

A P P E N D I X F

T R A F F I C E N G I N E E R I N G R E V I E W



November 14, 2012

Randy Nahas
The Nahas Company
111 Stone Valley Road
Alamo, CA 94507

Re: Traffic Engineering Review of Proposed TJ Maxx Store in the Castro Village Shopping Center

This letter has been prepared in response to questions that have been raised regarding the traffic conditions at the proposed TJ Maxx project in the Castro Village Shopping Center. In particular the traffic issues involve the impacts at site driveways and the traffic conditions on Redwood Road and Jamison Way.

Project Description

The project is a proposed 25,000 sq ft addition to the existing Castro Valley Shopping Center. **Figure 1** shows the project area and the roadway connections within the Castro Valley Shopping Center. As shown, the new store is totally contained within the existing shopping center, and backs up to Jamison Way. The parking adjacent to the new store will be reconfigured and expanded to accommodate the additional customers. An existing car wash facility that partially covers the site will be removed. Traffic gains access to this part of the shopping center from Jamison Way, Redwood Road and Castro Valley Boulevard. The primary roads that would be affected by the TJ Maxx project include:

- **Redwood Road** – This is a four-lane arterial roadway that extends north-south through Castro Valley starting at I-580. Most major intersections on Redwood Road are signalized, including an existing signal at the Safeway Shopping Center driveway.
- **Jamison Way** – This is a two-lane collector street with a combination of multi-family residential uses and commercial frontage. There is parking on both sides. Stop signs are in place at Santa Maria Road and at Redwood Road.

The project will not create any significant traffic impacts with the possible exception of the access driveways onto Redwood Road, and the addition of traffic onto Jamison Way. The driveway that will serve the project from Redwood Road is located about 100 feet from the existing traffic signal, and there is very limited room for left turn lanes (See **Figure 2**), and limited room for queued vehicles.

Traffic Volumes

Abrams Associates collected traffic volume data at the intersection of Redwood Road and the various shopping center driveways during both a morning and afternoon peak hour. In addition, AM and PM turning movement counts were made at the intersection of Redwood Road and Jamison Way. **Figure 2** shows the results of the traffic counts. The peak period of vehicle activity occurred during the late afternoon. The counts show very low traffic volumes at the unsignalized intersection to the Castro Valley Shopping Center. The morning peak hour was

relatively quiet, while the afternoon had significantly higher traffic. Field review and observations throughout the peak periods showed no unusual congestion or delay at either intersection. There were no instances observed where the left turn lanes formed a queue that interfered with through traffic on Redwood Road.

Trip Generation

The proposed project is estimated to generate traffic based on studies from the Institute of Transportation Engineers (ITE) Trip Generation Manual (9th Edition). The land use categories that were referenced are based on a shopping center with 200,000 square feet (LU Code 820). The results of the trip generation calculations are shown in **Table 1**.

Table 1
Trip Generation Calculations

| Land Use | ITE Code | Size | ADT | AM Peak Hour | | | PM Peak Hour | | |
|---------------------------------------|----------|-----------------------|-------|--------------|------|-------|--------------|------|-------|
| | | | | In | Out | Total | In | Out | Total |
| Trip Rates- Shopping Center | 820 | Trips per 1,000 sq ft | 42.94 | 0.61 | 0.39 | 1.00 | 1.84 | 1.89 | 3.73 |
| TJ Maxx (25,000 square foot building) | 820 | 25,000 sq ft | 1,073 | 15 | 10 | 25 | 46 | 47 | 93 |

With 25,000 square feet of retail space being added to the center, an additional 93 vehicle trips will be added to the project trip generation, with 46 of these trips entering and 47 vehicles exiting the shopping center during the peak hour. It should also be noted that there will be some reduction in traffic due to the closure of the car wash, but these trips have not been considered in the analysis.

Trip Distribution

The project traffic will be distributed among six (6) driveways or access points. The trip distribution assumptions have been based on the project's proximity to local activity centers, freeway interchanges, the existing directional split at other local driveways and intersections, and the overall land use patterns in the area. Based on these factors, it is conservatively estimated that about 25 percent of the new traffic will use the driveway on Redwood Road, and that 10 percent will use the driveway on Jamison Way. This will result in about 23 vehicle trips per hour added to the various movements at the unsignalized driveway intersection on Redwood Road and (9) trips on Jamison Way.

