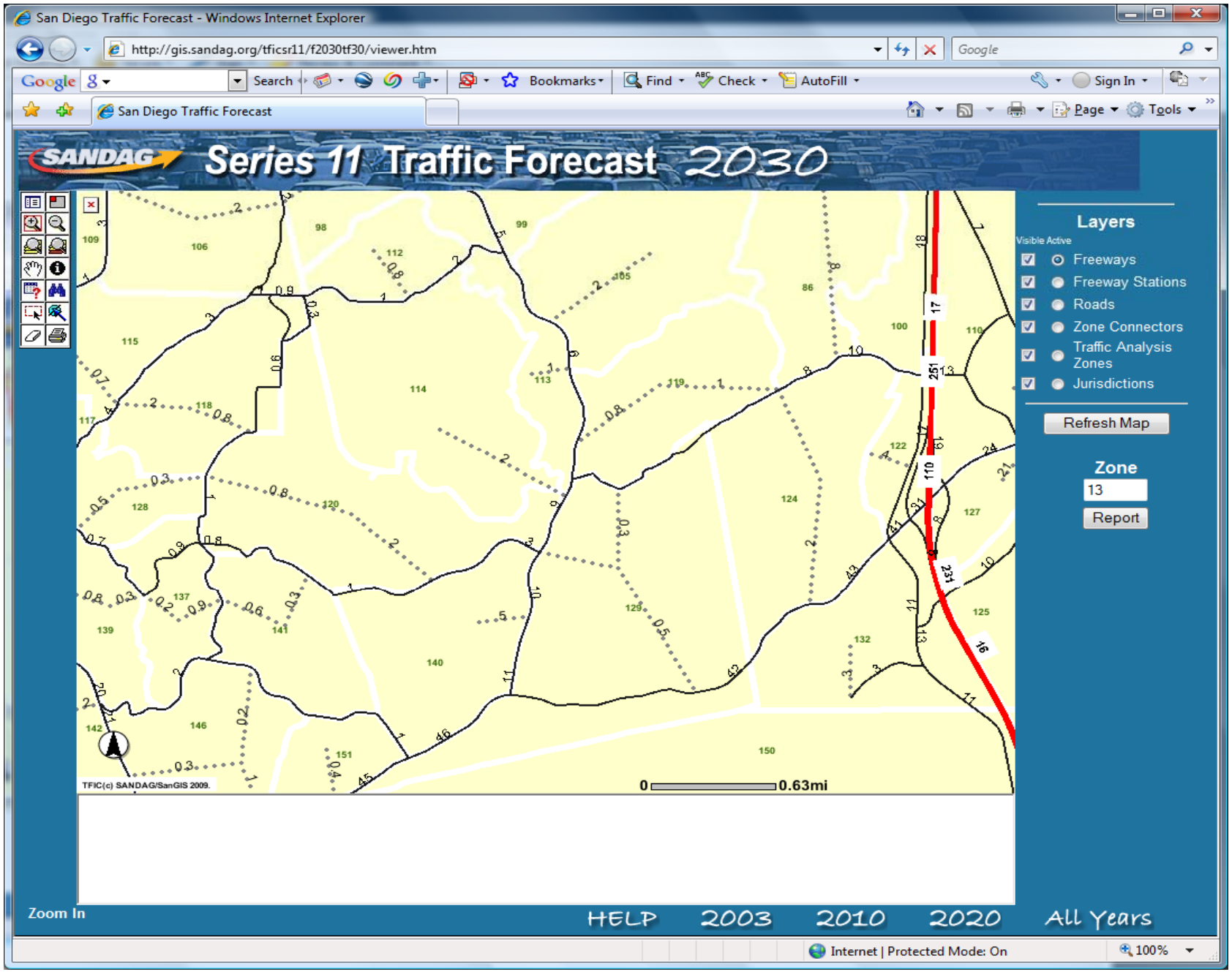
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Series 11 Traffic Forecast 2030
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Freeway Stations
Roads
Zone Connectors
Traffic Analysis Zones
Jurisdictions
Refresh Map
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All Years
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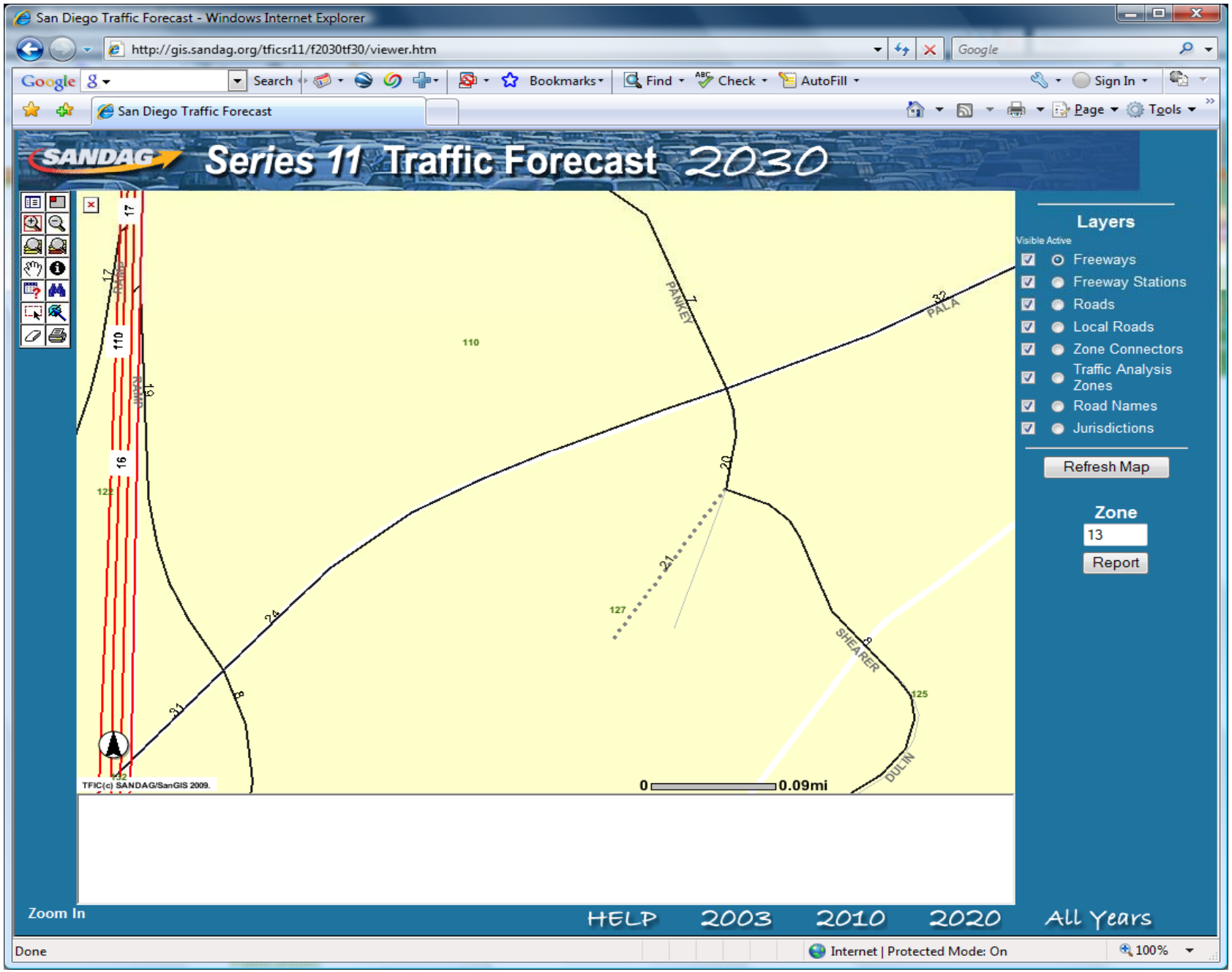
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Freeways
Freeway Stations
Roads
Local Roads
Zone Connectors
Traffic Analysis Zones
Road Names
Jurisdictions
Refresh Map
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PALA
SHEARER
DULIN
RAMP
110
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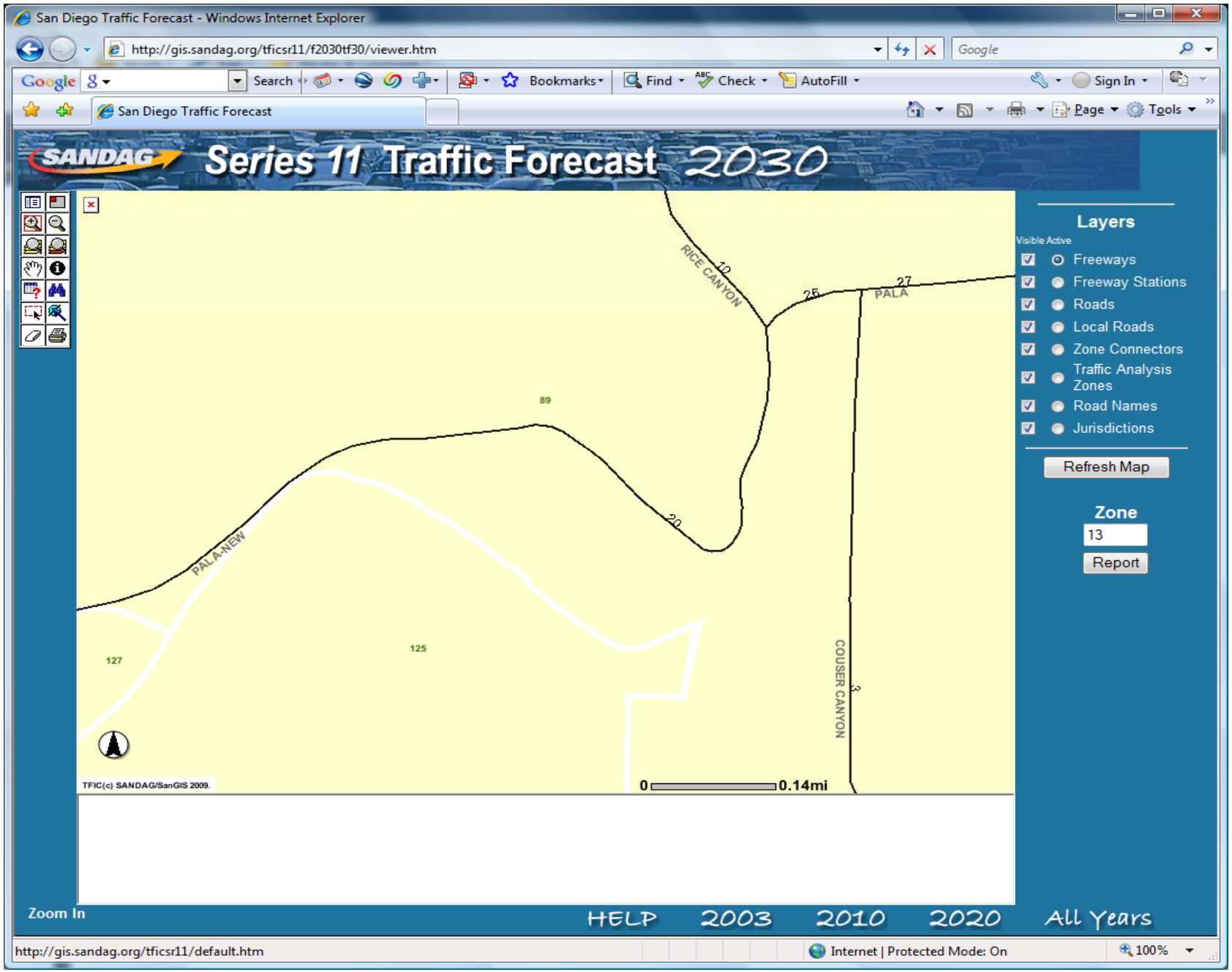
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SANDAG
Series 11 Traffic Forecast 2030
RICE CANYON
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PALA-NEW
COUSER CANYON
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TFIC(c) SANDAG/SanGIS 2009.
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Roads
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Zone Connectors
Traffic Analysis Zones
Road Names
Jurisdictions
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All Years
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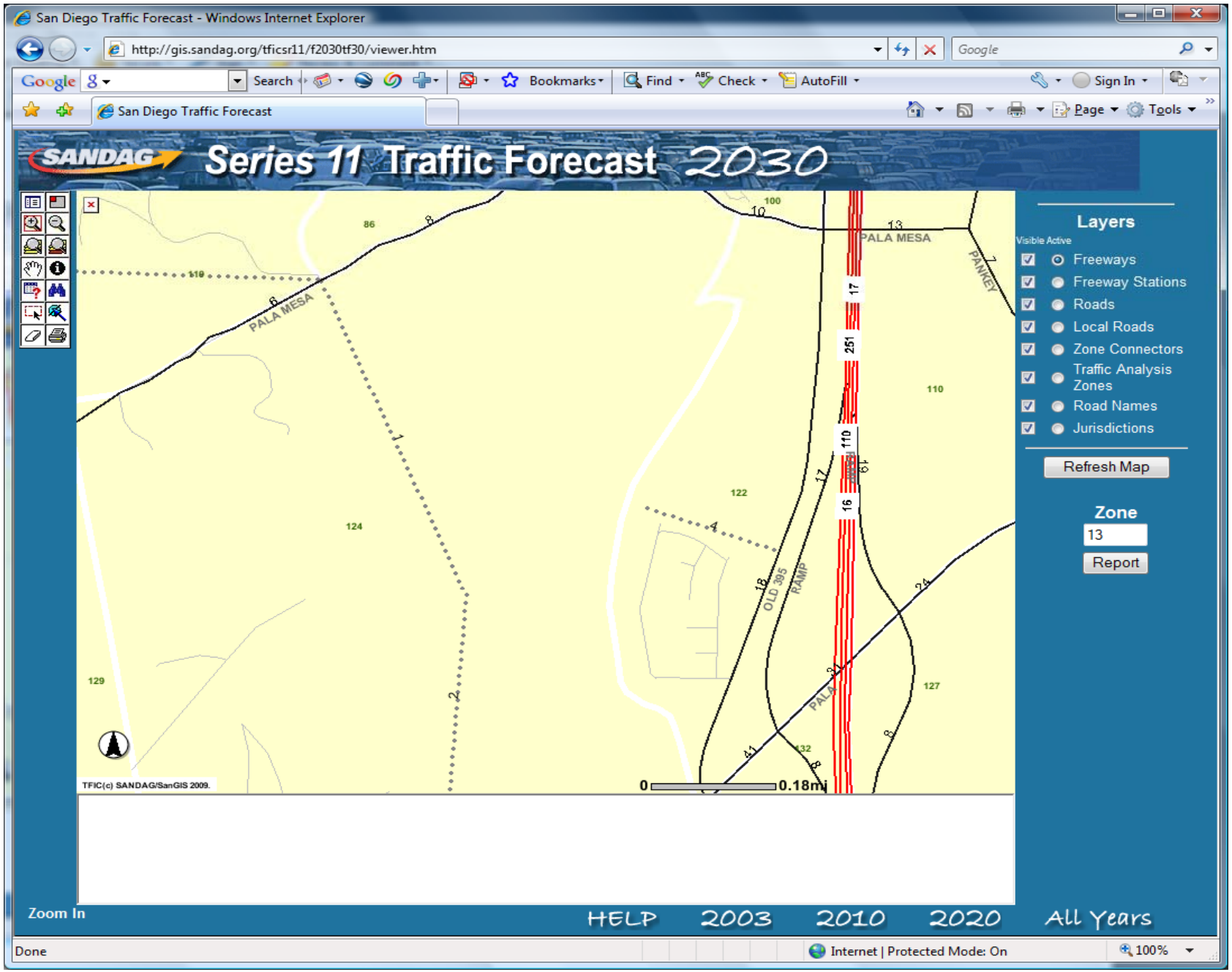
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PANKEY
OLD 395
RAMP
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Layers
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Freeway Stations
Roads
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Zone Connectors
Traffic Analysis Zones
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Jurisdictions
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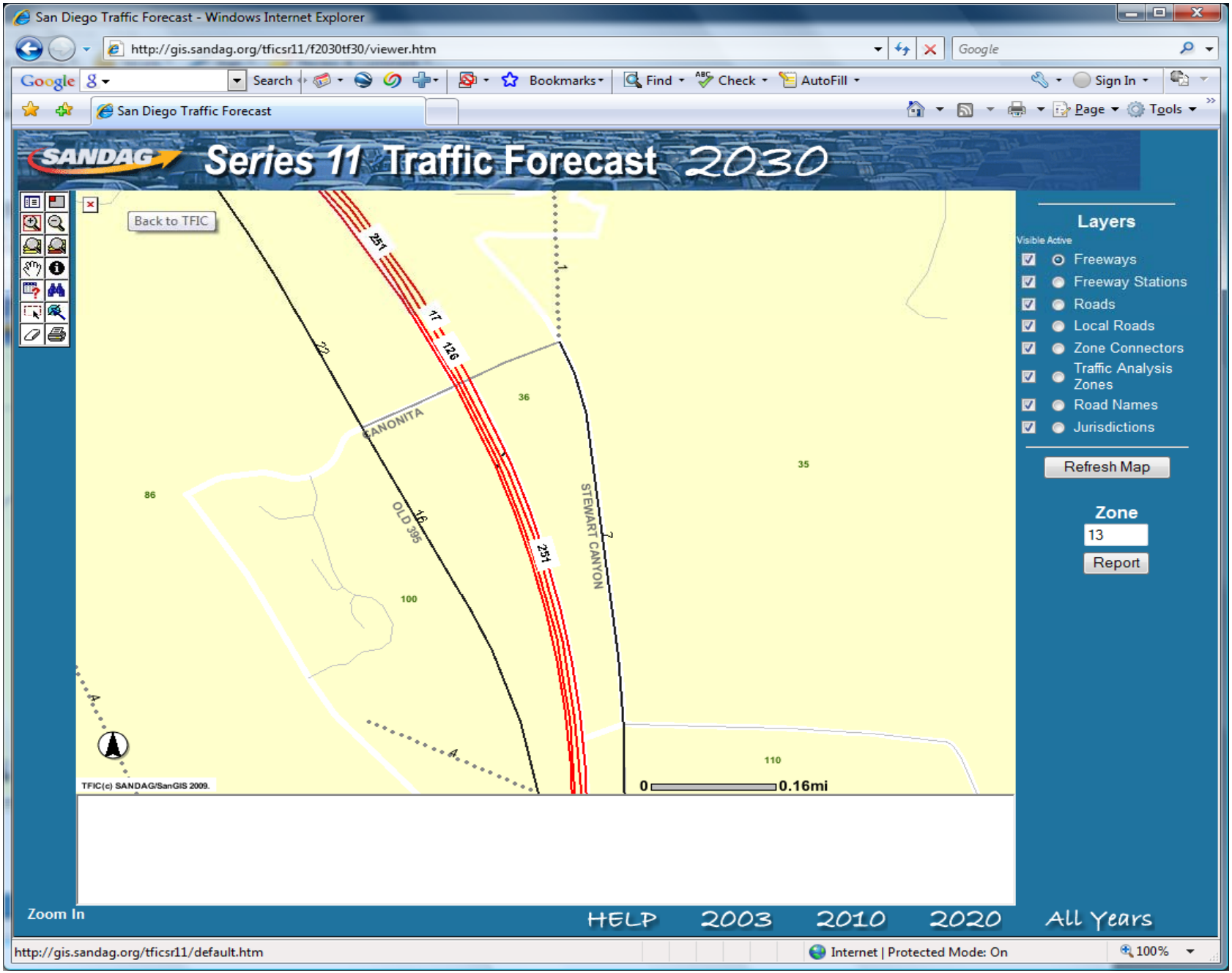
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SANDAG
Series 11 Traffic Forecast 2030
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Roads
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Zone Connectors
Traffic Analysis Zones
Road Names
Jurisdictions
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TFIC(c) SANDAG/SanGIS 2009.
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All Years
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County of San Diego
GP Update EIR

2030 Existing GP
LOS and Volume Plot

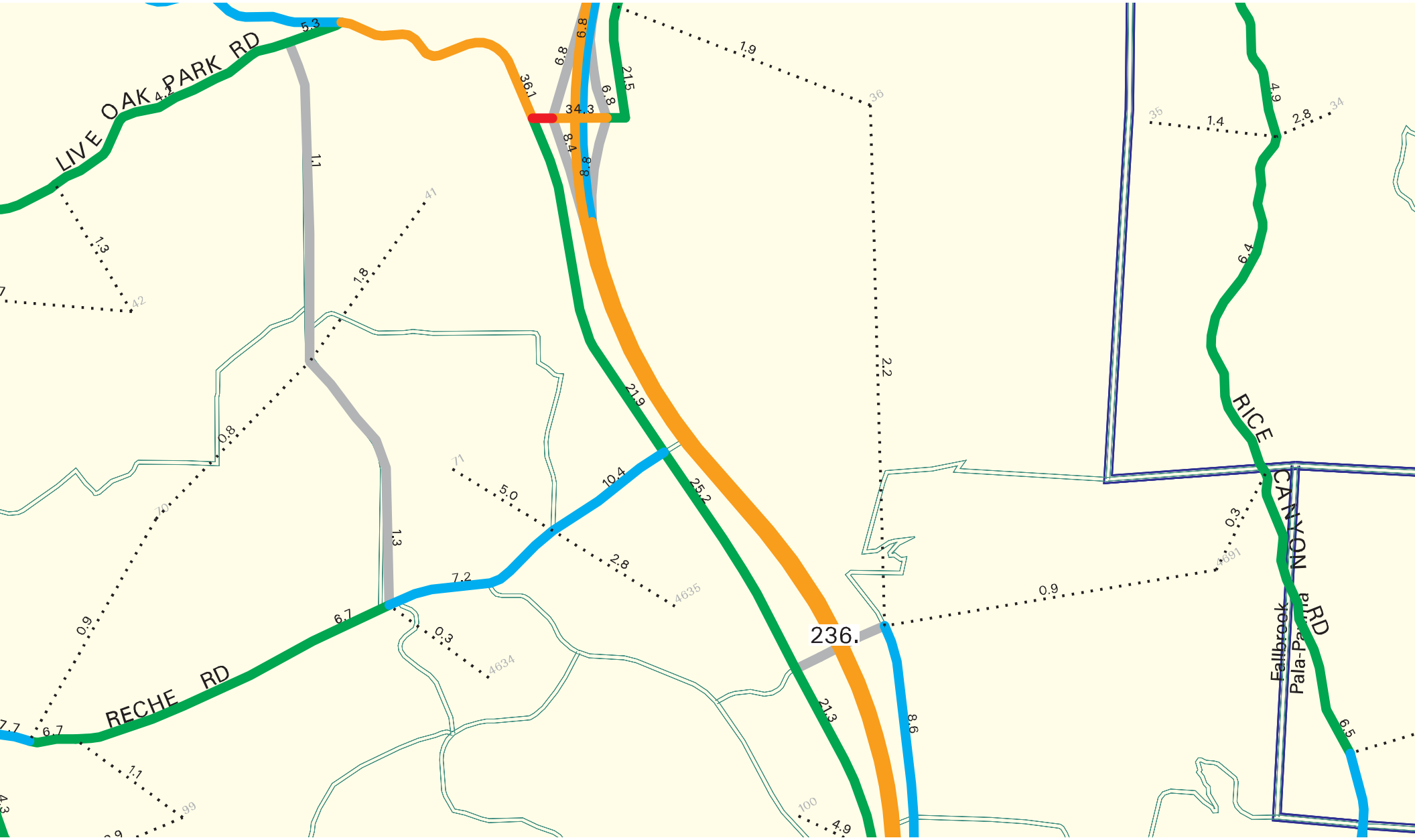
FALLBROOK & BONSALL Area

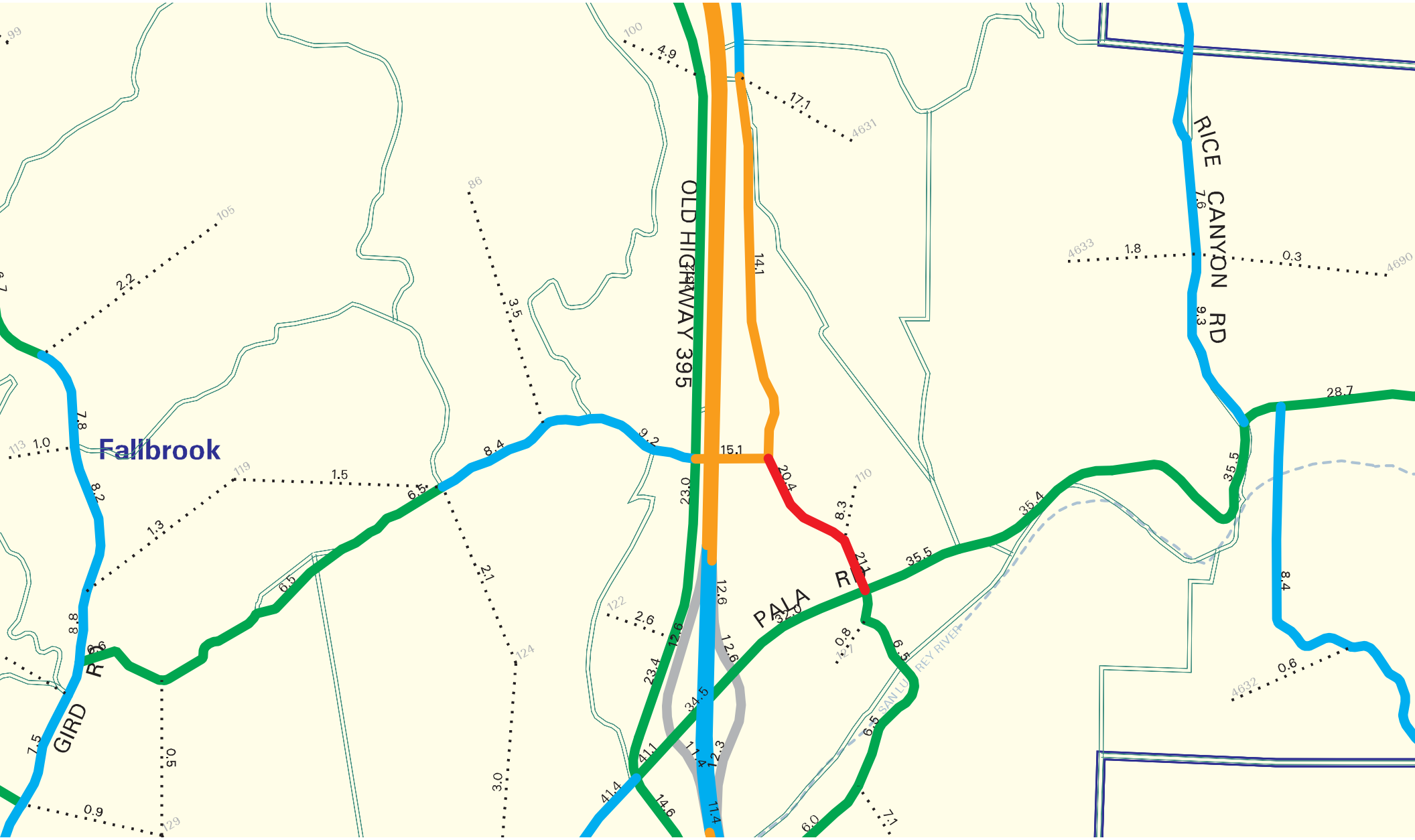
2030 Existing General Plan Network
2007 RTP Update
Model Run 07/15/08

Levels of Service:

A - C

D


LIVE OAK PARK RD
RECHE RD
RICE CANYON RD
236.


Fallbrook
OLD HIGHWAY 395
RICE CANYON RD
PALA R
GIRD R

Appendix Q

I-15/Stewart Canyon Interchange Status

From: "Ortiz, Francisco \"Nick\"" <Francisco.Ortiz@sdcounty.ca.gov>
To: Chris Brown <alchemycb@cox.net>
Cc: "Campbell, Dennis" <Dennis.Campbell@sdcounty.ca.gov>, "Areigat, Nael" <Nael.Areigat@sdcounty.ca.gov>, "Bankston, Troy" <Troy.Bankston@sdcounty.ca.gov>, "Citrano, Robert" <Robert.Citrano@sdcounty.ca.gov>
Conversation: Fallbrook interchange **Subject:** RE: Fallbrook interchange

Chris,

This is in response to your e-mail message regarding a “new” interchange north of Highway 76 and south of Mission Road on the I-15 that has been discussed at Fallbrook CPG meetings. Previous information provided to the County has identified that proposed new interchange would be located at I-15 and Stewart Canyon Road. Below is staff’s current understanding on the status of the proposed new I-15/Stewart Canyon Road interchange.

County information:

- The GP Update recommended roadway network does not include a new/proposed I-15/Stewart Canyon Road freeway interchange

- The County's TIF program does not assume a I-15/Stewart Canyon Road freeway interchange

- The County has not requested construction of the I-15/Stewart Canyon Road freeway interchange in order to mitigate the significant traffic impacts of the 3P projects.

Please contact Caltrans and SANDAG to confirm the following:

- The SANDAG 2030 RTP does not assume/include a I-15/Stewart Canyon Road freeway interchange

- I'm not aware of any Caltrans long-range plan and/or request for a I-15/Stewart Canyon Road freeway interchange

- Caltrans has not requested construction of the I-15/Stewart Canyon Road freeway interchange in order to mitigate the significant traffic impacts of the 3P projects.

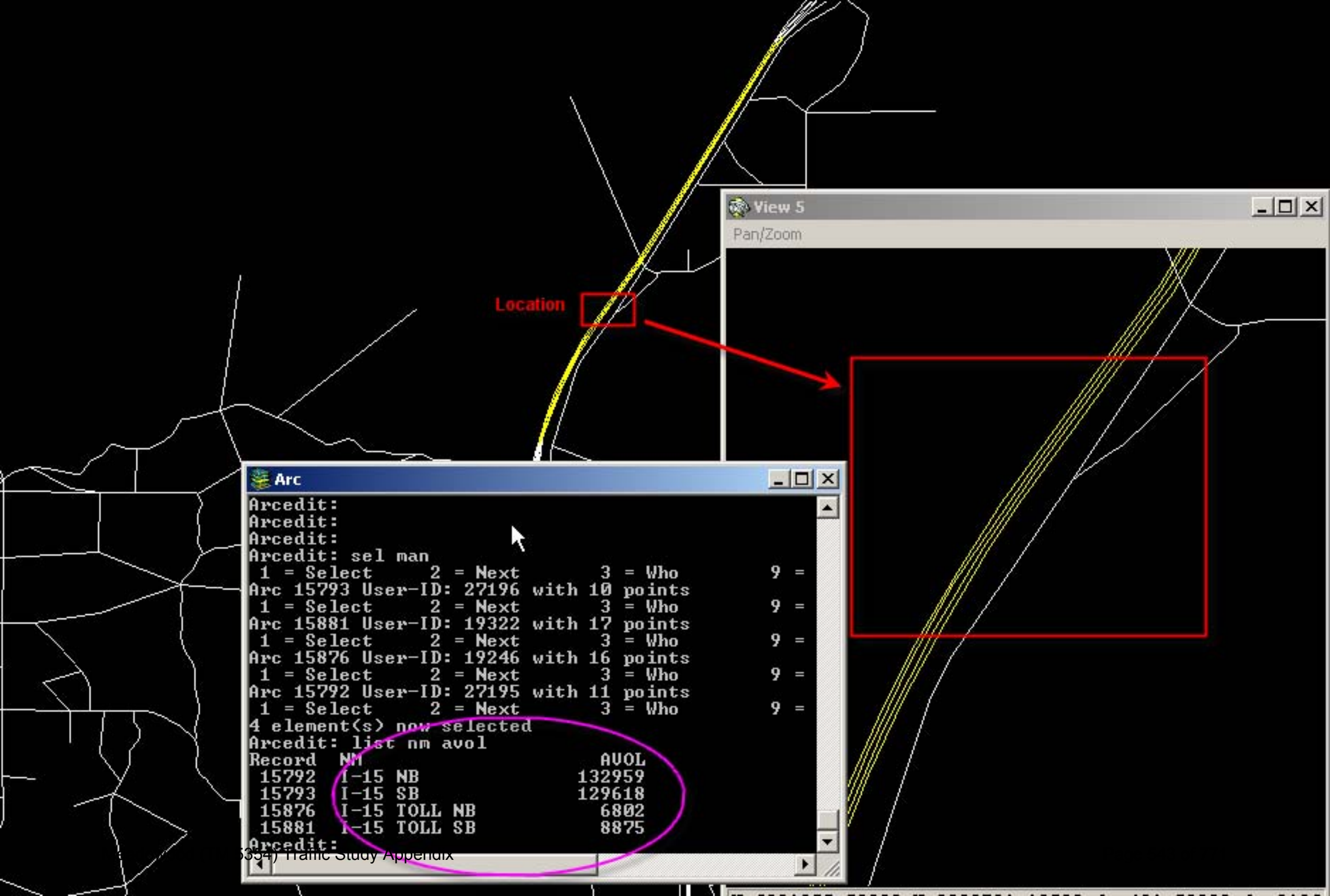
F.Nick Ortiz
County of San Diego, Department of Public Works
Transportation Planning section
Phone: 858-694-2410
Fax: 858-694-3373
MS 0336

Appendix R

SANDAG Series 11 Traffic Model I-15 Directional Splits

HORIZON YEAR (2030) SANDAG VOLUME SPLIT ON I-15

I-15 Segment	Total	NB % split	SB % split
Rainbow Valley to Mission Rd	262,577	132,959 50.64%	129,618 49.36%
Mission Rd to SR-76	239,425	121,518 50.75%	117,907 49.25%
SR-76 to Escondido Hwy	218,013	107,204 49.17%	110,809 50.83%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View 5
Pan/Zoom
Arc
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Arcedit: sel man
1 = Select 2 = Next 3 = Who 9 =
Arc 15793 User-ID: 27196 with 10 points
1 = Select 2 = Next 3 = Who 9 =
Arc 15881 User-ID: 19322 with 17 points
1 = Select 2 = Next 3 = Who 9 =
Arc 15876 User-ID: 19246 with 16 points
1 = Select 2 = Next 3 = Who 9 =
Arc 15792 User-ID: 27195 with 11 points
1 = Select 2 = Next 3 = Who 9 =
4 element(s) now selected
Arcedit: list nm avol
Record NM AVOL
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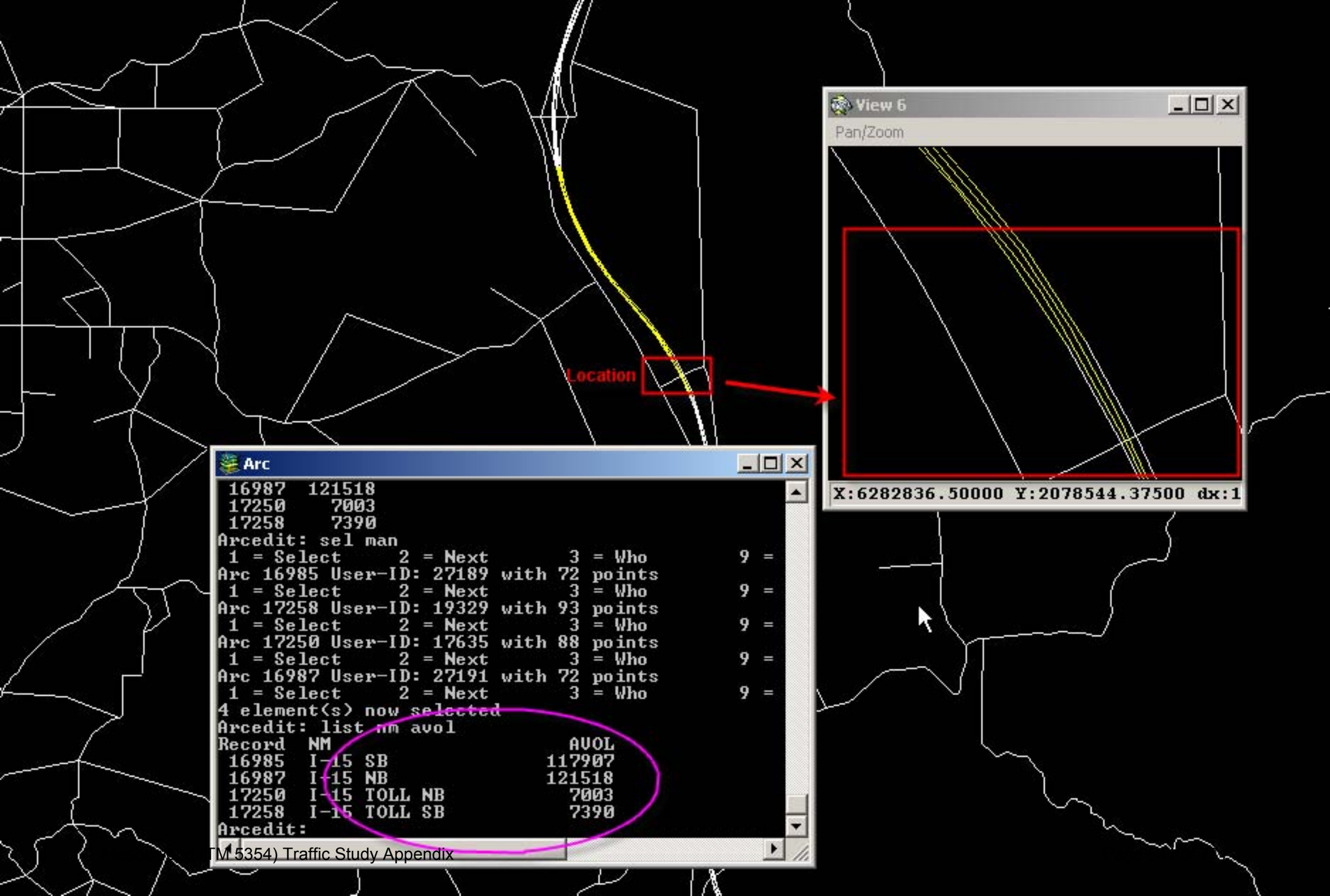
15793 I-15 SB 129618
15876 I-15 TOLL NB 6802
15881 I-15 TOLL SB 8875
Arcedit: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Arc
16987 121518
17250 7003
17258 7390
Arcedit: sel man
1 = Select 2 = Next 3 = Who 9 =
Arc 16985 User-ID: 27189 with 72 points
1 = Select 2 = Next 3 = Who 9 =
Arc 17258 User-ID: 19329 with 93 points
1 = Select 2 = Next 3 = Who 9 =
Arc 17250 User-ID: 17635 with 88 points
1 = Select 2 = Next 3 = Who 9 =
Arc 16987 User-ID: 27191 with 72 points
1 = Select 2 = Next 3 = Who 9 =
4 element(s) now selected
Arcedit: list nm avol
Record NM AVOL
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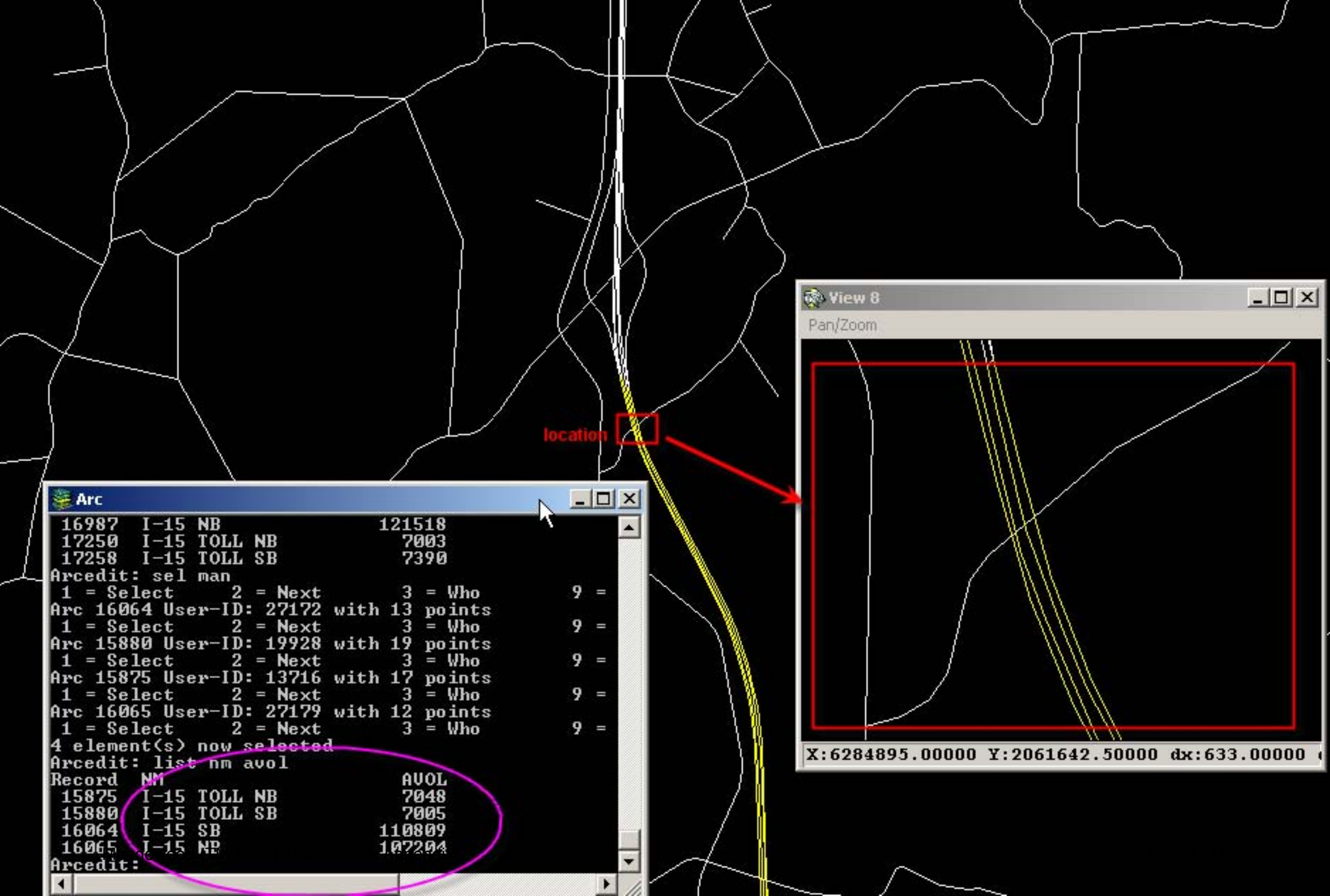
16987 I-15 NB 121518
17250 I-15 TOLL NB 7003
17258 I-15 TOLL SB 7390
Arcedit:


location
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Pan/Zoom
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17250 I-15 TOLL NB 7003
17258 I-15 TOLL SB 7390
Arcedit: sel man
1 = Select 2 = Next 3 = Who 9 =
Arc 16064 User-ID: 27172 with 13 points
1 = Select 2 = Next 3 = Who 9 =
Arc 15880 User-ID: 19928 with 19 points
1 = Select 2 = Next 3 = Who 9 =
Arc 15875 User-ID: 13716 with 17 points
1 = Select 2 = Next 3 = Who 9 =
Arc 16065 User-ID: 27179 with 12 points
1 = Select 2 = Next 3 = Who 9 =
4 element(s) now selected
Arcedit: list nm avol
Record NM AVOL
15875 I-15 TOLL NB 7048
15880 I-15 TOLL SB 7005
16064 I-15 SB 110809
16065 I-15 NB 107204
Arcedit:

Appendix S

Horizon Year (2030) Intersection LOS Calculations

AM Horizon Year

1: Pala Rd (SR-76) & Via Monserate — HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	10	1230	1938	50	100	40
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	1295	2040	53	105	42
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2093				2735	1046
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2093				2735	1046
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				0	81
cM capacity (veh/h)	260				16	225

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	11	647	647	1360	733	42
Volume Left	11	0	0	0	0	0
Volume Right	0	0	0	0	53	42
cSH	260	1700	1700	1700	1700	225
Volume to Capacity	0.04	0.38	0.38	0.80	0.43	0.19
Queue Length 95th (ft)	3	0	0	0	0	17
Control Delay (s)	19.4	0.0	0.0	0.0	0.0	24.7
Lane LOS	C					C
Approach Delay (s)	0.2			0.0		Err
Approach LOS						F

Intersection Summary			
Average Delay	Err		
Intersection Capacity Utilization	Err%	ICU Level of Service	H
Analysis Period (min)	15		

LOS Engineering

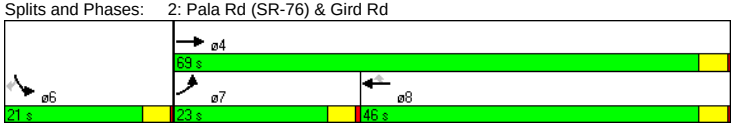
AM Horizon Year

2: Pala Rd (SR-76) & Gird Rd — Timings

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	160	1190	1308	50	90	140
Turn Type	Prot			Perm		Perm
Protected Phases	7	4	8		6	
Permitted Phases				8		6
Detector Phases	7	4	8	8	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	23.0	69.0	46.0	46.0	21.0	21.0
Total Split (%)	25.6%	76.7%	51.1%	51.1%	23.3%	23.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	None	None	None	Min	Min
Act Effct Green (s)	12.0	44.0	31.4	31.4	10.1	10.1
Actuated g/C Ratio	0.18	0.69	0.49	0.49	0.16	0.16
v/c Ratio	0.58	0.51	0.79	0.08	0.38	0.42
Control Delay	36.6	4.9	18.7	9.6	34.9	10.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.6	4.9	18.7	9.6	34.9	10.5
LOS	D	A	B	A	C	B
Approach Delay		8.6	18.4		20.1	
Approach LOS		A	B		C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 63.7	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.79	
Intersection Signal Delay: 14.0	Intersection LOS: B
Intersection Capacity Utilization 61.6%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 2: Pala Rd (SR-76) & Gird Rd



LOS Engineering

AM Horizon Year
2: Pala Rd (SR-76) & Gird Rd

Queues

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1900	1900	1700	1700	1700
Storage Length (ft)	450			20	0	180
Storage Lanes	1			1	1	1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1583	3539	3539	1417	1583	1417
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1583	3539	3539	1417	1583	1417
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				10		147
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		3191	8309		1271	
Travel Time (s)		72.5	188.8		28.9	
Volume (vph)	160	1190	1308	50	90	140
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	168	1253	1377	53	95	147
Lane Group Flow (vph)	168	1253	1377	53	95	147
v/c Ratio	0.58	0.51	0.79	0.08	0.38	0.42
Control Delay	36.6	4.9	18.7	9.6	34.9	10.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.6	4.9	18.7	9.6	34.9	10.5
Queue Length 50th (ft)	64	80	227	9	37	0
Queue Length 95th (ft)	145	153	420	32	93	51
Internal Link Dist (ft)		3111	8229		1191	
Turn Bay Length (ft)	450			20		180
Base Capacity (vph)	435	2784	2052	826	418	482
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	0.39	0.45	0.67	0.06	0.23	0.30

Intersection Summary
Area Type: Other

LOS Engineering

AM Horizon Year
2: Pala Rd (SR-76) & Gird Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1900	1900	1700	1700	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
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)	1583	3539	3539	1417	1583	1417
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1583	3539	3539	1417	1583	1417
Volume (vph)	160	1190	1308	50	90	140
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	168	1253	1377	53	95	147
RTOR Reduction (vph)	0	0	0	5	0	124
Lane Group Flow (vph)	168	1253	1377	48	95	23
Turn Type	Prot			Perm		Perm
Protected Phases	7	4	8		6	
Permitted Phases				8		6
Actuated Green, G (s)	9.7	45.1	31.4	31.4	10.1	10.1
Effective Green, g (s)	9.7	45.1	31.4	31.4	10.1	10.1
Actuated g/C Ratio	0.15	0.71	0.50	0.50	0.16	0.16
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	243	2525	1758	704	253	226
v/s Ratio Prot	c0.11	0.35	c0.39		c0.06	
v/s Ratio Perm				0.03		0.02
v/c Ratio	0.69	0.50	0.78	0.07	0.38	0.10
Uniform Delay, d1	25.3	4.0	13.1	8.3	23.7	22.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.2	0.2	2.4	0.0	0.9	0.2
Delay (s)	33.5	4.2	15.5	8.3	24.7	22.9
Level of Service	C	A	B	A	C	C
Approach Delay (s)		7.6	15.2		23.6	
Approach LOS		A	B		C	

Intersection Summary			
HCM Average Control Delay	12.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	63.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	61.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

AM Horizon Year

3: Pala Rd (SR-76) & Sage Rd — HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	10	1050	1558	10	10	20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	1105	1640	11	11	21
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1651				2219	825
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1651				2219	825
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				71	93
cM capacity (veh/h)	387				36	316

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	11	553	553	1093	557	21
Volume Left	11	0	0	0	0	0
Volume Right	0	0	0	0	11	21
cSH	387	1700	1700	1700	1700	316
Volume to Capacity	0.03	0.33	0.33	0.64	0.33	0.07
Queue Length 95th (ft)	2	0	0	0	0	5
Control Delay (s)	14.6	0.0	0.0	0.0	0.0	17.2
Lane LOS	B					C
Approach Delay (s)	0.1			0.0		Err
Approach LOS						F

Intersection Summary			
Average Delay	Err		
Intersection Capacity Utilization	Err%	ICU Level of Service	H
Analysis Period (min)	15		

LOS Engineering

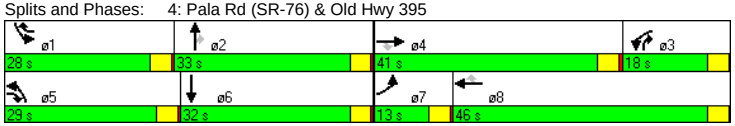
AM Horizon Year

4: Pala Rd (SR-76) & Old Hwy 395 — Timings

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Volume (vph)	93	697	160	90	1131	200	290	207	200	500	221
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot		pm+ov	Prot	
Protected Phases	7	4	5	3	8	1	5	2	3	1	6
Permitted Phases			4			8			2		
Detector Phases	7	4	5	3	8	1	5	2	3	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	8.0	20.0	20.0	20.0	20.0	8.0	20.0	20.0
Total Split (s)	13.0	41.0	29.0	18.0	46.0	28.0	29.0	33.0	18.0	28.0	32.0
Total Split (%)	10.8%	34.2%	24.2%	15.0%	38.3%	23.3%	24.2%	27.5%	15.0%	23.3%	26.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	Min	None	None	Min	Min	Min	None	Min	Min
Act Effct Green (s)	8.8	29.1	52.8	20.0	40.3	66.6	23.6	25.7	45.7	22.3	24.4
Actuated g/C Ratio	0.08	0.26	0.47	0.18	0.36	0.59	0.21	0.23	0.40	0.20	0.22
v/c Ratio	0.79	0.81	0.22	0.34	0.95	0.23	0.92	0.52	0.35	0.87	0.87
Control Delay	93.9	47.1	1.9	49.7	52.0	3.5	79.1	43.8	12.3	61.2	64.2
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	93.9	47.1	1.9	49.7	52.0	3.5	79.1	43.8	12.3	61.2	64.2
LOS	F	D	A	D	D	A	E	D	B	E	E
Approach Delay		44.1			45.0			49.4			62.4
Approach LOS		D			D			D			E

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 113.3	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.95	
Intersection Signal Delay: 49.3	Intersection LOS: D
Intersection Capacity Utilization 86.5%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 4: Pala Rd (SR-76) & Old Hwy 395



LOS Engineering

AM Horizon Year
4: Pala Rd (SR-76) & Old Hwy 395 — Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	330		0	150		150	0		0	0		0
Storage Lanes	1		0	1		1	1		1	2		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	50	50	50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt			0.850			0.850			0.850		0.951	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1583	3539	1417	1583	3539	1417	1583	1863	1417	3072	1771	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1583	3539	1417	1583	3539	1417	1583	1863	1417	3072	1771	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			168			170			39		19	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		652			462			899			4464	
Travel Time (s)		14.8			10.5			20.4			101.5	
Volume (vph)	93	697	160	90	1131	200	290	207	200	500	221	107
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	98	734	168	95	1191	211	305	218	211	526	233	113
Lane Group Flow (vph)	98	734	168	95	1191	211	305	218	211	526	346	0
v/c Ratio	0.79	0.81	0.22	0.34	0.95	0.23	0.92	0.52	0.35	0.87	0.87	
Control Delay	93.9	47.1	1.9	49.7	52.0	3.5	79.1	43.8	12.3	61.2	64.2	
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	93.9	47.1	1.9	49.7	52.0	3.5	79.1	43.8	12.3	61.2	64.2	
Queue Length 50th (ft)	76	281	0	66	472	13	234	146	45	204	242	
Queue Length 95th (ft)	#175	329	20	128	#621	47	#405	225	91	#293	#390	
Internal Link Dist (ft)		572			382			819			4384	
Turn Bay Length (ft)	330			150		150						
Base Capacity (vph)	127	1086	760	280	1298	893	347	466	595	645	441	
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	0.77	0.68	0.22	0.34	0.92	0.24	0.88	0.47	0.35	0.82	0.78	

Intersection Summary

Area Type: Other

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

LOS Engineering

AM Horizon Year
4: Pala Rd (SR-76) & Old Hwy 395 — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	
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)	1583	3539	1417	1583	3539	1417	1583	1863	1417	3072	1771	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1583	3539	1417	1583	3539	1417	1583	1863	1417	3072	1771	
Volume (vph)	93	697	160	90	1131	200	290	207	200	500	221	107
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	98	734	168	95	1191	211	305	218	211	526	233	113
RTOR Reduction (vph)	0	0	90	0	0	76	0	0	23	0	15	0
Lane Group Flow (vph)	98	734	78	95	1191	135	305	218	188	526	331	0
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot		pm+ov	Prot		
Protected Phases	7	4	5	3	8	1	5	2	3	1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	8.8	29.1	52.8	20.0	40.3	62.6	23.7	25.8	45.8	22.3	24.4	
Effective Green, g (s)	8.8	29.1	52.8	20.0	40.3	62.6	23.7	25.8	45.8	22.3	24.4	
Actuated g/C Ratio	0.08	0.26	0.47	0.18	0.36	0.55	0.21	0.23	0.40	0.20	0.22	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	123	910	661	280	1260	834	331	425	573	605	382	
v/s Ratio Prot	0.06	c0.21	0.02	0.06	c0.34	0.03	c0.19	0.12	0.06	0.17	c0.19	
v/s Ratio Perm			0.03			0.06			0.07			
v/c Ratio	0.80	0.81	0.12	0.34	0.95	0.16	0.92	0.51	0.33	0.87	0.87	
Uniform Delay, d1	51.3	39.4	17.1	40.8	35.4	12.4	43.8	38.2	23.1	44.0	42.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	29.0	5.3	0.1	0.7	14.2	0.1	30.1	1.0	0.3	12.6	18.2	
Delay (s)	80.3	44.7	17.1	41.5	49.5	12.5	73.9	39.3	23.5	56.7	61.1	
Level of Service	F	D	B	D	D	B	E	D	C	E	E	
Approach Delay (s)		43.6			43.8			49.1			58.4	
Approach LOS		D			D			D			E	

Intersection Summary

HCM Average Control Delay	47.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	113.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	86.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

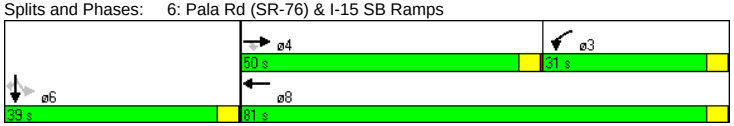
AM Horizon Year
6: Pala Rd (SR-76) & I-15 SB Ramps

Timings

Lane Group	EBT	EBR	WBL	WBT	SBL	SBT	SBR
Lane Configurations							
Volume (vph)	997	400	396	821	147	10	600
Turn Type		Perm	Prot		Perm		Perm
Protected Phases	4		3	8		6	
Permitted Phases		4			6		6
Detector Phases	4	4	3	8	6	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0	20.0	20.0
Total Split (s)	50.0	50.0	31.0	81.0	39.0	39.0	39.0
Total Split (%)	41.7%	41.7%	25.8%	67.5%	32.5%	32.5%	32.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes				
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min
Act Effct Green (s)	42.7	42.7	20.2	66.9	45.1	45.1	45.1
Actuated g/C Ratio	0.36	0.36	0.17	0.56	0.38	0.38	0.38
v/c Ratio	0.83	0.55	0.81	0.44	0.27	0.49	0.51
Control Delay	41.5	5.6	65.9	17.7	31.0	16.7	16.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.5	5.6	65.9	17.7	31.0	16.7	16.6
LOS	D	A	E	B	C	B	B
Approach Delay	31.2			33.4		19.4	
Approach LOS	C			C		B	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 40 (33%), Referenced to phase 2: and 6:SBTL, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.83	
Intersection Signal Delay: 29.3	Intersection LOS: C
Intersection Capacity Utilization 65.2%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 6: Pala Rd (SR-76) & I-15 SB Ramps



AM Horizon Year
6: Pala Rd (SR-76) & I-15 SB Ramps

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	0		0	500		0	0		0	0		900
Storage Lanes	0		1	2		0	0		0	1		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50	50	50					50	50	50
Trailing Detector (ft)		0	0	0	0					0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	1.00	1.00	0.95	0.91	0.95
Frt			0.850								0.855	0.850
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	3539	1417	3072	3539	0	0	0	0	1504	1449	1346
Flt Permitted				0.950						0.950		
Satd. Flow (perm)	0	3539	1417	3072	3539	0	0	0	0	1504	1449	1346
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			408								187	187
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		654			1271			961			1209	
Travel Time (s)		14.9			28.9			21.8			27.5	
Volume (vph)	0	997	400	396	821	0	0	0	0	147	10	600
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1049	421	417	864	0	0	0	0	155	11	632
Lane Group Flow (vph)	0	1049	421	417	864	0	0	0	0	155	327	316
v/c Ratio		0.83	0.55	0.81	0.44					0.27	0.49	0.51
Control Delay		41.5	5.6	65.9	17.7					31.0	16.7	16.6
Queue Delay		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Total Delay		41.5	5.6	65.9	17.7					31.0	16.7	16.6
Queue Length 50th (ft)		383	6	175	326					87	84	74
Queue Length 95th (ft)		441	75	m198	m405					169	213	196
Internal Link Dist (ft)		574			1191			881			1129	
Turn Bay Length (ft)				500								900
Base Capacity (vph)		1386	803	691	2283					570	665	626
Starvation Cap Reductn		0	0	0	0					0	0	0
Spillback Cap Reductn		0	0	0	0					0	0	0
Storage Cap Reductn		0	0	0	0					0	0	0
Reduced v/c Ratio		0.76	0.52	0.60	0.38					0.27	0.49	0.50

Intersection Summary	
Area Type:	Other
m Volume for 95th percentile queue is metered by upstream signal.	

