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MEMORANDUM

Date: May 23, 2016 (revised August 2, 2018) Project #:
18048.0

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Cc: Amy Lapin, EPS

From: Chirag Safi, Sara Muse

Project: Missouri Flat Master Circulation and Financing Plan Phase II

Subject: Technical Memorandum 1-6: Existing Traffic Analysis Results and Findings for the MC&FP Phase II Study Area

This memorandum summarizes the existing transportation conditions for the Missouri Flat Master Circulation and Financing Plan Phase II (MC&FP-II) project. The memo includes the operational results at study locations for the AM and PM peak hour conditions. Existing pedestrian, bicycle, and transit conditions are also inventoried. A safety assessment based on the Statewide Integrated Traffic Records System (SWITRS) was performed. Existing operational deficiencies are listed in this memorandum.

The subsequent sections in this memorandum describe the following:

- Study Locations
- Roadway Network
- Traffic Analysis Methodology and Standards
- Existing Traffic Operations
- Pedestrian Facilities
- Bicycle Facilities
- Transit Facilities
- Safety Assessment
- Key Findings

STUDY LOCATIONS

The study locations were identified based on the most recent projects, local circulation issues and a meeting with El Dorado County staff on February 16, 2016. A total of 23 intersections, 10 roadway segments, and 3 freeway mainline segments were analyzed for AM and PM peak hour conditions. The study locations are shown in Figure 1.

ROADWAY NETWORK

The characteristics of the roadway system near the study area are described below.

Missouri Flat Road is a two-lane to four-lane roadway that generally runs northwest-southeast between Green Valley Road (north of US Highway 50) and Pleasant Valley Road. Missouri Flat Road has two lanes for the majority of its route (and is identified as a Major 2-Lane Road in the El Dorado County General Plan). However the roadway widens to four lanes from Plaza Drive to Golden Center Drive to the south (and is identified as a 4-Lane Divided Road in the El Dorado County General Plan). The posted speed limit of Missouri Flat Road is 45 mph in the study area.

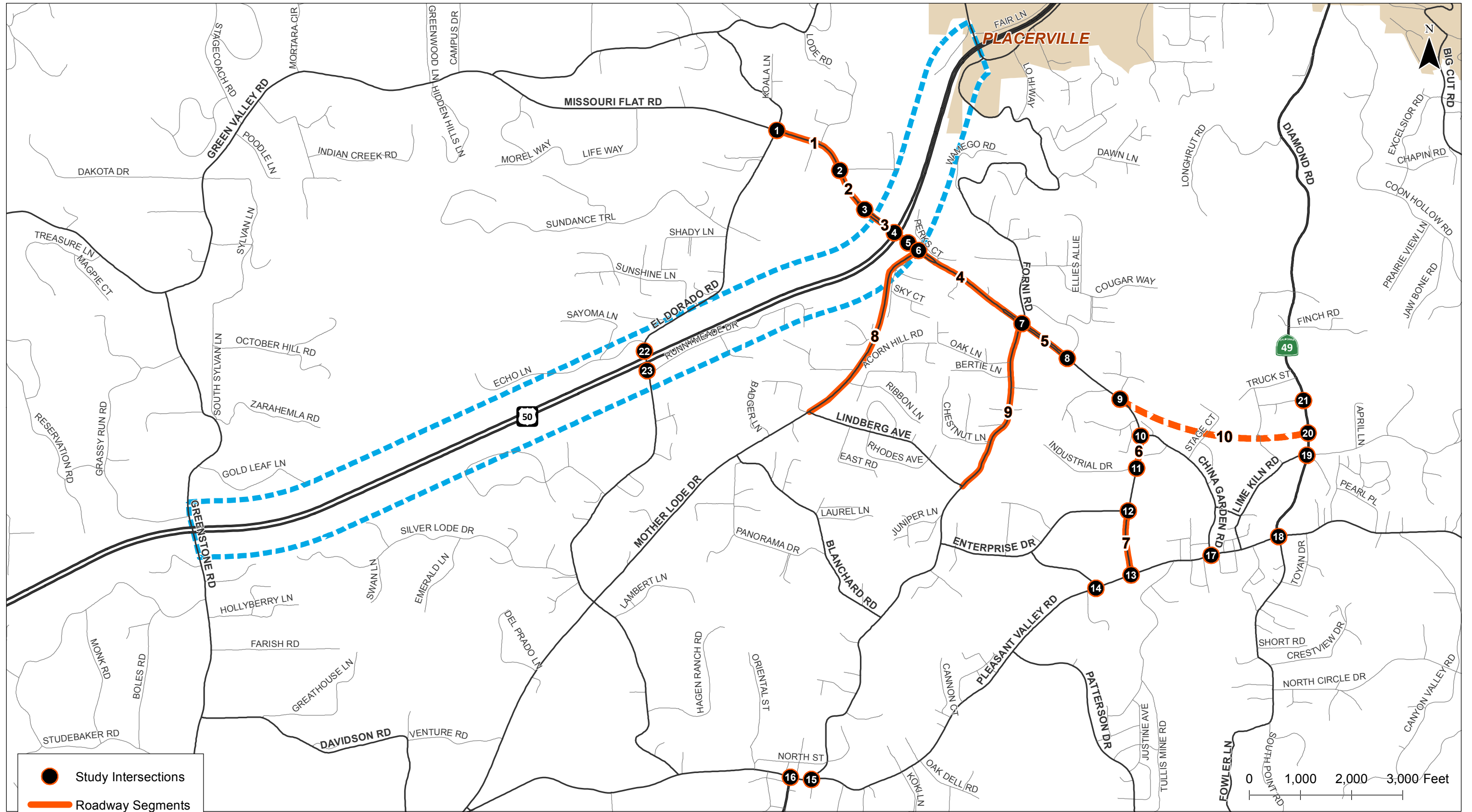
U.S. Highway 50 (US 50) is a four-lane east-west highway that is the primary regional transportation facility in El Dorado County, providing connections to Sacramento County, the Lake Tahoe area and the State of Nevada. US 50 is the major commuter route to employment locations in the greater Sacramento area and the major shipping route for goods movement by truck. Within the study area, US 50 is a four-lane conventional highway. Within other segments of US 50, there are additional truck-climbing and high occupancy vehicle (HOV) lanes.

Mother Lode Drive is a two-lane east-west roadway that intersects South Shingle Road in the west and Missouri Flat Road to the east. Mother Lode Drive is identified in the El Dorado County General Plan as a Major 2-Lane Road. The posted speed limit on Mother Lode Drive ranges from 35 to 50 mph.

El Dorado Road is a two-lane north-south roadway that is identified as a 2-Lane Regional Road in the El Dorado County General Plan. El Dorado Road begins at its intersection with Green Valley Road and terminates at the intersection of Pleasant Valley Road. El Dorado Road serves as a connection north and south of US 50. The posted speed limit on El Dorado Road is 45 mph.

China Garden Road is a two-lane east-west roadway that is identified as a 2-Lane Regional Road in the El Dorado County General Plan. China Garden Road connects Missouri Flat Road to Pleasant Valley Road. The posted speed limit on China Garden Road is 35 mph.

Enterprise Drive is a two-lane east-west roadway that is identified as a 2-Lane Regional Road in the El Dorado County General Plan. Enterprise Drive connects Missouri Flat Road to Forni Road through the Park West Business Park. The posted speed limit on Enterprise Drive is 25 mph.



Missouri Flat Master Circulation and Financing Plan Phase II
El Dorado County, California

Figure
1

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Industrial Drive is a two-lane east-west local roadway. Industrial Drive is less than one-half mile in length west of Missouri Flat Road. The speed limit along Industrial Drive is 25 mph.

Black Rice Lane/Lime Kiln Road is a two-lane east-west roadway that is identified as a 2-Lane Regional Road in the El Dorado County General Plan. West of Diamond Road, Black Rice Lane provides a connection to residential uses. East of Diamond Road, Lime Kiln Road provides access to residential and commercial uses. The posted speed limit along both streets is 25 mph.

Bradley Drive is a two-lane east-west local roadway. Bradley Drive extends less than 0.25 miles west of Diamond Road. The posted speed limit along Bradley Drive is 25 mph. Bradley Drive provides access to the Materials Recovery Facility.

Commerce Way is a two-lane north-south roadway that is identified as a 2-Lane Regional Road in the El Dorado County General Plan. Commerce Way serves as a connection between Pleasant Valley Road and Enterprise Drive through the Park West Business Park. The posted speed limit on Commerce Way is 25 mph.

Diamond Road (SR 49) is a two-lane, north-south roadway that is identified as a Major 2-Lane Road in the El Dorado County General Plan. Diamond Road is designated as State Route 49 for its entire length from Sacramento Street to Pleasant Valley Road. The posted speed limit on Diamond Road ranges between 40 and 50 mph in the study area.

Pleasant Valley Road (SR 49) is a two-lane east-west roadway that intersects Mother Lode Drive to the west and Sly Park Road to the east. Pleasant Valley Road is identified in the El Dorado County General Plan as a Major 2-Lane Road and shares a route with State Route (SR) 49 from Golden Chain Highway to Diamond Road. The posted speed limit on Pleasant Valley Road within the study area ranges from 25 to 45 mph.

Diamond Springs Parkway is a planned east-west four-lane divided roadway that will connect Missouri Flat Road north of China Garden Road to Diamond Road (SR 49) north of Lime Kiln Road. The project is listed under El Dorado County's Capital Improvement Program (CIP) Current Year Work Plan as project #72334. The project is programmed to be completed by the year 2025. The roadway will include bicycle and pedestrian access with sidewalks and Class II bike lanes. Three bus turnouts will also be included along the new roadway.

TRAFFIC ANALYSIS METHODOLOGY AND STANDARDS

This section provides an overview of the analysis methodologies described in Technical Memorandum 1-5: Traffic Analysis Locations, Methodology and Assumptions, prepared by Kittelson & Associates, Inc. dated April 22, 2016. Refer to this memorandum regarding detailed assumptions, methods and tools for the technical analysis.

Intersection Analysis

Traffic operations at the study intersections were analyzed using the procedures and methodologies contained in the Transportation Research Board *Highway Capacity Manual* (HCM). For signalized and all-way stop controlled intersections, HCM procedures calculate an average control delay per vehicle, and assign a level of service (LOS) designation based upon the delay. For one or two-way stop controlled intersections, this methodology determines the LOS by calculating an average total delay per vehicle for each individual controlled movement. HCM methodologies were applied using Synchro/SimTraffic software packages developed by Trafficware.

Given the HCM analyses do not explicitly address the interaction of operations between closely spaced intersections, the following intersections were analyzed with micro-simulation using calibrated SimTraffic models:

- Missouri Flat Road and Plaza Drive
- Missouri Flat Road and US 50 Westbound Ramps
- Missouri Flat Road and US 50 Eastbound Ramps
- Missouri Flat Road and Mother Lode Drive
- Missouri Flat Road and Forni Road

A field visit was conducted to collect queue measurements at the intersection approaches during the AM and PM peak hours. The calibrated SimTraffic models used for the Diamond Springs Parkway Phase 1B Transportation Analysis Report were obtained from the County. The signal timings, geometrics and traffic parameters were checked and updated as appropriate. The updated SimTraffic models were then iteratively calibrated using the field observations based on the FHWA's Traffic Analysis Tools Volume III: Guidelines for Applying Traffic Microsimulation Modeling Software. The average results of 10 random runs with 15-minutes of seeding interval are summarized in this memorandum. The operational results are reported based on one hour recording, broken down into four 15-minute intervals.

Roadway Segment Analysis

Roadway segment LOS was determined by comparing traffic volumes on the study roadway segments with peak hour LOS capacity thresholds.

Freeway Mainline Segment, Merge-Diverge Analysis and Weaving Analysis

For US 50, the basic freeway segment and merge-diverge LOS methodologies published in the HCM 2010 were applied. The HCM methods were implemented using validated HCM compatible spreadsheets for mainline and ramps analysis.

Level of Service Standards

Circulation Policy TC-Xd of the El Dorado County General Plan provides level of service standards for County-maintained roads and state highways as follows:

Level of Service (LOS) for County-maintained roads and state highways within the unincorporated areas of the county shall not be worse than LOS E in the Community Regions or LOS D in the Rural Centers and Rural Regions except as specified in Table TC-2. The volume to capacity ratio of the roadway segments listed in Table TC-2 shall not exceed the ratio specified in that table.

As such, the local roadways in the Community Regions are evaluated against the LOS E standard, while those in the Rural Regions and Rural Centers are analyzed against LOS D. Two segments listed in the Table TC-2 are included in the study area:

1. Missouri Flat Road from US 50 to Mother Lode Drive: maximum allowed volume to capacity ratio is 1.12
2. Missouri Flat Road from Mother Lode Drive to China Garden Road: maximum allowed volume to capacity ratio is 1.20

Caltrans facilities are also subject to Caltrans thresholds included in the Transportation Concept Report and Corridor System Management Plan. A threshold of LOS E is documented for US 50 between El Dorado Road and Placerville Drive. The SR 49 Transportation Concept Report established a threshold of LOS E for SR 49 segments within the study area.

The LOS criteria for the intersections, roadway segments, and freeway facilities are included in Appendix A.

EXISTING TRAFFIC OPERATIONS

This section summarizes traffic volumes and operational analysis results for the study area. The subsequent sections are as follows:

- Intersection Traffic Operations
- Roadway Segment Traffic Operations
- Freeway Traffic Operations

Intersection Traffic Operations

Intersection Traffic Volumes

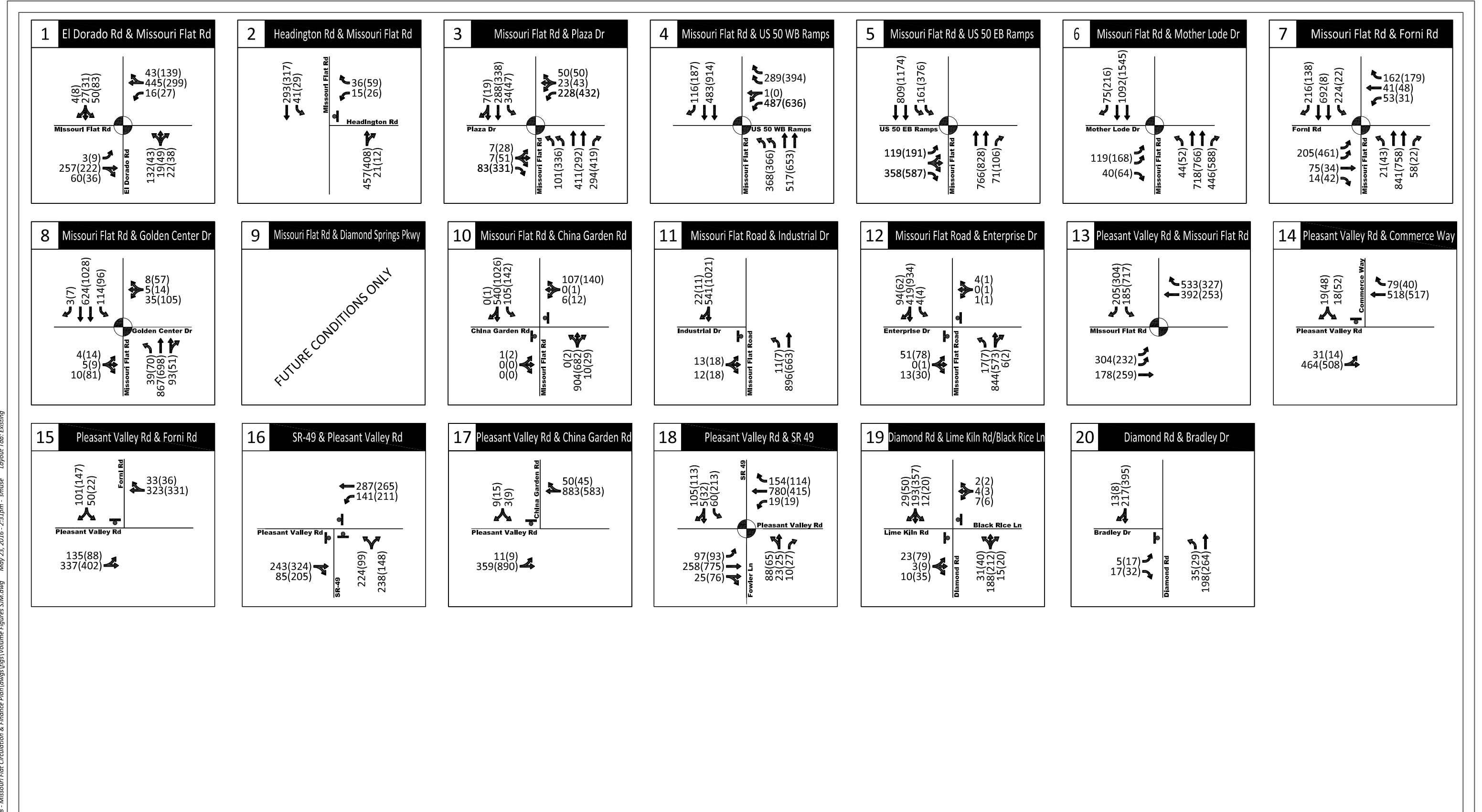
AM peak period (7 AM to 9 AM) and PM peak period (4 PM to 6 PM) intersection turning movement counts were obtained to determine existing traffic operations of the study facilities. Generally, turning movement counts at intersections were conducted in the year 2014 or 2015. The turning counts at one intersection, Pleasant Valley Road and Commerce Way (#14) were done prior to the year 2014. Turning movements at this intersection were adjusted up by balancing with the adjacent intersection, Missouri Flat Road and Pleasant Valley Road. Existing traffic volumes and lane configurations are shown in Figure 2.

Intersection Level of Service

Table 1 summarizes existing conditions LOS and delay for the study intersections during the AM and PM peak hours. Analysis worksheets are included in Appendix B.

While most of the intersections meet the County's LOS criteria, one side-street stop-controlled intersection, Missouri Flat Road/China Garden Road, exceeds operational criteria during both peak hours.

The operational results were compared with recently completed transportation and traffic studies in the area. The results presented herein are consistent with recent studies, with the exception of the Missouri Flat Road and China Garden Road intersection. The Diamond Springs Parkway (DSP) Transportation Analysis Report (Fehr & Peers, April 2016) estimated less delays and better LOS grades at this intersection. The differences in results can be explained by analysis techniques and methodologies. The DSP study applied SimTraffic simulation models to predict operational performance, while analysis results herein were based on the HCM method.



