

Project Assessment Form for PM_{2.5} Interagency Consultation

Application of Criteria for a Project of Air Quality Concern

Project Title: Treat Boulevard at San Miguel Road Signal Installation

Project Summary for Air Quality Conformity Task Force Meeting: May 28, 2015

Description

- Install new signal poles with mast arms in northwest and southeast quadrants
- Install Type 1- A signal pole (southwest quadrant) and Type 15 TS poles (northeast quadrant and southwest quadrant) to supplement signal indications to be provided with mast arm signal poles.
- Install new vehicle detection loops on all approaches
- Install new conduit and pull boxes
- Install new Pan Tilt Zoom (PTZ) camera (northeast quadrant)
- Install new TS2-T1 cabinet and NAZTEC 2070L controller including new network switch in northeast quadrant
- Install new Type III-AF service enclosure in northeast quadrant and provide new PG&E service connection
- Remove existing and install new pavement markings in vicinity of intersection
- Install new ADA curb ramps

Background

- NEPA process for the project is a Categorical Exemption with the preparation of technical memos for Caltrans processing
- Seeking air quality conformity determination on or before May 2015
- Schedule based on deadline for HSIP funding allocation

Not a Project of Air Quality Concern (40 CFR 93.123(b)(1))

(i) New or expanded highway projects with significant number/increase in diesel vehicles?

- Not a new or expanded highway project
- Intersection signalization project
- Signalization will not increase traffic volume or truck percentages on the roadway

(ii) Affects intersections at LOS D, E, or F with a significant number of diesel vehicles?

- Diesel vehicles represent two (2) percent of traffic volume on San Miguel Road and three (3) percent of traffic volume on Treat Boulevard. Treat Boulevard is identified on the City of Concord's designated truck routes system (see attached "Truck Routes" map). Truck volumes on Treat Boulevard are expected to increase to 5.4 percent of the ADT (40,500 trips) while truck volumes on San Miguel Road would remain at two percent in the 2040 horizon year.
- This intersection currently operates at LOS F during peak hours and would improve to LOS C and A with signalization. Horizon year (2040) intersection LOS would improve from LOS F to LOS D and A during the AM and PM peak hours, respectively, with signalization.
- This project does not change land use and will not lead to an increase in traffic volumes or an increase in diesel vehicle number or percentage of daily traffic volumes inside or outside of the project area.

(iii) New bus and rail terminals and transfer points?—Not Applicable

(iv) Expanded bus and rail terminals and transfer points?—Not Applicable

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(v) *Affects areas identified in PM₁₀ or PM_{2.5} implementation plan as site of violation?*

- No state implementation plan for PM_{2.5} required for the non-attainment area, therefore, the project is not identified in plan as an area of potential violation.

RTIP ID# <i>(required)</i> 240746					
TIP ID# <i>(required)</i> CC-110103					
Air Quality Conformity Task Force Consideration Date May 28, 2015					
Project Description <i>(clearly describe project)</i> The project is signalization of the intersection of Treat Boulevard and San Miguel Road. The project includes new signal poles with mast arms in the northwest and southeast quadrants of the intersection; new Type 1-A pole (southwest quadrant) and Type 15TS poles (northeast quadrant and southwest quadrant); new vehicle detection loops on all approaches; new conduit and pull boxes; a new TS2-T1 cabinet and NAZTEC 2070L controller including new network switch in the northeast quadrant; new Type III-AF service enclosure in the northeast quadrant and new PG&E service connection; remove existing and install new pavement markings in the vicinity of the intersection; and install new ADA curb ramps.					
Type of Project: Intersection signalization					
County CC	Narrative Location/Route & Postmiles City of Concord Caltrans Projects – EA#				
Lead Agency: City of Concord					
Contact Person Abul Hossain	Phone# (925) 671-3181	Fax# (925) 671-3381	Email abul.hossain@cityofconcord.org		
Federal Action for which Project-Level PM Conformity is Needed <i>(check appropriate box)</i>					
X	Categorical Exclusion (NEPA)	EA or Draft EIS	FONSI or Final EIS	PS&E or Construction	Other
Scheduled Date of Federal Action:					
NEPA Delegation – Project Type <i>(check appropriate box)</i>					
X	Exempt	Section 6004 – Categorical Exemption	Section 6005 – Non-Categorical Exemption		
Current Programming Dates <i>(as appropriate)</i>					
	PE/Environmental	ENG	ROW	CON	
Start	November 2014	December 2014	N/A	March 2016	
End	November 2015	November 2015	N/A	August 2016	

PM_{2.5} Project Assessment Form for Interagency Consultation

Project Purpose and Need (Summary): *(please be brief)*

The project is intended to improve safety by reducing the number of potential conflicts created by an existing unsignalized intersection. The project will install traffic signals and Americans with Disabilities Act (ADA) improvements at the project intersection to reduce the frequency of collisions and conflicts between vehicles and pedestrians or bicycles. The proposed improvements include new signing, striping, and ADA ramps on the east and west side of Treat Boulevard.