AM Horizon Year

6: Pala Rd (SR-76) & I-15 SB Ramps — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)		4.0	4.0	4.0	4.0					4.0	4.0	4.0
Lane Util. Factor		0.95	1.00	0.97	0.95					0.95	0.91	0.95
Frt		1.00	0.85	1.00	1.00					1.00	0.86	0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95	1.00	1.00
Satd. Flow (prot)		3539	1417	3072	3539					1504	1449	1346
Flt Permitted		1.00	1.00	0.95	1.00					0.95	1.00	1.00
Satd. Flow (perm)		3539	1417	3072	3539					1504	1449	1346
Volume (vph)	0	997	400	396	821	0	0	0	0	147	10	600
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1049	421	417	864	0	0	0	0	155	11	632
RTOR Reduction (vph)	0	0	263	0	0	0	0	0	0	0	117	117
Lane Group Flow (vph)	0	1049	158	417	864	0	0	0	0	155	210	199
Turn Type			Perm	Prot						Perm		Perm
Protected Phases		4		3	8						6	
Permitted Phases			4							6		6
Actuated Green, G (s)		42.7	42.7	20.2	66.9					45.1	45.1	45.1
Effective Green, g (s)		42.7	42.7	20.2	66.9					45.1	45.1	45.1
Actuated g/C Ratio		0.36	0.36	0.17	0.56					0.38	0.38	0.38
Clearance Time (s)		4.0	4.0	4.0	4.0					4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Lane Grp Cap (vph)		1259	504	517	1973					565	545	506
v/s Ratio Prot		c0.30		c0.14	0.24							
v/s Ratio Perm			0.11							0.10	0.15	c0.15
v/c Ratio		0.83	0.31	0.81	0.44					0.27	0.39	0.39
Uniform Delay, d1		35.4	28.0	48.0	15.5					26.1	27.3	27.4
Progression Factor		1.00	1.00	1.21	1.15					1.00	1.00	1.00
Incremental Delay, d2		4.9	0.4	6.0	0.1					1.2	2.1	2.3
Delay (s)		40.3	28.4	63.9	17.9					27.3	29.4	29.7
Level of Service		D	C	E	B					C	C	C
Approach Delay (s)		36.9			32.9			0.0			29.1	
Approach LOS		D			C			A			C	

Intersection Summary			
HCM Average Control Delay	33.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

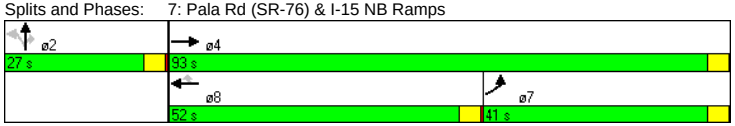
AM Horizon Year

7: Pala Rd (SR-76) & I-15 NB Ramps — Timings

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Lane Configurations							
Volume (vph)	550	594	937	130	280	10	370
Turn Type	Prot			Perm	Perm		Perm
Protected Phases	7	4	8			2	
Permitted Phases				8	2		2
Detector Phases	7	4	8	8	2	2	2
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	41.0	93.0	52.0	52.0	27.0	27.0	27.0
Total Split (%)	34.2%	77.5%	43.3%	43.3%	22.5%	22.5%	22.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lag		Lead	Lead			
Lead-Lag Optimize?	Yes		Yes	Yes			
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min
Act Effct Green (s)	30.6	73.7	39.2	39.2	38.3	38.3	38.3
Actuated g/C Ratio	0.26	0.61	0.33	0.33	0.32	0.32	0.32
v/c Ratio	0.74	0.29	0.85	0.28	0.35	0.41	0.49
Control Delay	63.7	25.7	45.3	20.8	38.9	36.5	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.7	25.7	45.3	20.8	38.9	36.5	7.5
LOS	E	C	D	C	D	D	A
Approach Delay		43.9	42.3			23.9	
Approach LOS		D	D			C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 38.7	Intersection LOS: D
Intersection Capacity Utilization 65.2%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 7: Pala Rd (SR-76) & I-15 NB Ramps



LOS Engineering

AM Horizon Year
7: Pala Rd (SR-76) & I-15 NB Ramps

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	450		0	0		50	0		800	0		0
Storage Lanes	2		0	0		1	1		1	0		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.95	0.91	0.95	1.00	1.00	1.00
Frt						0.850		0.949	0.850			
Flt Protected	0.950						0.950	0.971				
Satd. Flow (prot)	3072	3539	0	0	3539	1417	1504	1562	1346	0	0	0
Flt Permitted	0.950						0.950	0.971				
Satd. Flow (perm)	3072	3539	0	0	3539	1417	1504	1562	1346	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						40		19	317			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1271			2232			991			1241	
Travel Time (s)		28.9			50.7			22.5			28.2	
Volume (vph)	550	594	0	0	937	130	280	10	370	0	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	579	625	0	0	986	137	295	11	389	0	0	0
Lane Group Flow (vph)	579	625	0	0	986	137	168	210	317	0	0	0
v/c Ratio	0.74	0.29			0.85	0.28	0.35	0.41	0.49			
Control Delay	63.7	25.7			45.3	20.8	38.9	36.5	7.5			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	63.7	25.7			45.3	20.8	38.9	36.5	7.5			
Queue Length 50th (ft)	220	208			373	54	101	123	0			
Queue Length 95th (ft)	m236	m220			407	94	206	248	89			
Internal Link Dist (ft)		1191			2152			911			1161	
Turn Bay Length (ft)	450					50			800			
Base Capacity (vph)	971	2625			1416	591	480	511	645			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.60	0.24			0.70	0.23	0.35	0.41	0.49			

Intersection Summary

Area Type: Other

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

LOS Engineering

AM Horizon Year
7: Pala Rd (SR-76) & I-15 NB Ramps

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Lane Util. Factor	0.97	0.95			0.95	1.00	0.95	0.91	0.95			
Frt	1.00	1.00			1.00	0.85	1.00	0.95	0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95	0.97	1.00			
Satd. Flow (prot)	3072	3539			3539	1417	1504	1561	1346			
Flt Permitted	0.95	1.00			1.00	1.00	0.95	0.97	1.00			
Satd. Flow (perm)	3072	3539			3539	1417	1504	1561	1346			
Volume (vph)	550	594	0	0	937	130	280	10	370	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	579	625	0	0	986	137	295	11	389	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	27	0	13	216	0	0	0
Lane Group Flow (vph)	579	625	0	0	986	110	168	197	101	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Actuated Green, G (s)	30.6	73.8			39.2	39.2	38.2	38.2	38.2			
Effective Green, g (s)	30.6	73.8			39.2	39.2	38.2	38.2	38.2			
Actuated g/C Ratio	0.26	0.61			0.33	0.33	0.32	0.32	0.32			
Clearance Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Lane Grp Cap (vph)	783	2176			1156	463	479	497	428			
v/s Ratio Prot	c0.19	0.18			c0.28							
v/s Ratio Perm						0.08	0.11	0.13	0.07			
v/c Ratio	0.74	0.29			0.85	0.24	0.35	0.40	0.24			
Uniform Delay, d1	41.0	10.8			37.7	29.5	31.4	31.9	30.1			
Progression Factor	1.48	2.44			1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2	2.3	0.0			6.3	0.3	2.0	2.4	1.3			
Delay (s)	63.1	26.4			44.0	29.8	33.4	34.3	31.4			
Level of Service	E	C			D	C	C	C	C			
Approach Delay (s)		44.0			42.2			32.8			0.0	
Approach LOS		D			D			C			A	

Intersection Summary

HCM Average Control Delay	40.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

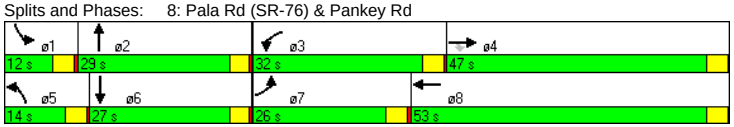
AM Horizon Year
8: Pala Rd (SR-76) & Pankey Rd

Timings

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	149	655	160	146	882	120	264	40	182
Turn Type	Prot		Perm	Prot		Prot		Prot	
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases			4						
Detector Phases	7	4	4	3	8	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	8.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	26.0	47.0	47.0	32.0	53.0	14.0	29.0	12.0	27.0
Total Split (%)	21.7%	39.2%	39.2%	26.7%	44.2%	11.7%	24.2%	10.0%	22.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	13.2	29.8	29.8	13.3	29.9	9.0	17.0	7.9	13.5
Actuated g/C Ratio	0.17	0.39	0.39	0.17	0.39	0.11	0.22	0.10	0.18
v/c Ratio	0.59	0.50	0.26	0.57	0.75	0.36	0.55	0.27	0.41
Control Delay	46.2	21.5	4.7	45.3	26.1	44.3	28.3	49.0	31.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.2	21.5	4.7	45.3	26.1	44.3	28.3	49.0	31.9
LOS	D	C	A	D	C	D	C	D	C
Approach Delay		22.5			28.6		31.9		34.3
Approach LOS		C			C		C		C

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 76.6	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 27.7	Intersection LOS: C
Intersection Capacity Utilization 65.5%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 8: Pala Rd (SR-76) & Pankey Rd



LOS Engineering

AM Horizon Year
8: Pala Rd (SR-76) & Pankey Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.986			0.944			0.961	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1583	3539	1417	1583	3490	0	3072	3341	0	1583	3401	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1583	3539	1417	1583	3490	0	3072	3341	0	1583	3401	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			168		11			94			37	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2232			2833			991			1488	
Travel Time (s)		50.7			64.4			22.5			33.8	
Volume (vph)	149	655	160	146	882	90	120	264	159	40	182	65
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	157	689	168	154	928	95	126	278	167	42	192	68
Lane Group Flow (vph)	157	689	168	154	1023	0	126	445	0	42	260	0
v/c Ratio	0.59	0.50	0.26	0.57	0.75		0.36	0.55		0.27	0.41	
Control Delay	46.2	21.5	4.7	45.3	26.1		44.3	28.3		49.0	31.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	46.2	21.5	4.7	45.3	26.1		44.3	28.3		49.0	31.9	
Queue Length 50th (ft)	75	139	0	74	234		31	88		20	54	
Queue Length 95th (ft)	181	257	43	175	408		80	185		70	121	
Internal Link Dist (ft)		2152			2753			911			1408	
Turn Bay Length (ft)												
Base Capacity (vph)	436	1807	806	513	1877		444	1174		182	1060	
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	0.36	0.38	0.21	0.30	0.55		0.28	0.38		0.23	0.25	

Intersection Summary	
Area Type:	Other

LOS Engineering

AM Horizon Year

8: Pala Rd (SR-76) & Pankey Rd — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.97	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.94		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	3539	1417	1583	3490		3072	3340		1583	3400	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	3539	1417	1583	3490		3072	3340		1583	3400	
Volume (vph)	149	655	160	146	882	90	120	264	159	40	182	65
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	157	689	168	154	928	95	126	278	167	42	192	68
RTOR Reduction (vph)	0	0	103	0	7	0	0	73	0	0	30	0
Lane Group Flow (vph)	157	689	65	154	1016	0	126	372	0	42	230	0
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	10.4	29.8	29.8	10.5	29.9		6.2	17.0		3.7	14.5	
Effective Green, g (s)	10.4	29.8	29.8	10.5	29.9		6.2	17.0		3.7	14.5	
Actuated g/C Ratio	0.14	0.39	0.39	0.14	0.39		0.08	0.22		0.05	0.19	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	214	1370	548	216	1355		247	737		76	640	
v/s Ratio Prot	c0.10	0.19		0.10	c0.29		c0.04	c0.11		0.03	0.07	
v/s Ratio Perm			0.05									
v/c Ratio	0.73	0.50	0.12	0.71	0.75		0.51	0.50		0.55	0.36	
Uniform Delay, d1	32.0	18.0	15.2	31.8	20.3		33.9	26.3		35.8	27.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	12.2	0.3	0.1	10.6	2.4		1.8	0.5		8.4	0.3	
Delay (s)	44.2	18.3	15.3	42.4	22.7		35.7	26.9		44.3	27.6	
Level of Service	D	B	B	D	C		D	C		D	C	
Approach Delay (s)		21.8			25.3			28.8			29.9	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	25.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	77.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

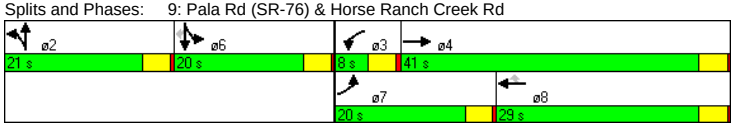
AM Horizon Year

9: Pala Rd (SR-76) & Horse Ranch Creek Rd — Timings

Lane Group	EBL	EBT	WBT	WBR	SBL	SBT	SBR	ø2	ø3
Lane Configurations									
Volume (vph)	415	440	850	83	57	0	268		
Turn Type	Prot			Perm	Split		Perm		
Protected Phases	7	4	8		6	6		2	3
Permitted Phases				8			6		
Detector Phases	7	4	8	8	6	6	6		
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	8.0
Total Split (s)	20.0	41.0	29.0	29.0	20.0	20.0	20.0	21.0	8.0
Total Split (%)	22.2%	45.6%	32.2%	32.2%	22.2%	22.2%	22.2%	23%	9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lag	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					Yes
Recall Mode	None	None	None	None	Min	Min	Min	Min	None
Act Effct Green (s)	13.7	39.7	21.9	21.9	8.3	8.3	8.3		
Actuated g/C Ratio	0.21	0.60	0.33	0.33	0.13	0.13	0.13		
v/c Ratio	0.68	0.22	0.76	0.16	0.32	0.20	0.21		
Control Delay	31.0	6.3	25.1	5.4	32.5	0.6	0.7		
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay	31.0	6.3	25.1	5.4	32.5	0.6	0.7		
LOS	C	A	C	A	C	A	A		
Approach Delay		18.3	23.3			6.3			
Approach LOS		B	C			A			

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 65.9	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.76	
Intersection Signal Delay: 18.7	Intersection LOS: B
Intersection Capacity Utilization 51.1%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 9: Pala Rd (SR-76) & Horse Ranch Creek Rd



LOS Engineering

AM Horizon Year
9: Pala Rd (SR-76) & Horse Ranch Creek Rd — Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	250		0	250		250	0		0	150		150
Storage Lanes	2		0	1		1	0		0	1		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50	50	50	50		50	50	50
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	0.95	0.91	0.95
Frt						0.850					0.850	0.850
Flt Protected	0.950									0.950		
Satd. Flow (prot)	3072	3539	0	1667	3539	1417	0	1863	0	1504	1441	1346
Flt Permitted	0.950									0.950		
Satd. Flow (perm)	3072	3539	0	1667	3539	1417	0	1863	0	1504	1441	1346
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						87					592	592
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2833			5160			734			1509	
Travel Time (s)		64.4			117.3			16.7			34.3	
Volume (vph)	415	440	0	0	850	83	0	0	0	57	0	268
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	437	463	0	0	895	87	0	0	0	60	0	282
Lane Group Flow (vph)	437	463	0	0	895	87	0	0	0	60	139	143
v/c Ratio	0.68	0.22			0.76	0.16				0.32	0.20	0.21
Control Delay	31.0	6.3			25.1	5.4				32.5	0.6	0.7
Queue Delay	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Total Delay	31.0	6.3			25.1	5.4				32.5	0.6	0.7
Queue Length 50th (ft)	88	38			172	0				25	0	0
Queue Length 95th (ft)	143	67			261	28				60	0	0
Internal Link Dist (ft)		2753			5080			654			1429	
Turn Bay Length (ft)	250					250				150		150
Base Capacity (vph)	729	2181			1292	573				331	779	758
Starvation Cap Reductn	0	0			0	0				0	0	0
Spillback Cap Reductn	0	0			0	0				0	0	0
Storage Cap Reductn	0	0			0	0				0	0	0
Reduced v/c Ratio	0.60	0.21			0.69	0.15				0.18	0.18	0.19

Intersection Summary
Area Type: Other

LOS Engineering

AM Horizon Year
9: Pala Rd (SR-76) & Horse Ranch Creek Rd — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0			4.0	4.0				4.0	4.0	4.0
Lane Util. Factor	0.97	0.95			0.95	1.00				0.95	0.91	0.95
Frt	1.00	1.00			1.00	0.85				1.00	0.85	0.85
Flt Protected	0.95	1.00			1.00	1.00				0.95	1.00	1.00
Satd. Flow (prot)	3072	3539			3539	1417				1504	1441	1346
Flt Permitted	0.95	1.00			1.00	1.00				0.95	1.00	1.00
Satd. Flow (perm)	3072	3539			3539	1417				1504	1441	1346
Volume (vph)	415	440	0	0	850	83	0	0	0	57	0	268
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	437	463	0	0	895	87	0	0	0	60	0	282
RTOR Reduction (vph)	0	0	0	0	0	58	0	0	0	0	121	125
Lane Group Flow (vph)	437	463	0	0	895	29	0	0	0	60	18	18
Turn Type	Prot			Prot		Perm	Split			Split		Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases						8						6
Actuated Green, G (s)	13.7	39.7			22.0	22.0				8.3	8.3	8.3
Effective Green, g (s)	13.7	39.7			22.0	22.0				8.3	8.3	8.3
Actuated g/C Ratio	0.21	0.61			0.34	0.34				0.13	0.13	0.13
Clearance Time (s)	4.0	4.0			4.0	4.0				4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0			3.0	3.0				3.0	3.0	3.0
Lane Grp Cap (vph)	642	2142			1187	475				190	182	170
v/s Ratio Prot	c0.14	0.13			c0.25					c0.04	0.01	
v/s Ratio Perm						0.02						0.01
v/c Ratio	0.68	0.22			0.75	0.06				0.32	0.10	0.11
Uniform Delay, d1	23.9	5.9			19.4	14.8				26.1	25.3	25.4
Progression Factor	1.00	1.00			1.00	1.00				1.00	1.00	1.00
Incremental Delay, d2	3.0	0.1			2.8	0.1				1.0	0.2	0.3
Delay (s)	26.9	5.9			22.2	14.8				27.0	25.6	25.6
Level of Service	C	A			C	B				C	C	C
Approach Delay (s)		16.1			21.5			0.0			25.9	
Approach LOS		B			C			A			C	

Intersection Summary

HCM Average Control Delay	20.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	65.6	Sum of lost time (s)	21.6
Intersection Capacity Utilization	51.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

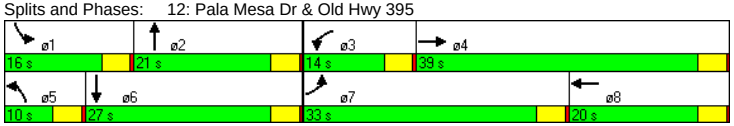
AM Horizon Year
12: Pala Mesa Dr & Old Hwy 395 — Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	400	127	84	71	60	370	149	720
Turn Type	Prot		Prot		Prot		Prot	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases								
Detector Phases	7	4	3	8	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	33.0	39.0	14.0	20.0	10.0	21.0	16.0	27.0
Total Split (%)	36.7%	43.3%	15.6%	22.2%	11.1%	23.3%	17.8%	30.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	23.5	25.5	9.0	11.0	6.6	16.6	10.9	20.6
Actuated g/C Ratio	0.33	0.35	0.12	0.15	0.09	0.23	0.15	0.28
v/c Ratio	0.82	0.83	0.46	0.52	0.44	0.63	0.68	0.79
Control Delay	40.3	25.8	44.6	30.2	50.7	31.6	51.9	34.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.3	25.8	44.6	30.2	50.7	31.6	51.9	34.1
LOS	D	C	D	C	D	C	D	C
Approach Delay		31.7		35.4		33.7		37.0
Approach LOS		C		D		C		D

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 72.3
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.83
Intersection Signal Delay: 34.2 — Intersection LOS: C
Intersection Capacity Utilization 77.5% — ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 12: Pala Mesa Dr & Old Hwy 395



AM Horizon Year
12: Pala Mesa Dr & Old Hwy 395 — Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	0		0	0		0	150		0	200		0
Storage Lanes	1		0	1		0	1		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.883			0.923			0.964			0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1583	1645	0	1583	1719	0	1583	3412	0	1583	3518	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1583	1645	0	1583	1719	0	1583	3412	0	1583	3518	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		232			51			42			4	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3628			1500			4464			5461	
Travel Time (s)		82.5			34.1			101.5			124.1	
Volume (vph)	400	127	450	84	71	75	60	370	118	149	720	30
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	421	134	474	88	75	79	63	389	124	157	758	32
Lane Group Flow (vph)	421	608	0	88	154	0	63	513	0	157	790	0
v/c Ratio	0.82	0.83		0.46	0.52		0.44	0.63		0.68	0.79	
Control Delay	40.3	25.8		44.6	30.2		50.7	31.6		51.9	34.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	40.3	25.8		44.6	30.2		50.7	31.6		51.9	34.1	
Queue Length 50th (ft)	198	188		44	51		33	121		79	202	
Queue Length 95th (ft)	#378	336		96	111		#94	191		#182	#328	
Internal Link Dist (ft)		3548			1420			4384			5381	
Turn Bay Length (ft)							150			200		
Base Capacity (vph)	627	867		230	411		144	926		272	1178	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.67	0.70		0.38	0.37		0.44	0.55		0.58	0.67	

Intersection Summary

Area Type: Other
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

AM Horizon Year

12: Pala Mesa Dr & Old Hwy 395 — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.88		1.00	0.92		1.00	0.96		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	1645		1583	1719		1583	3411		1583	3518	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	1645		1583	1719		1583	3411		1583	3518	
Volume (vph)	400	127	450	84	71	75	60	370	118	149	720	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	421	134	474	88	75	79	63	389	124	157	758	32
RTOR Reduction (vph)	0	151	0	0	45	0	0	32	0	0	3	0
Lane Group Flow (vph)	421	457	0	88	109	0	63	481	0	157	787	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	23.5	25.5		6.5	8.5		4.2	16.7		8.1	20.6	
Effective Green, g (s)	23.5	25.5		6.5	8.5		4.2	16.7		8.1	20.6	
Actuated g/C Ratio	0.32	0.35		0.09	0.12		0.06	0.23		0.11	0.28	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	511	576		141	201		91	782		176	995	
v/s Ratio Prot	c0.27	c0.28		0.06	0.06		0.04	0.14		c0.10	c0.22	
v/s Ratio Perm												
v/c Ratio	0.82	0.79		0.62	0.54		0.69	0.61		0.89	0.79	
Uniform Delay, d1	22.7	21.3		32.0	30.3		33.7	25.2		31.9	24.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	10.4	7.4		8.3	3.0		20.3	1.4		38.7	4.4	
Delay (s)	33.1	28.7		40.3	33.3		54.0	26.6		70.7	28.5	
Level of Service	C	C		D	C		D	C		E	C	
Approach Delay (s)		30.5			35.8			29.6			35.5	
Approach LOS		C			D			C			D	

Intersection Summary			
HCM Average Control Delay	32.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	72.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

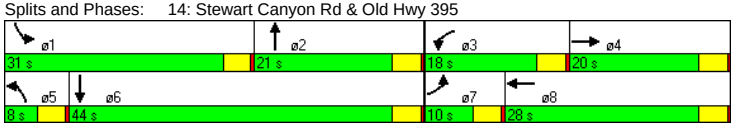
AM Horizon Year

14: Stewart Canyon Rd & Old Hwy 395 — Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	30	20	135	10	10	410	291	1010
Turn Type	Prot		Prot		Prot		Prot	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases								
Detector Phases	7	4	3	8	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	10.0	20.0	18.0	28.0	8.0	21.0	31.0	44.0
Total Split (%)	11.1%	22.2%	20.0%	31.1%	8.9%	23.3%	34.4%	48.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	6.4	7.3	10.4	13.2	4.6	21.6	16.2	37.0
Actuated g/C Ratio	0.10	0.12	0.17	0.22	0.07	0.37	0.27	0.64
v/c Ratio	0.20	0.30	0.52	0.44	0.10	0.35	0.72	0.49
Control Delay	37.9	18.3	35.0	8.1	39.9	23.7	31.8	10.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.9	18.3	35.0	8.1	39.9	23.7	31.8	10.9
LOS	D	B	D	A	D	C	C	B
Approach Delay		24.2		18.5		24.1		15.5
Approach LOS		C		B		C		B

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 58	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.72	
Intersection Signal Delay: 18.1	Intersection LOS: B
Intersection Capacity Utilization 62.0%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 14: Stewart Canyon Rd & Old Hwy 395



LOS Engineering

AM Horizon Year

14: Stewart Canyon Rd & Old Hwy 395 — Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	0		0	200		0	100		0	100		0
Storage Lanes	1		0	1		0	1		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.893			0.857			0.990			0.996	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1583	1663	0	1583	1596	0	1583	3504	0	1583	3525	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1583	1663	0	1583	1596	0	1583	3504	0	1583	3525	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		53			215			7			4	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1302			7424			5461			3410	
Travel Time (s)		29.6			168.7			124.1			77.5	
Volume (vph)	30	20	50	135	10	204	10	410	29	291	1010	30
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	21	53	142	11	215	11	432	31	306	1063	32
Lane Group Flow (vph)	32	74	0	142	226	0	11	463	0	306	1095	0
v/c Ratio	0.20	0.30		0.52	0.44		0.10	0.35		0.72	0.49	
Control Delay	37.9	18.3		35.0	8.1		39.9	23.7		31.8	10.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	37.9	18.3		35.0	8.1		39.9	23.7		31.8	10.9	
Queue Length 50th (ft)	12	8		51	3		4	85		108	134	
Queue Length 95th (ft)	44	49		128	61		22	168		220	287	
Internal Link Dist (ft)		1222			7344			5381			3330	
Turn Bay Length (ft)				200			100			100		
Base Capacity (vph)	165	441		376	709		112	1431		628	2356	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.19	0.17		0.38	0.32		0.10	0.32		0.49	0.46	

Intersection Summary

Area Type: Other

LOS Engineering

AM Horizon Year

14: Stewart Canyon Rd & Old Hwy 395 — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.89		1.00	0.86		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	1663		1583	1597		1583	3504		1583	3524	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	1663		1583	1597		1583	3504		1583	3524	
Volume (vph)	30	20	50	135	10	204	10	410	29	291	1010	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	21	53	142	11	215	11	432	31	306	1063	32
RTOR Reduction (vph)	0	49	0	0	179	0	0	5	0	0	2	0
Lane Group Flow (vph)	32	25	0	142	47	0	11	458	0	306	1093	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	1.7	4.4		8.2	10.9		0.6	22.3		13.4	35.1	
Effective Green, g (s)	1.7	4.4		8.2	10.9		0.6	22.3		13.4	35.1	
Actuated g/C Ratio	0.03	0.07		0.13	0.17		0.01	0.35		0.21	0.55	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	42	114		202	271		15	1215		330	1924	
v/s Ratio Prot	0.02	0.01		c0.09	c0.03		0.01	0.13		c0.19	c0.31	
v/s Ratio Perm												
v/c Ratio	0.76	0.22		0.70	0.18		0.73	0.38		0.93	0.57	
Uniform Delay, d1	31.1	28.3		26.9	22.9		31.8	15.8		25.0	9.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	56.2	1.0		10.6	0.3		103.2	0.2		31.1	0.4	
Delay (s)	87.2	29.3		37.4	23.2		135.0	16.0		56.1	10.0	
Level of Service	F	C		D	C		F	B		E	A	
Approach Delay (s)		46.8			28.7			18.7			20.1	
Approach LOS		D			C			B			C	

Intersection Summary

HCM Average Control Delay	22.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	64.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	62.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

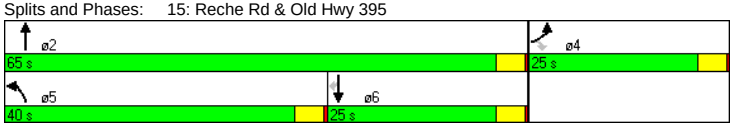
AM Horizon Year
15: Reche Rd & Old Hwy 395 — Timings

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	280	283	472	222	248	460
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Detector Phases	4	4	5	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0	20.0
Total Split (s)	25.0	25.0	40.0	65.0	25.0	25.0
Total Split (%)	27.8%	27.8%	44.4%	72.2%	27.8%	27.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	Min	Min	Min
Act Effct Green (s)	16.4	16.4	24.7	40.9	11.8	11.8
Actuated g/C Ratio	0.25	0.25	0.37	0.62	0.18	0.18
v/c Ratio	0.75	0.52	0.84	0.11	0.41	0.74
Control Delay	40.2	7.4	34.4	5.3	28.8	11.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.2	7.4	34.4	5.3	28.8	11.1
LOS	D	A	C	A	C	B
Approach Delay	23.7			25.1	17.3	
Approach LOS	C			C	B	

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 66.2
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.84
Intersection Signal Delay: 21.9 — Intersection LOS: C
Intersection Capacity Utilization 67.7% — ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 15: Reche Rd & Old Hwy 395



AM Horizon Year
15: Reche Rd & Old Hwy 395 — Queues

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1700	1700	1900	1900	1700
Storage Length (ft)	0	0	150			0
Storage Lanes	1	1	1			1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9	15			9
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1583	1417	1583	3539	3539	1417
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	1583	1417	1583	3539	3539	1417
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		298				484
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30			30	30	
Link Distance (ft)	2635			3410	4960	
Travel Time (s)	59.9			77.5	112.7	
Volume (vph)	280	283	472	222	248	460
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	295	298	497	234	261	484
Lane Group Flow (vph)	295	298	497	234	261	484
v/c Ratio	0.75	0.52	0.84	0.11	0.41	0.74
Control Delay	40.2	7.4	34.4	5.3	28.8	11.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.2	7.4	34.4	5.3	28.8	11.1
Queue Length 50th (ft)	112	0	182	19	53	0
Queue Length 95th (ft)	#290	65	#406	33	100	90
Internal Link Dist (ft)	2555			3330	4880	
Turn Bay Length (ft)			150			
Base Capacity (vph)	492	646	756	2535	1034	757
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	0.60	0.46	0.66	0.09	0.25	0.64

Intersection Summary

Area Type: Other
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

AM Horizon Year
15: Reche Rd & Old Hwy 395 — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1700	1700	1900	1900	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1583	1417	1583	3539	3539	1417
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1583	1417	1583	3539	3539	1417
Volume (vph)	280	283	472	222	248	460
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	295	298	497	234	261	484
RTOR Reduction (vph)	0	223	0	0	0	394
Lane Group Flow (vph)	295	75	497	234	261	90
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	16.4	16.4	24.7	40.9	12.2	12.2
Effective Green, g (s)	16.4	16.4	24.7	40.9	12.2	12.2
Actuated g/C Ratio	0.25	0.25	0.38	0.63	0.19	0.19
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	398	356	599	2217	661	265
v/s Ratio Prot	c0.19		c0.31	0.07	c0.07	
v/s Ratio Perm		0.05				0.06
v/c Ratio	0.74	0.21	0.83	0.11	0.39	0.34
Uniform Delay, d1	22.5	19.3	18.4	4.9	23.3	23.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.3	0.3	9.3	0.0	0.4	0.8
Delay (s)	29.8	19.6	27.7	4.9	23.7	23.8
Level of Service	C	B	C	A	C	C
Approach Delay (s)	24.7			20.4	23.8	
Approach LOS	C			C	C	

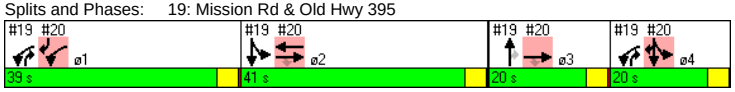
Intersection Summary			
HCM Average Control Delay	22.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	65.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

AM Horizon Year
19: Mission Rd & Old Hwy 395 — Timings

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	ø1	ø4
Lane Configurations								
Volume (vph)	199	1120	85	237	850	69		
Turn Type		Free		pm+ov	Split			
Protected Phases	1 4		3	1 4	2	2	1	4
Permitted Phases		Free		3				
Detector Phases	1 4		3	1 4	2	2		
Minimum Initial (s)			4.0		4.0	4.0	4.0	4.0
Minimum Split (s)			20.0		20.0	20.0	8.0	20.0
Total Split (s)	59.0	0.0	20.0	59.0	41.0	41.0	39.0	20.0
Total Split (%)	49.2%	0.0%	16.7%	49.2%	34.2%	34.2%	33%	17%
Yellow Time (s)			3.5		3.5	3.5	3.5	3.5
All-Red Time (s)			0.5		0.5	0.5	0.5	0.5
Lead/Lag			Lead		Lag	Lag	Lead	Lag
Lead-Lag Optimize?			Yes		Yes	Yes	Yes	Yes
Recall Mode			None		Min	Min	None	None
Act Effct Green (s)	55.0	117.3	13.2	72.3	37.0	37.0		
Actuated g/C Ratio	0.47	1.00	0.11	0.62	0.32	0.32		
v/c Ratio	0.28	0.83	0.42	0.29	0.92	0.12		
Control Delay	23.6	5.3	54.6	11.4	55.0	30.2		
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay	23.6	5.3	54.6	11.4	55.0	30.2		
LOS	C	A	D	B	D	C		
Approach Delay	8.1		22.8			53.1		
Approach LOS	A		C			D		

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 117.3	
Natural Cycle: 110	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.01	
Intersection Signal Delay: 26.1	Intersection LOS: C
Intersection Capacity Utilization 52.8%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 19: Mission Rd & Old Hwy 395



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1700	1700	1900	1700	1700	1900
Storage Length (ft)	0	130		210	100	
Storage Lanes	1	1		1	2	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.97	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1583	1417	1863	1417	3072	1863
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1583	1417	1863	1417	3072	1863
Right Turn on Red		No		No		
Satd. Flow (RTOR)						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30		30			30
Link Distance (ft)	434		4960			1035
Travel Time (s)	9.9		112.7			23.5
Volume (vph)	199	1120	85	237	850	69
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	209	1179	89	249	895	73
Lane Group Flow (vph)	209	1179	89	249	895	73
v/c Ratio	0.28	0.83	0.42	0.29	0.92	0.12
Control Delay	23.6	5.3	54.6	11.4	55.0	30.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.6	5.3	54.6	11.4	55.0	30.2
Queue Length 50th (ft)	101	155	64	82	342	40
Queue Length 95th (ft)	m110	m114	117	127	#477	78
Internal Link Dist (ft)	354		4880			955
Turn Bay Length (ft)		130		210	100	
Base Capacity (vph)	743	1417	254	873	970	588
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	0.28	0.83	0.35	0.29	0.92	0.12

Intersection Summary

Area Type: Other

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	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1700	1700	1900	1700	1700	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.97	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1583	1417	1863	1417	3072	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1583	1417	1863	1417	3072	1863
Volume (vph)	199	1120	85	237	850	69
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	209	1179	89	249	895	73
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	209	1179	89	249	895	73
Turn Type		Free		pm+ov	Split	
Protected Phases	1 4		3	1 4	2	2
Permitted Phases		Free		3		
Actuated Green, G (s)	55.0	117.2	13.2	68.2	37.0	37.0
Effective Green, g (s)	55.0	117.2	13.2	68.2	37.0	37.0
Actuated g/C Ratio	0.47	1.00	0.11	0.58	0.32	0.32
Clearance Time (s)			4.0		4.0	4.0
Vehicle Extension (s)			3.0		3.0	3.0
Lane Grp Cap (vph)	743	1417	210	873	970	588
v/s Ratio Prot	0.13		0.05	0.13	c0.29	0.04
v/s Ratio Perm		c0.83		0.04		
v/c Ratio	0.28	0.83	0.42	0.29	0.92	0.12
Uniform Delay, d1	19.0	0.0	48.5	12.3	38.7	28.6
Progression Factor	1.17	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	2.0	1.4	0.2	13.8	0.1
Delay (s)	22.3	2.0	49.8	12.5	52.5	28.7
Level of Service	C	A	D	B	D	C
Approach Delay (s)	5.1		22.3			50.7
Approach LOS	A		C			D

Intersection Summary

HCM Average Control Delay	23.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	117.2	Sum of lost time (s)	4.0
Intersection Capacity Utilization	52.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

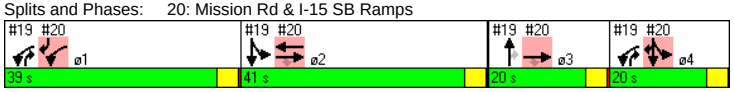
AM Horizon Year
20: Mission Rd & I-15 SB Ramps — Timings

Lane Group	EBT	EBR	WBL	WBT	SBT	SBR	ø3
Lane Configurations							
Volume (vph)	757	330	120	469	10	850	
Turn Type		Perm	Prot			custom	
Protected Phases	2 3		1	2	4	1 4	3
Permitted Phases		2 3				4	
Detector Phases	2 3	2 3	1	2	4	1 4	
Minimum Initial (s)			4.0	4.0	4.0		4.0
Minimum Split (s)			8.0	20.0	20.0		20.0
Total Split (s)	61.0	61.0	39.0	41.0	20.0	59.0	20.0
Total Split (%)	50.8%	50.8%	32.5%	34.2%	16.7%	49.2%	17%
Yellow Time (s)			3.5	3.5	3.5		3.5
All-Red Time (s)			0.5	0.5	0.5		0.5
Lead/Lag			Lead	Lag	Lag		Lead
Lead-Lag Optimize?			Yes	Yes	Yes		Yes
Recall Mode			None	Min	None		None
Act Effct Green (s)	54.3	54.3	35.0	37.0	16.0	55.0	
Actuated g/C Ratio	0.46	0.46	0.30	0.32	0.14	0.47	
v/c Ratio	0.49	0.41	0.27	0.84	0.09	1.01	
Control Delay	7.8	0.9	34.0	52.2	46.5	49.8	
Queue Delay	0.5	0.5	0.0	0.0	0.0	0.0	
Total Delay	8.2	1.4	34.0	52.2	46.5	49.8	
LOS	A	A	C	D	D	D	
Approach Delay	6.2			48.5	49.7		
Approach LOS	A			D	D		

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 117.3
Natural Cycle: 110
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.01
Intersection Signal Delay: 30.8 — Intersection LOS: C
Intersection Capacity Utilization 90.2% — ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 20: Mission Rd & I-15 SB Ramps



LOS Engineering

AM Horizon Year
20: Mission Rd & I-15 SB Ramps — Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	0		0	285		0	0		0	0		200
Storage Lanes	0		1	1		0	0		0	0		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50	50	50					50	50	50
Trailing Detector (ft)		0	0	0	0					0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950							0.976	
Satd. Flow (prot)	0	3539	1417	1583	1863	0	0	0	0	0	1818	1417
Flt Permitted				0.950							0.976	
Satd. Flow (perm)	0	3539	1417	1583	1863	0	0	0	0	0	1818	1417
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			347									421
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		434			744			972			897	
Travel Time (s)		9.9			16.9			22.1			20.4	
Volume (vph)	0	757	330	120	469	0	0	0	0	10	10	850
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	797	347	126	494	0	0	0	0	11	11	895
Lane Group Flow (vph)	0	797	347	126	494	0	0	0	0	0	22	895
v/c Ratio		0.49	0.41	0.27	0.84						0.09	1.01
Control Delay		7.8	0.9	34.0	52.2						46.5	49.8
Queue Delay		0.5	0.5	0.0	0.0						0.0	0.0
Total Delay		8.2	1.4	34.0	52.2						46.5	49.8
Queue Length 50th (ft)		52	0	74	354						15	~499
Queue Length 95th (ft)		m62	m0	128	#545						41	#798
Internal Link Dist (ft)		354			664			892			817	
Turn Bay Length (ft)				285								200
Base Capacity (vph)		1721	867	473	588						248	889
Starvation Cap Reductn		467	199	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	0.52	0.27	0.84						0.09	1.01

Intersection Summary

Area Type: Other
~ 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.

LOS Engineering

AM Horizon Year
20: Mission Rd & I-15 SB Ramps — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)		4.0	4.0	4.0	4.0						4.0	4.0
Lane Util. Factor		0.95	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						0.98	1.00
Satd. Flow (prot)		3539	1417	1583	1863						1817	1417
Flt Permitted		1.00	1.00	0.95	1.00						0.98	1.00
Satd. Flow (perm)		3539	1417	1583	1863						1817	1417
Volume (vph)	0	757	330	120	469	0	0	0	0	10	10	850
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	797	347	126	494	0	0	0	0	11	11	895
RTOR Reduction (vph)	0	0	187	0	0	0	0	0	0	0	0	223
Lane Group Flow (vph)	0	797	160	126	494	0	0	0	0	0	22	672
Turn Type			Perm	Prot						Split		custom
Protected Phases		2 3		1	2					4	4	1 4
Permitted Phases			2 3									4
Actuated Green, G (s)		54.2	54.2	35.0	37.0						16.0	55.0
Effective Green, g (s)		54.2	54.2	35.0	37.0						16.0	55.0
Actuated g/C Ratio		0.46	0.46	0.30	0.32						0.14	0.47
Clearance Time (s)				4.0	4.0						4.0	
Vehicle Extension (s)				3.0	3.0						3.0	
Lane Grp Cap (vph)		1637	655	473	588						248	665
v/s Ratio Prot		c0.23		0.08	c0.27						0.01	c0.47
v/s Ratio Perm			0.11									
v/c Ratio		0.49	0.24	0.27	0.84						0.09	1.01
Uniform Delay, d1		21.9	19.1	31.3	37.3						44.2	31.1
Progression Factor		0.33	0.03	1.00	1.00						1.00	1.00
Incremental Delay, d2		0.1	0.1	0.3	10.5						0.2	37.4
Delay (s)		7.3	0.6	31.6	47.8						44.4	68.5
Level of Service		A	A	C	D						D	E
Approach Delay (s)		5.2			44.5			0.0			67.9	
Approach LOS		A			D			A			E	

Intersection Summary			
HCM Average Control Delay	35.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	117.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	90.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

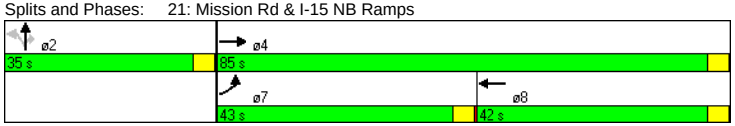
LOS Engineering

AM Horizon Year
21: Mission Rd & I-15 NB Ramps — Timings

Lane Group	EBL	EBT	WBT	NBT	NBR
Lane Configurations					
Volume (vph)	592	175	329	10	90
Turn Type	Prot				Perm
Protected Phases	7	4	8	2	
Permitted Phases					2
Detector Phases	7	4	8	2	2
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0
Total Split (s)	43.0	85.0	42.0	35.0	35.0
Total Split (%)	35.8%	70.8%	35.0%	29.2%	29.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Recall Mode	None	None	None	Min	Min
Act Effct Green (s)	19.6	42.9	18.6	16.2	16.2
Actuated g/C Ratio	0.29	0.63	0.27	0.24	0.24
v/c Ratio	0.71	0.16	0.73	0.68	0.23
Control Delay	29.0	6.2	34.0	35.7	8.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	29.0	6.2	34.0	35.7	8.2
LOS	C	A	C	D	A
Approach Delay		23.8	34.0	28.8	
Approach LOS		C	C	C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 68.5	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.73	
Intersection Signal Delay: 27.4	Intersection LOS: C
Intersection Capacity Utilization 90.2%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 21: Mission Rd & I-15 NB Ramps



LOS Engineering

AM Horizon Year
21: Mission Rd & I-15 NB Ramps

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	300		0	0		0	0		200	0		0
Storage Lanes	2		0	0		0	0		1	0		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50		50	50	50			
Trailing Detector (ft)	0	0			0		0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.992				0.850			
Flt Protected	0.950							0.954				
Satd. Flow (prot)	3072	1863	0	0	1848	0	0	1777	1417	0	0	0
Flt Permitted	0.950							0.954				
Satd. Flow (perm)	3072	1863	0	0	1848	0	0	1777	1417	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					3				95			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		744			1271			1082			1005	
Travel Time (s)		16.9			28.9			24.6			22.8	
Volume (vph)	592	175	0	0	329	20	260	10	90	0	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	623	184	0	0	346	21	274	11	95	0	0	0
Lane Group Flow (vph)	623	184	0	0	367	0	0	285	95	0	0	0
v/c Ratio	0.71	0.16			0.73			0.68	0.23			
Control Delay	29.0	6.2			34.0			35.7	8.2			
Queue Delay	0.0	0.0			0.0			0.0	0.0			
Total Delay	29.0	6.2			34.0			35.7	8.2			
Queue Length 50th (ft)	108	25			126			100	0			
Queue Length 95th (ft)	266	75			332			273	41			
Internal Link Dist (ft)		664			1191			1002			925	
Turn Bay Length (ft)	300								200			
Base Capacity (vph)	1427	1433			840			702	617			
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	0.44	0.13			0.44			0.41	0.15			

Intersection Summary

Area Type: Other

LOS Engineering

AM Horizon Year
21: Mission Rd & I-15 NB Ramps

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0			4.0			4.0	4.0			
Lane Util. Factor	0.97	1.00			1.00			1.00	1.00			
Frt	1.00	1.00			0.99			1.00	0.85			
Flt Protected	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (prot)	3072	1863			1848			1777	1417			
Flt Permitted	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (perm)	3072	1863			1848			1777	1417			
Volume (vph)	592	175	0	0	329	20	260	10	90	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	623	184	0	0	346	21	274	11	95	0	0	0
RTOR Reduction (vph)	0	0	0	0	2	0	0	0	72	0	0	0
Lane Group Flow (vph)	623	184	0	0	365	0	0	285	23	0	0	0
Turn Type	Prot						Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases							2		2			
Actuated Green, G (s)	19.6	42.9			19.3			16.3	16.3			
Effective Green, g (s)	19.6	42.9			19.3			16.3	16.3			
Actuated g/C Ratio	0.29	0.64			0.29			0.24	0.24			
Clearance Time (s)	4.0	4.0			4.0			4.0	4.0			
Vehicle Extension (s)	3.0	3.0			3.0			3.0	3.0			
Lane Grp Cap (vph)	896	1189			531			431	344			
v/s Ratio Prot	c0.20	0.10			c0.20							
v/s Ratio Perm								0.16	0.02			
v/c Ratio	0.70	0.15			0.69			0.66	0.07			
Uniform Delay, d1	21.1	4.9			21.3			23.0	19.6			
Progression Factor	1.00	1.00			1.00			1.00	1.00			
Incremental Delay, d2	2.4	0.1			3.7			3.8	0.1			
Delay (s)	23.5	4.9			25.0			26.7	19.7			
Level of Service	C	A			C			C	B			
Approach Delay (s)		19.3			25.0			25.0			0.0	
Approach LOS		B			C			C			A	

Intersection Summary

HCM Average Control Delay	22.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	67.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	90.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

AM Horizon Year

22: Stewart Canyon Rd & Horse Ranch Creek Rd — HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Yield			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	30	290	199	20	30	30
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	32	305	209	21	32	32
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	487	47	63			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	487	47	63			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	93	70	86			
cM capacity (veh/h)	466	1022	1539			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	337	231	63
Volume Left	32	209	0
Volume Right	305	0	32
cSH	919	1539	1700
Volume to Capacity	0.37	0.14	0.04
Queue Length 95th (ft)	42	12	0
Control Delay (s)	11.2	7.1	0.0
Lane LOS	B	A	
Approach Delay (s)	11.2	7.1	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	8.6		
Intersection Capacity Utilization	45.0%	ICU Level of Service	A
Analysis Period (min)	15		

LOS Engineering

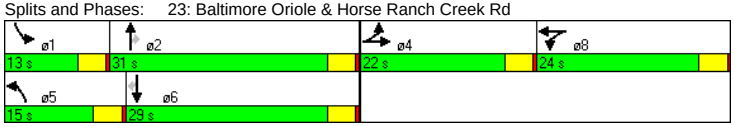
AM Horizon Year

23: Baltimore Oriole & Horse Ranch Creek Rd — Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	20	10	190	40	55	159	146	35	235	50
Turn Type	Split		Split		Prot		Perm	Prot		Perm
Protected Phases	4	4	8	8	5	2		1	6	
Permitted Phases							2			6
Detector Phases	4	4	8	8	5	2	2	1	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0	20.0
Total Split (s)	22.0	22.0	24.0	24.0	15.0	31.0	31.0	13.0	29.0	29.0
Total Split (%)	24.4%	24.4%	26.7%	26.7%	16.7%	34.4%	34.4%	14.4%	32.2%	32.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag					Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	7.9	7.9	13.1	13.1	9.0	28.1	28.1	8.3	27.6	27.6
Actuated g/C Ratio	0.12	0.12	0.21	0.21	0.14	0.47	0.47	0.13	0.46	0.46
v/c Ratio	0.11	0.09	0.43	0.43	0.27	0.19	0.21	0.18	0.29	0.08
Control Delay	25.6	20.2	20.7	17.6	24.5	13.5	4.4	25.4	14.9	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.6	20.2	20.7	17.6	24.5	13.5	4.4	25.4	14.9	6.8
LOS	C	C	C	B	C	B	A	C	B	A
Approach Delay		22.9		19.0		11.5			14.7	
Approach LOS		C		B		B			B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 59.9	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.43	
Intersection Signal Delay: 15.1	Intersection LOS: B
Intersection Capacity Utilization 40.3%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 23: Baltimore Oriole & Horse Ranch Creek Rd



LOS Engineering

AM Horizon Year

23: Baltimore Oriole & Horse Ranch Creek Rd — Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	50
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.932			0.949				0.850			0.850
Flt Protected	0.950			0.950	0.981		0.950			0.950		
Satd. Flow (prot)	1583	1736	0	1504	1647	0	1583	1863	1417	1583	1863	1417
Flt Permitted	0.950			0.950	0.981		0.950			0.950		
Satd. Flow (perm)	1583	1736	0	1504	1647	0	1583	1863	1417	1583	1863	1417
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9			26				154			53
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1047			1324			958			2343	
Travel Time (s)		23.8			30.1			21.8			53.3	
Volume (vph)	20	10	9	190	40	50	55	159	146	35	235	50
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	11	9	200	42	53	58	167	154	37	247	53
Lane Group Flow (vph)	21	20	0	138	157	0	58	167	154	37	247	53
v/c Ratio	0.11	0.09		0.43	0.43		0.27	0.19	0.21	0.18	0.29	0.08
Control Delay	25.6	20.2		20.7	17.6		24.5	13.5	4.4	25.4	14.9	6.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.6	20.2		20.7	17.6		24.5	13.5	4.4	25.4	14.9	6.8
Queue Length 50th (ft)	2	1		11	10		5	12	0	3	19	0
Queue Length 95th (ft)	28	23		106	105		55	103	38	41	156	24
Internal Link Dist (ft)		967			1244			878			2263	
Turn Bay Length (ft)												
Base Capacity (vph)	437	485		534	601		308	1126	918	260	1095	854
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	0.05	0.04		0.26	0.26		0.19	0.15	0.17	0.14	0.23	0.06