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AM(PM) - Traffic Volume
 - Stop Sign
 - Traffic Signal

Existing Intersection Traffic Volumes & Geometry

Figure 2

Table 1: Existing Intersection Level of Service Results

ID	Intersection	Control	AM		PM	
			Delay ^{1,2}	LOS ²	Delay ^{1,2}	LOS ²
1	Missouri Flat Road & El Dorado Road	Signal	19.9	B	14.7	B
2	Missouri Flat Road & Headington Road	SSSC	13.7	B	12.1	B
3	Missouri Flat Road & Plaza Drive*	Signal	28.6	C	38.7	D
4	Missouri Flat Road & US 50 Westbound Ramps*	Signal	31.8	C	28.0	C
5	Missouri Flat Road & US 50 Eastbound Ramps*	Signal	18.1	B	23.3	C
6	Missouri Flat Road & Mother Lode Drive*	Signal	11.4	B	13.2	B
7	Missouri Flat Road & Forni Road*	Signal	26.0	C	28.3	C
8	Missouri Flat Road & Golden Center Drive	Signal	10.2	B	16.2	B
9	Missouri Flat Road & Diamond Springs Parkway (Future Only)	N/A	N/A	N/A	N/A	N/A
10	Missouri Flat Road & China Garden Road	SSSC	154.9	F	116.4	F
11	Missouri Flat Road & Industrial Drive	SSSC	15.9	C	21.8	C
12	Missouri Flat Road & Enterprise Drive	SSSC	23.2	C	30.8	D
13	Missouri Flat Road & Pleasant Valley Road (SR 49)	Signal	14.2	B	28.6	C
14	Pleasant Valley Road (SR 49) & Commerce Way	SSSC	14.9	B	15.9	C
15	Pleasant Valley Road (SR 49) & Forni Road	SSSC	36.2	E	14.8	B
16	Pleasant Valley Road & SR 49 (West)	AWSC	47.3	E	20.7	C
17	Pleasant Valley Road (SR 49) & China Garden Road	SSSC	20.9	C	25.6	D
18	Pleasant Valley Road (SR 49) & Diamond Road/Fowler Lane	Signal	28.2	C	23.1	C
19	Diamond Road & Black Rice Lane/Lime Kiln Road	SSSC	13.1	B	21.8	C
20	Diamond Road & Diamond Springs Parkway (Future Only)	N/A	N/A	N/A	N/A	N/A
21	Diamond Road & Bradley Drive	SSSC	11.1	B	13.1	B
22	El Dorado Road & US 50 Westbound Ramps	SSSC	21.5	C	17.0	C
23	El Dorado Road & US 50 Eastbound Ramps	SSSC	15.6	C	15.5	C

Notes:

Source: Kittelson & Associates, 2016

SSSC = Side Street Stop Control, AWSC = All Way Stop Control, N/A = not applicable for this scenario

Bold and shaded cells indicate that delays and LOS exceed the County or State's operational threshold

* Analyzed using SimTraffic micro-simulation models

1 Delay is reported in seconds / vehicles, based on HCM 2000 methods

2 Worse movement delay and LOS reported for SSSC. For AWSC and signal, overall average delay and LOS is reported.

Signal Warrant Analysis

The signal warrant analysis was performed to check whether or not intersections meet the peak hour volume warrant based on the 2014 California Manual of Uniform Traffic Control Devices (2014 CA-MUTCD). The results are summarized in Table 2. Both of the unsignalized intersections that were evaluated meet the peak hour volume warrant during one or both peak hours. Detailed calculation worksheets are attached in Appendix C.

Table 2: Signal Warrant Analysis Results

ID	Intersection	Signal Warrant Met? ¹	
		AM Peak Period	PM Peak Period
10	Missouri Flat Road & China Garden Road	Yes	Yes
12	Missouri Flat Road & Enterprise Drive	No	Yes

Note:
Source: Kittelson & Associates, 2016
1 Based on 2014 CA-MUTCD Warrant #3

Intersection Queues

Table 3 summarizes AM and PM hour 95th percentile queues for the signalized intersections, by movement. Appendix B provides analysis worksheets. Individual turn movements that exceed available storage are highlighted.

Table 3: Existing Intersection 95th Percentile Queues

#	Intersection	Control	Movements	Available Storage (ft)	95th Percentile Queues (ft)		#	Intersection	Control	Movements	Available Storage (ft)	95th Percentile Queues (ft)				
					AM	PM						AM	PM			
1	Missouri Flat Road & El Dorado Rd	Signalized	EBL	290	10	19	7	Missouri Flat Road & Forni Road	Signalized	EBL	200	152	320			
			EBTR	815	169	142				EBT	720	106	384			
			WBL	290	25	277				EBR	160	45	451			
			WBTR	740	277	248				WBL	200	83	66			
			NBLTR	535	123	123				WBT	280	80	94			
			SBLTR	640	61	96				WBR	200	121	140			
3	Missouri Flat Rd & Plaza Drive*	Signalized	EBL	150	70	234				NBL	240	53	82			
			EBTR	120	34	157				NBT	1,000	263	263			
			WBL	285	147	254				NBR	160	175	33			
			WBTR	285	166	253				SBL	300	271	220			
			NBL	300	72	204				SBT	800	85	467			
			NBT	440	122	147				SBR	160	31	274			
			NBR	440	89	150				8	Missouri Flat Road & Golden Center Drive	Signalized	EBLTR	125	16	46
			SBL	120	63	89	WBLTR	240	47				151			
			SBT	245	121	176	NBL	260	55				85			
			SBR	400	87	145	NBTR	550	316				232			
4	Missouri Flat Road & US 50 Westbound Ramps*	Signalized	WBL	400	229	279	13	Missouri Flat Road & Pleasant Valley Road (SR 49)	Signalized	EBL	140	122	89			
			WBLT	1,370	255	315				EBT	640	293	188			
			WBR	400	106	230				WBT	800	293	188			
			NBL	140	212	184				WBR	160	164	30			
			NBT	325	111	122				SBL	645	155	659			
SBT	440	131	236	SBR	660	31				25						
5	Missouri Flat Road & US 50 Eastbound Ramps*	Signalized	EBL	400	165	388				18	Pleasant	Signalized	EBL	160	128	108
			EBLTR	1,090	239	520										
			EBR	400	183	420										
			NBT	150	212	200										

#	Intersection	Control	Movements	Available Storage (ft)	95th Percentile Queues (ft)		#	Intersection	Control	Movements	Available Storage (ft)	95th Percentile Queues (ft)	
					AM	PM						AM	PM
			NBR	80	95	94		Valley Road & SR 49		EBTR	610	83	273
			SBL	140	82	178			WBL	100	40	38	
			SBT	330	246	311			WBT	360	918	91	
6	Missouri Flat Road & Mother Lode Drive	Signalized	EBL	200	95	175			WBR	160	91	54	
			EBR	200	54	86			NBLT	215	135	111	
			NBL	140	90	107			NBR	100	0	6	
			NBT	>1,500	147	241			SBL	340	89	225	
			SBT	135	131	235			SBTR	525	59	83	

Notes:
 Source: Kittelson & Associates, 2016
 Bold and shaded cells indicate that queues exceed available storage
 * Analyzed using SimTraffic micro-simulation models
 95th percentile queues are reported in feet

Roadway Segment Traffic Operations

Roadway Segment Volumes

The County of El Dorado collects hourly traffic volumes annually on key roadways. The 2015 traffic volumes on the study roadways were received from the El Dorado County. Generally, the counts were conducted in April 2015.

Roadway Segment Level of Service

Table 4 summarizes the existing AM and PM peak hour volumes and LOS for roadway segments. The study segments operate within the County LOS standards during the AM and PM peak hours.

US 50 Freeway Traffic Operations

US 50 Freeway Traffic Volumes

Freeway mainline volumes were obtained from the Caltrans Performance Measurement System (PeMS) during September and October 2015 for Tuesdays through Thursdays. The AM and PM peak hour average volumes were computed and used for subsequent analyses. The peak hour ramp volumes were derived from the ramp terminal intersection counts as shown in Figure 2.

US 50 Freeway Mainline Level of Service

Table 5 summarizes freeway mainline analysis results during the AM and PM peak hours. Detailed analysis worksheets are included in the Appendix D. The US 50 study segments operate within the acceptable standard.

US 50 Merge-Diverge Level of Service

Table 6 summarizes freeway merge diverge results during the AM and PM peak hours. Detailed analysis worksheets are included in the Appendix D. The US 50 merge diverge influence areas operate within the acceptable standard.

Table 4: Existing Roadway Segment Level of Service Results

ID	Road Name	Location	Area	Type	LOS Threshold	AM Peak Hour		PM Peak Hour	
						Two-Way Volumes	LOS	Two-Way Volumes	LOS
1	Missouri Flat Road	East of El Dorado Road	Community Region	2AU	E	806	A-C	827	A-C
2	Missouri Flat Road	North of Plaza Drive	Community Region	2AU	E	741	A-C	801	A-C
3	Missouri Flat Road	North of Forni Road	Exception F	4AD	F	2,165	D	2,761	D
4	Forni Rd	West of Arroyo Vista Way	Community Region	2AU	E	85	A-C	135	A-C
5	Missouri Flat Road	South of Forni Road	Exception F	4AD	F	1,604	A-C	1,929	D
6	Missouri Flat Road	South of China Garden Road	Community Region	2AD	E	1,389	D	1,700	E
7	Missouri Flat Road	North of SR 49	Community Region	2AD	E	1,157	D	1,350	D
8	Mother Lode Drive	West of Missouri Flat Road	Community Region	2AU	E	242	A-C	321	A-C
9	Forni Road	West of Missouri Flat Road	Community Region	2AU	E	547	A-C	811	A-C

Note:
 Source: Kittelson & Associates, 2016
 Bold and shaded cells indicate that the LOS exceeds County's threshold criteria
 2AU - Two Lane Undivided Arterial, 2AD – Two Lane Divided Arterial, 4AD - Four Lane Divided Arterial

Table 5: US 50 Freeway Mainline Operational Results

Freeway ID	PM	From	To	Direction	AM Peak Hour				PM Peak Hour			
					Traffic Volumes (vph)	Average Speed (mph)	Density (pc/mi/ln) ¹	LOS ²	Traffic Volumes (vph)	Average Speed (mph)	Density (pc/mi/ln) ¹	LOS ²
1	12.19	Greenstone Road	El Dorado Road	Eastbound	1,544	65	13.69	B	2,178	65	19.31	C
				Westbound	1,945	65	17.25	B	1,839	65	16.31	B
2	14.011	El Dorado Road	Missouri Flat Road	Eastbound	1,467	65	13.01	B	2,097	65	18.59	C
				Westbound	1,919	65	17.02	B	1,808	65	16.03	B
3	15.055	Missouri Flat Road	Placerville Drive	Eastbound	1,668	65	10.23	A	2,385	65	14.11	B
				Westbound	2,211	65	13.57	B	2,285	65	13.51	B

Notes:
 Source: Kittelson & Associates, 2016
¹ Density expressed in pc/mi/ln, passenger cars per mile per lane
² Level of Service is based on density as described in Basic Freeway Segment, Chapter 11, HCM 2010

Table 6: US 50 Ramp Merge Diverge Operational Results

Type	Interchange	Direction	AM Peak			PM Peak		
			Average Speed (mph)	Density ¹ (pc/mi/ln)	LOS ²	Average Speed (mph)	Density ¹ (pc/mi/ln)	LOS ²
Merge	El Dorado Road	EB	57.89	15.26	B	57.43	20.70	C
	Missouri Flat Road	EB	59.47	10.10	B	58.78	16.07	B
	Missouri Flat Road	WB	57.75	18.33	B	57.84	17.33	B
	El Dorado Road	WB	57.49	19.68	B	57.57	18.77	B
Diverge	El Dorado Road	EB	54.72	17.16	B	54.66	23.20	C
	Missouri Flat Road	EB	54.07	15.53	B	53.38	21.53	C
	Missouri Flat Road	WB	53.39	0.11	A	52.81	0.82	A
	El Dorado Road	WB	54.84	20.74	C	54.88	19.68	B

Notes:
 Source: Kittelson & Associates, 2016
 1 Density expressed in pc/mi/ln, passenger cars per mile per lane
 2 Level of service is based on density as described in Freeway Merge and Diverge Segments, Chapter 13, HCM 2010

PEDESTRIAN FACILITIES

Existing pedestrian facilities are limited in the study area. Sidewalks are provided along Missouri Flat Road from Plaza Drive to the El Dorado Trail and range from six to ten feet. The El Dorado Trail is a multi-use path which currently extends from western El Dorado County to the Camino area east of Placerville. Most sidewalks in the study area do not provide a buffer (e.g., parking lane or landscaping) to separate pedestrians from moving traffic. Additionally, there are many locations with discontinuous sidewalks, or where sidewalks end abruptly. Most instances of fragmented sidewalks are along Pleasant Valley Road.

Marked crosswalks with standard striping are provided at all signalized intersections. The majority of intersections in the study area do not have ADA compliant curb-ramps. Some exceptions include the Missouri Flat Road and Plaza Drive intersection and the Missouri Flat Road and Golden Center Drive intersection.

Moderate pedestrian activity of approximately five to ten pedestrians occurred during the PM peak hour at the Missouri Flat Road and Golden Center Drive intersection and the Missouri Flat Road and Plaza Drive intersection.

There are several destinations within the study area that are expected to attract pedestrian activity. Some destinations include the following:

- Retail centers east and west of the Missouri Flat Road and Plaza Drive intersection
- Herbert C. Green Middle School
- El Dorado Trail
- Independence High School
- Union Mine High School
- Shenandoah High School
- Park West Business Park
- Towns of El Dorado and Diamond Springs

BICYCLE FACILITIES

The El Dorado County Bicycle Transportation Plan, 2010 Update (El Dorado County Transportation Commission) defines bicycle facilities within the study area as follows:

- **Class I Bikeway (Bicycle Trail):** A Class I bikeway is a facility that is physically separated from a roadway and designated primarily for the use of bicycles. Bicycle trails typically serve corridors not served by streets and highways, or where sufficient right-of-way exists to construct a separate facility parallel to the roadway.
- **Class II Bikeway (Bicycle Lane):** A Class II bikeway is a facility featuring a striped lane on the paved area of a road for preferential use by bicycles. It is located along the edge of the paved

area outside the motor vehicle travel lanes. A bicycle lane is typically identified by black and white “Bike Lane” signs, special lane striping, and may have “Bike Lane” stencils on the pavement.

- **Class III Bikeway (Bicycle Route):** A Class III bikeway route is a facility typically identified by green and white “Bike Route” guide signing only. There are usually no special lane designations, and parking may be permitted. Bicycle routes are established as a means to connect otherwise discontinuous segments of Class I or Class II bikeways.

The El Dorado County Bicycle Plan outlined the existing bike network within the study area. Existing Class II bike lanes are located along Missouri Flat Road from Forni Road to Plaza Drive on the east side of the street. El Dorado Trail is a Class I path within the study area that runs northeast-southwest through the project site south of Forni Road. The trail serves as a connection between Missouri Flat Road and the City of Placerville. The Bicycle Plan also outlined the proposed bike network within the study including the following segments.

Class I Facilities are proposed on the following segments within the study area:

- An extension of El Dorado Trail from Missouri Flat Road to Mother Lode Drive and beyond
- Pedestrian overcrossing at the US-50 and Missouri Flat Road interchange

Class II Facilities are proposed on the following segments within the study area:

- Commerce Way from Enterprise Drive to Pleasant Valley Road (SR 49)
- Diamond Springs Parkway from Missouri Flat Road to Diamond Road
- Diamond Road from Pleasant Valley Road (SR 49) to Diamond Springs Parkway
- Enterprise Drive from Forni Road to Missouri Flat Road
- Forni Road from Missouri Flat Road to Enterprise Drive
- Mother Lode Drive west of Missouri Flat Road
- Missouri Flat Road north of Plaza Drive
- Missouri Flat Road from the El Dorado Trail to Pleasant Valley Road (SR 49)
- Pleasant Valley Road (SR 49) from Ponderosa Road to Sly Park Road

Class III Facilities are proposed on the following segments within the study area:

- Union Mine Road south of SR 49
- Lindberg Avenue from Mother Lode Drive to Forni Road
- Patterson Drive south of SR 49

Existing bicycle activity within the study area is minimal. Most intersections have only a few bicyclists during the peak hours. Low bicycle activity of five to ten bicyclists per day was observed at the intersections near the US 50 and Missouri Flat Road interchange.

The El Dorado Trail is the major destination for multi-modal users within the study area. There is a Class I bike path proposed east of Missouri Flat Road that runs parallel to the US 50 Eastbound highway along Perks Court which terminates at Placerville Drive.

TRANSIT FACILITIES

Within the study area, transit service is provided by the El Dorado County Transit Authority (EDCTA). The EDCTA offers local fixed route, regional commuter route, dial-a-ride, and paratransit services. There are seven local fixed routes, four of which have stops on Missouri Flat Road and/or Pleasant Valley Road. Amtrak provides its Thruway Service (bus service) to customers in Placerville. In order to use this service, customers make reservations with Amtrak to provide bus service to an Amtrak station. One of the 12 park-and-ride facilities along US 50 is located in the study area adjacent to Mother Lode Drive.

A transfer center is located at the intersection of Missouri Flat Road and Forni Road serves five bus routes. The Diamond Springs route is the only one that runs south along Missouri Flat Road. This route has hourly service on weekdays and travels along both Missouri Flat Road and Pleasant Valley Road.

The Diamond Springs route runs from the Folsom Lake College – El Dorado Center along Missouri Flat Road to Pleasant Valley Road. The Diamond Springs route travels along Pleasant Valley Road between Oriental Street and Pearl Place. Weekday service is provided from 7:00 AM to 6:48 PM with one hour headways.

The Placerville route runs from the Missouri Flat Transfer Station to the Gold Country Inn in Placerville. Weekday service is provided from 7:00 AM to 7:00 PM with one hour headways.

The 50 Express route is a commuter route that runs from the Missouri Flat Transfer Station to the Folsom Iron Point light rail station. Weekday service is provided from 6:00 AM to 7:00 PM with one hour headways.

The Sacramento Commuter route provides 11 morning trips and 11 afternoon trips between El Dorado County and downtown Sacramento. Weekday service is provided in the morning from 5:00 AM to 10:30 AM and in the afternoon from 2:00 PM to 6:30 PM.

SAFETY ASSESSMENT

Collisions data for the study area was extracted from the Statewide Integrated Traffic Records System (SWITRS) from January 1, 2012 to December 31, 2014. There were a total of 59 reported collisions within the study area as reported in Table 7 below.

Table 7: Collision Frequency by Year

Intersection	2012	2013	2014	Total
Missouri Flat Road and El Dorado Road	0	2	0	2
Missouri Flat Road and Plaza Drive	2	1	1	4
Missouri Flat Road and US 50 Interchange*	5	8	8	21
Missouri Flat Road and Forni Road	1	1	0	2
Missouri Flat Road and Golden Center Drive	0	0	1	1
Missouri Flat Road and China Garden Road	0	1	1	2
Missouri Flat Road and Industrial Drive	1	0	2	3
Missouri Flat Road and Enterprise Drive	0	0	2	2
Missouri Flat Road and Pleasant Valley Road (SR 49)	3	1	2	6
Pleasant Valley Road and SR 49 (West)	1	1	1	3
Pleasant Valley Road (SR 49) and Diamond Road/Fowler Lane	1	0	1	2
Diamond Road and Black Rice Lane/Lime Kiln Road	1	1	1	3
Diamond Road and Bradley Drive	1	0	1	2
El Dorado Road and US 50 Interchange*	2	4	0	6
Total	18	20	21	59

* SWITRS data does not distinguish between EB and WB ramp terminal intersections, and therefore total interchange collisions are reported.

The highest number of collisions was concentrated in the vicinity of Missouri Flat Road and US 50 Interchange with 21 reported collisions from 2012 to 2014. The intersection with the second highest number of collisions occurred at the El Dorado Road/US 50 Interchange and Missouri Flat Road/Pleasant Valley Road intersection with 6 reported collisions.

The most common type of collision was Rear End as noted in Table 8 below. There were 29 Rear End collisions over the three-year period which continued to steadily increase from 8 reported collisions in 2012 to 12 in 2014. The second most common type of collision was Broadside with 12 reported collisions. The third most common type of collision was Hit Object with 7 collisions.

