Appendix F
Microsimulation Analysis

Parkmerced / 19th Avenue Corridor SimTraffic Analysis

Introduction

A simulation model was developed to evaluate the 19th Avenue corridor utilizing Trafficware's Synchro / SimTraffc 7 software (build 767) for the weekday AM and PM peak periods. This analysis included the following study locations:

1. 19th Avenue / Winston Drive;
2. 19th Avenue / Buckingham Way;
3. 19th Avenue / Holloway Avenue;
4. 19th Avenue / Crespi Drive;
5. 19th Avenue / Junipero Serra Boulevard;
6. Junipero Serra Boulevard / Winston Drive;
7. Junipero Serra Boulevard / Holloway Avenue;
8. Junipero Serra Boulevard / Font Boulevard;
9. Brotherhood Way / Chumasero Drive;
10. Brotherhood Way / Lake Merced Boulevard; and,
11. Brotherhood Way / Arch Street.

The simulation consisted of the interaction of many significant modes of transportation within the 19th Avenue corridor including vehicles, transit (bus and LRT), pedestrians, bicycles, and parking.

Analysis Methodology

The Synchro / SimTraffic model was calibrated based on observed queue lengths and traffic volumes. This calibration methodology is consistent with the procedures recommended by the Federal Highway Administration (FHWA).[1] All traffic simulation results were comprised of the average of five (5) simulations with unique random seeding numbers. The traffic simulation period occurred for a single peak hour from 7:00 AM to 9:00 AM and from 4:30 PM to 6:30 PM and all traffic volumes will be inputted in 15 minute count increments. Given the length of the simulated network and the traffic demand, a 30 minute seeding period was utilized required to reach steady state conditions.

Three (3) scenarios were evaluated. These scenarios (and the corresponding 19th Avenue Corridor Study scenario designations) included:

- Existing Conditions;
- 2030 No Project Conditions (Tier 3); and
- 2030 Project Conditions (Tier 4c).

The 2030 No Project Conditions included traffic volume growth (background and planned development) and proposed transportation projects in the area (such as the signalization improvements along 19th Avenue).

In addition to the traffic volume growth and proposed transportation improvements, the 2030 Project Conditions included the following modifications:

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[1] Traffic Analysis Toolbox Volume IV: Guidelines for applying CORSIM Microsimulation Modeling Software. Section 5.0 – Calibration. U.S. Department of Transportation, Federal Highway Administration, 400 Seventh Street S.W. Room 4410 Washington DC 20590, Publication No. FHWA-HOP-07-079, January 2007.

1. Realignment of the M-Ocean View and J-Church light rail lines into Parkmerced, with the proposed new stations;
2. Modifications to the 19th Avenue / Holloway Avenue intersection as required for the new train crossing;
3. Reconfiguration of Crespi Drive and new left-turn access from northbound 19th Avenue;
4. Modifications to the 19th Avenue / Junipero Serra Boulevard intersection as required for the new train crossing; and
5. Reconfiguration of Chumasero Drive and new left-turn access from northbound Junipero Serra Boulevard.

Corridor Study Adjustment Factors

The Synchro / SimTraffic model was utilized to optimize the transportation network. Network characteristics such as signal timing, signal coordination, and LRT priority were modified to accurately model the interactions and minimize delays for all modes of transportation. Based on the optimized Synchro / SimTraffic network, series of adjustment factors were derived and applied to the TRAFFIX analysis being conducted for the 19th Avenue Corridor Study. These adjustments included the following factors:

- Saturation flow rates;
- Lane utilization factors;
- Vehicle arrival type;
- Transit vehicle stops per hour;
- Left-turn and right-turn permissions;
- Signal timing (phases and green time per phase);
- Green to capacity (g/C) ratio; and,
- User saturation adjustment.

Evaluation of Results

The Synchro / SimTraffic models were utilized to evaluate and compare network operations of the analysis scenarios. The intersection operations for the three (3) analysis scenarios based on the traffic simulation are shown in **Table 1**.

Intersection operations would improve on 19th Avenue. In addition, the travel time on 19th Avenue between the Winston Drive and Chumasero Drive intersections would decrease and the traffic volume served would increase. The intersection cycle lengths throughout the 19th Avenue corridor would be increased to 120 seconds and 130 seconds during the weekday AM and PM peak periods, respectively, to account for the LRT signal phases.