Intersection Summary

Area Type: Other

LOS Engineering

AM Horizon Year

23: Baltimore Oriole & Horse Ranch Creek Rd — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
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	1.00		0.95	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.93		1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1583	1737		1504	1647		1583	1863	1417	1583	1863	1417
Flt Permitted	0.95	1.00		0.95	0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1583	1737		1504	1647		1583	1863	1417	1583	1863	1417
Volume (vph)	20	10	9	190	40	50	55	159	146	35	235	50
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	11	9	200	42	53	58	167	154	37	247	53
RTOR Reduction (vph)	0	9	0	0	21	0	0	0	85	0	0	30
Lane Group Flow (vph)	21	11	0	138	136	0	58	167	69	37	247	23
Turn Type	Split			Split			Prot		Perm	Prot		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	2.8	2.8		12.2	12.2		3.6	27.8	27.8	3.1	27.3	27.3
Effective Green, g (s)	2.8	2.8		12.2	12.2		3.6	27.8	27.8	3.1	27.3	27.3
Actuated g/C Ratio	0.05	0.05		0.20	0.20		0.06	0.45	0.45	0.05	0.44	0.44
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	72	79		296	325		92	837	636	79	822	625
v/s Ratio Prot	c0.01	0.01		c0.09	0.08		c0.04	0.09		0.02	c0.13	
v/s Ratio Perm									0.05			0.02
v/c Ratio	0.29	0.14		0.47	0.42		0.63	0.20	0.11	0.47	0.30	0.04
Uniform Delay, d1	28.6	28.4		22.0	21.7		28.5	10.3	9.9	28.6	11.1	9.8
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.2	0.8		1.2	0.9		13.2	0.1	0.1	4.3	0.2	0.0
Delay (s)	30.8	29.2		23.1	22.6		41.7	10.4	10.0	32.9	11.4	9.9
Level of Service	C	C		C	C		D	B	A	C	B	A
Approach Delay (s)		30.1			22.9			15.0			13.5	
Approach LOS		C			C			B			B	

Intersection Summary

HCM Average Control Delay	17.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	61.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	40.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

AM Horizon Year

24: Longspur Rd & Horse Ranch Creek Rd — Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	20	40	165	50	125	270	40	339
Turn Type	Split		Split		Prot		Prot	
Protected Phases	4	4	8	8	5	2	1	6
Permitted Phases								
Detector Phases	4	4	8	8	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	21.0	21.0	23.0	23.0	20.0	34.0	12.0	26.0
Total Split (%)	23.3%	23.3%	25.6%	25.6%	22.2%	37.8%	13.3%	28.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Max	None	Max
Act Effct Green (s)	8.3	8.3	12.4	12.4	12.0	45.2	7.4	38.1
Actuated g/C Ratio	0.10	0.10	0.15	0.15	0.14	0.55	0.09	0.46
v/c Ratio	0.14	0.44	0.59	0.56	0.59	0.25	0.31	0.26
Control Delay	32.8	22.8	38.6	30.8	39.0	8.6	39.0	17.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.8	22.8	38.6	30.8	39.0	8.6	39.0	17.4
LOS	C	C	D	C	D	A	D	B
Approach Delay		24.6		34.4		15.2		19.4
Approach LOS		C		C		B		B

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 82.5

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

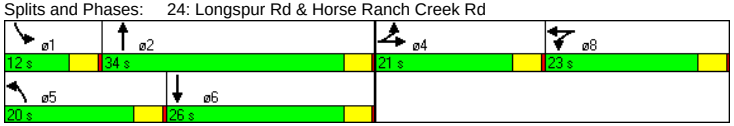
Maximum v/c Ratio: 0.59

Intersection Signal Delay: 20.9 — Intersection LOS: C

Intersection Capacity Utilization 43.1% — ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 24: Longspur Rd & Horse Ranch Creek Rd



LOS Engineering

AM Horizon Year

24: Longspur Rd & Horse Ranch Creek Rd — Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.917			0.947			0.939			0.978	
Flt Protected	0.950			0.950	0.986		0.950			0.950		
Satd. Flow (prot)	1583	1708	0	1504	1652	0	1583	3323	0	1583	3461	0
Flt Permitted	0.950			0.950	0.986		0.950			0.950		
Satd. Flow (perm)	1583	1708	0	1504	1652	0	1583	3323	0	1583	3461	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		52			28			196			21	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1010			908			1206			958	
Travel Time (s)		23.0			20.6			27.4			21.8	
Volume (vph)	20	40	49	165	50	50	125	270	186	40	339	60
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	42	52	174	53	53	132	284	196	42	357	63
Lane Group Flow (vph)	21	94	0	130	150	0	132	480	0	42	420	0
v/c Ratio	0.14	0.44		0.59	0.56		0.59	0.25		0.31	0.26	
Control Delay	32.8	22.8		38.6	30.8		39.0	8.6		39.0	17.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	32.8	22.8		38.6	30.8		39.0	8.6		39.0	17.4	
Queue Length 50th (ft)	9	18		56	52		55	40		18	65	
Queue Length 95th (ft)	30	62		117	115		114	90		52	133	
Internal Link Dist (ft)		930			828			1126			878	
Turn Bay Length (ft)												
Base Capacity (vph)	303	369		329	384		301	1908		152	1609	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.07	0.25		0.40	0.39		0.44	0.25		0.28	0.26	

Intersection Summary

Area Type: Other

LOS Engineering

AM Horizon Year

24: Longspur Rd & Horse Ranch Creek Rd — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		0.95	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.92		1.00	0.95		1.00	0.94		1.00	0.98	
Flt Protected	0.95	1.00		0.95	0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	1708		1504	1652		1583	3322		1583	3460	
Flt Permitted	0.95	1.00		0.95	0.99		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	1708		1504	1652		1583	3322		1583	3460	
Volume (vph)	20	40	49	165	50	50	125	270	186	40	339	60
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	42	52	174	53	53	132	284	196	42	357	63
RTOR Reduction (vph)	0	47	0	0	24	0	0	92	0	0	11	0
Lane Group Flow (vph)	21	47	0	130	126	0	132	388	0	42	409	0
Turn Type	Split			Split			Prot			Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	7.4	7.4		11.4	11.4		11.0	44.6		5.0	38.6	
Effective Green, g (s)	7.4	7.4		11.4	11.4		11.0	44.6		5.0	38.6	
Actuated g/C Ratio	0.09	0.09		0.14	0.14		0.13	0.53		0.06	0.46	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	139	150		203	223		206	1755		94	1582	
v/s Ratio Prot	0.01	c0.03		c0.09	0.08		c0.08	0.12		0.03	c0.12	
v/s Ratio Perm												
v/c Ratio	0.15	0.31		0.64	0.56		0.64	0.22		0.45	0.26	
Uniform Delay, d1	35.6	36.1		34.6	34.2		34.8	10.6		38.4	14.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	1.2		6.7	3.2		6.6	0.3		3.4	0.4	
Delay (s)	36.1	37.3		41.3	37.4		41.5	10.9		41.7	14.5	
Level of Service	D	D		D	D		D	B		D	B	
Approach Delay (s)		37.1			39.2			17.5			17.0	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM Average Control Delay	23.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	84.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	43.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

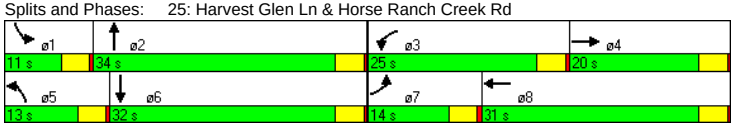
AM Horizon Year

25: Harvest Glen Ln & Horse Ranch Creek Rd — Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	10	29	131	25	60	523	56	477
Turn Type	Prot		Prot		Prot		Prot	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases								
Detector Phases	7	4	3	8	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	14.0	20.0	25.0	31.0	13.0	34.0	11.0	32.0
Total Split (%)	15.6%	22.2%	27.8%	34.4%	14.4%	37.8%	12.2%	35.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	7.1	7.6	11.1	13.0	8.1	31.6	7.4	31.0
Actuated g/C Ratio	0.11	0.13	0.20	0.23	0.14	0.59	0.12	0.57
v/c Ratio	0.06	0.18	0.44	0.16	0.30	0.37	0.30	0.26
Control Delay	29.6	22.6	23.0	10.6	27.8	11.2	29.7	11.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.6	22.6	23.0	10.6	27.8	11.2	29.7	11.9
LOS	C	C	C	B	C	B	C	B
Approach Delay		24.1		19.0		12.5		13.7
Approach LOS		C		B		B		B

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 54	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.44	
Intersection Signal Delay: 14.1	Intersection LOS: B
Intersection Capacity Utilization 48.3%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 25: Harvest Glen Ln & Horse Ranch Creek Rd



AM Horizon Year

25: Harvest Glen Ln & Horse Ranch Creek Rd — Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.961			0.909			0.962			0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1583	1790	0	1583	1693	0	1583	3405	0	1583	3518	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1583	1790	0	1583	1693	0	1583	3405	0	1583	3518	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			40			55			5	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1058			1173			1033			1206	
Travel Time (s)		24.0			26.7			23.5			27.4	
Volume (vph)	10	29	10	131	25	38	60	523	176	56	477	20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	31	11	138	26	40	63	551	185	59	502	21
Lane Group Flow (vph)	11	42	0	138	66	0	63	736	0	59	523	0
v/c Ratio	0.06	0.18		0.44	0.16		0.30	0.37		0.30	0.26	
Control Delay	29.6	22.6		23.0	10.6		27.8	11.2		29.7	11.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	29.6	22.6		23.0	10.6		27.8	11.2		29.7	11.9	
Queue Length 50th (ft)	1	3		14	2		7	30		6	21	
Queue Length 95th (ft)	20	41		106	39		64	188		62	142	
Internal Link Dist (ft)		978			1093			953			1126	
Turn Bay Length (ft)												
Base Capacity (vph)	281	473		552	729		266	2241		214	2250	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.04	0.09		0.25	0.09		0.24	0.33		0.28	0.23	

Intersection Summary

Area Type: Other

LOS Engineering

AM Horizon Year

25: Harvest Glen Ln & Horse Ranch Creek Rd — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.96		1.00	0.91		1.00	0.96		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	1790		1583	1693		1583	3406		1583	3518	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	1790		1583	1693		1583	3406		1583	3518	
Volume (vph)	10	29	10	131	25	38	60	523	176	56	477	20
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	31	11	138	26	40	63	551	185	59	502	21
RTOR Reduction (vph)	0	10	0	0	33	0	0	28	0	0	3	0
Lane Group Flow (vph)	11	32	0	138	33	0	63	708	0	59	520	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	1.0	3.1		8.5	10.6		2.8	29.6		2.2	29.0	
Effective Green, g (s)	1.0	3.1		8.5	10.6		2.8	29.6		2.2	29.0	
Actuated g/C Ratio	0.02	0.05		0.14	0.18		0.05	0.50		0.04	0.49	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	27	93		227	302		75	1697		59	1718	
v/s Ratio Prot	0.01	c0.02		c0.09	0.02		c0.04	c0.21		0.04	0.15	
v/s Ratio Perm												
v/c Ratio	0.41	0.34		0.61	0.11		0.84	0.42		1.00	0.30	
Uniform Delay, d1	28.9	27.2		23.9	20.4		28.1	9.4		28.6	9.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.7	2.2		4.6	0.2		52.9	0.2		117.2	0.1	
Delay (s)	38.6	29.3		28.4	20.6		81.0	9.6		145.8	9.2	
Level of Service	D	C		C	C		F	A		F	A	
Approach Delay (s)		31.3			25.9			15.2			23.1	
Approach LOS		C			C			B			C	

Intersection Summary

HCM Average Control Delay	19.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	59.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	48.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

AM Horizon Year

26: Pardee South Loop & Horse Ranch Creek Rd — Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	70	0	54	0	24	670	17	581
Turn Type	Split		Split		Prot		Prot	
Protected Phases	4	4	8	8	5	2	1	6
Permitted Phases								
Detector Phases	4	4	8	8	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	20.0	20.0	23.0	23.0	13.0	36.0	11.0	34.0
Total Split (%)	22.2%	22.2%	25.6%	25.6%	14.4%	40.0%	12.2%	37.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	9.5	9.5	8.6	8.6	7.3	39.3	6.9	39.1
Actuated g/C Ratio	0.14	0.14	0.13	0.13	0.10	0.62	0.10	0.61
v/c Ratio	0.33	0.07	0.25	0.22	0.15	0.33	0.12	0.30
Control Delay	22.7	0.2	23.3	12.7	26.7	10.4	27.4	10.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.7	0.2	23.3	12.7	26.7	10.4	27.4	10.4
LOS	C	A	C	B	C	B	C	B
Approach Delay		14.8		17.8		10.9		10.9
Approach LOS		B		B		B		B

Intersection Summary

Cycle Length: 90

Actuated Cycle Length: 63.7

Natural Cycle: 70

Control Type: Actuated-Uncoordinated

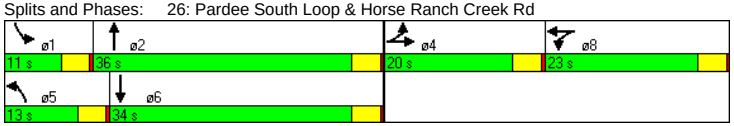
Maximum v/c Ratio: 0.33

Intersection Signal Delay: 11.6 — Intersection LOS: B

Intersection Capacity Utilization 40.0% — ICU Level of Service A

Analysis Period (min) 15

Splits and Phases: 26: Pardee South Loop & Horse Ranch Creek Rd



LOS Engineering

AM Horizon Year

26: Pardee South Loop & Horse Ranch Creek Rd — Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.850			0.879			0.996			0.993	
Flt Protected	0.950			0.950	0.990		0.950			0.950		
Satd. Flow (prot)	1583	1583	0	1504	1540	0	1583	3525	0	1583	3514	0
Flt Permitted	0.950			0.950	0.990		0.950			0.950		
Satd. Flow (perm)	1583	1583	0	1504	1540	0	1583	3525	0	1583	3514	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		450			41			4			6	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		869			1419			1340			1033	
Travel Time (s)		19.8			32.3			30.5			23.5	
Volume (vph)	70	0	38	54	0	39	24	670	20	17	581	30
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	74	0	40	57	0	41	25	705	21	18	612	32
Lane Group Flow (vph)	74	40	0	47	51	0	25	726	0	18	644	0
v/c Ratio	0.33	0.07		0.25	0.22		0.15	0.33		0.12	0.30	
Control Delay	22.7	0.2		23.3	12.7		26.7	10.4		27.4	10.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	22.7	0.2		23.3	12.7		26.7	10.4		27.4	10.4	
Queue Length 50th (ft)	14	0		9	2		5	65		4	56	
Queue Length 95th (ft)	65	0		49	33		31	183		26	165	
Internal Link Dist (ft)		789			1339			1260			953	
Turn Bay Length (ft)												
Base Capacity (vph)	385	726		410	449		215	2467		173	2421	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.19	0.06		0.11	0.11		0.12	0.29		0.10	0.27	

Intersection Summary

Area Type: Other

LOS Engineering

AM Horizon Year

26: Pardee South Loop & Horse Ranch Creek Rd — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		0.95	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.85		1.00	0.88		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	1583		1504	1541		1583	3524		1583	3513	
Flt Permitted	0.95	1.00		0.95	0.99		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	1583		1504	1541		1583	3524		1583	3513	
Volume (vph)	70	0	38	54	0	39	24	670	20	17	581	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	74	0	40	57	0	41	25	705	21	18	612	32
RTOR Reduction (vph)	0	36	0	0	37	0	0	2	0	0	3	0
Lane Group Flow (vph)	74	4	0	47	14	0	25	724	0	18	641	0
Turn Type	Split			Split			Prot			Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	6.9	6.9		6.1	6.1		1.5	37.7		1.3	37.5	
Effective Green, g (s)	6.9	6.9		6.1	6.1		1.5	37.7		1.3	37.5	
Actuated g/C Ratio	0.10	0.10		0.09	0.09		0.02	0.55		0.02	0.55	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	161	161		135	138		35	1954		30	1937	
v/s Ratio Prot	c0.05	0.00		c0.03	0.01		c0.02	c0.21		0.01	0.18	
v/s Ratio Perm												
v/c Ratio	0.46	0.03		0.35	0.10		0.71	0.37		0.60	0.33	
Uniform Delay, d1	28.8	27.5		29.1	28.4		33.0	8.5		33.1	8.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.1	0.1		1.6	0.3		51.0	0.1		28.3	0.1	
Delay (s)	30.9	27.6		30.6	28.7		84.0	8.6		61.4	8.5	
Level of Service	C	C		C	C		F	A		E	A	
Approach Delay (s)		29.7			29.7			11.1			9.9	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM Average Control Delay	13.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	68.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	40.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

AM Horizon Year

27: School/Park Access & Horse Ranch Creek Rd — HCM Unsignalized Intersection Capacity Analysis

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	150	698	230	0	671
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	158	735	242	0	706
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1209	488			977	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1209	488			977	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	70			100	
cM capacity (veh/h)	175	525			702	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	158	490	487	353	353
Volume Left	0	0	0	0	0
Volume Right	158	0	242	0	0
cSH	525	1700	1700	1700	1700
Volume to Capacity	0.30	0.29	0.29	0.21	0.21
Queue Length 95th (ft)	31	0	0	0	0
Control Delay (s)	14.8	0.0	0.0	0.0	0.0
Lane LOS	B				
Approach Delay (s)	14.8	0.0		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	43.7%	ICU Level of Service	A
Analysis Period (min)	15		

LOS Engineering

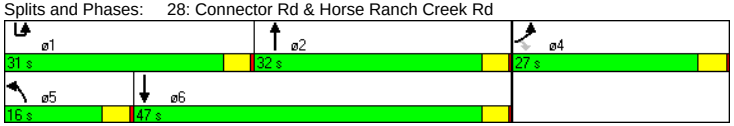
AM Horizon Year
28: Connector Rd & Horse Ranch Creek Rd

Timings

Lane Group	EBL	EBR	NBL	NBT	SBU	SBT
Lane Configurations						
Volume (vph)	225	16	17	491	190	309
Turn Type		Perm	Prot		Prot	
Protected Phases	4		5	2	1	6
Permitted Phases		4				
Detector Phases	4	4	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	27.0	27.0	16.0	32.0	31.0	47.0
Total Split (%)	30.0%	30.0%	17.8%	35.6%	34.4%	52.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag			Lead	Lag	Lead	Lag
Lead-Lag Optimize?			Yes	Yes	Yes	Yes
Recall Mode	None	None	None	Min	None	Min
Act Effct Green (s)	8.9	8.9	6.2	19.2	11.0	30.1
Actuated g/C Ratio	0.19	0.19	0.12	0.42	0.23	0.66
v/c Ratio	0.41	0.06	0.10	0.35	0.54	0.32
Control Delay	19.2	10.3	24.9	14.5	21.5	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.2	10.3	24.9	14.5	21.5	3.2
LOS	B	B	C	B	C	A
Approach Delay	18.6			14.9		7.1
Approach LOS	B			B		A

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 45.5	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.54	
Intersection Signal Delay: 11.2	Intersection LOS: B
Intersection Capacity Utilization 42.5%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 28: Connector Rd & Horse Ranch Creek Rd



LOS Engineering

AM Horizon Year
28: Connector Rd & Horse Ranch Creek Rd

Queues

Lane Group	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Ideal Flow (vphpl)	1700	1700	1700	1900	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	
Trailing Detector (ft)	0	0	0	0	0	0	
Turning Speed (mph)	15	9	15		9		9
Lane Util. Factor	0.97	1.00	1.00	0.95	1.00	0.95	0.95
Frt		0.850				0.917	
Flt Protected	0.950		0.950		0.950		
Satd. Flow (prot)	3072	1417	1583	3539	1583	3245	0
Flt Permitted	0.950		0.950		0.950		
Satd. Flow (perm)	3072	1417	1583	3539	1583	3245	0
Right Turn on Red		Yes					Yes
Satd. Flow (RTOR)		17				405	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30			30		30	
Link Distance (ft)	2875			1509		1400	
Travel Time (s)	65.3			34.3		31.8	
Volume (vph)	225	16	17	491	190	309	385
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	237	17	18	517	200	325	405
Lane Group Flow (vph)	237	17	18	517	200	730	0
v/c Ratio	0.41	0.06	0.10	0.35	0.54	0.32	
Control Delay	19.2	10.3	24.9	14.5	21.5	3.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	19.2	10.3	24.9	14.5	21.5	3.2	
Queue Length 50th (ft)	25	0	4	55	41	14	
Queue Length 95th (ft)	67	14	22	122	113	65	
Internal Link Dist (ft)	2795			1429		1320	
Turn Bay Length (ft)							
Base Capacity (vph)	1162	546	324	1993	681	2525	
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	0.20	0.03	0.06	0.26	0.29	0.29	

Intersection Summary	
Area Type:	Other

LOS Engineering

AM Horizon Year

28: Connector Rd & Horse Ranch Creek Rd — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Ideal Flow (vphpl)	1700	1700	1700	1900	1700	1900	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	0.97	1.00	1.00	0.95	1.00	0.95	
Frt	1.00	0.85	1.00	1.00	1.00	0.92	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	3072	1417	1583	3539	1583	3245	
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (perm)	3072	1417	1583	3539	1583	3245	
Volume (vph)	225	16	17	491	190	309	385
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	237	17	18	517	200	325	405
RTOR Reduction (vph)	0	14	0	0	0	168	0
Lane Group Flow (vph)	237	3	18	517	200	562	0
Turn Type		Perm	Prot		Prot		
Protected Phases	4		5	2	1	6	
Permitted Phases		4					
Actuated Green, G (s)	7.4	7.4	1.1	20.7	9.4	29.0	
Effective Green, g (s)	7.4	7.4	1.1	20.7	9.4	29.0	
Actuated g/C Ratio	0.15	0.15	0.02	0.42	0.19	0.59	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	459	212	35	1480	301	1901	
v/s Ratio Prot	c0.08		0.01	c0.15	c0.13	0.17	
v/s Ratio Perm		0.00					
v/c Ratio	0.52	0.01	0.51	0.35	0.66	0.30	
Uniform Delay, d1	19.4	17.9	23.9	9.8	18.6	5.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.0	0.0	12.2	0.1	5.4	0.1	
Delay (s)	20.4	18.0	36.1	10.0	24.0	5.2	
Level of Service	C	B	D	A	C	A	
Approach Delay (s)	20.2			10.8		9.3	
Approach LOS	C			B		A	

Intersection Summary			
HCM Average Control Delay	11.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	49.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	42.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

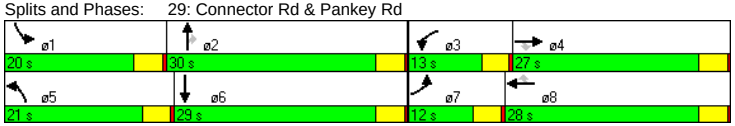
AM Horizon Year

29: Connector Rd & Pankey Rd — Timings

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Volume (vph)	60	118	210	37	273	180	160	310	23	134	40
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot	
Protected Phases	7	4		3	8		5	2		1	6
Permitted Phases			4			8			2		
Detector Phases	7	4	4	3	8	8	5	2	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0
Total Split (s)	12.0	27.0	27.0	13.0	28.0	28.0	21.0	30.0	30.0	20.0	29.0
Total Split (%)	13.3%	30.0%	30.0%	14.4%	31.1%	31.1%	23.3%	33.3%	33.3%	22.2%	32.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min
Act Effct Green (s)	7.7	16.3	16.3	7.6	14.6	14.6	11.7	24.7	24.7	10.9	24.0
Actuated g/C Ratio	0.12	0.26	0.26	0.12	0.24	0.24	0.19	0.41	0.41	0.18	0.40
v/c Ratio	0.33	0.37	0.36	0.21	0.65	0.40	0.56	0.42	0.04	0.50	0.09
Control Delay	38.7	22.2	7.2	37.5	31.7	7.1	35.7	24.7	10.2	35.5	17.2
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	38.7	22.2	7.2	37.5	31.7	7.1	35.7	24.7	10.2	35.5	17.2
LOS	D	C	A	D	C	A	D	C	B	D	B
Approach Delay		18.3			23.1			27.6			29.8
Approach LOS		B			C			C			C

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 59.7	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.65	
Intersection Signal Delay: 24.2	Intersection LOS: C
Intersection Capacity Utilization 56.0%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 29: Connector Rd & Pankey Rd



LOS Engineering

AM Horizon Year
29: Connector Rd & Pankey Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	50	50	50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.959	0.850			0.850			0.850		0.950	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1583	1697	1346	1583	1863	1417	1583	1863	1417	1583	1770	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1583	1697	1346	1583	1863	1417	1583	1863	1417	1583	1770	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		20	174			189			24		21	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1256			2875			1488			1443	
Travel Time (s)		28.5			65.3			33.8			32.8	
Volume (vph)	60	118	210	37	273	180	160	310	23	134	40	20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	63	124	221	39	287	189	168	326	24	141	42	21
Lane Group Flow (vph)	63	171	174	39	287	189	168	326	24	141	63	0
v/c Ratio	0.33	0.37	0.36	0.21	0.65	0.40	0.56	0.42	0.04	0.50	0.09	
Control Delay	38.7	22.2	7.2	37.5	31.7	7.1	35.7	24.7	10.2	35.5	17.2	
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	38.7	22.2	7.2	37.5	31.7	7.1	35.7	24.7	10.2	35.5	17.2	
Queue Length 50th (ft)	24	41	0	15	108	0	64	122	0	54	14	
Queue Length 95th (ft)	75	135	51	52	224	50	154	248	18	133	48	
Internal Link Dist (ft)		1176			2795			1408			1363	
Turn Bay Length (ft)												
Base Capacity (vph)	221	638	605	238	668	629	437	899	696	414	847	
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	0.27	0.29	0.16	0.43	0.30	0.38	0.36	0.03	0.34	0.07	

Intersection Summary

Area Type: Other

LOS Engineering

AM Horizon Year
29: Connector Rd & Pankey Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.96	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	
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)	1583	1697	1346	1583	1863	1417	1583	1863	1417	1583	1770	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1583	1697	1346	1583	1863	1417	1583	1863	1417	1583	1770	
Volume (vph)	60	118	210	37	273	180	160	310	23	134	40	20
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	63	124	221	39	287	189	168	326	24	141	42	21
RTOR Reduction (vph)	0	16	136	0	0	152	0	0	15	0	14	0
Lane Group Flow (vph)	63	155	38	39	287	37	168	326	9	141	49	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	3.7	13.7	13.7	2.5	12.5	12.5	9.2	22.6	22.6	8.5	21.9	
Effective Green, g (s)	3.7	13.7	13.7	2.5	12.5	12.5	9.2	22.6	22.6	8.5	21.9	
Actuated g/C Ratio	0.06	0.22	0.22	0.04	0.20	0.20	0.15	0.36	0.36	0.13	0.35	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	93	367	291	63	368	280	230	665	506	213	612	
v/s Ratio Prot	c0.04	0.09		0.02	c0.15		c0.11	c0.18		0.09	0.03	
v/s Ratio Perm			0.03			0.03			0.01			
v/c Ratio	0.68	0.42	0.13	0.62	0.78	0.13	0.73	0.49	0.02	0.66	0.08	
Uniform Delay, d1	29.2	21.4	20.0	29.9	24.1	20.9	25.9	15.9	13.2	26.0	13.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	17.8	0.8	0.2	16.7	10.0	0.2	11.3	0.6	0.0	7.5	0.1	
Delay (s)	47.0	22.2	20.2	46.7	34.1	21.2	37.2	16.4	13.2	33.5	14.0	
Level of Service	D	C	C	D	C	C	D	B	B	C	B	
Approach Delay (s)		25.2			30.3			23.0			27.5	
Approach LOS		C			C			C			C	

Intersection Summary

HCM Average Control Delay	26.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	63.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

PM Horizon Year
1: Pala Rd (SR-76) & Via Monserate — HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	60	2093	1594	120	60	30
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	63	2203	1678	126	63	32
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1804				2969	902
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1804				2969	902
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	81				0	89
cM capacity (veh/h)	338				9	281

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	63	1102	1102	1119	686	32
Volume Left	63	0	0	0	0	0
Volume Right	0	0	0	0	126	32
cSH	338	1700	1700	1700	1700	281
Volume to Capacity	0.19	0.65	0.65	0.66	0.40	0.11
Queue Length 95th (ft)	17	0	0	0	0	9
Control Delay (s)	18.1	0.0	0.0	0.0	0.0	19.4
Lane LOS	C					C
Approach Delay (s)	0.5			0.0		Err
Approach LOS						F

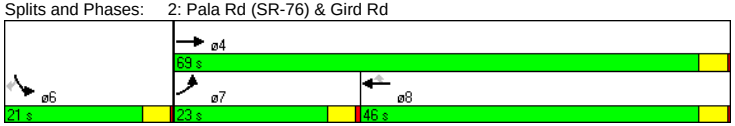
Intersection Summary			
Average Delay	Err		
Intersection Capacity Utilization	Err%	ICU Level of Service	H
Analysis Period (min)	15		

PM Horizon Year
2: Pala Rd (SR-76) & Gird Rd — Timings

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	230	1733	1334	130	70	90
Turn Type	Prot			Perm		Perm
Protected Phases	7	4	8		6	
Permitted Phases				8		6
Detector Phases	7	4	8	8	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	23.0	69.0	46.0	46.0	21.0	21.0
Total Split (%)	25.6%	76.7%	51.1%	51.1%	23.3%	23.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	None	None	None	Min	Min
Act Effct Green (s)	14.8	52.9	33.8	33.8	9.0	9.0
Actuated g/C Ratio	0.21	0.75	0.48	0.48	0.13	0.13
v/c Ratio	0.73	0.69	0.83	0.20	0.37	0.36
Control Delay	42.3	6.0	21.2	10.4	37.6	12.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.3	6.0	21.2	10.4	37.6	12.1
LOS	D	A	C	B	D	B
Approach Delay		10.3	20.2		23.3	
Approach LOS		B	C		C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 70.4	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.83	
Intersection Signal Delay: 14.9	Intersection LOS: B
Intersection Capacity Utilization 65.5%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 2: Pala Rd (SR-76) & Gird Rd



PM Horizon Year
2: Pala Rd (SR-76) & Gird Rd

Queues

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1900	1900	1700	1700	1700
Storage Length (ft)	450			20	0	180
Storage Lanes	1			1	1	1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1583	3539	3539	1417	1583	1417
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1583	3539	3539	1417	1583	1417
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				25		95
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		3191	8309		1271	
Travel Time (s)		72.5	188.8		28.9	
Volume (vph)	230	1733	1334	130	70	90
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	242	1824	1404	137	74	95
Lane Group Flow (vph)	242	1824	1404	137	74	95
v/c Ratio	0.73	0.69	0.83	0.20	0.37	0.36
Control Delay	42.3	6.0	21.2	10.4	37.6	12.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.3	6.0	21.2	10.4	37.6	12.1
Queue Length 50th (ft)	107	151	275	27	34	0
Queue Length 95th (ft)	#218	269	417	66	77	42
Internal Link Dist (ft)		3111	8229		1191	
Turn Bay Length (ft)	450			20		180
Base Capacity (vph)	416	2806	1917	779	356	392
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	0.58	0.65	0.73	0.18	0.21	0.24

Intersection Summary

Area Type: Other

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

LOS Engineering

PM Horizon Year
2: Pala Rd (SR-76) & Gird Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1900	1900	1700	1700	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
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)	1583	3539	3539	1417	1583	1417
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1583	3539	3539	1417	1583	1417
Volume (vph)	230	1733	1334	130	70	90
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	242	1824	1404	137	74	95
RTOR Reduction (vph)	0	0	0	13	0	83
Lane Group Flow (vph)	242	1824	1404	124	74	12
Turn Type	Prot			Perm		Perm
Protected Phases	7	4	8		6	
Permitted Phases				8		6
Actuated Green, G (s)	14.8	52.9	34.1	34.1	9.0	9.0
Effective Green, g (s)	14.8	52.9	34.1	34.1	9.0	9.0
Actuated g/C Ratio	0.21	0.76	0.49	0.49	0.13	0.13
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	335	2678	1726	691	204	182
v/s Ratio Prot	0.15	c0.52	c0.40		c0.05	
v/s Ratio Perm				0.09		0.01
v/c Ratio	0.72	0.68	0.81	0.18	0.36	0.07
Uniform Delay, d1	25.6	4.3	15.2	10.0	27.8	26.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.5	0.7	3.1	0.1	1.1	0.2
Delay (s)	33.1	5.0	18.3	10.2	28.9	26.9
Level of Service	C	A	B	B	C	C
Approach Delay (s)		8.3	17.5		27.8	
Approach LOS		A	B		C	

Intersection Summary

HCM Average Control Delay	12.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	69.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

PM Horizon Year

3: Pala Rd (SR-76) & Sage Rd — HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	20	1573	1594	20	20	20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	1656	1678	21	21	21
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1699				2558	849
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1699				2558	849
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	94				0	93
cM capacity (veh/h)	371				20	304

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	21	828	828	1119	580	21
Volume Left	21	0	0	0	0	0
Volume Right	0	0	0	0	21	21
cSH	371	1700	1700	1700	1700	304
Volume to Capacity	0.06	0.49	0.49	0.66	0.34	0.07
Queue Length 95th (ft)	4	0	0	0	0	6
Control Delay (s)	15.3	0.0	0.0	0.0	0.0	17.7
Lane LOS	C					C
Approach Delay (s)	0.2			0.0		Err
Approach LOS						F

Intersection Summary			
Average Delay	Err		
Intersection Capacity Utilization	Err%	ICU Level of Service	H
Analysis Period (min)	15		

LOS Engineering

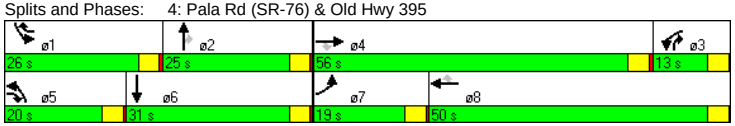
PM Horizon Year

4: Pala Rd (SR-76) & Old Hwy 395 — Timings

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Volume (vph)	114	1089	150	110	1085	380	230	289	150	350	215
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot		pm+ov	Prot	
Protected Phases	7	4	5	3	8	1	5	2	3	1	6
Permitted Phases			4			8			2		
Detector Phases	7	4	5	3	8	1	5	2	3	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	8.0	20.0	20.0	20.0	20.0	8.0	20.0	20.0
Total Split (s)	19.0	56.0	20.0	13.0	50.0	26.0	20.0	25.0	13.0	26.0	31.0
Total Split (%)	15.8%	46.7%	16.7%	10.8%	41.7%	21.7%	16.7%	20.8%	10.8%	21.7%	25.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	Min	None	None	Min	Min	Min	None	Min	Min
Act Effct Green (s)	12.3	42.6	58.8	10.8	41.0	63.4	16.2	23.6	34.4	18.3	25.7
Actuated g/C Ratio	0.11	0.38	0.53	0.10	0.37	0.57	0.15	0.21	0.31	0.16	0.23
v/c Ratio	0.69	0.85	0.19	0.76	0.88	0.45	1.05	0.77	0.34	0.73	0.93
Control Delay	69.3	38.0	1.6	81.4	41.9	8.0	121.5	58.6	16.3	54.0	69.3
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	69.3	38.0	1.6	81.4	41.9	8.0	121.5	58.6	16.3	54.0	69.3
LOS	E	D	A	F	D	A	F	E	B	D	E
Approach Delay		36.6			36.5			70.7			61.9
Approach LOS		D			D			E			E

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 111.5	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.05	
Intersection Signal Delay: 46.1	Intersection LOS: D
Intersection Capacity Utilization 85.7%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 4: Pala Rd (SR-76) & Old Hwy 395



LOS Engineering

PM Horizon Year
4: Pala Rd (SR-76) & Old Hwy 395 — Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	330		0	150		150	0		0	0		0
Storage Lanes	1		0	1		1	1		1	2		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	50	50	50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt			0.850			0.850			0.850		0.936	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1583	3539	1417	1583	3539	1417	1583	1863	1417	3072	1744	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1583	3539	1417	1583	3539	1417	1583	1863	1417	3072	1744	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			158			195			43		29	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		652			462			899			4464	
Travel Time (s)		14.8			10.5			20.4			101.5	
Volume (vph)	114	1089	150	110	1085	380	230	289	150	350	215	159
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	120	1146	158	116	1142	400	242	304	158	368	226	167
Lane Group Flow (vph)	120	1146	158	116	1142	400	242	304	158	368	393	0
v/c Ratio	0.69	0.85	0.19	0.76	0.88	0.45	1.05	0.77	0.34	0.73	0.93	
Control Delay	69.3	38.0	1.6	81.4	41.9	8.0	121.5	58.6	16.3	54.0	69.3	
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	69.3	38.0	1.6	81.4	41.9	8.0	121.5	58.6	16.3	54.0	69.3	
Queue Length 50th (ft)	88	407	0	86	414	74	~213	225	42	137	276	
Queue Length 95th (ft)	155	468	18	#214	512	138	#384	#406	89	190	#480	
Internal Link Dist (ft)		572			382			819			4384	
Turn Bay Length (ft)	330			150		150						
Base Capacity (vph)	210	1530	822	153	1404	882	230	394	467	591	442	
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	0.75	0.19	0.76	0.81	0.45	1.05	0.77	0.34	0.62	0.89	

Intersection Summary
Area Type: Other
~ 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.

LOS Engineering

PM Horizon Year
4: Pala Rd (SR-76) & Old Hwy 395 — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.94	
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)	1583	3539	1417	1583	3539	1417	1583	1863	1417	3072	1744	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1583	3539	1417	1583	3539	1417	1583	1863	1417	3072	1744	
Volume (vph)	114	1089	150	110	1085	380	230	289	150	350	215	159
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	120	1146	158	116	1142	400	242	304	158	368	226	167
RTOR Reduction (vph)	0	0	75	0	0	91	0	0	30	0	22	0
Lane Group Flow (vph)	120	1146	83	116	1142	309	242	304	128	368	371	0
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot		pm+ov	Prot		
Protected Phases	7	4	5	3	8	1	5	2	3	1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	12.3	42.6	58.8	10.8	41.1	59.4	16.2	23.6	34.4	18.3	25.7	
Effective Green, g (s)	12.3	42.6	58.8	10.8	41.1	59.4	16.2	23.6	34.4	18.3	25.7	
Actuated g/C Ratio	0.11	0.38	0.53	0.10	0.37	0.53	0.15	0.21	0.31	0.16	0.23	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	175	1355	749	154	1307	807	230	395	438	505	403	
v/s Ratio Prot	0.08	c0.32	0.02	0.07	c0.32	0.06	c0.15	0.16	0.03	0.12	c0.21	
v/s Ratio Perm			0.04			0.16			0.06			
v/c Ratio	0.69	0.85	0.11	0.75	0.87	0.38	1.05	0.77	0.29	0.73	0.92	
Uniform Delay, d1	47.6	31.4	13.2	49.0	32.7	15.2	47.5	41.3	29.2	44.1	41.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	10.6	5.1	0.1	18.6	6.7	0.3	73.7	8.8	0.4	5.2	25.6	
Delay (s)	58.2	36.4	13.2	67.6	39.4	15.5	121.3	50.0	29.6	49.4	67.4	
Level of Service	E	D	B	E	D	B	F	D	C	D	E	
Approach Delay (s)		35.7			35.6			69.9			58.7	
Approach LOS		D			D			E			E	

Intersection Summary			
HCM Average Control Delay	44.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	111.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	85.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

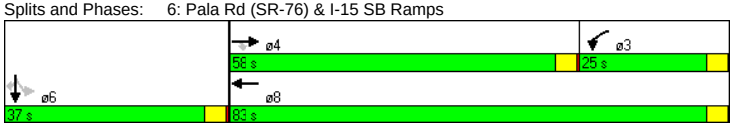
LOS Engineering

PM Horizon Year
6: Pala Rd (SR-76) & I-15 SB Ramps — Timings

Lane Group	EBT	EBR	WBL	WBT	SBL	SBT	SBR
Lane Configurations							
Volume (vph)	1289	300	373	1044	289	20	530
Turn Type		Perm	Prot		Perm		Perm
Protected Phases	4		3	8		6	
Permitted Phases		4			6		6
Detector Phases	4	4	3	8	6	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0	20.0	20.0
Total Split (s)	58.0	58.0	25.0	83.0	37.0	37.0	37.0
Total Split (%)	48.3%	48.3%	20.8%	69.2%	30.8%	30.8%	30.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes				
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min
Act Effct Green (s)	52.0	52.0	18.5	74.5	37.5	37.5	37.5
Actuated g/C Ratio	0.43	0.43	0.15	0.62	0.31	0.31	0.31
v/c Ratio	0.88	0.41	0.83	0.50	0.54	0.63	0.57
Control Delay	39.0	5.8	69.3	17.0	41.3	30.1	26.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.0	5.8	69.3	17.0	41.3	30.1	26.1
LOS	D	A	E	B	D	C	C
Approach Delay	32.7			30.8		32.0	
Approach LOS	C			C		C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 40 (33%), Referenced to phase 2: and 6:SBTL, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.88	
Intersection Signal Delay: 31.9	Intersection LOS: C
Intersection Capacity Utilization 72.8%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 6: Pala Rd (SR-76) & I-15 SB Ramps



PM Horizon Year
6: Pala Rd (SR-76) & I-15 SB Ramps — Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	0		0	500		0	0		0	0		900
Storage Lanes	0		1	2		0	0		0	1		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50	50	50					50	50	50
Trailing Detector (ft)		0	0	0	0					0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	1.00	1.00	0.95	0.91	0.95
Frt			0.850								0.881	0.850
Flt Protected				0.950						0.950	0.993	
Satd. Flow (prot)	0	3539	1417	3072	3539	0	0	0	0	1504	1483	1346
Flt Permitted				0.950						0.950	0.993	
Satd. Flow (perm)	0	3539	1417	3072	3539	0	0	0	0	1504	1483	1346
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			266								120	120
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		654			1271			961			1209	
Travel Time (s)		14.9			28.9			21.8			27.5	
Volume (vph)	0	1289	300	373	1044	0	0	0	0	289	20	530
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1357	316	393	1099	0	0	0	0	304	21	558
Lane Group Flow (vph)	0	1357	316	393	1099	0	0	0	0	253	345	285
v/c Ratio		0.88	0.41	0.83	0.50					0.54	0.63	0.57
Control Delay		39.0	5.8	69.3	17.0					41.3	30.1	26.1
Queue Delay		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Total Delay		39.0	5.8	69.3	17.0					41.3	30.1	26.1
Queue Length 50th (ft)		463	21	160	436					183	176	118
Queue Length 95th (ft)		584	81	m189	504					275	297	221
Internal Link Dist (ft)		574			1191			881			1129	
Turn Bay Length (ft)				500								900
Base Capacity (vph)		1616	792	538	2347					477	552	509
Starvation Cap Reductn		0	0	0	0					0	0	0
Spillback Cap Reductn		0	0	0	0					0	0	0
Storage Cap Reductn		0	0	0	0					0	0	0
Reduced v/c Ratio		0.84	0.40	0.73	0.47					0.53	0.63	0.56

Intersection Summary	
Area Type:	Other
m Volume for 95th percentile queue is metered by upstream signal.	

PM Horizon Year
6: Pala Rd (SR-76) & I-15 SB Ramps

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)		4.0	4.0	4.0	4.0					4.0	4.0	4.0
Lane Util. Factor		0.95	1.00	0.97	0.95					0.95	0.91	0.95
Frt		1.00	0.85	1.00	1.00					1.00	0.88	0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95	0.99	1.00
Satd. Flow (prot)		3539	1417	3072	3539					1504	1483	1346
Flt Permitted		1.00	1.00	0.95	1.00					0.95	0.99	1.00
Satd. Flow (perm)		3539	1417	3072	3539					1504	1483	1346
Volume (vph)	0	1289	300	373	1044	0	0	0	0	289	20	530
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1357	316	393	1099	0	0	0	0	304	21	558
RTOR Reduction (vph)	0	0	151	0	0	0	0	0	0	0	83	83
Lane Group Flow (vph)	0	1357	165	393	1099	0	0	0	0	253	263	203
Turn Type			Perm	Prot						Perm		Perm
Protected Phases		4		3	8						6	
Permitted Phases			4							6		6
Actuated Green, G (s)		52.0	52.0	18.5	74.5					37.5	37.5	37.5
Effective Green, g (s)		52.0	52.0	18.5	74.5					37.5	37.5	37.5
Actuated g/C Ratio		0.43	0.43	0.15	0.62					0.31	0.31	0.31
Clearance Time (s)		4.0	4.0	4.0	4.0					4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Lane Grp Cap (vph)		1534	614	474	2197					470	463	421
v/s Ratio Prot		c0.38		c0.13	0.31							
v/s Ratio Perm			0.12							0.17	0.18	0.15
v/c Ratio		0.88	0.27	0.83	0.50					0.54	0.57	0.48
Uniform Delay, d1		31.2	21.8	49.2	12.5					34.1	34.5	33.4
Progression Factor		1.00	1.00	1.21	1.35					1.00	1.00	1.00
Incremental Delay, d2		6.5	0.2	7.3	0.1					4.4	5.0	3.9
Delay (s)		37.7	22.0	66.9	17.0					38.5	39.4	37.3
Level of Service		D	C	E	B					D	D	D
Approach Delay (s)		34.7			30.1			0.0			38.5	
Approach LOS		C			C			A			D	

Intersection Summary			
HCM Average Control Delay	33.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

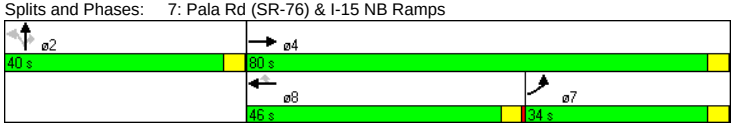
PM Horizon Year
7: Pala Rd (SR-76) & I-15 NB Ramps

Timings

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Lane Configurations							
Volume (vph)	600	979	968	346	450	20	387
Turn Type	Prot			Perm	Perm		Perm
Protected Phases	7	4	8			2	
Permitted Phases				8	2		2
Detector Phases	7	4	8	8	2	2	2
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	34.0	80.0	46.0	46.0	40.0	40.0	40.0
Total Split (%)	28.3%	66.7%	38.3%	38.3%	33.3%	33.3%	33.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lag		Lead	Lead			
Lead-Lag Optimize?	Yes		Yes	Yes			
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min
Act Effct Green (s)	28.6	72.7	40.0	40.0	39.3	39.3	39.3
Actuated g/C Ratio	0.24	0.61	0.33	0.33	0.33	0.33	0.33
v/c Ratio	0.86	0.48	0.86	0.68	0.56	0.61	0.58
Control Delay	65.8	27.0	45.8	31.8	40.2	39.4	25.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.8	27.0	45.8	31.8	40.2	39.4	25.3
LOS	E	C	D	C	D	D	C
Approach Delay		41.7	42.1			34.9	
Approach LOS		D	D			C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.86	
Intersection Signal Delay: 40.3	Intersection LOS: D
Intersection Capacity Utilization 72.8%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 7: Pala Rd (SR-76) & I-15 NB Ramps



LOS Engineering

PM Horizon Year
7: Pala Rd (SR-76) & I-15 NB Ramps

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	450		0	0		50	0		800	0		0
Storage Lanes	2		0	0		1	1		1	0		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.95	0.91	0.95	1.00	1.00	1.00
Frt						0.850		0.952	0.850			
Flt Protected	0.950						0.950	0.970				
Satd. Flow (prot)	3072	3539	0	0	3539	1417	1504	1565	1346	0	0	0
Flt Permitted	0.950						0.950	0.970				
Satd. Flow (perm)	3072	3539	0	0	3539	1417	1504	1565	1346	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						94		20	127			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1271			2232			991			1241	
Travel Time (s)		28.9			50.7			22.5			28.2	
Volume (vph)	600	979	0	0	968	346	450	20	387	0	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	632	1031	0	0	1019	364	474	21	407	0	0	0
Lane Group Flow (vph)	632	1031	0	0	1019	364	275	323	304	0	0	0
v/c Ratio	0.86	0.48			0.86	0.68	0.56	0.61	0.58			
Control Delay	65.8	27.0			45.8	31.8	40.2	39.4	25.3			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	65.8	27.0			45.8	31.8	40.2	39.4	25.3			
Queue Length 50th (ft)	198	251			371	174	203	239	130			
Queue Length 95th (ft)	m263	m342			463	288	291	342	229			
Internal Link Dist (ft)		1191			2152			911			1161	
Turn Bay Length (ft)	450					50			800			
Base Capacity (vph)	786	2278			1255	563	509	543	540			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.80	0.45			0.81	0.65	0.54	0.59	0.56			

Intersection Summary

Area Type: Other

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

LOS Engineering

PM Horizon Year
7: Pala Rd (SR-76) & I-15 NB Ramps

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Lane Util. Factor	0.97	0.95			0.95	1.00	0.95	0.91	0.95			
Frt	1.00	1.00			1.00	0.85	1.00	0.95	0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95	0.97	1.00			
Satd. Flow (prot)	3072	3539			3539	1417	1504	1566	1346			
Flt Permitted	0.95	1.00			1.00	1.00	0.95	0.97	1.00			
Satd. Flow (perm)	3072	3539			3539	1417	1504	1566	1346			
Volume (vph)	600	979	0	0	968	346	450	20	387	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	632	1031	0	0	1019	364	474	21	407	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	63	0	13	85	0	0	0
Lane Group Flow (vph)	632	1031	0	0	1019	301	275	310	219	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Actuated Green, G (s)	28.7	72.7			40.0	40.0	39.3	39.3	39.3			
Effective Green, g (s)	28.7	72.7			40.0	40.0	39.3	39.3	39.3			
Actuated g/C Ratio	0.24	0.61			0.33	0.33	0.33	0.33	0.33			
Clearance Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Lane Grp Cap (vph)	735	2144			1180	472	493	513	441			
v/s Ratio Prot	c0.21	0.29			c0.29							
v/s Ratio Perm						0.21	0.18	0.20	0.16			
v/c Ratio	0.86	0.48			0.86	0.64	0.56	0.60	0.50			
Uniform Delay, d1	43.7	13.2			37.4	33.9	33.2	33.8	32.4			
Progression Factor	1.34	2.05			1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2	5.6	0.1			6.7	2.8	4.5	5.2	3.9			
Delay (s)	64.2	27.0			44.2	36.7	37.7	39.0	36.3			
Level of Service	E	C			D	D	D	D	D			
Approach Delay (s)		41.2			42.2			37.7			0.0	
Approach LOS		D			D			D			A	

Intersection Summary

HCM Average Control Delay	40.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

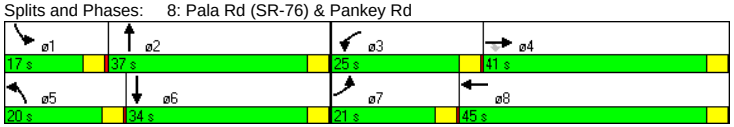
PM Horizon Year
8: Pala Rd (SR-76) & Pankey Rd

Timings

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	155	871	340	188	776	330	399	120	461
Turn Type	Prot		Perm	Prot		Prot		Prot	
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases			4						
Detector Phases	7	4	4	3	8	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	8.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	21.0	41.0	41.0	25.0	45.0	20.0	37.0	17.0	34.0
Total Split (%)	17.5%	34.2%	34.2%	20.8%	37.5%	16.7%	30.8%	14.2%	28.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	14.3	31.7	31.7	16.9	34.3	14.8	31.3	11.4	24.6
Actuated g/C Ratio	0.14	0.30	0.30	0.16	0.33	0.14	0.30	0.11	0.23
v/c Ratio	0.76	0.86	0.53	0.78	0.80	0.80	0.63	0.75	0.84
Control Delay	69.5	44.6	7.0	66.1	38.4	61.3	32.3	75.9	46.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.5	44.6	7.0	66.1	38.4	61.3	32.3	75.9	46.5
LOS	E	D	A	E	D	E	C	E	D
Approach Delay		38.1			43.3		42.1		51.0
Approach LOS		D			D		D		D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 104.8	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.86	
Intersection Signal Delay: 42.8	Intersection LOS: D
Intersection Capacity Utilization 79.0%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 8: Pala Rd (SR-76) & Pankey Rd



PM Horizon Year
8: Pala Rd (SR-76) & Pankey Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.984			0.943			0.953	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1583	3539	1417	1583	3483	0	3072	3337	0	1583	3373	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1583	3539	1417	1583	3483	0	3072	3337	0	1583	3373	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			348		11			108			58	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2232			2833			991			1488	
Travel Time (s)		50.7			64.4			22.5			33.8	
Volume (vph)	155	871	340	188	776	90	330	399	245	120	461	208
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	163	917	358	198	817	95	347	420	258	126	485	219
Lane Group Flow (vph)	163	917	358	198	912	0	347	678	0	126	704	0
v/c Ratio	0.76	0.86	0.53	0.78	0.80		0.80	0.63		0.75	0.84	
Control Delay	69.5	44.6	7.0	66.1	38.4		61.3	32.3		75.9	46.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	69.5	44.6	7.0	66.1	38.4		61.3	32.3		75.9	46.5	
Queue Length 50th (ft)	120	338	5	144	319		134	206		94	246	
Queue Length 95th (ft)	#222	432	80	#249	405		#215	277		#191	323	
Internal Link Dist (ft)		2152			2753			911			1408	
Turn Bay Length (ft)												
Base Capacity (vph)	259	1214	715	315	1311		482	1139		194	983	
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	0.76	0.50	0.63	0.70		0.72	0.60		0.65	0.72	

Intersection Summary	
Area Type:	Other
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