Table 8: Collision Type by Year

Type of Collision	2012	2013	2014	TOTAL
Head On	0	0	1	1
Sideswipe	2	0	0	2
Rear End	8	9	12	29
Broadside	4	5	3	12
Hit Object	1	4	2	7
Overturned	1	1	0	2
Vehicle/Pedestrian	1	0	2	3
Vehicle/Bicyclist	1	1	1	3

The Annual Accident Location Study (AALS) for 2015 was completed by the County of El Dorado Transportation Division in March 2016. The study is conducted annually by the Transportation Division to review the collision experience along the County's 1,080 miles of maintained roads. The crash rate is calculated based on annual average crashes per Million Entering Vehicles (MEV). A benchmark of 1.00 crash/MEV is adopted as County's acceptable rate for single sites, such as an intersection. Any site with a crash rate of 1.00 or above is considered for additional action. Based on this threshold, the 2015 report identified 18 locations that require further investigation based on high crash rates and/or severity. Within the study area, all the intersections determined to be in satisfactory conditions as marked by characteristics such as low crash rates, low severity and crashes not related to roadway conditions, with exception to Forni Road in the vicinity of Missouri Flat Road. Forni Road from Post Mile 1.86 to 2.08 in the vicinity of Missouri Flat Road experienced a crash rate of 1.00 MEV and is recommended for further investigation.

KEY FINDINGS

A summary of key findings are provided below.

- One study intersection (Missouri Flat Road and China Garden Road #10) currently exceeds the County's LOS standards during the AM and PM peak hours. At this intersection and one additional intersection (Missouri Flat Road and Enterprise Drive #12), the peak hour volumes warrant a signal control. It should be noted that the planned Diamond Springs Parkway would help to relieve traffic congestion on Missouri Flat Road between China Garden Road and Pleasant Valley Road.
- The County's Capital Improvement Program (CIP) includes a line item for improvements to intersections. The County annually monitors intersections with potential need for improvement through the Intersection Needs Prioritization Process. The information is then used to inform the annual update to the CIP and potential intersection improvements can be added, by the Board of Supervisors, to the CIP as funding becomes available.
- The estimated 95th percentile queues for a few individual movements at the study intersections exceed the available storage, although the queues were not observed to adversely affect the upstream facilities.
- The study roadway segments currently operate within County's LOS standards.
- There are no existing deficiencies for freeway mainline segments and merge-diverge influence areas along US 50 within the study area.
- The highest number of collisions was concentrated in the Missouri Flat Road and El Dorado Road interchange areas, although there are no obvious trends that can determine the causes of these collisions. County's 2015 AALS report identified Forni Road in the vicinity of Missouri Flat Road as one of the 18 locations requiring further review.
- The most common collision type was rear-end, followed by broadside.
- Low pedestrian and bicycle activities occur in the study area.

APPENDIX A: LEVEL OF SERVICE CRITERIA

Table A.1: Signalized and Unsignalized Intersection Level of Service Criteria

LOS	Average Delay (sec/veh)		Description
	Signalized	Unsignalized	
A	≤ 10.0	≤ 10.0	Very Low Delay: This occurs when progression is extremely favorable and most vehicles arrive during a green phase. Most vehicles do not stop at all.
B	>10.0 & ≤20.0	>10.0 & ≤15.0	Minimal Delays: This generally occurs with good progression, short cycle lengths, or both. More vehicles stop than at LOS A, causing higher levels of average delay.
C	>20.0 & ≤35.0	>15.0 & ≤25.0	Acceptable Delay: Delay increases due to only fair progression, longer cycle lengths, or both. Individual cycle failures (<i>to service all waiting vehicles</i>) may begin to appear at this level of service. The number of vehicles stopping is significant, though many still pass through the intersection without stopping.
D	>35.0 & ≤55.0	>25.0 & ≤35.0	Approaching Unstable/Tolerable Delays: The influence of congestion becomes more noticeable. Longer delays may result from some combination of unfavorable progression, long cycle lengths, or high v/c ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.
E	>55.0 & ≤80.0	>35.0 & ≤50.0	Unstable Operation/Significant Delays: These high delay values generally indicate poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent occurrences.
F	>80.0	>50.0	Excessive Delays: This level, considered to be unacceptable to most drivers, often occurs with oversaturation (i.e., when arrival flow rates exceed the capacity of the intersection). It may also occur at high v/c ratios below 1.00 with many individual cycle failures. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

Source: *Highway Capacity Manual*, Transportation Research Board, Washington D.C., 2010

Table A.2: Signalized and Unsignalized Intersection Level of Service Criteria

Functional Classification	Number of Lanes	Planning Level Volume Threshold (vehicles per hour)				
		LOS A	LOS B	LOS C	LOS D	LOS E
Arterial, Divided	2	-	-	890	1,610	1,730
	4	-	-	1,850	3,220	3,290
	6	-	-	2,760	4,680	4,710
Arterial, Undivided	2	-	-	850	1,540	1,650
	4	-	-	1,760	3,070	3,130
Multi-Lane Highway	4	-	2,240	3,230	4,250	4,970

Notes:
 Two-lane highway (and arterial 2-lane) thresholds are based on HCM 2010, Exhibit 15-30, Class II Rolling, .09 K-factor, and D-factor of 0.6
 Arterial volume thresholds are based on HCM 2010, Exhibit 16-14, K-factor of 0.09, posted speed 45 mi/h
 Volumes are for both directions

Table A.3: Basic Freeway Segment Level of Service Criteria

LOS	Density (pc/mi/ln)
A	≤ 11
B	> 11-18
C	> 18-26
D	> 26-35
E	> 35-45
F	Demand exceeds Capacity
	> 45

Source: *Highway Capacity Manual*, Transportation Research Board, Washington D.C., 2010

Table A.4: Ramps Merge-Diverge Level of Service Criteria

LOS	Density (pc/mi/ln)	Comment
A	≤ 10	Unrestricted operations
B	> 10-20	Merging and diverging maneuvers noticeable to drivers
C	> 20-28	Influence area speeds begin to decline
D	> 28-35	Influence area turbulence becomes intrusive
E	> 35	Turbulence felt by virtually all drivers
F	Demand exceeds Capacity	Ramp and freeway queues form




















Source: *Highway Capacity Manual*, Transportation Research Board, Washington D.C, 2010

APPENDIX B: SYNCHRO-SIMTRAFFIC ANALYSIS WORKSHEETS

HCM Signalized Intersection Capacity Analysis

1: El Dorado Rd & Missouri Flat Rd

01/03/2018

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	3	257	60	16	445	43	132	19	22	50	27	4	
Future Volume (vph)	3	257	60	16	445	43	132	19	22	50	27	4	
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	5.0		4.0	5.0			3.5			3.5		
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00		
Frt	1.00	0.97		1.00	0.99			0.98			0.99		
Flt Protected	0.95	1.00		0.95	1.00			0.96			0.97		
Satd. Flow (prot)	1752	1792		1752	1820			1747			1777		
Flt Permitted	0.95	1.00		0.95	1.00			0.73			0.77		
Satd. Flow (perm)	1752	1792		1752	1820			1317			1412		
Peak-hour factor, PHF	0.79	0.79	0.79	0.73	0.73	0.73	0.70	0.70	0.70	0.70	0.70	0.70	
Adj. Flow (vph)	4	325	76	22	610	59	189	27	31	71	39	6	
RTOR Reduction (vph)	0	9	0	0	3	0	0	5	0	0	2	0	
Lane Group Flow (vph)	4	392	0	22	666	0	0	242	0	0	114	0	
Heavy Vehicles (%)	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA		
Protected Phases	5	2		1	6			4			8		
Permitted Phases							4			8			
Actuated Green, G (s)	1.0	30.0		1.3	30.3			23.3			23.3		
Effective Green, g (s)	1.0	30.0		1.3	30.3			23.3			23.3		
Actuated g/C Ratio	0.01	0.45		0.02	0.45			0.35			0.35		
Clearance Time (s)	4.0	5.0		4.0	5.0			3.5			3.5		
Vehicle Extension (s)	2.5	2.5		2.5	2.5			2.0			3.0		
Lane Grp Cap (vph)	26	801		33	821			457			490		
v/s Ratio Prot	0.00	0.22		c0.01	c0.37								
v/s Ratio Perm								c0.18			0.08		
v/c Ratio	0.15	0.49		0.67	0.81			0.53			0.23		
Uniform Delay, d1	32.6	13.1		32.7	15.9			17.5			15.6		
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00		
Incremental Delay, d2	2.0	0.3		37.4	6.0			4.3			1.1		
Delay (s)	34.6	13.5		70.1	21.9			21.8			16.7		
Level of Service	C	B		E	C			C			B		
Approach Delay (s)		13.7			23.4			21.8			16.7		
Approach LOS		B			C			C			B		
Intersection Summary													
HCM 2000 Control Delay			19.9									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.69										
Actuated Cycle Length (s)			67.1									Sum of lost time (s)	12.5
Intersection Capacity Utilization			46.0%									ICU Level of Service	A
Analysis Period (min)			15										
c Critical Lane Group													

HCM Unsignalized Intersection Capacity Analysis

2: Headington Rd & Missouri Flat Rd

01/03/2018

























Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	15	36	457	21	41	293
Future Volume (Veh/h)	15	36	457	21	41	293
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.85	0.85	0.71	0.71	0.80	0.80
Hourly flow rate (vph)	18	42	644	30	51	366
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage (veh)	2			2		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1127	659			674	
vC1, stage 1 conf vol	659					
vC2, stage 2 conf vol	468					
vCu, unblocked vol	1127	659			674	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	91			94	
cM capacity (veh/h)	425	462			912	
Direction, Lane #	WB 1	WB 2	NB 1	SB 1	SB 2	
Volume Total	18	42	674	51	366	
Volume Left	18	0	0	51	0	
Volume Right	0	42	30	0	0	
cSH	425	462	1700	912	1700	
Volume to Capacity	0.04	0.09	0.40	0.06	0.22	
Queue Length 95th (ft)	3	7	0	4	0	
Control Delay (s)	13.8	13.6	0.0	9.2	0.0	
Lane LOS	B	B		A		
Approach Delay (s)	13.7		0.0	1.1		
Approach LOS	B					
Intersection Summary						
Average Delay			1.1			
Intersection Capacity Utilization			42.0%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

3: Missouri Flat Rd & Plaza Dr

01/03/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	7	7	83	228	23	50	101	411	294	34	288	7
Future Volume (vph)	7	7	83	228	23	50	101	411	294	34	288	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5	3.5	3.5	3.5		3.5	4.4	4.4	3.5	4.4	
Lane Util. Factor		0.95	0.95	0.95	0.95		0.97	0.95	1.00	1.00	0.95	
Frbp, ped/bikes		1.00	1.00	1.00	1.00		1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt		0.89	0.85	1.00	0.95		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.99	1.00	0.95	0.98		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1570	1504	1665	1613		3433	3471	1563	1770	3427	
Flt Permitted		0.99	1.00	0.95	0.98		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1570	1504	1665	1613		3433	3471	1563	1770	3427	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	8	8	92	253	26	56	112	457	327	38	320	8
RTOR Reduction (vph)	0	36	49	0	22	0	0	0	138	0	1	0
Lane Group Flow (vph)	0	19	4	170	143	0	112	457	189	38	327	0
Confl. Bikes (#/hr)									3			3
Heavy Vehicles (%)	2%	2%	2%	3%	9%	2%	2%	4%	2%	2%	5%	2%
Turn Type	Split	NA	Perm	Split	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	7		8	8		1	6		5	2	
Permitted Phases			7						6			
Actuated Green, G (s)		6.6	6.6	14.1	14.1		19.4	54.8	54.8	4.6	40.0	
Effective Green, g (s)		6.6	6.6	14.1	14.1		19.4	54.8	54.8	4.6	40.0	
Actuated g/C Ratio		0.07	0.07	0.15	0.15		0.20	0.58	0.58	0.05	0.42	
Clearance Time (s)		3.5	3.5	3.5	3.5		3.5	4.4	4.4	3.5	4.4	
Vehicle Extension (s)		2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)		109	104	247	239		701	2002	901	85	1442	
v/s Ratio Prot		c0.01		c0.10	0.09		0.03	c0.13		c0.02	c0.10	
v/s Ratio Perm			0.00						0.12			
v/c Ratio		0.17	0.04	0.69	0.60		0.16	0.23	0.21	0.45	0.23	
Uniform Delay, d1		41.6	41.2	38.4	37.8		31.1	9.8	9.7	44.0	17.6	
Progression Factor		1.00	1.00	1.00	1.00		1.18	1.42	3.71	1.00	1.00	
Incremental Delay, d2		0.3	0.1	6.2	2.7		0.0	0.3	0.5	1.4	0.4	
Delay (s)		41.9	41.3	44.6	40.5		36.8	14.1	36.4	45.3	18.0	
Level of Service		D	D	D	D		D	B	D	D	B	
Approach Delay (s)		41.6			42.6			25.1			20.8	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			28.6				HCM 2000 Level of Service				C	
HCM 2000 Volume to Capacity ratio			0.32									
Actuated Cycle Length (s)			95.0				Sum of lost time (s)				14.9	
Intersection Capacity Utilization			40.1%				ICU Level of Service				A	
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

4: Missouri Flat Rd & US 50 WB Ramps

01/03/2018























Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations				↖	↗	↖↗	↖↗	↖↗			↖↗	↖↗	
Traffic Volume (vph)	0	0	0	487	1	289	368	517	0	0	483	116	
Future Volume (vph)	0	0	0	487	1	289	368	517	0	0	483	116	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)				5.1	5.1	5.1	4.0	5.0			5.0	5.0	
Lane Util. Factor				0.95	0.95	0.88	0.97	0.95			0.95	1.00	
Frbp, ped/bikes				1.00	1.00	1.00	1.00	1.00			1.00	0.99	
Flpb, ped/bikes				1.00	1.00	1.00	1.00	1.00			1.00	1.00	
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85	
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00	
Satd. Flow (prot)				1649	1653	2787	3367	3505			3505	1547	
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00	
Satd. Flow (perm)				1649	1653	2787	3367	3505			3505	1547	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	
Adj. Flow (vph)	0	0	0	541	1	321	409	574	0	0	537	129	
RTOR Reduction (vph)	0	0	0	0	0	254	0	0	0	0	0	67	
Lane Group Flow (vph)	0	0	0	270	272	67	409	574	0	0	537	62	
Confl. Peds. (#/hr)									2			1	
Heavy Vehicles (%)	2%	2%	2%	4%	2%	2%	4%	3%	2%	2%	3%	3%	
Turn Type				Split	NA	Perm	Prot	NA			NA	Perm	
Protected Phases				4	4		1	6			2		
Permitted Phases						4						2	
Actuated Green, G (s)				19.9	19.9	19.9	15.1	65.0			45.9	45.9	
Effective Green, g (s)				19.9	19.9	19.9	15.1	65.0			45.9	45.9	
Actuated g/C Ratio				0.21	0.21	0.21	0.16	0.68			0.48	0.48	
Clearance Time (s)				5.1	5.1	5.1	4.0	5.0			5.0	5.0	
Vehicle Extension (s)				1.0	1.0	1.0	1.0	1.0			1.0	1.0	
Lane Grp Cap (vph)				345	346	583	535	2398			1693	747	
v/s Ratio Prot				0.16	c0.16		c0.12	0.16			c0.15		
v/s Ratio Perm						0.02						0.04	
v/c Ratio				0.78	0.79	0.12	0.76	0.24			0.32	0.08	
Uniform Delay, d1				35.5	35.5	30.4	38.2	5.7			15.0	13.2	
Progression Factor				1.00	1.00	1.00	1.24	0.72			1.73	4.25	
Incremental Delay, d2				10.2	10.4	0.0	5.1	0.2			0.5	0.2	
Delay (s)				45.7	45.9	30.5	52.4	4.3			26.4	56.4	
Level of Service				D	D	C	D	A			C	E	
Approach Delay (s)		0.0			40.1			24.3			32.2		
Approach LOS		A			D			C			C		
Intersection Summary													
HCM 2000 Control Delay			31.8		HCM 2000 Level of Service						C		
HCM 2000 Volume to Capacity ratio			0.52										
Actuated Cycle Length (s)			95.0		Sum of lost time (s)					14.1			
Intersection Capacity Utilization			49.9%		ICU Level of Service					A			
Analysis Period (min)			15										

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

5: Missouri Flat Rd & US 50 EB Ramps

01/03/2018

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	119	0	358	0	0	0	0	766	71	161	809	0	
Future Volume (vph)	119	0	358	0	0	0	0	766	71	161	809	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.1	4.1	4.1					4.9	4.9	3.5	4.9		
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	0.97	0.95		
Frbp, ped/bikes	1.00	1.00	1.00					1.00	1.00	1.00	1.00		
Flpb, ped/bikes	1.00	1.00	1.00					1.00	1.00	1.00	1.00		
Frt	1.00	0.86	0.85					1.00	0.85	1.00	1.00		
Flt Protected	0.95	1.00	1.00					1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1633	1423	1475					3471	1583	3400	3505		
Flt Permitted	0.95	1.00	1.00					1.00	1.00	0.95	1.00		
Satd. Flow (perm)	1633	1423	1475					3471	1583	3400	3505		
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	
Adj. Flow (vph)	132	0	398	0	0	0	0	851	79	179	899	0	
RTOR Reduction (vph)	0	151	151	0	0	0	0	0	36	0	0	0	
Lane Group Flow (vph)	119	57	52	0	0	0	0	851	43	179	899	0	
Confl. Peds. (#/hr)												1	
Heavy Vehicles (%)	5%	2%	4%	2%	2%	2%	2%	4%	2%	3%	3%	2%	
Turn Type	Split	NA	Perm					NA	Perm	Prot	NA		
Protected Phases	8	8						6		5	2		
Permitted Phases			8						6				
Actuated Green, G (s)	12.0	12.0	12.0					45.5	45.5	25.0	74.0		
Effective Green, g (s)	12.0	12.0	12.0					45.5	45.5	25.0	74.0		
Actuated g/C Ratio	0.13	0.13	0.13					0.48	0.48	0.26	0.78		
Clearance Time (s)	4.1	4.1	4.1					4.9	4.9	3.5	4.9		
Vehicle Extension (s)	2.2	2.2	2.2					3.0	3.0	2.0	3.0		
Lane Grp Cap (vph)	206	179	186					1662	758	894	2730		
v/s Ratio Prot	c0.07	0.04						c0.25		0.05	c0.26		
v/s Ratio Perm			0.04						0.03				
v/c Ratio	0.58	0.32	0.28					0.51	0.06	0.20	0.33		
Uniform Delay, d1	39.1	37.8	37.6					17.1	13.3	27.2	3.1		
Progression Factor	1.00	1.00	1.00					0.99	0.74	1.65	0.35		
Incremental Delay, d2	2.7	0.5	0.4					1.1	0.1	0.0	0.3		
Delay (s)	41.8	38.3	38.0					17.9	9.9	45.0	1.4		
Level of Service	D	D	D					B	A	D	A		
Approach Delay (s)		39.0			0.0			17.3			8.6		
Approach LOS		D			A			B			A		
Intersection Summary													
HCM 2000 Control Delay			18.1									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.47										
Actuated Cycle Length (s)			95.0									Sum of lost time (s)	12.5
Intersection Capacity Utilization			49.9%									ICU Level of Service	A
Analysis Period (min)			15										