Intersection Capacity Impacts on Redwood Road

The signalized intersection on Redwood Road that serves the Safeway operates at LOS "B" (delay = 19.5 sec) during the PM peak hour, based on the HCM Synchro traffic model. This condition remains the same with the addition of project traffic. At the unsignalized intersection where the project traffic intersects, the capacity conditions are Level of Service "A". The left turn lane has an average delay of 1.6 seconds per vehicle. The overall Level of Service and average vehicle delay remain the same both with and without the addition of the project.

Queuing at Redwood Road Driveway

At the unsignalized driveway on Redwood Road, the 95th percentile for the southbound left turn is a queue length of 23 feet (one car length). For the northbound left turn lane, the 95th percentile is a queue length of 47 feet (two car lengths). In other words, the probability of a queue of vehicles blocking a northbound lane is less than 5 percent. With the additional traffic from the TJ Maxx, the queue length will increase only minimally. This finding is consistent with observations and field review during both the AM and PM peak hours. There were few occasions where a third vehicle was present in the queue, and during these times, there was no noticeable effect on the through traffic. There are no reasonable mitigation measures that could be applied that would totally prevent this problem.

Turn restrictions on the approach exiting from the shopping center are not necessary for this intersection, and no changes are recommended. The potential for the accident rate to increase is not measurable. This turn movement has existed since the opening of the shopping center, and should continue to operate safely.

Traffic Impacts on Jamison Way

The amount of additional traffic generated by the project onto Jamison is very low such that the difference in delay as a result of traffic from the new store would be negligible. The average vehicle delay to side street traffic at Redwood Road could increase by about 2.0 seconds with the addition of 5 vehicle trips per hour. These additional trips would occur only with the diversion of traffic from other driveways. Given the relative delay and travel time for movements exiting from the shopping center, such changes are extremely speculative. As a result of the store, there is no need for changes to the traffic control devices at either intersection on Jamison Way.

The intersection of Jamison Way at Redwood Road has a stop sign on Jamison Way. **Figure 3** shows the intersection along with the traffic volumes and the capacity calculations for the intersection. The AM peak hour is very low and there are no traffic concerns. The PM peak hour calculations, however, do show some traffic issues. The results are that the overall intersection operates at LOS of "A". However, the side street on Jamison Way movement, by itself, operates at "LOS D/E", with an average vehicle delay of up to 40 seconds per vehicle. With the addition of project traffic, this delay increases by about 2 seconds per vehicle. The intersection does operate within the County's capacity standards, but these results do show that the installation of a traffic signal may be warranted.

Traffic Signal Warrants

Traffic volume counts were taken and the intersection on Jamison Way was measured against the Caltrans traffic signal warrants guidelines. The study of signal warrants show that the intersection comes very close to warranting a signal under the existing traffic conditions. It does not meet Warrant 1 – Eight-Hour Vehicular Volume, but it does come close to meeting Warrant 3 – Peak Hours, as shown on **Figure 4** which indicates the peak hour volume warrants and the traffic signal conditions at Jamison Way.

Conclusions and Findings

The results of this assessment indicate that this addition of the new TJ Maxx store to the shopping center will not result in any significant traffic or parking impacts. The new project could generate up to an additional 15 vehicle trips per hour turning left into the shopping center on Redwood Road. This does add to any queuing problems at this location. The project driveway on Redwood Road will continue to operate efficiently and the left turn movements can be made without a queuing problem. In particular, a queue will not be created that would cause blockage or backup through the Redwood Road intersection with Castro Valley Boulevard.

It is recommended that a "Keep Clear" pavement marking should be painted in the area of the project driveway. This will help to further reduce any potential delay to left turning traffic. With this exception, there are no intersection mitigation measures that should be needed to deal with this issue.

The County needs to continue to monitor the traffic conditions at the intersection of Jamison Way and Redwood Road with regard to the implementation of a new traffic signal. There may be some pavement marking changes and pedestrian crosswalk changes that could improve the safety of this intersection.