PM Horizon Year
8: Pala Rd (SR-76) & Pankey Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.97	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.94		1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	3539	1417	1583	3484		3072	3337		1583	3374	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	3539	1417	1583	3484		3072	3337		1583	3374	
Volume (vph)	155	871	340	188	776	90	330	399	245	120	461	208
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	163	917	358	198	817	95	347	420	258	126	485	219
RTOR Reduction (vph)	0	0	243	0	7	0	0	76	0	0	44	0
Lane Group Flow (vph)	163	917	115	198	905	0	347	602	0	126	660	0
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	14.3	31.7	31.7	16.9	34.3		14.8	31.3		9.3	25.8	
Effective Green, g (s)	14.3	31.7	31.7	16.9	34.3		14.8	31.3		9.3	25.8	
Actuated g/C Ratio	0.14	0.30	0.30	0.16	0.33		0.14	0.30		0.09	0.25	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	215	1066	427	254	1136		432	993		140	827	
v/s Ratio Prot	0.10	c0.26		c0.13	c0.26		c0.11	0.18		0.08	c0.20	
v/s Ratio Perm			0.08									
v/c Ratio	0.76	0.86	0.27	0.78	0.80		0.80	0.61		0.90	0.80	
Uniform Delay, d1	43.8	34.7	27.9	42.4	32.3		43.8	31.7		47.5	37.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	14.2	7.2	0.3	14.0	4.0		10.4	1.1		47.4	5.4	
Delay (s)	57.9	41.9	28.3	56.4	36.2		54.1	32.7		94.8	42.7	
Level of Service	E	D	C	E	D		D	C		F	D	
Approach Delay (s)		40.3			39.8			40.0			50.6	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	42.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	105.2	Sum of lost time (s)	20.0
Intersection Capacity Utilization	79.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

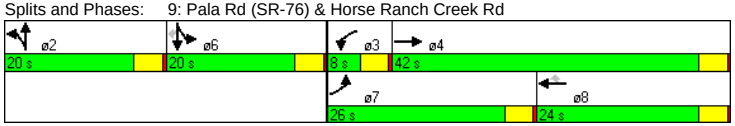
PM Horizon Year
9: Pala Rd (SR-76) & Horse Ranch Creek Rd

Timings

Lane Group	EBL	EBT	WBT	WBR	SBL	SBT	SBR	ø2	ø3
Lane Configurations									
Volume (vph)	546	750	740	103	79	0	314		
Turn Type	Prot			Perm	Split		Perm		
Protected Phases	7	4	8		6	6		2	3
Permitted Phases				8			6		
Detector Phases	7	4	8	8	6	6	6		
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	8.0
Total Split (s)	26.0	42.0	24.0	24.0	20.0	20.0	20.0	20.0	8.0
Total Split (%)	28.9%	46.7%	26.7%	26.7%	22.2%	22.2%	22.2%	22%	9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lag	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					Yes
Recall Mode	None	None	None	None	Min	Min	Min	Min	None
Act Effct Green (s)	17.3	41.1	19.8	19.8	8.6	8.6	8.6		
Actuated g/C Ratio	0.26	0.61	0.29	0.29	0.13	0.13	0.13		
v/c Ratio	0.73	0.37	0.75	0.22	0.29	0.57	0.54		
Control Delay	29.3	7.4	28.8	6.5	31.6	15.2	11.8		
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay	29.3	7.4	28.8	6.5	31.6	15.2	11.8		
LOS	C	A	C	A	C	B	B		
Approach Delay		16.7	26.1			15.9			
Approach LOS		B	C			B			

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 67.4	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 19.7	Intersection LOS: B
Intersection Capacity Utilization 53.3%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 9: Pala Rd (SR-76) & Horse Ranch Creek Rd



LOS Engineering

PM Horizon Year
9: Pala Rd (SR-76) & Horse Ranch Creek Rd — Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	250		0	250		250	0		0	150		150
Storage Lanes	2		0	1		1	0		0	1		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50	50	50	50		50	50	50
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	0.95	0.91	0.95
Frt						0.850					0.873	0.850
Flt Protected	0.950									0.950	0.993	
Satd. Flow (prot)	3072	3539	0	1667	3539	1417	0	1863	0	1504	1469	1346
Flt Permitted	0.950									0.950	0.993	
Satd. Flow (perm)	3072	3539	0	1667	3539	1417	0	1863	0	1504	1469	1346
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						108					158	173
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2833			5160			734			1509	
Travel Time (s)		64.4			117.3			16.7			34.3	
Volume (vph)	546	750	0	0	740	103	0	0	0	79	0	314
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	575	789	0	0	779	108	0	0	0	83	0	331
Lane Group Flow (vph)	575	789	0	0	779	108	0	0	0	55	186	173
v/c Ratio	0.73	0.37			0.75	0.22				0.29	0.57	0.54
Control Delay	29.3	7.4			28.8	6.5				31.6	15.2	11.8
Queue Delay	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Total Delay	29.3	7.4			28.8	6.5				31.6	15.2	11.8
Queue Length 50th (ft)	109	71			149	0				22	12	0
Queue Length 95th (ft)	181	132			#287	37				56	71	52
Internal Link Dist (ft)		2753			5080			654			1429	
Turn Bay Length (ft)	250					250				150		150
Base Capacity (vph)	942	2179			1055	498				324	440	426
Starvation Cap Reductn	0	0			0	0				0	0	0
Spillback Cap Reductn	0	0			0	0				0	0	0
Storage Cap Reductn	0	0			0	0				0	0	0
Reduced v/c Ratio	0.61	0.36			0.74	0.22				0.17	0.42	0.41

Intersection Summary
Area Type: Other
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

LOS Engineering

PM Horizon Year
9: Pala Rd (SR-76) & Horse Ranch Creek Rd — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0			4.0	4.0				4.0	4.0	4.0
Lane Util. Factor	0.97	0.95			0.95	1.00				0.95	0.91	0.95
Frt	1.00	1.00			1.00	0.85				1.00	0.87	0.85
Flt Protected	0.95	1.00			1.00	1.00				0.95	0.99	1.00
Satd. Flow (prot)	3072	3539			3539	1417				1504	1468	1346
Flt Permitted	0.95	1.00			1.00	1.00				0.95	0.99	1.00
Satd. Flow (perm)	3072	3539			3539	1417				1504	1468	1346
Volume (vph)	546	750	0	0	740	103	0	0	0	79	0	314
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	575	789	0	0	779	108	0	0	0	83	0	331
RTOR Reduction (vph)	0	0	0	0	0	76	0	0	0	0	138	151
Lane Group Flow (vph)	575	789	0	0	779	32	0	0	0	55	48	22
Turn Type	Prot			Prot		Perm	Split			Split		Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases						8						6
Actuated Green, G (s)	17.2	41.1			19.9	19.9				8.6	8.6	8.6
Effective Green, g (s)	17.2	41.1			19.9	19.9				8.6	8.6	8.6
Actuated g/C Ratio	0.26	0.61			0.30	0.30				0.13	0.13	0.13
Clearance Time (s)	4.0	4.0			4.0	4.0				4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0			3.0	3.0				3.0	3.0	3.0
Lane Grp Cap (vph)	785	2161			1046	419				192	188	172
v/s Ratio Prot	c0.19	0.22			c0.22					c0.04	0.03	
v/s Ratio Perm						0.02						0.02
v/c Ratio	0.73	0.37			0.74	0.08				0.29	0.26	0.13
Uniform Delay, d1	22.9	6.6			21.4	17.1				26.6	26.5	26.0
Progression Factor	1.00	1.00			1.00	1.00				1.00	1.00	1.00
Incremental Delay, d2	3.5	0.1			2.9	0.1				0.8	0.7	0.3
Delay (s)	26.5	6.7			24.3	17.2				27.4	27.2	26.4
Level of Service	C	A			C	B				C	C	C
Approach Delay (s)		15.0			23.5			0.0			26.9	
Approach LOS		B			C			A			C	

Intersection Summary

HCM Average Control Delay	19.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	67.3	Sum of lost time (s)	21.6
Intersection Capacity Utilization	53.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

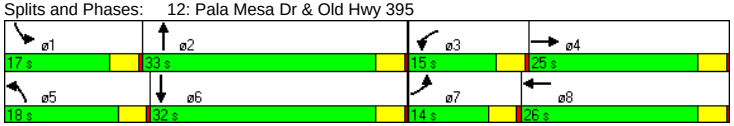
PM Horizon Year
12: Pala Mesa Dr & Old Hwy 395 — Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	150	149	161	185	120	820	195	490
Turn Type	Prot		Prot		Prot		Prot	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases								
Detector Phases	7	4	3	8	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	14.0	25.0	15.0	26.0	18.0	33.0	17.0	32.0
Total Split (%)	15.6%	27.8%	16.7%	28.9%	20.0%	36.7%	18.9%	35.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	10.0	20.7	10.9	21.6	11.4	28.2	12.9	29.6
Actuated g/C Ratio	0.11	0.23	0.12	0.24	0.13	0.32	0.15	0.33
v/c Ratio	0.88	0.82	0.87	0.96	0.62	0.92	0.89	0.52
Control Delay	84.5	42.4	78.1	61.8	49.9	43.0	76.5	25.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	84.5	42.4	78.1	61.8	49.9	43.0	76.5	25.3
LOS	F	D	E	E	D	D	E	C
Approach Delay		55.0		66.3		43.8		38.2
Approach LOS		E		E		D		D

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 88.7
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.96
Intersection Signal Delay: 48.7 — Intersection LOS: D
Intersection Capacity Utilization 86.7% — ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 12: Pala Mesa Dr & Old Hwy 395



PM Horizon Year
12: Pala Mesa Dr & Old Hwy 395 — Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	0		0	0		0	150		0	200		0
Storage Lanes	1		0	1		0	1		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.914			0.916			0.976			0.977	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1583	1703	0	1583	1706	0	1583	3454	0	1583	3458	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1583	1703	0	1583	1706	0	1583	3454	0	1583	3458	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		70			68			26			24	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3628			1500			4464			5461	
Travel Time (s)		82.5			34.1			101.5			124.1	
Volume (vph)	150	149	200	161	185	238	120	820	157	195	490	90
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	158	157	211	169	195	251	126	863	165	205	516	95
Lane Group Flow (vph)	158	368	0	169	446	0	126	1028	0	205	611	0
v/c Ratio	0.88	0.82		0.87	0.96		0.62	0.92		0.89	0.52	
Control Delay	84.5	42.4		78.1	61.8		49.9	43.0		76.5	25.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	84.5	42.4		78.1	61.8		49.9	43.0		76.5	25.3	
Queue Length 50th (ft)	90	163		96	217		68	285		116	140	
Queue Length 95th (ft)	#206	#309		#212	#407		124	#411		#245	199	
Internal Link Dist (ft)		3548			1420			4384			5381	
Turn Bay Length (ft)							150			200		
Base Capacity (vph)	179	455		196	472		243	1137		232	1171	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.88	0.81		0.86	0.94		0.52	0.90		0.88	0.52	

Intersection Summary

Area Type: Other
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

PM Horizon Year
12: Pala Mesa Dr & Old Hwy 395 — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.91		1.00	0.92		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	1703		1583	1705		1583	3454		1583	3457	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	1703		1583	1705		1583	3454		1583	3457	
Volume (vph)	150	149	200	161	185	238	120	820	157	195	490	90
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	158	157	211	169	195	251	126	863	165	205	516	95
RTOR Reduction (vph)	0	54	0	0	51	0	0	18	0	0	16	0
Lane Group Flow (vph)	158	314	0	169	395	0	126	1010	0	205	595	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	10.0	20.7		10.9	21.6		11.4	28.2		12.9	29.7	
Effective Green, g (s)	10.0	20.7		10.9	21.6		11.4	28.2		12.9	29.7	
Actuated g/C Ratio	0.11	0.23		0.12	0.24		0.13	0.32		0.15	0.33	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	178	397		195	415		203	1098		230	1158	
v/s Ratio Prot	0.10	0.18		c0.11	c0.23		0.08	c0.29		c0.13	0.17	
v/s Ratio Perm												
v/c Ratio	0.89	0.79		0.87	0.95		0.62	0.92		0.89	0.51	
Uniform Delay, d1	38.8	32.0		38.2	33.0		36.6	29.2		37.2	23.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	37.2	10.3		30.8	31.7		5.8	12.3		32.0	0.4	
Delay (s)	76.0	42.3		69.0	64.7		42.4	41.4		69.2	24.1	
Level of Service	E	D		E	E		D	D		E	C	
Approach Delay (s)		52.4			65.9			41.5			35.4	
Approach LOS		D			E			D			D	

Intersection Summary			
HCM Average Control Delay	46.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	88.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

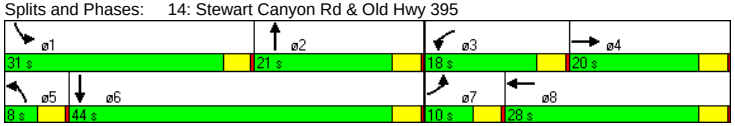
LOS Engineering

PM Horizon Year
14: Stewart Canyon Rd & Old Hwy 395 — Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	20	30	118	10	70	720	379	700
Turn Type	Prot		Prot		Prot		Prot	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases								
Detector Phases	7	4	3	8	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	10.0	20.0	18.0	28.0	8.0	21.0	31.0	44.0
Total Split (%)	11.1%	22.2%	20.0%	31.1%	8.9%	23.3%	34.4%	48.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	5.9	7.4	10.4	15.6	4.2	17.9	21.9	35.5
Actuated g/C Ratio	0.08	0.10	0.14	0.22	0.06	0.25	0.31	0.50
v/c Ratio	0.17	0.35	0.55	0.57	0.80	0.89	0.82	0.48
Control Delay	40.2	22.9	41.1	8.2	92.1	43.9	39.8	13.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.2	22.9	41.1	8.2	92.1	43.9	39.8	13.6
LOS	D	C	D	A	F	D	D	B
Approach Delay		26.7		16.9		48.1		22.1
Approach LOS		C		B		D		C

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 71.4	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.89	
Intersection Signal Delay: 29.7	Intersection LOS: C
Intersection Capacity Utilization 74.3%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 14: Stewart Canyon Rd & Old Hwy 395



LOS Engineering

PM Horizon Year
14: Stewart Canyon Rd & Old Hwy 395 — Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	0		0	200		0	100		0	100		0
Storage Lanes	1		0	1		0	1		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.915			0.855			0.995			0.983	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1583	1704	0	1583	1593	0	1583	3522	0	1583	3479	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1583	1704	0	1583	1593	0	1583	3522	0	1583	3479	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		42			334			3			20	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1302			7424			5461			3410	
Travel Time (s)		29.6			168.7			124.1			77.5	
Volume (vph)	20	30	40	118	10	317	70	720	25	379	700	90
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	32	42	124	11	334	74	758	26	399	737	95
Lane Group Flow (vph)	21	74	0	124	345	0	74	784	0	399	832	0
v/c Ratio	0.17	0.35		0.55	0.57		0.80	0.89		0.82	0.48	
Control Delay	40.2	22.9		41.1	8.2		92.1	43.9		39.8	13.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	40.2	22.9		41.1	8.2		92.1	43.9		39.8	13.6	
Queue Length 50th (ft)	10	14		56	4		36	~196		167	124	
Queue Length 95th (ft)	33	54		114	74		#125	#368		#335	201	
Internal Link Dist (ft)		1222			7344			5381			3330	
Turn Bay Length (ft)				200			100			100		
Base Capacity (vph)	126	384		292	721		93	883		569	1861	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.17	0.19		0.42	0.48		0.80	0.89		0.70	0.45	

Intersection Summary

Area Type: Other

~ 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.

LOS Engineering

PM Horizon Year
14: Stewart Canyon Rd & Old Hwy 395 — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.91		1.00	0.85		1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	1704		1583	1592		1583	3522		1583	3479	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	1704		1583	1592		1583	3522		1583	3479	
Volume (vph)	20	30	40	118	10	317	70	720	25	379	700	90
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	32	42	124	11	334	74	758	26	399	737	95
RTOR Reduction (vph)	0	37	0	0	263	0	0	2	0	0	10	0
Lane Group Flow (vph)	21	37	0	124	82	0	74	782	0	399	822	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	2.1	9.0		8.7	15.6		4.2	17.8		21.9	35.5	
Effective Green, g (s)	2.1	9.0		8.7	15.6		4.2	17.8		21.9	35.5	
Actuated g/C Ratio	0.03	0.12		0.12	0.21		0.06	0.24		0.30	0.48	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	45	209		188	338		91	854		472	1683	
v/s Ratio Prot	0.01	0.02		c0.08	c0.05		0.05	c0.22		c0.25	0.24	
v/s Ratio Perm												
v/c Ratio	0.47	0.18		0.66	0.24		0.81	0.92		0.85	0.49	
Uniform Delay, d1	35.1	28.9		30.9	24.0		34.2	27.1		24.2	12.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	7.5	0.4		8.1	0.4		40.5	14.2		13.1	0.2	
Delay (s)	42.6	29.3		39.0	24.4		74.7	41.3		37.2	13.0	
Level of Service	D	C		D	C		E	D		D	B	
Approach Delay (s)		32.2			28.2			44.2			20.9	
Approach LOS		C			C			D			C	

Intersection Summary

HCM Average Control Delay	30.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	73.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

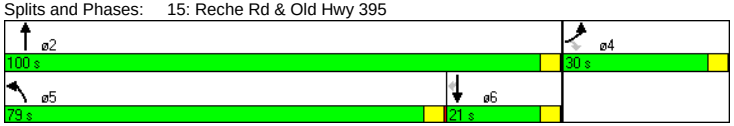
LOS Engineering

PM Horizon Year
15: Reche Rd & Old Hwy 395 — Timings

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	300	239	871	306	140	400
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Detector Phases	4	4	5	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0	20.0
Total Split (s)	30.0	30.0	79.0	100.0	21.0	21.0
Total Split (%)	23.1%	23.1%	60.8%	76.9%	16.2%	16.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	Min	Min	Min
Act Effct Green (s)	26.0	26.0	75.1	91.5	12.4	12.4
Actuated g/C Ratio	0.21	0.21	0.60	0.73	0.10	0.10
v/c Ratio	0.96	0.51	0.97	0.12	0.42	0.87
Control Delay	90.7	9.2	47.9	5.2	56.5	27.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	90.7	9.2	47.9	5.2	56.5	27.6
LOS	F	A	D	A	E	C
Approach Delay	54.5			36.8	35.1	
Approach LOS	D			D	D	

Intersection Summary	
Cycle Length: 130	
Actuated Cycle Length: 125.5	
Natural Cycle: 130	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.97	
Intersection Signal Delay: 40.6	Intersection LOS: D
Intersection Capacity Utilization 88.3%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 15: Reche Rd & Old Hwy 395



PM Horizon Year
15: Reche Rd & Old Hwy 395 — Queues

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1700	1700	1900	1900	1700
Storage Length (ft)	0	0	150			0
Storage Lanes	1	1	1			1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9	15			9
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1583	1417	1583	3539	3539	1417
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	1583	1417	1583	3539	3539	1417
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		252				380
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30			30	30	
Link Distance (ft)	2635			3410	4960	
Travel Time (s)	59.9			77.5	112.7	
Volume (vph)	300	239	871	306	140	400
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	316	252	917	322	147	421
Lane Group Flow (vph)	316	252	917	322	147	421
v/c Ratio	0.96	0.51	0.97	0.12	0.42	0.87
Control Delay	90.7	9.2	47.9	5.2	56.5	27.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	90.7	9.2	47.9	5.2	56.5	27.6
Queue Length 50th (ft)	254	0	661	36	60	31
Queue Length 95th (ft)	#463	75	#1058	50	94	#195
Internal Link Dist (ft)	2555			3330	4880	
Turn Bay Length (ft)			150			
Base Capacity (vph)	329	494	947	2613	463	516
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	0.96	0.51	0.97	0.12	0.32	0.82

Intersection Summary	
Area Type:	Other

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

PM Horizon Year
15: Reche Rd & Old Hwy 395 — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1700	1700	1900	1900	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1583	1417	1583	3539	3539	1417
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1583	1417	1583	3539	3539	1417
Volume (vph)	300	239	871	306	140	400
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	316	252	917	322	147	421
RTOR Reduction (vph)	0	200	0	0	0	343
Lane Group Flow (vph)	316	52	917	322	147	78
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	26.0	26.0	75.1	91.4	12.3	12.3
Effective Green, g (s)	26.0	26.0	75.1	91.4	12.3	12.3
Actuated g/C Ratio	0.21	0.21	0.60	0.73	0.10	0.10
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	328	294	948	2579	347	139
v/s Ratio Prot	c0.20		c0.58	0.09	0.04	
v/s Ratio Perm		0.04				c0.06
v/c Ratio	0.96	0.18	0.97	0.12	0.42	0.56
Uniform Delay, d1	49.2	40.9	24.0	5.1	53.2	54.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	39.7	0.3	21.4	0.0	0.8	5.1
Delay (s)	88.9	41.2	45.4	5.1	54.1	59.1
Level of Service	F	D	D	A	D	E
Approach Delay (s)	67.7			34.9	57.8	
Approach LOS	E			C	E	

Intersection Summary			
HCM Average Control Delay	48.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	125.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	88.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

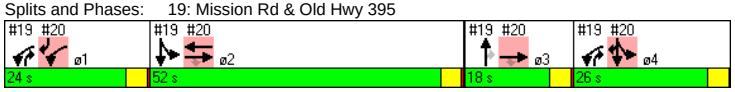
LOS Engineering

PM Horizon Year
19: Mission Rd & Old Hwy 395 — Timings

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	ø1	ø4
Lane Configurations								
Volume (vph)	315	850	128	288	1200	75		
Turn Type		Free		pm+ov	Split			
Protected Phases	1 4		3	1 4	2	2	1	4
Permitted Phases		Free		3				
Detector Phases	1 4		3	1 4	2	2		
Minimum Initial (s)			4.0		4.0	4.0	4.0	4.0
Minimum Split (s)			20.0		20.0	20.0	8.0	20.0
Total Split (s)	50.0	0.0	18.0	50.0	52.0	52.0	24.0	26.0
Total Split (%)	41.7%	0.0%	15.0%	41.7%	43.3%	43.3%	20%	22%
Yellow Time (s)			3.5		3.5	3.5	3.5	3.5
All-Red Time (s)			0.5		0.5	0.5	0.5	0.5
Lead/Lag			Lead		Lag	Lag	Lead	Lag
Lead-Lag Optimize?			Yes		Yes	Yes	Yes	Yes
Recall Mode			None		Min	Min	None	None
Act Effct Green (s)	42.5	116.2	13.6	60.1	48.1	48.1		
Actuated g/C Ratio	0.37	1.00	0.12	0.52	0.41	0.41		
v/c Ratio	0.57	0.63	0.62	0.41	0.99	0.10		
Control Delay	37.0	2.4	62.9	19.1	58.4	22.6		
Queue Delay	1.5	0.0	0.0	0.0	0.0	0.0		
Total Delay	38.6	2.4	62.9	19.1	58.4	22.6		
LOS	D	A	E	B	E	C		
Approach Delay	12.2		32.6			56.3		
Approach LOS	B		C			E		

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 116.2	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.99	
Intersection Signal Delay: 34.9	Intersection LOS: C
Intersection Capacity Utilization 74.5%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 19: Mission Rd & Old Hwy 395



LOS Engineering

PM Horizon Year
19: Mission Rd & Old Hwy 395 — Queues

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1700	1700	1900	1700	1700	1900
Storage Length (ft)	0	130		210	100	
Storage Lanes	1	1		1	2	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.97	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1583	1417	1863	1417	3072	1863
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1583	1417	1863	1417	3072	1863
Right Turn on Red		No		No		
Satd. Flow (RTOR)						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30		30			30
Link Distance (ft)	434		4960			1035
Travel Time (s)	9.9		112.7			23.5
Volume (vph)	315	850	128	288	1200	75
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	332	895	135	303	1263	79
Lane Group Flow (vph)	332	895	135	303	1263	79
v/c Ratio	0.57	0.63	0.62	0.41	0.99	0.10
Control Delay	37.0	2.4	62.9	19.1	58.4	22.6
Queue Delay	1.5	0.0	0.0	0.0	0.0	0.0
Total Delay	38.6	2.4	62.9	19.1	58.4	22.6
Queue Length 50th (ft)	192	44	101	134	~538	38
Queue Length 95th (ft)	m251	m14	170	203	#673	71
Internal Link Dist (ft)	354		4880			955
Turn Bay Length (ft)		130		210	100	
Base Capacity (vph)	616	1417	225	766	1272	771
Starvation Cap Reductn	140	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	0.70	0.63	0.60	0.40	0.99	0.10

Intersection Summary

Area Type: Other

~ 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.

LOS Engineering

PM Horizon Year
19: Mission Rd & Old Hwy 395 — HCM Signalized Intersection Capacity Analysis

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1700	1700	1900	1700	1700	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.97	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1583	1417	1863	1417	3072	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1583	1417	1863	1417	3072	1863
Volume (vph)	315	850	128	288	1200	75
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	332	895	135	303	1263	79
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	332	895	135	303	1263	79
Turn Type		Free		pm+ov	Split	
Protected Phases	1 4		3	1 4	2	2
Permitted Phases		Free		3		
Actuated Green, G (s)	42.4	116.1	13.6	56.0	48.1	48.1
Effective Green, g (s)	42.4	116.1	13.6	56.0	48.1	48.1
Actuated g/C Ratio	0.37	1.00	0.12	0.48	0.41	0.41
Clearance Time (s)			4.0		4.0	4.0
Vehicle Extension (s)			3.0		3.0	3.0
Lane Grp Cap (vph)	578	1417	218	732	1273	772
v/s Ratio Prot	0.21		0.07	0.15	c0.41	0.04
v/s Ratio Perm		c0.63		0.06		
v/c Ratio	0.57	0.63	0.62	0.41	0.99	0.10
Uniform Delay, d1	29.6	0.0	48.8	19.4	33.8	20.8
Progression Factor	1.16	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8	1.2	5.2	0.4	23.2	0.1
Delay (s)	35.1	1.2	53.9	19.8	57.0	20.9
Level of Service	D	A	D	B	E	C
Approach Delay (s)	10.4		30.3			54.9
Approach LOS	B		C			D

Intersection Summary

HCM Average Control Delay	33.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	116.1	Sum of lost time (s)	4.0
Intersection Capacity Utilization	74.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

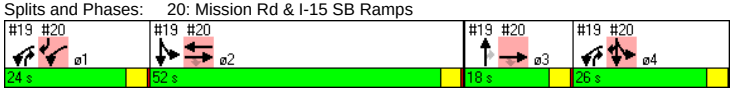
LOS Engineering

PM Horizon Year
20: Mission Rd & I-15 SB Ramps — Timings

Lane Group	EBT	EBR	WBL	WBT	SBT	SBR	ø3
Lane Configurations							
Volume (vph)	1238	250	90	505	20	660	
Turn Type		Perm	Prot			custom	
Protected Phases	2 3		1	2	4	1 4	3
Permitted Phases		2 3				4	
Detector Phases	2 3	2 3	1	2	4	1 4	
Minimum Initial (s)			4.0	4.0	4.0		4.0
Minimum Split (s)			8.0	20.0	20.0		20.0
Total Split (s)	70.0	70.0	24.0	52.0	26.0	50.0	18.0
Total Split (%)	58.3%	58.3%	20.0%	43.3%	21.7%	41.7%	15%
Yellow Time (s)			3.5	3.5	3.5		3.5
All-Red Time (s)			0.5	0.5	0.5		0.5
Lead/Lag			Lead	Lag	Lag		Lead
Lead-Lag Optimize?			Yes	Yes	Yes		Yes
Recall Mode			None	Min	None		None
Act Effct Green (s)	65.7	65.7	17.0	48.1	21.4	42.5	
Actuated g/C Ratio	0.57	0.57	0.15	0.41	0.18	0.37	
v/c Ratio	0.65	0.29	0.41	0.69	0.13	0.90	
Control Delay	6.6	0.4	50.7	34.5	42.0	31.6	
Queue Delay	1.2	0.0	0.0	0.0	0.0	0.0	
Total Delay	7.8	0.4	50.7	34.5	42.0	31.6	
LOS	A	A	D	C	D	C	
Approach Delay	6.5			36.9	32.2		
Approach LOS	A			D	C		

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 116.2	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.99	
Intersection Signal Delay: 19.5	Intersection LOS: B
Intersection Capacity Utilization 78.9%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 20: Mission Rd & I-15 SB Ramps



LOS Engineering

PM Horizon Year
20: Mission Rd & I-15 SB Ramps — Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	0		0	285		0	0		0	0		200
Storage Lanes	0		1	1		0	0		0	0		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50	50	50					50	50	50
Trailing Detector (ft)		0	0	0	0					0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950							0.976	
Satd. Flow (prot)	0	3539	1417	1583	1863	0	0	0	0	0	1818	1417
Flt Permitted				0.950							0.976	
Satd. Flow (perm)	0	3539	1417	1583	1863	0	0	0	0	0	1818	1417
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			263									394
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		434			744			972			897	
Travel Time (s)		9.9			16.9			22.1			20.4	
Volume (vph)	0	1238	250	90	505	0	0	0	0	20	20	660
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1303	263	95	532	0	0	0	0	21	21	695
Lane Group Flow (vph)	0	1303	263	95	532	0	0	0	0	0	42	695
v/c Ratio		0.65	0.29	0.41	0.69						0.13	0.90
Control Delay		6.6	0.4	50.7	34.5						42.0	31.6
Queue Delay		1.2	0.0	0.0	0.0						0.0	0.0
Total Delay		7.8	0.4	50.7	34.5						42.0	31.6
Queue Length 50th (ft)		87	0	66	341						28	247
Queue Length 95th (ft)		m96	m0	120	475						61	#519
Internal Link Dist (ft)		354			664			892			817	
Turn Bay Length (ft)				285								200
Base Capacity (vph)		2015	920	273	771						345	792
Starvation Cap Reductn		449	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		0.83	0.29	0.35	0.69						0.12	0.88

Intersection Summary	
Area Type:	Other
#	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.

LOS Engineering

PM Horizon Year
20: Mission Rd & I-15 SB Ramps

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)		4.0	4.0	4.0	4.0						4.0	4.0
Lane Util. Factor		0.95	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						0.98	1.00
Satd. Flow (prot)		3539	1417	1583	1863						1817	1417
Flt Permitted		1.00	1.00	0.95	1.00						0.98	1.00
Satd. Flow (perm)		3539	1417	1583	1863						1817	1417
Volume (vph)	0	1238	250	90	505	0	0	0	0	20	20	660
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1303	263	95	532	0	0	0	0	21	21	695
RTOR Reduction (vph)	0	0	114	0	0	0	0	0	0	0	0	250
Lane Group Flow (vph)	0	1303	149	95	532	0	0	0	0	0	42	445
Turn Type			Perm	Prot						Split		custom
Protected Phases		2 3		1	2					4	4	1 4
Permitted Phases			2 3									4
Actuated Green, G (s)		65.7	65.7	17.0	48.1						21.4	42.4
Effective Green, g (s)		65.7	65.7	17.0	48.1						21.4	42.4
Actuated g/C Ratio		0.57	0.57	0.15	0.41						0.18	0.37
Clearance Time (s)				4.0	4.0						4.0	
Vehicle Extension (s)				3.0	3.0						3.0	
Lane Grp Cap (vph)		2003	802	232	772						335	517
v/s Ratio Prot		c0.37		0.06	c0.29						0.02	c0.31
v/s Ratio Perm			0.11									
v/c Ratio		0.65	0.19	0.41	0.69						0.13	0.86
Uniform Delay, d1		17.3	12.2	45.0	27.9						39.5	34.1
Progression Factor		0.32	0.00	1.00	1.00						1.00	1.00
Incremental Delay, d2		0.3	0.1	1.2	2.6						0.2	13.7
Delay (s)		5.9	0.1	46.2	30.4						39.7	47.8
Level of Service		A	A	D	C						D	D
Approach Delay (s)		4.9			32.8			0.0			47.3	
Approach LOS		A			C			A			D	

Intersection Summary			
HCM Average Control Delay	21.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	116.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	78.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

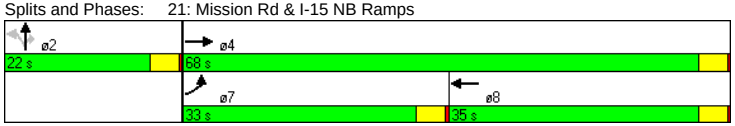
PM Horizon Year
21: Mission Rd & I-15 NB Ramps

Timings

Lane Group	EBL	EBT	WBT	NBT	NBR
Lane Configurations					
Volume (vph)	970	288	225	20	180
Turn Type	Prot				Perm
Protected Phases	7	4	8	2	
Permitted Phases					2
Detector Phases	7	4	8	2	2
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0
Total Split (s)	33.0	68.0	35.0	22.0	22.0
Total Split (%)	36.7%	75.6%	38.9%	24.4%	24.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Recall Mode	None	None	None	Min	Min
Act Effct Green (s)	29.1	48.3	15.2	18.1	18.1
Actuated g/C Ratio	0.39	0.65	0.20	0.24	0.24
v/c Ratio	0.85	0.25	0.68	0.95	0.39
Control Delay	30.3	5.9	36.0	64.0	7.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	30.3	5.9	36.0	64.0	7.0
LOS	C	A	D	E	A
Approach Delay		24.8	36.0	46.0	
Approach LOS		C	D	D	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 74.4	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.95	
Intersection Signal Delay: 31.9	Intersection LOS: C
Intersection Capacity Utilization 78.9%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 21: Mission Rd & I-15 NB Ramps



LOS Engineering

PM Horizon Year
21: Mission Rd & I-15 NB Ramps

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	300		0	0		0	0		200	0		0
Storage Lanes	2		0	0		0	0		1	0		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50		50	50	50			
Trailing Detector (ft)	0	0			0		0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.989				0.850			
Flt Protected	0.950							0.955				
Satd. Flow (prot)	3072	1863	0	0	1842	0	0	1779	1417	0	0	0
Flt Permitted	0.950							0.955				
Satd. Flow (perm)	3072	1863	0	0	1842	0	0	1779	1417	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					5				189			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		744			1271			1082			1005	
Travel Time (s)		16.9			28.9			24.6			22.8	
Volume (vph)	970	288	0	0	225	20	370	20	180	0	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1021	303	0	0	237	21	389	21	189	0	0	0
Lane Group Flow (vph)	1021	303	0	0	258	0	0	410	189	0	0	0
v/c Ratio	0.85	0.25			0.68			0.95	0.39			
Control Delay	30.3	5.9			36.0			64.0	7.0			
Queue Delay	0.0	0.0			0.0			0.0	0.0			
Total Delay	30.3	5.9			36.0			64.0	7.0			
Queue Length 50th (ft)	215	50			108			186	0			
Queue Length 95th (ft)	#378	81			180			#398	51			
Internal Link Dist (ft)		664			1191			1002			925	
Turn Bay Length (ft)	300								200			
Base Capacity (vph)	1201	1325			638			432	487			
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	0.85	0.23			0.40			0.95	0.39			

Intersection Summary

Area Type: Other

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

LOS Engineering

PM Horizon Year
21: Mission Rd & I-15 NB Ramps

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0			4.0			4.0	4.0			
Lane Util. Factor	0.97	1.00			1.00			1.00	1.00			
Frt	1.00	1.00			0.99			1.00	0.85			
Flt Protected	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (prot)	3072	1863			1842			1778	1417			
Flt Permitted	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (perm)	3072	1863			1842			1778	1417			
Volume (vph)	970	288	0	0	225	20	370	20	180	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1021	303	0	0	237	21	389	21	189	0	0	0
RTOR Reduction (vph)	0	0	0	0	4	0	0	0	143	0	0	0
Lane Group Flow (vph)	1021	303	0	0	254	0	0	410	46	0	0	0
Turn Type	Prot						Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases							2		2			
Actuated Green, G (s)	29.1	48.3			15.2			18.1	18.1			
Effective Green, g (s)	29.1	48.3			15.2			18.1	18.1			
Actuated g/C Ratio	0.39	0.65			0.20			0.24	0.24			
Clearance Time (s)	4.0	4.0			4.0			4.0	4.0			
Vehicle Extension (s)	3.0	3.0			3.0			3.0	3.0			
Lane Grp Cap (vph)	1202	1209			376			433	345			
v/s Ratio Prot	c0.33	0.16			c0.14							
v/s Ratio Perm								0.23	0.03			
v/c Ratio	0.85	0.25			0.68			0.95	0.13			
Uniform Delay, d1	20.7	5.5			27.3			27.7	22.0			
Progression Factor	1.00	1.00			1.00			1.00	1.00			
Incremental Delay, d2	5.8	0.1			4.8			29.8	0.2			
Delay (s)	26.4	5.6			32.1			57.5	22.2			
Level of Service	C	A			C			E	C			
Approach Delay (s)		21.7			32.1			46.4			0.0	
Approach LOS		C			C			D			A	

Intersection Summary

HCM Average Control Delay	29.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	74.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

PM Horizon Year

22: Stewart Canyon Rd & Horse Ranch Creek Rd — HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Yield			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	20	384	304	30	30	100
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	404	320	32	32	105
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	756	84	137			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	756	84	137			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	93	59	78			
cM capacity (veh/h)	293	975	1447			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	425	352	137
Volume Left	21	320	0
Volume Right	404	0	105
cSH	874	1447	1700
Volume to Capacity	0.49	0.22	0.08
Queue Length 95th (ft)	68	21	0
Control Delay (s)	13.0	7.6	0.0
Lane LOS	B	A	
Approach Delay (s)	13.0	7.6	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	9.0		
Intersection Capacity Utilization	61.0%	ICU Level of Service	B
Analysis Period (min)	15		

LOS Engineering

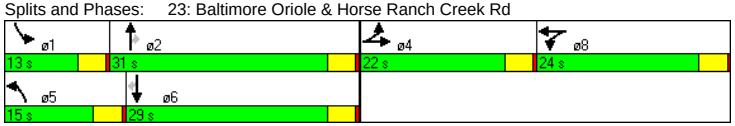
PM Horizon Year

23: Baltimore Oriole & Horse Ranch Creek Rd — Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	30	20	226	30	58	269	279	70	304	50
Turn Type	Split		Split		Prot		Perm	Prot		Perm
Protected Phases	4	4	8	8	5	2		1	6	
Permitted Phases							2			6
Detector Phases	4	4	8	8	5	2	2	1	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0	20.0
Total Split (s)	22.0	22.0	24.0	24.0	15.0	31.0	31.0	13.0	29.0	29.0
Total Split (%)	24.4%	24.4%	26.7%	26.7%	16.7%	34.4%	34.4%	14.4%	32.2%	32.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag					Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	8.1	8.1	13.6	13.6	9.1	31.0	31.0	8.9	30.8	30.8
Actuated g/C Ratio	0.11	0.11	0.19	0.19	0.13	0.45	0.45	0.12	0.45	0.45
v/c Ratio	0.18	0.18	0.52	0.50	0.31	0.34	0.37	0.38	0.38	0.08
Control Delay	30.3	22.4	27.2	23.6	29.9	17.2	4.1	31.9	18.2	6.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.3	22.4	27.2	23.6	29.9	17.2	4.1	31.9	18.2	6.7
LOS	C	C	C	C	C	B	A	C	B	A
Approach Delay		26.1		25.3		12.4			19.1	
Approach LOS		C		C		B			B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 68.7	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.52	
Intersection Signal Delay: 17.8	Intersection LOS: B
Intersection Capacity Utilization 44.7%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 23: Baltimore Oriole & Horse Ranch Creek Rd



LOS Engineering

PM Horizon Year

23: Baltimore Oriole & Horse Ranch Creek Rd — Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	50
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.935			0.958				0.850			0.850
Flt Protected	0.950			0.950	0.974		0.950			0.950		
Satd. Flow (prot)	1583	1742	0	1504	1651	0	1583	1863	1417	1583	1863	1417
Flt Permitted	0.950			0.950	0.974		0.950			0.950		
Satd. Flow (perm)	1583	1742	0	1504	1651	0	1583	1863	1417	1583	1863	1417
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			20				294			53
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1047			1324			958			2343	
Travel Time (s)		23.8			30.1			21.8			53.3	
Volume (vph)	30	20	15	226	30	45	58	269	279	70	304	50
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	21	16	238	32	47	61	283	294	74	320	53
Lane Group Flow (vph)	32	37	0	150	167	0	61	283	294	74	320	53
v/c Ratio	0.18	0.18		0.52	0.50		0.31	0.34	0.37	0.38	0.38	0.08
Control Delay	30.3	22.4		27.2	23.6		29.9	17.2	4.1	31.9	18.2	6.7
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.3	22.4		27.2	23.6		29.9	17.2	4.1	31.9	18.2	6.7
Queue Length 50th (ft)	10	6		46	45		18	81	0	22	93	0
Queue Length 95th (ft)	40	37		125	125		63	178	51	76	211	24
Internal Link Dist (ft)		967			1244			878			2263	
Turn Bay Length (ft)												
Base Capacity (vph)	391	442		456	515		271	1025	912	229	996	782
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	0.08	0.08		0.33	0.32		0.23	0.28	0.32	0.32	0.32	0.07

Intersection Summary

Area Type: Other

LOS Engineering

PM Horizon Year

23: Baltimore Oriole & Horse Ranch Creek Rd — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
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	1.00		0.95	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.94		1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.97		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1583	1742		1504	1651		1583	1863	1417	1583	1863	1417
Flt Permitted	0.95	1.00		0.95	0.97		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1583	1742		1504	1651		1583	1863	1417	1583	1863	1417
Volume (vph)	30	20	15	226	30	45	58	269	279	70	304	50
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	21	16	238	32	47	61	283	294	74	320	53
RTOR Reduction (vph)	0	15	0	0	16	0	0	0	164	0	0	30
Lane Group Flow (vph)	32	22	0	150	151	0	61	283	130	74	320	23
Turn Type	Split			Split			Prot		Perm	Prot		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	4.8	4.8		12.6	12.6		5.7	30.6	30.6	5.4	30.3	30.3
Effective Green, g (s)	4.8	4.8		12.6	12.6		5.7	30.6	30.6	5.4	30.3	30.3
Actuated g/C Ratio	0.07	0.07		0.18	0.18		0.08	0.44	0.44	0.08	0.44	0.44
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	109	120		273	300		130	821	625	123	813	619
v/s Ratio Prot	c0.02	0.01		c0.10	0.09		0.04	0.15		c0.05	c0.17	
v/s Ratio Perm									0.09			0.02
v/c Ratio	0.29	0.18		0.55	0.50		0.47	0.34	0.21	0.60	0.39	0.04
Uniform Delay, d1	30.7	30.5		25.8	25.6		30.4	12.8	11.9	31.0	13.3	11.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.5	0.7		2.3	1.3		2.7	0.3	0.2	8.0	0.3	0.0
Delay (s)	32.2	31.2		28.1	26.9		33.1	13.0	12.1	39.0	13.6	11.2
Level of Service	C	C		C	C		C	B	B	D	B	B
Approach Delay (s)		31.7			27.5			14.5			17.5	
Approach LOS		C			C			B			B	

Intersection Summary

HCM Average Control Delay	19.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	69.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	44.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

PM Horizon Year
24: Longspur Rd & Horse Ranch Creek Rd

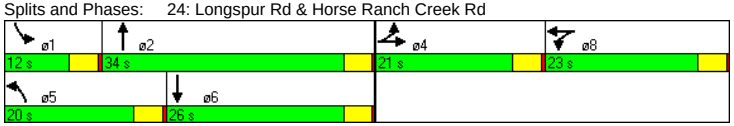
Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	20	50	274	50	138	531	60	415
Turn Type	Split		Split		Prot		Prot	
Protected Phases	4	4	8	8	5	2	1	6
Permitted Phases								
Detector Phases	4	4	8	8	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	21.0	21.0	23.0	23.0	20.0	34.0	12.0	26.0
Total Split (%)	23.3%	23.3%	25.6%	25.6%	22.2%	37.8%	13.3%	28.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Max	None	Max
Act Effct Green (s)	8.4	8.4	13.3	13.3	11.4	35.2	7.2	28.8
Actuated g/C Ratio	0.11	0.11	0.18	0.18	0.15	0.48	0.09	0.39
v/c Ratio	0.12	0.49	0.68	0.66	0.60	0.51	0.43	0.36
Control Delay	33.2	24.8	41.7	36.5	41.3	16.3	44.3	21.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.2	24.8	41.7	36.5	41.3	16.3	44.3	21.1
LOS	C	C	D	D	D	B	D	C
Approach Delay		26.0		39.0		20.0		23.7
Approach LOS		C		D		B		C

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 73.2
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.68
Intersection Signal Delay: 25.0 Intersection LOS: C
Intersection Capacity Utilization 54.3% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 24: Longspur Rd & Horse Ranch Creek Rd



LOS Engineering

PM Horizon Year
24: Longspur Rd & Horse Ranch Creek Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.916			0.962			0.949			0.981	
Flt Protected	0.950			0.950	0.976		0.950			0.950		
Satd. Flow (prot)	1583	1706	0	1504	1662	0	1583	3359	0	1583	3472	0
Flt Permitted	0.950			0.950	0.976		0.950			0.950		
Satd. Flow (perm)	1583	1706	0	1504	1662	0	1583	3359	0	1583	3472	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		63			17			110			17	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1010			908			1206			958	
Travel Time (s)		23.0			20.6			27.4			21.8	
Volume (vph)	20	50	65	274	50	50	138	531	275	60	415	60
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	53	68	288	53	53	145	559	289	63	437	63
Lane Group Flow (vph)	21	121	0	186	208	0	145	848	0	63	500	0
v/c Ratio	0.12	0.49		0.68	0.66		0.60	0.51		0.43	0.36	
Control Delay	33.2	24.8		41.7	36.5		41.3	16.3		44.3	21.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	33.2	24.8		41.7	36.5		41.3	16.3		44.3	21.1	
Queue Length 50th (ft)	9	26		87	88		65	143		29	92	
Queue Length 95th (ft)	31	77		165	170		129	243		72	168	
Internal Link Dist (ft)		930			828			1126			878	
Turn Bay Length (ft)												
Base Capacity (vph)	324	399		367	418		320	1671		163	1375	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.06	0.30		0.51	0.50		0.45	0.51		0.39	0.36	

Intersection Summary

Area Type: Other

LOS Engineering

PM Horizon Year

24: Longspur Rd & Horse Ranch Creek Rd — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		0.95	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.92		1.00	0.96		1.00	0.95		1.00	0.98	
Flt Protected	0.95	1.00		0.95	0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	1706		1504	1661		1583	3358		1583	3472	
Flt Permitted	0.95	1.00		0.95	0.98		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	1706		1504	1661		1583	3358		1583	3472	
Volume (vph)	20	50	65	274	50	50	138	531	275	60	415	60
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	53	68	288	53	53	145	559	289	63	437	63
RTOR Reduction (vph)	0	57	0	0	14	0	0	59	0	0	10	0
Lane Group Flow (vph)	21	64	0	186	194	0	145	789	0	63	490	0
Turn Type	Split			Split			Prot			Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	6.9	6.9		13.3	13.3		9.8	35.2		4.3	29.7	
Effective Green, g (s)	6.9	6.9		13.3	13.3		9.8	35.2		4.3	29.7	
Actuated g/C Ratio	0.09	0.09		0.18	0.18		0.13	0.46		0.06	0.39	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	144	156		264	292		205	1561		90	1362	
v/s Ratio Prot	0.01	c0.04		c0.12	0.12		c0.09	c0.23		0.04	0.14	
v/s Ratio Perm												
v/c Ratio	0.15	0.41		0.70	0.66		0.71	0.51		0.70	0.36	
Uniform Delay, d1	31.7	32.5		29.4	29.1		31.6	14.2		35.1	16.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	1.7		8.3	5.6		10.6	1.2		21.1	0.7	
Delay (s)	32.2	34.2		37.6	34.7		42.2	15.3		56.2	17.0	
Level of Service	C	C		D	C		D	B		E	B	
Approach Delay (s)		33.9			36.1			19.3			21.4	
Approach LOS		C			D			B			C	

Intersection Summary			
HCM Average Control Delay	24.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	75.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	54.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

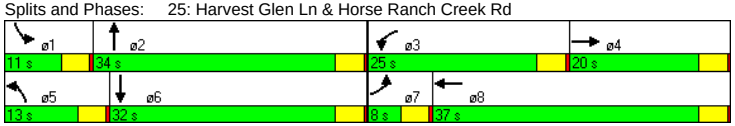
PM Horizon Year

25: Harvest Glen Ln & Horse Ranch Creek Rd — Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	10	35	245	38	50	861	55	679
Turn Type	Prot		Prot		Prot		Prot	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases								
Detector Phases	7	4	3	8	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	8.0	20.0	25.0	37.0	13.0	34.0	11.0	32.0
Total Split (%)	8.9%	22.2%	27.8%	41.1%	14.4%	37.8%	12.2%	35.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	4.3	7.3	15.4	20.3	7.5	31.6	6.6	30.7
Actuated g/C Ratio	0.06	0.10	0.23	0.30	0.11	0.47	0.09	0.46
v/c Ratio	0.12	0.29	0.71	0.19	0.32	0.70	0.39	0.45
Control Delay	42.7	27.7	36.8	9.7	38.6	21.7	42.9	18.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.7	27.7	36.8	9.7	38.6	21.7	42.9	18.3
LOS	D	C	D	A	D	C	D	B
Approach Delay		30.1		28.9		22.5		20.1
Approach LOS		C		C		C		C

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 67.4	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.71	
Intersection Signal Delay: 22.9	Intersection LOS: C
Intersection Capacity Utilization 66.3%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 25: Harvest Glen Ln & Horse Ranch Creek Rd



LOS Engineering

PM Horizon Year
25: Harvest Glen Ln & Horse Ranch Creek Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.946			0.907			0.969			0.998	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1583	1762	0	1583	1690	0	1583	3429	0	1583	3532	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1583	1762	0	1583	1690	0	1583	3429	0	1583	3532	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		21			66			39			2	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1058			1173			1033			1206	
Travel Time (s)		24.0			26.7			23.5			27.4	
Volume (vph)	10	35	20	245	38	63	50	861	227	55	679	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	37	21	258	40	66	53	906	239	58	715	11
Lane Group Flow (vph)	11	58	0	258	106	0	53	1145	0	58	726	0
v/c Ratio	0.12	0.29		0.71	0.19		0.32	0.70		0.39	0.45	
Control Delay	42.7	27.7		36.8	9.7		38.6	21.7		42.9	18.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	42.7	27.7		36.8	9.7		38.6	21.7		42.9	18.3	
Queue Length 50th (ft)	5	17		116	12		24	253		27	143	
Queue Length 95th (ft)	22	53		204	50		61	#424		68	225	
Internal Link Dist (ft)		978			1093			953			1126	
Turn Bay Length (ft)												
Base Capacity (vph)	91	379		475	757		202	1683		161	1660	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.12	0.15		0.54	0.14		0.26	0.68		0.36	0.44	

Intersection Summary

Area Type: Other

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

LOS Engineering

PM Horizon Year
25: Harvest Glen Ln & Horse Ranch Creek Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.95		1.00	0.91		1.00	0.97		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	1762		1583	1689		1583	3428		1583	3531	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	1762		1583	1689		1583	3428		1583	3531	
Volume (vph)	10	35	20	245	38	63	50	861	227	55	679	10
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	37	21	258	40	66	53	906	239	58	715	11
RTOR Reduction (vph)	0	19	0	0	47	0	0	22	0	0	1	0
Lane Group Flow (vph)	11	39	0	258	59	0	53	1123	0	58	725	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	0.6	5.6		15.4	20.4		4.3	31.6		3.5	30.8	
Effective Green, g (s)	0.6	5.6		15.4	20.4		4.3	31.6		3.5	30.8	
Actuated g/C Ratio	0.01	0.08		0.21	0.28		0.06	0.44		0.05	0.43	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	13	137		338	478		94	1502		77	1508	
v/s Ratio Prot	0.01	c0.02		c0.16	0.03		0.03	c0.33		c0.04	0.21	
v/s Ratio Perm												
v/c Ratio	0.85	0.28		0.76	0.12		0.56	0.75		0.75	0.48	
Uniform Delay, d1	35.7	31.4		26.6	19.2		33.0	16.9		33.9	14.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	166.4	1.1		9.8	0.1		7.5	2.1		33.5	0.2	
Delay (s)	202.1	32.5		36.5	19.3		40.5	19.0		67.3	15.1	
Level of Service	F	C		D	B		D	B		E	B	
Approach Delay (s)		59.5			31.5			20.0			19.0	
Approach LOS		E			C			B			B	

Intersection Summary

HCM Average Control Delay	22.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	72.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

PM Horizon Year
26: Pardee South Loop & Horse Ranch Creek Rd

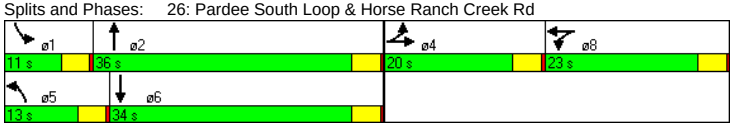
Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	50	0	54	0	75	1058	43	821
Turn Type	Split		Split		Prot		Prot	
Protected Phases	4	4	8	8	5	2	1	6
Permitted Phases								
Detector Phases	4	4	8	8	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	20.0	20.0	23.0	23.0	13.0	36.0	11.0	34.0
Total Split (%)	22.2%	22.2%	25.6%	25.6%	14.4%	40.0%	12.2%	37.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	8.5	8.5	8.1	8.1	8.5	50.6	7.0	49.4
Actuated g/C Ratio	0.11	0.11	0.10	0.10	0.11	0.66	0.09	0.65
v/c Ratio	0.32	0.05	0.26	0.26	0.47	0.51	0.32	0.42
Control Delay	32.6	0.2	32.9	19.5	37.1	13.4	36.3	13.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.6	0.2	32.9	19.5	37.1	13.4	36.3	13.0
LOS	C	A	C	B	D	B	D	B
Approach Delay		21.7		25.5		14.9		14.0
Approach LOS		C		C		B		B

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 76.2
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.51
Intersection Signal Delay: 15.1 Intersection LOS: B
Intersection Capacity Utilization 54.7% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 26: Pardee South Loop & Horse Ranch Creek Rd