Surrounding Land Use/Traffic Generators *(especially effect on diesel traffic)*

The surrounding land uses include residential and open space.

Brief summary of assumptions and methodology used for conducting analysis

Traffic counts at the intersection were taken January 20, 2015. The percentage of trucks using the roadway was determined to be three percent (3%) for Treat Boulevard and two percent (2%) for San Miguel Road. Intersection operations are defined by the average control delay per vehicle (measured in seconds) for each movement that must yield the right-of-way. At side street-controlled intersections, the control delay (and LOS) is calculated for each controlled movement, as well as the left-turn movement from the major street, and the entire intersection. The delays for the entire intersection and for the movement or approach with the highest delay are reported.

The project will install a traffic signal and would not result in any change in traffic volumes or truck percentages at the intersection. As shown below, the project would not lead to any negative change in intersection LOS nor any increase in the number of diesel vehicles at the intersection. As such, the criteria for a project of air quality concern should not apply to this project.

Opening Year: If facility is a highway or street, Build and No Build LOS, AADT, % and # trucks, truck AADT of proposed facility

N/A

RTP Horizon Year / Design Year: If facility is a highway or street, Build and No Build LOS, AADT, % and # trucks, truck AADT of proposed facility

N/A

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Opening Year: If facility is an interchange(s) or intersection(s), Build and No Build cross-street AADT, % and # trucks, truck AADT

Installation of the traffic signal improvements is expected to occur in fiscal year 2016-17. LOS is summarized below.

<u>Intersection</u>	<u>AM Peak Hour</u>		<u>PM Peak Hour</u>	
	<u>No Build</u>	<u>Build</u>	<u>No Build</u>	<u>Build</u>
Treat Boulevard/San Miguel Road	B(F)	C	A(F)	A

The ADTs on Treat Boulevard and San Miguel Road are approximately 35,200 vehicles per day and 3,800 vehicles per day, respectively, including trucks. (This ADT is also representative of the AADT.) Treat Boulevard is on the City of Concord's designated truck route system. Truck traffic represents approximately 3% of the ADT on Treat Boulevard or approximately 1,056 trucks (or heavy vehicles) per day and 2% of the ADT on San Miguel Road or approximately 76 trucks (or heavy vehicles) per day.

No change in the ADT, truck percentage, or truck ADT is expected on Treat Boulevard or San Miguel Road as a result of the proposed project (Build scenario).

RTP Horizon Year / Design Year: If facility is an interchange (s) or intersection(s), Build and No Build cross-street AADT, % and # trucks, truck AADT

Year 2040 forecasts for LOS, ADT, Truck ADT and percentage of trucks are listed below. The percentage of trucks would remain unchanged on San Miguel Road but increase on Treat Boulevard (a designated truck route) from current levels.

<u>Intersection</u>	<u>AM Peak Hour</u>		<u>PM Peak Hour</u>	
	<u>No Build</u>	<u>Build</u>	<u>No Build</u>	<u>Build</u>
Treat Boulevard/San Miguel Road	F(F)	D	A(F)	A

<u>Street</u>	<u>ADT</u>	<u>Truck ADT</u>	<u>% Trucks</u>
Treat Boulevard	40,500	2,190	5.4%
San Miguel Road	3,800	76	2.0%

Although the 2040 ADT, truck percentage, and truck ADT is expected to increase on Treat Boulevard, none of these increases results from the project. The project will improve intersection LOS in the 2040 horizon year.

Opening Year: If facility is a bus, rail or intermodal facility/terminal/transfer point, # of bus arrivals for Build and No Build, % and # of bus arrivals will be diesel buses

N/A

RTP Horizon Year / Design Year: If facility is a bus, rail or intermodal facility/terminal/transfer point, # of bus arrivals for Build and No Build, % and # of bus arrivals will be diesel buses

N/A

Describe potential traffic redistribution effects of congestion relief (*impact on other facilities*)

No redistribution of vehicular traffic is anticipated due to the implementation of the proposed project. No impact on other facilities, therefore, will result from the project.

PM_{2.5} Project Assessment Form for Interagency Consultation

Comments/Explanation/Details *(please be brief)*

We appreciate the Air Quality Conformity Task Force review of this project and hope that the project information provided in this Project Assessment Form and supplemental attachments are at a sufficient level of detail to facilitate this PM_{2.5} Interagency Consultation.