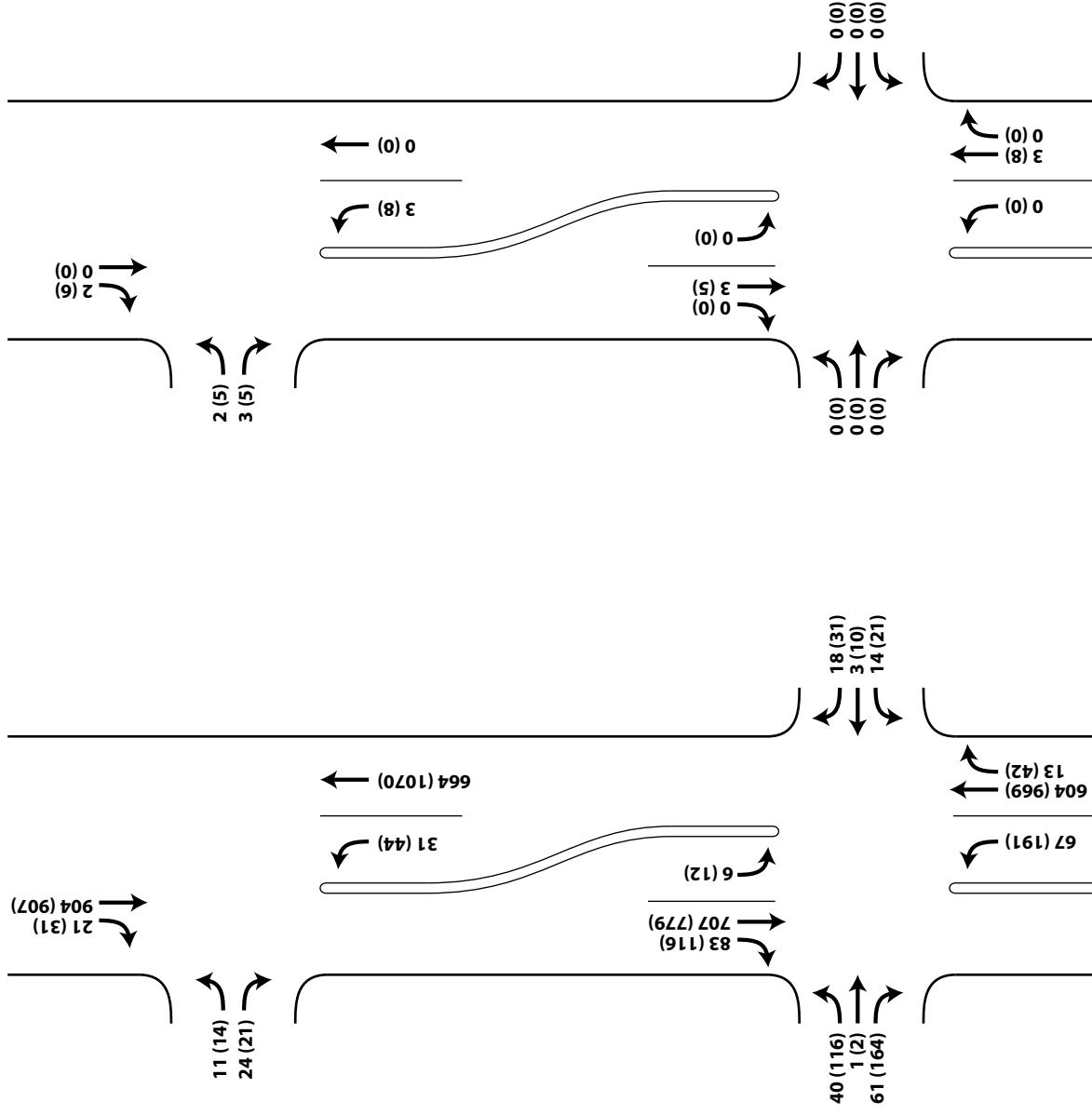
Sincerely,



Charlie Abrams, Calif CE #32500, Calif TE#1417
Principal, Abrams Associates



FIGURE 1 | PROJECT AREA
TRAFFIC IMPACT STUDY
Castro Valley Shopping Center
Castro Valley