LOS Engineering

PM Horizon Year
26: Pardee South Loop & Horse Ranch Creek Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.850			0.902			0.990			0.985	
Flt Protected	0.950			0.950	0.983		0.950			0.950		
Satd. Flow (prot)	1583	1583	0	1504	1569	0	1583	3504	0	1583	3486	0
Flt Permitted	0.950			0.950	0.983		0.950			0.950		
Satd. Flow (perm)	1583	1583	0	1504	1569	0	1583	3504	0	1583	3486	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		416			32			9			14	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		869			1419			1340			1033	
Travel Time (s)		19.8			32.3			30.5			23.5	
Volume (vph)	50	0	26	54	0	30	75	1058	74	43	821	90
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	0	27	57	0	32	79	1114	78	45	864	95
Lane Group Flow (vph)	53	27	0	40	49	0	79	1192	0	45	959	0
v/c Ratio	0.32	0.05		0.26	0.26		0.47	0.51		0.32	0.42	
Control Delay	32.6	0.2		32.9	19.5		37.1	13.4		36.3	13.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	32.6	0.2		32.9	19.5		37.1	13.4		36.3	13.0	
Queue Length 50th (ft)	21	0		16	7		32	208		18	160	
Queue Length 95th (ft)	54	0		47	37		76	331		51	257	
Internal Link Dist (ft)		789			1339			1260			953	
Turn Bay Length (ft)												
Base Capacity (vph)	308	643		333	373		190	2330		150	2265	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.17	0.04		0.12	0.13		0.42	0.51		0.30	0.42	

Intersection Summary

Area Type: Other

LOS Engineering

PM Horizon Year

26: Pardee South Loop & Horse Ranch Creek Rd — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		0.95	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.85		1.00	0.90		1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	1583		1504	1569		1583	3504		1583	3487	
Flt Permitted	0.95	1.00		0.95	0.98		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	1583		1504	1569		1583	3504		1583	3487	
Volume (vph)	50	0	26	54	0	30	75	1058	74	43	821	90
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	0	27	57	0	32	79	1114	78	45	864	95
RTOR Reduction (vph)	0	25	0	0	30	0	0	4	0	0	6	0
Lane Group Flow (vph)	53	2	0	40	19	0	79	1188	0	45	953	0
Turn Type	Split			Split			Prot			Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	5.8	5.8		5.4	5.4		5.6	48.6		4.4	47.4	
Effective Green, g (s)	5.8	5.8		5.4	5.4		5.6	48.6		4.4	47.4	
Actuated g/C Ratio	0.07	0.07		0.07	0.07		0.07	0.61		0.05	0.59	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	114	114		101	106		111	2123		87	2061	
v/s Ratio Prot	c0.03	0.00		c0.03	0.01		c0.05	c0.34		0.03	0.27	
v/s Ratio Perm												
v/c Ratio	0.46	0.02		0.40	0.18		0.71	0.56		0.52	0.46	
Uniform Delay, d1	35.7	34.6		35.8	35.3		36.5	9.4		36.9	9.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.0	0.1		2.5	0.8		19.3	0.3		5.1	0.2	
Delay (s)	38.7	34.6		38.4	36.1		55.8	9.7		42.0	9.4	
Level of Service	D	C		D	D		E	A		D	A	
Approach Delay (s)		37.3			37.1			12.6			10.9	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM Average Control Delay	13.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	80.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	54.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

PM Horizon Year

27: School/Park Access & Horse Ranch Creek Rd — HCM Unsignalized Intersection Capacity Analysis

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	70	1179	50	0	892
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	74	1241	53	0	939
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1737	647			1294	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1737	647			1294	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	82			100	
cM capacity (veh/h)	78	414			532	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	74	827	466	469	469
Volume Left	0	0	0	0	0
Volume Right	74	0	53	0	0
cSH	414	1700	1700	1700	1700
Volume to Capacity	0.18	0.49	0.27	0.28	0.28
Queue Length 95th (ft)	16	0	0	0	0
Control Delay (s)	15.6	0.0	0.0	0.0	0.0
Lane LOS	C				
Approach Delay (s)	15.6	0.0		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	45.7%	ICU Level of Service	A
Analysis Period (min)	15		

LOS Engineering

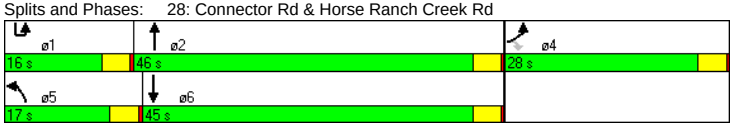
PM Horizon Year
28: Connector Rd & Horse Ranch Creek Rd

Timings

Lane Group	EBL	EBR	NBL	NBT	SBU	SBT
Lane Configurations						
Volume (vph)	579	18	15	634	50	445
Turn Type		Perm	Prot		Prot	
Protected Phases	4		5	2	1	6
Permitted Phases		4				
Detector Phases	4	4	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	28.0	28.0	17.0	46.0	16.0	45.0
Total Split (%)	31.1%	31.1%	18.9%	51.1%	17.8%	50.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag			Lead	Lag	Lead	Lag
Lead-Lag Optimize?			Yes	Yes	Yes	Yes
Recall Mode	None	None	None	Min	None	Min
Act Effct Green (s)	14.6	14.6	6.6	15.2	7.4	17.4
Actuated g/C Ratio	0.34	0.34	0.13	0.35	0.15	0.40
v/c Ratio	0.58	0.04	0.08	0.53	0.22	0.62
Control Delay	16.3	7.9	28.1	14.6	25.5	8.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.3	7.9	28.1	14.6	25.5	8.3
LOS	B	A	C	B	C	A
Approach Delay	16.0			15.0		9.2
Approach LOS	B			B		A

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 43	
Natural Cycle: 50	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.62	
Intersection Signal Delay: 12.7	Intersection LOS: B
Intersection Capacity Utilization 59.0%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 28: Connector Rd & Horse Ranch Creek Rd



LOS Engineering

PM Horizon Year
28: Connector Rd & Horse Ranch Creek Rd

Queues

Lane Group	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Ideal Flow (vphpl)	1700	1700	1700	1900	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	
Trailing Detector (ft)	0	0	0	0	0	0	
Turning Speed (mph)	15	9	15		9		9
Lane Util. Factor	0.97	1.00	1.00	0.95	1.00	0.95	0.95
Frt		0.850				0.923	
Flt Protected	0.950		0.950		0.950		
Satd. Flow (prot)	3072	1417	1583	3539	1583	3267	0
Flt Permitted	0.950		0.950		0.950		
Satd. Flow (perm)	3072	1417	1583	3539	1583	3267	0
Right Turn on Red		Yes					Yes
Satd. Flow (RTOR)		19				386	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30			30		30	
Link Distance (ft)	2875			1509		1400	
Travel Time (s)	65.3			34.3		31.8	
Volume (vph)	579	18	15	634	50	445	464
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	609	19	16	667	53	468	488
Lane Group Flow (vph)	609	19	16	667	53	956	0
v/c Ratio	0.58	0.04	0.08	0.53	0.22	0.62	
Control Delay	16.3	7.9	28.1	14.6	25.5	8.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	16.3	7.9	28.1	14.6	25.5	8.3	
Queue Length 50th (ft)	43	0	3	44	8	37	
Queue Length 95th (ft)	166	13	24	171	52	158	
Internal Link Dist (ft)	2795			1429		1320	
Turn Bay Length (ft)							
Base Capacity (vph)	1486	695	384	2193	374	2219	
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	0.03	0.04	0.30	0.14	0.43	

Intersection Summary	
Area Type:	Other

LOS Engineering

PM Horizon Year
28: Connector Rd & Horse Ranch Creek Rd — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Ideal Flow (vphpl)	1700	1700	1700	1900	1700	1900	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	0.97	1.00	1.00	0.95	1.00	0.95	
Frt	1.00	0.85	1.00	1.00	1.00	0.92	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	3072	1417	1583	3539	1583	3268	
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (perm)	3072	1417	1583	3539	1583	3268	
Volume (vph)	579	18	15	634	50	445	464
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	609	19	16	667	53	468	488
RTOR Reduction (vph)	0	13	0	0	0	237	0
Lane Group Flow (vph)	609	6	16	667	53	719	0
Turn Type		Perm	Prot		Prot		
Protected Phases	4		5	2	1	6	
Permitted Phases		4					
Actuated Green, G (s)	14.6	14.6	0.9	15.7	2.5	17.3	
Effective Green, g (s)	14.6	14.6	0.9	15.7	2.5	17.3	
Actuated g/C Ratio	0.33	0.33	0.02	0.35	0.06	0.39	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	1001	462	32	1240	88	1262	
v/s Ratio Prot	c0.20		0.01	0.19	c0.03	c0.22	
v/s Ratio Perm		0.00					
v/c Ratio	0.61	0.01	0.50	0.54	0.60	0.57	
Uniform Delay, d1	12.7	10.2	21.7	11.6	20.7	10.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.1	0.0	11.8	0.5	11.1	0.6	
Delay (s)	13.8	10.2	33.5	12.1	31.7	11.4	
Level of Service	B	B	C	B	C	B	
Approach Delay (s)	13.6			12.6		12.5	
Approach LOS	B			B		B	

Intersection Summary			
HCM Average Control Delay	12.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	44.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	59.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

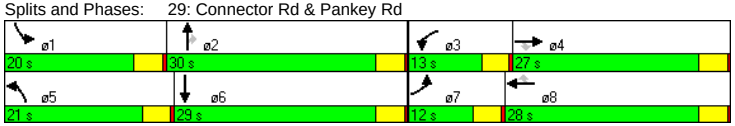
LOS Engineering

PM Horizon Year
29: Connector Rd & Pankey Rd — Timings

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Volume (vph)	90	438	310	29	252	274	210	380	43	221	480
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot	
Protected Phases	7	4		3	8		5	2		1	6
Permitted Phases			4			8			2		
Detector Phases	7	4	4	3	8	8	5	2	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0
Total Split (s)	12.0	27.0	27.0	13.0	28.0	28.0	21.0	30.0	30.0	20.0	29.0
Total Split (%)	13.3%	30.0%	30.0%	14.4%	31.1%	31.1%	23.3%	33.3%	33.3%	22.2%	32.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min
Act Effct Green (s)	7.6	23.8	23.8	7.1	21.3	21.3	14.8	25.3	25.3	14.8	25.3
Actuated g/C Ratio	0.09	0.29	0.29	0.08	0.26	0.26	0.18	0.31	0.31	0.18	0.31
v/c Ratio	0.66	0.90	0.53	0.24	0.55	0.50	0.78	0.70	0.10	0.82	0.93
Control Delay	62.2	54.6	6.8	42.4	33.1	6.8	53.7	34.8	8.1	58.7	55.0
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	62.2	54.6	6.8	42.4	33.1	6.8	53.7	34.8	8.1	58.7	55.0
LOS	E	D	A	D	C	A	D	C	A	E	D
Approach Delay		37.7			20.6			39.3			56.1
Approach LOS		D			C			D			E

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 82.7	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.93	
Intersection Signal Delay: 39.4	Intersection LOS: D
Intersection Capacity Utilization 85.5%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 29: Connector Rd & Pankey Rd



LOS Engineering

PM Horizon Year
29: Connector Rd & Pankey Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	50	50	50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850		0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1583	1770	1346	1583	1863	1417	1583	1863	1417	1583	1852	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1583	1770	1346	1583	1863	1417	1583	1863	1417	1583	1852	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			326			288			45		2	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1256			2875			1488			1443	
Travel Time (s)		28.5			65.3			33.8			32.8	
Volume (vph)	90	438	310	29	252	274	210	380	43	221	480	20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	461	326	31	265	288	221	400	45	233	505	21
Lane Group Flow (vph)	95	461	326	31	265	288	221	400	45	233	526	0
v/c Ratio	0.66	0.90	0.53	0.24	0.55	0.50	0.78	0.70	0.10	0.82	0.93	
Control Delay	62.2	54.6	6.8	42.4	33.1	6.8	53.7	34.8	8.1	58.7	55.0	
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	62.2	54.6	6.8	42.4	33.1	6.8	53.7	34.8	8.1	58.7	55.0	
Queue Length 50th (ft)	52	269	0	17	129	0	116	198	0	126	290	
Queue Length 95th (ft)	#126	#490	71	44	206	60	#225	#319	25	#254	#519	
Internal Link Dist (ft)		1176			2795			1408			1363	
Turn Bay Length (ft)												
Base Capacity (vph)	150	510	620	161	528	608	319	584	475	304	568	
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	0.63	0.90	0.53	0.19	0.50	0.47	0.69	0.68	0.09	0.77	0.93	

Intersection Summary

Area Type: Other

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

LOS Engineering

PM Horizon Year
29: Connector Rd & Pankey Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	0.95	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	0.99	
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)	1583	1770	1346	1583	1863	1417	1583	1863	1417	1583	1852	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1583	1770	1346	1583	1863	1417	1583	1863	1417	1583	1852	
Volume (vph)	90	438	310	29	252	274	210	380	43	221	480	20
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	461	326	31	265	288	221	400	45	233	505	21
RTOR Reduction (vph)	0	0	234	0	0	213	0	0	32	0	1	0
Lane Group Flow (vph)	95	461	92	31	265	75	221	400	13	233	525	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	6.2	23.8	23.8	4.5	22.1	22.1	14.8	25.3	25.3	14.8	25.3	
Effective Green, g (s)	6.2	23.8	23.8	4.5	22.1	22.1	14.8	25.3	25.3	14.8	25.3	
Actuated g/C Ratio	0.07	0.28	0.28	0.05	0.26	0.26	0.18	0.30	0.30	0.18	0.30	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	116	499	380	84	488	371	278	558	425	278	555	
v/s Ratio Prot	c0.06	c0.26		0.02	0.14		0.14	0.21		c0.15	c0.28	
v/s Ratio Perm			0.07			0.05			0.01			
v/c Ratio	0.82	0.92	0.24	0.37	0.54	0.20	0.79	0.72	0.03	0.84	0.95	
Uniform Delay, d1	38.5	29.4	23.3	38.6	26.8	24.3	33.3	26.4	20.9	33.6	28.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	34.4	22.9	0.3	2.7	1.2	0.3	14.5	4.4	0.0	19.3	25.1	
Delay (s)	72.9	52.3	23.7	41.3	28.0	24.6	47.8	30.7	20.9	52.9	54.0	
Level of Service	E	D	C	D	C	C	D	C	C	D	D	
Approach Delay (s)		43.9			27.0			35.7			53.6	
Approach LOS		D			C			D			D	

Intersection Summary

HCM Average Control Delay	41.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	84.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	85.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

Appendix T

Horizon Year (2030) + Project Intersection LOS Calculations

AM Horizon Year + Project
1: Pala Rd (SR-76) & Via Monserate — HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	10	1240	1970	50	100	40
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	1305	2074	53	105	42
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2126				2774	1063
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2126				2774	1063
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				0	81
cM capacity (veh/h)	252				15	219

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	11	653	653	1382	744	42
Volume Left	11	0	0	0	0	0
Volume Right	0	0	0	0	53	42
cSH	252	1700	1700	1700	1700	219
Volume to Capacity	0.04	0.38	0.38	0.81	0.44	0.19
Queue Length 95th (ft)	3	0	0	0	0	17
Control Delay (s)	19.9	0.0	0.0	0.0	0.0	25.3
Lane LOS	C					D
Approach Delay (s)	0.2			0.0		Err
Approach LOS						F

Intersection Summary			
Average Delay	Err		
Intersection Capacity Utilization	Err%	ICU Level of Service	H
Analysis Period (min)	15		

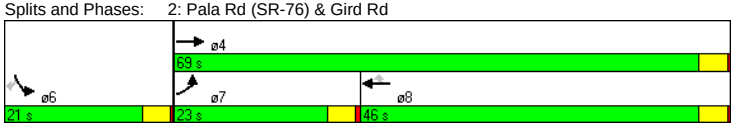
LOS Engineering

AM Horizon Year + Project
2: Pala Rd (SR-76) & Gird Rd — Timings

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	160	1200	1340	50	90	140
Turn Type	Prot			Perm		Perm
Protected Phases	7	4	8		6	
Permitted Phases				8		6
Detector Phases	7	4	8	8	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	23.0	69.0	46.0	46.0	21.0	21.0
Total Split (%)	25.6%	76.7%	51.1%	51.1%	23.3%	23.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	None	None	None	Min	Min
Act Effct Green (s)	12.1	45.1	32.4	32.4	10.1	10.1
Actuated g/C Ratio	0.18	0.70	0.50	0.50	0.16	0.16
v/c Ratio	0.58	0.51	0.80	0.07	0.38	0.42
Control Delay	37.2	4.8	19.1	9.5	35.4	10.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.2	4.8	19.1	9.5	35.4	10.6
LOS	D	A	B	A	D	B
Approach Delay		8.6	18.8		20.3	
Approach LOS		A	B		C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 64.8	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.80	
Intersection Signal Delay: 14.3	Intersection LOS: B
Intersection Capacity Utilization 62.5%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 2: Pala Rd (SR-76) & Gird Rd



LOS Engineering

AM Horizon Year + Project
2: Pala Rd (SR-76) & Gird Rd

Queues

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1900	1900	1700	1700	1700
Storage Length (ft)	450			20	0	180
Storage Lanes	1			1	1	1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1583	3539	3539	1417	1583	1417
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1583	3539	3539	1417	1583	1417
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				10		147
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		3191	8309		1271	
Travel Time (s)		72.5	188.8		28.9	
Volume (vph)	160	1200	1340	50	90	140
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	168	1263	1411	53	95	147
Lane Group Flow (vph)	168	1263	1411	53	95	147
v/c Ratio	0.58	0.51	0.80	0.07	0.38	0.42
Control Delay	37.2	4.8	19.1	9.5	35.4	10.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.2	4.8	19.1	9.5	35.4	10.6
Queue Length 50th (ft)	68	83	243	9	39	0
Queue Length 95th (ft)	145	155	438	32	93	51
Internal Link Dist (ft)		3111	8229		1191	
Turn Bay Length (ft)	450			20		180
Base Capacity (vph)	429	2781	2047	824	411	477
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	0.39	0.45	0.69	0.06	0.23	0.31

Intersection Summary

Area Type: Other

LOS Engineering

AM Horizon Year + Project
2: Pala Rd (SR-76) & Gird Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1900	1900	1700	1700	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
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)	1583	3539	3539	1417	1583	1417
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1583	3539	3539	1417	1583	1417
Volume (vph)	160	1200	1340	50	90	140
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	168	1263	1411	53	95	147
RTOR Reduction (vph)	0	0	0	5	0	124
Lane Group Flow (vph)	168	1263	1411	48	95	23
Turn Type	Prot			Perm		Perm
Protected Phases	7	4	8		6	
Permitted Phases				8		6
Actuated Green, G (s)	9.8	46.2	32.4	32.4	10.1	10.1
Effective Green, g (s)	9.8	46.2	32.4	32.4	10.1	10.1
Actuated g/C Ratio	0.15	0.72	0.50	0.50	0.16	0.16
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	241	2543	1783	714	249	223
v/s Ratio Prot	c0.11	0.36	c0.40		c0.06	
v/s Ratio Perm				0.03		0.02
v/c Ratio	0.70	0.50	0.79	0.07	0.38	0.10
Uniform Delay, d1	25.8	4.0	13.2	8.2	24.3	23.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.5	0.2	2.5	0.0	1.0	0.2
Delay (s)	34.3	4.1	15.6	8.2	25.3	23.4
Level of Service	C	A	B	A	C	C
Approach Delay (s)		7.7	15.4		24.2	
Approach LOS		A	B		C	

Intersection Summary

HCM Average Control Delay	12.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	64.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	62.5%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

AM Horizon Year + Project
3: Pala Rd (SR-76) & Sage Rd — HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	10	1060	1590	10	10	20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	1116	1674	11	11	21
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1684				2258	842
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1684				2258	842
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	97				69	93
cM capacity (veh/h)	376				34	308

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	11	558	558	1116	568	21
Volume Left	11	0	0	0	0	0
Volume Right	0	0	0	0	11	21
cSH	376	1700	1700	1700	1700	308
Volume to Capacity	0.03	0.33	0.33	0.66	0.33	0.07
Queue Length 95th (ft)	2	0	0	0	0	5
Control Delay (s)	14.9	0.0	0.0	0.0	0.0	17.6
Lane LOS	B					C
Approach Delay (s)	0.1			0.0		Err
Approach LOS						F

Intersection Summary			
Average Delay	Err		
Intersection Capacity Utilization	Err%	ICU Level of Service	H
Analysis Period (min)	15		

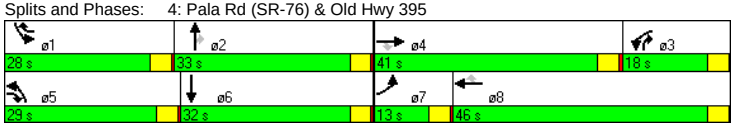
LOS Engineering

AM Horizon Year + Project
4: Pala Rd (SR-76) & Old Hwy 395 — Timings

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Volume (vph)	100	700	160	90	1140	200	290	210	200	500	230
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot		pm+ov	Prot	
Protected Phases	7	4	5	3	8	1	5	2	3	1	6
Permitted Phases			4			8			2		
Detector Phases	7	4	5	3	8	1	5	2	3	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	8.0	20.0	20.0	20.0	20.0	8.0	20.0	20.0
Total Split (s)	13.0	41.0	29.0	18.0	46.0	28.0	29.0	33.0	18.0	28.0	32.0
Total Split (%)	10.8%	34.2%	24.2%	15.0%	38.3%	23.3%	24.2%	27.5%	15.0%	23.3%	26.7%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	Min	None	None	Min	Min	Min	None	Min	Min
Act Effct Green (s)	9.0	29.9	53.8	20.2	41.0	67.6	23.9	27.5	47.7	22.6	26.1
Actuated g/C Ratio	0.08	0.26	0.46	0.17	0.35	0.58	0.21	0.24	0.41	0.19	0.22
v/c Ratio	0.85	0.81	0.23	0.35	0.96	0.24	0.94	0.50	0.35	0.88	0.92
Control Delay	103.5	48.1	1.9	50.2	55.3	3.6	82.4	43.5	12.4	63.0	69.8
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	103.5	48.1	1.9	50.2	55.3	3.6	82.4	43.5	12.4	63.0	69.8
LOS	F	D	A	D	E	A	F	D	B	E	E
Approach Delay		46.2			47.7			50.7			65.9
Approach LOS		D			D			D			E

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 116.2	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.96	
Intersection Signal Delay: 51.8	Intersection LOS: D
Intersection Capacity Utilization 89.0%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 4: Pala Rd (SR-76) & Old Hwy 395



LOS Engineering

AM Horizon Year + Project
4: Pala Rd (SR-76) & Old Hwy 395

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	330		0	150		150	0		0	0		0
Storage Lanes	1		0	1		1	1		1	2		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	50	50	50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt			0.850			0.850			0.850		0.946	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1583	3539	1417	1583	3539	1417	1583	1863	1417	3072	1762	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1583	3539	1417	1583	3539	1417	1583	1863	1417	3072	1762	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			168			168			38		22	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		652			462			899			4464	
Travel Time (s)		14.8			10.5			20.4			101.5	
Volume (vph)	100	700	160	90	1140	200	290	210	200	500	230	130
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	737	168	95	1200	211	305	221	211	526	242	137
Lane Group Flow (vph)	105	737	168	95	1200	211	305	221	211	526	379	0
v/c Ratio	0.85	0.81	0.23	0.35	0.96	0.24	0.94	0.50	0.35	0.88	0.92	
Control Delay	103.5	48.1	1.9	50.2	55.3	3.6	82.4	43.5	12.4	63.0	69.8	
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	103.5	48.1	1.9	50.2	55.3	3.6	82.4	43.5	12.4	63.0	69.8	
Queue Length 50th (ft)	82	282	0	66	477	14	234	148	45	204	271	
Queue Length 95th (ft)	#190	331	20	128	#629	48	#405	228	91	#293	#447	
Internal Link Dist (ft)		572			382			819			4384	
Turn Bay Length (ft)	330			150		150						
Base Capacity (vph)	123	1064	753	275	1271	892	338	460	604	628	436	
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	0.85	0.69	0.22	0.35	0.94	0.24	0.90	0.48	0.35	0.84	0.87	

Intersection Summary

Area Type: Other

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

LOS Engineering

AM Horizon Year + Project
4: Pala Rd (SR-76) & Old Hwy 395

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	
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)	1583	3539	1417	1583	3539	1417	1583	1863	1417	3072	1762	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1583	3539	1417	1583	3539	1417	1583	1863	1417	3072	1762	
Volume (vph)	100	700	160	90	1140	200	290	210	200	500	230	130
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	737	168	95	1200	211	305	221	211	526	242	137
RTOR Reduction (vph)	0	0	90	0	0	76	0	0	22	0	17	0
Lane Group Flow (vph)	105	737	78	95	1200	135	305	221	189	526	362	0
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot		pm+ov	Prot		
Protected Phases	7	4	5	3	8	1	5	2	3	1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	9.0	29.9	53.8	20.2	41.1	63.7	23.9	27.5	47.7	22.6	26.2	
Effective Green, g (s)	9.0	29.9	53.8	20.2	41.1	63.7	23.9	27.5	47.7	22.6	26.2	
Actuated g/C Ratio	0.08	0.26	0.46	0.17	0.35	0.55	0.21	0.24	0.41	0.19	0.23	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	123	911	656	275	1252	826	326	441	582	597	397	
v/s Ratio Prot	0.07	c0.21	0.02	0.06	c0.34	0.03	c0.19	0.12	0.06	0.17	c0.21	
v/s Ratio Perm			0.03			0.06			0.08			
v/c Ratio	0.85	0.81	0.12	0.35	0.96	0.16	0.94	0.50	0.32	0.88	0.91	
Uniform Delay, d1	52.9	40.5	17.7	42.2	36.7	13.0	45.4	38.4	23.3	45.5	43.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	40.3	5.4	0.1	0.8	16.3	0.1	33.2	0.9	0.3	14.3	24.7	
Delay (s)	93.2	45.8	17.8	42.9	53.0	13.1	78.6	39.3	23.6	59.7	68.6	
Level of Service	F	D	B	D	D	B	E	D	C	E	E	
Approach Delay (s)		46.1			46.8			51.1			63.4	
Approach LOS		D			D			D			E	

Intersection Summary

HCM Average Control Delay	51.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	116.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	89.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

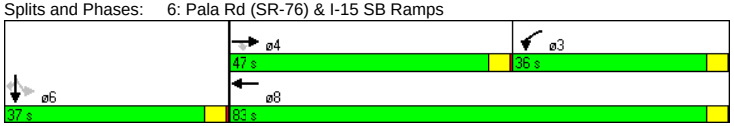
AM Horizon Year + Project
6: Pala Rd (SR-76) & I-15 SB Ramps

Timings

Lane Group	EBT	EBR	WBL	WBT	SBL	SBT	SBR
Lane Configurations							
Volume (vph)	1000	400	450	830	150	10	600
Turn Type		Perm	Prot		Perm		Perm
Protected Phases	4		3	8		6	
Permitted Phases		4			6		6
Detector Phases	4	4	3	8	6	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0	20.0	20.0
Total Split (s)	47.0	47.0	36.0	83.0	37.0	37.0	37.0
Total Split (%)	39.2%	39.2%	30.0%	69.2%	30.8%	30.8%	30.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes				
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min
Act Effct Green (s)	42.7	42.7	21.8	68.5	43.5	43.5	43.5
Actuated g/C Ratio	0.36	0.36	0.18	0.57	0.36	0.36	0.36
v/c Ratio	0.84	0.56	0.85	0.43	0.29	0.50	0.52
Control Delay	42.0	6.7	65.9	15.9	31.8	16.5	16.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.0	6.7	65.9	15.9	31.8	16.5	16.3
LOS	D	A	E	B	C	B	B
Approach Delay	31.9			33.5		19.4	
Approach LOS	C			C		B	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 40 (33%), Referenced to phase 2: and 6:SBTL, Start of Green	
Natural Cycle: 60	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 29.7	Intersection LOS: C
Intersection Capacity Utilization 67.2%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 6: Pala Rd (SR-76) & I-15 SB Ramps



LOS Engineering

AM Horizon Year + Project
6: Pala Rd (SR-76) & I-15 SB Ramps

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	0		0	500		0	0		0	0		900
Storage Lanes	0		1	2		0	0		0	1		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50	50	50					50	50	50
Trailing Detector (ft)		0	0	0	0					0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	1.00	1.00	0.95	0.91	0.95
Frt			0.850								0.855	0.850
Flt Protected				0.950						0.950		
Satd. Flow (prot)	0	3539	1417	3072	3539	0	0	0	0	1504	1449	1346
Flt Permitted				0.950						0.950		
Satd. Flow (perm)	0	3539	1417	3072	3539	0	0	0	0	1504	1449	1346
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			391								192	192
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		654			1271			961			1209	
Travel Time (s)		14.9			28.9			21.8			27.5	
Volume (vph)	0	1000	400	450	830	0	0	0	0	150	10	600
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1053	421	474	874	0	0	0	0	158	11	632
Lane Group Flow (vph)	0	1053	421	474	874	0	0	0	0	158	327	316
v/c Ratio		0.84	0.56	0.85	0.43					0.29	0.50	0.52
Control Delay		42.0	6.7	65.9	15.9					31.8	16.5	16.3
Queue Delay		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Total Delay		42.0	6.7	65.9	15.9					31.8	16.5	16.3
Queue Length 50th (ft)		376	15	188	230					93	84	74
Queue Length 95th (ft)		477	97	m232	m417					165	200	184
Internal Link Dist (ft)		574			1191			881			1129	
Turn Bay Length (ft)				500								900
Base Capacity (vph)		1327	776	819	2330					546	648	611
Starvation Cap Reductn		0	0	0	0					0	0	0
Spillback Cap Reductn		0	0	0	0					0	0	0
Storage Cap Reductn		0	0	0	0					0	0	0
Reduced v/c Ratio		0.79	0.54	0.58	0.38					0.29	0.50	0.52

Intersection Summary	
Area Type:	Other
m Volume for 95th percentile queue is metered by upstream signal.	

LOS Engineering

AM Horizon Year + Project
6: Pala Rd (SR-76) & I-15 SB Ramps

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)		4.0	4.0	4.0	4.0					4.0	4.0	4.0
Lane Util. Factor		0.95	1.00	0.97	0.95					0.95	0.91	0.95
Frt		1.00	0.85	1.00	1.00					1.00	0.86	0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95	1.00	1.00
Satd. Flow (prot)		3539	1417	3072	3539					1504	1449	1346
Flt Permitted		1.00	1.00	0.95	1.00					0.95	1.00	1.00
Satd. Flow (perm)		3539	1417	3072	3539					1504	1449	1346
Volume (vph)	0	1000	400	450	830	0	0	0	0	150	10	600
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1053	421	474	874	0	0	0	0	158	11	632
RTOR Reduction (vph)	0	0	252	0	0	0	0	0	0	0	122	122
Lane Group Flow (vph)	0	1053	169	474	874	0	0	0	0	158	205	194
Turn Type			Perm	Prot						Perm		Perm
Protected Phases		4		3	8						6	
Permitted Phases			4							6		6
Actuated Green, G (s)		42.7	42.7	21.8	68.5					43.5	43.5	43.5
Effective Green, g (s)		42.7	42.7	21.8	68.5					43.5	43.5	43.5
Actuated g/C Ratio		0.36	0.36	0.18	0.57					0.36	0.36	0.36
Clearance Time (s)		4.0	4.0	4.0	4.0					4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Lane Grp Cap (vph)		1259	504	558	2020					545	525	488
v/s Ratio Prot		c0.30		c0.15	0.25							
v/s Ratio Perm			0.12							0.11	0.14	c0.14
v/c Ratio		0.84	0.34	0.85	0.43					0.29	0.39	0.40
Uniform Delay, d1		35.4	28.3	47.5	14.7					27.2	28.4	28.5
Progression Factor		1.00	1.00	1.19	1.08					1.00	1.00	1.00
Incremental Delay, d2		5.0	0.4	7.7	0.1					1.3	2.2	2.4
Delay (s)		40.4	28.7	64.0	16.0					28.6	30.6	30.9
Level of Service		D	C	E	B					C	C	C
Approach Delay (s)		37.1			32.9			0.0			30.3	
Approach LOS		D			C			A			C	

Intersection Summary			
HCM Average Control Delay	34.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

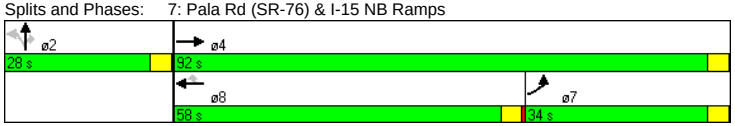
AM Horizon Year + Project
7: Pala Rd (SR-76) & I-15 NB Ramps

Timings

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Lane Configurations							
Volume (vph)	550	600	1000	140	280	10	390
Turn Type	Prot			Perm	Perm		Perm
Protected Phases	7	4	8			2	
Permitted Phases				8	2		2
Detector Phases	7	4	8	8	2	2	2
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	34.0	92.0	58.0	58.0	28.0	28.0	28.0
Total Split (%)	28.3%	76.7%	48.3%	48.3%	23.3%	23.3%	23.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lag		Lead	Lead			
Lead-Lag Optimize?	Yes		Yes	Yes			
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min
Act Effct Green (s)	28.3	73.8	41.6	41.6	38.2	38.2	38.2
Actuated g/C Ratio	0.24	0.62	0.35	0.35	0.32	0.32	0.32
v/c Ratio	0.80	0.29	0.86	0.28	0.37	0.41	0.51
Control Delay	68.5	26.2	43.9	19.8	38.7	35.1	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.5	26.2	43.9	19.8	38.7	35.1	7.4
LOS	E	C	D	B	D	D	A
Approach Delay		46.4	41.0			23.3	
Approach LOS		D	D			C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:, Start of Green	
Natural Cycle: 65	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.86	
Intersection Signal Delay: 39.0	Intersection LOS: D
Intersection Capacity Utilization 67.2%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 7: Pala Rd (SR-76) & I-15 NB Ramps



LOS Engineering

AM Horizon Year + Project
7: Pala Rd (SR-76) & I-15 NB Ramps

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	450		0	0		50	0		800	0		0
Storage Lanes	2		0	0		1	1		1	0		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.95	0.91	0.95	1.00	1.00	1.00
Frt						0.850		0.942	0.850			
Flt Protected	0.950						0.950	0.973				
Satd. Flow (prot)	3072	3539	0	0	3539	1417	1504	1554	1346	0	0	0
Flt Permitted	0.950						0.950	0.973				
Satd. Flow (perm)	3072	3539	0	0	3539	1417	1504	1554	1346	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						43		24	330			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1271			2232			991			1241	
Travel Time (s)		28.9			50.7			22.5			28.2	
Volume (vph)	550	600	0	0	1000	140	280	10	390	0	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	579	632	0	0	1053	147	295	11	411	0	0	0
Lane Group Flow (vph)	579	632	0	0	1053	147	178	209	330	0	0	0
v/c Ratio	0.80	0.29			0.86	0.28	0.37	0.41	0.51			
Control Delay	68.5	26.2			43.9	19.8	38.7	35.1	7.4			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	68.5	26.2			43.9	19.8	38.7	35.1	7.4			
Queue Length 50th (ft)	227	217			395	56	107	116	0			
Queue Length 95th (ft)	m236	m221			428	97	214	238	91			
Internal Link Dist (ft)		1191			2152			911			1161	
Turn Bay Length (ft)	450					50			800			
Base Capacity (vph)	822	2595			1593	661	479	511	653			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.70	0.24			0.66	0.22	0.37	0.41	0.51			

Intersection Summary

Area Type: Other

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

LOS Engineering

AM Horizon Year + Project
7: Pala Rd (SR-76) & I-15 NB Ramps

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Lane Util. Factor	0.97	0.95			0.95	1.00	0.95	0.91	0.95			
Frt	1.00	1.00			1.00	0.85	1.00	0.94	0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95	0.97	1.00			
Satd. Flow (prot)	3072	3539			3539	1417	1504	1553	1346			
Flt Permitted	0.95	1.00			1.00	1.00	0.95	0.97	1.00			
Satd. Flow (perm)	3072	3539			3539	1417	1504	1553	1346			
Volume (vph)	550	600	0	0	1000	140	280	10	390	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	579	632	0	0	1053	147	295	11	411	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	28	0	16	225	0	0	0
Lane Group Flow (vph)	579	632	0	0	1053	119	178	193	105	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Actuated Green, G (s)	28.3	73.9			41.6	41.6	38.1	38.1	38.1			
Effective Green, g (s)	28.3	73.9			41.6	41.6	38.1	38.1	38.1			
Actuated g/C Ratio	0.24	0.62			0.35	0.35	0.32	0.32	0.32			
Clearance Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Lane Grp Cap (vph)	724	2179			1227	491	478	493	427			
v/s Ratio Prot	c0.19	0.18			c0.30							
v/s Ratio Perm						0.08	0.12	0.12	0.08			
v/c Ratio	0.80	0.29			0.86	0.24	0.37	0.39	0.25			
Uniform Delay, d1	43.2	10.8			36.5	28.0	31.7	31.9	30.3			
Progression Factor	1.47	2.50			1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2	3.9	0.0			6.2	0.3	2.2	2.3	1.4			
Delay (s)	67.3	27.0			42.6	28.2	33.9	34.2	31.7			
Level of Service	E	C			D	C	C	C	C			
Approach Delay (s)		46.3			40.8			33.0			0.0	
Approach LOS		D			D			C			A	

Intersection Summary

HCM Average Control Delay	41.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

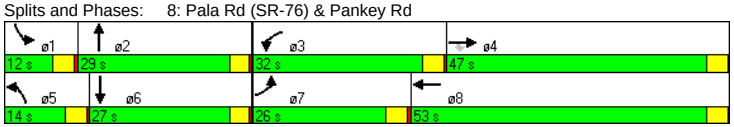
AM Horizon Year + Project
8: Pala Rd (SR-76) & Pankey Rd

Timings

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	150	680	160	210	950	120	270	40	200
Turn Type	Prot		Perm	Prot		Prot		Prot	
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases			4						
Detector Phases	7	4	4	3	8	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	8.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	26.0	47.0	47.0	32.0	53.0	14.0	29.0	12.0	27.0
Total Split (%)	21.7%	39.2%	39.2%	26.7%	44.2%	11.7%	24.2%	10.0%	22.5%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	13.6	29.3	29.3	16.5	32.0	9.1	17.7	7.9	14.2
Actuated g/C Ratio	0.17	0.37	0.37	0.20	0.40	0.11	0.22	0.09	0.18
v/c Ratio	0.60	0.55	0.27	0.69	0.78	0.37	0.57	0.28	0.45
Control Delay	48.4	25.0	5.3	47.2	27.5	46.4	28.0	51.1	33.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.4	25.0	5.3	47.2	27.5	46.4	28.0	51.1	33.5
LOS	D	C	A	D	C	D	C	D	C
Approach Delay		25.4			30.8		31.9		35.8
Approach LOS		C			C		C		D

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 79.8	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.78	
Intersection Signal Delay: 29.8	Intersection LOS: C
Intersection Capacity Utilization 68.3%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 8: Pala Rd (SR-76) & Pankey Rd



LOS Engineering

AM Horizon Year + Project
8: Pala Rd (SR-76) & Pankey Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.987			0.940			0.961	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1583	3539	1417	1583	3493	0	3072	3327	0	1583	3401	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1583	3539	1417	1583	3493	0	3072	3327	0	1583	3401	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			168		10			119			36	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2232			2833			991			1488	
Travel Time (s)		50.7			64.4			22.5			33.8	
Volume (vph)	150	680	160	210	950	90	120	270	180	40	200	70
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	158	716	168	221	1000	95	126	284	189	42	211	74
Lane Group Flow (vph)	158	716	168	221	1095	0	126	473	0	42	285	0
v/c Ratio	0.60	0.55	0.27	0.69	0.78		0.37	0.57		0.28	0.45	
Control Delay	48.4	25.0	5.3	47.2	27.5		46.4	28.0		51.1	33.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	48.4	25.0	5.3	47.2	27.5		46.4	28.0		51.1	33.5	
Queue Length 50th (ft)	80	161	0	111	264		32	94		21	64	
Queue Length 95th (ft)	184	294	47	239	459		81	188		70	133	
Internal Link Dist (ft)		2152			2753			911			1408	
Turn Bay Length (ft)												
Base Capacity (vph)	424	1728	778	512	1860		430	1161		177	1035	
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	0.37	0.41	0.22	0.43	0.59		0.29	0.41		0.24	0.28	

Intersection Summary	
Area Type:	Other

LOS Engineering

AM Horizon Year + Project
8: Pala Rd (SR-76) & Pankey Rd — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.97	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.94		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	3539	1417	1583	3493		3072	3327		1583	3401	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	3539	1417	1583	3493		3072	3327		1583	3401	
Volume (vph)	150	680	160	210	950	90	120	270	180	40	200	70
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	158	716	168	221	1000	95	126	284	189	42	211	74
RTOR Reduction (vph)	0	0	106	0	6	0	0	93	0	0	29	0
Lane Group Flow (vph)	158	716	62	221	1089	0	126	380	0	42	256	0
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	10.7	29.4	29.4	13.3	32.0		6.3	17.7		3.7	15.1	
Effective Green, g (s)	10.7	29.4	29.4	13.3	32.0		6.3	17.7		3.7	15.1	
Actuated g/C Ratio	0.13	0.37	0.37	0.17	0.40		0.08	0.22		0.05	0.19	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	211	1299	520	263	1395		242	735		73	641	
v/s Ratio Prot	0.10	0.20		c0.14	c0.31		c0.04	c0.11		0.03	0.08	
v/s Ratio Perm			0.04									
v/c Ratio	0.75	0.55	0.12	0.84	0.78		0.52	0.52		0.58	0.40	
Uniform Delay, d1	33.4	20.1	16.8	32.4	21.0		35.4	27.4		37.4	28.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	13.5	0.5	0.1	20.8	2.9		2.0	0.6		10.5	0.4	
Delay (s)	46.9	20.6	16.9	53.2	23.9		37.5	28.1		47.9	28.9	
Level of Service	D	C	B	D	C		D	C		D	C	
Approach Delay (s)		24.0			28.8			30.0			31.4	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	27.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	80.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	68.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

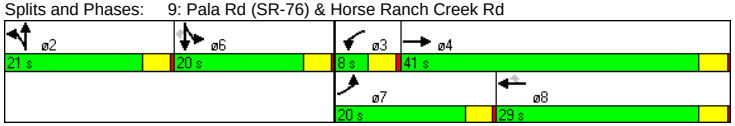
LOS Engineering

AM Horizon Year + Project
9: Pala Rd (SR-76) & Horse Ranch Creek Rd — Timings

Lane Group	EBL	EBT	WBT	WBR	SBL	SBT	SBR	ø2	ø3
Lane Configurations									
Volume (vph)	460	440	850	90	80	0	400		
Turn Type	Prot			Perm	Split		Perm		
Protected Phases	7	4	8		6	6		2	3
Permitted Phases				8			6		
Detector Phases	7	4	8	8	6	6	6		
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	8.0
Total Split (s)	20.0	41.0	29.0	29.0	20.0	20.0	20.0	21.0	8.0
Total Split (%)	22.2%	45.6%	32.2%	32.2%	22.2%	22.2%	22.2%	23%	9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lag	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					Yes
Recall Mode	None	None	None	None	Min	Min	Min	Min	None
Act Effct Green (s)	14.8	41.3	22.4	22.4	9.7	9.7	9.7		
Actuated g/C Ratio	0.22	0.60	0.33	0.33	0.14	0.14	0.14		
v/c Ratio	0.73	0.22	0.78	0.18	0.40	0.29	0.31		
Control Delay	34.2	6.9	27.0	5.6	33.7	1.0	1.2		
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay	34.2	6.9	27.0	5.6	33.7	1.0	1.2		
LOS	C	A	C	A	C	A	A		
Approach Delay		20.8	24.9			6.5			
Approach LOS		C	C			A			

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 68.8	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.78	
Intersection Signal Delay: 19.5	Intersection LOS: B
Intersection Capacity Utilization 54.5%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 9: Pala Rd (SR-76) & Horse Ranch Creek Rd



LOS Engineering

AM Horizon Year + Project
9: Pala Rd (SR-76) & Horse Ranch Creek Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	250		0	250		250	0		0	150		150
Storage Lanes	2		0	1		1	0		0	1		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50	50	50	50		50	50	50
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	0.95	0.91	0.95
Frt						0.850					0.850	0.850
Flt Protected	0.950									0.950		
Satd. Flow (prot)	3072	3539	0	1667	3539	1417	0	1863	0	1504	1441	1346
Flt Permitted	0.950									0.950		
Satd. Flow (perm)	3072	3539	0	1667	3539	1417	0	1863	0	1504	1441	1346
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						95					592	592
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2833			5160			734			1509	
Travel Time (s)		64.4			117.3			16.7			34.3	
Volume (vph)	460	440	0	0	850	90	0	0	0	80	0	400
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	484	463	0	0	895	95	0	0	0	84	0	421
Lane Group Flow (vph)	484	463	0	0	895	95	0	0	0	84	205	216
v/c Ratio	0.73	0.22			0.78	0.18				0.40	0.29	0.31
Control Delay	34.2	6.9			27.0	5.6				33.7	1.0	1.2
Queue Delay	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Total Delay	34.2	6.9			27.0	5.6				33.7	1.0	1.2
Queue Length 50th (ft)	102	40			178	0				36	0	0
Queue Length 95th (ft)	#180	75			276	31				77	0	0
Internal Link Dist (ft)		2753			5080			654			1429	
Turn Bay Length (ft)	250					250				150		150
Base Capacity (vph)	710	2159			1249	561				324	775	754
Starvation Cap Reductn	0	0			0	0				0	0	0
Spillback Cap Reductn	0	0			0	0				0	0	0
Storage Cap Reductn	0	0			0	0				0	0	0
Reduced v/c Ratio	0.68	0.21			0.72	0.17				0.26	0.26	0.29

Intersection Summary

Area Type: Other

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

LOS Engineering

AM Horizon Year + Project
9: Pala Rd (SR-76) & Horse Ranch Creek Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0			4.0	4.0				4.0	4.0	4.0
Lane Util. Factor	0.97	0.95			0.95	1.00				0.95	0.91	0.95
Frt	1.00	1.00			1.00	0.85				1.00	0.85	0.85
Flt Protected	0.95	1.00			1.00	1.00				0.95	1.00	1.00
Satd. Flow (prot)	3072	3539			3539	1417				1504	1441	1346
Flt Permitted	0.95	1.00			1.00	1.00				0.95	1.00	1.00
Satd. Flow (perm)	3072	3539			3539	1417				1504	1441	1346
Volume (vph)	460	440	0	0	850	90	0	0	0	80	0	400
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	484	463	0	0	895	95	0	0	0	84	0	421
RTOR Reduction (vph)	0	0	0	0	0	64	0	0	0	0	176	185
Lane Group Flow (vph)	484	463	0	0	895	31	0	0	0	84	29	31
Turn Type	Prot			Prot		Perm	Split			Split		Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases						8						6
Actuated Green, G (s)	14.8	41.2			22.4	22.4				9.7	9.7	9.7
Effective Green, g (s)	14.8	41.2			22.4	22.4				9.7	9.7	9.7
Actuated g/C Ratio	0.22	0.60			0.33	0.33				0.14	0.14	0.14
Clearance Time (s)	4.0	4.0			4.0	4.0				4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0			3.0	3.0				3.0	3.0	3.0
Lane Grp Cap (vph)	664	2129			1157	463				213	204	191
v/s Ratio Prot	c0.16	0.13			c0.25					c0.06	0.02	
v/s Ratio Perm						0.02						0.02
v/c Ratio	0.73	0.22			0.77	0.07				0.39	0.14	0.16
Uniform Delay, d1	25.0	6.3			20.8	15.9				26.7	25.8	25.8
Progression Factor	1.00	1.00			1.00	1.00				1.00	1.00	1.00
Incremental Delay, d2	4.0	0.1			3.3	0.1				1.2	0.3	0.4
Delay (s)	29.0	6.3			24.0	15.9				27.9	26.1	26.2
Level of Service	C	A			C	B				C	C	C
Approach Delay (s)		17.9			23.3			0.0			26.4	
Approach LOS		B			C			A			C	

Intersection Summary

HCM Average Control Delay	21.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	68.5	Sum of lost time (s)	21.6
Intersection Capacity Utilization	54.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

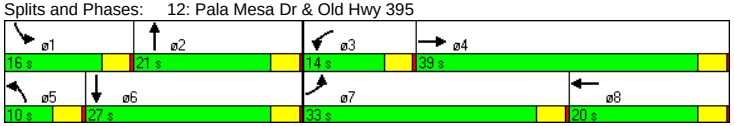
AM Horizon Year + Project
12: Pala Mesa Dr & Old Hwy 395 — Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	400	130	120	80	60	370	150	720
Turn Type	Prot		Prot		Prot		Prot	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases								
Detector Phases	7	4	3	8	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	33.0	39.0	14.0	20.0	10.0	21.0	16.0	27.0
Total Split (%)	36.7%	43.3%	15.6%	22.2%	11.1%	23.3%	17.8%	30.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	23.7	25.6	9.6	11.3	6.7	16.6	11.0	20.6
Actuated g/C Ratio	0.33	0.35	0.13	0.15	0.09	0.23	0.15	0.28
v/c Ratio	0.82	0.84	0.62	0.55	0.45	0.65	0.68	0.79
Control Delay	40.6	27.0	52.3	32.1	51.0	32.0	52.6	34.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.6	27.0	52.3	32.1	51.0	32.0	52.6	34.5
LOS	D	C	D	C	D	C	D	C
Approach Delay		32.6		40.7		34.0		37.5
Approach LOS		C		D		C		D

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 72.8
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.84
Intersection Signal Delay: 35.3 — Intersection LOS: D
Intersection Capacity Utilization 79.9% — ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 12: Pala Mesa Dr & Old Hwy 395



AM Horizon Year + Project
12: Pala Mesa Dr & Old Hwy 395 — Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	0		0	0		0	150		0	200		0
Storage Lanes	1		0	1		0	1		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.884			0.925			0.961			0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1583	1647	0	1583	1723	0	1583	3401	0	1583	3518	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1583	1647	0	1583	1723	0	1583	3401	0	1583	3518	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		226			49			48			4	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3628			1500			4464			5461	
Travel Time (s)		82.5			34.1			101.5			124.1	
Volume (vph)	400	130	450	120	80	80	60	370	130	150	720	30
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	421	137	474	126	84	84	63	389	137	158	758	32
Lane Group Flow (vph)	421	611	0	126	168	0	63	526	0	158	790	0
v/c Ratio	0.82	0.84		0.62	0.55		0.45	0.65		0.68	0.79	
Control Delay	40.6	27.0		52.3	32.1		51.0	32.0		52.6	34.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	40.6	27.0		52.3	32.1		51.0	32.0		52.6	34.5	
Queue Length 50th (ft)	200	194		65	60		33	125		81	205	
Queue Length 95th (ft)	#378	#345		#157	123		#94	#198		#185	#328	
Internal Link Dist (ft)		3548			1420			4384			5381	
Turn Bay Length (ft)							150			200		
Base Capacity (vph)	625	862		229	410		143	923		270	1172	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.67	0.71		0.55	0.41		0.44	0.57		0.59	0.67	

Intersection Summary

Area Type: Other
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

AM Horizon Year + Project
12: Pala Mesa Dr & Old Hwy 395 — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.88		1.00	0.93		1.00	0.96		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	1646		1583	1723		1583	3401		1583	3518	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	1646		1583	1723		1583	3401		1583	3518	
Volume (vph)	400	130	450	120	80	80	60	370	130	150	720	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	421	137	474	126	84	84	63	389	137	158	758	32
RTOR Reduction (vph)	0	147	0	0	43	0	0	37	0	0	3	0
Lane Group Flow (vph)	421	464	0	126	125	0	63	489	0	158	787	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	23.7	25.6		6.9	8.8		4.2	16.6		8.2	20.6	
Effective Green, g (s)	23.7	25.6		6.9	8.8		4.2	16.6		8.2	20.6	
Actuated g/C Ratio	0.32	0.35		0.09	0.12		0.06	0.23		0.11	0.28	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	512	575		149	207		91	770		177	989	
v/s Ratio Prot	c0.27	c0.28		0.08	0.07		0.04	0.14		c0.10	c0.22	
v/s Ratio Perm												
v/c Ratio	0.82	0.81		0.85	0.60		0.69	0.63		0.89	0.80	
Uniform Delay, d1	22.9	21.6		32.7	30.6		33.9	25.6		32.1	24.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	10.3	8.1		33.3	4.9		20.3	1.7		38.7	4.5	
Delay (s)	33.1	29.7		66.0	35.5		54.3	27.3		70.8	28.9	
Level of Service	C	C		E	D		D	C		E	C	
Approach Delay (s)		31.1			48.5			30.2			35.9	
Approach LOS		C			D			C			D	

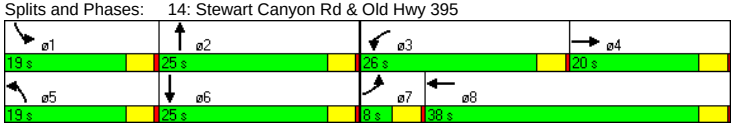
Intersection Summary			
HCM Average Control Delay	34.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	73.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

AM Horizon Year + Project
14: Stewart Canyon Rd & Old Hwy 395 — Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	30	20	140	10	10	410	320	1010
Turn Type	Prot		Prot		Prot		Prot	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases								
Detector Phases	7	4	3	8	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	8.0	20.0	26.0	38.0	19.0	25.0	19.0	25.0
Total Split (%)	8.9%	22.2%	28.9%	42.2%	21.1%	27.8%	21.1%	27.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	4.1	7.0	10.7	14.1	6.3	12.9	16.0	31.4
Actuated g/C Ratio	0.06	0.12	0.18	0.24	0.10	0.22	0.27	0.54
v/c Ratio	0.31	0.31	0.53	0.51	0.07	0.59	0.78	0.58
Control Delay	41.1	17.1	31.2	6.6	33.6	24.8	40.8	14.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.1	17.1	31.2	6.6	33.6	24.8	40.8	14.6
LOS	D	B	C	A	C	C	D	B
Approach Delay		24.4		14.4		25.0		20.8
Approach LOS		C		B		C		C

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 58.3	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.78	
Intersection Signal Delay: 20.6	Intersection LOS: C
Intersection Capacity Utilization 67.3%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 14: Stewart Canyon Rd & Old Hwy 395