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

6: Missouri Flat Rd & Mother Lode Dr

01/03/2018



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	119	40	44	718	1092	75
Future Volume (vph)	119	40	44	718	1092	75
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.9	4.9	4.9
Lane Util. Factor	0.97	1.00	1.00	0.95	0.95	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
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)	3433	1583	1719	3505	3505	1398
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	3433	1583	1719	3505	3505	1398
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	132	44	49	798	1213	83
RTOR Reduction (vph)	0	38	0	0	0	26
Lane Group Flow (vph)	132	6	49	798	1213	57
Confl. Peds. (#/hr)						1
Heavy Vehicles (%)	2%	2%	5%	3%	3%	13%
Turn Type	Prot	Perm	Prot	NA	NA	Perm
Protected Phases	8		1	6	2	
Permitted Phases		8				2
Actuated Green, G (s)	12.0	12.0	5.1	74.1	65.0	65.0
Effective Green, g (s)	12.0	12.0	5.1	74.1	65.0	65.0
Actuated g/C Ratio	0.13	0.13	0.05	0.78	0.68	0.68
Clearance Time (s)	4.0	4.0	4.0	4.9	4.9	4.9
Vehicle Extension (s)	2.0	2.0	2.0	3.0	3.0	3.0
Lane Grp Cap (vph)	433	199	92	2733	2398	956
v/s Ratio Prot	c0.04		c0.03	0.23	c0.35	
v/s Ratio Perm		0.00				0.04
v/c Ratio	0.30	0.03	0.53	0.29	0.51	0.06
Uniform Delay, d1	37.7	36.4	43.8	3.0	7.2	4.9
Progression Factor	1.00	1.00	1.00	1.00	1.49	2.22
Incremental Delay, d2	0.1	0.0	2.9	0.3	0.7	0.1
Delay (s)	37.9	36.4	46.7	3.2	11.5	11.1
Level of Service	D	D	D	A	B	B
Approach Delay (s)	37.5			5.8	11.5	
Approach LOS	D			A	B	

Intersection Summary




























HCM 2000 Control Delay	11.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	12.9
Intersection Capacity Utilization	47.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

7: Missouri Flat Rd & Forni Rd

01/03/2018




















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 							 			 	
Traffic Volume (vph)	205	75	14	53	41	162	21	841	58	224	692	216
Future Volume (vph)	205	75	14	53	41	162	21	841	58	224	692	216
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3433	1827	1417	1770	1863	1568	1719	3505	1547	1770	3471	1546
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	1827	1417	1770	1863	1568	1719	3505	1547	1770	3471	1546
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	228	83	16	59	46	180	23	934	64	249	769	240
RTOR Reduction (vph)	0	0	13	0	0	160	0	0	40	0	0	74
Lane Group Flow (vph)	228	83	3	59	46	20	23	934	24	249	769	166
Confl. Peds. (#/hr)									2			2
Heavy Vehicles (%)	2%	4%	14%	2%	2%	3%	5%	3%	2%	2%	4%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases			8			4			6			2
Actuated Green, G (s)	11.8	15.8	15.8	6.9	10.9	10.9	2.5	37.3	37.3	20.6	55.4	55.4
Effective Green, g (s)	11.8	15.8	15.8	6.9	10.9	10.9	2.5	37.3	37.3	20.6	55.4	55.4
Actuated g/C Ratio	0.12	0.16	0.16	0.07	0.11	0.11	0.03	0.38	0.38	0.21	0.56	0.56
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	3.0	3.0	2.0	3.0	3.0
Lane Grp Cap (vph)	410	292	227	123	205	173	43	1325	585	369	1950	868
v/s Ratio Prot	c0.07	c0.05		0.03	0.02		0.01	c0.27		c0.14	0.22	
v/s Ratio Perm			0.00			0.01			0.02			0.11
v/c Ratio	0.56	0.28	0.01	0.48	0.22	0.12	0.53	0.70	0.04	0.67	0.39	0.19
Uniform Delay, d1	40.9	36.4	34.8	44.1	40.0	39.5	47.5	26.0	19.4	35.9	12.2	10.6
Progression 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
Incremental Delay, d2	0.9	0.2	0.0	1.1	0.2	0.1	6.3	1.7	0.0	3.8	0.1	0.1
Delay (s)	41.9	36.6	34.8	45.2	40.2	39.6	53.7	27.7	19.4	39.7	12.3	10.7
Level of Service	D	D	C	D	D	D	D	C	B	D	B	B
Approach Delay (s)		40.2			40.9			27.8			17.4	
Approach LOS		D			D			C			B	
Intersection Summary												
HCM 2000 Control Delay			26.0			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.63									
Actuated Cycle Length (s)			98.6	Sum of lost time (s)			18.0					
Intersection Capacity Utilization			60.1%	ICU Level of Service			B					
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis



















8: Missouri Flat Rd & Golden Center Dr

01/03/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	5	10	35	5	8	39	867	93	114	624	3
Future Volume (vph)	4	5	10	35	5	8	39	867	93	114	624	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	5.0		4.0	5.0	5.0
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	1.00
Frbp, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	1.00
Frt		0.93			0.98		1.00	0.99		1.00	1.00	0.85
Flt Protected		0.99			0.96		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1630			1741		1770	3446		1770	3438	1182
Flt Permitted		0.92			0.76		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)		1514			1378		1770	3446		1770	3438	1182
Peak-hour factor, PHF	0.59	0.59	0.59	0.71	0.71	0.71	0.94	0.94	0.94	0.83	0.83	0.83
Adj. Flow (vph)	7	8	17	49	7	11	41	922	99	137	752	4
RTOR Reduction (vph)	0	15	0	0	8	0	0	7	0	0	0	2
Lane Group Flow (vph)	0	17	0	0	59	0	41	1014	0	137	752	2
Confl. Peds. (#/hr)							1			2		5
Confl. Bikes (#/hr)										1		
Heavy Vehicles (%)	25%	2%	2%	3%	2%	2%	2%	3%	3%	2%	5%	33%
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								6
Actuated Green, G (s)		6.0			6.0		2.5	30.0		8.1	35.6	35.6
Effective Green, g (s)		6.0			6.0		2.5	30.0		8.1	35.6	35.6
Actuated g/C Ratio		0.11			0.11		0.04	0.53		0.14	0.62	0.62
Clearance Time (s)		4.0			4.0		4.0	5.0		4.0	5.0	5.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		159			144		77	1810		251	2143	736
v/s Ratio Prot							0.02	c0.29		c0.08	0.22	
v/s Ratio Perm		0.01			c0.04							0.00
v/c Ratio		0.11			0.41		0.53	0.56		0.55	0.35	0.00
Uniform Delay, d1		23.1			23.9		26.7	9.1		22.8	5.2	4.1
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		0.3			1.9		6.9	0.4		2.4	0.1	0.0
Delay (s)		23.4			25.8		33.6	9.5		25.2	5.3	4.1
Level of Service		C			C		C	A		C	A	A
Approach Delay (s)		23.4			25.8			10.4			8.3	
Approach LOS		C			C			B			A	
Intersection Summary												
HCM 2000 Control Delay			10.2				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.54									
Actuated Cycle Length (s)			57.1				Sum of lost time (s)				13.0	
Intersection Capacity Utilization			52.0%				ICU Level of Service				A	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
 10: Driveway/China Garden Rd & Missouri Flat Rd

01/03/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	0	0	6	0	107	0	904	10	105	540	0
Future Volume (Veh/h)	1	0	0	6	0	107	0	904	10	105	540	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.25	0.25	0.78	0.78	0.78	0.95	0.95	0.95	0.90	0.90	0.90
Hourly flow rate (vph)	4	0	0	8	0	137	0	952	11	117	600	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTL				None
Median storage (veh)								2				
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1928	1797	600	1792	1792	958	600			963		
vC1, stage 1 conf vol	834	834		958	958							
vC2, stage 2 conf vol	1094	963		834	834							
vCu, unblocked vol	1928	1797	600	1792	1792	958	600			963		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	86	100	100	96	100	56	100			84		
cM capacity (veh/h)	28	185	501	217	235	312	977			715		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2							
Volume Total	4	145	963	117	600							
Volume Left	4	8	0	117	0							
Volume Right	0	137	11	0	0							
cSH	28	305	977	715	1700							
Volume to Capacity	0.14	0.48	0.00	0.16	0.35							
Queue Length 95th (ft)	11	61	0	15	0							
Control Delay (s)	154.9	27.1	0.0	11.0	0.0							
Lane LOS	F	D		B								
Approach Delay (s)	154.9	27.1	0.0	1.8								
Approach LOS	F	D										
Intersection Summary												
Average Delay			3.2									
Intersection Capacity Utilization			93.4%		ICU Level of Service				F			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

11: Missouri Flat Road & Industrial Dr

01/03/2018






















Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	13	12	11	896	541	22
Future Volume (Veh/h)	13	12	11	896	541	22
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Hourly flow rate (vph)	15	14	13	1018	615	25
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL	TWLTL		
Median storage (veh)			2	2		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1672	628	640			
vC1, stage 1 conf vol	628					
vC2, stage 2 conf vol	1044					
vCu, unblocked vol	1672	628	640			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	95	97	99			
cM capacity (veh/h)	290	481	939			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	29	13	1018	640		
Volume Left	15	13	0	0		
Volume Right	14	0	0	25		
cSH	359	939	1700	1700		
Volume to Capacity	0.08	0.01	0.60	0.38		
Queue Length 95th (ft)	7	1	0	0		
Control Delay (s)	15.9	8.9	0.0	0.0		
Lane LOS	C	A				
Approach Delay (s)	15.9	0.1		0.0		
Approach LOS	C					
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			57.2%	ICU Level of Service	B	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

12: Missouri Flat Road & Enterprise Dr

01/03/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	51	0	13	1	0	4	17	844	6	4	419	94
Future Volume (Veh/h)	51	0	13	1	0	4	17	844	6	4	419	94
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	59	0	15	1	0	5	20	981	7	5	487	109
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLTTL				TWLTTL
Median storage (veh)								2				2
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1578	1580	542	1536	1630	984	596			988		
vC1, stage 1 conf vol	552	552		1024	1024							
vC2, stage 2 conf vol	1026	1028		512	606							
vCu, unblocked vol	1578	1580	542	1536	1630	984	596			988		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	75	100	97	100	100	98	98			99		
cM capacity (veh/h)	240	266	539	248	263	300	976			696		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	74	6	20	988	5	596						
Volume Left	59	1	20	0	5	0						
Volume Right	15	5	0	7	0	109						
cSH	271	290	976	1700	696	1700						
Volume to Capacity	0.27	0.02	0.02	0.58	0.01	0.35						
Queue Length 95th (ft)	27	2	2	0	1	0						
Control Delay (s)	23.2	17.7	8.8	0.0	10.2	0.0						
Lane LOS	C	C	A		B							
Approach Delay (s)	23.2	17.7	0.2		0.1							
Approach LOS	C	C										
Intersection Summary												
Average Delay			1.2									
Intersection Capacity Utilization			61.7%		ICU Level of Service				B			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

13: Pleasant Valley Rd & Missouri Flat Rd

01/03/2018



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	304	178	392	533	185	205
Future Volume (vph)	304	178	392	533	185	205
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.1	4.1	4.6	4.6	4.0
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99
Flpb, ped/bikes	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)	3400	1776	1845	1583	1671	1512
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3400	1776	1845	1583	1671	1512
Peak-hour factor, PHF	0.80	0.80	0.91	0.92	0.81	0.81
Adj. Flow (vph)	380	222	431	579	228	253
RTOR Reduction (vph)	0	0	0	56	0	123
Lane Group Flow (vph)	380	223	431	523	228	130
Confl. Peds. (#/hr)						2
Heavy Vehicles (%)	3%	7%	3%	2%	8%	6%
Turn Type	Prot	NA	NA	pm+ov	Prot	pm+ov
Protected Phases	5	2	6	7	7	5
Permitted Phases				6		4
Actuated Green, G (s)	12.3	36.3	20.0	34.0	14.0	26.3
Effective Green, g (s)	12.3	36.3	20.0	34.0	14.0	26.3
Actuated g/C Ratio	0.21	0.62	0.34	0.58	0.24	0.45
Clearance Time (s)	4.0	4.1	4.1	4.6	4.6	4.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	708	1092	625	912	396	673
v/s Ratio Prot	c0.11	0.13	c0.23	0.14	c0.14	0.04
v/s Ratio Perm				0.19		0.05
v/c Ratio	0.54	0.20	0.69	0.57	0.58	0.19
Uniform Delay, d1	20.8	5.0	16.8	7.9	19.9	9.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.0	2.5	0.5	1.3	0.1
Delay (s)	21.2	5.0	19.4	8.5	21.1	10.0
Level of Service	C	A	B	A	C	A
Approach Delay (s)		15.2	13.1		15.3	
Approach LOS		B	B		B	

Intersection Summary			
HCM 2000 Control Delay	14.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	59.0	Sum of lost time (s)	12.7
Intersection Capacity Utilization	50.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

14: Pleasant Valley Rd & Commerce Way

01/03/2018



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕	↗	↘	↘
Traffic Volume (veh/h)	31	464	518	79	18	19
Future Volume (Veh/h)	31	464	518	79	18	19
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.78	0.78	0.79	0.79	0.66	0.66
Hourly flow rate (vph)	40	595	656	100	27	29
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None TWLTL					
Median storage (veh)	2					
Upstream signal (ft)	750					
pX, platoon unblocked	0.84				0.84	0.84
vC, conflicting volume	756				1331	656
vC1, stage 1 conf vol					656	
vC2, stage 2 conf vol					675	
vCu, unblocked vol	614				1299	495
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	95				93	94
cM capacity (veh/h)	807				368	481
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total	635	656	100	56		
Volume Left	40	0	0	27		
Volume Right	0	0	100	29		
cSH	807	1700	1700	419		
Volume to Capacity	0.05	0.39	0.06	0.13		
Queue Length 95th (ft)	4	0	0	11		
Control Delay (s)	1.3	0.0	0.0	14.9		
Lane LOS	A			B		
Approach Delay (s)	1.3	0.0		14.9		
Approach LOS				B		
Intersection Summary						
Average Delay			1.1			
Intersection Capacity Utilization			59.9%	ICU Level of Service	B	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

15: Pleasant Valley Rd & Forni Rd

01/03/2018













Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	135	337	323	33	50	101
Future Volume (Veh/h)	135	337	323	33	50	101
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	180	449	431	44	67	135
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	475			1262	453	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	475			1262	453	
tC, single (s)	4.1			6.4	6.2	
tC, 2 stage (s)						
tF (s)	2.2			3.5	3.3	
p0 queue free %	83			57	78	
cM capacity (veh/h)	1082			156	605	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	629	475	202			
Volume Left	180	0	67			
Volume Right	0	44	135			
cSH	1082	1700	309			
Volume to Capacity	0.17	0.28	0.65			
Queue Length 95th (ft)	15	0	107			
Control Delay (s)	4.0	0.0	36.2			
Lane LOS	A		E			
Approach Delay (s)	4.0	0.0	36.2			
Approach LOS			E			
Intersection Summary						
Average Delay			7.5			
Intersection Capacity Utilization			63.2%	ICU Level of Service	B	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

16: SR-49 & Pleasant Valley Rd

01/03/2018

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	243	85	141	287	224	238
Future Volume (vph)	243	85	141	287	224	238
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	312	109	181	368	287	305
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total (vph)	421	181	368	592		
Volume Left (vph)	0	181	0	287		
Volume Right (vph)	109	0	0	305		
Hadj (s)	-0.10	0.55	0.05	-0.16		
Departure Headway (s)	6.8	7.9	7.4	6.5		
Degree Utilization, x	0.79	0.40	0.76	1.06		
Capacity (veh/h)	523	450	479	566		
Control Delay (s)	31.0	14.8	28.6	80.5		
Approach Delay (s)	31.0	24.1		80.5		
Approach LOS	D	C		F		
Intersection Summary						
Delay			47.3			
Level of Service			E			
Intersection Capacity Utilization			62.8%	ICU Level of Service	B	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

17: Pleasant Valley Rd & China Garden Rd

01/03/2018

























Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	11	359	883	50	3	9
Future Volume (Veh/h)	11	359	883	50	3	9
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	12	395	970	55	3	10
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	1025				1416	998
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1025				1416	998
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				98	97
cM capacity (veh/h)	673				148	295
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	407	1025	13			
Volume Left	12	0	3			
Volume Right	0	55	10			
cSH	673	1700	240			
Volume to Capacity	0.02	0.60	0.05			
Queue Length 95th (ft)	1	0	4			
Control Delay (s)	0.5	0.0	20.9			
Lane LOS	A		C			
Approach Delay (s)	0.5	0.0	20.9			
Approach LOS			C			
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			59.5%	ICU Level of Service	B	
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

18: Pleasant Valley Rd & SR 49

















01/03/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	97	258	25	19	780	154	88	23	10	60	5	105
Future Volume (vph)	97	258	25	19	780	154	88	23	10	60	5	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	4.6		3.0	4.6	4.6		4.1	4.1	3.0	3.0	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00	0.99	1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85		1.00	0.85	1.00	0.86	
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.96	1.00	0.95	1.00	
Satd. Flow (prot)	1671	3338		1770	1863	1583		1792	1563	1719	1499	
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.96	1.00	0.95	1.00	
Satd. Flow (perm)	1671	3338		1770	1863	1583		1792	1563	1719	1499	
Peak-hour factor, PHF	0.88	0.88	0.88	0.89	0.89	0.89	0.77	0.77	0.77	0.89	0.89	0.89
Adj. Flow (vph)	110	293	28	21	876	173	114	30	13	67	6	118
RTOR Reduction (vph)	0	3	0	0	0	29	0	0	11	0	108	0
Lane Group Flow (vph)	110	318	0	21	876	144	0	144	2	67	16	0
Confl. Peds. (#/hr)									1			
Heavy Vehicles (%)	8%	7%	4%	2%	2%	2%	2%	2%	2%	5%	2%	9%
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA	Perm	Split	NA	
Protected Phases	1	6		5	2		4	4		8	8	
Permitted Phases						2			4			
Actuated Green, G (s)	10.9	60.8		2.5	52.4	52.4		12.5	12.5	8.3	8.3	
Effective Green, g (s)	10.9	60.8		2.5	52.4	52.4		12.5	12.5	8.3	8.3	
Actuated g/C Ratio	0.11	0.62		0.03	0.53	0.53		0.13	0.13	0.08	0.08	
Clearance Time (s)	3.0	4.6		3.0	4.6	4.6		4.1	4.1	3.0	3.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	184	2054		44	988	839		226	197	144	125	
v/s Ratio Prot	c0.07	0.10		0.01	c0.47			c0.08		c0.04	0.01	
v/s Ratio Perm						0.09			0.00			
v/c Ratio	0.60	0.15		0.48	0.89	0.17		0.64	0.01	0.47	0.13	
Uniform Delay, d1	41.9	8.1		47.5	20.6	12.0		41.0	37.7	43.1	41.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00	
Incremental Delay, d2	3.5	0.0		3.0	9.4	0.0		4.3	0.0	0.9	0.2	
Delay (s)	45.3	8.1		50.5	30.0	12.0		45.3	37.7	44.0	42.1	
Level of Service	D	A		D	C	B		D	D	D	D	
Approach Delay (s)		17.6			27.5			44.7			42.7	
Approach LOS		B			C			D			D	
Intersection Summary												
HCM 2000 Control Delay			28.2				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.77									
Actuated Cycle Length (s)			98.8				Sum of lost time (s)		14.7			
Intersection Capacity Utilization			70.2%				ICU Level of Service		C			
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 19: Diamond Rd & Lime Kiln Rd/Black Rice Ln