Existing Layout

Existing AM(PM) Traffic Volumes

Project AM(PM) Trips

FIGURE 2 | EXISTING TRAFFIC VOLUMES AND PROPOSED PROJECT TRIPS

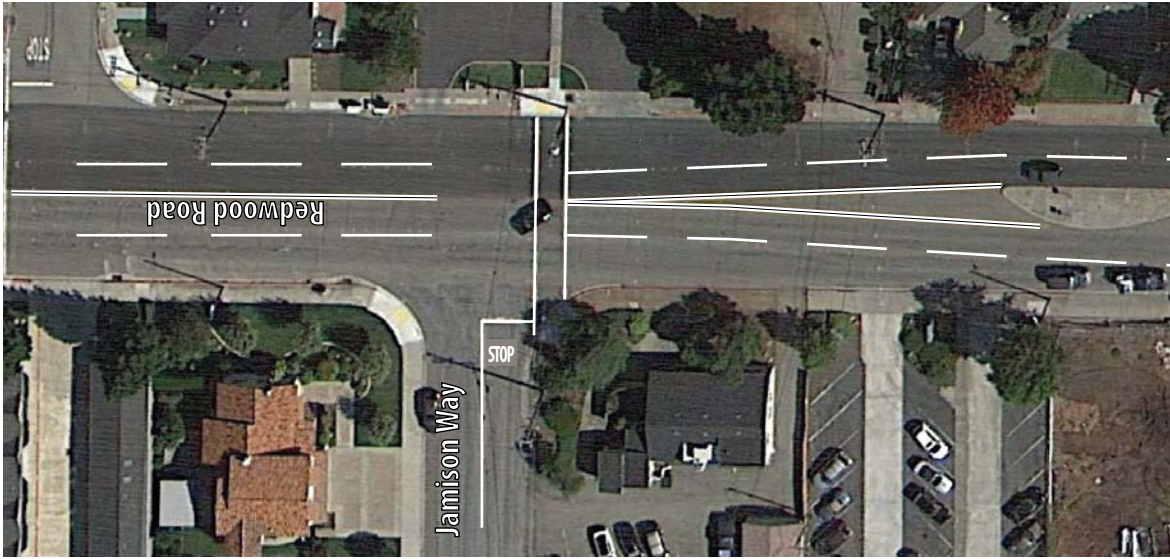
TRAFFIC IMPACT STUDY

Castro Valley Shopping Center

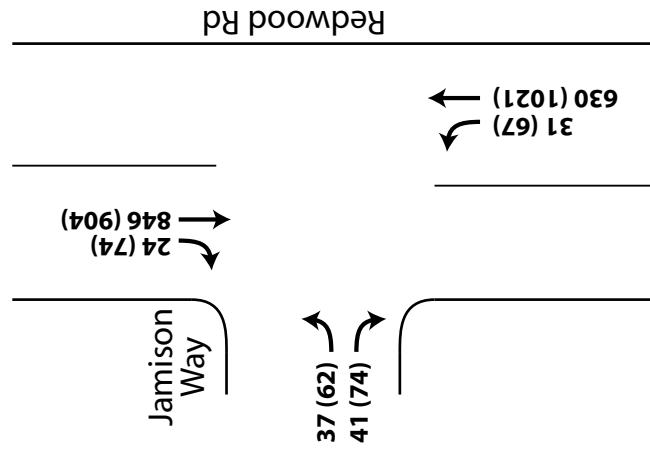
Castro Valley



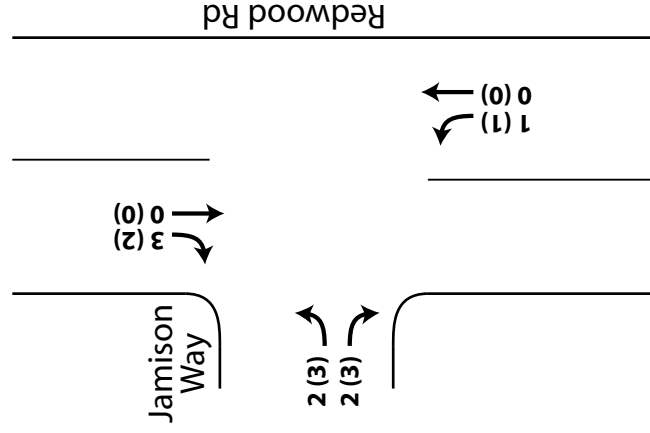
Abrams Associates
TRAFFIC ENGINEERING, INC.