The proposed project includes the installation of a signal, striping, and ADA improvements at Treat Boulevard and San Miguel Road, which may have triggered the need for the PM_{2.5} Interagency Consultation. Nonetheless, this project is not expected to create more congestion or increase the volume of diesel-powered vehicles on the streets within the project limits or any other streets in the City of Concord. Therefore, no negative environmental or air quality impacts are anticipated as a result of this project. The project will significantly increase the safety of vehicles and multimodal users of this intersection.

Based on the project information provided in this report, we believe that it should not be considered a project of air quality concern and, therefore, should not be required to complete PM_{2.5} hot-spot analysis for project-level conformity determination.

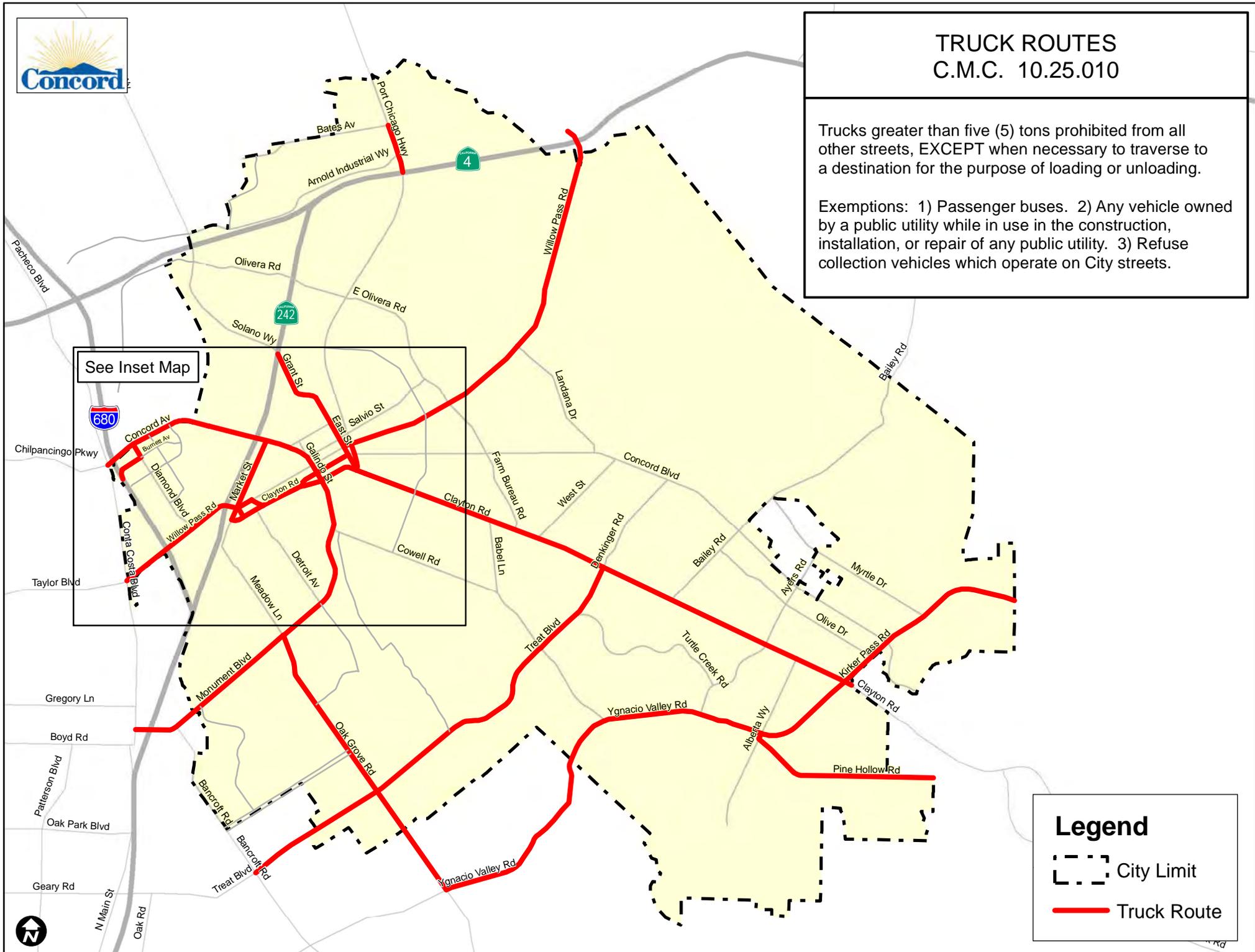
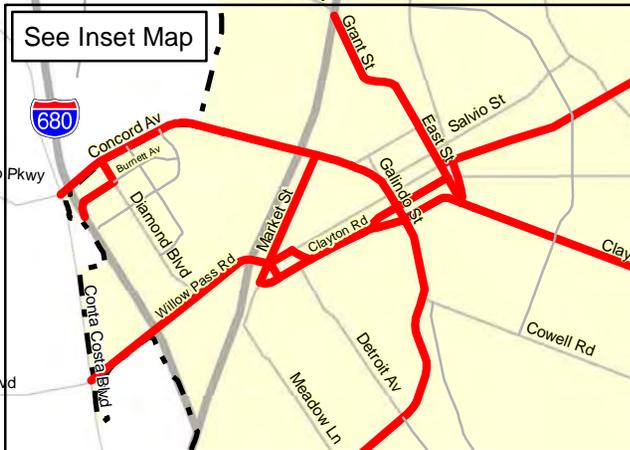