AM Horizon Year + Project
14: Stewart Canyon Rd & Old Hwy 395 — Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	0		0	200		0	100		0	100		0
Storage Lanes	1		0	1		0	1		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.893			0.855			0.990			0.996	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1583	1663	0	1583	1593	0	1583	3504	0	1583	3525	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1583	1663	0	1583	1593	0	1583	3504	0	1583	3525	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		53			305			8			3	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1302			7424			5461			3410	
Travel Time (s)		29.6			168.7			124.1			77.5	
Volume (vph)	30	20	50	140	10	290	10	410	30	320	1010	30
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	21	53	147	11	305	11	432	32	337	1063	32
Lane Group Flow (vph)	32	74	0	147	316	0	11	464	0	337	1095	0
v/c Ratio	0.31	0.31		0.53	0.51		0.07	0.59		0.78	0.58	
Control Delay	41.1	17.1		31.2	6.6		33.6	24.8		40.8	14.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	41.1	17.1		31.2	6.6		33.6	24.8		40.8	14.6	
Queue Length 50th (ft)	12	7		50	3		4	80		119	133	
Queue Length 95th (ft)	#47	46		116	60		20	146		#348	#378	
Internal Link Dist (ft)		1222			7344			5381			3330	
Turn Bay Length (ft)				200			100			100		
Base Capacity (vph)	104	436		496	877		324	1144		434	1902	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.31	0.17		0.30	0.36		0.03	0.41		0.78	0.58	

Intersection Summary
Area Type: Other
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

LOS Engineering

AM Horizon Year + Project
14: Stewart Canyon Rd & Old Hwy 395 — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.89		1.00	0.86		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	1663		1583	1593		1583	3503		1583	3524	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	1663		1583	1593		1583	3503		1583	3524	
Volume (vph)	30	20	50	140	10	290	10	410	30	320	1010	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	21	53	147	11	305	11	432	32	337	1063	32
RTOR Reduction (vph)	0	48	0	0	238	0	0	6	0	0	2	0
Lane Group Flow (vph)	32	26	0	147	78	0	11	458	0	337	1093	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	1.3	6.4		9.0	14.1		1.1	16.6		16.0	31.5	
Effective Green, g (s)	1.3	6.4		9.0	14.1		1.1	16.6		16.0	31.5	
Actuated g/C Ratio	0.02	0.10		0.14	0.22		0.02	0.26		0.25	0.49	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	32	166		223	351		27	909		396	1734	
v/s Ratio Prot	0.02	0.02		c0.09	c0.05		0.01	0.13		c0.21	c0.31	
v/s Ratio Perm												
v/c Ratio	1.00	0.16		0.66	0.22		0.41	0.50		0.85	0.63	
Uniform Delay, d1	31.4	26.3		26.0	20.5		31.1	20.2		22.9	12.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	159.1	0.4		6.9	0.3		9.7	0.4		15.9	0.8	
Delay (s)	190.4	26.8		32.9	20.8		40.9	20.6		38.8	12.7	
Level of Service	F	C		C	C		D	C		D	B	
Approach Delay (s)		76.2			24.6			21.1			18.9	
Approach LOS		E			C			C			B	

Intersection Summary

HCM Average Control Delay	22.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	64.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	67.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

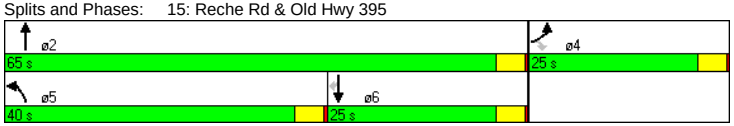
AM Horizon Year + Project
15: Reche Rd & Old Hwy 395 — Timings

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	280	290	490	290	270	460
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Detector Phases	4	4	5	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0	20.0
Total Split (s)	25.0	25.0	40.0	65.0	25.0	25.0
Total Split (%)	27.8%	27.8%	44.4%	72.2%	27.8%	27.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	Min	Min	Min
Act Effct Green (s)	16.6	16.6	26.0	42.9	12.4	12.4
Actuated g/C Ratio	0.24	0.24	0.38	0.63	0.18	0.18
v/c Ratio	0.77	0.53	0.85	0.14	0.44	0.74
Control Delay	42.1	7.5	35.9	5.4	29.5	10.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.1	7.5	35.9	5.4	29.5	10.9
LOS	D	A	D	A	C	B
Approach Delay	24.5			24.5	17.8	
Approach LOS	C			C	B	

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 68.3
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.85
Intersection Signal Delay: 22.2 — Intersection LOS: C
Intersection Capacity Utilization 68.8% — ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 15: Reche Rd & Old Hwy 395



AM Horizon Year + Project
15: Reche Rd & Old Hwy 395 — Queues

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1700	1700	1900	1900	1700
Storage Length (ft)	0	0	150			0
Storage Lanes	1	1	1			1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9	15			9
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1583	1417	1583	3539	3539	1417
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	1583	1417	1583	3539	3539	1417
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		305				484
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30			30	30	
Link Distance (ft)	2635			3410	4960	
Travel Time (s)	59.9			77.5	112.7	
Volume (vph)	280	290	490	290	270	460
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	295	305	516	305	284	484
Lane Group Flow (vph)	295	305	516	305	284	484
v/c Ratio	0.77	0.53	0.85	0.14	0.44	0.74
Control Delay	42.1	7.5	35.9	5.4	29.5	10.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.1	7.5	35.9	5.4	29.5	10.9
Queue Length 50th (ft)	119	0	199	26	62	0
Queue Length 95th (ft)	#290	66	#431	42	107	90
Internal Link Dist (ft)	2555			3330	4880	
Turn Bay Length (ft)			150			
Base Capacity (vph)	478	641	747	2527	1012	751
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	0.62	0.48	0.69	0.12	0.28	0.64

Intersection Summary

Area Type: Other
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

AM Horizon Year + Project
15: Reche Rd & Old Hwy 395 — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1700	1700	1900	1900	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1583	1417	1583	3539	3539	1417
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1583	1417	1583	3539	3539	1417
Volume (vph)	280	290	490	290	270	460
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	295	305	516	305	284	484
RTOR Reduction (vph)	0	230	0	0	0	392
Lane Group Flow (vph)	295	75	516	305	284	92
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	16.6	16.6	26.0	42.9	12.9	12.9
Effective Green, g (s)	16.6	16.6	26.0	42.9	12.9	12.9
Actuated g/C Ratio	0.25	0.25	0.39	0.64	0.19	0.19
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	389	348	610	2249	676	271
v/s Ratio Prot	c0.19		c0.33	0.09	c0.08	
v/s Ratio Perm		0.05				0.07
v/c Ratio	0.76	0.22	0.85	0.14	0.42	0.34
Uniform Delay, d1	23.6	20.3	18.9	4.9	24.0	23.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.2	0.3	10.5	0.0	0.4	0.8
Delay (s)	31.8	20.6	29.4	4.9	24.4	24.4
Level of Service	C	C	C	A	C	C
Approach Delay (s)	26.1			20.3	24.4	
Approach LOS	C			C	C	

Intersection Summary			
HCM Average Control Delay	23.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	67.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

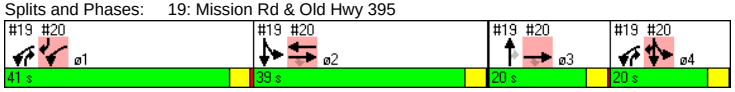
LOS Engineering

AM Horizon Year + Project
19: Mission Rd & Old Hwy 395 — Timings

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	ø1	ø4
Lane Configurations								
Volume (vph)	220	1120	90	300	850	70		
Turn Type		Free		pm+ov	Split			
Protected Phases	1 4		3	1 4	2	2	1	4
Permitted Phases		Free		3				
Detector Phases	1 4		3	1 4	2	2		
Minimum Initial (s)			4.0		4.0	4.0	4.0	4.0
Minimum Split (s)			20.0		20.0	20.0	8.0	20.0
Total Split (s)	61.0	0.0	20.0	61.0	39.0	39.0	41.0	20.0
Total Split (%)	50.8%	0.0%	16.7%	50.8%	32.5%	32.5%	34%	17%
Yellow Time (s)			3.5		3.5	3.5	3.5	3.5
All-Red Time (s)			0.5		0.5	0.5	0.5	0.5
Lead/Lag			Lead		Lag	Lag	Lead	Lag
Lead-Lag Optimize?			Yes		Yes	Yes	Yes	Yes
Recall Mode			None		Min	Min	None	None
Act Effct Green (s)	57.0	117.7	13.6	74.7	35.0	35.0		
Actuated g/C Ratio	0.48	1.00	0.12	0.63	0.30	0.30		
v/c Ratio	0.30	0.83	0.44	0.35	0.98	0.13		
Control Delay	22.7	5.1	55.0	11.4	66.7	31.8		
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay	22.7	5.1	55.0	11.4	66.7	31.8		
LOS	C	A	D	B	E	C		
Approach Delay	8.0		21.5			64.1		
Approach LOS	A		C			E		

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 117.7	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.01	
Intersection Signal Delay: 29.4	Intersection LOS: C
Intersection Capacity Utilization 54.5%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 19: Mission Rd & Old Hwy 395



LOS Engineering

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1700	1700	1900	1700	1700	1900
Storage Length (ft)	0	130		210	100	
Storage Lanes	1	1		1	2	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.97	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1583	1417	1863	1417	3072	1863
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1583	1417	1863	1417	3072	1863
Right Turn on Red		No		No		
Satd. Flow (RTOR)						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30		30			30
Link Distance (ft)	434		4960			1035
Travel Time (s)	9.9		112.7			23.5
Volume (vph)	220	1120	90	300	850	70
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	232	1179	95	316	895	74
Lane Group Flow (vph)	232	1179	95	316	895	74
v/c Ratio	0.30	0.83	0.44	0.35	0.98	0.13
Control Delay	22.7	5.1	55.0	11.4	66.7	31.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.7	5.1	55.0	11.4	66.7	31.8
Queue Length 50th (ft)	112	140	68	105	353	42
Queue Length 95th (ft)	m116	m119	123	158	#499	81
Internal Link Dist (ft)	354		4880			955
Turn Bay Length (ft)		130		210	100	
Base Capacity (vph)	767	1417	253	899	914	554
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	0.30	0.83	0.38	0.35	0.98	0.13

Intersection Summary

Area Type: Other

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	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1700	1700	1900	1700	1700	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.97	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1583	1417	1863	1417	3072	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1583	1417	1863	1417	3072	1863
Volume (vph)	220	1120	90	300	850	70
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	232	1179	95	316	895	74
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	232	1179	95	316	895	74
Turn Type		Free		pm+ov	Split	
Protected Phases	1 4		3	1 4	2	2
Permitted Phases		Free		3		
Actuated Green, G (s)	57.0	117.6	13.6	70.6	35.0	35.0
Effective Green, g (s)	57.0	117.6	13.6	70.6	35.0	35.0
Actuated g/C Ratio	0.48	1.00	0.12	0.60	0.30	0.30
Clearance Time (s)			4.0		4.0	4.0
Vehicle Extension (s)			3.0		3.0	3.0
Lane Grp Cap (vph)	767	1417	215	899	914	554
v/s Ratio Prot	0.15		0.05	0.17	c0.29	0.04
v/s Ratio Perm		c0.83		0.05		
v/c Ratio	0.30	0.83	0.44	0.35	0.98	0.13
Uniform Delay, d1	18.3	0.0	48.5	11.9	40.9	30.2
Progression Factor	1.17	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	1.7	1.4	0.2	24.4	0.1
Delay (s)	21.5	1.7	49.9	12.1	65.4	30.3
Level of Service	C	A	D	B	E	C
Approach Delay (s)	5.0		20.9			62.7
Approach LOS	A		C			E

Intersection Summary

HCM Average Control Delay	27.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	117.6	Sum of lost time (s)	4.0
Intersection Capacity Utilization	54.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

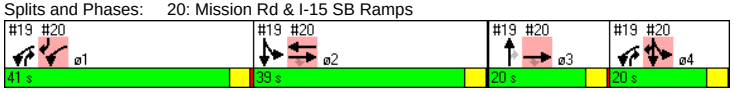
AM Horizon Year + Project
20: Mission Rd & I-15 SB Ramps

Timings

Lane Group	EBT	EBR	WBL	WBT	SBT	SBR	ø3
Lane Configurations							
Volume (vph)	820	330	120	470	10	870	
Turn Type		Perm	Prot			custom	
Protected Phases	2 3		1	2	4	1 4	3
Permitted Phases		2 3				4	
Detector Phases	2 3	2 3	1	2	4	1 4	
Minimum Initial (s)			4.0	4.0	4.0		4.0
Minimum Split (s)			8.0	20.0	20.0		20.0
Total Split (s)	59.0	59.0	41.0	39.0	20.0	61.0	20.0
Total Split (%)	49.2%	49.2%	34.2%	32.5%	16.7%	50.8%	17%
Yellow Time (s)			3.5	3.5	3.5		3.5
All-Red Time (s)			0.5	0.5	0.5		0.5
Lead/Lag			Lead	Lag	Lag		Lead
Lead-Lag Optimize?			Yes	Yes	Yes		Yes
Recall Mode			None	Min	None		None
Act Effct Green (s)	52.7	52.7	37.0	35.0	16.0	57.0	
Actuated g/C Ratio	0.45	0.45	0.31	0.30	0.14	0.48	
v/c Ratio	0.55	0.42	0.25	0.89	0.09	1.01	
Control Delay	10.1	0.9	32.4	60.0	46.6	50.8	
Queue Delay	0.7	0.4	0.0	0.0	0.0	0.0	
Total Delay	10.8	1.3	32.4	60.0	46.6	50.8	
LOS	B	A	C	E	D	D	
Approach Delay	8.1			54.4	50.7		
Approach LOS	A			D	D		

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 117.7	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.01	
Intersection Signal Delay: 32.9	Intersection LOS: C
Intersection Capacity Utilization 91.6%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 20: Mission Rd & I-15 SB Ramps



LOS Engineering

AM Horizon Year + Project
20: Mission Rd & I-15 SB Ramps

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	0		0	285		0	0		0	0		200
Storage Lanes	0		1	1		0	0		0	0		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50	50	50					50	50	50
Trailing Detector (ft)		0	0	0	0					0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950							0.976	
Satd. Flow (prot)	0	3539	1417	1583	1863	0	0	0	0	0	1818	1417
Flt Permitted				0.950							0.976	
Satd. Flow (perm)	0	3539	1417	1583	1863	0	0	0	0	0	1818	1417
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			347									422
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		434			744			972			897	
Travel Time (s)		9.9			16.9			22.1			20.4	
Volume (vph)	0	820	330	120	470	0	0	0	0	10	10	870
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	863	347	126	495	0	0	0	0	11	11	916
Lane Group Flow (vph)	0	863	347	126	495	0	0	0	0	0	22	916
v/c Ratio		0.55	0.42	0.25	0.89						0.09	1.01
Control Delay		10.1	0.9	32.4	60.0						46.6	50.8
Queue Delay		0.7	0.4	0.0	0.0						0.0	0.0
Total Delay		10.8	1.3	32.4	60.0						46.6	50.8
Queue Length 50th (ft)		73	0	73	366						15	~566
Queue Length 95th (ft)		m82	m0	125	#571						41	#824
Internal Link Dist (ft)		354			664			892			817	
Turn Bay Length (ft)				285								200
Base Capacity (vph)		1655	847	498	554						247	904
Starvation Cap Reductn		437	174	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	0.52	0.25	0.89						0.09	1.01

Intersection Summary

Area Type: Other

~ 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.

LOS Engineering

AM Horizon Year + Project
20: Mission Rd & I-15 SB Ramps

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)		4.0	4.0	4.0	4.0						4.0	4.0
Lane Util. Factor		0.95	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						0.98	1.00
Satd. Flow (prot)		3539	1417	1583	1863						1817	1417
Flt Permitted		1.00	1.00	0.95	1.00						0.98	1.00
Satd. Flow (perm)		3539	1417	1583	1863						1817	1417
Volume (vph)	0	820	330	120	470	0	0	0	0	10	10	870
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	863	347	126	495	0	0	0	0	11	11	916
RTOR Reduction (vph)	0	0	192	0	0	0	0	0	0	0	0	217
Lane Group Flow (vph)	0	863	155	126	495	0	0	0	0	0	22	699
Turn Type			Perm	Prot						Split		custom
Protected Phases		2 3		1	2					4	4	1 4
Permitted Phases			2 3									4
Actuated Green, G (s)		52.6	52.6	37.0	35.0						16.0	57.0
Effective Green, g (s)		52.6	52.6	37.0	35.0						16.0	57.0
Actuated g/C Ratio		0.45	0.45	0.31	0.30						0.14	0.48
Clearance Time (s)				4.0	4.0						4.0	
Vehicle Extension (s)				3.0	3.0						3.0	
Lane Grp Cap (vph)		1583	634	498	554						247	687
v/s Ratio Prot		c0.24		0.08	c0.27						0.01	c0.49
v/s Ratio Perm			0.11									
v/c Ratio		0.55	0.24	0.25	0.89						0.09	1.02
Uniform Delay, d1		23.8	20.2	30.0	39.5						44.4	30.3
Progression Factor		0.39	0.03	1.00	1.00						1.00	1.00
Incremental Delay, d2		0.2	0.1	0.3	16.7						0.2	38.6
Delay (s)		9.5	0.8	30.3	56.2						44.6	68.9
Level of Service		A	A	C	E						D	E
Approach Delay (s)		7.0			50.9			0.0			68.3	
Approach LOS		A			D			A			E	

Intersection Summary			
HCM Average Control Delay	37.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	117.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	91.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

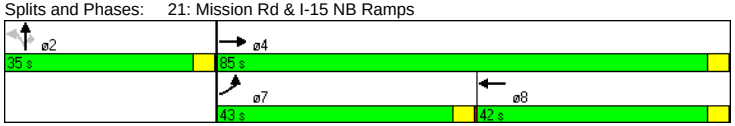
AM Horizon Year + Project
21: Mission Rd & I-15 NB Ramps

Timings

Lane Group	EBL	EBT	WBT	NBT	NBR
Lane Configurations					
Volume (vph)	650	180	330	10	90
Turn Type	Prot				Perm
Protected Phases	7	4	8	2	
Permitted Phases					2
Detector Phases	7	4	8	2	2
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0
Total Split (s)	43.0	85.0	42.0	35.0	35.0
Total Split (%)	35.8%	70.8%	35.0%	29.2%	29.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Recall Mode	None	None	None	Min	Min
Act Effct Green (s)	21.5	45.5	19.2	16.7	16.7
Actuated g/C Ratio	0.30	0.64	0.27	0.23	0.23
v/c Ratio	0.74	0.16	0.74	0.69	0.24
Control Delay	29.9	6.1	35.9	38.0	8.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	29.9	6.1	35.9	38.0	8.6
LOS	C	A	D	D	A
Approach Delay		24.8	35.9	30.7	
Approach LOS		C	D	C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 71.6	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.74	
Intersection Signal Delay: 28.7	Intersection LOS: C
Intersection Capacity Utilization 91.6%	ICU Level of Service F
Analysis Period (min) 15	

Splits and Phases: 21: Mission Rd & I-15 NB Ramps



AM Horizon Year + Project
21: Mission Rd & I-15 NB Ramps

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	300		0	0		0	0		200	0		0
Storage Lanes	2		0	0		0	0		1	0		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50		50	50	50			
Trailing Detector (ft)	0	0			0		0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.992				0.850			
Flt Protected	0.950							0.954				
Satd. Flow (prot)	3072	1863	0	0	1848	0	0	1777	1417	0	0	0
Flt Permitted	0.950							0.954				
Satd. Flow (perm)	3072	1863	0	0	1848	0	0	1777	1417	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					3				95			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		744			1271			1082			1005	
Travel Time (s)		16.9			28.9			24.6			22.8	
Volume (vph)	650	180	0	0	330	20	260	10	90	0	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	684	189	0	0	347	21	274	11	95	0	0	0
Lane Group Flow (vph)	684	189	0	0	368	0	0	285	95	0	0	0
v/c Ratio	0.74	0.16			0.74			0.69	0.24			
Control Delay	29.9	6.1			35.9			38.0	8.6			
Queue Delay	0.0	0.0			0.0			0.0	0.0			
Total Delay	29.9	6.1			35.9			38.0	8.6			
Queue Length 50th (ft)	126	26			135			106	0			
Queue Length 95th (ft)	300	76			348			288	42			
Internal Link Dist (ft)		664			1191			1002			925	
Turn Bay Length (ft)	300								200			
Base Capacity (vph)	1412	1428			820			683	603			
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	0.48	0.13			0.45			0.42	0.16			

Intersection Summary

Area Type: Other

LOS Engineering

AM Horizon Year + Project
21: Mission Rd & I-15 NB Ramps

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0			4.0			4.0	4.0			
Lane Util. Factor	0.97	1.00			1.00			1.00	1.00			
Frt	1.00	1.00			0.99			1.00	0.85			
Flt Protected	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (prot)	3072	1863			1848			1777	1417			
Flt Permitted	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (perm)	3072	1863			1848			1777	1417			
Volume (vph)	650	180	0	0	330	20	260	10	90	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	684	189	0	0	347	21	274	11	95	0	0	0
RTOR Reduction (vph)	0	0	0	0	2	0	0	0	72	0	0	0
Lane Group Flow (vph)	684	189	0	0	366	0	0	285	23	0	0	0
Turn Type	Prot						Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases							2		2			
Actuated Green, G (s)	21.5	45.5			20.0			16.7	16.7			
Effective Green, g (s)	21.5	45.5			20.0			16.7	16.7			
Actuated g/C Ratio	0.31	0.65			0.28			0.24	0.24			
Clearance Time (s)	4.0	4.0			4.0			4.0	4.0			
Vehicle Extension (s)	3.0	3.0			3.0			3.0	3.0			
Lane Grp Cap (vph)	941	1208			526			423	337			
v/s Ratio Prot	c0.22	0.10			c0.20							
v/s Ratio Perm								0.16	0.02			
v/c Ratio	0.73	0.16			0.70			0.67	0.07			
Uniform Delay, d1	21.7	4.8			22.4			24.3	20.7			
Progression Factor	1.00	1.00			1.00			1.00	1.00			
Incremental Delay, d2	2.8	0.1			4.0			4.2	0.1			
Delay (s)	24.6	4.9			26.4			28.5	20.8			
Level of Service	C	A			C			C	C			
Approach Delay (s)		20.3			26.4			26.6			0.0	
Approach LOS		C			C			C			A	

Intersection Summary

HCM Average Control Delay	23.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	70.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	91.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

AM Horizon Year + Project

22: Stewart Canyon Rd & Horse Ranch Creek Rd — HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Yield			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	30	320	290	20	30	30
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	32	337	305	21	32	32
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	679	47	63			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	679	47	63			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	91	67	80			
cM capacity (veh/h)	334	1022	1539			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	368	326	63
Volume Left	32	305	0
Volume Right	337	0	32
cSH	869	1539	1700
Volume to Capacity	0.42	0.20	0.04
Queue Length 95th (ft)	53	18	0
Control Delay (s)	12.2	7.5	0.0
Lane LOS	B	A	
Approach Delay (s)	12.2	7.5	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	9.1		
Intersection Capacity Utilization	51.9%	ICU Level of Service	A
Analysis Period (min)	15		

LOS Engineering

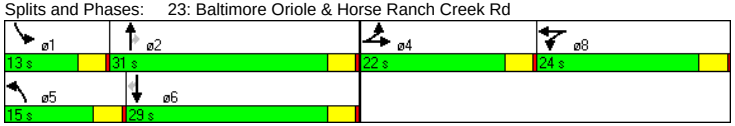
AM Horizon Year + Project

23: Baltimore Oriole & Horse Ranch Creek Rd — Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	20	10	230	40	60	240	190	40	260	50
Turn Type	Split		Split		Prot		Perm	Prot		Perm
Protected Phases	4	4	8	8	5	2		1	6	
Permitted Phases							2			6
Detector Phases	4	4	8	8	5	2	2	1	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0	20.0
Total Split (s)	22.0	22.0	24.0	24.0	15.0	31.0	31.0	13.0	29.0	29.0
Total Split (%)	24.4%	24.4%	26.7%	26.7%	16.7%	34.4%	34.4%	14.4%	32.2%	32.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag					Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	7.5	7.5	13.3	13.3	8.7	26.3	26.3	8.0	25.8	25.8
Actuated g/C Ratio	0.12	0.12	0.23	0.23	0.14	0.46	0.46	0.13	0.46	0.46
v/c Ratio	0.11	0.10	0.48	0.47	0.29	0.29	0.26	0.21	0.32	0.08
Control Delay	27.2	20.8	21.7	18.6	26.4	14.6	4.3	27.0	15.7	6.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.2	20.8	21.7	18.6	26.4	14.6	4.3	27.0	15.7	6.9
LOS	C	C	C	B	C	B	A	C	B	A
Approach Delay		23.9		20.1		12.1			15.7	
Approach LOS		C		C		B			B	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 56.7	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.48	
Intersection Signal Delay: 15.7	Intersection LOS: B
Intersection Capacity Utilization 43.3%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 23: Baltimore Oriole & Horse Ranch Creek Rd



LOS Engineering

AM Horizon Year + Project
23: Baltimore Oriole & Horse Ranch Creek Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	50
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.925			0.949				0.850			0.850
Flt Protected	0.950			0.950	0.979		0.950			0.950		
Satd. Flow (prot)	1583	1723	0	1504	1644	0	1583	1863	1417	1583	1863	1417
Flt Permitted	0.950			0.950	0.979		0.950			0.950		
Satd. Flow (perm)	1583	1723	0	1504	1644	0	1583	1863	1417	1583	1863	1417
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			27				200			53
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1047			1324			958			2343	
Travel Time (s)		23.8			30.1			21.8			53.3	
Volume (vph)	20	10	10	230	40	60	60	240	190	40	260	50
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	11	11	242	42	63	63	253	200	42	274	53
Lane Group Flow (vph)	21	22	0	163	184	0	63	253	200	42	274	53
v/c Ratio	0.11	0.10		0.48	0.47		0.29	0.29	0.26	0.21	0.32	0.08
Control Delay	27.2	20.8		21.7	18.6		26.4	14.6	4.3	27.0	15.7	6.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.2	20.8		21.7	18.6		26.4	14.6	4.3	27.0	15.7	6.9
Queue Length 50th (ft)	2	1		14	13		6	20	0	4	22	0
Queue Length 95th (ft)	30	25		126	125		62	158	44	47	179	24
Internal Link Dist (ft)		967			1244			878			2263	
Turn Bay Length (ft)												
Base Capacity (vph)	440	487		543	611		310	1115	929	262	1084	847
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	0.05	0.05		0.30	0.30		0.20	0.23	0.22	0.16	0.25	0.06

Intersection Summary

Area Type: Other

LOS Engineering

AM Horizon Year + Project
23: Baltimore Oriole & Horse Ranch Creek Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
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	1.00		0.95	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.93		1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1583	1723		1504	1643		1583	1863	1417	1583	1863	1417
Flt Permitted	0.95	1.00		0.95	0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1583	1723		1504	1643		1583	1863	1417	1583	1863	1417
Volume (vph)	20	10	10	230	40	60	60	240	190	40	260	50
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	11	11	242	42	63	63	253	200	42	274	53
RTOR Reduction (vph)	0	11	0	0	21	0	0	0	113	0	0	30
Lane Group Flow (vph)	21	11	0	163	163	0	63	253	87	42	274	23
Turn Type	Split			Split			Prot		Perm	Prot		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	2.5	2.5		12.2	12.2		3.3	25.9	25.9	2.8	25.4	25.4
Effective Green, g (s)	2.5	2.5		12.2	12.2		3.3	25.9	25.9	2.8	25.4	25.4
Actuated g/C Ratio	0.04	0.04		0.21	0.21		0.06	0.44	0.44	0.05	0.43	0.43
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	67	73		309	337		88	812	618	75	797	606
v/s Ratio Prot	c0.01	0.01		c0.11	0.10		c0.04	0.14		0.03	c0.15	
v/s Ratio Perm									0.06			0.02
v/c Ratio	0.31	0.16		0.53	0.48		0.72	0.31	0.14	0.56	0.34	0.04
Uniform Delay, d1	27.6	27.4		21.0	20.8		27.6	10.9	10.1	27.7	11.4	9.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.7	1.0		1.6	1.1		24.0	0.2	0.1	9.2	0.3	0.0
Delay (s)	30.3	28.4		22.7	21.9		51.6	11.2	10.2	36.9	11.7	9.9
Level of Service	C	C		C	C		D	B	B	D	B	A
Approach Delay (s)		29.3			22.3			15.7			14.3	
Approach LOS		C			C			B			B	

Intersection Summary

HCM Average Control Delay	17.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	59.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	43.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

AM Horizon Year + Project
24: Longspur Rd & Horse Ranch Creek Rd

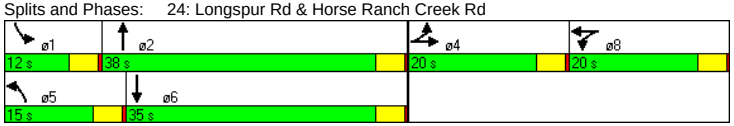
Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	20	40	220	50	130	410	40	410
Turn Type	Split		Split		Prot		Prot	
Protected Phases	4	4	8	8	5	2	1	6
Permitted Phases								
Detector Phases	4	4	8	8	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	20.0	20.0	20.0	20.0	15.0	38.0	12.0	35.0
Total Split (%)	22.2%	22.2%	22.2%	22.2%	16.7%	42.2%	13.3%	38.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Max	None	Max
Act Effct Green (s)	7.8	7.8	12.3	12.3	10.0	40.6	7.0	35.8
Actuated g/C Ratio	0.10	0.10	0.16	0.16	0.13	0.53	0.09	0.46
v/c Ratio	0.13	0.44	0.65	0.64	0.69	0.37	0.30	0.30
Control Delay	35.0	24.5	44.2	38.3	52.7	11.7	41.5	16.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.0	24.5	44.2	38.3	52.7	11.7	41.5	16.4
LOS	C	C	D	D	D	B	D	B
Approach Delay		26.4		41.1		18.6		18.4
Approach LOS		C		D		B		B

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 77.1
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.69
Intersection Signal Delay: 23.2 Intersection LOS: C
Intersection Capacity Utilization 48.0% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 24: Longspur Rd & Horse Ranch Creek Rd



LOS Engineering

AM Horizon Year + Project
24: Longspur Rd & Horse Ranch Creek Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.916			0.956			0.945			0.981	
Flt Protected	0.950			0.950	0.980		0.950			0.950		
Satd. Flow (prot)	1583	1706	0	1504	1658	0	1583	3345	0	1583	3472	0
Flt Permitted	0.950			0.950	0.980		0.950			0.950		
Satd. Flow (perm)	1583	1706	0	1504	1658	0	1583	3345	0	1583	3472	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		53			20			151			19	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1010			908			1206			958	
Travel Time (s)		23.0			20.6			27.4			21.8	
Volume (vph)	20	40	50	220	50	50	130	410	240	40	410	60
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	42	53	232	53	53	137	432	253	42	432	63
Lane Group Flow (vph)	21	95	0	157	181	0	137	685	0	42	495	0
v/c Ratio	0.13	0.44		0.65	0.64		0.69	0.37		0.30	0.30	
Control Delay	35.0	24.5		44.2	38.3		52.7	11.7		41.5	16.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	35.0	24.5		44.2	38.3		52.7	11.7		41.5	16.4	
Queue Length 50th (ft)	10	20		75	77		64	90		20	84	
Queue Length 95th (ft)	31	64		147	153		#152	156		53	140	
Internal Link Dist (ft)		930			828			1126			878	
Turn Bay Length (ft)												
Base Capacity (vph)	291	357		300	346		218	1832		155	1623	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.07	0.27		0.52	0.52		0.63	0.37		0.27	0.30	

Intersection Summary

Area Type: Other
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

LOS Engineering

AM Horizon Year + Project
24: Longspur Rd & Horse Ranch Creek Rd — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		0.95	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.92		1.00	0.96		1.00	0.94		1.00	0.98	
Flt Protected	0.95	1.00		0.95	0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	1707		1504	1658		1583	3343		1583	3472	
Flt Permitted	0.95	1.00		0.95	0.98		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	1707		1504	1658		1583	3343		1583	3472	
Volume (vph)	20	40	50	220	50	50	130	410	240	40	410	60
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	42	53	232	53	53	137	432	253	42	432	63
RTOR Reduction (vph)	0	49	0	0	17	0	0	74	0	0	10	0
Lane Group Flow (vph)	21	46	0	157	164	0	137	611	0	42	485	0
Turn Type	Split			Split			Prot			Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	6.4	6.4		12.3	12.3		8.3	40.6		4.4	36.7	
Effective Green, g (s)	6.4	6.4		12.3	12.3		8.3	40.6		4.4	36.7	
Actuated g/C Ratio	0.08	0.08		0.15	0.15		0.10	0.51		0.06	0.46	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	127	137		232	256		165	1703		87	1599	
v/s Ratio Prot	0.01	c0.03		c0.10	0.10		c0.09	c0.18		0.03	0.14	
v/s Ratio Perm												
v/c Ratio	0.17	0.34		0.68	0.64		0.83	0.36		0.48	0.30	
Uniform Delay, d1	34.2	34.6		31.8	31.6		35.0	11.7		36.5	13.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	1.5		7.6	5.4		28.3	0.6		4.2	0.5	
Delay (s)	34.8	36.1		39.4	37.0		63.3	12.3		40.7	14.0	
Level of Service	C	D		D	D		E	B		D	B	
Approach Delay (s)		35.9			38.1			20.8			16.1	
Approach LOS		D			D			C			B	

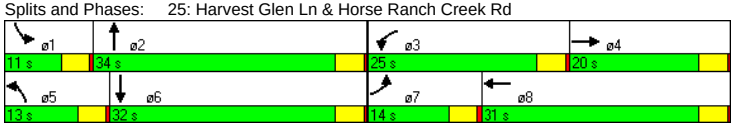
Intersection Summary			
HCM Average Control Delay	23.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	79.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	48.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

AM Horizon Year + Project
25: Harvest Glen Ln & Horse Ranch Creek Rd — Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	10	30	260	30	60	650	80	580
Turn Type	Prot		Prot		Prot		Prot	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases								
Detector Phases	7	4	3	8	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	14.0	20.0	25.0	31.0	13.0	34.0	11.0	32.0
Total Split (%)	15.6%	22.2%	27.8%	34.4%	14.4%	37.8%	12.2%	35.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	6.4	7.0	15.6	19.8	7.6	27.4	7.1	29.6
Actuated g/C Ratio	0.09	0.10	0.24	0.30	0.11	0.41	0.10	0.45
v/c Ratio	0.08	0.23	0.73	0.26	0.37	0.66	0.51	0.40
Control Delay	38.3	29.8	37.5	8.1	39.2	20.3	46.7	17.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.3	29.8	37.5	8.1	39.2	20.3	46.7	17.9
LOS	D	C	D	A	D	C	D	B
Approach Delay		31.5		27.2		21.5		21.3
Approach LOS		C		C		C		C

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 66.2	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.73	
Intersection Signal Delay: 22.7	Intersection LOS: C
Intersection Capacity Utilization 63.7%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 25: Harvest Glen Ln & Horse Ranch Creek Rd



AM Horizon Year + Project
25: Harvest Glen Ln & Horse Ranch Creek Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.962			0.882			0.958			0.995	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1583	1792	0	1583	1643	0	1583	3391	0	1583	3522	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1583	1792	0	1583	1643	0	1583	3391	0	1583	3522	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			116			67			4	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1058			1173			1033			1206	
Travel Time (s)		24.0			26.7			23.5			27.4	
Volume (vph)	10	30	10	260	30	110	60	650	250	80	580	20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	32	11	274	32	116	63	684	263	84	611	21
Lane Group Flow (vph)	11	43	0	274	148	0	63	947	0	84	632	0
v/c Ratio	0.08	0.23		0.73	0.26		0.37	0.66		0.51	0.40	
Control Delay	38.3	29.8		37.5	8.1		39.2	20.3		46.7	17.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	38.3	29.8		37.5	8.1		39.2	20.3		46.7	17.9	
Queue Length 50th (ft)	5	14		114	9		27	185		38	121	
Queue Length 95th (ft)	21	46		#222	56		70	282		#109	190	
Internal Link Dist (ft)		978			1093			953			1126	
Turn Bay Length (ft)												
Base Capacity (vph)	211	379		480	714		204	1568		170	1605	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.05	0.11		0.57	0.21		0.31	0.60		0.49	0.39	

Intersection Summary

Area Type: Other

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

LOS Engineering

AM Horizon Year + Project
25: Harvest Glen Ln & Horse Ranch Creek Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.96		1.00	0.88		1.00	0.96		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	1791		1583	1644		1583	3392		1583	3522	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	1791		1583	1644		1583	3392		1583	3522	
Volume (vph)	10	30	10	260	30	110	60	650	250	80	580	20
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	32	11	274	32	116	63	684	263	84	611	21
RTOR Reduction (vph)	0	10	0	0	84	0	0	40	0	0	2	0
Lane Group Flow (vph)	11	33	0	274	64	0	63	907	0	84	630	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	1.2	5.4		15.6	19.8		4.4	28.6		5.5	29.7	
Effective Green, g (s)	1.2	5.4		15.6	19.8		4.4	28.6		5.5	29.7	
Actuated g/C Ratio	0.02	0.08		0.22	0.28		0.06	0.40		0.08	0.42	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	27	136		347	458		98	1364		122	1471	
v/s Ratio Prot	0.01	c0.02		c0.17	0.04		0.04	c0.27		c0.05	0.18	
v/s Ratio Perm												
v/c Ratio	0.41	0.24		0.79	0.14		0.64	0.66		0.69	0.43	
Uniform Delay, d1	34.6	30.9		26.2	19.3		32.6	17.3		32.0	14.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.7	0.9		11.3	0.1		13.5	1.2		15.0	0.2	
Delay (s)	44.3	31.8		37.5	19.4		46.1	18.6		46.9	14.9	
Level of Service	D	C		D	B		D	B		D	B	
Approach Delay (s)		34.4			31.2			20.3			18.6	
Approach LOS		C			C			C			B	

Intersection Summary

HCM Average Control Delay	22.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	71.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	63.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

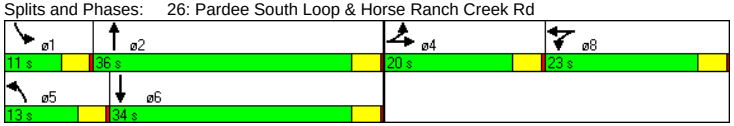
AM Horizon Year + Project
26: Pardee South Loop & Horse Ranch Creek Rd

Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	70	0	240	0	60	770	50	780
Turn Type	Split		Split		Prot		Prot	
Protected Phases	4	4	8	8	5	2	1	6
Permitted Phases								
Detector Phases	4	4	8	8	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	20.0	20.0	23.0	23.0	13.0	36.0	11.0	34.0
Total Split (%)	22.2%	22.2%	25.6%	25.6%	14.4%	40.0%	12.2%	37.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	8.8	8.8	12.8	12.8	7.8	31.3	6.9	30.5
Actuated g/C Ratio	0.13	0.13	0.20	0.20	0.12	0.50	0.10	0.49
v/c Ratio	0.35	0.15	0.59	0.57	0.34	0.52	0.32	0.49
Control Delay	35.2	0.8	34.0	21.4	37.7	17.8	39.5	18.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.2	0.8	34.0	21.4	37.7	17.8	39.5	18.6
LOS	D	A	C	C	D	B	D	B
Approach Delay		19.4		27.0		19.1		19.8
Approach LOS		B		C		B		B

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 62	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.59	
Intersection Signal Delay: 20.7	Intersection LOS: C
Intersection Capacity Utilization 56.4%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 26: Pardee South Loop & Horse Ranch Creek Rd



LOS Engineering

AM Horizon Year + Project
26: Pardee South Loop & Horse Ranch Creek Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.850			0.901			0.983			0.994	
Flt Protected	0.950			0.950	0.983		0.950			0.950		
Satd. Flow (prot)	1583	1583	0	1504	1567	0	1583	3479	0	1583	3518	0
Flt Permitted	0.950			0.950	0.983		0.950			0.950		
Satd. Flow (perm)	1583	1583	0	1504	1567	0	1583	3479	0	1583	3518	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		235			98			17			5	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		869			1419			1340			1033	
Travel Time (s)		19.8			32.3			30.5			23.5	
Volume (vph)	70	0	60	240	0	140	60	770	100	50	780	30
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	74	0	63	253	0	147	63	811	105	53	821	32
Lane Group Flow (vph)	74	63	0	177	223	0	63	916	0	53	853	0
v/c Ratio	0.35	0.15		0.59	0.57		0.34	0.52		0.32	0.49	
Control Delay	35.2	0.8		34.0	21.4		37.7	17.8		39.5	18.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	35.2	0.8		34.0	21.4		37.7	17.8		39.5	18.6	
Queue Length 50th (ft)	29	0		72	49		25	173		21	163	
Queue Length 95th (ft)	78	0		161	136		72	288		65	277	
Internal Link Dist (ft)		789			1339			1260			953	
Turn Bay Length (ft)												
Base Capacity (vph)	366	547		442	530		228	1986		182	1945	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.20	0.12		0.40	0.42		0.28	0.46		0.29	0.44	

Intersection Summary	
Area Type:	Other

LOS Engineering

AM Horizon Year + Project

26: Pardee South Loop & Horse Ranch Creek Rd — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		0.95	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.85		1.00	0.90		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	1583		1504	1568		1583	3478		1583	3519	
Flt Permitted	0.95	1.00		0.95	0.98		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	1583		1504	1568		1583	3478		1583	3519	
Volume (vph)	70	0	60	240	0	140	60	770	100	50	780	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	74	0	63	253	0	147	63	811	105	53	821	32
RTOR Reduction (vph)	0	58	0	0	81	0	0	9	0	0	3	0
Lane Group Flow (vph)	74	5	0	177	142	0	63	907	0	53	850	0
Turn Type	Split			Split			Prot			Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	5.0	5.0		11.1	11.1		4.1	30.2		3.3	29.4	
Effective Green, g (s)	5.0	5.0		11.1	11.1		4.1	30.2		3.3	29.4	
Actuated g/C Ratio	0.08	0.08		0.17	0.17		0.06	0.46		0.05	0.45	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	121	121		254	265		99	1601		80	1577	
v/s Ratio Prot	c0.05	0.00		c0.12	0.09		c0.04	c0.26		0.03	0.24	
v/s Ratio Perm												
v/c Ratio	0.61	0.04		0.70	0.53		0.64	0.57		0.66	0.54	
Uniform Delay, d1	29.4	28.1		25.7	24.9		30.0	12.9		30.6	13.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	8.8	0.1		8.1	2.1		12.6	0.5		18.7	0.4	
Delay (s)	38.2	28.2		33.7	27.0		42.7	13.4		49.3	13.5	
Level of Service	D	C		C	C		D	B		D	B	
Approach Delay (s)		33.6			30.0			15.3			15.6	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	18.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	65.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

AM Horizon Year + Project

27: School/Park Access & Horse Ranch Creek Rd — HCM Unsignalized Intersection Capacity Analysis

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	150	770	230	0	1100
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	158	811	242	0	1158
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1511	526			1053	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1511	526			1053	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	68			100	
cM capacity (veh/h)	111	496			657	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	158	540	512	579	579
Volume Left	0	0	0	0	0
Volume Right	158	0	242	0	0
cSH	496	1700	1700	1700	1700
Volume to Capacity	0.32	0.32	0.30	0.34	0.34
Queue Length 95th (ft)	34	0	0	0	0
Control Delay (s)	15.6	0.0	0.0	0.0	0.0
Lane LOS	C				
Approach Delay (s)	15.6	0.0		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	45.7%	ICU Level of Service	A
Analysis Period (min)	15		

LOS Engineering

AM Horizon Year + Project
28: Connector Rd & Horse Ranch Creek Rd

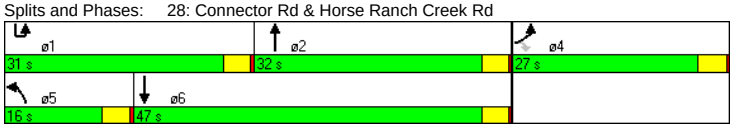
Timings

Lane Group	EBL	EBR	NBL	NBT	SBU	SBT
Lane Configurations						
Volume (vph)	280	20	20	540	190	460
Turn Type		Perm	Prot		Prot	
Protected Phases	4		5	2	1	6
Permitted Phases		4				
Detector Phases	4	4	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	27.0	27.0	16.0	32.0	31.0	47.0
Total Split (%)	30.0%	30.0%	17.8%	35.6%	34.4%	52.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag			Lead	Lag	Lead	Lag
Lead-Lag Optimize?			Yes	Yes	Yes	Yes
Recall Mode	None	None	None	Min	None	Min
Act Effct Green (s)	9.9	9.9	6.5	19.7	11.2	30.3
Actuated g/C Ratio	0.21	0.21	0.12	0.43	0.23	0.66
v/c Ratio	0.47	0.07	0.11	0.37	0.54	0.43
Control Delay	20.3	10.1	26.9	15.3	22.9	4.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.3	10.1	26.9	15.3	22.9	4.6
LOS	C	B	C	B	C	A
Approach Delay	19.6			15.7		7.7
Approach LOS	B			B		A

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 46
Natural Cycle: 55
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.54
Intersection Signal Delay: 11.7 Intersection LOS: B
Intersection Capacity Utilization 50.4% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 28: Connector Rd & Horse Ranch Creek Rd



LOS Engineering

AM Horizon Year + Project
28: Connector Rd & Horse Ranch Creek Rd

Queues

Lane Group	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Ideal Flow (vphpl)	1700	1700	1700	1900	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	
Trailing Detector (ft)	0	0	0	0	0	0	
Turning Speed (mph)	15	9	15		9		9
Lane Util. Factor	0.97	1.00	1.00	0.95	1.00	0.95	0.95
Frt		0.850				0.923	
Flt Protected	0.950		0.950		0.950		
Satd. Flow (prot)	3072	1417	1583	3539	1583	3267	0
Flt Permitted	0.950		0.950		0.950		
Satd. Flow (perm)	3072	1417	1583	3539	1583	3267	0
Right Turn on Red		Yes					Yes
Satd. Flow (RTOR)		21				403	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30			30		30	
Link Distance (ft)	2875			1509		1400	
Travel Time (s)	65.3			34.3		31.8	
Volume (vph)	280	20	20	540	190	460	480
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	295	21	21	568	200	484	505
Lane Group Flow (vph)	295	21	21	568	200	989	0
v/c Ratio	0.47	0.07	0.11	0.37	0.54	0.43	
Control Delay	20.3	10.1	26.9	15.3	22.9	4.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	20.3	10.1	26.9	15.3	22.9	4.6	
Queue Length 50th (ft)	34	0	5	65	44	30	
Queue Length 95th (ft)	86	16	26	143	122	126	
Internal Link Dist (ft)	2795			1429		1320	
Turn Bay Length (ft)							
Base Capacity (vph)	1175	555	329	1960	680	2511	
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	0.25	0.04	0.06	0.29	0.29	0.39	

Intersection Summary

Area Type: Other

LOS Engineering

AM Horizon Year + Project
28: Connector Rd & Horse Ranch Creek Rd — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Ideal Flow (vphpl)	1700	1700	1700	1900	1700	1900	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	0.97	1.00	1.00	0.95	1.00	0.95	
Frt	1.00	0.85	1.00	1.00	1.00	0.92	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	3072	1417	1583	3539	1583	3268	
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (perm)	3072	1417	1583	3539	1583	3268	
Volume (vph)	280	20	20	540	190	460	480
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	295	21	21	568	200	484	505
RTOR Reduction (vph)	0	18	0	0	0	169	0
Lane Group Flow (vph)	295	3	21	568	200	820	0
Turn Type		Perm	Prot		Prot		
Protected Phases	4		5	2	1	6	
Permitted Phases		4					
Actuated Green, G (s)	7.9	7.9	1.1	20.8	9.3	29.0	
Effective Green, g (s)	7.9	7.9	1.1	20.8	9.3	29.0	
Actuated g/C Ratio	0.16	0.16	0.02	0.42	0.19	0.58	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	485	224	35	1472	294	1895	
v/s Ratio Prot	c0.10		0.01	0.16	c0.13	c0.25	
v/s Ratio Perm		0.00					
v/c Ratio	0.61	0.01	0.60	0.39	0.68	0.43	
Uniform Delay, d1	19.6	17.8	24.2	10.2	19.0	5.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.2	0.0	24.7	0.2	6.3	0.2	
Delay (s)	21.8	17.8	48.9	10.3	25.3	6.0	
Level of Service	C	B	D	B	C	A	
Approach Delay (s)	21.5			11.7		9.3	
Approach LOS	C			B		A	

Intersection Summary			
HCM Average Control Delay	11.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

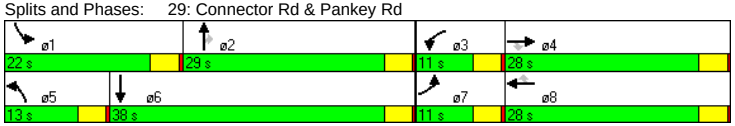
LOS Engineering

AM Horizon Year + Project
29: Connector Rd & Pankey Rd — Timings

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Volume (vph)	60	130	210	60	310	230	160	310	30	150	40
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot	
Protected Phases	7	4		3	8		5	2		1	6
Permitted Phases			4			8			2		
Detector Phases	7	4	4	3	8	8	5	2	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0
Total Split (s)	11.0	28.0	28.0	11.0	28.0	28.0	13.0	29.0	29.0	22.0	38.0
Total Split (%)	12.2%	31.1%	31.1%	12.2%	31.1%	31.1%	14.4%	32.2%	32.2%	24.4%	42.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min
Act Effct Green (s)	6.9	16.0	16.0	6.9	16.0	16.0	10.5	20.3	20.3	11.5	17.8
Actuated g/C Ratio	0.10	0.25	0.25	0.10	0.25	0.25	0.17	0.32	0.32	0.18	0.28
v/c Ratio	0.39	0.40	0.38	0.39	0.70	0.45	0.64	0.55	0.07	0.57	0.12
Control Delay	43.1	24.4	7.1	43.1	33.2	6.9	48.9	27.9	9.7	37.1	13.8
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	43.1	24.4	7.1	43.1	33.2	6.9	48.9	27.9	9.7	37.1	13.8
LOS	D	C	A	D	C	A	D	C	A	D	B
Approach Delay		19.8			24.1			33.5			30.5
Approach LOS		B			C			C			C

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 63.6	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.70	
Intersection Signal Delay: 26.6	Intersection LOS: C
Intersection Capacity Utilization 59.0%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 29: Connector Rd & Pankey Rd



LOS Engineering

AM Horizon Year + Project
29: Connector Rd & Pankey Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	50	50	50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.965	0.850			0.850			0.850		0.950	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1583	1708	1346	1583	1863	1417	1583	1863	1417	1583	1770	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1583	1708	1346	1583	1863	1417	1583	1863	1417	1583	1770	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16	180			242			32		21	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1256			2875			1488			1443	
Travel Time (s)		28.5			65.3			33.8			32.8	
Volume (vph)	60	130	210	60	310	230	160	310	30	150	40	20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	63	137	221	63	326	242	168	326	32	158	42	21
Lane Group Flow (vph)	63	178	180	63	326	242	168	326	32	158	63	0
v/c Ratio	0.39	0.40	0.38	0.39	0.70	0.45	0.64	0.55	0.07	0.57	0.12	
Control Delay	43.1	24.4	7.1	43.1	33.2	6.9	48.9	27.9	9.7	37.1	13.8	
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	43.1	24.4	7.1	43.1	33.2	6.9	48.9	27.9	9.7	37.1	13.8	
Queue Length 50th (ft)	26	61	0	26	127	0	71	127	0	63	13	
Queue Length 95th (ft)	#83	141	51	#83	257	56	#232	252	21	143	41	
Internal Link Dist (ft)		1176			2795			1408			1363	
Turn Bay Length (ft)												
Base Capacity (vph)	176	619	596	176	664	661	262	732	576	420	803	
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	0.29	0.30	0.36	0.49	0.37	0.64	0.45	0.06	0.38	0.08	

Intersection Summary

Area Type: Other

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

LOS Engineering

AM Horizon Year + Project
29: Connector Rd & Pankey Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.97	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	
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)	1583	1708	1346	1583	1863	1417	1583	1863	1417	1583	1770	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1583	1708	1346	1583	1863	1417	1583	1863	1417	1583	1770	
Volume (vph)	60	130	210	60	310	230	160	310	30	150	40	20
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	63	137	221	63	326	242	168	326	32	158	42	21
RTOR Reduction (vph)	0	12	136	0	0	183	0	0	22	0	15	0
Lane Group Flow (vph)	63	166	44	63	326	59	168	326	10	158	48	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	3.3	16.0	16.0	3.3	16.0	16.0	10.5	20.3	20.3	9.6	19.4	
Effective Green, g (s)	3.3	16.0	16.0	3.3	16.0	16.0	10.5	20.3	20.3	9.6	19.4	
Actuated g/C Ratio	0.05	0.25	0.25	0.05	0.25	0.25	0.16	0.31	0.31	0.15	0.30	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	80	419	330	80	457	348	255	580	441	233	527	
v/s Ratio Prot	c0.04	0.10		0.04	c0.18		c0.11	c0.18		0.10	0.03	
v/s Ratio Perm			0.03			0.04			0.01			
v/c Ratio	0.79	0.40	0.13	0.79	0.71	0.17	0.66	0.56	0.02	0.68	0.09	
Uniform Delay, d1	30.6	20.6	19.2	30.6	22.5	19.4	25.7	18.7	15.6	26.3	16.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	38.7	0.6	0.2	38.7	5.2	0.2	6.0	1.3	0.0	7.6	0.1	
Delay (s)	69.3	21.2	19.4	69.3	27.7	19.6	31.7	20.0	15.6	33.9	16.6	
Level of Service	E	C	B	E	C	B	C	B	B	C	B	
Approach Delay (s)		27.6			28.8			23.5			29.0	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	27.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	65.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

PM Horizon Year + Project
1: Pala Rd (SR-76) & Via Monserate — HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	60	2130	1610	120	60	30
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	63	2242	1695	126	63	32
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1821				3005	911
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1821				3005	911
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	81				0	89
cM capacity (veh/h)	332				9	277