**Existing Conditions
AM(PM) Volumes**



**Future AM(PM)
Project Traffic**



**Capacity and Delay
Calculations**

| | Capacity and Delay Calculations | With the Addition of Project Traffic |
|------------------|---------------------------------|--------------------------------------|
| AM Overall Delay | - 1.5 sec/veh (A) | - 1.6 sec/veh (A) |
| Jamison Delay | - 17.8 sec /veh (C) | - 18.1 sec /veh (C) |
| PM Overall Delay | - 3.7 sec/veh (A) | - 4.0 sec/veh (A) |
| Jamison Delay | - 37.8 sec /veh (E) | - 40.2 sec /veh (E) |

Existing Conditions

FIGURE 3 | TRAFFIC CONDITIONS AT JAMISON WAY

TRAFFIC IMPACT STUDY

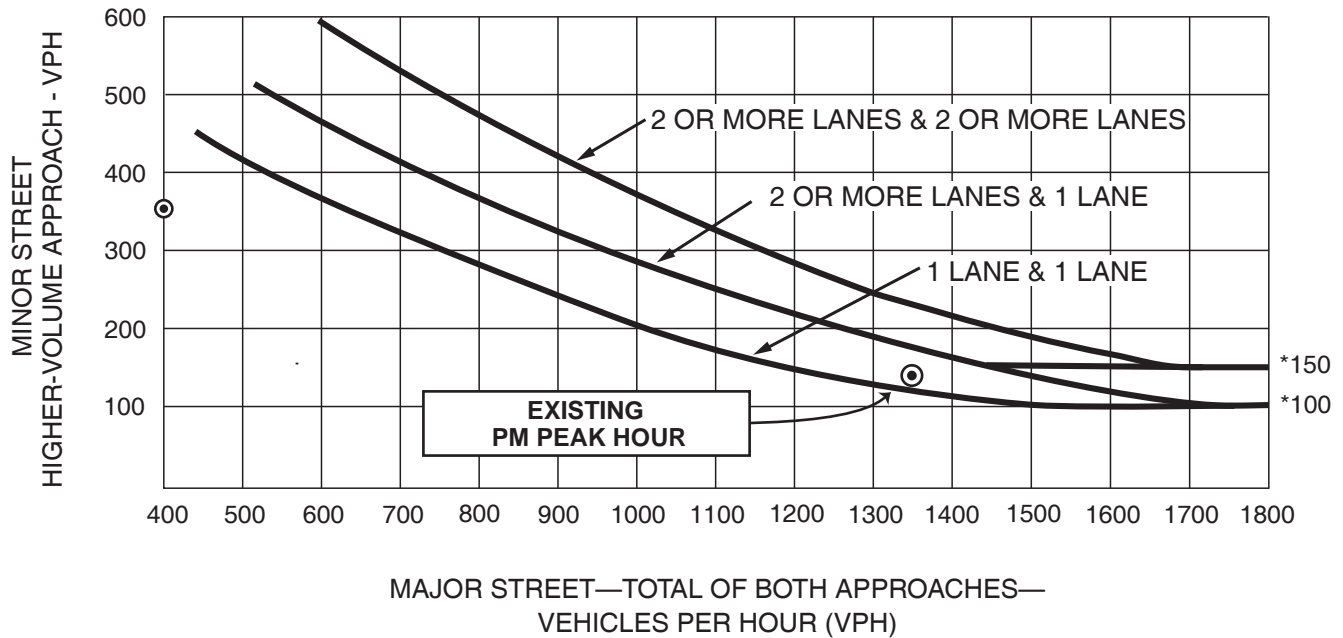
Castro Valley Shopping Center

Castro Valley



Abrams Associates
TRAFFIC ENGINEERING, INC.