TRUCK ROUTES C.M.C. 10.25.010

Trucks greater than five (5) tons prohibited from all other streets, EXCEPT when necessary to traverse to a destination for the purpose of loading or unloading.

Exemptions: 1) Passenger buses. 2) Any vehicle owned by a public utility while in use in the construction, installation, or repair of any public utility. 3) Refuse collection vehicles which operate on City streets.

See Inset Map



Legend

- City Limit
- Truck Route





TREAT BOULEVARD/SAN MIGUEL ROAD INTERSECTION SIGNALIZATION SURROUNDING LAND USES

ALL TRAFFIC DATA

City of Concord
 All Vehicles on Unshifted
 Nothing on Bank 1
 Nothing on Bank 2

(916) 771-8700

orders@atdtraffic.com

File Name : 15-7063-005 San Miguel Road-Treat Boulevard.ppd

Date : 1/20/2015

Unshifted Count = All Vehicles

START TIME	San Miguel Road Southbound					Treat Boulevard Westbound					Northbound					Treat Boulevard Eastbound					Total	Utum Total
	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL		
07:00	3	0	21	0	24	0	680	14	0	694	0	0	0	0	0	3	82	0	0	85	803	0
07:15	5	0	26	0	31	0	657	24	0	681	0	0	0	0	0	8	90	0	0	98	810	0
07:30	4	0	41	0	45	0	663	50	0	713	0	0	0	0	0	3	126	0	0	129	887	0
07:45	3	0	43	0	46	0	549	63	0	612	0	0	0	0	0	10	146	0	0	156	814	0
Total	15	0	131	0	146	0	2549	151	0	2700	0	0	0	0	0	24	444	0	0	468	3314	0
08:00	3	0	38	0	41	0	583	88	0	671	0	0	0	0	0	17	176	0	0	193	905	0
08:15	6	0	22	0	28	0	522	56	0	578	0	0	0	0	0	21	157	0	0	178	784	0
08:30	2	0	25	0	27	0	452	6	0	458	0	0	0	0	0	10	91	0	0	101	586	0
08:45	6	0	22	0	28	0	423	7	0	430	0	0	0	0	0	7	116	0	0	123	581	0
Total	17	0	107	0	124	0	1980	157	0	2137	0	0	0	0	0	55	540	0	0	595	2856	0
16:00	15	0	20	0	35	0	185	19	0	204	0	0	0	0	0	23	436	0	0	459	698	0
16:15	6	0	22	0	28	0	191	7	0	198	0	0	0	0	0	17	455	0	0	472	698	0
16:30	6	0	19	0	25	0	159	12	0	171	0	0	0	0	0	32	472	0	0	504	700	0
16:45	6	0	20	0	26	0	193	12	0	205	0	0	0	0	0	17	428	0	0	445	676	0
Total	33	0	81	0	114	0	728	50	0	778	0	0	0	0	0	89	1791	0	0	1880	2772	0
17:00	10	0	12	0	22	0	193	11	0	204	0	0	0	0	0	25	496	0	0	521	747	0
17:15	12	0	13	0	25	0	218	11	0	229	0	0	0	0	0	30	505	0	0	535	789	0
17:30	6	0	13	0	19	0	207	5	0	212	0	0	0	0	0	20	508	0	0	528	759	0
17:45	10	0	18	0	28	0	158	13	0	171	0	0	0	0	0	24	554	0	0	578	777	0
Total	38	0	56	0	94	0	776	40	0	816	0	0	0	0	0	99	2063	0	0	2162	3072	0
Grand Total	103	0	375	0	478	0	6033	398	0	6431	0	0	0	0	0	267	4838	0	0	5105	12014	0
Apprch %	21.5%	0.0%	78.5%	0.0%		0.0%	93.8%	6.2%	0.0%		0.0%	0.0%	0.0%	0.0%		5.2%	94.8%	0.0%	0.0%			
Total %	0.9%	0.0%	3.1%	0.0%	4.0%	0.0%	50.2%	3.3%	0.0%	53.5%	0.0%	0.0%	0.0%	0.0%	0.0%	2.2%	40.3%	0.0%	0.0%	42.5%	100.0%	