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	63	1121	1121	1130	691	32
Volume Left	63	0	0	0	0	0
Volume Right	0	0	0	0	126	32
cSH	332	1700	1700	1700	1700	277
Volume to Capacity	0.19	0.66	0.66	0.66	0.41	0.11
Queue Length 95th (ft)	17	0	0	0	0	10
Control Delay (s)	18.4	0.0	0.0	0.0	0.0	19.7
Lane LOS	C					C
Approach Delay (s)	0.5			0.0		Err
Approach LOS						F

Intersection Summary			
Average Delay	Err		
Intersection Capacity Utilization	Err%	ICU Level of Service	H
Analysis Period (min)	15		

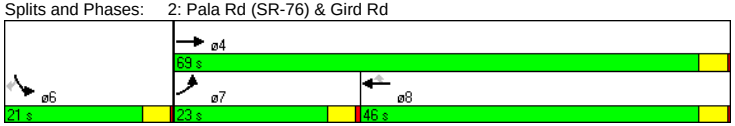
LOS Engineering

PM Horizon Year + Project
2: Pala Rd (SR-76) & Gird Rd — Timings

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	230	1770	1350	130	70	90
Turn Type	Prot			Perm		Perm
Protected Phases	7	4	8		6	
Permitted Phases				8		6
Detector Phases	7	4	8	8	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	23.0	69.0	46.0	46.0	21.0	21.0
Total Split (%)	25.6%	76.7%	51.1%	51.1%	23.3%	23.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	None	None	None	Min	Min
Act Effct Green (s)	14.9	53.6	34.5	34.5	9.0	9.0
Actuated g/C Ratio	0.21	0.75	0.48	0.48	0.13	0.13
v/c Ratio	0.73	0.70	0.83	0.20	0.37	0.36
Control Delay	42.8	6.2	21.4	10.4	38.0	12.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.8	6.2	21.4	10.4	38.0	12.1
LOS	D	A	C	B	D	B
Approach Delay		10.4	20.4		23.5	
Approach LOS		B	C		C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 71.2	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.83	
Intersection Signal Delay: 15.1	Intersection LOS: B
Intersection Capacity Utilization 65.9%	ICU Level of Service C
Analysis Period (min) 15	

Splits and Phases: 2: Pala Rd (SR-76) & Gird Rd



LOS Engineering

PM Horizon Year + Project
2: Pala Rd (SR-76) & Gird Rd

Queues

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1900	1900	1700	1700	1700
Storage Length (ft)	450			20	0	180
Storage Lanes	1			1	1	1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15			9	15	9
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt				0.850		0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1583	3539	3539	1417	1583	1417
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1583	3539	3539	1417	1583	1417
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				25		95
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30	30		30	
Link Distance (ft)		3191	8309		1271	
Travel Time (s)		72.5	188.8		28.9	
Volume (vph)	230	1770	1350	130	70	90
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	242	1863	1421	137	74	95
Lane Group Flow (vph)	242	1863	1421	137	74	95
v/c Ratio	0.73	0.70	0.83	0.20	0.37	0.36
Control Delay	42.8	6.2	21.4	10.4	38.0	12.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.8	6.2	21.4	10.4	38.0	12.1
Queue Length 50th (ft)	112	160	286	28	35	0
Queue Length 95th (ft)	#218	282	425	66	77	42
Internal Link Dist (ft)		3111	8229		1191	
Turn Bay Length (ft)	450			20		180
Base Capacity (vph)	412	2805	1914	778	353	390
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	0.59	0.66	0.74	0.18	0.21	0.24

Intersection Summary

Area Type: Other

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

LOS Engineering

PM Horizon Year + Project
2: Pala Rd (SR-76) & Gird Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1900	1900	1700	1700	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
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)	1583	3539	3539	1417	1583	1417
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1583	3539	3539	1417	1583	1417
Volume (vph)	230	1770	1350	130	70	90
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	242	1863	1421	137	74	95
RTOR Reduction (vph)	0	0	0	13	0	83
Lane Group Flow (vph)	242	1863	1421	124	74	12
Turn Type	Prot			Perm		Perm
Protected Phases	7	4	8		6	
Permitted Phases				8		6
Actuated Green, G (s)	14.9	53.6	34.7	34.7	9.0	9.0
Effective Green, g (s)	14.9	53.6	34.7	34.7	9.0	9.0
Actuated g/C Ratio	0.21	0.76	0.49	0.49	0.13	0.13
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	334	2687	1739	696	202	181
v/s Ratio Prot	0.15	c0.53	c0.40		c0.05	
v/s Ratio Perm				0.09		0.01
v/c Ratio	0.72	0.69	0.82	0.18	0.37	0.07
Uniform Delay, d1	25.9	4.3	15.3	10.0	28.2	27.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.6	0.8	3.1	0.1	1.1	0.2
Delay (s)	33.5	5.1	18.4	10.1	29.3	27.3
Level of Service	C	A	B	B	C	C
Approach Delay (s)		8.4	17.6		28.2	
Approach LOS		A	B		C	

Intersection Summary

HCM Average Control Delay	13.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	70.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

PM Horizon Year + Project
3: Pala Rd (SR-76) & Sage Rd — HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Volume (veh/h)	20	1610	1610	20	20	20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	1695	1695	21	21	21
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1716				2595	858
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1716				2595	858
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	94				0	93
cM capacity (veh/h)	365				19	300

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	SB 1
Volume Total	21	847	847	1130	586	21
Volume Left	21	0	0	0	0	0
Volume Right	0	0	0	0	21	21
cSH	365	1700	1700	1700	1700	300
Volume to Capacity	0.06	0.50	0.50	0.66	0.34	0.07
Queue Length 95th (ft)	5	0	0	0	0	6
Control Delay (s)	15.5	0.0	0.0	0.0	0.0	17.9
Lane LOS	C					C
Approach Delay (s)	0.2			0.0		Err
Approach LOS						F

Intersection Summary			
Average Delay	Err		
Intersection Capacity Utilization	Err%	ICU Level of Service	H
Analysis Period (min)	15		

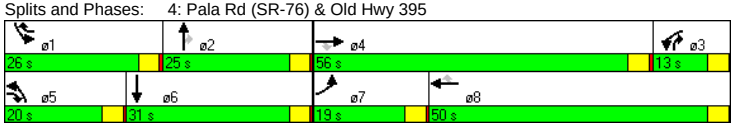
LOS Engineering

PM Horizon Year + Project
4: Pala Rd (SR-76) & Old Hwy 395 — Timings

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Volume (vph)	140	1100	150	110	1090	380	230	300	150	350	220
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot		pm+ov	Prot	
Protected Phases	7	4	5	3	8	1	5	2	3	1	6
Permitted Phases			4			8			2		
Detector Phases	7	4	5	3	8	1	5	2	3	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	8.0	20.0	20.0	20.0	20.0	8.0	20.0	20.0
Total Split (s)	19.0	56.0	20.0	13.0	50.0	26.0	20.0	25.0	13.0	26.0	31.0
Total Split (%)	15.8%	46.7%	16.7%	10.8%	41.7%	21.7%	16.7%	20.8%	10.8%	21.7%	25.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lead	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	Min	None	None	Min	Min	Min	None	Min	Min
Act Effct Green (s)	13.6	44.2	60.3	11.1	41.7	64.5	16.1	24.5	35.6	18.7	27.1
Actuated g/C Ratio	0.12	0.39	0.53	0.10	0.36	0.56	0.14	0.21	0.31	0.16	0.24
v/c Ratio	0.78	0.85	0.19	0.76	0.89	0.46	1.09	0.79	0.34	0.73	0.94
Control Delay	77.8	38.6	1.6	81.7	44.0	9.9	133.4	60.7	16.6	55.2	72.7
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	77.8	38.6	1.6	81.7	44.0	9.9	133.4	60.7	16.6	55.2	72.7
LOS	E	D	A	F	D	A	F	E	B	E	E
Approach Delay		38.6			38.4			75.6			64.4
Approach LOS		D			D			E			E

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 114.6	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.09	
Intersection Signal Delay: 48.6	Intersection LOS: D
Intersection Capacity Utilization 88.3%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 4: Pala Rd (SR-76) & Old Hwy 395



LOS Engineering

PM Horizon Year + Project
4: Pala Rd (SR-76) & Old Hwy 395

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	330		0	150		150	0		0	0		0
Storage Lanes	1		0	1		1	1		1	2		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	50	50	50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	1.00
Frt			0.850			0.850			0.850		0.935	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1583	3539	1417	1583	3539	1417	1583	1863	1417	3072	1742	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1583	3539	1417	1583	3539	1417	1583	1863	1417	3072	1742	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			158			156			42		30	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		652			462			899			4464	
Travel Time (s)		14.8			10.5			20.4			101.5	
Volume (vph)	140	1100	150	110	1090	380	230	300	150	350	220	170
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	147	1158	158	116	1147	400	242	316	158	368	232	179
Lane Group Flow (vph)	147	1158	158	116	1147	400	242	316	158	368	411	0
v/c Ratio	0.78	0.85	0.19	0.76	0.89	0.46	1.09	0.79	0.34	0.73	0.94	
Control Delay	77.8	38.6	1.6	81.7	44.0	9.9	133.4	60.7	16.6	55.2	72.7	
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	77.8	38.6	1.6	81.7	44.0	9.9	133.4	60.7	16.6	55.2	72.7	
Queue Length 50th (ft)	111	418	0	87	422	94	~218	240	43	139	298	
Queue Length 95th (ft)	#211	476	18	#214	515	159	#384	#427	90	190	#512	
Internal Link Dist (ft)		572			382			819			4384	
Turn Bay Length (ft)	330			150		150						
Base Capacity (vph)	205	1508	820	153	1373	857	222	398	469	575	435	
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	0.72	0.77	0.19	0.76	0.84	0.47	1.09	0.79	0.34	0.64	0.94	

Intersection Summary

Area Type: Other

~ 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.

LOS Engineering

PM Horizon Year + Project
4: Pala Rd (SR-76) & Old Hwy 395

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93	
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)	1583	3539	1417	1583	3539	1417	1583	1863	1417	3072	1741	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1583	3539	1417	1583	3539	1417	1583	1863	1417	3072	1741	
Volume (vph)	140	1100	150	110	1090	380	230	300	150	350	220	170
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	147	1158	158	116	1147	400	242	316	158	368	232	179
RTOR Reduction (vph)	0	0	75	0	0	74	0	0	29	0	23	0
Lane Group Flow (vph)	147	1158	83	116	1147	326	242	316	129	368	388	0
Turn Type	Prot		pm+ov	Prot		pm+ov	Prot		pm+ov	Prot		
Protected Phases	7	4	5	3	8	1	5	2	3	1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	13.6	44.2	60.3	11.1	41.7	60.4	16.1	24.5	35.6	18.7	27.1	
Effective Green, g (s)	13.6	44.2	60.3	11.1	41.7	60.4	16.1	24.5	35.6	18.7	27.1	
Actuated g/C Ratio	0.12	0.39	0.53	0.10	0.36	0.53	0.14	0.21	0.31	0.16	0.24	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	188	1366	746	153	1289	797	223	399	441	502	412	
v/s Ratio Prot	0.09	c0.33	0.02	0.07	c0.32	0.07	c0.15	0.17	0.03	0.12	c0.22	
v/s Ratio Perm			0.04			0.16			0.06			
v/c Ratio	0.78	0.85	0.11	0.76	0.89	0.41	1.09	0.79	0.29	0.73	0.94	
Uniform Delay, d1	49.0	32.1	13.6	50.4	34.2	16.3	49.2	42.6	29.9	45.5	42.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	18.8	5.1	0.1	19.1	7.9	0.3	84.8	10.3	0.4	5.5	29.9	
Delay (s)	67.8	37.2	13.7	69.5	42.1	16.6	134.0	52.9	30.3	51.0	72.8	
Level of Service	E	D	B	E	D	B	F	D	C	D	E	
Approach Delay (s)		37.7			37.9			75.3			62.5	
Approach LOS		D			D			E			E	

Intersection Summary

HCM Average Control Delay	47.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	114.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	88.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

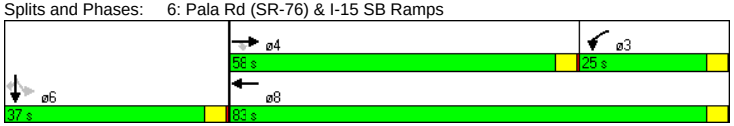
PM Horizon Year + Project
6: Pala Rd (SR-76) & I-15 SB Ramps

Timings

Lane Group	EBT	EBR	WBL	WBT	SBL	SBT	SBR
Lane Configurations							
Volume (vph)	1300	300	400	1050	300	20	530
Turn Type		Perm	Prot		Perm		Perm
Protected Phases	4		3	8		6	
Permitted Phases		4			6		6
Detector Phases	4	4	3	8	6	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0	20.0	20.0
Total Split (s)	58.0	58.0	25.0	83.0	37.0	37.0	37.0
Total Split (%)	48.3%	48.3%	20.8%	69.2%	30.8%	30.8%	30.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lead	Lag				
Lead-Lag Optimize?	Yes	Yes	Yes				
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min
Act Effct Green (s)	52.3	52.3	19.4	75.7	36.3	36.3	36.3
Actuated g/C Ratio	0.44	0.44	0.16	0.63	0.30	0.30	0.30
v/c Ratio	0.89	0.41	0.85	0.50	0.56	0.65	0.59
Control Delay	39.1	5.9	69.0	16.0	42.7	31.6	27.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.1	5.9	69.0	16.0	42.7	31.6	27.4
LOS	D	A	E	B	D	C	C
Approach Delay	32.9			30.6		33.4	
Approach LOS	C			C		C	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 40 (33%), Referenced to phase 2: and 6:SBTL, Start of Green	
Natural Cycle: 70	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.89	
Intersection Signal Delay: 32.2	Intersection LOS: C
Intersection Capacity Utilization 74.3%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 6: Pala Rd (SR-76) & I-15 SB Ramps



LOS Engineering

PM Horizon Year + Project
6: Pala Rd (SR-76) & I-15 SB Ramps

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	0		0	500		0	0		0	0		900
Storage Lanes	0		1	2		0	0		0	1		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50	50	50					50	50	50
Trailing Detector (ft)		0	0	0	0					0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95	1.00	1.00	1.00	1.00	0.95	0.91	0.95
Frt			0.850								0.884	0.850
Flt Protected				0.950						0.950	0.992	
Satd. Flow (prot)	0	3539	1417	3072	3539	0	0	0	0	1504	1486	1346
Flt Permitted				0.950						0.950	0.992	
Satd. Flow (perm)	0	3539	1417	3072	3539	0	0	0	0	1504	1486	1346
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			263								119	119
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		654			1271			961			1209	
Travel Time (s)		14.9			28.9			21.8			27.5	
Volume (vph)	0	1300	300	400	1050	0	0	0	0	300	20	530
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1368	316	421	1105	0	0	0	0	316	21	558
Lane Group Flow (vph)	0	1368	316	421	1105	0	0	0	0	257	349	289
v/c Ratio		0.89	0.41	0.85	0.50					0.56	0.65	0.59
Control Delay		39.1	5.9	69.0	16.0					42.7	31.6	27.4
Queue Delay		0.0	0.0	0.0	0.0					0.0	0.0	0.0
Total Delay		39.1	5.9	69.0	16.0					42.7	31.6	27.4
Queue Length 50th (ft)		464	22	170	422					192	187	127
Queue Length 95th (ft)		592	83	m201	m516					281	303	227
Internal Link Dist (ft)		574			1191			881			1129	
Turn Bay Length (ft)				500								900
Base Capacity (vph)		1618	790	542	2359					468	544	500
Starvation Cap Reductn		0	0	0	0					0	0	0
Spillback Cap Reductn		0	0	0	0					0	0	0
Storage Cap Reductn		0	0	0	0					0	0	0
Reduced v/c Ratio		0.85	0.40	0.78	0.47					0.55	0.64	0.58

Intersection Summary	
Area Type:	Other
m Volume for 95th percentile queue is metered by upstream signal.	

LOS Engineering

PM Horizon Year + Project
6: Pala Rd (SR-76) & I-15 SB Ramps

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)		4.0	4.0	4.0	4.0					4.0	4.0	4.0
Lane Util. Factor		0.95	1.00	0.97	0.95					0.95	0.91	0.95
Frt		1.00	0.85	1.00	1.00					1.00	0.88	0.85
Flt Protected		1.00	1.00	0.95	1.00					0.95	0.99	1.00
Satd. Flow (prot)		3539	1417	3072	3539					1504	1487	1346
Flt Permitted		1.00	1.00	0.95	1.00					0.95	0.99	1.00
Satd. Flow (perm)		3539	1417	3072	3539					1504	1487	1346
Volume (vph)	0	1300	300	400	1050	0	0	0	0	300	20	530
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1368	316	421	1105	0	0	0	0	316	21	558
RTOR Reduction (vph)	0	0	148	0	0	0	0	0	0	0	83	83
Lane Group Flow (vph)	0	1368	168	421	1105	0	0	0	0	257	266	206
Turn Type			Perm	Prot						Perm		Perm
Protected Phases		4		3	8						6	
Permitted Phases			4							6		6
Actuated Green, G (s)		52.3	52.3	19.4	75.7					36.3	36.3	36.3
Effective Green, g (s)		52.3	52.3	19.4	75.7					36.3	36.3	36.3
Actuated g/C Ratio		0.44	0.44	0.16	0.63					0.30	0.30	0.30
Clearance Time (s)		4.0	4.0	4.0	4.0					4.0	4.0	4.0
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	3.0
Lane Grp Cap (vph)		1542	618	497	2233					455	450	407
v/s Ratio Prot		c0.39		c0.14	0.31							
v/s Ratio Perm			0.12							0.17	0.18	0.15
v/c Ratio		0.89	0.27	0.85	0.49					0.56	0.59	0.51
Uniform Delay, d1		31.1	21.7	48.9	11.9					35.2	35.5	34.5
Progression Factor		1.00	1.00	1.21	1.32					1.00	1.00	1.00
Incremental Delay, d2		6.6	0.2	7.7	0.1					5.0	5.6	4.4
Delay (s)		37.7	21.9	66.9	15.8					40.2	41.2	38.9
Level of Service		D	C	E	B					D	D	D
Approach Delay (s)		34.7			29.9			0.0			40.2	
Approach LOS		C			C			A			D	

Intersection Summary			
HCM Average Control Delay	34.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

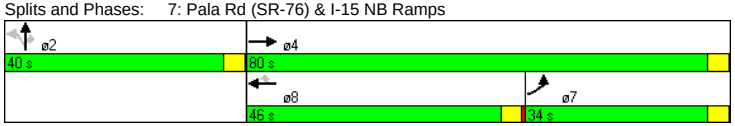
PM Horizon Year + Project
7: Pala Rd (SR-76) & I-15 NB Ramps

Timings

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Lane Configurations							
Volume (vph)	600	1000	1000	350	450	20	450
Turn Type	Prot			Perm	Perm		Perm
Protected Phases	7	4	8			2	
Permitted Phases				8	2		2
Detector Phases	7	4	8	8	2	2	2
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0	20.0	20.0
Total Split (s)	34.0	80.0	46.0	46.0	40.0	40.0	40.0
Total Split (%)	28.3%	66.7%	38.3%	38.3%	33.3%	33.3%	33.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lag		Lead	Lead			
Lead-Lag Optimize?	Yes		Yes	Yes			
Recall Mode	None	None	None	None	C-Min	C-Min	C-Min
Act Effct Green (s)	28.1	72.8	40.7	40.7	39.2	39.2	39.2
Actuated g/C Ratio	0.23	0.61	0.34	0.34	0.33	0.33	0.33
v/c Ratio	0.88	0.49	0.88	0.68	0.60	0.66	0.63
Control Delay	66.4	26.8	46.5	31.9	41.5	39.9	28.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.4	26.8	46.5	31.9	41.5	39.9	28.7
LOS	E	C	D	C	D	D	C
Approach Delay		41.6	42.7			36.6	
Approach LOS		D	D			D	

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 120	
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:, Start of Green	
Natural Cycle: 75	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.88	
Intersection Signal Delay: 40.8	Intersection LOS: D
Intersection Capacity Utilization 74.3%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 7: Pala Rd (SR-76) & I-15 NB Ramps



PM Horizon Year + Project
7: Pala Rd (SR-76) & I-15 NB Ramps

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	450		0	0		50	0		800	0		0
Storage Lanes	2		0	0		1	1		1	0		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50	50	50	50	50			
Trailing Detector (ft)	0	0			0	0	0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	0.95	0.91	0.95	1.00	1.00	1.00
Frt						0.850		0.937	0.850			
Flt Protected	0.950						0.950	0.975				
Satd. Flow (prot)	3072	3539	0	0	3539	1417	1504	1549	1346	0	0	0
Flt Permitted	0.950						0.950	0.975				
Satd. Flow (perm)	3072	3539	0	0	3539	1417	1504	1549	1346	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						92		31	121			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1271			2232			991			1241	
Travel Time (s)		28.9			50.7			22.5			28.2	
Volume (vph)	600	1000	0	0	1000	350	450	20	450	0	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	632	1053	0	0	1053	368	474	21	474	0	0	0
Lane Group Flow (vph)	632	1053	0	0	1053	368	294	346	329	0	0	0
v/c Ratio	0.88	0.49			0.88	0.68	0.60	0.66	0.63			
Control Delay	66.4	26.8			46.5	31.9	41.5	39.9	28.7			
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0	0.0			
Total Delay	66.4	26.8			46.5	31.9	41.5	39.9	28.7			
Queue Length 50th (ft)	192	244			377	173	222	256	160			
Queue Length 95th (ft)	m262	m347			484	295	313	364	266			
Internal Link Dist (ft)		1191			2152			911			1161	
Turn Bay Length (ft)	450					50			800			
Base Capacity (vph)	778	2271			1257	563	503	539	531			
Starvation Cap Reductn	0	0			0	0	0	0	0			
Spillback Cap Reductn	0	0			0	0	0	0	0			
Storage Cap Reductn	0	0			0	0	0	0	0			
Reduced v/c Ratio	0.81	0.46			0.84	0.65	0.58	0.64	0.62			

Intersection Summary

Area Type: Other

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

LOS Engineering

PM Horizon Year + Project
7: Pala Rd (SR-76) & I-15 NB Ramps

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Lane Util. Factor	0.97	0.95			0.95	1.00	0.95	0.91	0.95			
Frt	1.00	1.00			1.00	0.85	1.00	0.94	0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95	0.97	1.00			
Satd. Flow (prot)	3072	3539			3539	1417	1504	1548	1346			
Flt Permitted	0.95	1.00			1.00	1.00	0.95	0.97	1.00			
Satd. Flow (perm)	3072	3539			3539	1417	1504	1548	1346			
Volume (vph)	600	1000	0	0	1000	350	450	20	450	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	632	1053	0	0	1053	368	474	21	474	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	61	0	21	81	0	0	0
Lane Group Flow (vph)	632	1053	0	0	1053	307	294	325	248	0	0	0
Turn Type	Prot					Perm	Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases						8	2		2			
Actuated Green, G (s)	28.1	72.8			40.7	40.7	39.2	39.2	39.2			
Effective Green, g (s)	28.1	72.8			40.7	40.7	39.2	39.2	39.2			
Actuated g/C Ratio	0.23	0.61			0.34	0.34	0.33	0.33	0.33			
Clearance Time (s)	4.0	4.0			4.0	4.0	4.0	4.0	4.0			
Vehicle Extension (s)	3.0	3.0			3.0	3.0	3.0	3.0	3.0			
Lane Grp Cap (vph)	719	2147			1200	481	491	506	440			
v/s Ratio Prot	c0.21	0.30			c0.30							
v/s Ratio Perm						0.22	0.20	0.21	0.18			
v/c Ratio	0.88	0.49			0.88	0.64	0.60	0.64	0.56			
Uniform Delay, d1	44.3	13.2			37.3	33.4	33.8	34.4	33.3			
Progression Factor	1.32	2.02			1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2	6.8	0.1			7.5	2.8	5.3	6.2	5.1			
Delay (s)	65.2	26.8			44.8	36.2	39.1	40.6	38.5			
Level of Service	E	C			D	D	D	D	D			
Approach Delay (s)		41.2			42.6			39.4			0.0	
Approach LOS		D			D			D			A	

Intersection Summary

HCM Average Control Delay	41.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

PM Horizon Year + Project
8: Pala Rd (SR-76) & Pankey Rd

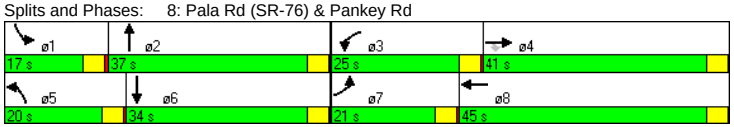
Timings

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Volume (vph)	160	950	340	220	810	330	420	120	470
Turn Type	Prot		Perm	Prot		Prot		Prot	
Protected Phases	7	4		3	8	5	2	1	6
Permitted Phases			4						
Detector Phases	7	4	4	3	8	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	8.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	21.0	41.0	41.0	25.0	45.0	20.0	37.0	17.0	34.0
Total Split (%)	17.5%	34.2%	34.2%	20.8%	37.5%	16.7%	30.8%	14.2%	28.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	14.9	34.4	34.4	18.9	38.4	15.0	29.2	11.8	25.9
Actuated g/C Ratio	0.13	0.31	0.31	0.17	0.35	0.14	0.26	0.11	0.23
v/c Ratio	0.79	0.91	0.54	0.86	0.78	0.83	0.79	0.75	0.86
Control Delay	74.4	50.4	8.4	75.3	38.2	66.4	37.1	77.6	49.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	74.4	50.4	8.4	75.3	38.2	66.4	37.1	77.6	49.2
LOS	E	D	A	E	D	E	D	E	D
Approach Delay		43.2			45.5		46.1		53.5
Approach LOS		D			D		D		D

Intersection Summary

Cycle Length: 120
Actuated Cycle Length: 110.7
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.91
Intersection Signal Delay: 46.3 Intersection LOS: D
Intersection Capacity Utilization 83.4% ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 8: Pala Rd (SR-76) & Pankey Rd



LOS Engineering

PM Horizon Year + Project
8: Pala Rd (SR-76) & Pankey Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50		50	50		50	50	
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	0.97	0.95	0.95	1.00	0.95	0.95
Frt			0.850		0.985			0.935			0.954	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1583	3539	1417	1583	3486	0	3072	3309	0	1583	3376	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1583	3539	1417	1583	3486	0	3072	3309	0	1583	3376	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			325		11			158			57	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2232			2833			991			1488	
Travel Time (s)		50.7			64.4			22.5			33.8	
Volume (vph)	160	950	340	220	810	90	330	420	320	120	470	210
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	168	1000	358	232	853	95	347	442	337	126	495	221
Lane Group Flow (vph)	168	1000	358	232	948	0	347	779	0	126	716	0
v/c Ratio	0.79	0.91	0.54	0.86	0.78		0.83	0.79		0.75	0.86	
Control Delay	74.4	50.4	8.4	75.3	38.2		66.4	37.1		77.6	49.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	74.4	50.4	8.4	75.3	38.2		66.4	37.1		77.6	49.2	
Queue Length 50th (ft)	126	390	18	175	341		136	236		96	255	
Queue Length 95th (ft)	#234	#518	100	#312	425		#215	311		#191	330	
Internal Link Dist (ft)		2152			2753			911			1408	
Turn Bay Length (ft)												
Base Capacity (vph)	243	1169	686	299	1285		449	1077		187	936	
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	0.69	0.86	0.52	0.78	0.74		0.77	0.72		0.67	0.76	

Intersection Summary

Area Type: Other
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

LOS Engineering

PM Horizon Year + Project
8: Pala Rd (SR-76) & Pankey Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		0.97	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.94		1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	3539	1417	1583	3486		3072	3310		1583	3375	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	3539	1417	1583	3486		3072	3310		1583	3375	
Volume (vph)	160	950	340	220	810	90	330	420	320	120	470	210
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	168	1000	358	232	853	95	347	442	337	126	495	221
RTOR Reduction (vph)	0	0	223	0	7	0	0	116	0	0	44	0
Lane Group Flow (vph)	168	1000	135	232	941	0	347	663	0	126	672	0
Turn Type	Prot		Perm	Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	14.9	34.5	34.5	18.9	38.5		15.0	29.2		11.8	26.0	
Effective Green, g (s)	14.9	34.5	34.5	18.9	38.5		15.0	29.2		11.8	26.0	
Actuated g/C Ratio	0.13	0.31	0.31	0.17	0.35		0.14	0.26		0.11	0.24	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	214	1106	443	271	1216		417	875		169	795	
v/s Ratio Prot	0.11	c0.28		c0.15	c0.27		c0.11	c0.20		0.08	c0.20	
v/s Ratio Perm			0.09									
v/c Ratio	0.79	0.90	0.30	0.86	0.77		0.83	0.76		0.75	0.85	
Uniform Delay, d1	46.2	36.4	28.8	44.4	32.1		46.5	37.3		47.8	40.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	17.0	10.4	0.4	22.3	3.1		13.3	3.8		16.3	8.3	
Delay (s)	63.2	46.8	29.2	66.8	35.2		59.7	41.1		64.1	48.5	
Level of Service	E	D	C	E	D		E	D		E	D	
Approach Delay (s)		44.5			41.4			46.9			50.9	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	45.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	110.4	Sum of lost time (s)	24.0
Intersection Capacity Utilization	83.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

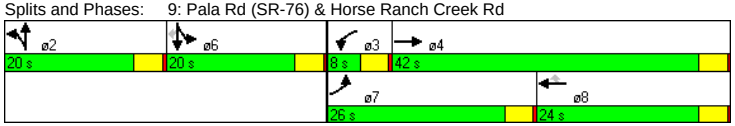
PM Horizon Year + Project
9: Pala Rd (SR-76) & Horse Ranch Creek Rd

Timings

Lane Group	EBL	EBT	WBT	WBR	SBL	SBT	SBR	ø2	ø3
Lane Configurations									
Volume (vph)	700	750	740	130	90	0	380		
Turn Type	Prot			Perm	Split		Perm		
Protected Phases	7	4	8		6	6		2	3
Permitted Phases				8			6		
Detector Phases	7	4	8	8	6	6	6		
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0	8.0
Total Split (s)	26.0	42.0	24.0	24.0	20.0	20.0	20.0	20.0	8.0
Total Split (%)	28.9%	46.7%	26.7%	26.7%	22.2%	22.2%	22.2%	22%	9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lag	Lag					Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes					Yes
Recall Mode	None	None	None	None	Min	Min	Min	Min	None
Act Effct Green (s)	21.7	45.8	20.1	20.1	10.2	10.2	10.2		
Actuated g/C Ratio	0.30	0.62	0.27	0.27	0.14	0.14	0.14		
v/c Ratio	0.81	0.36	0.81	0.28	0.45	0.25	0.26		
Control Delay	33.5	7.7	33.8	6.4	36.1	0.8	0.8		
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay	33.5	7.7	33.8	6.4	36.1	0.8	0.8		
LOS	C	A	C	A	D	A	A		
Approach Delay		20.2	29.7			7.6			
Approach LOS		C	C			A			

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 73.5	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.81	
Intersection Signal Delay: 21.0	Intersection LOS: C
Intersection Capacity Utilization 59.2%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 9: Pala Rd (SR-76) & Horse Ranch Creek Rd



LOS Engineering

PM Horizon Year + Project
9: Pala Rd (SR-76) & Horse Ranch Creek Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	250		0	250		250	0		0	150		150
Storage Lanes	2		0	1		1	0		0	1		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50	50	50	50		50	50	50
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	0.95	0.91	0.95
Frt						0.850					0.850	0.850
Flt Protected	0.950									0.950		
Satd. Flow (prot)	3072	3539	0	1667	3539	1417	0	1863	0	1504	1441	1346
Flt Permitted	0.950									0.950		
Satd. Flow (perm)	3072	3539	0	1667	3539	1417	0	1863	0	1504	1441	1346
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)						137					690	690
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		2833			5160			734			1509	
Travel Time (s)		64.4			117.3			16.7			34.3	
Volume (vph)	700	750	0	0	740	130	0	0	0	90	0	380
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	737	789	0	0	779	137	0	0	0	95	0	400
Lane Group Flow (vph)	737	789	0	0	779	137	0	0	0	95	200	200
v/c Ratio	0.81	0.36			0.81	0.28				0.45	0.25	0.26
Control Delay	33.5	7.7			33.8	6.4				36.1	0.8	0.8
Queue Delay	0.0	0.0			0.0	0.0				0.0	0.0	0.0
Total Delay	33.5	7.7			33.8	6.4				36.1	0.8	0.8
Queue Length 50th (ft)	157	79			173	0				42	0	0
Queue Length 95th (ft)	#271	135			#291	41				87	0	0
Internal Link Dist (ft)		2753			5080			654			1429	
Turn Bay Length (ft)	250					250				150		150
Base Capacity (vph)	917	2204			966	486				304	842	823
Starvation Cap Reductn	0	0			0	0				0	0	0
Spillback Cap Reductn	0	0			0	0				0	0	0
Storage Cap Reductn	0	0			0	0				0	0	0
Reduced v/c Ratio	0.80	0.36			0.81	0.28				0.31	0.24	0.24

Intersection Summary

Area Type: Other

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

LOS Engineering

PM Horizon Year + Project
9: Pala Rd (SR-76) & Horse Ranch Creek Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0			4.0	4.0				4.0	4.0	4.0
Lane Util. Factor	0.97	0.95			0.95	1.00				0.95	0.91	0.95
Frt	1.00	1.00			1.00	0.85				1.00	0.85	0.85
Flt Protected	0.95	1.00			1.00	1.00				0.95	1.00	1.00
Satd. Flow (prot)	3072	3539			3539	1417				1504	1441	1346
Flt Permitted	0.95	1.00			1.00	1.00				0.95	1.00	1.00
Satd. Flow (perm)	3072	3539			3539	1417				1504	1441	1346
Volume (vph)	700	750	0	0	740	130	0	0	0	90	0	380
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	737	789	0	0	779	137	0	0	0	95	0	400
RTOR Reduction (vph)	0	0	0	0	0	100	0	0	0	0	172	172
Lane Group Flow (vph)	737	789	0	0	779	37	0	0	0	95	28	28
Turn Type	Prot			Prot		Perm	Split			Split		Perm
Protected Phases	7	4		3	8		2	2		6	6	
Permitted Phases						8						6
Actuated Green, G (s)	21.7	45.8			20.1	20.1				10.2	10.2	10.2
Effective Green, g (s)	21.7	45.8			20.1	20.1				10.2	10.2	10.2
Actuated g/C Ratio	0.30	0.62			0.27	0.27				0.14	0.14	0.14
Clearance Time (s)	4.0	4.0			4.0	4.0				4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0			3.0	3.0				3.0	3.0	3.0
Lane Grp Cap (vph)	907	2205			968	388				209	200	187
v/s Ratio Prot	c0.24	0.22			c0.22					c0.06	0.02	
v/s Ratio Perm						0.03						0.02
v/c Ratio	0.81	0.36			0.80	0.10				0.45	0.14	0.15
Uniform Delay, d1	24.0	6.7			24.9	19.9				29.1	27.8	27.8
Progression Factor	1.00	1.00			1.00	1.00				1.00	1.00	1.00
Incremental Delay, d2	5.6	0.1			4.9	0.1				1.6	0.3	0.4
Delay (s)	29.6	6.8			29.8	20.0				30.7	28.1	28.2
Level of Service	C	A			C	C				C	C	C
Approach Delay (s)		17.8			28.3			0.0			28.6	
Approach LOS		B			C			A			C	

Intersection Summary

HCM Average Control Delay	22.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	73.5	Sum of lost time (s)	21.5
Intersection Capacity Utilization	59.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

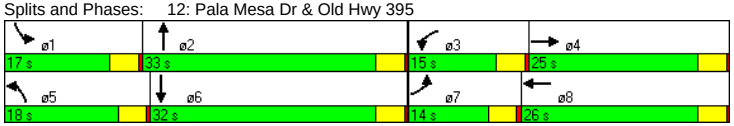
PM Horizon Year + Project
12: Pala Mesa Dr & Old Hwy 395 — Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	150	160	180	190	120	820	200	490
Turn Type	Prot		Prot		Prot		Prot	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases								
Detector Phases	7	4	3	8	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	14.0	25.0	15.0	26.0	18.0	33.0	17.0	32.0
Total Split (%)	15.6%	27.8%	16.7%	28.9%	20.0%	36.7%	18.9%	35.6%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	10.0	21.0	11.0	22.0	11.5	28.9	13.0	30.4
Actuated g/C Ratio	0.11	0.23	0.12	0.24	0.13	0.32	0.14	0.34
v/c Ratio	0.90	0.84	0.98	0.97	0.62	0.95	0.92	0.52
Control Delay	87.2	45.8	101.5	64.9	50.4	47.3	82.3	25.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	87.2	45.8	101.5	64.9	50.4	47.3	82.3	25.3
LOS	F	D	F	E	D	D	F	C
Approach Delay		58.0		75.7		47.6		39.9
Approach LOS		E		E		D		D

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 89.9
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.98
Intersection Signal Delay: 53.0 — Intersection LOS: D
Intersection Capacity Utilization 88.8% — ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 12: Pala Mesa Dr & Old Hwy 395



PM Horizon Year + Project
12: Pala Mesa Dr & Old Hwy 395 — Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	0		0	0		0	150		0	200		0
Storage Lanes	1		0	1		0	1		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.916			0.916			0.971			0.977	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1583	1706	0	1583	1706	0	1583	3437	0	1583	3458	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1583	1706	0	1583	1706	0	1583	3437	0	1583	3458	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		66			67			35			24	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		3628			1500			4464			5461	
Travel Time (s)		82.5			34.1			101.5			124.1	
Volume (vph)	150	160	200	180	190	240	120	820	200	200	490	90
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	158	168	211	189	200	253	126	863	211	211	516	95
Lane Group Flow (vph)	158	379	0	189	453	0	126	1074	0	211	611	0
v/c Ratio	0.90	0.84		0.98	0.97		0.62	0.95		0.92	0.52	
Control Delay	87.2	45.8		101.5	64.9		50.4	47.3		82.3	25.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	87.2	45.8		101.5	64.9		50.4	47.3		82.3	25.3	
Queue Length 50th (ft)	90	173		109	223		68	303		120	140	
Queue Length 95th (ft)	#206	#329		#242	#418		124	#440		#253	199	
Internal Link Dist (ft)		3548			1420			4384			5381	
Turn Bay Length (ft)							150			200		
Base Capacity (vph)	176	449		193	468		240	1131		229	1186	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.90	0.84		0.98	0.97		0.53	0.95		0.92	0.52	

Intersection Summary

Area Type: Other
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

PM Horizon Year + Project
12: Pala Mesa Dr & Old Hwy 395 — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.92		1.00	0.92		1.00	0.97		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	1707		1583	1707		1583	3435		1583	3457	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	1707		1583	1707		1583	3435		1583	3457	
Volume (vph)	150	160	200	180	190	240	120	820	200	200	490	90
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	158	168	211	189	200	253	126	863	211	211	516	95
RTOR Reduction (vph)	0	51	0	0	51	0	0	24	0	0	16	0
Lane Group Flow (vph)	158	328	0	189	402	0	126	1050	0	211	595	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	10.0	21.0		11.0	22.0		11.5	28.9		13.0	30.4	
Effective Green, g (s)	10.0	21.0		11.0	22.0		11.5	28.9		13.0	30.4	
Actuated g/C Ratio	0.11	0.23		0.12	0.24		0.13	0.32		0.14	0.34	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	176	399		194	418		202	1104		229	1169	
v/s Ratio Prot	0.10	0.19		c0.12	c0.24		0.08	c0.31		c0.13	0.17	
v/s Ratio Perm												
v/c Ratio	0.90	0.82		0.97	0.96		0.62	0.95		0.92	0.51	
Uniform Delay, d1	39.4	32.7		39.3	33.5		37.1	29.8		37.9	23.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	39.7	12.9		56.7	34.2		5.9	16.7		38.5	0.4	
Delay (s)	79.2	45.6		96.0	67.8		43.0	46.5		76.4	24.1	
Level of Service	E	D		F	E		D	D		E	C	
Approach Delay (s)		55.4			76.1			46.1			37.6	
Approach LOS		E			E			D			D	

Intersection Summary			
HCM Average Control Delay	51.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	89.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	88.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

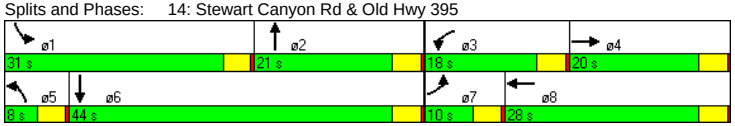
LOS Engineering

PM Horizon Year + Project
14: Stewart Canyon Rd & Old Hwy 395 — Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	20	30	120	10	70	720	480	700
Turn Type	Prot		Prot		Prot		Prot	
Protected Phases	7	4	3	8	5	2	1	6
Permitted Phases								
Detector Phases	7	4	3	8	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	8.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	10.0	20.0	18.0	28.0	8.0	21.0	31.0	44.0
Total Split (%)	11.1%	22.2%	20.0%	31.1%	8.9%	23.3%	34.4%	48.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lead	Lag	Lead	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	5.8	7.3	10.8	15.9	4.1	17.2	27.4	40.5
Actuated g/C Ratio	0.07	0.10	0.14	0.21	0.05	0.23	0.36	0.53
v/c Ratio	0.19	0.37	0.58	0.62	0.88	0.99	0.89	0.45
Control Delay	41.1	23.7	43.0	8.5	112.6	62.8	46.2	13.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.1	23.7	43.0	8.5	112.6	62.8	46.2	13.1
LOS	D	C	D	A	F	E	D	B
Approach Delay		27.5		17.0		67.1		25.6
Approach LOS		C		B		E		C

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 76.3	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.99	
Intersection Signal Delay: 36.8	Intersection LOS: D
Intersection Capacity Utilization 83.4%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 14: Stewart Canyon Rd & Old Hwy 395



LOS Engineering

PM Horizon Year + Project
14: Stewart Canyon Rd & Old Hwy 395

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	0		0	200		0	100		0	100		0
Storage Lanes	1		0	1		0	1		0	1		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.915			0.854			0.994			0.983	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1583	1704	0	1583	1591	0	1583	3518	0	1583	3479	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1583	1704	0	1583	1591	0	1583	3518	0	1583	3479	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		42			379			4			20	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1302			7424			5461			3410	
Travel Time (s)		29.6			168.7			124.1			77.5	
Volume (vph)	20	30	40	120	10	360	70	720	30	480	700	90
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	32	42	126	11	379	74	758	32	505	737	95
Lane Group Flow (vph)	21	74	0	126	390	0	74	790	0	505	832	0
v/c Ratio	0.19	0.37		0.58	0.62		0.88	0.99		0.89	0.45	
Control Delay	41.1	23.7		43.0	8.5		112.6	62.8		46.2	13.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	41.1	23.7		43.0	8.5		112.6	62.8		46.2	13.1	
Queue Length 50th (ft)	10	15		58	4		37	~221		234	125	
Queue Length 95th (ft)	33	54		115	79		#125	#373		#469	201	
Internal Link Dist (ft)		1222			7344			5381			3330	
Turn Bay Length (ft)				200			100			100		
Base Capacity (vph)	116	357		273	727		84	797		567	1857	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.18	0.21		0.46	0.54		0.88	0.99		0.89	0.45	

Intersection Summary

Area Type: Other

~ 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.

LOS Engineering

PM Horizon Year + Project
14: Stewart Canyon Rd & Old Hwy 395

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.91		1.00	0.85		1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	1704		1583	1591		1583	3518		1583	3479	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	1704		1583	1591		1583	3518		1583	3479	
Volume (vph)	20	30	40	120	10	360	70	720	30	480	700	90
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	32	42	126	11	379	74	758	32	505	737	95
RTOR Reduction (vph)	0	37	0	0	302	0	0	3	0	0	10	0
Lane Group Flow (vph)	21	37	0	126	88	0	74	787	0	505	822	0
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	2.2	8.9		9.2	15.9		4.1	17.3		27.3	40.5	
Effective Green, g (s)	2.2	8.9		9.2	15.9		4.1	17.3		27.3	40.5	
Actuated g/C Ratio	0.03	0.11		0.12	0.20		0.05	0.22		0.35	0.51	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	44	193		185	321		82	773		549	1790	
v/s Ratio Prot	0.01	0.02		c0.08	c0.06		0.05	c0.22		c0.32	0.24	
v/s Ratio Perm												
v/c Ratio	0.48	0.19		0.68	0.27		0.90	1.02		0.92	0.46	
Uniform Delay, d1	37.7	31.6		33.3	26.5		37.1	30.7		24.7	12.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	7.9	0.5		9.9	0.5		67.3	36.9		20.5	0.2	
Delay (s)	45.6	32.1		43.2	27.0		104.4	67.6		45.2	12.3	
Level of Service	D	C		D	C		F	E		D	B	
Approach Delay (s)		35.1			30.9			70.8			24.7	
Approach LOS		D			C			E			C	

Intersection Summary

HCM Average Control Delay	40.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	78.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	83.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

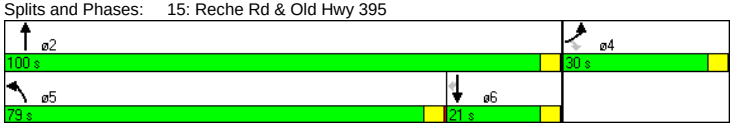
PM Horizon Year + Project
15: Reche Rd & Old Hwy 395 — Timings

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	300	260	880	340	220	400
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Detector Phases	4	4	5	2	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	20.0	20.0
Total Split (s)	30.0	30.0	79.0	100.0	21.0	21.0
Total Split (%)	23.1%	23.1%	60.8%	76.9%	16.2%	16.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Recall Mode	None	None	None	Min	Min	Min
Act Effct Green (s)	26.0	26.0	75.1	93.1	14.0	14.0
Actuated g/C Ratio	0.20	0.20	0.59	0.73	0.11	0.11
v/c Ratio	0.98	0.54	0.99	0.14	0.59	0.85
Control Delay	94.7	9.3	53.9	5.2	60.3	25.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	94.7	9.3	53.9	5.2	60.3	25.6
LOS	F	A	D	A	E	C
Approach Delay	55.0			40.3	38.0	
Approach LOS	E			D	D	

Intersection Summary

Cycle Length: 130
Actuated Cycle Length: 127.1
Natural Cycle: 130
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.99
Intersection Signal Delay: 43.1 — Intersection LOS: D
Intersection Capacity Utilization 89.1% — ICU Level of Service E
Analysis Period (min) 15

Splits and Phases: 15: Reche Rd & Old Hwy 395



LOS Engineering

PM Horizon Year + Project
15: Reche Rd & Old Hwy 395 — Queues

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1700	1700	1900	1900	1700
Storage Length (ft)	0	0	150			0
Storage Lanes	1	1	1			1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9	15			9
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1583	1417	1583	3539	3539	1417
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	1583	1417	1583	3539	3539	1417
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		274				378
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30			30	30	
Link Distance (ft)	2635			3410	4960	
Travel Time (s)	59.9			77.5	112.7	
Volume (vph)	300	260	880	340	220	400
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	316	274	926	358	232	421
Lane Group Flow (vph)	316	274	926	358	232	421
v/c Ratio	0.98	0.54	0.99	0.14	0.59	0.85
Control Delay	94.7	9.3	53.9	5.2	60.3	25.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	94.7	9.3	53.9	5.2	60.3	25.6
Queue Length 50th (ft)	262	0	723	40	97	33
Queue Length 95th (ft)	#463	78	#1074	55	141	#198
Internal Link Dist (ft)	2555			3330	4880	
Turn Bay Length (ft)			150			
Base Capacity (vph)	324	508	935	2613	463	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	0.98	0.54	0.99	0.14	0.50	0.82

Intersection Summary

Area Type: Other
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

LOS Engineering

PM Horizon Year + Project
15: Reche Rd & Old Hwy 395 — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1700	1700	1700	1900	1900	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1583	1417	1583	3539	3539	1417
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1583	1417	1583	3539	3539	1417
Volume (vph)	300	260	880	340	220	400
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	316	274	926	358	232	421
RTOR Reduction (vph)	0	218	0	0	0	336
Lane Group Flow (vph)	316	56	926	358	232	85
Turn Type		Perm	Prot			Perm
Protected Phases	4		5	2	6	
Permitted Phases		4				6
Actuated Green, G (s)	26.0	26.0	75.0	93.0	14.0	14.0
Effective Green, g (s)	26.0	26.0	75.0	93.0	14.0	14.0
Actuated g/C Ratio	0.20	0.20	0.59	0.73	0.11	0.11
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	324	290	935	2592	390	156
v/s Ratio Prot	c0.20		c0.58	0.10	c0.07	
v/s Ratio Perm		0.04				0.06
v/c Ratio	0.98	0.19	0.99	0.14	0.59	0.54
Uniform Delay, d1	50.2	41.8	25.6	5.1	53.8	53.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	42.9	0.3	27.0	0.0	2.4	3.8
Delay (s)	93.1	42.1	52.6	5.1	56.2	57.3
Level of Service	F	D	D	A	E	E
Approach Delay (s)	69.4			39.4	56.9	
Approach LOS	E			D	E	

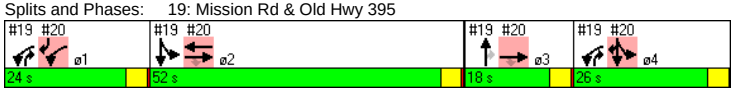
Intersection Summary			
HCM Average Control Delay	50.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	127.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	89.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

PM Horizon Year + Project
19: Mission Rd & Old Hwy 395 — Timings

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT	ø1	ø4
Lane Configurations								
Volume (vph)	390	850	130	320	1200	80		
Turn Type		Free		pm+ov	Split			
Protected Phases	1 4		3	1 4	2	2	1	4
Permitted Phases		Free		3				
Detector Phases	1 4		3	1 4	2	2		
Minimum Initial (s)			4.0		4.0	4.0	4.0	4.0
Minimum Split (s)			20.0		20.0	20.0	8.0	20.0
Total Split (s)	50.0	0.0	18.0	50.0	52.0	52.0	24.0	26.0
Total Split (%)	41.7%	0.0%	15.0%	41.7%	43.3%	43.3%	20%	22%
Yellow Time (s)			3.5		3.5	3.5	3.5	3.5
All-Red Time (s)			0.5		0.5	0.5	0.5	0.5
Lead/Lag			Lead		Lag	Lag	Lead	Lag
Lead-Lag Optimize?			Yes		Yes	Yes	Yes	Yes
Recall Mode			None		Min	Min	None	None
Act Effct Green (s)	46.0	119.7	13.7	63.7	48.0	48.0		
Actuated g/C Ratio	0.38	1.00	0.11	0.53	0.40	0.40		
v/c Ratio	0.68	0.63	0.64	0.45	1.03	0.11		
Control Delay	38.7	1.7	65.2	19.6	68.2	23.2		
Queue Delay	4.7	0.0	0.0	0.0	0.0	0.0		
Total Delay	43.4	1.7	65.2	19.6	68.2	23.2		
LOS	D	A	E	B	E	C		
Approach Delay	14.8		32.7			65.4		
Approach LOS	B		C			E		

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 119.7	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.03	
Intersection Signal Delay: 39.3	Intersection LOS: D
Intersection Capacity Utilization 79.3%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 19: Mission Rd & Old Hwy 395



PM Horizon Year + Project
19: Mission Rd & Old Hwy 395 — Queues

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1700	1700	1900	1700	1700	1900
Storage Length (ft)	0	130		210	100	
Storage Lanes	1	1		1	2	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50
Trailing Detector (ft)	0	0	0	0	0	0
Turning Speed (mph)	15	9		9	15	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.97	1.00
Frt		0.850		0.850		
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1583	1417	1863	1417	3072	1863
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1583	1417	1863	1417	3072	1863
Right Turn on Red		No		No		
Satd. Flow (RTOR)						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30		30			30
Link Distance (ft)	434		4960			1035
Travel Time (s)	9.9		112.7			23.5
Volume (vph)	390	850	130	320	1200	80
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	411	895	137	337	1263	84
Lane Group Flow (vph)	411	895	137	337	1263	84
v/c Ratio	0.68	0.63	0.64	0.45	1.03	0.11
Control Delay	38.7	1.7	65.2	19.6	68.2	23.2
Queue Delay	4.7	0.0	0.0	0.0	0.0	0.0
Total Delay	43.4	1.7	65.2	19.6	68.2	23.2
Queue Length 50th (ft)	252	23	103	154	~538	40
Queue Length 95th (ft)	m306	m0	#172	231	#673	75
Internal Link Dist (ft)	354		4880			955
Turn Bay Length (ft)		130		210	100	
Base Capacity (vph)	608	1417	218	754	1232	747
Starvation Cap Reductn	132	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	0.86	0.63	0.63	0.45	1.03	0.11

Intersection Summary

Area Type: Other

~ 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.