01/03/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	23	3	10	7	4	2	31	188	15	12	193	29
Future Volume (Veh/h)	23	3	10	7	4	2	31	188	15	12	193	29
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	25	3	11	8	4	2	34	204	16	13	210	32
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	536	540	226	544	548	212	242			220		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	536	540	226	544	548	212	242			220		
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 %	94	99	99	98	99	100	97			99		
cM capacity (veh/h)	437	431	811	428	427	826	1319			1343		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	39	14	254	255								
Volume Left	25	8	34	13								
Volume Right	11	2	16	32								
cSH	502	459	1319	1343								
Volume to Capacity	0.08	0.03	0.03	0.01								
Queue Length 95th (ft)	6	2	2	1								
Control Delay (s)	12.8	13.1	1.2	0.5								
Lane LOS	B	B	A	A								
Approach Delay (s)	12.8	13.1	1.2	0.5								
Approach LOS	B	B										
Intersection Summary												
Average Delay			2.0									
Intersection Capacity Utilization			32.0%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

21: Diamond Rd & Bradley Dr

01/03/2018



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	5	17	35	198	217	13
Future Volume (Veh/h)	5	17	35	198	217	13
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.88	0.88	0.83	0.83	0.68	0.68
Hourly flow rate (vph)	6	19	42	239	319	19
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)	2					
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	652	328	338			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	652	328	338			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	97	97			
cM capacity (veh/h)	416	711	1216			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	25	42	239	338		
Volume Left	6	42	0	0		
Volume Right	19	0	0	19		
cSH	935	1216	1700	1700		
Volume to Capacity	0.03	0.03	0.14	0.20		
Queue Length 95th (ft)	2	3	0	0		
Control Delay (s)	11.1	8.1	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s)	11.1	1.2	0.0			
Approach LOS	B					
Intersection Summary						
Average Delay	1.0					
Intersection Capacity Utilization	28.9%			ICU Level of Service	A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

22: US-50 WB On-ramp/US-50 WB Off-ramp & El Dorado Rd

01/03/2018


















Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔			↔			↔	
Traffic Volume (veh/h)	0	0	0	124	0	22	105	178	0	0	56	62
Future Volume (Veh/h)	0	0	0	124	0	22	105	178	0	0	56	62
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.75	0.75	0.75	0.77	0.77	0.77	0.82	0.82	0.82
Hourly flow rate (vph)	0	0	0	165	0	29	136	231	0	0	68	76
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	638	609	106	609	647	231	144			231		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	638	609	106	609	647	231	144			231		
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 %	100	100	100	56	100	96	91			100		
cM capacity (veh/h)	347	370	946	376	352	806	1432			1331		
Direction, Lane #												
	WB 1	NB 1	SB 1									
Volume Total	194	367	144									
Volume Left	165	136	0									
Volume Right	29	0	76									
cSH	409	1432	1700									
Volume to Capacity	0.47	0.09	0.08									
Queue Length 95th (ft)	62	8	0									
Control Delay (s)	21.5	3.4	0.0									
Lane LOS	C	A										
Approach Delay (s)	21.5	3.4	0.0									
Approach LOS	C											
Intersection Summary												
Average Delay			7.7									
Intersection Capacity Utilization			36.7%	ICU Level of Service						A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

23: El Dorado Rd & US-50 EB Off-ramp/US-50 EB On-ramp

01/03/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	90	2	98	0	0	0	0	193	87	24	156	0
Future Volume (Veh/h)	90	2	98	0	0	0	0	193	87	24	156	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.92	0.92	0.92	0.83	0.83	0.83	0.69	0.69	0.69
Hourly flow rate (vph)	102	2	111	0	0	0	0	233	105	35	226	0
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	582	634	226	694	582	286	226			338		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	582	634	226	694	582	286	226			338		
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 %	75	99	86	100	100	100	100			97		
cM capacity (veh/h)	414	384	811	299	411	751	1337			1216		
Direction, Lane #	EB 1	NB 1	SB 1									
Volume Total	215	338	261									
Volume Left	102	0	35									
Volume Right	111	105	0									
cSH	553	1700	1216									
Volume to Capacity	0.39	0.20	0.03									
Queue Length 95th (ft)	46	0	2									
Control Delay (s)	15.6	0.0	1.3									
Lane LOS	C		A									
Approach Delay (s)	15.6	0.0	1.3									
Approach LOS	C											
Intersection Summary												
Average Delay			4.5									
Intersection Capacity Utilization			46.1%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

33: Missouri Flat Rd

01/03/2018





















Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑↑	↑		↑↑
Traffic Volume (veh/h)	0	0	762	446	0	1132
Future Volume (Veh/h)	0	0	762	446	0	1132
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	0	0	847	496	0	1258
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)						371
pX, platoon unblocked	0.83					
vC, conflicting volume	1476	424			1343	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1160	424			1343	
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)	156	579			509	
Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2	
Volume Total	424	424	496	629	629	
Volume Left	0	0	0	0	0	
Volume Right	0	0	496	0	0	
cSH	1700	1700	1700	1700	1700	
Volume to Capacity	0.25	0.25	0.29	0.37	0.37	
Queue Length 95th (ft)	0	0	0	0	0	
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	
Lane LOS						
Approach Delay (s)	0.0			0.0		
Approach LOS						
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			34.6%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

35: Missouri Flat Rd

01/03/2018

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (veh/h)	0	0	18	0	0	71	0	849	30	0	723	36	
Future Volume (Veh/h)	0	0	18	0	0	71	0	849	30	0	723	36	
Sign Control	Stop			Stop			Free			Free			
Grade	0%			0%			0%			0%			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	
Hourly flow rate (vph)	0	0	20	0	0	79	0	943	33	0	803	40	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type							None			None			
Median storage (veh)													
Upstream signal (ft)							559			576			
pX, platoon unblocked	0.88	0.88	0.88	0.88	0.88	0.82	0.88				0.82		
vC, conflicting volume	1354	1779	402	1364	1786	472	843				976		
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	528	1011	53	540	1019	0	554				538		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	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 %	100	100	98	100	100	91	100				100		
cM capacity (veh/h)	348	210	884	366	208	891	893				844		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3					
Volume Total	20	79	472	472	33	402	402	40					
Volume Left	0	0	0	0	0	0	0	0					
Volume Right	20	79	0	0	33	0	0	40					
cSH	884	891	1700	1700	1700	1700	1700	1700					
Volume to Capacity	0.02	0.09	0.28	0.28	0.02	0.24	0.24	0.02					
Queue Length 95th (ft)	2	7	0	0	0	0	0	0					
Control Delay (s)	9.2	9.4	0.0	0.0	0.0	0.0	0.0	0.0					
Lane LOS	A	A											
Approach Delay (s)	9.2	9.4	0.0					0.0					
Approach LOS	A	A											
Intersection Summary													
Average Delay			0.5										
Intersection Capacity Utilization			34.5%	ICU Level of Service				A					
Analysis Period (min)			15										

3: Missouri Flat Rd & Plaza Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.1	0.1	0.1	0.2	0.2	0.2	0.0	0.0	0.0	3.6	1.4	3.5
Total Del/Veh (s)	45.9	52.6	8.3	36.5	41.2	20.9	38.3	9.4	3.9	50.4	12.5	4.7

3: Missouri Flat Rd & Plaza Dr Performance by movement

Movement	All
Denied Del/Veh (s)	0.4
Total Del/Veh (s)	16.8

4: Missouri Flat Rd & US 50 WB Ramps Performance by movement

Movement	WBL	WBT	WBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.9	0.4	1.3	0.0	0.0	0.0	0.0	0.4
Total Del/Veh (s)	39.2	61.2	8.2	54.2	4.0	14.9	1.5	22.5

5: Missouri Flat Rd & US 50 EB Ramps Performance by movement

Movement	EBL	EBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.9	1.2	0.1	0.0	0.0	0.0	0.3
Total Del/Veh (s)	36.7	17.6	16.2	3.1	24.1	14.7	17.1

6: Missouri Flat Rd & Mother Lode Dr Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	3.9	0.4	0.1	0.0	0.0	0.0	0.2
Total Del/Veh (s)	40.4	8.9	45.5	4.8	4.3	2.2	7.4

7: Missouri Flat Rd & Forni Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	3.7	0.8	3.8	3.7	0.6	3.7	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	35.2	33.9	7.0	41.3	38.0	14.7	50.1	20.7	5.7	41.3	11.3	6.2

7: Missouri Flat Rd & Forni Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.7
Total Del/Veh (s)	20.4

33: Missouri Flat Rd Performance by movement

Movement	NBT	NBR	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	5.0	6.6	1.5	3.6

Total Network Performance

Denied Del/Veh (s)	1.2
Total Del/Veh (s)	52.9

Intersection: 3: Missouri Flat Rd & Plaza Dr

Movement	EB	EB	WB	WB	NB	NB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	R	L	LTR	L	L	T	T	R	L	T	TR
Maximum Queue (ft)	94	42	169	202	54	79	137	144	110	80	147	122
Average Queue (ft)	32	14	85	87	13	39	46	66	50	27	57	38
95th Queue (ft)	70	34	147	166	40	72	107	122	89	63	121	87
Link Distance (ft)	894	894	776	776			438	438	438		843	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)					300	300					120	400
Storage Blk Time (%)												1
Queuing Penalty (veh)												2

Intersection: 4: Missouri Flat Rd & US 50 WB Ramps

Movement	WB	WB	WB	WB	NB	NB	NB	NB	SB	SB	
Directions Served	L	LT	R	R	L	L	T	T	T	T	
Maximum Queue (ft)	257	286	156	77	189	234	198	74	163	140	
Average Queue (ft)	142	175	56	37	116	137	14	5	58	30	
95th Queue (ft)	229	255	106	63	188	212	111	44	131	95	
Link Distance (ft)		1370	1370				375	375	438	438	
Upstream Blk Time (%)							0				
Queuing Penalty (veh)							0				
Storage Bay Dist (ft)	400			400	140	140					
Storage Blk Time (%)					3	14					
Queuing Penalty (veh)					8	36					

Intersection: 5: Missouri Flat Rd & US 50 EB Ramps

Movement	EB	EB	EB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LTR	R	T	T	R	L	L	T	T
Maximum Queue (ft)	228	288	243	185	188	137	92	105	246	265
Average Queue (ft)	57	148	85	136	100	19	22	38	115	142
95th Queue (ft)	165	239	183	212	187	95	64	82	210	246
Link Distance (ft)		1083		165	165				375	375
Upstream Blk Time (%)				7	2	0				
Queuing Penalty (veh)				28	9	0				
Storage Bay Dist (ft)	400			400		80	140	140		
Storage Blk Time (%)					12	0	0	0	4	
Queuing Penalty (veh)					9	0	0	0	6	

Intersection: 6: Missouri Flat Rd & Mother Lode Dr

Movement	EB	EB	EB	NB	NB	NB	SB	SB
Directions Served	L	L	R	L	T	T	T	T
Maximum Queue (ft)	106	118	67	123	189	134	176	168
Average Queue (ft)	48	48	24	40	58	35	55	63
95th Queue (ft)	94	95	54	90	147	99	126	131
Link Distance (ft)			1142		287	287	165	165
Upstream Blk Time (%)					0		0	0
Queuing Penalty (veh)					0		1	1
Storage Bay Dist (ft)	200	200		140				
Storage Blk Time (%)				0	1			
Queuing Penalty (veh)				0	1			

Intersection: 7: Missouri Flat Rd & Forni Rd

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB
Directions Served	L	L	T	R	L	T	R	L	T	T	R	L
Maximum Queue (ft)	135	178	130	64	103	101	152	72	296	306	175	271
Average Queue (ft)	55	90	54	13	42	36	69	19	152	161	21	139
95th Queue (ft)	111	152	106	45	83	80	121	53	255	263	99	234
Link Distance (ft)			717			757			485	485		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	200	200		160	200		200	240			160	300
Storage Blk Time (%)		0	0				0		1	7		0
Queuing Penalty (veh)		0	0				0		0	4		0

Intersection: 7: Missouri Flat Rd & Forni Rd

Movement	SB	SB	SB
Directions Served	T	T	R
Maximum Queue (ft)	192	200	128
Average Queue (ft)	74	85	31
95th Queue (ft)	157	166	81
Link Distance (ft)	1991	1991	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			160
Storage Blk Time (%)		1	
Queuing Penalty (veh)		2	

Intersection: 33: Missouri Flat Rd

Movement	NB
Directions Served	T
Maximum Queue (ft)	3
Average Queue (ft)	0
95th Queue (ft)	3
Link Distance (ft)	1991
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 107

HCM Signalized Intersection Capacity Analysis

1: El Dorado Rd & Missouri Flat Rd

01/03/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	9	222	36	27	299	139	43	49	38	83	31	8
Future Volume (vph)	9	222	36	27	299	139	43	49	38	83	31	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0		4.0	5.0			3.5			3.5	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.98		1.00	0.95			0.96			0.99	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.97	
Satd. Flow (prot)	1770	1824		1770	1774			1760			1786	
Flt Permitted	0.95	1.00		0.95	1.00			0.88			0.64	
Satd. Flow (perm)	1770	1824		1770	1774			1571			1186	
Peak-hour factor, PHF	0.90	0.90	0.90	0.89	0.89	0.89	0.74	0.74	0.74	0.78	0.78	0.78
Adj. Flow (vph)	10	247	40	30	336	156	58	66	51	106	40	10
RTOR Reduction (vph)	0	5	0	0	12	0	0	18	0	0	3	0
Lane Group Flow (vph)	10	282	0	30	480	0	0	157	0	0	153	0
Turn Type	Prot	NA		Prot	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			4			8	
Permitted Phases							4			8		
Actuated Green, G (s)	1.0	38.0		2.5	39.5			13.4			13.4	
Effective Green, g (s)	1.0	38.0		2.5	39.5			13.4			13.4	
Actuated g/C Ratio	0.02	0.57		0.04	0.59			0.20			0.20	
Clearance Time (s)	4.0	5.0		4.0	5.0			3.5			3.5	
Vehicle Extension (s)	2.5	2.5		2.5	2.5			2.0			3.0	
Lane Grp Cap (vph)	26	1043		66	1055			317			239	
v/s Ratio Prot	0.01	0.15		c0.02	c0.27							
v/s Ratio Perm								0.10			c0.13	
v/c Ratio	0.38	0.27		0.45	0.45			0.50			0.64	
Uniform Delay, d1	32.4	7.2		31.3	7.5			23.5			24.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	6.8	0.6		3.6	1.4			0.4			5.5	
Delay (s)	39.2	7.8		34.9	8.9			24.0			29.8	
Level of Service	D	A		C	A			C			C	
Approach Delay (s)		8.9			10.4			24.0			29.8	
Approach LOS		A			B			C			C	

Intersection Summary

HCM 2000 Control Delay	14.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	66.4	Sum of lost time (s)	12.5
Intersection Capacity Utilization	44.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

2: Headington Rd & Missouri Flat Rd

01/03/2018

























Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	26	59	408	12	29	317
Future Volume (Veh/h)	26	59	408	12	29	317
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.71	0.71	0.90	0.90	0.93	0.93
Hourly flow rate (vph)	37	83	453	13	31	341
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage (veh)	2			2		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	862	460			466	
vC1, stage 1 conf vol	460					
vC2, stage 2 conf vol	403					
vCu, unblocked vol	862	460			466	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	93	86			97	
cM capacity (veh/h)	523	602			1095	
Direction, Lane #	WB 1	WB 2	NB 1	SB 1	SB 2	
Volume Total	37	83	466	31	341	
Volume Left	37	0	0	31	0	
Volume Right	0	83	13	0	0	
cSH	523	602	1700	1095	1700	
Volume to Capacity	0.07	0.14	0.27	0.03	0.20	
Queue Length 95th (ft)	6	12	0	2	0	
Control Delay (s)	12.4	11.9	0.0	8.4	0.0	
Lane LOS	B	B		A		
Approach Delay (s)	12.1		0.0	0.7		
Approach LOS	B					
Intersection Summary						
Average Delay			1.8			
Intersection Capacity Utilization			34.1%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

3: Missouri Flat Rd & Plaza Dr




















01/03/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	28	51	331	432	43	50	336	292	419	47	338	19
Future Volume (vph)	28	51	331	432	43	50	336	292	419	47	338	19
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.5	3.5	3.5	3.5		3.5	4.4	4.4	3.5	4.4	
Lane Util. Factor		0.95	0.95	0.95	0.95		0.97	0.95	1.00	1.00	0.95	
Frbp, ped/bikes		0.99	0.99	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt		0.91	0.85	1.00	0.97		1.00	1.00	0.85	1.00	0.99	
Flt Protected		0.99	1.00	0.95	0.97		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1579	1483	1681	1665		3433	3539	1583	1770	3508	
Flt Permitted		0.99	1.00	0.95	0.97		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1579	1483	1681	1665		3433	3539	1583	1770	3508	
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)	29	54	348	455	45	53	354	307	441	49	356	20
RTOR Reduction (vph)	0	74	180	0	9	0	0	0	248	0	3	0
Lane Group Flow (vph)	0	148	29	278	266	0	354	307	193	49	373	0
Confl. Peds. (#/hr)	2		1				1					2
Turn Type	Split	NA	Perm	Split	NA		Prot	NA	Perm	Prot	NA	
Protected Phases	7	7		8	8		1	6		5	2	
Permitted Phases			7						6			
Actuated Green, G (s)		13.2	13.2	20.3	20.3		13.4	41.6	41.6	5.0	33.2	
Effective Green, g (s)		13.2	13.2	20.3	20.3		13.4	41.6	41.6	5.0	33.2	
Actuated g/C Ratio		0.14	0.14	0.21	0.21		0.14	0.44	0.44	0.05	0.35	
Clearance Time (s)		3.5	3.5	3.5	3.5		3.5	4.4	4.4	3.5	4.4	
Vehicle Extension (s)		2.0	2.0	2.0	2.0		2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)		219	206	359	355		484	1549	693	93	1225	
v/s Ratio Prot		c0.09		c0.17	0.16		c0.10	0.09		c0.03	c0.11	
v/s Ratio Perm			0.02						0.12			
v/c Ratio		0.68	0.14	0.77	0.75		0.73	0.20	0.28	0.53	0.30	
Uniform Delay, d1		38.9	35.9	35.2	35.0		39.1	16.4	17.1	43.8	22.5	
Progression Factor		1.00	1.00	1.00	1.00		1.13	1.22	2.76	1.00	1.00	
Incremental Delay, d2		6.3	0.1	9.2	7.4		4.7	0.3	1.0	2.5	0.6	
Delay (s)		45.2	36.0	44.3	42.3		48.8	20.4	48.1	46.3	23.1	
Level of Service		D	D	D	D		D	C	D	D	C	
Approach Delay (s)		40.8		43.3			40.6				25.8	
Approach LOS		D		D			D				C	
Intersection Summary												
HCM 2000 Control Delay			38.7				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.57									
Actuated Cycle Length (s)			95.0				Sum of lost time (s)			14.9		
Intersection Capacity Utilization			63.9%				ICU Level of Service			B		
Analysis Period (min)			15									
c	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis

4: Missouri Flat Rd & US 50 WB Ramps





















01/03/2018

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	0	0	0	636	0	394	366	653	0	0	914	187	
Future Volume (vph)	0	0	0	636	0	394	366	653	0	0	914	187	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)				5.1	5.1	5.1	4.0	5.0			5.0	5.0	
Lane Util. Factor				0.95	0.95	0.88	0.97	0.95			0.95	1.00	
Frbp, ped/bikes				1.00	1.00	1.00	1.00	1.00			1.00	0.99	
Flpb, ped/bikes				1.00	1.00	1.00	1.00	1.00			1.00	1.00	
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85	
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00	
Satd. Flow (prot)				1665	1665	2787	3433	3539			3539	1560	
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00	
Satd. Flow (perm)				1665	1665	2787	3433	3539			3539	1560	
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	0	0	669	0	415	385	687	0	0	962	197	
RTOR Reduction (vph)	0	0	0	0	0	287	0	0	0	0	0	108	
Lane Group Flow (vph)	0	0	0	334	335	128	385	687	0	0	962	89	
Confl. Peds. (#/hr)												1	
Confl. Bikes (#/hr)									3			2	
Heavy Vehicles (%)	2%	2%	2%	3%	2%	2%	2%	2%	2%	2%	2%	2%	
Turn Type				Split	NA	Perm	Prot	NA			NA	Perm	
Protected Phases				4	4		1	6			2		
Permitted Phases						4						2	
Actuated Green, G (s)				23.8	23.8	23.8	14.2	61.1			42.9	42.9	
Effective Green, g (s)				23.8	23.8	23.8	14.2	61.1			42.9	42.9	
Actuated g/C Ratio				0.25	0.25	0.25	0.15	0.64			0.45	0.45	
Clearance Time (s)				5.1	5.1	5.1	4.0	5.0			5.0	5.0	
Vehicle Extension (s)				1.0	1.0	1.0	1.0	1.0			1.0	1.0	
Lane Grp Cap (vph)				417	417	698	513	2276			1598	704	
v/s Ratio Prot				0.20	c0.20		c0.11	0.19			c0.27		
v/s Ratio Perm						0.05						0.06	
v/c Ratio				0.80	0.80	0.18	0.75	0.30			0.60	0.13	
Uniform Delay, d1				33.4	33.4	28.0	38.7	7.5			19.6	15.2	
Progression Factor				1.00	1.00	1.00	1.13	1.13			1.05	2.12	
Incremental Delay, d2				10.0	10.1	0.0	4.2	0.3			1.5	0.3	
Delay (s)				43.4	43.5	28.0	47.9	8.8			22.1	32.5	
Level of Service				D	D	C	D	A			C	C	
Approach Delay (s)		0.0			37.5			22.8			23.9		
Approach LOS		A			D			C			C		
Intersection Summary													
HCM 2000 Control Delay			28.0		HCM 2000 Level of Service						C		
HCM 2000 Volume to Capacity ratio			0.69										
Actuated Cycle Length (s)			95.0		Sum of lost time (s)					14.1			
Intersection Capacity Utilization			65.1%		ICU Level of Service					C			
Analysis Period (min)			15										
c	Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Missouri Flat Rd & US 50 EB Ramps

01/03/2018

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	191	4	587	0	0	0	0	828	106	376	1174	0	
Future Volume (vph)	191	4	587	0	0	0	0	828	106	376	1174	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.1	4.1	4.1					4.9	4.9	3.5	4.9		
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	0.97	0.95		
Frbp, ped/bikes	1.00	1.00	1.00					1.00	0.99	1.00	1.00		
Flpb, ped/bikes	1.00	1.00	1.00					1.00	1.00	1.00	1.00		
Frt	1.00	0.86	0.85					1.00	0.85	1.00	1.00		
Flt Protected	0.95	1.00	1.00					1.00	1.00	0.95	1.00		
Satd. Flow (prot)	1681	1455	1504					3539	1562	3433	3539		
Flt Permitted	0.95	1.00	1.00					1.00	1.00	0.95	1.00		
Satd. Flow (perm)	1681	1455	1504					3539	1562	3433	3539		
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)	201	4	618	0	0	0	0	872	112	396	1236	0	
RTOR Reduction (vph)	0	66	66	0	0	0	0	0	42	0	0	0	
Lane Group Flow (vph)	181	255	255	0	0	0	0	872	70	396	1236	0	
Confl. Peds. (#/hr)												1	
Confl. Bikes (#/hr)									3			2	
Turn Type	Split	NA	Perm					NA	Perm	Prot	NA		
Protected Phases	8	8						6		5	2		
Permitted Phases			8						6				
Actuated Green, G (s)	20.5	20.5	20.5					37.0	37.0	25.0	65.5		
Effective Green, g (s)	20.5	20.5	20.5					37.0	37.0	25.0	65.5		
Actuated g/C Ratio	0.22	0.22	0.22					0.39	0.39	0.26	0.69		
Clearance Time (s)	4.1	4.1	4.1					4.9	4.9	3.5	4.9		
Vehicle Extension (s)	2.2	2.2	2.2					3.0	3.0	2.0	3.0		
Lane Grp Cap (vph)	362	313	324					1378	608	903	2440		
v/s Ratio Prot	0.11	c0.18						c0.25		0.12	c0.35		
v/s Ratio Perm			0.17						0.04				
v/c Ratio	0.50	0.82	0.79					0.63	0.11	0.44	0.51		
Uniform Delay, d1	32.7	35.4	35.2					23.5	18.5	29.2	7.0		
Progression Factor	1.00	1.00	1.00					1.04	0.98	1.29	0.27		
Incremental Delay, d2	0.6	14.4	11.3					2.2	0.4	0.1	0.6		
Delay (s)	33.3	49.8	46.4					26.6	18.5	37.7	2.5		
Level of Service	C	D	D					C	B	D	A		
Approach Delay (s)		44.9			0.0			25.6			11.1		
Approach LOS		D			A			C			B		
Intersection Summary													
HCM 2000 Control Delay			23.3									HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.65										
Actuated Cycle Length (s)			95.0									Sum of lost time (s)	12.5
Intersection Capacity Utilization			65.1%									ICU Level of Service	C
Analysis Period (min)			15										

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

6: Missouri Flat Rd & Mother Lode Dr

01/03/2018



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↖↗	↗	↖	↑↑	↑↑	↗
Traffic Volume (vph)	168	64	52	766	1545	216
Future Volume (vph)	168	64	52	766	1545	216
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.9	4.9	4.9
Lane Util. Factor	0.97	1.00	1.00	0.95	0.95	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
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)	3433	1568	1770	3539	3539	1547
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	3433	1568	1770	3539	3539	1547
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	177	67	55	806	1626	227
RTOR Reduction (vph)	0	58	0	0	0	65
Lane Group Flow (vph)	177	9	55	806	1626	162
Confl. Peds. (#/hr)						1
Confl. Bikes (#/hr)						2
Heavy Vehicles (%)	2%	3%	2%	2%	2%	2%
Turn Type	Prot	Perm	Prot	NA	NA	Perm
Protected Phases	8		1	6	2	
Permitted Phases		8				2
Actuated Green, G (s)	12.9	12.9	6.5	73.2	62.7	62.7
Effective Green, g (s)	12.9	12.9	6.5	73.2	62.7	62.7
Actuated g/C Ratio	0.14	0.14	0.07	0.77	0.66	0.66
Clearance Time (s)	4.0	4.0	4.0	4.9	4.9	4.9
Vehicle Extension (s)	2.0	2.0	2.0	3.0	3.0	3.0
Lane Grp Cap (vph)	466	212	121	2726	2335	1021
v/s Ratio Prot	c0.05		c0.03	0.23	c0.46	
v/s Ratio Perm		0.01				0.10
v/c Ratio	0.38	0.04	0.45	0.30	0.70	0.16
Uniform Delay, d1	37.4	35.7	42.5	3.2	10.2	6.1
Progression Factor	1.00	1.00	1.00	1.00	1.23	1.53
Incremental Delay, d2	0.2	0.0	1.0	0.3	1.4	0.3
Delay (s)	37.6	35.7	43.5	3.5	13.9	9.7
Level of Service	D	D	D	A	B	A
Approach Delay (s)	37.1			6.1	13.4	
Approach LOS	D			A	B	




























Intersection Summary

HCM 2000 Control Delay	13.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	95.0	Sum of lost time (s)	12.9
Intersection Capacity Utilization	55.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

7: Missouri Flat Rd & Forni Rd

01/03/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	 							 			 	
Traffic Volume (vph)	461	34	42	31	48	179	47	758	22	146	1136	327
Future Volume (vph)	461	34	42	31	48	179	47	758	22	146	1136	327
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0
Lane Util. Factor	*1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3539	1863	1583	1770	1863	1557	1770	3539	1451	1770	3539	1549
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3539	1863	1583	1770	1863	1557	1770	3539	1451	1770	3539	1549
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)	485	36	44	33	51	188	49	798	23	154	1196	344
RTOR Reduction (vph)	0	0	32	0	0	169	0	0	15	0	0	87
Lane Group Flow (vph)	485	36	12	33	51	19	49	798	8	154	1196	257
Confl. Bikes (#/hr)						2			1			2
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	9%	2%	2%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases			8			4			6			2
Actuated Green, G (s)	19.6	25.1	25.1	4.1	9.6	9.6	6.1	35.4	35.4	13.3	42.6	42.6
Effective Green, g (s)	19.6	25.1	25.1	4.1	9.6	9.6	6.1	35.4	35.4	13.3	42.6	42.6
Actuated g/C Ratio	0.20	0.26	0.26	0.04	0.10	0.10	0.06	0.37	0.37	0.14	0.44	0.44
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	5.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	3.0	3.0	2.0	3.0	3.0
Lane Grp Cap (vph)	723	487	414	75	186	155	112	1306	535	245	1572	688
v/s Ratio Prot	c0.14	0.02		0.02	c0.03		0.03	0.23		c0.09	c0.34	
v/s Ratio Perm			0.01			0.01			0.01			0.17
v/c Ratio	0.67	0.07	0.03	0.44	0.27	0.12	0.44	0.61	0.02	0.63	0.76	0.37
Uniform Delay, d1	35.2	26.7	26.3	44.8	39.9	39.3	43.2	24.6	19.2	39.0	22.4	17.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.9	0.0	0.0	1.5	0.3	0.1	1.0	0.9	0.0	3.6	2.2	0.3
Delay (s)	37.1	26.7	26.3	46.3	40.2	39.4	44.2	25.5	19.2	42.6	24.6	18.1
Level of Service	D	C	C	D	D	D	D	C	B	D	C	B
Approach Delay (s)		35.6			40.4			26.4			24.9	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM 2000 Control Delay			28.3									C
HCM 2000 Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			95.9								18.0	
Intersection Capacity Utilization			66.2%									C
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

8: Missouri Flat Rd & Golden Center Dr

01/03/2018





















Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕↕		↕	↕↕	↕
Traffic Volume (vph)	14	9	81	105	14	57	70	698	51	96	1028	7
Future Volume (vph)	14	9	81	105	14	57	70	698	51	96	1028	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	5.0		4.0	5.0	5.0
Lane Util. Factor		1.00			1.00		1.00	0.95		1.00	0.95	1.00
Frbp, ped/bikes		0.98			1.00		1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	1.00
Frt		0.89			0.96		1.00	0.99		1.00	1.00	0.85
Flt Protected		0.99			0.97		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1627			1720		1770	3498		1770	3539	1534
Flt Permitted		0.95			0.76		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)		1558			1344		1770	3498		1770	3539	1534
Peak-hour factor, PHF	0.81	0.81	0.81	0.96	0.96	0.96	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	17	11	100	109	15	59	75	751	55	103	1105	8
RTOR Reduction (vph)	0	76	0	0	17	0	0	6	0	0	0	4
Lane Group Flow (vph)	0	52	0	0	166	0	75	800	0	103	1105	4
Confl. Peds. (#/hr)												7
Confl. Bikes (#/hr)			1						2			
Heavy Vehicles (%)	2%	2%	2%	3%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA		Perm	NA		Prot	NA		Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8								6
Actuated Green, G (s)		15.1			15.1		6.8	28.3		7.7	29.2	29.2
Effective Green, g (s)		15.1			15.1		6.8	28.3		7.7	29.2	29.2
Actuated g/C Ratio		0.24			0.24		0.11	0.44		0.12	0.46	0.46
Clearance Time (s)		4.0			4.0		4.0	5.0		4.0	5.0	5.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)		367			316		187	1544		212	1612	698
v/s Ratio Prot							0.04	0.23		c0.06	c0.31	
v/s Ratio Perm		0.03			c0.12							0.00
v/c Ratio		0.14			0.53		0.40	0.52		0.49	0.69	0.01
Uniform Delay, d1		19.4			21.4		26.7	13.0		26.4	13.8	9.5
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2		0.2			1.6		1.4	0.3		1.8	1.2	0.0
Delay (s)		19.5			23.0		28.2	13.3		28.1	15.0	9.5
Level of Service		B			C		C	B		C	B	A
Approach Delay (s)		19.5			23.0		14.5			16.1		
Approach LOS		B			C		B			B		

Intersection Summary		
HCM 2000 Control Delay	16.2	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.62	B
Actuated Cycle Length (s)	64.1	Sum of lost time (s)
Intersection Capacity Utilization	59.8%	13.0
Analysis Period (min)	15	ICU Level of Service
		B
c	Critical Lane Group	

HCM Unsignalized Intersection Capacity Analysis
 10: China Garden Rd & Missouri Flat Rd

01/03/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	0	0	12	1	140	2	682	29	142	1026	1
Future Volume (Veh/h)	2	0	0	12	1	140	2	682	29	142	1026	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.25	0.25	0.85	0.85	0.85	0.92	0.92	0.92	0.96	0.96	0.96
Hourly flow rate (vph)	8	0	0	14	1	165	2	741	32	148	1069	1
Pedestrians												1
Lane Width (ft)												12.0
Walking Speed (ft/s)												4.0
Percent Blockage												0
Right turn flare (veh)												
Median type								TWLTL				None
Median storage (veh)								2				
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	2293	2142	1070	2126	2127	758	1070			773		
vC1, stage 1 conf vol	1366	1366		761	761							
vC2, stage 2 conf vol	928	777		1365	1366							
vCu, unblocked vol	2293	2142	1070	2126	2127	758	1070			773		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	80	100	100	90	99	59	100			82		
cM capacity (veh/h)	40	147	269	136	159	407	651			833		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2							
Volume Total	8	180	775	148	1070							
Volume Left	8	14	2	148	0							
Volume Right	0	165	32	0	1							
cSH	40	350	651	833	1700							
Volume to Capacity	0.20	0.51	0.00	0.18	0.63							
Queue Length 95th (ft)	16	70	0	16	0							
Control Delay (s)	116.4	25.7	0.1	10.3	0.0							
Lane LOS	F	D	A	B								
Approach Delay (s)	116.4	25.7	0.1	1.2								
Approach LOS	F	D										
Intersection Summary												
Average Delay			3.3									
Intersection Capacity Utilization			111.1%		ICU Level of Service					H		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

11: Missouri Flat Road & Industrial Dr

01/03/2018





















Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	18	18	7	663	1021	11
Future Volume (Veh/h)	18	18	7	663	1021	11
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	20	20	8	729	1122	12
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL	TWLTL		
Median storage (veh)			2	2		
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1873	1128	1134			
vC1, stage 1 conf vol	1128					
vC2, stage 2 conf vol	745					
vCu, unblocked vol	1873	1128	1134			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3	2.2			
p0 queue free %	92	92	99			
cM capacity (veh/h)	260	249	616			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	40	8	729	1134		
Volume Left	20	8	0	0		
Volume Right	20	0	0	12		
cSH	254	616	1700	1700		
Volume to Capacity	0.16	0.01	0.43	0.67		
Queue Length 95th (ft)	14	1	0	0		
Control Delay (s)	21.8	10.9	0.0	0.0		
Lane LOS	C	B				
Approach Delay (s)	21.8	0.1		0.0		
Approach LOS	C					
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			64.4%	ICU Level of Service	C	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

12: Missouri Flat Road & Enterprise Dr

01/03/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	78	1	30	1	1	1	7	573	2	4	934	62
Future Volume (Veh/h)	78	1	30	1	1	1	7	573	2	4	934	62
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	83	1	32	1	1	1	7	610	2	4	994	66
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								TWLT			TWLT	
Median storage (veh)								2			2	
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1660	1661	1027	1660	1693	611	1060			612		
vC1, stage 1 conf vol	1035	1035		625	625							
vC2, stage 2 conf vol	626	626		1034	1068							
vCu, unblocked vol	1660	1661	1027	1660	1693	611	1060			612		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	66	100	89	100	100	100	99			100		
cM capacity (veh/h)	242	265	285	215	254	494	657			962		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	116	3	7	612	4	1060						
Volume Left	83	1	7	0	4	0						
Volume Right	32	1	0	2	0	66						
cSH	252	282	657	1700	962	1700						
Volume to Capacity	0.46	0.01	0.01	0.36	0.00	0.62						
Queue Length 95th (ft)	56	1	1	0	0	0						
Control Delay (s)	30.8	17.9	10.5	0.0	8.8	0.0						
Lane LOS	D	C	B		A							
Approach Delay (s)	30.8	17.9	0.1		0.0							
Approach LOS	D	C										
Intersection Summary												
Average Delay			2.1									
Intersection Capacity Utilization			71.8%		ICU Level of Service					C		
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

13: Pleasant Valley Rd & Missouri Flat Rd

01/03/2018



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	232	259	253	327	717	304
Future Volume (vph)	232	259	253	327	717	304
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.1	4.1	4.6	4.6	4.0
Lane Util. Factor	0.97	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)	3433	1863	1863	1583	1770	1553
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	3433	1863	1863	1583	1770	1553
Peak-hour factor, PHF	0.94	0.94	0.90	0.90	0.88	0.88
Adj. Flow (vph)	247	276	281	363	815	345
RTOR Reduction (vph)	0	0	0	93	0	141
Lane Group Flow (vph)	247	276	281	270	815	204
Heavy Vehicles (%)	2%	2%	2%	2%	2%	4%
Turn Type	Prot	NA	NA	pm+ov	Prot	pm+ov
Protected Phases	5	2	6	7	7	5
Permitted Phases				6		4
Actuated Green, G (s)	9.3	27.9	14.6	44.9	30.3	39.6
Effective Green, g (s)	9.3	27.9	14.6	44.9	30.3	39.6
Actuated g/C Ratio	0.14	0.42	0.22	0.67	0.45	0.59
Clearance Time (s)	4.0	4.1	4.1	4.6	4.6	4.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	477	776	406	1062	801	919
v/s Ratio Prot	c0.07	0.15	c0.15	0.11	c0.46	0.03
v/s Ratio Perm				0.06		0.10
v/c Ratio	0.52	0.36	0.69	0.25	1.02	0.22
Uniform Delay, d1	26.7	13.3	24.1	4.4	18.3	6.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.1	4.1	0.0	36.2	0.0
Delay (s)	27.1	13.4	28.2	4.4	54.5	6.5
Level of Service	C	B	C	A	D	A
Approach Delay (s)		19.9	14.8		40.2	
Approach LOS		B	B		D	
Intersection Summary						
HCM 2000 Control Delay			28.6		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.84			
Actuated Cycle Length (s)			66.9		Sum of lost time (s)	12.7
Intersection Capacity Utilization			70.2%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis

14: Pleasant Valley Rd & Commerce Way

01/03/2018



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↑	↗	↘	↘
Traffic Volume (veh/h)	14	508	517	40	52	48
Future Volume (Veh/h)	14	508	517	40	52	48
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.85	0.85	0.79	0.79
Hourly flow rate (vph)	15	558	608	47	66	61
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None TWLTL					
Median storage (veh)	2					
Upstream signal (ft)	750					
pX, platoon unblocked	0.89				0.89	0.89
vC, conflicting volume	655				1196	608
vC1, stage 1 conf vol					608	
vC2, stage 2 conf vol					588	
vCu, unblocked vol	555				1160	502
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)	2.2				3.5	3.3
p0 queue free %	98				84	88
cM capacity (veh/h)	908				416	509
Direction, Lane #	EB 1	WB 1	WB 2	SB 1		
Volume Total	573	608	47	127		
Volume Left	15	0	0	66		
Volume Right	0	0	47	61		
cSH	908	1700	1700	456		
Volume to Capacity	0.02	0.36	0.03	0.28		
Queue Length 95th (ft)	1	0	0	28		
Control Delay (s)	0.5	0.0	0.0	15.9		
Lane LOS	A			C		
Approach Delay (s)	0.5	0.0		15.9		
Approach LOS				C		
Intersection Summary						
Average Delay			1.7			
Intersection Capacity Utilization			50.5%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