At the 19th Avenue / Holloway Avenue intersection, the LRT signal phase would be actuated and only called upon the arrival of a LRT. The northbound through movement phase would operate concurrently with the LRT phase. In instances where the LRT was not present, the remainder of the signal cycle length (26 seconds) would be allotted to the northbound and southbound approaches.

At the 19th Avenue / Junipero Serra Boulevard intersection, the LRT signal phase would be actuated and only called upon the arrival of a LRT. The westbound through movement phase would operate concurrently with the LRT phase. In instances where the LRT was not present, the remainder of the signal cycle length (26 seconds) would be allotted to the northbound approach and the eastbound right movement.

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Table 1: Intersection Operations – Synchro / SimTraffic Simulation

Intersection		Peak Hour	Existing Conditions		No Project Conditions		Project Conditions	
			LOS	Delay	LOS	Delay	LOS	Delay
1	19th Av / Winston Dr	AM	**F**	**>80.0**	**F**	**>80.0**	**F**	**>80.0**
		PM	**F**	**>80.0**	**F**	**>80.0**	**F**	**>80.0**
2	19th Av / Buckingham Wy	AM	A	4.5	A	5.1	A	5.1
		PM	A	7.3	D	28.5	D	28.5
3	19th Av / Holloway Av	AM	B	15.4	B	13.9	B	15.5
		PM	B	15.5	D	44.2	C	21.1
4	19th Av / Crespi Dr	AM	B	12.5	A	6.3	B	13.4
		PM	A	9.6	C	26.7	B	13.8
5	Junipero Serra Bl / Winston Dr	AM	B	16.6	D	37.2	D	37.2
		PM	C	26.7	**F**	**>80.0**	**F**	**>80.0**
6	Junipero Serra Bl / Holloway Av	AM	C	27.9	**F**	**>80.0**	**F**	**>80.0**
		PM	C	27.8	**F**	**>80.0**	**F**	**>80.0**
7	19th Av / Junipero Serra Bl	AM	**E**	**55.2**	**F**	**>80.0**	C	29.8
		PM	**E**	**71.8**	**F**	**>80.0**	C	25.1
8	Junipero Serra Bl / Font Bl	AM	A	7.5	B	10.3	B	10.2
		PM	A	7.7	A	8.1	B	11.8
9	Brotherhood Wy / Lake Merced Bl	AM	B	16.2	**F**	**>80.0**	**F**	**>80.0**
		PM	**F**	**>80.0**	**F**	**>80.0**	**F**	**>80.0**
10	Brotherhood Wy / Chumasero Dr	AM	C	23.1	**E**	**68.3**	B	18.7
		PM	B	13.1	**E**	**55.1**	A	10.0
11	Brotherhood Wy / Arch St	AM	B	10.8	B	14.1	B	14.1
		PM	A	8.7	A	7.5	A	7.5
12	Brotherhood Wy / Thomas More Wy	AM	-	-	-	-	A	8.8
		PM	-	-	-	-	**F**	**>80.0**

Source: AECOM – December 2009
Notes:
- Weekday AM peak period = 7:00 AM to 9:00 AM; Weekday PM peak period = 4:30 PM to 6:30 PM.
- Delay in terms of seconds per vehicle.
- **Bold** denotes intersection operating at LOS E or worse.

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It should be noted that an evaluation was conducted to determine the optimal signal phasing routine with and without the presence of the LRT. Given the significance of progression throughout the corridor, pedestrian crossing time constraints, LRT arrival rate, and phase consistency, allotting a specific phase for the LRT crossing was determined to be collectively optimal for all modes of transportation.

Conclusions

With the implementation of the transportation modifications proposed in the 2030 Project Conditions, the operations throughout the network would improve. In addition to intersection operations, the travel time on 19th Avenue between the Winston Drive and Chumasero Drive intersections would decrease and the traffic volume served would increase.

The intersection cycle lengths throughout the 19th Avenue corridor would be increased to 120 seconds and 130 seconds during the weekday AM and PM peak periods, respectively, to account for the LRT signal phases.

Allotting a specific phase for the LRT crossing was determined to be collectively optimal for all modes of transportation given the significance of progression throughout the corridor, pedestrian crossing time constraints, LRT arrival rate, and phase consistency,

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