ALL TRAFFIC DATA

City of Concord
 All Vehicles on Unshifted
 Nothing on Bank 1
 Nothing on Bank 2

(916) 771-8700

orders@atdtraffic.com

File Name : 15-7063-005 San Miguel Road-Treat Boulevard.ppd

Date : 1/20/2015

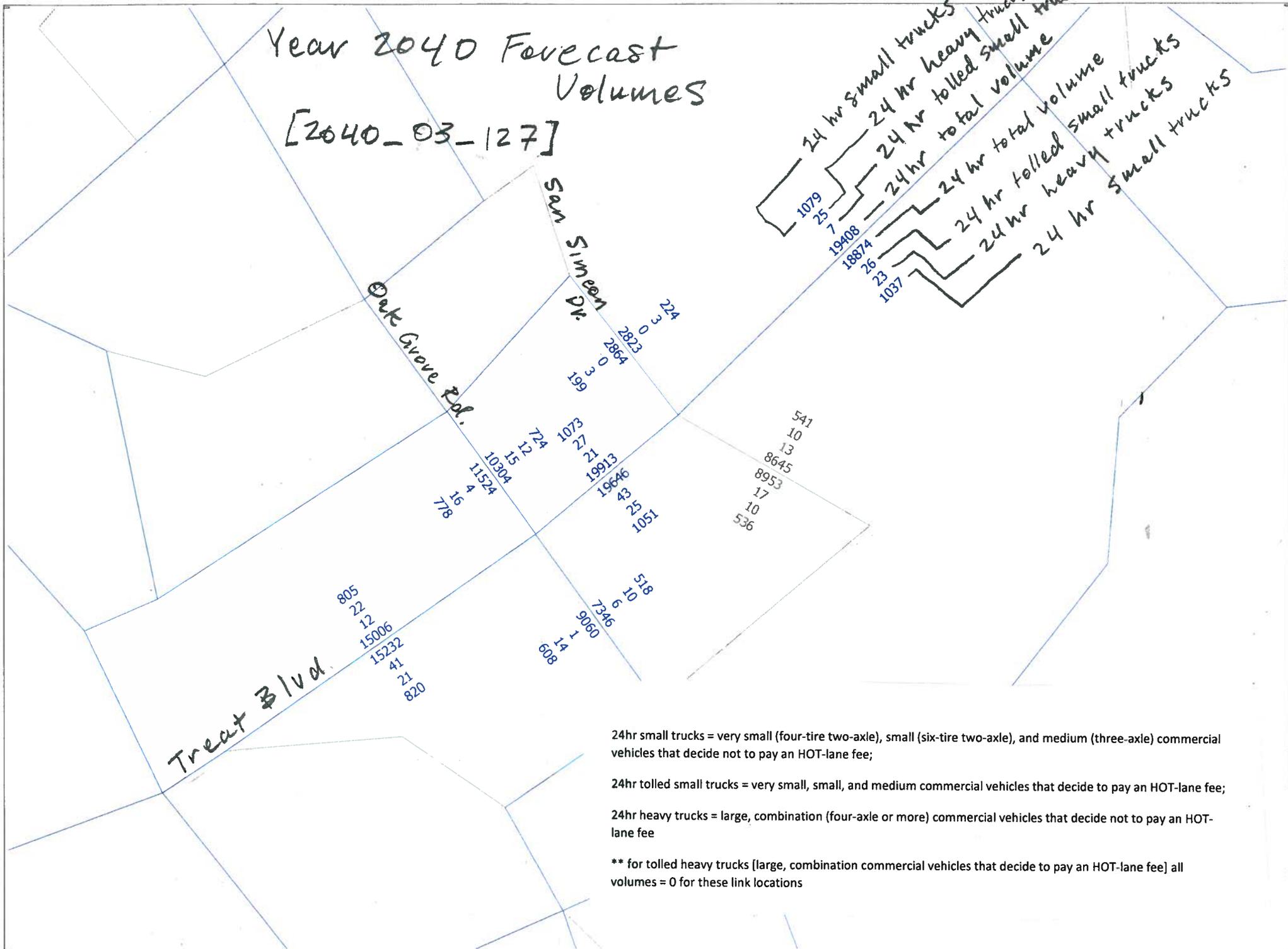
Unshifted Count = All Vehicles

AM PEAK HOUR	San Miguel Road Southbound					Treat Boulevard Westbound					Northbound					Treat Boulevard Eastbound					Total
	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	
Peak Hour Analysis From 07:15 to 08:15																					
Peak Hour For Entire Intersection Begins at 07:15																					
07:15	5	0	26	0	31	0	657	24	0	681	0	0	0	0	0	8	90	0	0	98	810
07:30	4	0	41	0	45	0	663	50	0	713	0	0	0	0	0	3	126	0	0	129	887
07:45	3	0	43	0	46	0	549	63	0	612	0	0	0	0	0	10	146	0	0	156	814
08:00	3	0	38	0	41	0	583	88	0	671	0	0	0	0	0	17	176	0	0	193	905
Total Volume	15	0	148	0	163	0	2452	225	0	2677	0	0	0	0	0	38	538	0	0	576	3416
% App Total	9.2%	0.0%	90.8%	0.0%		0.0%	91.6%	8.4%	0.0%		0.0%	0.0%	0.0%	0.0%		6.6%	93.4%	0.0%	0.0%		
PHF	.750	.000	.860	.000	.886	.000	.925	.639	.000	.939	.000	.000	.000	.000	.000	.559	.764	.000	.000	.746	.944

PM PEAK HOUR	San Miguel Road Southbound					Treat Boulevard Westbound					Northbound					Treat Boulevard Eastbound					Total
	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	LEFT	THRU	RIGHT	UTURNS	APP.TOTAL	
Peak Hour Analysis From 17:00 to 18:00																					
Peak Hour For Entire Intersection Begins at 17:00																					
17:00	10	0	12	0	22	0	193	11	0	204	0	0	0	0	0	25	496	0	0	521	747
17:15	12	0	13	0	25	0	218	11	0	229	0	0	0	0	0	30	505	0	0	535	789
17:30	6	0	13	0	19	0	207	5	0	212	0	0	0	0	0	20	508	0	0	528	759
17:45	10	0	18	0	28	0	158	13	0	171	0	0	0	0	0	24	554	0	0	578	777
Total Volume	38	0	56	0	94	0	776	40	0	816	0	0	0	0	0	99	2063	0	0	2162	3072
% App Total	40.4%	0.0%	59.6%	0.0%		0.0%	95.1%	4.9%	0.0%		0.0%	0.0%	0.0%	0.0%		4.6%	95.4%	0.0%	0.0%		
PHF	.792	.000	.778	.000	.839	.000	.890	.769	.000	.891	.000	.000	.000	.000	.000	.825	.931	.000	.000	.935	.973

Year 2040 Forecast Volumes

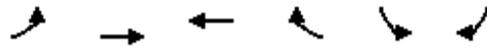