15: Pleasant Valley Rd & Forni Rd












01/03/2018



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	88	402	331	36	22	147
Future Volume (Veh/h)	88	402	331	36	22	147
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	95	432	356	39	24	158
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	395			998	376	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	395			998	376	
tC, single (s)	4.1			6.4	6.2	
tC, 2 stage (s)						
tF (s)	2.2			3.5	3.3	
p0 queue free %	92			90	76	
cM capacity (veh/h)	1164			248	671	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	527	395	182			
Volume Left	95	0	24			
Volume Right	0	39	158			
cSH	1164	1700	548			
Volume to Capacity	0.08	0.23	0.33			
Queue Length 95th (ft)	7	0	36			
Control Delay (s)	2.3	0.0	14.8			
Lane LOS	A		B			
Approach Delay (s)	2.3	0.0	14.8			
Approach LOS			B			
Intersection Summary						
Average Delay			3.5			
Intersection Capacity Utilization			65.9%	ICU Level of Service	C	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 16: SR-49 & Pleasant Valley Rd

01/03/2018

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	324	205	211	265	99	148
Future Volume (vph)	324	205	211	265	99	148
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	345	218	224	282	105	157
Direction, Lane #	EB 1	WB 1	WB 2	NB 1		
Volume Total (vph)	563	224	282	262		
Volume Left (vph)	0	224	0	105		
Volume Right (vph)	218	0	0	157		
Hadj (s)	-0.20	0.53	0.03	-0.25		
Departure Headway (s)	5.4	6.6	6.1	6.2		
Degree Utilization, x	0.84	0.41	0.48	0.45		
Capacity (veh/h)	657	526	569	543		
Control Delay (s)	30.4	13.1	13.5	14.2		
Approach Delay (s)	30.4	13.3		14.2		
Approach LOS	D	B		B		
Intersection Summary						
Delay			20.7			
Level of Service			C			
Intersection Capacity Utilization			65.8%	ICU Level of Service	C	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

17: Pleasant Valley Rd & China Garden Rd

01/03/2018
























Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	9	890	583	45	9	15
Future Volume (Veh/h)	9	890	583	45	9	15
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	10	978	641	49	10	16
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	690			1664	666	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	690			1664	666	
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			91	97	
cM capacity (veh/h)	905			105	460	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	988	690	26			
Volume Left	10	0	10			
Volume Right	0	49	16			
cSH	905	1700	201			
Volume to Capacity	0.01	0.41	0.13			
Queue Length 95th (ft)	1	0	11			
Control Delay (s)	0.3	0.0	25.6			
Lane LOS	A		D			
Approach Delay (s)	0.3	0.0	25.6			
Approach LOS			D			
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			64.0%	ICU Level of Service	C	
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

















18: Pleasant Valley Rd & SR 49

01/03/2018

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	93	775	76	19	415	114	65	25	27	213	32	113	
Future Volume (vph)	93	775	76	19	415	114	65	25	27	213	32	113	
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	3.0	4.6		3.0	4.6	4.6		4.1	4.1	3.0	3.0		
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00		1.00	1.00	1.00	1.00		
Frbp, ped/bikes	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	0.98		
Flpb, ped/bikes	1.00	1.00		1.00	1.00	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	0.88		
Flt Protected	0.95	1.00		0.95	1.00	1.00		0.97	1.00	0.95	1.00		
Satd. Flow (prot)	1770	3492		1770	1863	1583		1798	1583	1770	1617		
Flt Permitted	0.95	1.00		0.95	1.00	1.00		0.97	1.00	0.95	1.00		
Satd. Flow (perm)	1770	3492		1770	1863	1583		1798	1583	1770	1617		
Peak-hour factor, PHF	0.98	0.98	0.98	0.87	0.87	0.87	0.92	0.92	0.92	0.82	0.82	0.82	
Adj. Flow (vph)	95	791	78	22	477	131	71	27	29	260	39	138	
RTOR Reduction (vph)	0	5	0	0	0	56	0	0	26	0	81	0	
Lane Group Flow (vph)	95	864	0	22	477	75	0	98	3	260	96	0	
Confl. Peds. (#/hr)												1	
Turn Type	Prot	NA		Prot	NA	Perm	Split	NA	Perm	Split	NA		
Protected Phases	1	6		5	2		4	4		8	8		
Permitted Phases						2			4				
Actuated Green, G (s)	7.4	32.3		2.3	27.2	27.2		7.6	7.6	21.2	21.2		
Effective Green, g (s)	7.4	32.3		2.3	27.2	27.2		7.6	7.6	21.2	21.2		
Actuated g/C Ratio	0.09	0.41		0.03	0.35	0.35		0.10	0.10	0.27	0.27		
Clearance Time (s)	3.0	4.6		3.0	4.6	4.6		4.1	4.1	3.0	3.0		
Vehicle Extension (s)	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0	2.0		
Lane Grp Cap (vph)	167	1444		52	648	551		174	154	480	438		
v/s Ratio Prot	c0.05	0.25		0.01	c0.26			c0.05		c0.15	0.06		
v/s Ratio Perm						0.05			0.00				
v/c Ratio	0.57	0.60		0.42	0.74	0.14		0.56	0.02	0.54	0.22		
Uniform Delay, d1	33.8	17.8		37.2	22.3	17.4		33.7	31.9	24.3	22.0		
Progression Factor	1.00	1.00		1.00	1.00	1.00		1.00	1.00	1.00	1.00		
Incremental Delay, d2	2.6	0.4		2.0	3.8	0.0		2.5	0.0	0.7	0.1		
Delay (s)	36.5	18.3		39.3	26.1	17.5		36.1	31.9	25.0	22.1		
Level of Service	D	B		D	C	B		D	C	C	C		
Approach Delay (s)		20.1			24.7			35.2			23.8		
Approach LOS		C			C			D			C		
Intersection Summary													
HCM 2000 Control Delay			23.1									HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.63										
Actuated Cycle Length (s)			78.1									Sum of lost time (s)	14.7
Intersection Capacity Utilization			59.6%									ICU Level of Service	B
Analysis Period (min)			15										
c	Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
 19: Diamond Rd & Lime Kiln Rd/Black Rice Ln

01/03/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	79	9	35	6	3	2	40	212	20	20	357	50
Future Volume (Veh/h)	79	9	35	6	3	2	40	212	20	20	357	50
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	86	10	38	7	3	2	43	230	22	22	388	54
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	790	797	415	829	813	241	442			252		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	790	797	415	829	813	241	442			252		
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 %	71	97	94	97	99	100	96			98		
cM capacity (veh/h)	292	302	637	255	296	798	1118			1313		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	134	12	295	464								
Volume Left	86	7	43	22								
Volume Right	38	2	22	54								
cSH	346	299	1118	1313								
Volume to Capacity	0.39	0.04	0.04	0.02								
Queue Length 95th (ft)	44	3	3	1								
Control Delay (s)	21.8	17.5	1.5	0.5								
Lane LOS	C	C	A	A								
Approach Delay (s)	21.8	17.5	1.5	0.5								
Approach LOS	C	C										
Intersection Summary												
Average Delay			4.2									
Intersection Capacity Utilization			43.7%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

21: Diamond Rd & Bradley Dr

01/03/2018



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	17	32	29	264	395	8
Future Volume (Veh/h)	17	32	29	264	395	8
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.67	0.67	0.78	0.78	0.96	0.96
Hourly flow rate (vph)	25	48	37	338	411	8
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)	2					
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	827	415	419			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	827	415	419			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	92	92	97			
cM capacity (veh/h)	330	637	1140			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1		
Volume Total	73	37	338	419		
Volume Left	25	37	0	0		
Volume Right	48	0	0	8		
cSH	964	1140	1700	1700		
Volume to Capacity	0.08	0.03	0.20	0.25		
Queue Length 95th (ft)	6	3	0	0		
Control Delay (s)	13.1	8.3	0.0	0.0		
Lane LOS	B	A				
Approach Delay (s)	13.1	0.8		0.0		
Approach LOS	B					
Intersection Summary						
Average Delay	1.5					
Intersection Capacity Utilization	34.1%			ICU Level of Service	A	
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

22: US-50 WB On-ramp/US-50 WB Off-ramp & El Dorado Rd

01/03/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔			↔			↔	
Traffic Volume (veh/h)	0	0	0	82	0	38	98	160	0	0	88	53
Future Volume (Veh/h)	0	0	0	82	0	38	98	160	0	0	88	53
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.81	0.81	0.81	0.73	0.73	0.73	0.84	0.84	0.84
Hourly flow rate (vph)	0	0	0	101	0	47	134	219	0	0	105	63
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	670	624	136	624	655	219	168			219		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	670	624	136	624	655	219	168			219		
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 %	100	100	100	73	100	94	90			100		
cM capacity (veh/h)	324	364	912	369	349	821	1410			1350		
Direction, Lane #												
	WB 1	NB 1	SB 1									
Volume Total	148	353	168									
Volume Left	101	134	0									
Volume Right	47	0	63									
cSH	447	1410	1700									
Volume to Capacity	0.33	0.10	0.10									
Queue Length 95th (ft)	36	8	0									
Control Delay (s)	17.0	3.5	0.0									
Lane LOS	C	A										
Approach Delay (s)	17.0	3.5	0.0									
Approach LOS	C											
Intersection Summary												
Average Delay			5.6									
Intersection Capacity Utilization		38.6%		ICU Level of Service		A						
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

23: El Dorado Rd & US-50 EB Off-ramp/US-50 EB On-ramp

01/03/2018



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕						↕			↕	
Traffic Volume (veh/h)	106	0	113	0	0	0	0	152	95	43	127	0
Future Volume (Veh/h)	106	0	113	0	0	0	0	152	95	43	127	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.86	0.86	0.86	0.92	0.92	0.92	0.65	0.65	0.65	0.90	0.90	0.90
Hourly flow rate (vph)	123	0	131	0	0	0	0	234	146	48	141	0
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	544	617	141	675	544	307	141			380		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	544	617	141	675	544	307	141			380		
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 %	72	100	86	100	100	100	100			96		
cM capacity (veh/h)	436	389	907	305	428	733	1442			1178		
Direction, Lane #												
	EB 1	NB 1	SB 1									
Volume Total	254	380	189									
Volume Left	123	0	48									
Volume Right	131	146	0									
cSH	595	1700	1178									
Volume to Capacity	0.43	0.22	0.04									
Queue Length 95th (ft)	53	0	3									
Control Delay (s)	15.5	0.0	2.3									
Lane LOS	C		A									
Approach Delay (s)	15.5	0.0	2.3									
Approach LOS	C											
Intersection Summary												
Average Delay			5.3									
Intersection Capacity Utilization			45.7%	ICU Level of Service						A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

33: Missouri Flat Rd

01/03/2018





















Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			↑↑	↗		↑↑
Traffic Volume (veh/h)	0	0	818	588	0	1609
Future Volume (Veh/h)	0	0	818	588	0	1609
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	0	861	619	0	1694
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)	365					
pX, platoon unblocked	0.70					
vC, conflicting volume	1708	430			1480	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1141	430			1480	
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)	135	573			451	
Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2	
Volume Total	430	430	619	847	847	
Volume Left	0	0	0	0	0	
Volume Right	0	0	619	0	0	
cSH	1700	1700	1700	1700	1700	
Volume to Capacity	0.25	0.25	0.36	0.50	0.50	
Queue Length 95th (ft)	0	0	0	0	0	
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	
Lane LOS						
Approach Delay (s)	0.0			0.0		
Approach LOS						
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			47.8%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

35: Missouri Flat Rd

01/03/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	30	0	0	88	0	739	30	0	1101	112
Future Volume (Veh/h)	0	0	30	0	0	88	0	739	30	0	1101	112
Sign Control	Stop			Stop			Free				Free	
Grade	0%			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
Hourly flow rate (vph)	0	0	32	0	0	93	0	778	32	0	1159	118
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked	0.79	0.79	0.72	0.79	0.79	0.85	0.72			0.85		
vC, conflicting volume	1641	1969	580	1390	2055	389	1277			810		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	453	866	0	136	974	0	607			432		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	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 %	100	100	96	100	100	90	100			100		
cM capacity (veh/h)	350	230	781	625	199	925	696			959		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	32	93	389	389	32	580	580	118				
Volume Left	0	0	0	0	0	0	0	0				
Volume Right	32	93	0	0	32	0	0	118				
cSH	781	925	1700	1700	1700	1700	1700	1700				
Volume to Capacity	0.04	0.10	0.23	0.23	0.02	0.34	0.34	0.07				
Queue Length 95th (ft)	3	8	0	0	0	0	0	0				
Control Delay (s)	9.8	9.3	0.0	0.0	0.0	0.0	0.0	0.0				
Lane LOS	A	A										
Approach Delay (s)	9.8	9.3	0.0			0.0						
Approach LOS	A	A										
Intersection Summary												
Average Delay			0.5									
Intersection Capacity Utilization			40.4%	ICU Level of Service				A				
Analysis Period (min)			15									

3: Missouri Flat Rd & Plaza Dr Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.3	0.3	0.2	0.3	0.3	0.3	0.0	0.0	0.0	3.5	1.5	3.6
Total Del/Veh (s)	40.1	41.3	19.0	35.6	34.5	26.4	55.3	22.7	7.4	50.3	26.7	13.8

3: Missouri Flat Rd & Plaza Dr Performance by movement

Movement	All
Denied Del/Veh (s)	0.4
Total Del/Veh (s)	28.5

4: Missouri Flat Rd & US 50 WB Ramps Performance by movement

Movement	WBL	WBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.7	1.2	0.0	0.0	0.0	0.0	0.3
Total Del/Veh (s)	36.4	29.2	62.8	6.3	19.3	1.8	25.3

5: Missouri Flat Rd & US 50 EB Ramps Performance by movement

Movement	EBL	EBT	EBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	1.8	1.3	1.8	0.0	0.0	0.0	0.0	0.4
Total Del/Veh (s)	46.2	74.8	51.3	22.5	5.0	26.4	16.1	26.7

6: Missouri Flat Rd & Mother Lode Dr Performance by movement

Movement	EBL	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	3.8	0.5	0.0	0.0	0.0	0.0	0.2
Total Del/Veh (s)	53.2	17.7	46.5	10.0	8.1	1.6	11.7

7: Missouri Flat Rd & Forni Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL
Denied Del/Veh (s)	4.6	2.1	4.7	3.6	0.7	3.8	0.0	0.0	0.0	0.0	0.0	0.0
Total Del/Veh (s)	73.2	37.5	16.1	43.3	44.1	18.2	52.6	48.3	22.5	4.9	50.6	52.0

7: Missouri Flat Rd & Forni Rd Performance by movement

Movement	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	1.0
Total Del/Veh (s)	25.5	15.6	32.2

33: Missouri Flat Rd Performance by movement

Movement	NBT	NBR	SBT	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0
Total Del/Veh (s)	5.0	6.7	2.7	4.1

Total Network Performance

Denied Del/Veh (s)	1.5
Total Del/Veh (s)	76.4

Intersection: 3: Missouri Flat Rd & Plaza Dr

Movement	EB	EB	WB	WB	NB	NB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	R	L	LTR	L	L	T	T	R	L	T	TR
Maximum Queue (ft)	274	199	292	287	210	221	174	178	183	107	206	175
Average Queue (ft)	141	70	155	149	103	127	62	81	85	42	107	76
95th Queue (ft)	234	157	254	253	184	204	140	147	150	89	176	145
Link Distance (ft)	680	680	469	469			435	435	435		847	
Upstream Blk Time (%)							0					
Queuing Penalty (veh)							1					
Storage Bay Dist (ft)					300	300				120		400
Storage Blk Time (%)					0	1				0	8	
Queuing Penalty (veh)					1	1				0	18	

Intersection: 4: Missouri Flat Rd & US 50 WB Ramps

Movement	WB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	LT	R	R	L	L	T	T	T	T
Maximum Queue (ft)	308	362	285	183	186	211	198	151	291	246
Average Queue (ft)	180	219	135	89	103	124	31	20	116	76
95th Queue (ft)	279	315	230	154	164	184	122	97	236	182
Link Distance (ft)		1375	1375				375	375	435	435
Upstream Blk Time (%)							0	0	0	
Queuing Penalty (veh)							1	0	0	
Storage Bay Dist (ft)	400			400	140	140				
Storage Blk Time (%)		0	0		2	11	0			
Queuing Penalty (veh)		0	0		6	35	0			

Intersection: 5: Missouri Flat Rd & US 50 EB Ramps

Movement	EB	EB	EB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LTR	R	T	T	R	L	L	T	T
Maximum Queue (ft)	409	492	403	182	177	142	186	228	309	311
Average Queue (ft)	165	273	226	165	101	22	65	81	171	206
95th Queue (ft)	388	520	420	200	178	94	155	178	278	311
Link Distance (ft)		1085		165	165				375	375
Upstream Blk Time (%)		0		21	2	0			0	
Queuing Penalty (veh)		0		98	8	0			0	
Storage Bay Dist (ft)	400		400			80	140	140		
Storage Blk Time (%)	1	5	3		15	0	1	4	9	
Queuing Penalty (veh)	4	19	15		16	0	7	21	33	

Intersection: 6: Missouri Flat Rd & Mother Lode Dr

Movement	EB	EB	EB	NB	NB	NB	SB	SB
Directions Served	L	L	R	L	T	T	T	T
Maximum Queue (ft)	213	180	120	161	258	172	224	205
Average Queue (ft)	86	56	37	46	120	58	136	143
95th Queue (ft)	175	127	86	107	241	136	235	219
Link Distance (ft)			747		280	280	165	165
Upstream Blk Time (%)					1		7	7
Queuing Penalty (veh)					2		40	42
Storage Bay Dist (ft)	200	200		140				
Storage Blk Time (%)	2	0		0	7			
Queuing Penalty (veh)	2	0		0	4			

Intersection: 7: Missouri Flat Rd & Forni Rd

Movement	EB	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB
Directions Served	L	L	T	R	L	T	R	UL	T	T	R	UL
Maximum Queue (ft)	293	366	406	103	80	119	169	95	253	292	46	279
Average Queue (ft)	196	241	112	27	27	43	81	38	139	166	6	113
95th Queue (ft)	320	384	451	79	66	94	140	82	232	263	33	220
Link Distance (ft)			717			758			480	480		
Upstream Blk Time (%)			3									
Queuing Penalty (veh)			0									
Storage Bay Dist (ft)	200	200		160	200		200	240			160	300
Storage Blk Time (%)	13	28	0				0		1	9		0
Queuing Penalty (veh)	10	21	0				0		0	2		1

Intersection: 7: Missouri Flat Rd & Forni Rd

Movement	SB	SB	SB
Directions Served	T	T	R
Maximum Queue (ft)	454	499	240
Average Queue (ft)	209	229	116
95th Queue (ft)	447	467	274
Link Distance (ft)	1996	1996	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			160
Storage Blk Time (%)	3	16	0
Queuing Penalty (veh)	4	51	0