PEAK HOUR VOLUME WARRANT (Urban Areas)



*** NOTE:**
 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR-STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR-STREET APPROACH WITH ONE LANE.



















SOURCE:
 MUTCD, CHAPTER 4
 (FIGURE 4C-3)

FIGURE 4 | WARRANTS AT JAMISON WAY AND REDWOOD RD.
 TRAFFIC IMPACT STUDY
 Castro Valley Shopping Center
 Castro Valley

HCM Signalized Intersection Capacity Analysis
1: South Entrance & Redwood Rd.

Existing +Project PM

5/23/2012

| |  |  |  |  |  |  |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | EBL | EBT | EBR | WBL | WBT | WBR | NBL | NBT | NBR | SBL | SBT | SBR |
| Lane Configurations | |  | | |  | |  |  | |  |  | |
| Volume (vph) | 116 | 2 | 164 | 21 | 1 | 31 | 191 | 989 | 42 | 12 | 791 | 116 |
| 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 | 4.0 | | 4.0 | 4.0 | |
| Lane Util. Factor | | 1.00 | | | 1.00 | | 1.00 | 0.95 | | 1.00 | 0.95 | |
| Flt | | 0.92 | | | 0.92 | | 1.00 | 0.99 | | 1.00 | 0.98 | |
| Flt Protected | | 0.98 | | | 0.98 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (prot) | | 1682 | | | 1682 | | 1770 | 3517 | | 1770 | 3471 | |
| Flt Permitted | | 0.86 | | | 0.82 | | 0.95 | 1.00 | | 0.95 | 1.00 | |
| Satd. Flow (perm) | | 1474 | | | 1402 | | 1770 | 3517 | | 1770 | 3471 | |
| Peak-hour factor, PHF | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Adj. Flow (vph) | 126 | 2 | 178 | 23 | 1 | 34 | 208 | 1075 | 46 | 13 | 860 | 126 |
| RTOR Reduction (vph) | 0 | 61 | 0 | 0 | 27 | 0 | 0 | 3 | 0 | 0 | 11 | 0 |
| Lane Group Flow (vph) | 0 | 245 | 0 | 0 | 31 | 0 | 208 | 1118 | 0 | 13 | 975 | 0 |
| Turn Type | Perm | | | Perm | | | Prot | | | Prot | | |
| Protected Phases | | 4 | | | 8 | | 5 | 2 | | 1 | 6 | |
| Permitted Phases | 4 | | | 8 | | | | | | | | |
| Actuated Green, G (s) | | 17.7 | | | 17.7 | | 13.8 | 51.3 | | 0.7 | 38.2 | |
| Effective Green, g (s) | | 17.7 | | | 17.7 | | 13.8 | 51.3 | | 0.7 | 38.2 | |
| Actuated g/C Ratio | | 0.22 | | | 0.22 | | 0.17 | 0.63 | | 0.01 | 0.47 | |
| Clearance Time (s) | | 4.0 | | | 4.0 | | 4.0 | 4.0 | | 4.0 | 4.0 | |
| Vehicle Extension (s) | | 3.0 | | | 3.0 | | 3.0 | 3.0 | | 3.0 | 3.0 | |
| Lane Grp Cap (vph) | | 319 | | | 304 | | 299 | 2208 | | 15 | 1623 | |
| v/s Ratio Prot | | | | | | | c0.12 | 0.32 | | 0.01 | c0.28 | |
| v/s Ratio Perm | | c0.17 | | | 0.02 | | | | | | | |
| v/c Ratio | | 0.77 | | | 0.10 | | 0.70 | 0.51 | | 0.87 | 0.60 | |
| Uniform Delay, d1 | | 30.1 | | | 25.6 | | 32.0 | 8.3 | | 40.5 | 16.1 | |
| Progression Factor | | 1.00 | | | 1.00 | | 1.00 | 1.00 | | 1.00 | 1.00 | |
| Incremental Delay, d2 | | 10.6 | | | 0.1 | | 6.9 | 0.8 | | 162.9 | 1.7 | |
| Delay (s) | | 40.6 | | | 25.8 | | 38.8 | 9.1 | | 203.4 | 17.8 | |
| Level of Service | | D | | | C | | D | A | | F | B | |
| Approach Delay (s) | | 40.6 | | | 25.8 | | | 13.8 | | | 20.2 | |
| Approach LOS | | D | | | C | | | B | | | C | |
| Intersection Summary | | | | | | | | | | | | |
| HCM Average Control Delay | | | 19.5 | | | | HCM Level of Service | | | | B | |
| HCM Volume to Capacity ratio | | | 0.66 | | | | | | | | | |
| Actuated Cycle Length (s) | | | 81.7 | | | | Sum of lost time (s) | | | 12.0 | | |
| Intersection Capacity Utilization | | | 67.9% | | | | ICU Level of Service | | | C | | |
| Analysis Period (min) | | | 15 | | | | | | | | | |
| c Critical Lane Group | | | | | | | | | | | | |