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HCM Unsignalized Intersection Capacity Analysis

12: Treat Blvd & San Miguel Rd

3/4/2015



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↵	↑↑	↑↑	↵	↵	↵
Volume (veh/h)	38	538	2452	225	15	148
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	40	572	2609	239	16	157
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	2848				2976	1304
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2848				2976	1304
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	69				0	0
cM capacity (veh/h)	130				8	151

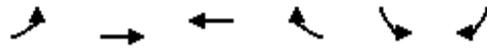
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	SB 1	SB 2
Volume Total	40	286	286	1304	1304	239	16	157
Volume Left	40	0	0	0	0	0	16	0
Volume Right	0	0	0	0	0	239	0	157
cSH	130	1700	1700	1700	1700	1700	8	151
Volume to Capacity	0.31	0.17	0.17	0.77	0.77	0.14	2.10	1.04
Queue Length 95th (ft)	30	0	0	0	0	0	76	203
Control Delay (s)	44.6	0.0	0.0	0.0	0.0	0.0	1438.2	145.0
Lane LOS	E						F	F
Approach Delay (s)	2.9			0.0			264.0	
Approach LOS							F	

Intersection Summary		
Average Delay		13.1
Intersection Capacity Utilization	83.6%	ICU Level of Service
Analysis Period (min)		15
E		

HCM Unsignalized Intersection Capacity Analysis

12: Treat Blvd & San Miguel Rd

3/9/2015



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	99	2063	776	40	38	56
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	102	2127	800	41	39	58
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	841				2068	400
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	841				2068	400
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	87				4	90
cM capacity (veh/h)	790				41	600

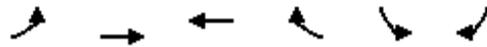
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	SB 1	SB 2
Volume Total	102	1063	1063	400	400	41	39	58
Volume Left	102	0	0	0	0	0	39	0
Volume Right	0	0	0	0	0	41	0	58
cSH	790	1700	1700	1700	1700	1700	41	600
Volume to Capacity	0.13	0.63	0.63	0.24	0.24	0.02	0.96	0.10
Queue Length 95th (ft)	11	0	0	0	0	0	93	8
Control Delay (s)	10.2	0.0	0.0	0.0	0.0	0.0	279.3	11.6
Lane LOS	B						F	B
Approach Delay (s)	0.5			0.0			119.9	
Approach LOS							F	