LOS Engineering

PM Horizon Year + Project
19: Mission Rd & Old Hwy 395 — HCM Signalized Intersection Capacity Analysis

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Ideal Flow (vphpl)	1700	1700	1900	1700	1700	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.97	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1583	1417	1863	1417	3072	1863
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1583	1417	1863	1417	3072	1863
Volume (vph)	390	850	130	320	1200	80
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	411	895	137	337	1263	84
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	411	895	137	337	1263	84
Turn Type		Free		pm+ov	Split	
Protected Phases	1 4		3	1 4	2	2
Permitted Phases		Free		3		
Actuated Green, G (s)	46.0	119.7	13.7	59.7	48.0	48.0
Effective Green, g (s)	46.0	119.7	13.7	59.7	48.0	48.0
Actuated g/C Ratio	0.38	1.00	0.11	0.50	0.40	0.40
Clearance Time (s)			4.0		4.0	4.0
Vehicle Extension (s)			3.0		3.0	3.0
Lane Grp Cap (vph)	608	1417	213	754	1232	747
v/s Ratio Prot	c0.26		0.07	0.17	c0.41	0.05
v/s Ratio Perm		c0.63		0.07		
v/c Ratio	0.68	0.63	0.64	0.45	1.03	0.11
Uniform Delay, d1	30.7	0.0	50.7	19.4	35.9	22.5
Progression Factor	1.14	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.4	1.0	6.5	0.4	32.2	0.1
Delay (s)	36.3	1.0	57.2	19.8	68.1	22.6
Level of Service	D	A	E	B	E	C
Approach Delay (s)	12.1		30.6			65.2
Approach LOS	B		C			E

Intersection Summary

HCM Average Control Delay	37.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	119.7	Sum of lost time (s)	4.0
Intersection Capacity Utilization	79.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

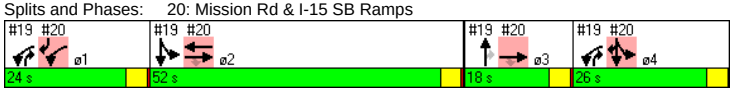
PM Horizon Year + Project
20: Mission Rd & I-15 SB Ramps

Timings

Lane Group	EBT	EBR	WBL	WBT	SBT	SBR	ø3
Lane Configurations							
Volume (vph)	1270	250	90	510	20	730	
Turn Type		Perm	Prot			custom	
Protected Phases	2 3		1	2	4	1 4	3
Permitted Phases		2 3				4	
Detector Phases	2 3	2 3	1	2	4	1 4	
Minimum Initial (s)			4.0	4.0	4.0		4.0
Minimum Split (s)			8.0	20.0	20.0		20.0
Total Split (s)	70.0	70.0	24.0	52.0	26.0	50.0	18.0
Total Split (%)	58.3%	58.3%	20.0%	43.3%	21.7%	41.7%	15%
Yellow Time (s)			3.5	3.5	3.5		3.5
All-Red Time (s)			0.5	0.5	0.5		0.5
Lead/Lag			Lead	Lag	Lag		Lead
Lead-Lag Optimize?			Yes	Yes	Yes		Yes
Recall Mode			None	Min	None		None
Act Effct Green (s)	65.7	65.7	20.0	48.0	22.0	46.0	
Actuated g/C Ratio	0.55	0.55	0.17	0.40	0.18	0.38	
v/c Ratio	0.69	0.29	0.36	0.72	0.13	0.98	
Control Delay	7.7	0.3	48.8	36.9	42.2	45.7	
Queue Delay	2.1	0.0	0.0	0.0	0.0	17.8	
Total Delay	9.7	0.3	48.8	36.9	42.2	63.4	
LOS	A	A	D	D	D	E	
Approach Delay	8.2			38.7	62.3		
Approach LOS	A			D	E		

Intersection Summary	
Cycle Length: 120	
Actuated Cycle Length: 119.7	
Natural Cycle: 100	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.03	
Intersection Signal Delay: 28.9	Intersection LOS: C
Intersection Capacity Utilization 84.0%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 20: Mission Rd & I-15 SB Ramps



PM Horizon Year + Project
20: Mission Rd & I-15 SB Ramps

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	0		0	285		0	0		0	0		200
Storage Lanes	0		1	1		0	0		0	0		1
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)		50	50	50	50					50	50	50
Trailing Detector (ft)		0	0	0	0					0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850									0.850
Flt Protected				0.950							0.976	
Satd. Flow (prot)	0	3539	1417	1583	1863	0	0	0	0	0	1818	1417
Flt Permitted				0.950							0.976	
Satd. Flow (perm)	0	3539	1417	1583	1863	0	0	0	0	0	1818	1417
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			263									392
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		434			744			972			897	
Travel Time (s)		9.9			16.9			22.1			20.4	
Volume (vph)	0	1270	250	90	510	0	0	0	0	20	20	730
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1337	263	95	537	0	0	0	0	21	21	768
Lane Group Flow (vph)	0	1337	263	95	537	0	0	0	0	0	42	768
v/c Ratio		0.69	0.29	0.36	0.72						0.13	0.98
Control Delay		7.7	0.3	48.8	36.9						42.2	45.7
Queue Delay		2.1	0.0	0.0	0.0						0.0	17.8
Total Delay		9.7	0.3	48.8	36.9						42.2	63.4
Queue Length 50th (ft)		101	0	66	346						28	352
Queue Length 95th (ft)		m107	m0	120	481						61	#646
Internal Link Dist (ft)		354			664			892			817	
Turn Bay Length (ft)				285								200
Base Capacity (vph)		1950	899	265	747						334	786
Starvation Cap Reductn		443	0	0	0						0	0
Spillback Cap Reductn		0	0	0	0						0	50
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.89	0.29	0.36	0.72						0.13	1.04

Intersection Summary	
Area Type:	Other
#	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.

PM Horizon Year + Project
20: Mission Rd & I-15 SB Ramps — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)		4.0	4.0	4.0	4.0						4.0	4.0
Lane Util. Factor		0.95	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						0.98	1.00
Satd. Flow (prot)		3539	1417	1583	1863						1817	1417
Flt Permitted		1.00	1.00	0.95	1.00						0.98	1.00
Satd. Flow (perm)		3539	1417	1583	1863						1817	1417
Volume (vph)	0	1270	250	90	510	0	0	0	0	20	20	730
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	1337	263	95	537	0	0	0	0	21	21	768
RTOR Reduction (vph)	0	0	119	0	0	0	0	0	0	0	0	241
Lane Group Flow (vph)	0	1337	144	95	537	0	0	0	0	0	42	527
Turn Type			Perm	Prot						Split		custom
Protected Phases		2 3		1	2					4	4	1 4
Permitted Phases			2 3									4
Actuated Green, G (s)		65.7	65.7	20.0	48.0						22.0	46.0
Effective Green, g (s)		65.7	65.7	20.0	48.0						22.0	46.0
Actuated g/C Ratio		0.55	0.55	0.17	0.40						0.18	0.38
Clearance Time (s)				4.0	4.0						4.0	
Vehicle Extension (s)				3.0	3.0						3.0	
Lane Grp Cap (vph)		1942	778	264	747						334	545
v/s Ratio Prot		c0.38		0.06	c0.29						0.02	c0.37
v/s Ratio Perm			0.10									
v/c Ratio		0.69	0.19	0.36	0.72						0.13	0.97
Uniform Delay, d1		19.6	13.6	44.2	30.2						40.8	36.1
Progression Factor		0.34	0.00	1.00	1.00						1.00	1.00
Incremental Delay, d2		0.4	0.0	0.8	3.3						0.2	29.9
Delay (s)		7.2	0.0	45.0	33.5						41.0	66.0
Level of Service		A	A	D	C						D	E
Approach Delay (s)		6.0			35.2			0.0			64.7	
Approach LOS		A			D			A			E	

Intersection Summary			
HCM Average Control Delay	27.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	119.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	84.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

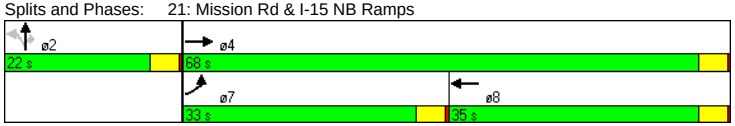
LOS Engineering

PM Horizon Year + Project
21: Mission Rd & I-15 NB Ramps — Timings

Lane Group	EBL	EBT	WBT	NBT	NBR
Lane Configurations					
Volume (vph)	1000	290	230	20	180
Turn Type	Prot				Perm
Protected Phases	7	4	8	2	
Permitted Phases					2
Detector Phases	7	4	8	2	2
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	20.0	20.0
Total Split (s)	33.0	68.0	35.0	22.0	22.0
Total Split (%)	36.7%	75.6%	38.9%	24.4%	24.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead		Lag		
Lead-Lag Optimize?	Yes		Yes		
Recall Mode	None	None	None	Min	Min
Act Effct Green (s)	29.1	48.6	15.5	18.1	18.1
Actuated g/C Ratio	0.39	0.65	0.21	0.24	0.24
v/c Ratio	0.88	0.25	0.68	0.95	0.39
Control Delay	32.7	5.9	36.1	64.8	7.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	32.7	5.9	36.1	64.8	7.0
LOS	C	A	D	E	A
Approach Delay		26.7	36.1	46.6	
Approach LOS		C	D	D	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 74.7	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.95	
Intersection Signal Delay: 33.2	Intersection LOS: C
Intersection Capacity Utilization 84.0%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 21: Mission Rd & I-15 NB Ramps



LOS Engineering

PM Horizon Year + Project
21: Mission Rd & I-15 NB Ramps

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Storage Length (ft)	300		0	0		0	0		200	0		0
Storage Lanes	2		0	0		0	0		1	0		0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50			50		50	50	50			
Trailing Detector (ft)	0	0			0		0	0	0			
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt					0.989				0.850			
Flt Protected	0.950							0.955				
Satd. Flow (prot)	3072	1863	0	0	1842	0	0	1779	1417	0	0	0
Flt Permitted	0.950							0.955				
Satd. Flow (perm)	3072	1863	0	0	1842	0	0	1779	1417	0	0	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					5				189			
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		744			1271			1082			1005	
Travel Time (s)		16.9			28.9			24.6			22.8	
Volume (vph)	1000	290	0	0	230	20	370	20	180	0	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1053	305	0	0	242	21	389	21	189	0	0	0
Lane Group Flow (vph)	1053	305	0	0	263	0	0	410	189	0	0	0
v/c Ratio	0.88	0.25			0.68			0.95	0.39			
Control Delay	32.7	5.9			36.1			64.8	7.0			
Queue Delay	0.0	0.0			0.0			0.0	0.0			
Total Delay	32.7	5.9			36.1			64.8	7.0			
Queue Length 50th (ft)	226	51			111			187	0			
Queue Length 95th (ft)	#398	81			183			#400	50			
Internal Link Dist (ft)		664			1191			1002			925	
Turn Bay Length (ft)	300								200			
Base Capacity (vph)	1197	1325			638			430	486			
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	0.88	0.23			0.41			0.95	0.39			

Intersection Summary

Area Type: Other

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

LOS Engineering

PM Horizon Year + Project
21: Mission Rd & I-15 NB Ramps

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0			4.0			4.0	4.0			
Lane Util. Factor	0.97	1.00			1.00			1.00	1.00			
Frt	1.00	1.00			0.99			1.00	0.85			
Flt Protected	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (prot)	3072	1863			1843			1778	1417			
Flt Permitted	0.95	1.00			1.00			0.95	1.00			
Satd. Flow (perm)	3072	1863			1843			1778	1417			
Volume (vph)	1000	290	0	0	230	20	370	20	180	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	1053	305	0	0	242	21	389	21	189	0	0	0
RTOR Reduction (vph)	0	0	0	0	4	0	0	0	143	0	0	0
Lane Group Flow (vph)	1053	305	0	0	259	0	0	410	46	0	0	0
Turn Type	Prot						Perm		Perm			
Protected Phases	7	4			8			2				
Permitted Phases							2		2			
Actuated Green, G (s)	29.1	48.6			15.5			18.1	18.1			
Effective Green, g (s)	29.1	48.6			15.5			18.1	18.1			
Actuated g/C Ratio	0.39	0.65			0.21			0.24	0.24			
Clearance Time (s)	4.0	4.0			4.0			4.0	4.0			
Vehicle Extension (s)	3.0	3.0			3.0			3.0	3.0			
Lane Grp Cap (vph)	1197	1212			382			431	343			
v/s Ratio Prot	c0.34	0.16			c0.14							
v/s Ratio Perm								0.23	0.03			
v/c Ratio	0.88	0.25			0.68			0.95	0.13			
Uniform Delay, d1	21.2	5.5			27.3			27.9	22.2			
Progression Factor	1.00	1.00			1.00			1.00	1.00			
Incremental Delay, d2	7.6	0.1			4.7			31.0	0.2			
Delay (s)	28.8	5.6			32.0			58.9	22.3			
Level of Service	C	A			C			E	C			
Approach Delay (s)		23.6			32.0			47.4			0.0	
Approach LOS		C			C			D			A	

Intersection Summary

HCM Average Control Delay	31.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	74.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	84.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

PM Horizon Year + Project
22: Stewart Canyon Rd & Horse Ranch Creek Rd — HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Yield			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	20	490	350	30	30	100
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	516	368	32	32	105
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	853	84	137			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	853	84	137			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	91	47	75			
cM capacity (veh/h)	246	975	1447			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	537	400	137
Volume Left	21	368	0
Volume Right	516	0	105
cSH	873	1447	1700
Volume to Capacity	0.61	0.25	0.08
Queue Length 95th (ft)	108	25	0
Control Delay (s)	15.5	7.8	0.0
Lane LOS	C	A	
Approach Delay (s)	15.5	7.8	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	10.7		
Intersection Capacity Utilization	70.1%	ICU Level of Service	C
Analysis Period (min)	15		

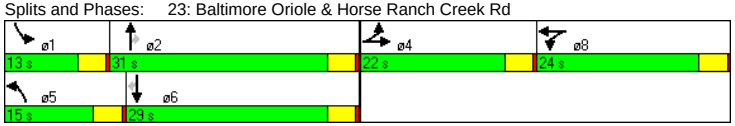
LOS Engineering

PM Horizon Year + Project
23: Baltimore Oriole & Horse Ranch Creek Rd — Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Volume (vph)	30	20	260	30	60	310	300	80	400	50
Turn Type	Split		Split		Prot		Perm	Prot		Perm
Protected Phases	4	4	8	8	5	2		1	6	
Permitted Phases							2			6
Detector Phases	4	4	8	8	5	2	2	1	6	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0	20.0
Total Split (s)	22.0	22.0	24.0	24.0	15.0	31.0	31.0	13.0	29.0	29.0
Total Split (%)	24.4%	24.4%	26.7%	26.7%	16.7%	34.4%	34.4%	14.4%	32.2%	32.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag					Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	7.4	7.4	13.1	13.1	8.3	30.1	30.1	8.2	29.9	29.9
Actuated g/C Ratio	0.11	0.11	0.20	0.20	0.12	0.48	0.48	0.12	0.47	0.47
v/c Ratio	0.18	0.20	0.56	0.54	0.32	0.37	0.38	0.44	0.48	0.08
Control Delay	32.9	22.8	30.0	26.2	33.2	18.0	4.1	36.5	20.3	6.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.9	22.8	30.0	26.2	33.2	18.0	4.1	36.5	20.3	6.7
LOS	C	C	C	C	C	B	A	D	C	A
Approach Delay		27.1		28.0		13.1			21.5	
Approach LOS		C		C		B			C	

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 63.2	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.56	
Intersection Signal Delay: 19.6	Intersection LOS: B
Intersection Capacity Utilization 50.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 23: Baltimore Oriole & Horse Ranch Creek Rd



LOS Engineering

PM Horizon Year + Project
23: Baltimore Oriole & Horse Ranch Creek Rd — Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50	50	50	50	50
Trailing Detector (ft)	0	0		0	0		0	0	0	0	0	0
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.925			0.958				0.850			0.850
Flt Protected	0.950			0.950	0.973		0.950			0.950		
Satd. Flow (prot)	1583	1723	0	1504	1650	0	1583	1863	1417	1583	1863	1417
Flt Permitted	0.950			0.950	0.973		0.950			0.950		
Satd. Flow (perm)	1583	1723	0	1504	1650	0	1583	1863	1417	1583	1863	1417
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		21			20				316			53
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1047			1324			958			2343	
Travel Time (s)		23.8			30.1			21.8			53.3	
Volume (vph)	30	20	20	260	30	50	60	310	300	80	400	50
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	21	21	274	32	53	63	326	316	84	421	53
Lane Group Flow (vph)	32	42	0	170	189	0	63	326	316	84	421	53
v/c Ratio	0.18	0.20		0.56	0.54		0.32	0.37	0.38	0.44	0.48	0.08
Control Delay	32.9	22.8		30.0	26.2		33.2	18.0	4.1	36.5	20.3	6.7
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.9	22.8		30.0	26.2		33.2	18.0	4.1	36.5	20.3	6.7
Queue Length 50th (ft)	11	7		62	61		22	103	0	30	139	0
Queue Length 95th (ft)	41	39		140	141		66	213	54	86	#303	25
Internal Link Dist (ft)		967			1244			878			2263	
Turn Bay Length (ft)												
Base Capacity (vph)	389	439		457	515		268	1011	914	227	983	773
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	0.08	0.10		0.37	0.37		0.24	0.32	0.35	0.37	0.43	0.07

Intersection Summary

Area Type: Other

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

LOS Engineering

PM Horizon Year + Project
23: Baltimore Oriole & Horse Ranch Creek Rd — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
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	1.00		0.95	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.93		1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.97		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1583	1723		1504	1650		1583	1863	1417	1583	1863	1417
Flt Permitted	0.95	1.00		0.95	0.97		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1583	1723		1504	1650		1583	1863	1417	1583	1863	1417
Volume (vph)	30	20	20	260	30	50	60	310	300	80	400	50
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	21	21	274	32	53	63	326	316	84	421	53
RTOR Reduction (vph)	0	20	0	0	16	0	0	0	175	0	0	30
Lane Group Flow (vph)	32	22	0	170	173	0	63	326	141	84	421	23
Turn Type	Split			Split			Prot		Perm	Prot		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	4.1	4.1		11.8	11.8		4.9	29.4	29.4	4.7	29.2	29.2
Effective Green, g (s)	4.1	4.1		11.8	11.8		4.9	29.4	29.4	4.7	29.2	29.2
Actuated g/C Ratio	0.06	0.06		0.18	0.18		0.07	0.45	0.45	0.07	0.44	0.44
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	98	107		269	295		118	830	631	113	824	627
v/s Ratio Prot	c0.02	0.01		c0.11	0.10		0.04	0.18		c0.05	c0.23	
v/s Ratio Perm									0.10			0.02
v/c Ratio	0.33	0.21		0.63	0.59		0.53	0.39	0.22	0.74	0.51	0.04
Uniform Delay, d1	29.6	29.4		25.1	24.9		29.4	12.3	11.3	30.1	13.3	10.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.9	1.0		4.8	2.9		4.6	0.3	0.2	22.9	0.5	0.0
Delay (s)	31.6	30.4		29.9	27.8		34.0	12.6	11.4	53.0	13.8	10.5
Level of Service	C	C		C	C		C	B	B	D	B	B
Approach Delay (s)		30.9			28.8			14.0			19.4	
Approach LOS		C			C			B			B	

Intersection Summary

HCM Average Control Delay	19.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	66.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	50.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

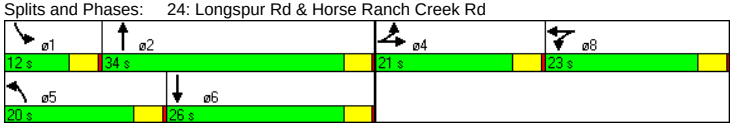
PM Horizon Year + Project
24: Longspur Rd & Horse Ranch Creek Rd

Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	20	50	310	50	140	600	60	560
Turn Type	Split		Split		Prot		Prot	
Protected Phases	4	4	8	8	5	2	1	6
Permitted Phases								
Detector Phases	4	4	8	8	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	21.0	21.0	23.0	23.0	20.0	34.0	12.0	26.0
Total Split (%)	23.3%	23.3%	25.6%	25.6%	22.2%	37.8%	13.3%	28.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Max	None	Max
Act Effct Green (s)	8.4	8.4	14.0	14.0	11.5	34.7	7.2	28.3
Actuated g/C Ratio	0.11	0.11	0.19	0.19	0.15	0.47	0.09	0.39
v/c Ratio	0.12	0.51	0.71	0.69	0.61	0.58	0.43	0.48
Control Delay	33.5	24.5	43.0	38.3	41.9	18.0	44.7	23.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.5	24.5	43.0	38.3	41.9	18.0	44.7	23.3
LOS	C	C	D	D	D	B	D	C
Approach Delay		25.8		40.5		21.2		25.2
Approach LOS		C		D		C		C

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 73.3	
Natural Cycle: 75	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.71	
Intersection Signal Delay: 26.2	Intersection LOS: C
Intersection Capacity Utilization 58.0%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 24: Longspur Rd & Horse Ranch Creek Rd



PM Horizon Year + Project
24: Longspur Rd & Horse Ranch Creek Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.913			0.965			0.950			0.986	
Flt Protected	0.950			0.950	0.974		0.950			0.950		
Satd. Flow (prot)	1583	1701	0	1504	1663	0	1583	3362	0	1583	3490	0
Flt Permitted	0.950			0.950	0.974		0.950			0.950		
Satd. Flow (perm)	1583	1701	0	1504	1663	0	1583	3362	0	1583	3490	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		69			15			104			12	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1010			908			1206			958	
Travel Time (s)		23.0			20.6			27.4			21.8	
Volume (vph)	20	50	70	310	50	50	140	600	300	60	560	60
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	53	74	326	53	53	147	632	316	63	589	63
Lane Group Flow (vph)	21	127	0	204	228	0	147	948	0	63	652	0
v/c Ratio	0.12	0.51		0.71	0.69		0.61	0.58		0.43	0.48	
Control Delay	33.5	24.5		43.0	38.3		41.9	18.0		44.7	23.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	33.5	24.5		43.0	38.3		41.9	18.0		44.7	23.3	
Queue Length 50th (ft)	9	27		96	101		67	176		29	132	
Queue Length 95th (ft)	31	79		182	188		131	286		72	228	
Internal Link Dist (ft)		930			828			1126			878	
Turn Bay Length (ft)												
Base Capacity (vph)	324	402		370	420		320	1647		163	1354	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.06	0.32		0.55	0.54		0.46	0.58		0.39	0.48	

Intersection Summary	
Area Type:	Other

PM Horizon Year + Project
24: Longspur Rd & Horse Ranch Creek Rd — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		0.95	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.91		1.00	0.97		1.00	0.95		1.00	0.99	
Flt Protected	0.95	1.00		0.95	0.97		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	1700		1504	1663		1583	3362		1583	3488	
Flt Permitted	0.95	1.00		0.95	0.97		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	1700		1504	1663		1583	3362		1583	3488	
Volume (vph)	20	50	70	310	50	50	140	600	300	60	560	60
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	21	53	74	326	53	53	147	632	316	63	589	63
RTOR Reduction (vph)	0	63	0	0	12	0	0	56	0	0	7	0
Lane Group Flow (vph)	21	64	0	204	216	0	147	892	0	63	645	0
Turn Type	Split			Split			Prot			Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	6.9	6.9		14.0	14.0		9.8	34.7		4.3	29.2	
Effective Green, g (s)	6.9	6.9		14.0	14.0		9.8	34.7		4.3	29.2	
Actuated g/C Ratio	0.09	0.09		0.18	0.18		0.13	0.46		0.06	0.38	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	144	155		277	307		204	1537		90	1342	
v/s Ratio Prot	0.01	c0.04		c0.14	0.13		c0.09	c0.27		0.04	0.18	
v/s Ratio Perm												
v/c Ratio	0.15	0.41		0.74	0.70		0.72	0.58		0.70	0.48	
Uniform Delay, d1	31.8	32.6		29.2	29.0		31.7	15.2		35.2	17.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	1.8		9.8	7.1		11.8	1.6		21.1	1.2	
Delay (s)	32.3	34.4		39.0	36.1		43.6	16.8		56.3	18.9	
Level of Service	C	C		D	D		D	B		E	B	
Approach Delay (s)		34.1			37.5			20.4			22.2	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM Average Control Delay	24.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	75.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

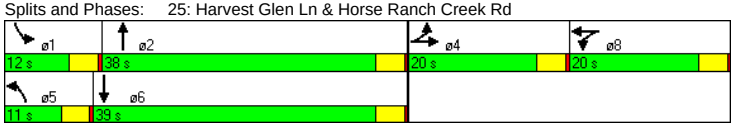
LOS Engineering

PM Horizon Year + Project
25: Harvest Glen Ln & Horse Ranch Creek Rd — Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	10	40	330	40	50	920	140	780
Turn Type	Split		Split		Prot		Prot	
Protected Phases	4	4	8	8	5	2	1	6
Permitted Phases								
Detector Phases	4	4	8	8	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	20.0	20.0	20.0	20.0	11.0	38.0	12.0	39.0
Total Split (%)	22.2%	22.2%	22.2%	22.2%	12.2%	42.2%	13.3%	43.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	7.5	7.5	14.9	14.9	6.7	34.3	8.1	40.2
Actuated g/C Ratio	0.09	0.09	0.19	0.19	0.08	0.44	0.10	0.51
v/c Ratio	0.07	0.34	0.81	0.79	0.42	0.89	0.91	0.46
Control Delay	34.4	30.4	54.5	46.1	47.0	29.6	89.8	16.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.4	30.4	54.5	46.1	47.0	29.6	89.8	16.0
LOS	C	C	D	D	D	C	F	B
Approach Delay		31.0		50.0		30.2		27.1
Approach LOS		C		D		C		C

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 78.7	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.91	
Intersection Signal Delay: 32.5	Intersection LOS: C
Intersection Capacity Utilization 75.5%	ICU Level of Service D
Analysis Period (min) 15	

Splits and Phases: 25: Harvest Glen Ln & Horse Ranch Creek Rd



LOS Engineering

PM Horizon Year + Project
25: Harvest Glen Ln & Horse Ranch Creek Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.950			0.940			0.958			0.998	
Flt Protected	0.950			0.950	0.978		0.950			0.950		
Satd. Flow (prot)	1583	1770	0	1504	1627	0	1583	3391	0	1583	3532	0
Flt Permitted	0.950			0.950	0.978		0.950			0.950		
Satd. Flow (perm)	1583	1770	0	1504	1627	0	1583	3391	0	1583	3532	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		21			32			74			2	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1058			1173			1033			1206	
Travel Time (s)		24.0			26.7			23.5			27.4	
Volume (vph)	10	40	20	330	40	100	50	920	360	140	780	10
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	42	21	347	42	105	53	968	379	147	821	11
Lane Group Flow (vph)	11	63	0	230	264	0	53	1347	0	147	832	0
v/c Ratio	0.07	0.34		0.81	0.79		0.42	0.89		0.91	0.46	
Control Delay	34.4	30.4		54.5	46.1		47.0	29.6		89.8	16.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	34.4	30.4		54.5	46.1		47.0	29.6		89.8	16.0	
Queue Length 50th (ft)	5	20		117	118		26	316		76	160	
Queue Length 95th (ft)	20	56		#249	#252		63	#496		#195	230	
Internal Link Dist (ft)		978			1093			953			1126	
Turn Bay Length (ft)												
Base Capacity (vph)	284	336		303	354		134	1521		162	1803	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.04	0.19		0.76	0.75		0.40	0.89		0.91	0.46	

Intersection Summary

Area Type: Other

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

LOS Engineering

PM Horizon Year + Project
25: Harvest Glen Ln & Horse Ranch Creek Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		0.95	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.95		1.00	0.94		1.00	0.96		1.00	1.00	
Flt Protected	0.95	1.00		0.95	0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	1770		1504	1628		1583	3390		1583	3532	
Flt Permitted	0.95	1.00		0.95	0.98		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	1770		1504	1628		1583	3390		1583	3532	
Volume (vph)	10	40	20	330	40	100	50	920	360	140	780	10
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	42	21	347	42	105	53	968	379	147	821	11
RTOR Reduction (vph)	0	19	0	0	26	0	0	41	0	0	1	0
Lane Group Flow (vph)	11	44	0	230	238	0	53	1306	0	147	831	0
Turn Type	Split			Split			Prot			Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	6.2	6.2		14.9	14.9		4.0	36.1		8.1	40.2	
Effective Green, g (s)	6.2	6.2		14.9	14.9		4.0	36.1		8.1	40.2	
Actuated g/C Ratio	0.08	0.08		0.18	0.18		0.05	0.44		0.10	0.49	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	121	135		276	298		78	1505		158	1746	
v/s Ratio Prot	0.01	c0.02		c0.15	0.15		0.03	c0.39		c0.09	0.24	
v/s Ratio Perm												
v/c Ratio	0.09	0.32		0.83	0.80		0.68	0.87		0.93	0.48	
Uniform Delay, d1	34.9	35.6		32.0	31.8		38.0	20.4		36.3	13.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	1.4		19.0	13.8		21.0	5.6		51.3	0.2	
Delay (s)	35.3	37.0		51.0	45.6		59.0	26.0		87.6	13.8	
Level of Service	D	D		D	D		E	C		F	B	
Approach Delay (s)		36.7			48.1			27.3			24.9	
Approach LOS		D			D			C			C	

Intersection Summary

HCM Average Control Delay	30.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	81.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	75.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

LOS Engineering

PM Horizon Year + Project
26: Pardee South Loop & Horse Ranch Creek Rd

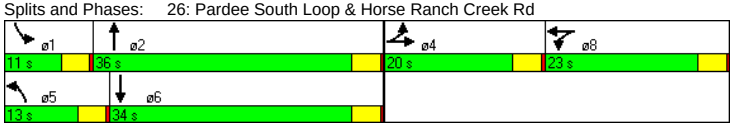
Timings

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Volume (vph)	50	0	130	0	90	1200	160	890
Turn Type	Split		Split		Prot		Prot	
Protected Phases	4	4	8	8	5	2	1	6
Permitted Phases								
Detector Phases	4	4	8	8	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	20.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	20.0	20.0	23.0	23.0	13.0	36.0	11.0	34.0
Total Split (%)	22.2%	22.2%	25.6%	25.6%	14.4%	40.0%	12.2%	37.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag					Lead	Lag	Lead	Lag
Lead-Lag Optimize?					Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	Min	None	Min
Act Effct Green (s)	8.0	8.0	10.2	10.2	8.3	38.3	7.1	39.8
Actuated g/C Ratio	0.10	0.10	0.14	0.14	0.11	0.52	0.10	0.54
v/c Ratio	0.32	0.07	0.49	0.43	0.55	0.84	1.10	0.54
Control Delay	36.5	0.3	37.2	16.4	44.0	24.6	138.0	17.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.5	0.3	37.2	16.4	44.0	24.6	138.0	17.2
LOS	D	A	D	B	D	C	F	B
Approach Delay		22.9		25.8		25.8		34.1
Approach LOS		C		C		C		C

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 73.5
Natural Cycle: 100
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.10
Intersection Signal Delay: 28.9 Intersection LOS: C
Intersection Capacity Utilization 73.4% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 26: Pardee South Loop & Horse Ranch Creek Rd



PM Horizon Year + Project
26: Pardee South Loop & Horse Ranch Creek Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50		50	50		50	50		50	50	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00	1.00	0.95	0.95	1.00	0.95	0.95
Frt		0.850			0.896			0.975			0.986	
Flt Protected	0.950			0.950	0.985		0.950			0.950		
Satd. Flow (prot)	1583	1583	0	1504	1562	0	1583	3451	0	1583	3490	0
Flt Permitted	0.950			0.950	0.985		0.950			0.950		
Satd. Flow (perm)	1583	1583	0	1504	1562	0	1583	3451	0	1583	3490	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		310			84			29			13	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		869			1419			1340			1033	
Travel Time (s)		19.8			32.3			30.5			23.5	
Volume (vph)	50	0	30	130	0	80	90	1200	240	160	890	90
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	0	32	137	0	84	95	1263	253	168	937	95
Lane Group Flow (vph)	53	32	0	100	121	0	95	1516	0	168	1032	0
v/c Ratio	0.32	0.07		0.49	0.43		0.55	0.84		1.10	0.54	
Control Delay	36.5	0.3		37.2	16.4		44.0	24.6		138.0	17.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	36.5	0.3		37.2	16.4		44.0	24.6		138.0	17.2	
Queue Length 50th (ft)	23	0		44	15		41	337		~88	194	
Queue Length 95th (ft)	58	0		94	64		#101	#599		#227	316	
Internal Link Dist (ft)		789			1339			1260			953	
Turn Bay Length (ft)												
Base Capacity (vph)	298	550		343	422		190	1814		153	1898	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.18	0.06		0.29	0.29		0.50	0.84		1.10	0.54	

Intersection Summary

Area Type: Other
~ 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.

PM Horizon Year + Project
26: Pardee South Loop & Horse Ranch Creek Rd — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		0.95	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.85		1.00	0.90		1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00		0.95	0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1583	1583		1504	1561		1583	3451		1583	3490	
Flt Permitted	0.95	1.00		0.95	0.98		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1583	1583		1504	1561		1583	3451		1583	3490	
Volume (vph)	50	0	30	130	0	80	90	1200	240	160	890	90
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	0	32	137	0	84	95	1263	253	168	937	95
RTOR Reduction (vph)	0	30	0	0	74	0	0	14	0	0	6	0
Lane Group Flow (vph)	53	2	0	100	47	0	95	1502	0	168	1026	0
Turn Type	Split			Split			Prot			Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	5.4	5.4		9.0	9.0		7.1	39.1		7.1	39.1	
Effective Green, g (s)	5.4	5.4		9.0	9.0		7.1	39.1		7.1	39.1	
Actuated g/C Ratio	0.07	0.07		0.12	0.12		0.09	0.51		0.09	0.51	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	112	112		177	183		147	1762		147	1781	
v/s Ratio Prot	c0.03	0.00		c0.07	0.03		0.06	c0.44		c0.11	0.29	
v/s Ratio Perm												
v/c Ratio	0.47	0.02		0.56	0.26		0.65	0.85		1.14	0.58	
Uniform Delay, d1	34.2	33.1		31.9	30.8		33.5	16.2		34.8	13.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.1	0.1		4.1	0.7		9.4	4.2		117.8	0.5	
Delay (s)	37.4	33.2		36.0	31.5		42.9	20.5		152.5	13.5	
Level of Service	D	C		D	C		D	C		F	B	
Approach Delay (s)		35.8			33.6			21.8			32.9	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM Average Control Delay	27.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	76.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	73.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

LOS Engineering

PM Horizon Year + Project
27: School/Park Access & Horse Ranch Creek Rd — HCM Unsignalized Intersection Capacity Analysis

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Volume (veh/h)	0	70	1440	50	0	1050
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	74	1516	53	0	1105
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	2095	784			1568	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2095	784			1568	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	78			100	
cM capacity (veh/h)	45	336			417	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	74	1011	558	553	553
Volume Left	0	0	0	0	0
Volume Right	74	0	53	0	0
cSH	336	1700	1700	1700	1700
Volume to Capacity	0.22	0.59	0.33	0.33	0.33
Queue Length 95th (ft)	21	0	0	0	0
Control Delay (s)	18.7	0.0	0.0	0.0	0.0
Lane LOS	C				
Approach Delay (s)	18.7	0.0		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	52.9%	ICU Level of Service	A
Analysis Period (min)	15		

LOS Engineering

PM Horizon Year + Project
28: Connector Rd & Horse Ranch Creek Rd

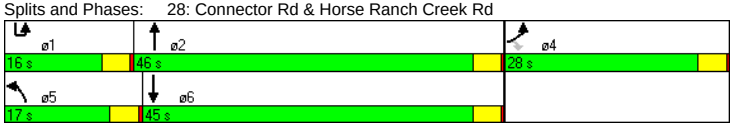
Timings

Lane Group	EBL	EBR	NBL	NBT	SBU	SBT
Lane Configurations						
Volume (vph)	670	20	20	810	50	520
Turn Type		Perm	Prot		Prot	
Protected Phases	4		5	2	1	6
Permitted Phases		4				
Detector Phases	4	4	5	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0	8.0	20.0	8.0	20.0
Total Split (s)	28.0	28.0	17.0	46.0	16.0	45.0
Total Split (%)	31.1%	31.1%	18.9%	51.1%	17.8%	50.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag			Lead	Lag	Lead	Lag
Lead-Lag Optimize?			Yes	Yes	Yes	Yes
Recall Mode	None	None	None	Min	None	Min
Act Effct Green (s)	18.2	18.2	7.0	19.9	7.8	24.3
Actuated g/C Ratio	0.34	0.34	0.11	0.37	0.14	0.45
v/c Ratio	0.68	0.04	0.12	0.65	0.25	0.65
Control Delay	21.8	9.0	34.3	18.1	30.9	9.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	21.8	9.0	34.3	18.1	30.9	9.6
LOS	C	A	C	B	C	A
Approach Delay	21.5			18.5		10.6
Approach LOS	C			B		B

Intersection Summary

Cycle Length: 90
Actuated Cycle Length: 53.8
Natural Cycle: 50
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.68
Intersection Signal Delay: 16.0 Intersection LOS: B
Intersection Capacity Utilization 65.5% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 28: Connector Rd & Horse Ranch Creek Rd



LOS Engineering

PM Horizon Year + Project
28: Connector Rd & Horse Ranch Creek Rd

Queues

Lane Group	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Ideal Flow (vphpl)	1700	1700	1700	1900	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	
Trailing Detector (ft)	0	0	0	0	0	0	
Turning Speed (mph)	15	9	15		9		9
Lane Util. Factor	0.97	1.00	1.00	0.95	1.00	0.95	0.95
Frt		0.850				0.926	
Flt Protected	0.950		0.950		0.950		
Satd. Flow (prot)	3072	1417	1583	3539	1583	3277	0
Flt Permitted	0.950		0.950		0.950		
Satd. Flow (perm)	3072	1417	1583	3539	1583	3277	0
Right Turn on Red		Yes					Yes
Satd. Flow (RTOR)		21				362	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)	30			30		30	
Link Distance (ft)	2875			1509		1400	
Travel Time (s)	65.3			34.3		31.8	
Volume (vph)	670	20	20	810	50	520	510
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	705	21	21	853	53	547	537
Lane Group Flow (vph)	705	21	21	853	53	1084	0
v/c Ratio	0.68	0.04	0.12	0.65	0.25	0.65	
Control Delay	21.8	9.0	34.3	18.1	30.9	9.6	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	21.8	9.0	34.3	18.1	30.9	9.6	
Queue Length 50th (ft)	112	0	7	138	18	76	
Queue Length 95th (ft)	225	16	31	226	57	206	
Internal Link Dist (ft)	2795			1429		1320	
Turn Bay Length (ft)							
Base Capacity (vph)	1314	618	328	2024	326	2119	
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	0.54	0.03	0.06	0.42	0.16	0.51	

Intersection Summary

Area Type: Other

LOS Engineering

PM Horizon Year + Project
28: Connector Rd & Horse Ranch Creek Rd — HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBR	NBL	NBT	SBU	SBT	SBR
Lane Configurations							
Ideal Flow (vphpl)	1700	1700	1700	1900	1700	1900	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	0.97	1.00	1.00	0.95	1.00	0.95	
Frt	1.00	0.85	1.00	1.00	1.00	0.93	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	3072	1417	1583	3539	1583	3276	
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (perm)	3072	1417	1583	3539	1583	3276	
Volume (vph)	670	20	20	810	50	520	510
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	705	21	21	853	53	547	537
RTOR Reduction (vph)	0	14	0	0	0	204	0
Lane Group Flow (vph)	705	7	21	853	53	880	0
Turn Type		Perm	Prot		Prot		
Protected Phases	4		5	2	1	6	
Permitted Phases		4					
Actuated Green, G (s)	18.2	18.2	1.1	21.2	4.2	24.3	
Effective Green, g (s)	18.2	18.2	1.1	21.2	4.2	24.3	
Actuated g/C Ratio	0.33	0.33	0.02	0.38	0.08	0.44	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	1006	464	31	1349	120	1432	
v/s Ratio Prot	c0.23		0.01	0.24	c0.03	c0.27	
v/s Ratio Perm		0.00					
v/c Ratio	0.70	0.01	0.68	0.63	0.44	0.61	
Uniform Delay, d1	16.3	12.6	27.1	14.0	24.6	12.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.2	0.0	45.6	1.0	2.6	0.8	
Delay (s)	18.5	12.7	72.7	15.0	27.2	12.8	
Level of Service	B	B	E	B	C	B	
Approach Delay (s)	18.4			16.4		13.5	
Approach LOS	B			B		B	

Intersection Summary			
HCM Average Control Delay	15.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	55.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

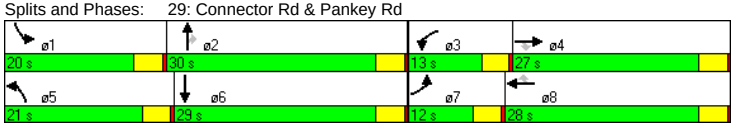
LOS Engineering

PM Horizon Year + Project
29: Connector Rd & Pankey Rd — Timings

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations											
Volume (vph)	90	480	310	40	270	300	210	380	70	280	480
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot	
Protected Phases	7	4		3	8		5	2		1	6
Permitted Phases			4			8			2		
Detector Phases	7	4	4	3	8	8	5	2	2	1	6
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	8.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0	20.0	8.0	20.0
Total Split (s)	12.0	27.0	27.0	13.0	28.0	28.0	21.0	30.0	30.0	20.0	29.0
Total Split (%)	13.3%	30.0%	30.0%	14.4%	31.1%	31.1%	23.3%	33.3%	33.3%	22.2%	32.2%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min
Act Effct Green (s)	7.6	24.0	24.0	7.5	21.7	21.7	14.8	23.9	23.9	16.2	25.3
Actuated g/C Ratio	0.09	0.29	0.29	0.09	0.26	0.26	0.18	0.29	0.29	0.19	0.30
v/c Ratio	0.67	0.99	0.53	0.31	0.58	0.52	0.79	0.75	0.16	0.96	0.93
Control Delay	62.8	71.3	6.8	44.2	33.7	6.8	54.4	37.7	7.2	79.6	56.2
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	62.8	71.3	6.8	44.2	33.7	6.8	54.4	37.7	7.2	79.6	56.2
LOS	E	E	A	D	C	A	D	D	A	E	E
Approach Delay		47.7			21.2			39.8			64.6
Approach LOS		D			C			D			E

Intersection Summary	
Cycle Length: 90	
Actuated Cycle Length: 83.1	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.99	
Intersection Signal Delay: 44.9	Intersection LOS: D
Intersection Capacity Utilization 87.7%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 29: Connector Rd & Pankey Rd



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PM Horizon Year + Project
29: Connector Rd & Pankey Rd

Queues

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Leading Detector (ft)	50	50	50	50	50	50	50	50	50	50	50	
Trailing Detector (ft)	0	0	0	0	0	0	0	0	0	0	0	
Turning Speed (mph)	15		9	15		9	15		9	15		9
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850			0.850			0.850		0.994	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1583	1770	1346	1583	1863	1417	1583	1863	1417	1583	1852	0
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1583	1770	1346	1583	1863	1417	1583	1863	1417	1583	1852	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			326			316			74		2	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1256			2875			1488			1443	
Travel Time (s)		28.5			65.3			33.8			32.8	
Volume (vph)	90	480	310	40	270	300	210	380	70	280	480	20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	505	326	42	284	316	221	400	74	295	505	21
Lane Group Flow (vph)	95	505	326	42	284	316	221	400	74	295	526	0
v/c Ratio	0.67	0.99	0.53	0.31	0.58	0.52	0.79	0.75	0.16	0.96	0.93	
Control Delay	62.8	71.3	6.8	44.2	33.7	6.8	54.4	37.7	7.2	79.6	56.2	
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	62.8	71.3	6.8	44.2	33.7	6.8	54.4	37.7	7.2	79.6	56.2	
Queue Length 50th (ft)	52	~341	0	23	140	0	117	201	0	~179	~296	
Queue Length 95th (ft)	#126	#552	71	54	221	63	#225	#319	31	#342	#519	
Internal Link Dist (ft)		1176			2795			1408			1363	
Turn Bay Length (ft)												
Base Capacity (vph)	149	510	620	161	528	628	317	571	485	308	564	
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	0.64	0.99	0.53	0.26	0.54	0.50	0.70	0.70	0.15	0.96	0.93	

Intersection Summary

Area Type: Other

~ 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.

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PM Horizon Year + Project
29: Connector Rd & Pankey Rd

HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1700	1900	1700	1700	1900	1700	1700	1900	1700	1700	1900	1700
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	0.95	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	0.99	
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)	1583	1770	1346	1583	1863	1417	1583	1863	1417	1583	1852	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1583	1770	1346	1583	1863	1417	1583	1863	1417	1583	1852	
Volume (vph)	90	480	310	40	270	300	210	380	70	280	480	20
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	505	326	42	284	316	221	400	74	295	505	21
RTOR Reduction (vph)	0	0	234	0	0	232	0	0	53	0	1	0
Lane Group Flow (vph)	95	505	92	42	284	84	221	400	21	295	525	0
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			
Actuated Green, G (s)	6.2	24.0	24.0	4.8	22.6	22.6	14.8	23.9	23.9	16.2	25.3	
Effective Green, g (s)	6.2	24.0	24.0	4.8	22.6	22.6	14.8	23.9	23.9	16.2	25.3	
Actuated g/C Ratio	0.07	0.28	0.28	0.06	0.27	0.27	0.17	0.28	0.28	0.19	0.30	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	116	500	380	89	496	377	276	524	399	302	552	
v/s Ratio Prot	c0.06	c0.29		0.03	0.15		0.14	0.21		c0.19	c0.28	
v/s Ratio Perm			0.07			0.06			0.01			
v/c Ratio	0.82	1.01	0.24	0.47	0.57	0.22	0.80	0.76	0.05	0.98	0.95	
Uniform Delay, d1	38.8	30.5	23.4	38.8	27.0	24.3	33.6	27.9	22.2	34.2	29.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	34.4	42.8	0.3	3.9	1.6	0.3	15.2	6.5	0.1	45.0	26.3	
Delay (s)	73.2	73.2	23.8	42.7	28.6	24.6	48.9	34.4	22.3	79.2	55.5	
Level of Service	E	E	C	D	C	C	D	C	C	E	E	
Approach Delay (s)		55.8			27.5			37.7			64.0	
Approach LOS		E			C			D			E	

Intersection Summary

HCM Average Control Delay	48.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	84.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	87.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

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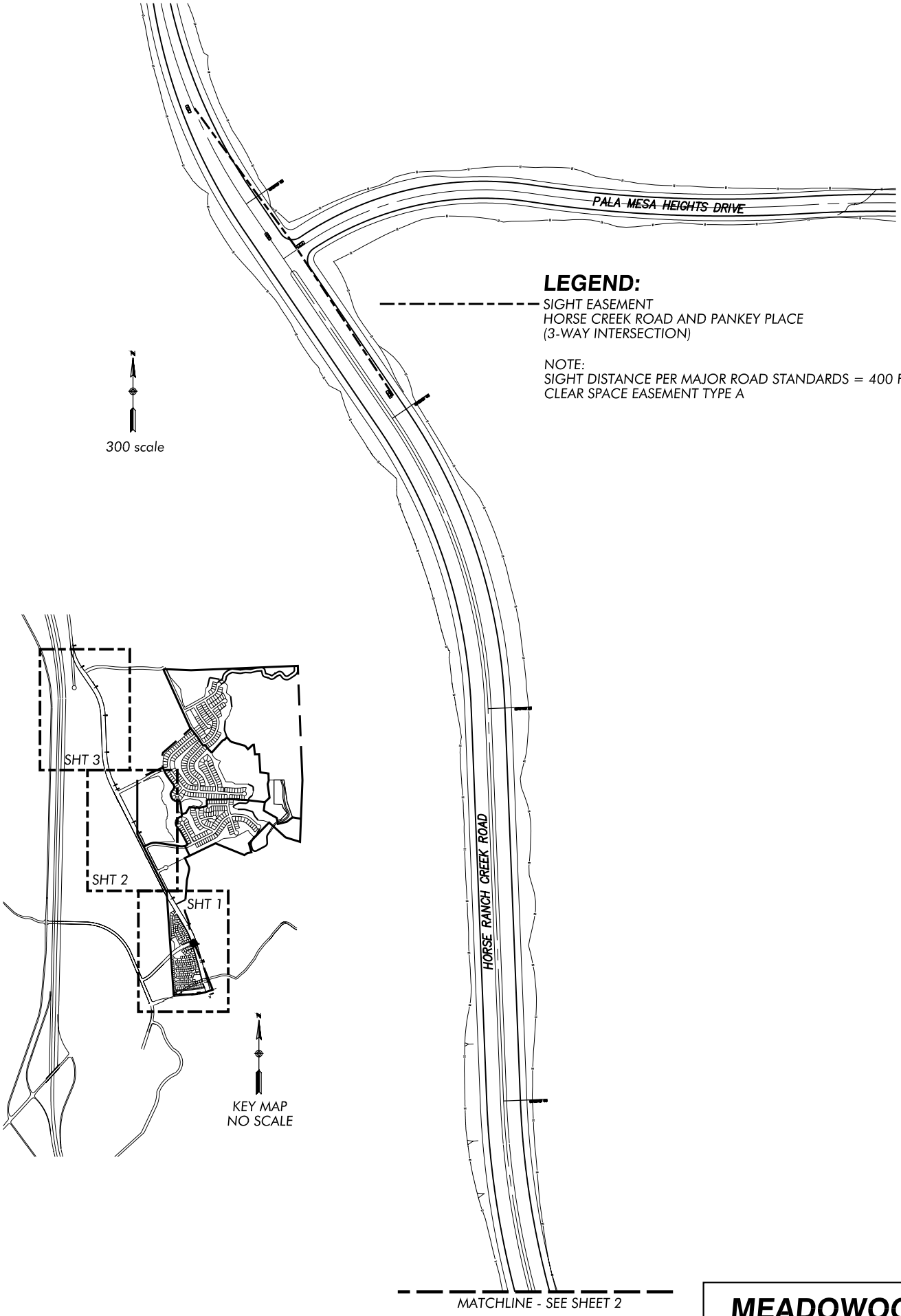
Appendix U

Corner Sight Distance Triangle Drawings



MEADOWOOD

SIGHT DISTANCE
HORSE RANCH CREEK ROAD

3 OF 3

RICK ENGINEERING COMPANY
5620 EXPRESS ROAD
SAN DIEGO, CALIFORNIA 92154
619.291.0707
(FAX)619.291.4165

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MATCHLINE - SEE SHEET 3

STREET 'B'

STREET 'C'

STREET 'D'

HORSE RANCH CREEK ROAD (PUBLIC)

N.A.P

300 scale

HORSE RANCH CREEK ROAD

STREET 'E'

SHT 3

SHT 2

SHT 1

STREET 'A'

HORSE RANCH CREEK ROAD (PUBLIC)

STREET 'G'

KEY MAP
NO SCALE

MATCHLINE - SEE SHEET 1

LEGEND:

SIGHT EASEMENT
HORSE CREEK ROAD AND PANKEY PLACE
(3-WAY INTERSECTION)

NOTE:
SIGHT DISTANCE PER MAJOR ROAD STANDARDS = 400 FEET
CLEAR SPACE EASEMENT TYPE A

MEADOWOOD

SIGHT DISTANCE
HORSE RANCH CREEK ROAD

2 OF 3

RICK ENGINEERING COMPANY
5620 OLMPS ROAD
SAN DIEGO, CA 92123
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(FAX)619.291.4165

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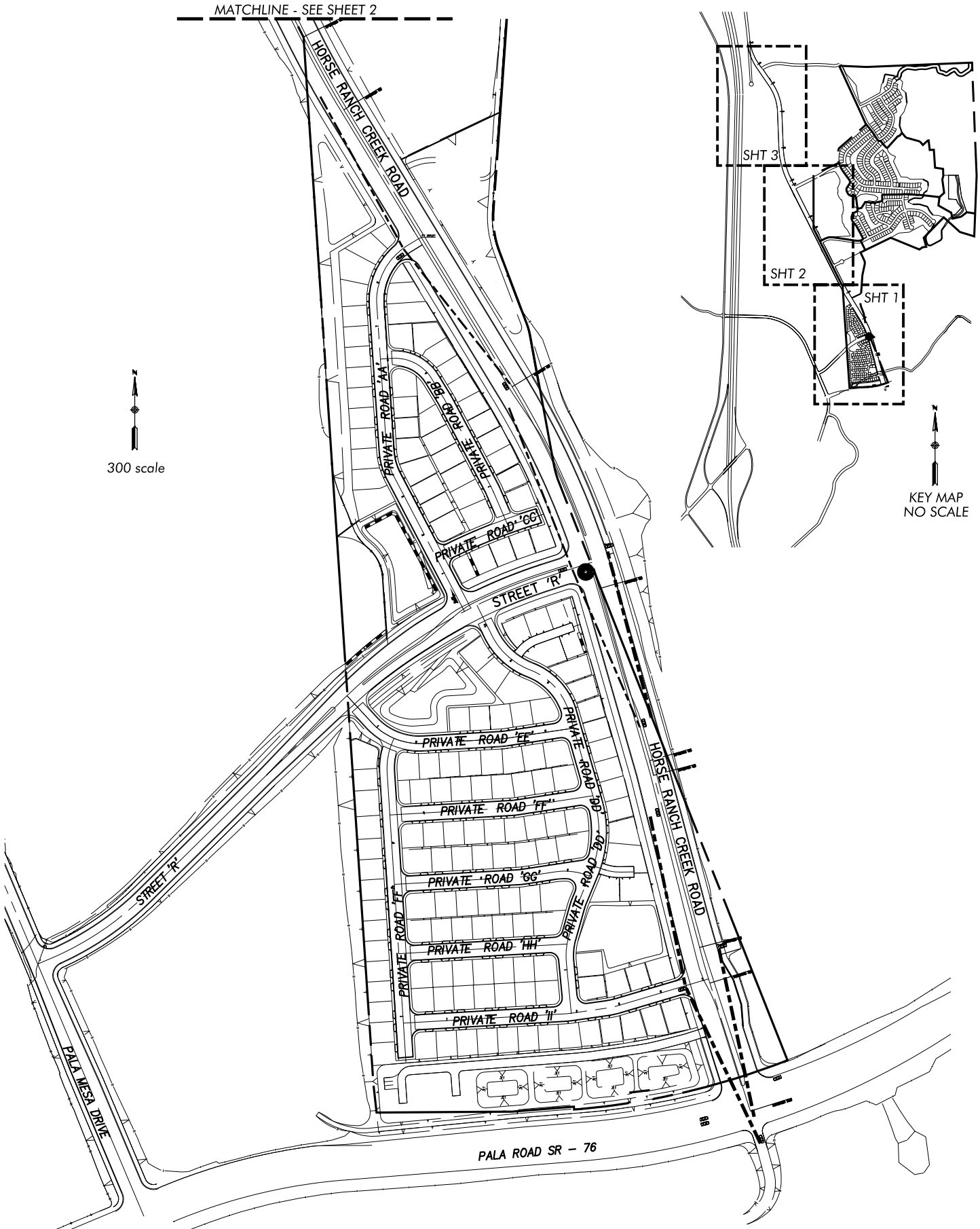

LEGEND:

SIGHT EASEMENT
HORSE CREEK ROAD AND PANKEY PLACE
(3-WAY INTERSECTION)

NOTE:
SIGHT DISTANCE PER MAJOR ROAD STANDARDS = 400 FEET
CLEARSPACE EASEMENT TYPE A

MEADOWOOD

SIGHT DISTANCE
HORSE RANCH CREEK ROAD

1 OF 3

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