HCM Unsignalized Intersection Capacity Analysis

3: Redwood Rd & Jamison Way

Existing AM Volumes

11/9/2012



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|-----------------------------------|------|------|-------|------|----------------------|------|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 37 | 41 | 31 | 441 | 592 | 24 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 40 | 45 | 34 | 479 | 643 | 26 |
| 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 | 964 | 335 | 670 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 964 | 335 | 670 | | | |
| tC, single (s) | 6.8 | 6.9 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 84 | 93 | 96 | | | |
| cM capacity (veh/h) | 244 | 661 | 916 | | | |
| Direction, Lane # | EB 1 | NB 1 | NB 2 | SB 1 | SB 2 | |
| Volume Total | 85 | 193 | 320 | 429 | 241 | |
| Volume Left | 40 | 34 | 0 | 0 | 0 | |
| Volume Right | 45 | 0 | 0 | 0 | 26 | |
| cSH | 365 | 916 | 1700 | 1700 | 1700 | |
| Volume to Capacity | 0.23 | 0.04 | 0.19 | 0.25 | 0.14 | |
| Queue Length 95th (ft) | 22 | 3 | 0 | 0 | 0 | |
| Control Delay (s) | 17.8 | 1.9 | 0.0 | 0.0 | 0.0 | |
| Lane LOS | C | A | | | | |
| Approach Delay (s) | 17.8 | 0.7 | | 0.0 | | |
| Approach LOS | C | | | | | |
| Intersection Summary | | | | | | |
| Average Delay | | | 1.5 | | | |
| Intersection Capacity Utilization | | | 44.8% | | ICU Level of Service | A |
| Analysis Period (min) | | | 15 | | | |

HCM Unsignalized Intersection Capacity Analysis

3: Redwood Rd & Jamison Way

Existing PM Volumes

11/9/2012












| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|-----------------------------------|------|------|-------|----------------------|------|------|
| Lane Configurations | Y | | | ↑↑ | ↑↑ | |
| Volume (veh/h) | 62 | 74 | 67 | 715 | 633 | 74 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 67 | 80 | 73 | 777 | 688 | 80 |
| 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 | 1262 | 384 | 768 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1262 | 384 | 768 | | | |
| tC, single (s) | 6.8 | 6.9 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 54 | 87 | 91 | | | |
| cM capacity (veh/h) | 148 | 614 | 841 | | | |
| Direction, Lane # | EB 1 | NB 1 | NB 2 | SB 1 | SB 2 | |
| Volume Total | 148 | 332 | 518 | 459 | 310 | |
| Volume Left | 67 | 73 | 0 | 0 | 0 | |
| Volume Right | 80 | 0 | 0 | 0 | 80 | |
| cSH | 252 | 841 | 1700 | 1700 | 1700 | |
| Volume to Capacity | 0.59 | 0.09 | 0.30 | 0.27 | 0.18 | |
| Queue Length 95th (ft) | 85 | 7 | 0 | 0 | 0 | |
| Control Delay (s) | 37.8 | 2.9 | 0.0 | 0.0 | 0.0 | |
| Lane LOS | E | A | | | | |
| Approach Delay (s) | 37.8 | 1.1 | | 0.0 | | |
| Approach LOS | E | | | | | |
| Intersection Summary | | | | | | |
| Average Delay | | | 3.7 | | | |
| Intersection Capacity Utilization | | | 59.5% | ICU Level of Service | | B |
| Analysis Period (min) | | | 15 | | | |