Intersection Summary	
Average Delay	4.0
Intersection Capacity Utilization	67.0%
ICU Level of Service	C
Analysis Period (min)	15

HCM Signalized Intersection Capacity Analysis

12: Treat Blvd & San Miguel Rd

3/9/2015



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	38	538	2452	225	15	148
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0	5.0	5.0	4.5	4.5
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	3539	3539	1583	1770	1583
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	3539	3539	1583	1770	1583
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	40	572	2609	239	16	157
RTOR Reduction (vph)	0	0	0	18	0	147
Lane Group Flow (vph)	40	572	2609	221	16	10
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA	NA	Perm	Perm	Perm
Protected Phases	5	2	6			
Permitted Phases				6	4	4
Actuated Green, G (s)	7.1	102.7	91.6	91.6	7.8	7.8
Effective Green, g (s)	7.1	102.7	91.6	91.6	7.8	7.8
Actuated g/C Ratio	0.06	0.86	0.76	0.76	0.06	0.06
Clearance Time (s)	4.0	5.0	5.0	5.0	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	104	3028	2701	1208	115	102
v/s Ratio Prot	c0.02	0.16	c0.74			
v/s Ratio Perm				0.14	c0.01	0.01
v/c Ratio	0.38	0.19	0.97	0.18	0.14	0.10
Uniform Delay, d1	54.3	1.5	12.8	3.9	52.9	52.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.4	0.1	11.0	0.3	0.6	0.4
Delay (s)	56.7	1.6	23.8	4.2	53.5	53.2
Level of Service	E	A	C	A	D	D
Approach Delay (s)		5.2	22.2		53.3	
Approach LOS		A	C		D	

Intersection Summary

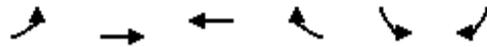
HCM 2000 Control Delay	20.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	84.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

12: Treat Blvd & San Miguel Rd

3/9/2015



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↷	↷	↷	↶	↷
Volume (vph)	99	2063	776	40	38	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0	5.0	5.0	4.5	4.5
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	3539	3539	1583	1770	1583
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	3539	3539	1583	1770	1583
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	102	2127	800	41	39	58
RTOR Reduction (vph)	0	0	0	11	0	55
Lane Group Flow (vph)	102	2127	800	30	39	3
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA	NA	Perm	Perm	Perm
Protected Phases	5	2	6			
Permitted Phases				6	4	4
Actuated Green, G (s)	12.2	103.5	87.3	87.3	7.0	7.0
Effective Green, g (s)	12.2	103.5	87.3	87.3	7.0	7.0
Actuated g/C Ratio	0.10	0.86	0.73	0.73	0.06	0.06
Clearance Time (s)	4.0	5.0	5.0	5.0	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	179	3052	2574	1151	103	92
v/s Ratio Prot	0.06	c0.60	0.23			
v/s Ratio Perm				0.02	c0.02	0.00
v/c Ratio	0.57	0.70	0.31	0.03	0.38	0.04
Uniform Delay, d1	51.4	2.8	5.8	4.5	54.4	53.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.1	1.3	0.3	0.0	2.3	0.2
Delay (s)	55.5	4.2	6.1	4.6	56.7	53.5
Level of Service	E	A	A	A	E	D
Approach Delay (s)		6.5	6.0		54.8	
Approach LOS		A	A		D	

Intersection Summary

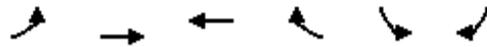
HCM 2000 Control Delay	7.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	69.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

12: Treat Blvd & San Miguel Rd

5/12/2015



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↵	↑↑	↑↑	↵	↵	↵
Volume (veh/h)	38	619	2820	225	15	148
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	40	659	3000	239	16	157
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	3239				3410	1500
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	3239				3410	1500
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	55				0	0
cM capacity (veh/h)	90				3	111

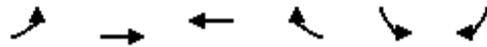
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	SB 1	SB 2
Volume Total	40	329	329	1500	1500	239	16	157
Volume Left	40	0	0	0	0	0	16	0
Volume Right	0	0	0	0	0	239	0	157
cSH	90	1700	1700	1700	1700	1700	3	111
Volume to Capacity	0.45	0.19	0.19	0.88	0.88	0.14	5.32	1.42
Queue Length 95th (ft)	47	0	0	0	0	0	Err	278
Control Delay (s)	73.8	0.0	0.0	0.0	0.0	0.0	Err	303.1
Lane LOS	F						F	F
Approach Delay (s)	4.3			0.0			1195.3	
Approach LOS							F	