Intersection: 33: Missouri Flat Rd

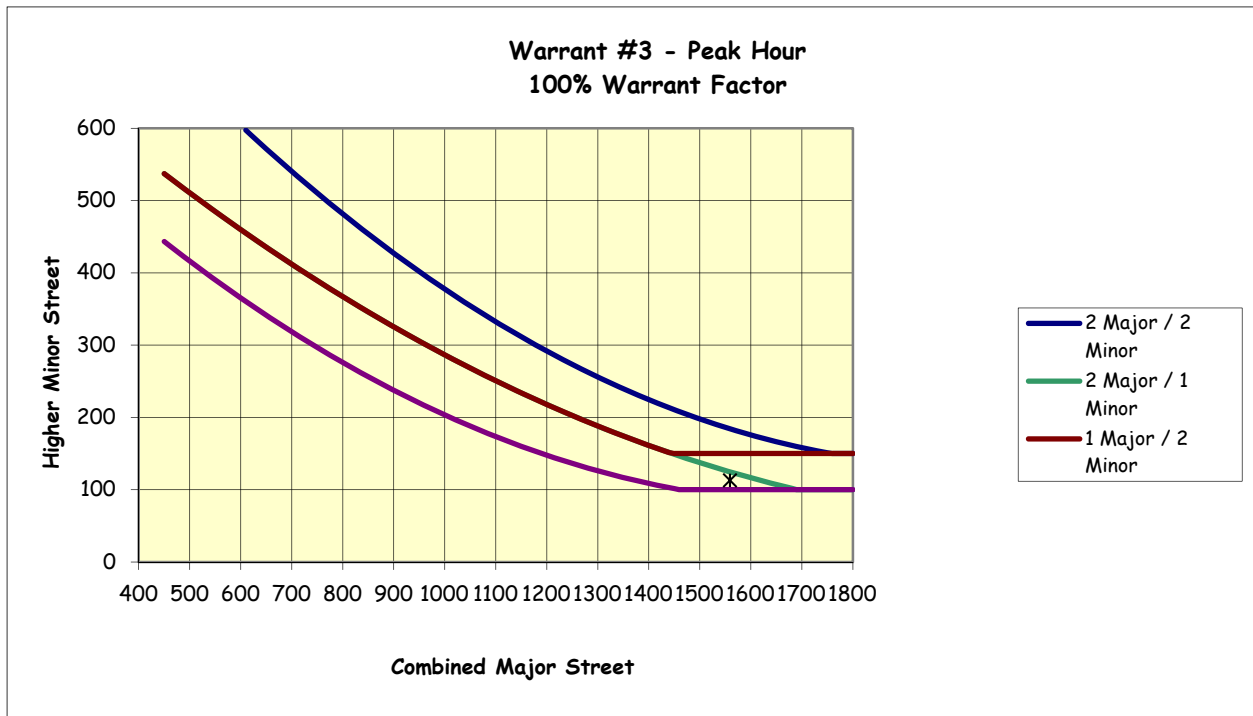
Movement	NB
Directions Served	T
Maximum Queue (ft)	62
Average Queue (ft)	5
95th Queue (ft)	40
Link Distance (ft)	1996
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

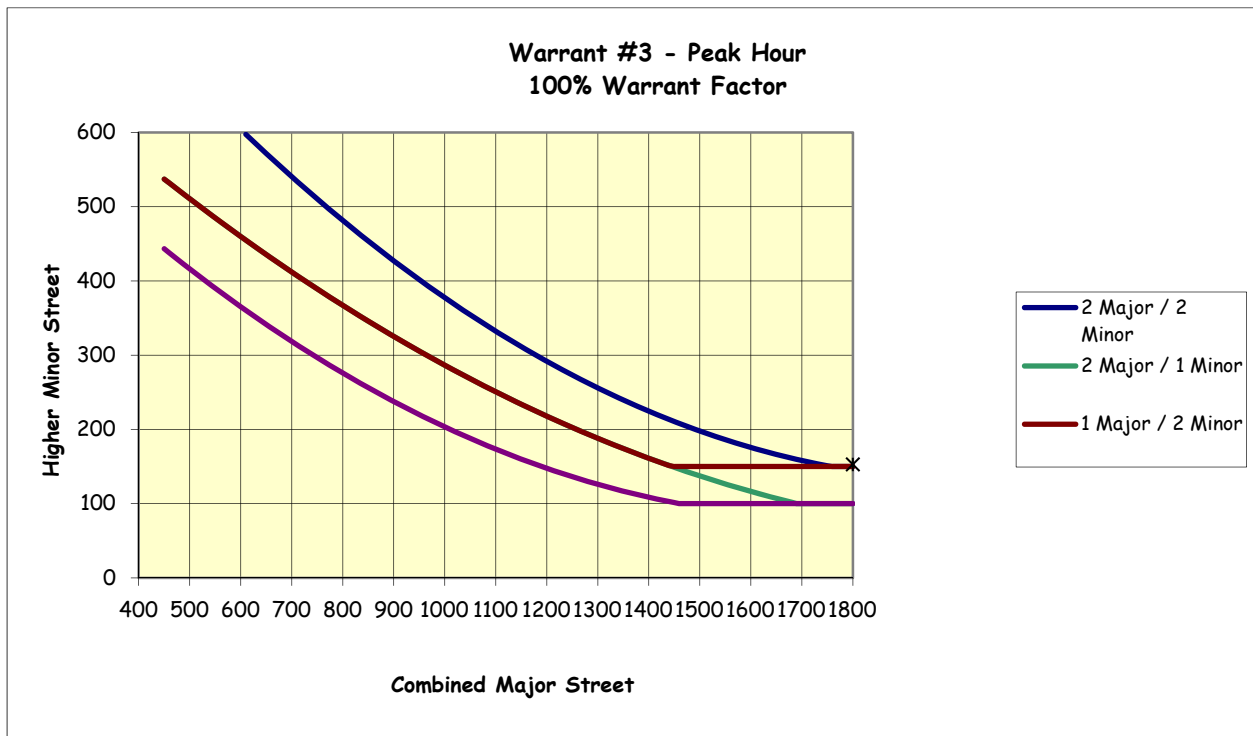
Network wide Queuing Penalty: 462

APPENDIX C: SIGNAL WARRANT ANALYSIS WORKSHEETS

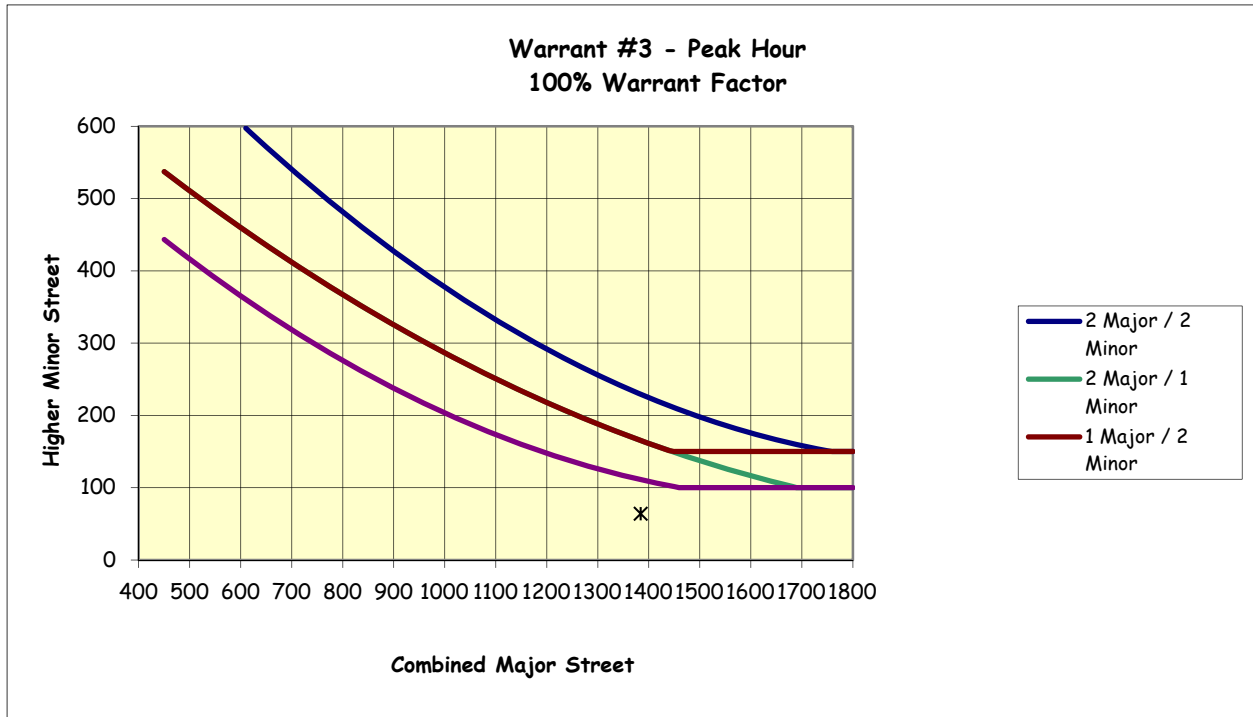
Missouri Flat Road and China Garden Road – AM Peak



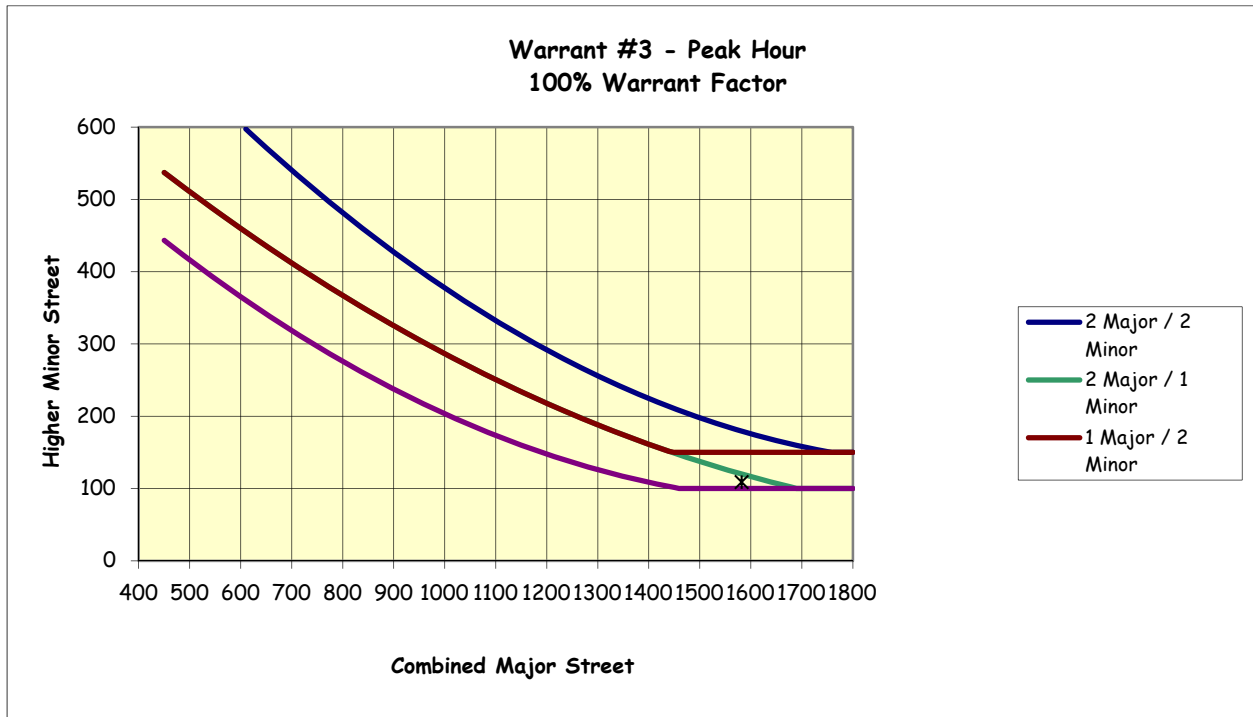
Missouri Flat Road and China Garden Road – PM Peak



Missouri Flat Road and Enterprise Drive – AM Peak



Missouri Flat Road and Enterprise Drive – PM Peak



APPENDIX D: US 50 FREEWAY MAINLINE AND MERGE-DIVERGE ANALYSIS WORKSHEETS

FREEWAY LEVEL OF SERVICE ANALYSIS (HCM 2010)

**2015 Existing US-50 - EB
WEEKDAY MORNING PEAK HOUR**

PM	From	To	Miles	Ramp Density (per mile)	Number of Lanes in One Direction	Lane Width (ft)	Aux Lane ?	HOV Lane?	Right-side Lateral Clearance (ft)	Terrain	Use Measured FFS?	Measured Free Flow Speed (mph)	F LW Adj	F LC Adj	TRD Adj	Base Free Flow Speed (mph)	FFS Curve	Base Capacity (pc/h/ln)	Total PHV (vph)	HOV Lane Utilization (%)	HOV Lane PHV (vph)	Mixed Flow + HOV PHV (vph)	Peak Hour Factor	% Trucks and Buses	% RV	Driver Population Factor F P Adj	F HV Adj	Flow Rate V P (pc/h/ln)	CAF Default = 1	Segment Speed (mi/h)	Density (pc/mi/ln)	LOS
12.19	GREENSTONE RD	EL DORADO ROAD	1.82	1	2	12	0	0	10	R	Yes	65	0.00	0.00	1.00	72.2	65.0	2,350	1544	0.0%	0	1,544	0.92	3.4%	1.0%	1	0.943	890	1.00	65.00	13.7	B
14.011	EL DORADO ROAD	MISSOURI FLAT ROAD	1.04	1	2	12	0	0	10	R	Yes	65	0.00	0.00	1.00	72.2	65.0	2,350	1467	0.0%	0	1,467	0.92	3.4%	1.0%	1	0.943	846	1.00	65.00	13.0	B
15.055	MISSOURI FLAT ROAD	PLACERVILLE DR	0.77	1	2	12	1	0	10	R	Yes	65	0.00	0.00	1.00	72.2	65.0	1,867	1668	0.0%	0	1,668	0.92	3.4%	1.0%	1	0.943	665	1.00	65.00	10.2	A

**2015 Existing US-50 - EB
WEEKDAY EVENING PEAK HOUR**

PM	From	To	Miles	Ramp Density (per mile)	Number of Lanes in One Direction	Lane Width (ft)	Aux Lane ?	HOV Lane?	Right-side Lateral Clearance (ft)	Terrain	Use Measured FFS?	Measured Free Flow Speed (mph)	F LW Adj	F LC Adj	TRD Adj	Base Free Flow Speed (mph)	FFS Curve	Base Capacity (pc/h/ln)	Total PHV (vph)	HOV Lane Utilization (%)	HOV Lane PHV (vph)	Mixed Flow + HOV PHV (vph)	Peak Hour Factor	% Trucks and Buses	% RV	Driver Population Factor F P Adj	F HV Adj	Flow Rate V P (pc/h/ln)	CAF Default = 1	Segment Speed (mi/h)	Density (pc/mi/ln)	LOS
12.19	GREENSTONE RD	EL DORADO ROAD	1.82	1	2	12	0	0	10	R	Yes	65	0.00	0.00	1.00	72.2	65.0	2,350	2178	0.0%	0	2,178	0.92	3.4%	1.0%	1	0.943	1,255	1.00	65.00	19.3	C
14.011	EL DORADO ROAD	MISSOURI FLAT ROAD	1.04	1	2	12	0	0	10	R	Yes	65	0.00	0.00	1.00	72.2	65.0	2,350	2097	0.0%	0	2,097	0.92	3.4%	1.0%	1	0.943	1,209	1.00	65.00	18.6	C
15.055	MISSOURI FLAT ROAD	PLACERVILLE DR	0.77	1	2	12	1	0	10	R	Yes	65	0.00	0.00	1.00	72.2	65.0	1,867	2385	0.0%	0	2,385	0.92	3.4%	1.0%	1	0.943	917	1.00	65.00	14.1	B

**2015 Existing US-50 - WB
WEEKDAY MORNING PEAK HOUR**

PM	From	To	Miles	Ramp Density (per mile)	Number of Lanes in One Direction	Lane Width (ft)	Aux Lane ?	HOV Lane?	Right-side Lateral Clearance (ft)	Terrain	Use Measured FFS?	Measured Free Flow Speed (mph)	F LW Adj	F LC Adj	TRD Adj	Base Free Flow Speed (mph)	FFS Curve	Base Capacity (pc/h/ln)	Total PHV (vph)	HOV Lane Utilization (%)	HOV Lane PHV (vph)	Mixed Flow + HOV PHV (vph)	Peak Hour Factor	% Trucks and Buses	% RV	Driver Population Factor F P Adj	F HV Adj	Flow Rate V P (pc/h/ln)	CAF Default = 1	Segment Speed (mi/h)	Density (pc/mi/ln)	LOS
12.19	GREENSTONE RD	EL DORADO ROAD	1.82	1	2	12	0	0	10	R	Yes	65	0.00	0.00	1.00	72.2	65.0	2,350	1945	0.0%	0	1,945	0.92	3.4%	1.0%	1	0.943	1,121	1.00	65.00	17.2	B
14.011	EL DORADO ROAD	MISSOURI FLAT ROAD	1.04	1	2	12	0	0	10	R	Yes	65	0.00	0.00	1.00	72.2	65.0	2,350	1919	0.0%	0	1,919	0.92	3.4%	1.0%	1	0.943	1,106	1.00	65.00	17.0	B
15.055	MISSOURI FLAT ROAD	PLACERVILLE DR	0.77	1	2	12	1	0	10	R	Yes	65	0.00	0.00	1.00	72.2	65.0	1,867	2211	0.0%	0	2,211	0.92	3.4%	1.0%	1	0.943	882	1.00	65.00	13.6	B

**2015 Existing US-50 - WB
WEEKDAY EVENING PEAK HOUR**

PM	From	To	Miles	Ramp Density (per mile)	Number of Lanes in One Direction	Lane Width (ft)	Aux Lane ?	HOV Lane?	Right-side Lateral Clearance (ft)	Terrain	Use Measured FFS?	Measured Free Flow Speed (mph)	F LW Adj	F LC Adj	TRD Adj	Base Free Flow Speed (mph)	FFS Curve	Base Capacity (pc/h/ln)	Total PHV (vph)	HOV Lane Utilization (%)	HOV Lane PHV (vph)	Mixed Flow + HOV PHV (vph)	Peak Hour Factor	% Trucks and Buses	% RV	Driver Population Factor F P Adj	F HV Adj	Flow Rate V P (pc/h/ln)	CAF Default = 1	Segment Speed (mi/h)	Density (pc/mi/ln)	LOS
12.19	GREENSTONE RD	EL DORADO ROAD	1.82	1	2	12	0	0	10	R	Yes	65	0.00	0.00	1.00	72.2	65.0	2,350	1839	0.0%	0	1,839	0.92	3.4%	1.0%	1	0.943	1,060	1.00	65.00	16.3	B
14.011	EL DORADO ROAD	MISSOURI FLAT ROAD	1.04	1	2	12	0	0	10	R	Yes	65	0.00	0.00	1.00	72.2	65.0	2,350	1808	0.0%	0	1,808	0.92	3.4%	1.0%	1	0.943	1,042	1.00	65.00	16.0	B
15.055	MISSOURI FLAT ROAD	PLACERVILLE DR	0.77	1	2	12	1	0	10	R	Yes	65	0.00	0.00	1.00	72.2	65.0	1,867	2285	0.0%	0	2,285	0.92	3.4%	1.0%	1	0.943	878	1.00	65.00	13.5	B