HCM Unsignalized Intersection Capacity Analysis

3: Redwood Rd & Jamison Way

Existing +Project AM Volumes

11/9/2012

| |  |  |  |  |  |  |
|-----------------------------------|---|---|---|---|---|---|
| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
| Lane Configurations |  | | |  |  | |
| Volume (veh/h) | 39 | 43 | 32 | 441 | 592 | 27 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 42 | 47 | 35 | 479 | 643 | 29 |
| 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 | 967 | 336 | 673 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 967 | 336 | 673 | | | |
| tC, single (s) | 6.8 | 6.9 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 82 | 93 | 96 | | | |
| cM capacity (veh/h) | 242 | 659 | 914 | | | |
| Direction, Lane # | EB 1 | NB 1 | NB 2 | SB 1 | SB 2 | |
| Volume Total | 89 | 195 | 320 | 429 | 244 | |
| Volume Left | 42 | 35 | 0 | 0 | 0 | |
| Volume Right | 47 | 0 | 0 | 0 | 29 | |
| cSH | 362 | 914 | 1700 | 1700 | 1700 | |
| Volume to Capacity | 0.25 | 0.04 | 0.19 | 0.25 | 0.14 | |
| Queue Length 95th (ft) | 24 | 3 | 0 | 0 | 0 | |
| Control Delay (s) | 18.1 | 1.9 | 0.0 | 0.0 | 0.0 | |
| Lane LOS | C | A | | | | |
| Approach Delay (s) | 18.1 | 0.7 | | 0.0 | | |
| Approach LOS | C | | | | | |
| Intersection Summary | | | | | | |
| Average Delay | | | 1.6 | | | |
| Intersection Capacity Utilization | | | 45.1% | ICU Level of Service | | A |
| Analysis Period (min) | | | 15 | | | |

HCM Unsignalized Intersection Capacity Analysis

3: Redwood Rd & Jamison Way

Existing +Project PM Volumes

11/9/2012



| Movement | EBL | EBR | NBL | NBT | SBT | SBR |
|-----------------------------------|------|------|-------|----------------------|------|------|
| Lane Configurations | | | | | | |
| Volume (veh/h) | 65 | 77 | 68 | 715 | 633 | 76 |
| Sign Control | Stop | | | Free | Free | |
| Grade | 0% | | | 0% | 0% | |
| Peak Hour Factor | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 | 0.92 |
| Hourly flow rate (vph) | 71 | 84 | 74 | 777 | 688 | 83 |
| 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 | 1266 | 385 | 771 | | | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1266 | 385 | 771 | | | |
| tC, single (s) | 6.8 | 6.9 | 4.1 | | | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | 2.2 | | | |
| p0 queue free % | 52 | 86 | 91 | | | |
| cM capacity (veh/h) | 147 | 613 | 840 | | | |
| Direction, Lane # | EB 1 | NB 1 | NB 2 | SB 1 | SB 2 | |
| Volume Total | 154 | 333 | 518 | 459 | 312 | |
| Volume Left | 71 | 74 | 0 | 0 | 0 | |
| Volume Right | 84 | 0 | 0 | 0 | 83 | |
| cSH | 250 | 840 | 1700 | 1700 | 1700 | |
| Volume to Capacity | 0.62 | 0.09 | 0.30 | 0.27 | 0.18 | |
| Queue Length 95th (ft) | 93 | 7 | 0 | 0 | 0 | |
| Control Delay (s) | 40.2 | 2.9 | 0.0 | 0.0 | 0.0 | |
| Lane LOS | E | A | | | | |
| Approach Delay (s) | 40.2 | 1.1 | | 0.0 | | |
| Approach LOS | E | | | | | |
| Intersection Summary | | | | | | |
| Average Delay | | | 4.0 | | | |
| Intersection Capacity Utilization | | | 60.0% | ICU Level of Service | | B |
| Analysis Period (min) | | | 15 | | | |