Intersection Summary			
Average Delay		51.1	
Intersection Capacity Utilization		93.8%	ICU Level of Service
Analysis Period (min)		15	F

HCM Unsignalized Intersection Capacity Analysis

12: Treat Blvd & San Miguel Rd

5/12/2015



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↶	↕↕	↕↕	↷	↶	↷
Volume (veh/h)	99	2372	892	40	38	56
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	102	2445	920	41	39	58
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	961				2346	460
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	961				2346	460
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	86				0	89
cM capacity (veh/h)	712				26	548

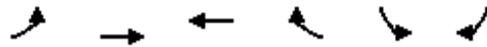
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	SB 1	SB 2
Volume Total	102	1223	1223	460	460	41	39	58
Volume Left	102	0	0	0	0	0	39	0
Volume Right	0	0	0	0	0	41	0	58
cSH	712	1700	1700	1700	1700	1700	26	548
Volume to Capacity	0.14	0.72	0.72	0.27	0.27	0.02	1.51	0.11
Queue Length 95th (ft)	12	0	0	0	0	0	119	9
Control Delay (s)	10.9	0.0	0.0	0.0	0.0	0.0	588.0	12.3
Lane LOS	B						F	B
Approach Delay (s)	0.4			0.0			245.1	
Approach LOS							F	

Intersection Summary			
Average Delay		6.9	
Intersection Capacity Utilization	75.6%		ICU Level of Service D
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis

12: Treat Blvd & San Miguel Rd

5/12/2015



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	38	619	2820	225	15	148
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0	5.0	5.0	4.5	4.5
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	3539	3539	1583	1770	1583
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	3539	3539	1583	1770	1583
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	40	659	3000	239	16	157
RTOR Reduction (vph)	0	0	0	21	0	71
Lane Group Flow (vph)	40	659	3000	218	16	86
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA	NA	Perm	Perm	Perm
Protected Phases	5	2	6			
Permitted Phases				6	4	4
Actuated Green, G (s)	6.7	127.9	117.2	117.2	12.6	12.6
Effective Green, g (s)	6.7	127.9	117.2	117.2	12.6	12.6
Actuated g/C Ratio	0.04	0.85	0.78	0.78	0.08	0.08
Clearance Time (s)	4.0	5.0	5.0	5.0	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	79	3017	2765	1236	148	132
v/s Ratio Prot	c0.02	0.19	c0.85			
v/s Ratio Perm				0.14	0.01	c0.05
v/c Ratio	0.51	0.22	1.08	0.18	0.11	0.66
Uniform Delay, d1	70.0	2.0	16.4	4.2	63.5	66.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.0	0.2	45.3	0.3	0.3	11.1
Delay (s)	75.1	2.2	61.7	4.5	63.8	77.7
Level of Service	E	A	E	A	E	E
Approach Delay (s)		6.3	57.4		76.4	
Approach LOS		A	E		E	

Intersection Summary

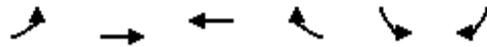
HCM 2000 Control Delay	49.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	95.0%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

12: Treat Blvd & San Miguel Rd

5/12/2015



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	↕↕	↕↕	↰	↰	↰
Volume (vph)	99	2372	892	40	38	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	5.0	5.0	5.0	4.5	4.5
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	3539	3539	1583	1770	1583
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1770	3539	3539	1583	1770	1583
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	102	2445	920	41	39	58
RTOR Reduction (vph)	0	0	0	10	0	55
Lane Group Flow (vph)	102	2445	920	31	39	3
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%
Turn Type	Prot	NA	NA	Perm	Perm	Perm
Protected Phases	5	2	6			
Permitted Phases				6	4	4
Actuated Green, G (s)	12.2	103.5	87.3	87.3	7.0	7.0
Effective Green, g (s)	12.2	103.5	87.3	87.3	7.0	7.0
Actuated g/C Ratio	0.10	0.86	0.73	0.73	0.06	0.06
Clearance Time (s)	4.0	5.0	5.0	5.0	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	179	3052	2574	1151	103	92
v/s Ratio Prot	0.06	c0.69	0.26			
v/s Ratio Perm				0.02	c0.02	0.00
v/c Ratio	0.57	0.80	0.36	0.03	0.38	0.04
Uniform Delay, d1	51.4	3.7	6.0	4.5	54.4	53.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.1	2.3	0.4	0.0	2.3	0.2
Delay (s)	55.5	6.0	6.4	4.6	56.7	53.5
Level of Service	E	A	A	A	E	D
Approach Delay (s)		8.0	6.3		54.8	
Approach LOS		A	A		D	

Intersection Summary

HCM 2000 Control Delay	8.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	78.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group